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Purpose and application

Critical Processes and Products for 22 retained scope subjects. This book specifies evaluable implementation controls, scope boundaries and the complete application-specific parameter and evidence architecture. Actual engineering values, local permissions and release decisions must be separately established.

Source requirements and added implementation detail

The controlling ASTRA source is identified above by content fingerprint. Numbered source clauses and annexes retain their own authority. The retained operating material is restructured and expanded with implementation methods, additional profile controls, worked synthetic examples, decision diagrams and record contracts. Added implementation detail is not presented as an earlier institutional approval or as a change to the supplied core standard. Any additional binding criterion requires the applicable technical adoption process.

The displayed publication date identifies the edition; it is not a fabricated authoring, test, approval or operational date. Actual records retain genuine event times and controlled versions. No named outside organisation or standard is incorporated as a normative reference. AF internal instruments and separate legal or contractual duties remain applicable within their actual scope.

Acceptance boundary

A positive grant requires every applicable mandatory condition to PASS, every N/A to have independent justification, every in-scope nonconformity to be verified closed, and competent independent authority. HOLD, unknown state, missing evidence, a favourable average, a signature image or a completed form cannot substitute for those conditions.

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1 Family boundary, outcome and retained subjects

Critical Processes and Products for 22 retained scope subjects. This book specifies evaluable implementation controls, scope boundaries and the complete application-specific parameter and evidence architecture. Actual engineering values, local permissions and release decisions must be separately established.

This book retains each original subject code and its R01–R06 implementation controls. R07–R12 are new elaborations aligned with the latest core. They become binding only through the applicable technical adoption process. None supplies a universal engineering value or a real scope activation.

Retained subject	Exact title	Result boundary
F02-CP01	Thermal treatment	Qualification applies to the stated thermal process envelope, not every material, furnace load or delivered article.
F02-CP02	Fusion joining	No universal joining parameters or permission to fabricate restricted products is supplied; the outcome is limited to the demonstrated joining scope.
F02-CP03	Solid-state joining	A qualified machine or process principle does not establish every joined interface or product duty.
F02-CP04	Brazing and soldering	Brazing/soldering capability is bounded by the demonstrated joint family and function, not all structural and electronic applications.
F02-CP05	Chemical surface preparation	This scope supplies assurance controls, not chemical formulations or hazardous processing instructions.
F02-CP06	Plating and conversion coatings	Qualification does not authorise every substrate, coating or service-life claim; actual property limits require the approved technical basis.
F02-CP07	Thermal spray processes	No universal deposition settings are supplied; each coating process and product configuration retains its own acceptance boundary.
F02-CP08	Organic coating processes	A coating-process result is not a universal corrosion life, fire performance or complete aircraft approval.
F02-CP09	Composite material processing	Qualified material or cure equipment does not qualify every laminate, geometry or complete structure.
F02-CP10	Structural bonding	A passed coupon or nominal adhesive strength does not establish every installed structural bond.
F02-CP11	Metal additive manufacture	In-process sensor evidence supports only a validated property/detection boundary and does not automatically replace product acceptance.
F02-CP12	Polymer additive manufacture	Prototype appearance, dimensional fit or a material trade name does not establish full product qualification.
F02-CP13	Casting	Lot test values support only the justified parent-material and processing relationship, not every unrepresented casting.
F02-CP14	Forging and forming	A dimensionally correct formed part is not proof that all material and through-life properties are satisfied.
F02-CP15	Precision machining	A capability index or successful first article does not approve every future unit or untested configuration.

Retained subject	Exact title	Result boundary
F02-CP16	Non-conventional machining	No universal energy settings or process recipes are supplied; apparently correct geometry does not establish hidden material integrity.
F02-CP17	Mechanical surface enhancement	A qualified surface process does not by itself establish a universal fatigue-life improvement or unrestricted retreatment allowance.
F02-CP18	Electronics assembly	A successful bench test or workmanship inspection does not establish complete aircraft/spacecraft installation suitability.
F02-CP19	Wire and harness assembly	Continuity alone does not establish insulation, shielding, grounding, mechanical integrity or suitability for every installation.
F02-CP20	Optical assembly	Assembly qualification is configuration- and environment-specific and does not establish every optical or mission-performance characteristic.
F02-CP21	Critical mechanical assembly	A completed checklist or qualified torque tool does not prove that every hidden assembly requirement was satisfied.
F02-CP22	Cleanliness and contamination-sensitive processing	Cleanliness acceptance is limited to the defined contaminants, surfaces, method and time/condition boundary.

2 Requirement and decision architecture

Apply the following logic to the exact evaluated object and responsible function. A procedural checkpoint, product characteristic, competence decision and public credential are different objects. Their states shall not be collapsed into one score. Source: ASTRA 62.1–62.7 and Annex AL.

State	Sufficient basis	Required next action
PASS	Applicable; current approved predicate met by valid, purpose-specific evidence.	Retain the original evidence and bounded inference. Other mandatory gates still apply.
FAIL	Applicable; valid evidence demonstrates that the approved predicate is not met.	Contain affected use; retain the failure; assess cause, extent and required corrective verification.
HOLD	Applicability, criterion, method, evidence, uncertainty or authority is unresolved.	Resolve the missing basis. Do not manufacture a value, favourable default or product-defect conclusion.
N/A	Activity trigger and retained responsibility are absent; independent exclusion approval exists.	Retain the scope-specific reason and reassess when activity or responsibility changes.
UNSET	Only an uncompleted field in this PDF; not a conformity state.	No conclusion is recorded. Complete review before the field can support a decision.

For a compound source clause, create a child-condition ledger containing every separately testable condition, location, phase and operating mode. A sentence-level checkpoint is a navigation aid, not permission to merge unrelated predicates. Each child receives an ID, responsible owner, criterion, method, source evidence, uncertainty where relevant, current state and independent review. The parent cannot PASS while any mandatory child is FAIL, HOLD or UNSET.

An acceptable measurement interval and an acceptable authority chain are independent prerequisites. Use finite, unit-consistent, unrounded values; negative uncertainty, reversed limits, unknown version or wrong-object evidence produce HOLD. For inclusive [L,H] and accepted interval [a,b], PASS requires $a \geq L$ and $b \leq H$; FAIL requires $b < L$ or $a > H$; otherwise HOLD. Approved one-sided or exclusive boundaries retain their own declared predicate.

Positive-decision conjunction

Every applicable mandatory child is PASS AND each N/A is independently justified AND every in-scope nonconformity is verified closed AND scope, competence, independence and actual authority are valid AND required panel participation and voting rules are satisfied. No average, majority preference or payment supplies missing evidence.

3 Prospective parameter schedule

These are required information groups from Annex AO, not pre-approved engineering limits. For every triggered group, populate actual values or observable attributes before evaluation, with unit, inclusivity, phase/mode, technical derivation, uncertainty/dependence, method version, owner, independent review, authentic approval and change trigger. An absent trigger requires an approved exclusion; an unsupported or missing essential value is HOLD.

P01 — Mission and scope

Legal owner, performer, family/module, object, domain, configuration, location, duration and modes.

Derivation and evidence: Scope tuple and mission concept; approved applicability matrix.

Completion test: No undefined essential object, duty, phase or exclusion.

P02 — Environment and exposure

Quantity, spatial/temporal boundary, distribution or bound, source/model, uncertainty and coupled effects.

Derivation and evidence: Mission environment baseline and qualified specialist rationale.

Completion test: Selected conditions bound each claimed use; unknown critical mechanisms remain HOLD.

P03 — Requirements and acceptance

Stable ID, owner, characteristic, units, bound inclusivity, predicate, observation and essential-step marker.

Derivation and evidence: Requirement baseline and Annex AL decision rule.

Completion test: Every condition is evaluable before observations are judged.

P05 — Materials and process qualification

Material type/condition, geometry, sources, variables, qualified window, machine/tool state and hidden properties.

Derivation and evidence: Actual representative qualification; lot/build genealogy.

Completion test: All influential variables and required product properties are supported.

P06 — Test article and fixtures

Article pedigree, differences from delivered object, mounting, boundary conditions, operating state and exposure history.

Derivation and evidence: Approved representativeness and cumulative-test analysis.

Completion test: No material difference or prior damage invalidates the intended inference.

P07 — Measurement and uncertainty

Measurand, instrument/range, corrections, sensitivity, covariance, coverage, time/space sampling and calibration.

Derivation and evidence: Complete measurement model; valid raw data.

Completion test: Uncertainty and detection capability are fit for the approved decision rule.

P08 — Structure, life and mechanisms

Loads, allowables, factors, life, geometry, material state, mechanisms, detectability and approved reserve.

Derivation and evidence: Qualified structural/life model and representative evidence.

Completion test: Each prospectively defined margin and essential mechanism predicate passes.

P09 – Power and energy

End-of-life generation, peak load, usable storage, efficiency, outage/eclipses, mode durations and terminal reserve.

Derivation and evidence: Configuration-specific phase budget and protection tests.

Completion test: Power and energy limits both pass without duplicate reserve credit.

P10 – Thermal and environmental control

Node/location, mode, temperatures/gradients, heat inputs, sink/view factors, properties, uncertainty and transient cases.

Derivation and evidence: Correlated thermal model and applicable environment tests.

Completion test: All required hot, cold and transition conditions meet approved limits.

P13 – Contamination and samples

Relevant substances/particles, pathway, limit, method/detection, custody, cleanliness, containment and receiving.

Derivation and evidence: Mission-specific technical/protection basis.

Completion test: Required integrity and scientific cleanliness are demonstrated for the actual sample/use.

P14 – Software, AI and models

Purpose/domain, source/build/weights/data, dependencies, target, errors, uncertainty, prohibited behaviour and change limits.

Derivation and evidence: Independent verification and model/use validation.

Completion test: Essential scenarios and target conditions pass; experimental outputs remain separate.

P17 – Logistics and environmental claims

Identity, amount, units, condition, losses, allocation, lifecycle boundary, factor provenance and exclusive attributes.

Derivation and evidence: Reconciled custody/quantity records and separate suitability/statement evaluation.

Completion test: Quantity and claim integrity pass independently of technical eligibility.

P18 – Decision, continuity and terminal duties

Closed findings, reviewer competence, independence, authority, status clocks, final-state criteria, custody and open obligations.

Derivation and evidence: Authenticated decisions and verified terminal/transfer evidence.

Completion test: Every mandatory gate is complete; incomplete or unknown terminal state remains explicit.

4 Detailed subject profiles

F02-CP01 – Thermal treatment

Qualified heat-treatment operations for defined metallic or other technically justified material families and states, including relevant preparation, thermal cycles, atmosphere, cooling and post-treatment. Identify the relationship between a qualified process window and each product property being accepted.

Application-specific parameters: Material grade/state and thickness; equipment/load family; sensor and recording chain; approved temperature/time/atmosphere/cooling variables; uniformity and control evidence; relevant final properties.

Profile boundary	Detail
Technical emphasis	thermal history, representative loads and material response
Failure / evidence risks	one control sensor can conceal an unobserved article-temperature excursion
Representative witnessing	Witness loading identity, approved recipe selection, monitoring, run review and representative property acceptance, including an adverse-run disposition. Actual hazardous operations remain with authorised specialists.
Change and requalification triggers	Equipment relocation/repair; load arrangement; material condition or geometry; thermal window; atmosphere/cooling method; instrumentation; repeat-treatment allowance.
Outcome limitation	Qualification applies to the stated thermal process envelope, not every material, furnace load or delivered article.

F02-CP01-R01 – Retained subject control

Define the actual material condition, intended property change and approved product/process specification; do not combine materially different routes merely under one thermal-treatment title.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R02 – Retained subject control

Demonstrate equipment suitability and representative load conditions, including temperature measurement, control, spatial behaviour and the effect of tooling or loading on the article.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R03 – Retained subject control

Preserve the complete actual thermal and environmental history for each run, linked to material lots, articles, programme version and responsible personnel.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R04 — Retained subject control

Verify required resulting properties with representative specimens and suitable methods; a furnace trace within the intended window is not by itself proof of every material property.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R05 — Retained subject control

Investigate sensor failure, interrupted cycles and excursions from the last demonstrated valid state; later successful treatment does not automatically validate earlier affected products.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R06 — Retained subject control

Qualify changes in material, loading, equipment, control software, monitoring or downstream processing before relying on prior evidence for the altered route.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP01-R07 — Mission and environment transfer

For thermal treatment, define the qualified or evaluated envelope for thermal history, representative loads and material response. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP01-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: one control sensor can conceal an unobserved article-temperature excursion. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP01-R09 — Configuration and data identity

Bind thermal history, representative loads and material response to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP01-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: compare control and independent measurement history with representative resulting-property evidence. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP01-R11 — Receiving interface and bounded output

Deliver the bounded output to process authority and product acceptance function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP01-R12 — Independent release and continuing validity

Evaluate F02-CP01 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: compare control and independent measurement history with representative resulting-property evidence. The reviewer records the affected F02-CP01 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by process authority and product acceptance function.

F02-CP02 — Fusion joining

Fusion-based joining of specified material combinations, joint geometries and product families, with defined preparation, consumables, equipment, personnel and subsequent verification. Separate procedure qualification, operator authority and product joint acceptance.

Application-specific parameters: Joining process; base/filler materials; joint and thickness range; preparation; position/access; equipment/programme; essential variables; shielding/cleanliness controls; inspection and property criteria.

Profile boundary	Detail
Technical emphasis	fusion-joint procedure and material/geometry envelope
Failure / evidence risks	a sound visible surface can conceal an unverified internal joint characteristic
Representative witnessing	Follow one joint from approved data and preparation through actual joining records, inspection and release; review a repair or rejected joint and the linked cause/extent decision.
Change and requalification triggers	Material combination; thickness/joint geometry; consumable source; equipment or programme; operating position; procedure; operator scope; heat-treatment or inspection route.
Outcome limitation	No universal joining parameters or permission to fabricate restricted products is supplied; the outcome is limited to the demonstrated joining scope.

F02-CP02-R01 — Retained subject control

Establish a qualified procedure for the actual joint, materials and intended duty, identifying essential variables and limitations before production.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R02 — Retained subject control

Verify consumable identity, condition, preparation and storage, and trace base-material and joining-material lots to the actual joint.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R03 — Retained subject control

Demonstrate competent personnel or validated automated equipment for the authorised operation, including setup, monitoring, interruptions and rework boundaries.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R04 — Retained subject control

Record relevant actual joining conditions and concealed steps; a finished external appearance is not complete evidence of internal joint integrity.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R05 — Retained subject control

Use representative destructive/property and non-destructive evidence as technically required, with F03 competence separate from the joining qualification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R06 – Retained subject control

Control repair, repeat work and changes in process/material/geometry with authorised technical review and required requalification rather than retrospective acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP02-R07 – Mission and environment transfer

For fusion joining, define the qualified or evaluated envelope for fusion-joint procedure and material/geometry envelope. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP02-R08 – Essential properties and observability

Identify the failure and evidence risks specific to this subject: a sound visible surface can conceal an unverified internal joint characteristic. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP02-R09 – Configuration and data identity

Bind fusion-joint procedure and material/geometry envelope to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP02-R10 – Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconcile procedure variables, joint identity, representative property tests and qualified defect detection. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP02-R11 — Receiving interface and bounded output

Deliver the bounded output to joining technical authority and receiving fabrication route. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP02-R12 — Independent release and continuing validity

Evaluate F02-CP02 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconcile procedure variables, joint identity, representative property tests and qualified defect detection. The reviewer records the affected F02-CP02 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by joining technical authority and receiving fabrication route.

F02-CP03 — Solid-state joining

Solid-state joining routes for specified material pairs, interface conditions and geometries. The qualified process must address bond formation, interface properties and defects that may be inaccessible to final inspection.

Application-specific parameters: Material pair/state; joint geometry; interface preparation; equipment/tooling; controlled motion/force/thermal or other essential variables; monitoring; specimen representation; inspection limitations.

Profile boundary	Detail
Technical emphasis	solid-state joint interface and controlled process history
Failure / evidence risks	equipment settings alone do not establish the intended interface transformation
Representative witnessing	Observe the approved preparation-to-joining sequence and review representative interface evidence, monitoring limits and a change or interrupted-process disposition.
Change and requalification triggers	Material pair; surface preparation; fit/geometry; tool/equipment condition; essential-variable combination; monitoring algorithm; post-treatment.
Outcome limitation	A qualified machine or process principle does not establish every joined interface or product duty.

F02-CP03-R01 — Retained subject control

Define the mechanism, material pairing, interface design and intended properties of the particular joining route; do not infer equivalence from the absence of melting.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R02 — Retained subject control

Control preparation, oxide/contamination state, time between preparation and joining, fit and tooling where they affect the hidden interface.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R03 — Retained subject control

Qualify the actual equipment, tooling, digital programme and essential-variable combinations for representative geometries and material states.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R04 — Retained subject control

Preserve monitored process histories and link them to each output; define response to incomplete bonding indicators, tool wear or interrupted work.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R05 — Retained subject control

Demonstrate interface properties and defect-detection limits through suitable representative evidence rather than one accessible external inspection.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R06 — Retained subject control

Assess changes in interface condition, material, tooling, software or sequence and justify retained evidence before partial or full requalification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP03-R07 — Mission and environment transfer

For solid-state joining, define the qualified or evaluated envelope for solid-state joint interface and controlled process history. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP03-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: equipment settings alone do not establish the intended interface transformation. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP03-R09 — Configuration and data identity

Bind solid-state joint interface and controlled process history to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP03-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: trace actual influential-variable history to destructive or otherwise validated interface-property evidence. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP03-R11 — Receiving interface and bounded output

Deliver the bounded output to joint qualification owner and product authority. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP03-R12 — Independent release and continuing validity

Evaluate F02-CP03 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: trace actual influential-variable history to destructive or otherwise validated interface-property evidence. The reviewer records the affected F02-CP03 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by joint qualification owner and product authority.

F02-CP04 — Brazing and soldering

Brazed or soldered joints in structural, thermal, fluid, electrical or electronic applications within a declared duty and product boundary. Different joint functions and failure mechanisms require distinct technical justification.

Application-specific parameters: Joint function; base and joining materials; clearance/fit; surface preparation; flux or atmosphere where relevant; heating route; cleaning; inspection; functional and durability criteria.

Profile boundary	Detail
Technical emphasis	brazed or soldered joints and post-process condition
Failure / evidence risks	an electrical continuity result can conceal unacceptable joint durability or retained residue
Representative witnessing	Trace a representative joint from consumables and preparation through process monitoring, cleaning, functional evidence and authorised rework limits.
Change and requalification triggers	Material combination; filler/flux source; fit; heating method; cleaning chemistry; geometry; application duty; rework cycles.
Outcome limitation	Brazing/soldering capability is bounded by the demonstrated joint family and function, not all structural and electronic applications.

F02-CP04-R01 — Retained subject control

Define the actual joint function, material compatibility, geometry and acceptance basis before selecting qualification specimens and methods.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R02 — Retained subject control

Control source, condition, expiry and traceability of filler, solder, flux and related consumables along with the parent materials.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R03 — Retained subject control

Qualify preparation, assembly, thermal route and cleaning for the intended joint family, including hidden-interface and residue concerns.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R04 — Retained subject control

Record equipment/programme identity, responsible personnel, actual process history and interruptions; do not replace a complete route record with a visual pass.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R05 — Retained subject control

Verify relevant mechanical, leak, thermal or electrical characteristics and durability under the approved application basis, using competent methods.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R06 — Retained subject control

Review rework, substitutions and changed geometry or chemistry for effects on the joint and downstream system before acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP04-R07 — Mission and environment transfer

For brazing and soldering, define the qualified or evaluated envelope for brazed or soldered joints and post-process condition. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP04-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: an electrical continuity result can conceal unacceptable joint durability or retained residue. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP04-R09 — Configuration and data identity

Bind brazed or soldered joints and post-process condition to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP04-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: compare preparation, consumable identity, actual cycle, cleanliness and task-specific joint evidence. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP04-R11 — Receiving interface and bounded output

Deliver the bounded output to assembly owner and subsequent inspection function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP04-R12 — Independent release and continuing validity

Evaluate F02-CP04 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: compare preparation, consumable identity, actual cycle, cleanliness and task-specific joint evidence. The reviewer records the affected F02-CP04 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by assembly owner and subsequent inspection function.

F02-CP05 — Chemical surface preparation

Controlled chemical preparation, cleaning or activation of surfaces before coating, bonding, joining or other sensitive processing. Qualification concerns the required surface state and compatibility with downstream use, not merely completion of a bath step.

Application-specific parameters: Substrate/condition; contaminants and target surface state; chemistry and source; equipment; approved process variables; rinsing/drying; hold time; measurement locations; downstream process.

Profile boundary	Detail
Technical emphasis	prepared surface condition and time to subsequent processing
Failure / evidence risks	a surface can leave its accepted state between cleaning and the next operation
Representative witnessing	Observe material identity, process selection, monitoring and preserved handover to a downstream operation; review an excursion and the evidence used to determine its extent.
Change and requalification triggers	Chemistry or supplier; bath condition; substrate; cleaning method; rinsing/drying; exposure/hold time; downstream coating or bonding.
Outcome limitation	This scope supplies assurance controls, not chemical formulations or hazardous processing instructions.

F02-CP05-R01 — Retained subject control

Identify the substrate, initial condition, required surface property and later process whose performance depends on preparation.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R02 — Retained subject control

Control chemical identity, batch/condition, contamination and relevant process monitoring under approved specialist instructions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R03 — Retained subject control

Verify equipment, handling, rinsing, drying and time-to-next-process controls needed to preserve the qualified surface condition.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R04 — Retained subject control

Use a validated cleanliness or surface-condition method appropriate to the relevant mechanism and location; generic clean appearance is insufficient.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R05 — Retained subject control

Trace each prepared batch to chemistry/equipment history, actual conditions, personnel and downstream handover, including excursions and reprocessing.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R06 — Retained subject control

Assess changed chemicals, source, substrate, equipment or downstream process and obtain relevant requalification before dependent use.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP05-R07 — Mission and environment transfer

For chemical surface preparation, define the qualified or evaluated envelope for prepared surface condition and time to subsequent processing. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP05-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a surface can leave its accepted state between cleaning and the next operation. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP05-R09 — Configuration and data identity

Bind prepared surface condition and time to subsequent processing to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP05-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconstruct preparation, exposure, hold-time and downstream acceptance on the same article. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP05-R11 — Receiving interface and bounded output

Deliver the bounded output to surface-process owner and downstream treatment function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP05-R12 — Independent release and continuing validity

Evaluate F02-CP05 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconstruct preparation, exposure, hold-time and downstream acceptance on the same article. The reviewer records the affected F02-CP05 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by surface-process owner and downstream treatment function.

F02-CP06 – Plating and conversion coatings

Electrodeposited, chemically deposited or conversion-treated surfaces for specified substrates and functional requirements, including relevant preparation, treatment, post-treatment, inspection and downstream compatibility.

Application-specific parameters: Substrate; coating/treatment system; surface preparation; equipment/bath state; thickness or other specified properties; post-treatment; adhesion/corrosion/electrical or other acceptance needs.

Profile boundary	Detail
Technical emphasis	plated or conversion-coated substrate and functional properties
Failure / evidence risks	a thickness pass can coexist with an unverified adhesion or substrate-integrity condition
Representative witnessing	Trace one batch through preparation, process monitoring, post-treatment, property results and acceptance, including location-dependent evidence and a repaired or rejected item.
Change and requalification triggers	Substrate condition; treatment chemistry; supplier/bath; geometry; thickness window; post-treatment; stripping or repair method.
Outcome limitation	Qualification does not authorise every substrate, coating or service-life claim; actual property limits require the approved technical basis.

F02-CP06-R01 – Retained subject control

Define the substrate-treatment combination and intended functional properties, including effects on the component and subsequent assembly.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R02 – Retained subject control

Qualify the complete preparation, deposition/conversion and post-treatment route with representative geometry and sensitive locations.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R03 – Retained subject control

Maintain chemistry/source, bath condition, equipment and essential-variable monitoring linked to actual batch and article identities.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R04 – Retained subject control

Verify thickness, adhesion, surface condition, corrosion or other required performance with technically suitable specimens and methods.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R05 — Retained subject control

Evaluate hidden adverse effects and inspection limitations; a conforming visible coating does not establish every substrate or fatigue property.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R06 — Retained subject control

Control stripping, repair, repeat treatment and substitutions with technical disposition and requalification where prior evidence no longer bounds the route.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP06-R07 — Mission and environment transfer

For plating and conversion coatings, define the qualified or evaluated envelope for plated or conversion-coated substrate and functional properties. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP06-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a thickness pass can coexist with an unverified adhesion or substrate-integrity condition. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP06-R09 — Configuration and data identity

Bind plated or conversion-coated substrate and functional properties to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP06-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: evaluate separately the coating, interface and substrate predicates after the actual route. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP06-R11 — Receiving interface and bounded output

Deliver the bounded output to coating authority and accepting product function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP06-R12 — Independent release and continuing validity

Evaluate F02-CP06 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: evaluate separately the coating, interface and substrate predicates after the actual route The reviewer records the affected F02-CP06 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by coating authority and accepting product function.

F02-CP07 — Thermal spray processes

Thermal deposition of specified coating systems onto defined substrates, with attention to preparation, material feed, equipment, deposition history and subsequent finishing. Qualification is tied to functional coating requirements and representative geometry.

Application-specific parameters: Substrate and coating material; preparation; feedstock source/state; equipment/programme; essential deposition variables; geometry; monitoring; thickness/adhesion/structure and functional criteria.

Profile boundary	Detail
Technical emphasis	thermal-sprayed coating, substrate and finishing route

Profile boundary	Detail
Failure / evidence risks	an in-process trace can omit a critical interface property after finishing
Representative witnessing	Observe preparation and controlled deposition records, then follow representative property evidence and final acceptance for the same substrate/coating configuration.
Change and requalification triggers	Feedstock or source; substrate; preparation; deposition system or programme; geometry; coating thickness/function; finishing and repair.
Outcome limitation	No universal deposition settings are supplied; each coating process and product configuration retains its own acceptance boundary.

F02-CP07-R01 — Retained subject control

Identify the coating function, substrate condition, material pairing and service environment before defining the qualification envelope.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R02 — Retained subject control

Control feedstock identity, condition, storage and permitted reuse, with source and batch links to the deposited coating.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R03 — Retained subject control

Qualify preparation, deposition equipment, programme and post-processing for representative geometry, access and coating-location variation.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R04 — Retained subject control

Preserve actual process history, operator/equipment status and monitoring, including interruptions and limits of in-process indications.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R05 — Retained subject control

Verify specified coating properties through suitable representative specimens and inspections; external appearance alone does not establish bond or internal structure.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R06 — Retained subject control

Assess repair, changed feedstock/equipment, geometry or finishing against retained qualification evidence and document required new demonstration.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP07-R07 — Mission and environment transfer

For thermal spray processes, define the qualified or evaluated envelope for thermal-sprayed coating, substrate and finishing route. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP07-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: an in-process trace can omit a critical interface property after finishing. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP07-R09 — Configuration and data identity

Bind thermal-sprayed coating, substrate and finishing route to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP07-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: link feedstock, deposition, test locations and post-processing to the final required properties. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP07-R11 — Receiving interface and bounded output

Deliver the bounded output to deposition owner and final finishing/acceptance function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP07-R12 — Independent release and continuing validity

Evaluate F02-CP07 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: link feedstock, deposition, test locations and post-processing to the final required properties The reviewer records the affected F02-CP07 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by deposition owner and final finishing/acceptance function.

F02-CP08 — Organic coating processes

Paint, primer and other organic coating systems used for protection, appearance or specified function on declared aerospace materials and assemblies. Control the complete preparation, mixing/application, cure and preservation route.

Application-specific parameters: Substrate; coating system and layers; component lots; shelf/pot life; preparation; mixing/application variables; environmental conditions; cure; thickness/adhesion and functional acceptance.

Profile boundary	Detail
Technical emphasis	organic coating system, preparation and cure
Failure / evidence risks	a visually acceptable coating can have unsupported cure or environmental durability
Representative witnessing	Trace a coating batch from receipt through mixing, surface preparation, application, cure, test evidence and a repair or shelf-life exception.
Change and requalification triggers	Product/source; preparation; substrate; layer sequence; environment; cure; application equipment; recoat or repair method.
Outcome limitation	A coating-process result is not a universal corrosion life, fire performance or complete aircraft approval.

F02-CP08-R01 — Retained subject control

Define the approved substrate-coating system, required functions and compatibility with adjacent materials, markings, seals and later work.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R02 — Retained subject control

Verify material identities, component ratios where specified, condition, shelf/pot life and traceable mixing records without inventing universal formulations.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R03 — Retained subject control

Qualify surface preparation, application, environment and cure for actual geometry and the required properties.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R04 — Retained subject control

Record point-of-use material history, actual application/cure conditions, operator and equipment, including interruptions and expired material holds.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R05 — Retained subject control

Inspect required layer condition, thickness, adhesion or performance using appropriate locations and methods; visual appearance does not establish all protection claims.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R06 — Retained subject control

Control touch-up, recoat, stripping and substitutions through technical review, preserving original defects and the final as-applied system.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP08-R07 — Mission and environment transfer

For organic coating processes, define the qualified or evaluated envelope for organic coating system, preparation and cure. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP08-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a visually acceptable coating can have unsupported cure or environmental durability. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP08-R09 — Configuration and data identity

Bind organic coating system, preparation and cure to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP08-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconcile shelf/out-time, mixing history, actual conditions and representative functional evidence. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP08-R11 — Receiving interface and bounded output

Deliver the bounded output to coating authority and delivered-article custodian. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP08-R12 — Independent release and continuing validity

Evaluate F02-CP08 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconcile shelf/out-time, mixing history, actual conditions and representative functional evidence. The reviewer records the affected F02-CP08 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by coating authority and delivered-article custodian.

F02-CP09 — Composite material processing

Processing of defined fibre/resin systems into laminates or composite structures, including storage, out-time, preparation, lay-up, tooling, compaction, cure and finishing. Preserve constituent-to-laminate evidence and the limits of inspectability.

Application-specific parameters: Fibre/resin system and lots; storage/out-time; ply orientation/sequence; geometry; tooling and compaction; cure programme; machine/sensor state; post-processing; property and defect criteria.

Profile boundary	Detail
Technical emphasis	composite constituents, lay-up, cure and laminate identity
Failure / evidence risks	a correct cure trace can coexist with wrong constituent out-time or unverified lay-up
Representative witnessing	Follow a representative laminate from constituent history and lay-up accountability to actual cure, test/inspection results, repair disposition and separate product acceptance.
Change and requalification triggers	Constituent/source; storage excursion; lay-up/geometry; tool; compaction/cure; software; trimming/finishing; receiving site.
Outcome limitation	Qualified material or cure equipment does not qualify every laminate, geometry or complete structure.

F02-CP09-R01 — Retained subject control

Identify constituent systems, source lots, specified condition and permitted storage/out-time without erasing earlier use or excursions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R02 — Retained subject control

Control the actual lay-up sequence, orientation, geometry, tooling and concealed preparation steps against the approved configuration.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R03 — Retained subject control

Qualify compaction/cure and relevant equipment behaviour using representative material, part location and geometry rather than machine capability alone.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R04 — Retained subject control

Link actual cure and environmental records to each laminate, preserving interruptions, deviations, sensor limitations and repairs.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R05 — Retained subject control

Demonstrate required laminate properties and defect-detection capability using suitable representative evidence; a surface inspection cannot establish all hidden conditions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R06 — Retained subject control

Review material source, tool, lay-up, cure, finishing or receiving-site changes with a retained/new-evidence rationale and appropriate requalification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP09-R07 — Mission and environment transfer

For composite material processing, define the qualified or evaluated envelope for composite constituents, lay-up, cure and laminate identity. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP09-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a correct cure trace can coexist with wrong constituent out-time or unverified lay-up. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP09-R09 — Configuration and data identity

Bind composite constituents, lay-up, cure and laminate identity to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP09-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: follow constituent lots and exposure through concealed lay-up steps into laminate/property verification. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP09-R11 — Receiving interface and bounded output

Deliver the bounded output to composite process authority and structural acceptance owner. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP09-R12 — Independent release and continuing validity

Evaluate F02-CP09 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: follow constituent lots and exposure through concealed lay-up steps into laminate/property verification The reviewer records the affected F02-CP09 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by composite process authority and structural acceptance owner.

F02-CP10 — Structural bonding

Bonded structural interfaces for specified adherends, adhesives, joint geometries and environments. The process must demonstrate preparation, assembly, cure, durability and the capability to verify or otherwise control hidden bond integrity.

Application-specific parameters: Adherend pair and surface state; adhesive lots; storage/out-time; preparation; bond geometry; assembly/pressure; cure; witness specimens; durability and inspection limits.

Profile boundary	Detail
Technical emphasis	structural bond preparation, assembly and durability
Failure / evidence risks	final non-destructive inspection may not establish all adhesion-related hidden properties
Representative witnessing	Observe the preparation-to-bond handover and review representative joint/durability evidence, hidden-step records and a rejected or repaired bond.
Change and requalification triggers	Adhesive/source; adherend condition; preparation; time-to-bond; joint geometry; cure/tooling; environment; repair and inspection method.
Outcome limitation	A passed coupon or nominal adhesive strength does not establish every installed structural bond.

F02-CP10-R01 — Retained subject control

Define joint function, adherend materials, service conditions and required properties before selecting the qualification and acceptance strategy.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R02 — Retained subject control

Preserve adhesive and adherend identity, storage history, out-time and condition, and verify compatibility of all preparation and processing materials.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R03 — Retained subject control

Qualify the actual surface preparation, timing, assembly and cure route; do not assume visible cleanliness proves a bondable surface.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R04 — Retained subject control

Record concealed steps, actual process conditions, tooling and assembly configuration contemporaneously for each controlled joint or batch.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R05 — Retained subject control

Address durability, representative loading/environment and inspection limitations. Where an essential defect cannot be reliably detected, preserve the required process controls rather than claiming detection by default.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R06 — Retained subject control

Control repair, disbonding/rebonding, substitutions and geometry/source changes through technical review and necessary requalification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP10-R07 — Mission and environment transfer

For structural bonding, define the qualified or evaluated envelope for structural bond preparation, assembly and durability. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP10-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: final non-destructive inspection may not establish all adhesion-related hidden properties. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP10-R09 — Configuration and data identity

Bind structural bond preparation, assembly and durability to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP10-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: challenge surface-state evidence, time-to-bond, representative durability and detection limitations. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP10-R11 — Receiving interface and bounded output

Deliver the bounded output to bonding authority and structural design authority. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP10-R12 — Independent release and continuing validity

Evaluate F02-CP10 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: challenge surface-state evidence, time-to-bond, representative durability and detection limitations The reviewer records the affected F02-CP10 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by bonding authority and structural design authority.

F02-CP11 – Metal additive manufacture

Digitally controlled manufacture of metal products within a defined material-machine-build-post-processing envelope. Qualification addresses the actual component or bounded family, including location, orientation, hidden properties and downstream treatment.

Application-specific parameters: Feedstock/source/reuse; machine and condition; build file/toolchain; orientation and support; parameter set; atmosphere/environment; monitoring; geometry/location; heat treatment/finishing; property criteria.

Profile boundary	Detail
Technical emphasis	metal additive feedstock, build configuration and post-treatment
Failure / evidence risks	a changed build orientation or toolchain can invalidate retained property evidence
Representative witnessing	Trace a build from feedstock and signed digital baseline through monitored manufacture, post-processing, representative properties and product acceptance; review an interrupted build without deleting adverse evidence.
Change and requalification triggers	Feedstock/source or reuse; slicing/toolchain; machine state; orientation/location; geometry family; parameter set; post-treatment; site transfer.
Outcome limitation	In-process sensor evidence supports only a validated property/detection boundary and does not automatically replace product acceptance.

F02-CP11-R01 – Retained subject control

Identify feedstock identity, condition, storage and reuse history, and connect every build to material source and any mixing or replenishment.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R02 – Retained subject control

Freeze the reviewed digital geometry, build preparation, machine programme and software/toolchain versions that determine the as-built result.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R03 – Retained subject control

Qualify representative geometry, orientation and build locations for the intended material and machine envelope; machine or material qualification alone is not component qualification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R04 — Retained subject control

Preserve actual build records, equipment state, essential variables, interruptions and monitoring data with their detection and interpretation limits.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R05 — Retained subject control

Include removal, post-treatment, finishing and inspection in the qualified route; demonstrate required properties with suitable representative evidence.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R06 — Retained subject control

Assess changed feedstock, parameters, algorithms, machine, geometry or post-processing and verify actual receiving-site capability before retaining a broader claim.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP11-R07 — Mission and environment transfer

For metal additive manufacture, define the qualified or evaluated envelope for metal additive feedstock, build configuration and post-treatment. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP11-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a changed build orientation or toolchain can invalidate retained property evidence. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP11-R09 — Configuration and data identity

Bind metal additive feedstock, build configuration and post-treatment to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP11-R10 – Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconcile digital build identity, position/orientation, feedstock history and finished-part test locations. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP11-R11 – Receiving interface and bounded output

Deliver the bounded output to additive process owner and product qualification authority. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP11-R12 – Independent release and continuing validity

Evaluate F02-CP11 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconcile digital build identity, position/orientation, feedstock history and finished-part test locations The reviewer records the affected F02-CP11 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by additive process owner and product qualification authority.

F02-CP12 – Polymer additive manufacture

Additive manufacture of polymer or polymer-based composite products within a declared material, process, build and service boundary. Include material preparation, digital identity, environment, post-cure/finishing and intended-use properties.

Application-specific parameters: Material and batch; storage/moisture/age where relevant; machine and software; build orientation; geometry; process variables; support removal; post-cure/finishing; environmental and functional criteria.

Profile boundary	Detail
Technical emphasis	polymer additive material history, build and post-cure
Failure / evidence risks	dimensional fit can conceal orientation-dependent or environment-sensitive performance
Representative witnessing	Follow representative products through material preparation, digital baseline, build, finishing, property evidence and rejected-build disposition.
Change and requalification triggers	Material/source; storage/condition; process type; build orientation; toolchain; geometry; post-cure; service environment; receiving site.
Outcome limitation	Prototype appearance, dimensional fit or a material trade name does not establish full product qualification.

F02-CP12-R01 — Retained subject control

Define the intended product duty and relevant material properties rather than accepting a printed shape as evidence of aerospace suitability.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R02 — Retained subject control

Control material identity, storage, condition, preparation and reuse where permitted, with traceable batch history.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R03 — Retained subject control

Qualify the actual machine, programme, orientation, geometry and process environment for representative properties and interfaces.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R04 — Retained subject control

Retain build file and loaded settings, actual process records, interruptions and any monitoring used in acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R05 — Retained subject control

Verify required mechanical, thermal, dimensional or other specified properties after all post-processing, acknowledging directional or location-related limitations where relevant.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R06 — Retained subject control

Review changed material, software, machine, orientation, finishing or duty and complete additional demonstration before extending the qualified envelope.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP12-R07 — Mission and environment transfer

For polymer additive manufacture, define the qualified or evaluated envelope for polymer additive material history, build and post-cure. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP12-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: dimensional fit can conceal orientation-dependent or environment-sensitive performance. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP12-R09 — Configuration and data identity

Bind polymer additive material history, build and post-cure to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP12-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: compare material condition, build direction, post-cure and required service-environment properties. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP12-R11 — Receiving interface and bounded output

Deliver the bounded output to polymer process owner and receiving application engineer. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP12-R12 — Independent release and continuing validity

Evaluate F02-CP12 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: compare material condition, build direction, post-cure and required service-environment properties The reviewer records the affected F02-CP12 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by polymer process owner and receiving application engineer.

F02-CP13 — Casting

Casting of specified material and product families, including source material, mould/tooling, process history, subsequent treatment and representative property/defect verification. Maintain traceability through lots, repairs and final machining.

Application-specific parameters: Alloy/material state; source and charge history; mould/tooling route; geometry/section family; process variables; post-treatment; specimen location; inspection and repair criteria.

Profile boundary	Detail
Technical emphasis	casting material, geometry and process-to-specimen relationship
Failure / evidence risks	a favourable detached specimen can fail to represent a critical article section
Representative witnessing	Trace a casting lot through material source, process history, post-treatment, representative test location, inspection, repair disposition and final article acceptance.
Change and requalification triggers	Material/source; tooling/mould; geometry/section; processing route; thermal treatment; repair; inspection technique; site transfer.
Outcome limitation	Lot test values support only the justified parent-material and processing relationship, not every unrepresented casting.

F02-CP13-R01 — Retained subject control

Define the material, product geometry and intended properties, including the casting-to-finished-product route and its technical acceptance responsibilities.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R02 — Retained subject control

Preserve source, charge, lot and consumable identity with actual process and article genealogy; a generic chemistry certificate is not proof of each required property.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R03 — Retained subject control

Qualify mould/tooling, controlled processing and relevant post-treatment for representative geometry and critical sections.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R04 — Retained subject control

Record actual production history, deviations, interruptions and identified defect populations, not only accepted final castings.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R05 — Retained subject control

Use representative property specimens and suitable defect-detection methods with stated location, preparation and inference limits.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R06 — Retained subject control

Control repair, blending, repeat treatment and changed material/tooling/process route through authorised review and required requalification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP13-R07 — Mission and environment transfer

For casting, define the qualified or evaluated envelope for casting material, geometry and process-to-specimen relationship. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP13-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a favourable detached specimen can fail to represent a critical article section. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP13-R09 — Configuration and data identity

Bind casting material, geometry and process-to-specimen relationship to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP13-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: trace charge, process history, specimen location and section-specific inspection into lot disposition. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP13-R11 — Receiving interface and bounded output

Deliver the bounded output to foundry technical authority and final article acceptance function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP13-R12 — Independent release and continuing validity

Evaluate F02-CP13 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: trace charge, process history, specimen location and section-specific inspection into lot disposition The reviewer records the affected F02-CP13 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by foundry technical authority and final article acceptance function.

F02-CP14 — Forging and forming

Controlled deformation/forming of specified materials and geometry families, including incoming state, tooling, process sequence, thermal history and downstream treatment or machining. Qualification is tied to resulting geometry and properties.

Application-specific parameters: Material grade/state; initial stock identity; tooling; deformation sequence; essential variables; geometry/section; thermal/post-treatment; specimen orientation/location; surface/internal criteria.

Profile boundary	Detail
Technical emphasis	forging or forming route, material state and downstream treatment
Failure / evidence risks	final geometry can conceal an unacceptable local material or strain-history condition
Representative witnessing	Observe material/route control and trace a representative finished item backward through deformation and treatment history, including a rejected or reworked case.
Change and requalification triggers	Material/state; stock dimensions; tooling; sequence; essential variables; section/orientation; downstream treatment; site.
Outcome limitation	A dimensionally correct formed part is not proof that all material and through-life properties are satisfied.

F02-CP14-R01 — Retained subject control

Identify incoming material state and intended final geometry/properties with the actual design and process authority.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R02 — Retained subject control

Qualify tooling, sequence and essential-variable combinations for representative sections, orientations and material conditions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R03 — Retained subject control

Preserve actual material and process history through intermediate shapes, treatments, splits and subcontracted stages.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R04 — Retained subject control

Control equipment/tool condition and point-of-use instructions; deviations and interrupted sequences need technical review.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R05 — Retained subject control

Verify geometry, surface and relevant internal/material properties using representative methods and specimens after the complete route.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R06 — Retained subject control

Review changed stock, geometry, tool, sequence, thermal state or receiving-site implementation and justify retained evidence before new acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP14-R07 — Mission and environment transfer

For forging and forming, define the qualified or evaluated envelope for forging or forming route, material state and downstream treatment. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP14-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: final geometry can conceal an unacceptable local material or strain-history condition. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP14-R09 — Configuration and data identity

Bind forging or forming route, material state and downstream treatment to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP14-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconcile starting condition, forming sequence, representative property locations and finishing effects. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP14-R11 — Receiving interface and bounded output

Deliver the bounded output to forming authority and material/product acceptance owner. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP14-R12 — Independent release and continuing validity

Evaluate F02-CP14 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconcile starting condition, forming sequence, representative property locations and finishing effects The reviewer records the affected F02-CP14 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by forming authority and material/product acceptance owner.

F02-CP15 — Precision machining

Machining of specified critical geometries and surface conditions using controlled machines, tools, fixtures, programmes and measurement. Define where geometry, surface integrity and hidden machining effects affect the intended product.

Application-specific parameters: Material/state; drawing/datums; machine and tool; fixture; programme version; toolpath; essential variables; tool wear; surface/edge condition; measurement model and acceptance.

Profile boundary	Detail
Technical emphasis	precision-machined geometry, datums and surface integrity
Failure / evidence risks	a numerical programme name can conceal a changed toolpath, datum or surface condition
Representative witnessing	Trace one critical feature from drawing and programme through setup, manufacture, measurement and acceptance; review a tool-change or drift response with prior-output extent.
Change and requalification triggers	Toolpath/programme; machine or fixture; tool type/wear strategy; material; critical geometry; measurement method; rework; transfer.
Outcome limitation	A capability index or successful first article does not approve every future unit or untested configuration.

F02-CP15-R01 — Retained subject control

Freeze the product definition, datums, material state and critical characteristics before programming or acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R02 — Retained subject control

Control machine, fixture, tool and programme identity, including authorised changes and setup verification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R03 — Retained subject control

Demonstrate capability for representative geometry and surface requirements with suitable measurement uncertainty and a justified production/low-volume strategy.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R04 — Retained subject control

Record actual setup, tool condition, in-process checks, offsets where relevant, interruptions and deviations against the article or lot.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R05 — Retained subject control

Assess surface integrity, edge condition and other specified effects with suitable methods; passing nominal dimensions is not complete acceptance.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R06 — Retained subject control

Control rework, programme changes, new tools or relocated equipment and reconcile full/partial first-article and requalification requirements.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP15-R07 — Mission and environment transfer

For precision machining, define the qualified or evaluated envelope for precision-machined geometry, datums and surface integrity. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP15-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a numerical programme name can conceal a changed toolpath, datum or surface condition. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP15-R09 — Configuration and data identity

Bind precision-machined geometry, datums and surface integrity to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP15-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: replay a critical characteristic from authorised digital programme through measurement uncertainty. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP15-R11 — Receiving interface and bounded output

Deliver the bounded output to machining owner and independent characteristic acceptance function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP15-R12 — Independent release and continuing validity

Evaluate F02-CP15 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: replay a critical characteristic from authorised digital programme through measurement uncertainty The reviewer records the affected F02-CP15 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by machining owner and independent characteristic acceptance function.

F02-CP16 – Non-conventional machining

Non-conventional material-removal routes applied to defined materials, geometries and product duties. Qualification addresses the relevant thermal, electrical, chemical, erosion or other process effects without prescribing operational energy or chemical settings.

Application-specific parameters: Process principle; material/state; geometry/access; equipment/programme; consumables; essential variables; surface/near-surface effects; post-processing; representative inspection and property criteria.

Profile boundary	Detail
Technical emphasis	non-conventional machining and affected surface layers
Failure / evidence risks	a dimensionally conforming feature can retain unverified altered-layer effects
Representative witnessing	Observe controlled setup and review actual process-to-property evidence, including an abnormal run and how hidden effects were assessed before disposition.
Change and requalification triggers	Process principle; material; media/consumables; programme; geometry/access; equipment; post-processing; inspection method.
Outcome limitation	No universal energy settings or process recipes are supplied; apparently correct geometry does not establish hidden material integrity.

F02-CP16-R01 – Retained subject control

Define the removal mechanism, intended geometry and potentially affected surface or hidden properties in the actual application.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R02 – Retained subject control

Qualify material, equipment, programme, geometry and essential-variable combinations rather than infer suitability from a machine specification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R03 – Retained subject control

Control source/condition of relevant media and consumables, equipment condition and authorised point-of-use instructions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R04 – Retained subject control

Preserve actual process records and deviations; identify last valid state after interruption, abnormal indication or equipment failure.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R05 — Retained subject control

Verify required dimensions and surface/near-surface integrity through appropriate methods and post-processing evidence, with explicit detection limitations.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R06 — Retained subject control

Review changed method, media, material, geometry, software or finishing and define additional demonstration before scope extension.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP16-R07 — Mission and environment transfer

For non-conventional machining, define the qualified or evaluated envelope for non-conventional machining and affected surface layers. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP16-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a dimensionally conforming feature can retain unverified altered-layer effects. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP16-R09 — Configuration and data identity

Bind non-conventional machining and affected surface layers to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP16-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: link actual process state and media to relevant surface and hidden-property verification. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP16-R11 — Receiving interface and bounded output

Deliver the bounded output to process specialist and product integrity authority. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP16-R12 — Independent release and continuing validity

Evaluate F02-CP16 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: link actual process state and media to relevant surface and hidden-property verification The reviewer records the affected F02-CP16 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by process specialist and product integrity authority.

F02-CP17 — Mechanical surface enhancement

Mechanical surface-treatment routes intended to alter specified surface or near-surface properties, including relevant media/tools, coverage, process control and consequential product performance.

Application-specific parameters: Substrate/state; surface geometry; tool/media; essential variables; coverage; monitoring/reference checks; surface condition; relevant fatigue or integrity criteria; downstream treatment.

Profile boundary	Detail
Technical emphasis	mechanical surface enhancement and local coverage
Failure / evidence risks	nominal equipment output can conceal incomplete coverage on difficult geometry

Profile boundary	Detail
Representative witnessing	Witness coverage and process control on representative geometry, then review property evidence and an excluded or inaccessible treatment area.
Change and requalification triggers	Media/tool; material/state; geometry/access; coverage strategy; programme; parameters; downstream treatment; retreatment.
Outcome limitation	A qualified surface process does not by itself establish a universal fatigue-life improvement or unrestricted retreatment allowance.

F02-CP17-R01 – Retained subject control

Define the intended surface change and the product property or duty it supports, together with the approved technical basis.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R02 – Retained subject control

Qualify media/tool, equipment, coverage and essential-variable combinations for representative geometry and access.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R03 – Retained subject control

Control consumable identity/condition and equipment/programme status, with suitable reference or process-monitoring checks.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R04 – Retained subject control

Preserve actual treatment history and coverage evidence linked to article identity; an average process measure must not hide untreated critical locations.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R05 – Retained subject control

Verify relevant surface and consequential properties with appropriate methods, distinguishing process indicators from demonstrated service-life claims.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R06 — Retained subject control

Assess retreatment, changed substrate/media/tooling, geometry or downstream processing and obtain additional qualification where required.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP17-R07 — Mission and environment transfer

For mechanical surface enhancement, define the qualified or evaluated envelope for mechanical surface enhancement and local coverage. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP17-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: nominal equipment output can conceal incomplete coverage on difficult geometry. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP17-R09 — Configuration and data identity

Bind mechanical surface enhancement and local coverage to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP17-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: compare local access/coverage evidence and process variables with the claimed fatigue or surface effect. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP17-R11 — Receiving interface and bounded output

Deliver the bounded output to surface specialist and structural life authority. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP17-R12 — Independent release and continuing validity

Evaluate F02-CP17 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: compare local access/coverage evidence and process variables with the claimed fatigue or surface effect. The reviewer records the affected F02-CP17 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by surface specialist and structural life authority.

F02-CP18 — Electronics assembly

Assembly of electronic boards, modules and equipment with controlled parts, interconnections, coatings, handling and loaded configuration. Separate workmanship, electrical function, environmental suitability and installed-system acceptance.

Application-specific parameters: Board/module configuration; component lots/source; programmable content; interconnection process; ESD/moisture and cleanliness conditions; equipment; inspection and functional test; rework limits.

Profile boundary	Detail
Technical emphasis	electronics assembly and loaded digital configuration
Failure / evidence risks	a passing board test can use different logic or parameters from the delivered assembly
Representative witnessing	Trace a board/module from parts receipt through assembly, inspection, programming, functional results and a repaired or substituted component.
Change and requalification triggers	Component source; package/interconnection; assembly chemistry; software/logic; equipment; coating; rework route; test configuration.
Outcome limitation	A successful bench test or workmanship inspection does not establish complete aircraft/spacecraft installation suitability.

F02-CP18-R01 — Retained subject control

Verify parts authenticity, eligibility, condition and configuration, including actual programmed devices and controlled component substitutions.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R02 — Retained subject control

Qualify critical interconnection, bonding, coating and assembly operations with actual equipment, materials and competent personnel.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R03 — Retained subject control

Control handling, moisture/ESD-sensitive and contamination-related conditions appropriate to the components and application.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R04 — Retained subject control

Record concealed steps, material genealogy, process history and loaded software/logic identity against the delivered unit.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R05 — Retained subject control

Verify workmanship and functional performance with suitable methods and keep environmental/installation suitability as separately demonstrated characteristics.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R06 — Retained subject control

Preserve rework and failure history and assess changed components, processes, software or testing before accepting the altered assembly.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP18-R07 — Mission and environment transfer

For electronics assembly, define the qualified or evaluated envelope for electronics assembly and loaded digital configuration. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP18-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a passing board test can use different logic or parameters from the delivered assembly. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP18-R09 — Configuration and data identity

Bind electronics assembly and loaded digital configuration to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP18-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: reconcile component genealogy, interconnections, rework and verified loaded target identity. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP18-R11 — Receiving interface and bounded output

Deliver the bounded output to electronics authority and integration test owner. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP18-R12 — Independent release and continuing validity

Evaluate F02-CP18 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: reconcile component genealogy, interconnections, rework and verified loaded target identity The reviewer records the affected F02-CP18 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by electronics authority and integration test owner.

F02-CP19 — Wire and harness assembly

Fabrication and assembly of circuits, wires, cables, connectors, shielding, terminations and harnesses for defined electrical and installation functions. Preserve circuit identity and final routing/protective configuration.

Application-specific parameters: Circuit/drawing version; wire/cable/connectors; source lots; termination process; tools; routing/support; bonding/shielding; continuity/insulation and functional criteria; installed limitations.

Profile boundary	Detail
Technical emphasis	wire and harness circuit identity, terminations and shielding
Failure / evidence risks	continuity alone can conceal wrong pin assignment or inadequate installed bonding/shielding
Representative witnessing	Follow one harness from circuit baseline and component genealogy through termination, hidden-step records, electrical results and final identification.
Change and requalification triggers	Circuit design; components/source; termination tools/process; routing; shield/bond method; protection; repair; installation environment.
Outcome limitation	Continuity alone does not establish insulation, shielding, grounding, mechanical integrity or suitability for every installation.

F02-CP19-R01 — Retained subject control

Control circuit identity, pin or connection definitions, component eligibility and applicable drawing/configuration before assembly.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R02 — Retained subject control

Verify wire, cable, connector, contact and protective-material source/condition and trace them to the actual harness.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R03 — Retained subject control

Qualify termination and critical assembly methods with suitable tools, personnel and representative verification of required properties.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R04 — Retained subject control

Record concealed connections, routing, identification, strain/protection and shielding/bonding features before they become inaccessible.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R05 — Retained subject control

Perform required electrical and functional checks under a defined method, configuration and decision rule; retain original readings and test limitations.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R06 — Retained subject control

Assess repair, rerouting, component substitution, tooling or test changes and preserve the relationship between bench and installed evidence.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP19-R07 — Mission and environment transfer

For wire and harness assembly, define the qualified or evaluated envelope for wire and harness circuit identity, terminations and shielding. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP19-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: continuity alone can conceal wrong pin assignment or inadequate installed bonding/shielding. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP19-R09 – Configuration and data identity

Bind wire and harness circuit identity, terminations and shielding to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP19-R10 – Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: trace drawing-to-pin identity, termination evidence and installation-relevant electrical predicates. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP19-R11 – Receiving interface and bounded output

Deliver the bounded output to harness authority and installed-system integrator. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP19-R12 – Independent release and continuing validity

Evaluate F02-CP19 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: trace drawing-to-pin identity, termination evidence and installation-relevant electrical predicates The reviewer records the affected F02-CP19 child condition, contains the dependent use, retains earlier evidence and requests the missing or

corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by harness authority and installed-system integrator.

F02-CP20 – Optical assembly

Assembly of optical components, sensors or subsystems requiring controlled identity, alignment, cleanliness, bonding/mounting and measured function in a defined environment.

Application-specific parameters: Optical configuration; component/surface identity; alignment/reference basis; mounting/bonding; cleanliness; equipment; environmental conditions; measurement uncertainty; functional criteria.

Profile boundary	Detail
Technical emphasis	optical assembly, alignment and contamination state
Failure / evidence risks	an alignment measurement can lose relevance after handling or a changed processing correction
Representative witnessing	Trace a representative optical unit from source identity and cleanliness through assembly/alignment to measured function and protected handover.
Change and requalification triggers	Optical component/coating; mounting/adhesive; alignment/reference method; environment; cleanliness; measurement equipment; software.
Outcome limitation	Assembly qualification is configuration- and environment-specific and does not establish every optical or mission-performance characteristic.

F02-CP20-R01 – Retained subject control

Identify optical components, coatings, surfaces and configuration together with the intended measured or transmitted function.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R02 – Retained subject control

Control handling, cleanliness, storage and exposure of sensitive surfaces with a defined acceptance and preservation basis.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R03 – Retained subject control

Qualify mounting, bonding, alignment and related equipment/methods for representative configuration and environmental effects.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R04 – Retained subject control

Retain actual assembly, alignment, material and concealed-step records, including reference systems and instrumentation status.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R05 — Retained subject control

Measure specified optical and functional performance using suitable uncertainty, reference conditions and range; visual clarity is not a complete technical result.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R06 — Retained subject control

Review component, adhesive, surface, alignment, environment or verification changes and preserve limits on inherited qualification evidence.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP20-R07 — Mission and environment transfer

For optical assembly, define the qualified or evaluated envelope for optical assembly, alignment and contamination state. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP20-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: an alignment measurement can lose relevance after handling or a changed processing correction. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP20-R09 — Configuration and data identity

Bind optical assembly, alignment and contamination state to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP20-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: retain optical identity, cleanliness, alignment basis and post-handover functional verification. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP20-R11 — Receiving interface and bounded output

Deliver the bounded output to optical technical authority and payload acceptance owner. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP20-R12 — Independent release and continuing validity

Evaluate F02-CP20 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: retain optical identity, cleanliness, alignment basis and post-handover functional verification The reviewer records the affected F02-CP20 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by optical technical authority and payload acceptance owner.

F02-CP21 — Critical mechanical assembly

Assembly of mechanically critical products with defined fit, fastening, alignment, lubrication, interfaces and protective features. Qualification concerns the complete sequence and hidden characteristics supporting the actual function.

Application-specific parameters: Assembly configuration; component genealogy; critical fits/fasteners; tools/fixtures; sequence; essential variables; concealed checks; lubrication/cleanliness; functional and release criteria.

Profile boundary	Detail
Technical emphasis	critical mechanical assembly and concealed operations
Failure / evidence risks	final function can conceal a missing independent check at an irreversible assembly step

Profile boundary	Detail
Representative witnessing	Observe a critical assembly trail including one hidden hold point, final functional evidence and an interruption/restart record.
Change and requalification triggers	Component; fit/fastener; tool/fixture; sequence; lubrication; critical settings; repair; independent-check or acceptance method.
Outcome limitation	A completed checklist or qualified torque tool does not prove that every hidden assembly requirement was satisfied.

F02-CP21-R01 – Retained subject control

Freeze the assembly design and required interfaces, identifying critical components, concealed features and authorised technical acceptance roles.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R02 – Retained subject control

Verify component source, condition, life status and compatibility before assembly; do not treat a matching external shape as technical equivalence.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R03 – Retained subject control

Qualify tools, fixtures, sequence and essential assembly controls for the required fit, alignment and fastening characteristics.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R04 – Retained subject control

Record actual concealed steps and independent checks where required, including interruptions, temporary devices and final restoration.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R05 – Retained subject control

Verify required mechanical and functional performance on the final configuration; separate individual component acceptance from system integration.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R06 — Retained subject control

Control disassembly, repair, replacement or sequence changes with traceable history and necessary renewed inspection or qualification.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP21-R07 — Mission and environment transfer

For critical mechanical assembly, define the qualified or evaluated envelope for critical mechanical assembly and concealed operations. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP21-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: final function can conceal a missing independent check at an irreversible assembly step. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP21-R09 — Configuration and data identity

Bind critical mechanical assembly and concealed operations to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP21-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: trace critical fits, fastener/tool identity, concealed-step evidence and restoration of protections. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP21-R11 — Receiving interface and bounded output

Deliver the bounded output to assembly authority and independent product release function. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP21-R12 — Independent release and continuing validity

Evaluate F02-CP21 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: trace critical fits, fastener/tool identity, concealed-step evidence and restoration of protections The reviewer records the affected F02-CP21 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by assembly authority and independent product release function.

F02-CP22 — Cleanliness and contamination-sensitive processing

Cleaning, handling, conditioning, controlled-environment processing and packaging of contamination-sensitive materials and products. Acceptance relates to defined particulate, molecular or other relevant contamination criteria and preservation of that condition.

Application-specific parameters: Sensitive item/surface; contamination type and actual limits; validated collection/measurement method; sample locations; facility/environment; cleaning materials; handling/exposure; packaging; hold/reclean rules.

Profile boundary	Detail
Technical emphasis	contamination-sensitive processing and preserved condition
Failure / evidence risks	a generic cleanliness statement can use the wrong species, particle range or sampling location
Representative witnessing	Follow a sensitive item through preparation, measured cleanliness, packaging and a controlled handover; review an exposure excursion and the resulting acceptance decision.
Change and requalification triggers	Cleaning materials; facility; method; packaging; exposure duration; substrate/geometry; measurement technique; downstream sensitivity.
Outcome limitation	Cleanliness acceptance is limited to the defined contaminants, surfaces, method and time/condition boundary.

F02-CP22-R01 — Retained subject control

Define the sensitive function and applicable contamination type, criterion, units and technical basis; the word clean is not an acceptance limit.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R02 — Retained subject control

Qualify cleaning and handling for the actual material, geometry and contaminant mechanisms without damaging required properties.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R03 — Retained subject control

Control facility conditions, consumables, equipment and incompatible activities that can alter the accepted condition.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R04 — Retained subject control

Validate sample/collection and measurement methods, including blanks, recovery and relevant detection/uncertainty limits.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R05 — Retained subject control

Preserve actual exposure, handling, cleaning and acceptance history through transport, storage, integration and packaging.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R06 — Retained subject control

Review contamination excursions, new materials, methods, facilities or packaging and verify recleaning/acceptance before restoring the affected condition.

Verification: Trace each independently testable condition to its actual criterion, method, evidence, responsible performer and independent reviewer.

Acceptance / hold: Every mandatory child predicate is satisfied by valid evidence. Unresolved applicability or evidence is HOLD; demonstrated unmet criteria are FAIL.

Basis: Retained operating subject control; latest core 18; 62 and Annex AL.

F02-CP22-R07 — Mission and environment transfer

For cleanliness and contamination-sensitive processing, define the qualified or evaluated envelope for contamination-sensitive processing and preserved condition. Compare the intended mission, material, site, configuration and phase/mode with the actual evidence. Identify material differences and allocate new demonstration before relying on heritage or terrestrial qualification.

Verification: Inspect the difference matrix, environmental inputs, owner approvals and requirement-to-method links.

Acceptance / hold: PASS only when every influential difference is either bounded by valid retained evidence or closed by accepted additional demonstration. Missing essential transfer evidence is HOLD.

Basis: New implementation detail aligned with ASTRA 62.1–62.2; 63.2–63.6; 64.1–64.6

F02-CP22-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a generic cleanliness statement can use the wrong species, particle range or sampling location. State which critical properties are directly observed, measured, inferred using a validated model or unknown. Allocate separate child predicates for each hidden property and each essential protective function.

Verification: Review detection capability, raw observations, model validity and limitations against each claimed property.

Acceptance / hold: A valid observation supports only its demonstrated property and domain. An unobservable essential condition is HOLD, not a favourable default or a proven product defect.

Basis: New implementation detail aligned with ASTRA 62.3–62.5; 77.1–77.6

F02-CP22-R09 — Configuration and data identity

Bind contamination-sensitive processing and preserved condition to actual configuration, controlled technical data, source/lot or record identity, equipment and software state, authorised performer and actual event time. Preserve failed runs, changed objects and prior evidence through any digital transfer.

Verification: Replay one result from original records and verify event-time authority, method version and the evaluated-to-delivered relationship.

Acceptance / hold: PASS requires reproducible identity and valid links for the actual claim. Wrong configuration, stale state, inaccessible evidence or an unverified substituted record is HOLD.

Basis: New implementation detail aligned with ASTRA 33.3–33.4; 56.1–56.5; 62.7; 78.7

F02-CP22-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: challenge actual limit, detection capability, blanks, exposure history and protected packaging. Define the expected outcome before execution, retain original failures and repeat the failed case after correction.

Verification: Compare prospective expectations, actual observations, conditions, evidence, defect disposition and relevant regression.

Acceptance / hold: Every essential adverse scenario must have valid accepted evidence. A scripted teaching example is not actual qualification; unavailable required observation remains HOLD.

Basis: New implementation detail aligned with ASTRA 62.6–62.7; 77.5–77.8; Annex AP

F02-CP22-R11 — Receiving interface and bounded output

Deliver the bounded output to cleanliness authority and accepting sensitive-system owner. Reconcile identity, configuration, conditions, unresolved limitations, technical eligibility, remaining duties and readable evidence. Identify the actual performer and the organisation retaining acceptance responsibility.

Verification: Check the sending manifest, actual recipient access, acknowledgement, restrictions and remaining action owners.

Acceptance / hold: Transfer is complete only after the necessary receiving acceptance is authentic. Sending a file, reconciling quantity or generating a certificate does not establish technical eligibility.

Basis: New implementation detail aligned with ASTRA 32.5; 48.4–48.6; 63.6; 80.4

F02-CP22-R12 — Independent release and continuing validity

Evaluate F02-CP22 independently within its declared object and outcome class. Reconcile the original R01–R06 controls with R07–R11, applicable source requirements, prospective parameters, findings and actual authority. Monitor the subject-specific changes stated in this profile and reopen affected conclusions when the evidence changes.

Verification: Independently replay the final predicate and inspect scope, exclusions, competence, conflict clearance, findings closure and event history.

Acceptance / hold: No positive grant, renewal or extension while any applicable mandatory child is FAIL, HOLD or UNSET. N/A requires independent scope justification; technical concessions remain separate from conformity.

Basis: New implementation detail aligned with ASTRA 15.1–15.5; 16.1–16.6; 62.4–62.7; 80.1–80.6

Qualification dossier and receiving closure

The profile owner assembles the actual scope, local child-condition ledger, approved parameters, method validation, source and output genealogy, representative observations, adverse-case results, competency and independence checks, finding closure, technical release and bounded public claim. The independent reviewer checks original evidence and challenges unsupported inheritance. Keep the accepted dossier version and actual decision time accessible to the receiving custodian.

Worked failure path — synthetic: challenge actual limit, detection capability, blanks, exposure history and protected packaging The reviewer records the affected F02-CP22 child condition, contains the dependent use, retains earlier evidence and requests the missing or corrected demonstration. A later favourable run does not erase the first result. Final closure requires evidence addressing the original mechanism and receiving acceptance by cleanliness authority and accepting sensitive-system owner.

5 Domain-specific integration dossiers

The following Annex AK tags are selected because the document can support these responsibilities. Applicability is decided for the actual case. Tags do not expand a family, create an operating permission or place a whole mission inside a supplier's limited scope. Resolve domain, phase, mode, environment and retained duty before accepting a claim.

AK01 — Terrestrial engineering and supply

Design offices, manufacturing, material sources, procurement and integration.

Mandatory profile content: Actual site, source, configuration, delegated responsibilities and released technical data.

Source acceptance boundary: Every delivered characteristic and essential supplier interface is traceable to accepted evidence.

Source connection: 32, 33, 41, 48, 62–65

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK04 — Launch and deployment interfaces

Vehicle/payload integration, handling, ascent environment, separation and commissioning.

Mandatory profile content: Article pedigree, qualification envelope, interfaces and distinct readiness/permission decisions.

Source acceptance boundary: Every required integration and protective condition is met before the actual commitment.

Source connection: 35, 36, 64, 65, 70

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK05 – Reusable launch and return articles

Cumulative exposure, refurbishment, thermal protection, hidden damage and life decisions.

Mandatory profile content: Serial identity, use history, inspection detectability, qualified repair and current limits.

Source acceptance boundary: Reuse is based on actual history and accepted condition, never a reset life.

Source connection: 36, 43, 49, 55, 70

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK06 – Low Earth orbit systems

Satellites, stations and services in the declared near-Earth operating environment.

Mandatory profile content: Actual orbit and duration, drag/atmosphere, atomic oxygen where material, radiation and terminal duties.

Source acceptance boundary: Environment-specific qualification and end-of-life capability support the bounded mission.

Source connection: 35, 37, 64–68

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.

Dossier step	Evidence and decision control
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK07 – Medium, geosynchronous and high Earth orbits

Navigation, communication, relay and other specified orbit-dependent services.

Mandatory profile content: Actual geometry, radiation/charging, links, clocks, service bounds and disposal assumptions.

Source acceptance boundary: No lower-orbit or nominal-link evidence automatically covers a different environment.

Source connection: 35, 64–68

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK09 – Cislunar and libration-region systems

Lunar vicinity, relays, gateways, transportation interfaces and regional services.

Mandatory profile content: Reference frames, communication constraints, resources, users and external support.

Source acceptance boundary: The exact operating domain and service dependencies are technically complete.

Source connection: 35–39, 64, 66, 69, 72

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK12 – Cooperative docking and servicing

Authorised inspection, connection, transfer, repair and service interventions.

Mandatory profile content: Consent, actual assets, relative-state evidence, compatible interfaces and protected states.

Source acceptance boundary: All essential interface and completion states are independently supported.

Source connection: 33, 37, 65–69

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK13 – On-orbit assembly and manufacture

Assembly, additive or other production, finishing and output verification in space.

Mandatory profile content: Inputs, essential variables, environment, sensor/model validity and product acceptance.

Source acceptance boundary: Process execution is not substituted for evidence of required output properties.

Source connection: 18, 37, 41, 69, 75

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK16 – Lunar surface systems

Landers, rovers, infrastructure, observation and processing on the Moon.

Mandatory profile content: Dust, local terrain, illumination, temperature, gravity, radiation and communication assumptions.

Source acceptance boundary: Destination-specific evidence bounds the actual region, phase and operating mode.

Source connection: 38, 64, 71, 73–75

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK17 – Planetary landers and surface vehicles

Surface exploration, scientific instruments, mobility and handling.

Mandatory profile content: Environment/region, terrain, access, autonomy, supportability and contamination control.

Source acceptance boundary: Terrestrial analogy is justified; unknown critical surface conditions remain restricted.

Source connection: 38, 65, 71, 74

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK18 – Atmospheric and buoyant exploration

Planetary atmospheric vehicles, balloons, aircraft and relevant instruments.

Mandatory profile content: Atmosphere, pressure, chemistry, thermal conditions, flight/buoyancy functions and terminal state.

Source acceptance boundary: All relevant environment-specific structural and functional predicates pass.

Source connection: 34, 38, 64, 65, 71

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.

Dossier step	Evidence and decision control
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK19 – Small-body and comet operations

Observation, cooperative contact, sampling and resource demonstrations.

Mandatory profile content: Body uncertainty, surface interaction, contamination, autonomy and sample custody.

Source acceptance boundary: Uncertain body/interaction properties are not treated as established terrestrial conditions.

Source connection: 35, 38, 64, 69, 71, 74

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK20 – Subsurface and ocean-world exploration

Subsurface, liquid, ice and extreme-pressure exploration systems and their interfaces.

Mandatory profile content: Pressure/chemistry, thermal state, containment, access, communication and protection duties.

Source acceptance boundary: Specialist boundary and contamination evidence precedes dependent use.

Source connection: 38, 64, 71, 74

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK26 – Planetary protection and sample return

Forward/backward contamination, scientific cleanliness, samples and receiving chain.

Mandatory profile content: Destination, pathway, applicable protection duties, containment, custody and receiving readiness.

Source acceptance boundary: No dependent commitment precedes complete protection and receiving evidence.

Source connection: 35, 38, 69–74

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK27 – Resource utilisation and remote processing

Resource characterisation, processing, quality, storage, use and residues.

Mandatory profile content: Input variability, environmental qualification, quantity/quality, rights and disposition.

Source acceptance boundary: Resource yield, product eligibility and permission remain distinct.

Source connection: 18, 37, 38, 53, 75

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK28 – Space logistics and distributed supply

Warehousing, transfer, spares, custody, condition, receiving and service continuity.

Mandatory profile content: Actual items, life, environment, compatible interfaces and arrival/acceptance states.

Source acceptance boundary: Only physically or otherwise validly confirmed accepted usable inventory supports mission budgets.

Source connection: 48, 49, 69, 75

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK29 – Specialised energy infrastructure

Generation, storage, conversion, remote delivery and controlled high-hazard power interfaces.

Mandatory profile content: Architecture, margins, protection, specialist permissions, heat rejection and terminal inventory.

Source acceptance boundary: Performance never substitutes for safety, source authority or terminal accountability.

Source connection: 43, 53, 65, 76

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK31 – Digital and autonomous space systems

Software, programmable hardware, AI, models, twins and defensive security.

Mandatory profile content: Intended use, domain, source/build/model identity, data, validation, human authority and support.

Source acceptance boundary: All essential behaviours and prohibited transitions are verified for the actual deployment.

Source connection: 44–47, 56, 78

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.

Dossier step	Evidence and decision control
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

AK32 – Retirement and long-term stewardship

Disposal, passivation governance, loss-of-contact states, records and residual obligations.

Mandatory profile content: Terminal criteria, actual evidence, unknowns, remaining inventories, notifications and custody.

Source acceptance boundary: Final-state claims are truthful and every unresolved duty has an accepted owner.

Source connection: 30, 36, 37, 53–55, 68, 79

Dossier step	Evidence and decision control
Define the exact application	Record the responsible entity and actual performer; claimed object; location/domain; intended phase and mode; configuration; duration; upstream and receiving interfaces.
Resolve environmental transfer	Compare the selected domain with the environment represented by prior qualification. Identify retained evidence, invalidated evidence, unobserved mechanisms and required new demonstration.
Challenge the claim	Use an adverse case in which the domain is correct but the configuration, event time, remote observability or receiving authority is wrong. The dependent predicate shall not PASS from a correct domain label alone.
Close and maintain	Record accepted requirements and restrictions. Preserve unknown operational states separately from requirement HOLD. A later mission or provider change reopens affected assumptions before expanded reliance.

6 Qualification and evidence handovers

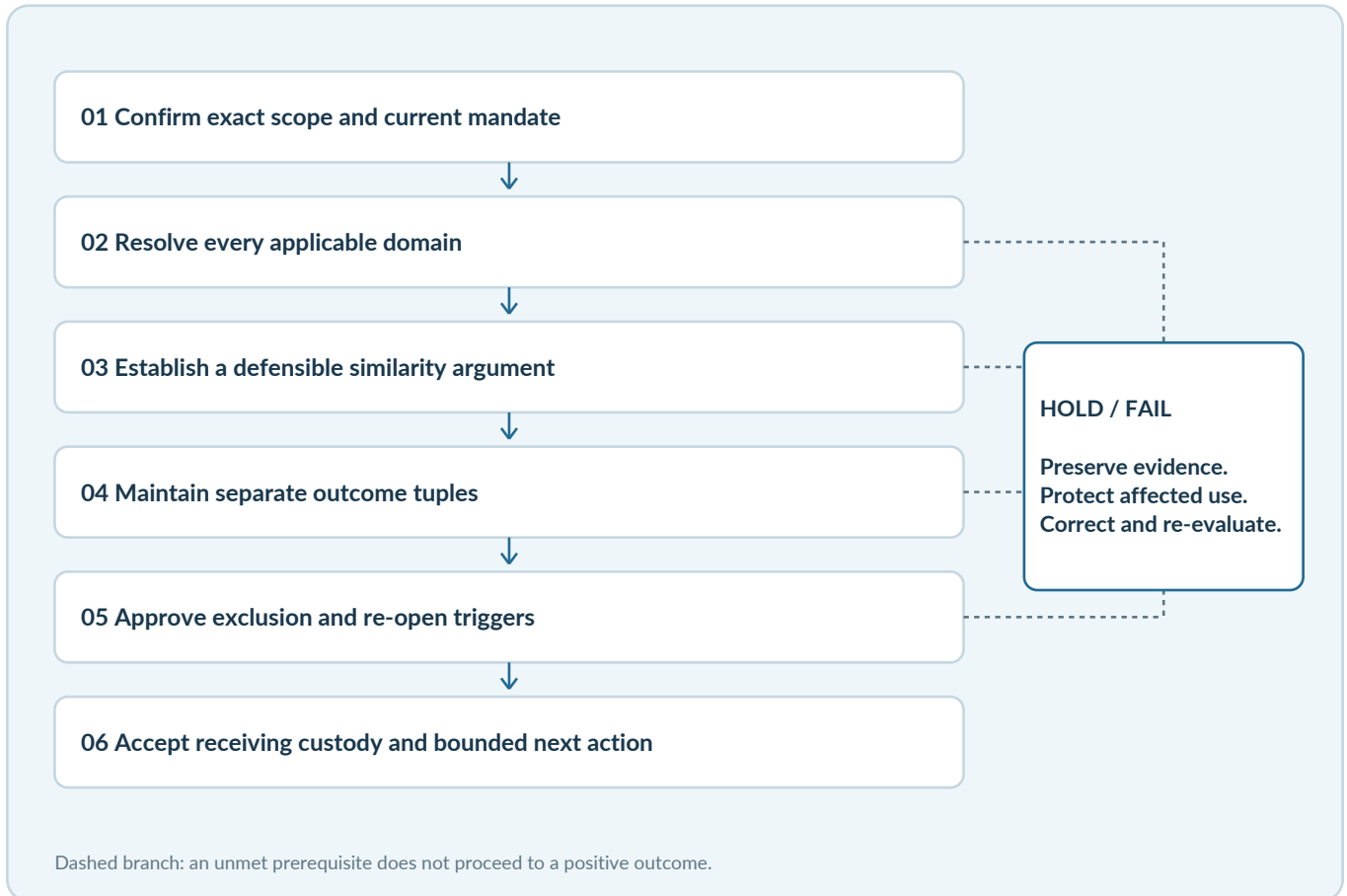
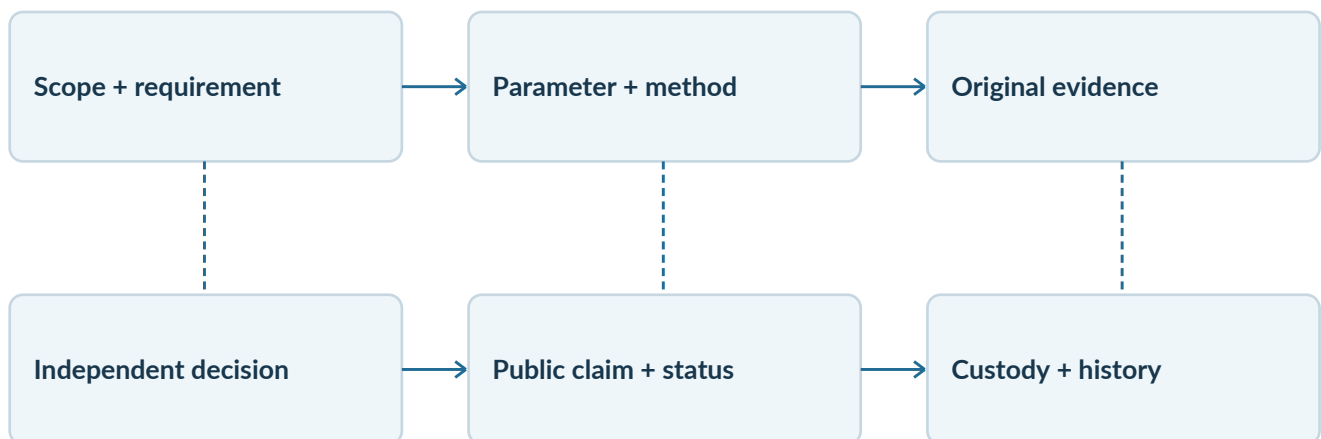


Figure — Implementation sequence for AF-AST-PR-004. Explanatory diagram; the source prerequisites and actual authority remain controlling.



Each relationship carries object identity, controlled version, actual event time and purpose-specific validity.

Figure — Scope-to-custody evidence relationships. A relationship is validated for its decision purpose, not merely because two identifiers exist.

7 Worked calculations and technical charts

The worked calculations below reproduce the supplied standard's Annex AM examples. Charted extensions are newly computed synthetic illustrations of those equations, not measured mission performance or new universal limits. A result is usable only when the actual inputs, model, units, uncertainty and approved application predicate are valid. A successful arithmetic check is not field validation.

AM.Q01 Measurement uncertainty and covariance

Source: ASTRA Annex AM, Q01, page 200. All numerical inputs in this example are synthetic.

$$u_c^2 = \sum (c_i^2 u_i^2) + 2\sum (i < j) (c_i c_j \text{cov}_{ij})$$

$$U = k u_c$$

Variables and units

u_i is a standard uncertainty; c_i is a sensitivity coefficient; cov_{ij} is covariance; k is the justified coverage factor. Variance terms carry squared output units.

Example inputs

Synthetic direct sum: $c_1=c_2=1$; $u_1=0.003$ mm; $u_2=0.004$ mm. First assume independence, then correlation $\rho=0.5$. Illustrative $k=2$.

Calculation and checks

1. Independent variance = $0.003^2 + 0.004^2 = 0.000025$ mm².
2. $u_c = 0.005$ mm; $U = 0.010$ mm for the stated k .
3. Correlated covariance = $0.5 \times 0.003 \times 0.004 = 0.000006$ mm².
4. Correlated variance = $0.000025 + 2 \times 0.000006 = 0.000037$ mm².
5. Correlated $u_c = 0.0060827625303$ mm; $U = 0.0121655250606$ mm.

Decision interpretation: The correlated model produces a larger uncertainty. No PASS/FAIL follows until an approved specification and decision rule are applied.

Validity limits: The linear propagation model requires a valid measurement function and adequate approximation. $k=2$ is not a universal guarantee of 95% coverage. Known bias requires correction or explicitly justified treatment; uncertainty does not conceal missing requirements.

ASTRA connections: 9.4–9.5; Annex G; 62; 77

Standard and expanded uncertainty

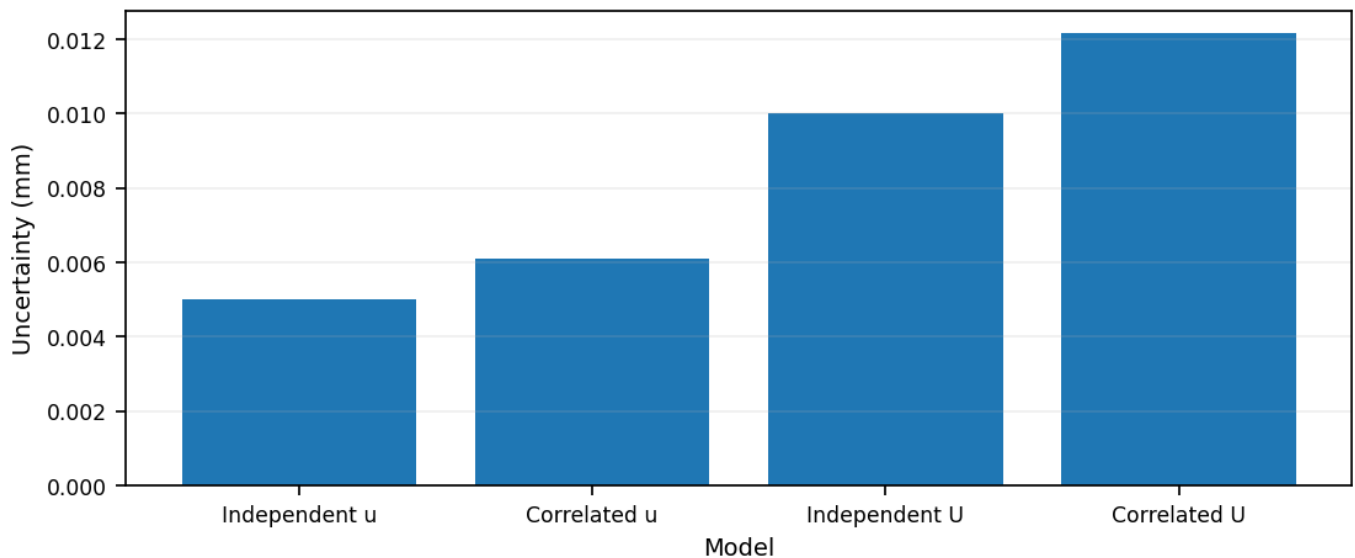


Figure Q01 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q02 Inclusive limits and four distinct measurement outcomes

Source: ASTRA Annex AM, Q02, page 201. All numerical inputs in this example are synthetic.

PASS: $y - U \geq L$ AND $y + U \leq H$

FAIL: $y + U < L$ OR $y - U > H$

Otherwise: HOLD; invalid evidence also results in HOLD

Variables and units

L and H are inclusive specification limits; y is a corrected result; U is a non-negative expanded uncertainty with stated coverage.

Example inputs

Synthetic specification [49.970, 50.030] mm; U=0.004 mm. Results y=50.024, 50.028, 50.036 and 50.026 mm.

Calculation and checks

1. $50.024 \pm 0.004 \rightarrow [50.020, 50.028]$ mm: PASS.
2. $50.028 \pm 0.004 \rightarrow [50.024, 50.032]$ mm: HOLD, interval overlaps the upper limit.
3. $50.036 \pm 0.004 \rightarrow [50.032, 50.040]$ mm: FAIL, interval entirely above the limit.
4. $50.026 \pm 0.004 \rightarrow [50.022, 50.030]$ mm: PASS; equality is inside the inclusive upper bound.

Decision interpretation: Neither the overlapping interval nor an invalid run is rounded into acceptance. N/A is an applicability decision, not a measurement outcome.

Validity limits: Use actual endpoints for asymmetric intervals. For an upper-only limit, PASS requires the upper endpoint at or below the limit and FAIL the lower endpoint above it. A coverage interval is not automatically a probability that this particular item conforms.

ASTRA connections: Annex G; 62.3–62.5; 77.6

Inclusive full-interval decisions

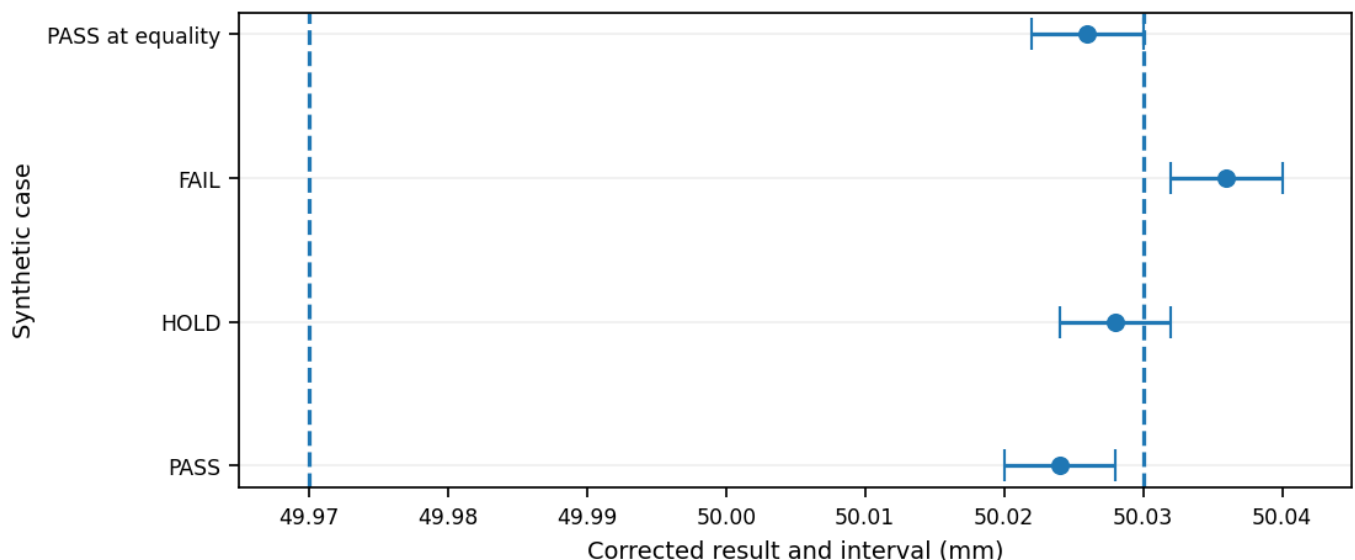


Figure Q02 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q06 Random detection sample size

Source: ASTRA Annex AM, Q06, page 205. All numerical inputs in this example are synthetic.

$$P(\text{at least one detection}) = 1 - (1-p)^n$$

$$n_{\min} = \text{ceil}[\ln(1-C)/\ln(1-p)]$$

Variables and units

p is a fixed issue probability per independent representative observation; C is the selected target detection probability; n is a positive integer.

Example inputs

Synthetic $p=0.10$ and $C=0.95$.

Calculation and checks

1. $\ln(0.05)/\ln(0.90) = 28.433158\dots$; round upward to $n=29$.
2. $P(\text{detection at } n=29) = 1 - 0.9^{29} = 0.9528987130$.
3. At $n=28$, $P = 0.9476652367$, below the specified target.

Decision interpretation: 29 is the minimum integer sample for the stated independent model; the demonstration does not certify 95% conformity.

Validity limits: This calculation is invalid for unexamined dependence, changing p , biased selection or a judgemental sample represented as random. Detection is also conditional on an effective observation method.

ASTRA connections: 9.3; Annex F.5; 55.3

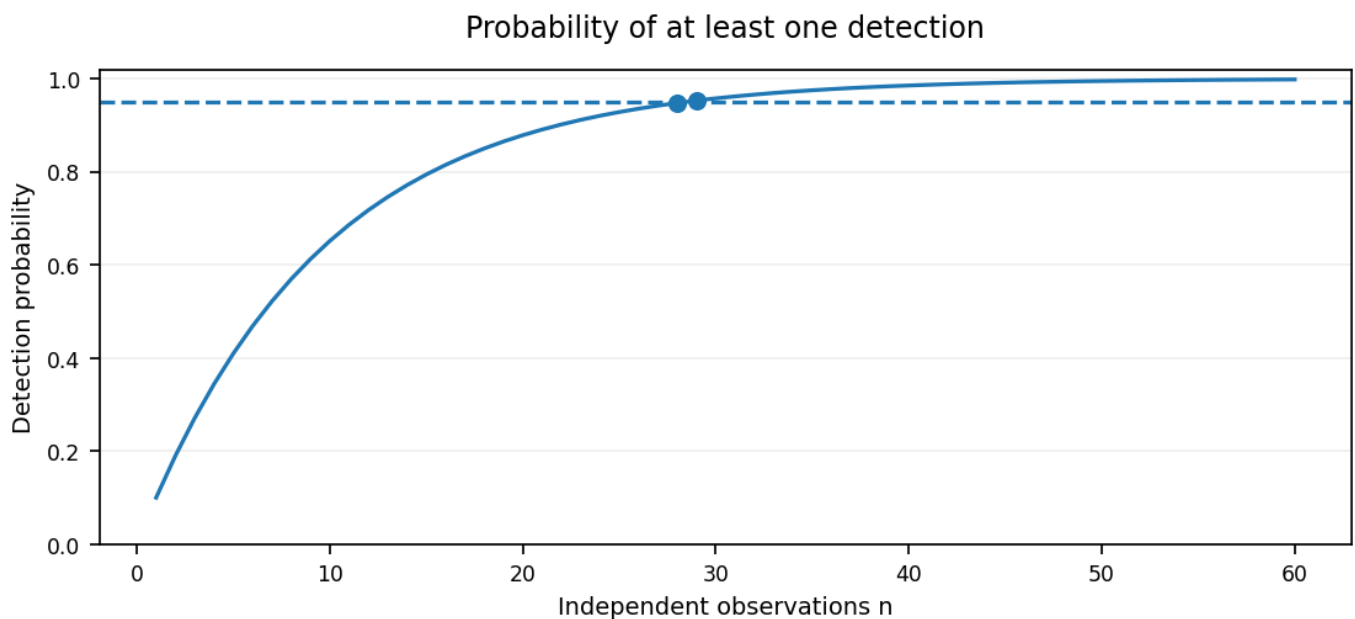


Figure Q06 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q07 Zero observed failures and an exact binomial bound

Source: ASTRA Annex AM, Q07, page 206. All numerical inputs in this example are synthetic.

$$p_{\text{upper}} = 1 - \alpha^{(1/n)}$$

$$n_{\min} = \text{ceil}[\ln(\alpha)/\ln(1-p_{\text{target}})]$$

Variables and units

$\alpha=1$ -confidence; n is a prospectively fixed number of independent comparable binary trials; all n trials have zero observed failures.

Example inputs

Synthetic one-sided confidence 95%, so $\alpha=0.05$. Examine $n=30$ and a target upper failure probability of 0.01.

Calculation and checks

1. For $n=30$: $p_{\text{upper}} = 1 - 0.05^{(1/30)} = 0.095033853 = 9.5033853\%$.

2. For $p_{\text{target}}=0.01$: $\text{ceil}[\ln(0.05)/\ln(0.99)] = 299$.

3. For $n=299$: $p_{\text{upper}} \approx 0.0099691468$, below 1%.

Decision interpretation: Thirty successful trials do not demonstrate a failure probability below 1%. Under the specified model, 299 all-success trials are needed for that particular bound.

Validity limits: A statistical upper confidence bound is not proof of zero risk or total system safety. Nonrepresentative trials, changing configuration, adaptive stopping or unmodelled common causes invalidate this simple inference.

ASTRA connections: 55.1–55.3; 62; 77

Zero failures: one-sided 95% binomial bound

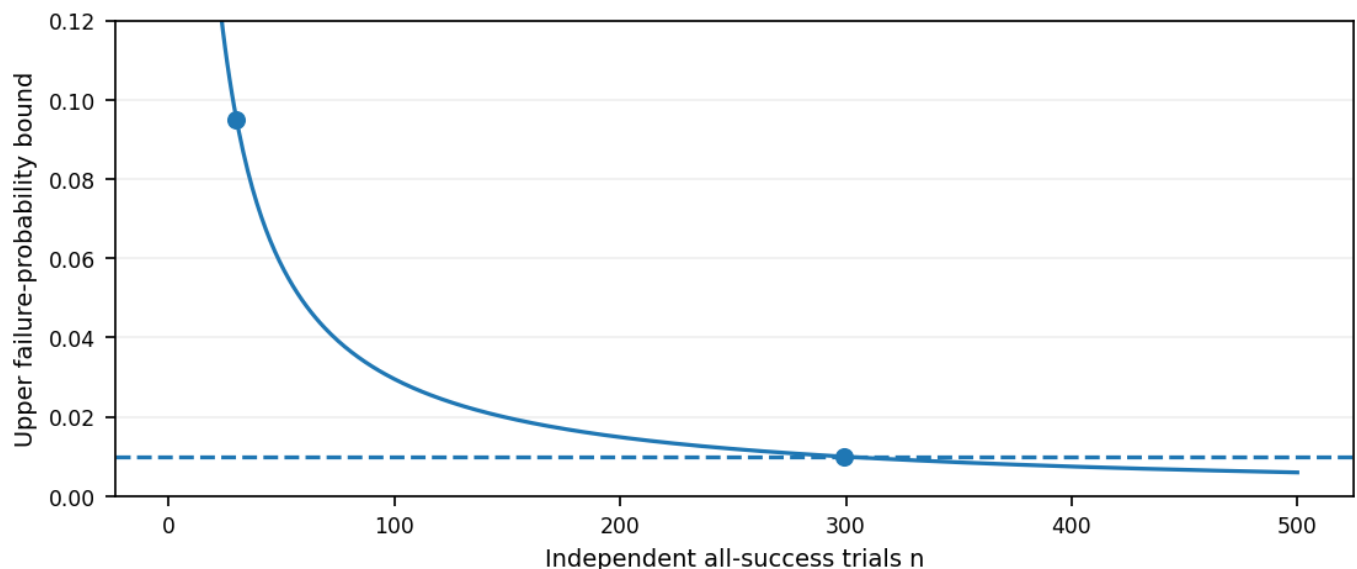


Figure Q07 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q18 Structural margin with explicitly assigned factors

Source: ASTRA Annex AM, Q18, page 217. All numerical inputs in this example are synthetic.

$$MS = \text{allowable_lower_bound} / (\text{factor} \times \text{demand_upper_bound}) - 1$$

Variables and units

Use compatible force, stress or other characteristic units and a consistent definition of applied factors. The chosen lower and upper bounds must not double-count uncertainty.

Example inputs

Synthetic allowable lower bound=150 kN; demand upper bound=100 kN; approved example factor=1.25; required example margin=0.10.

Calculation and checks

1. Factored demand=1.25×100=125 kN.

2. $MS=150/125-1=0.20$.

3. The result 0.20 is at least the example required 0.10.

Decision interpretation: The stated scalar margin passes its example predicate. Every other required load case and mechanism remains separately evaluated.

Validity limits: No factor or margin here is a universal structural design rule. Buckling, joints, thermal loads, dynamics, damage, fatigue and model validity may require distinct analysis and evidence.

ASTRA connections: 33.5; 65.1; 77

Scalar structural margin: approved factors still required

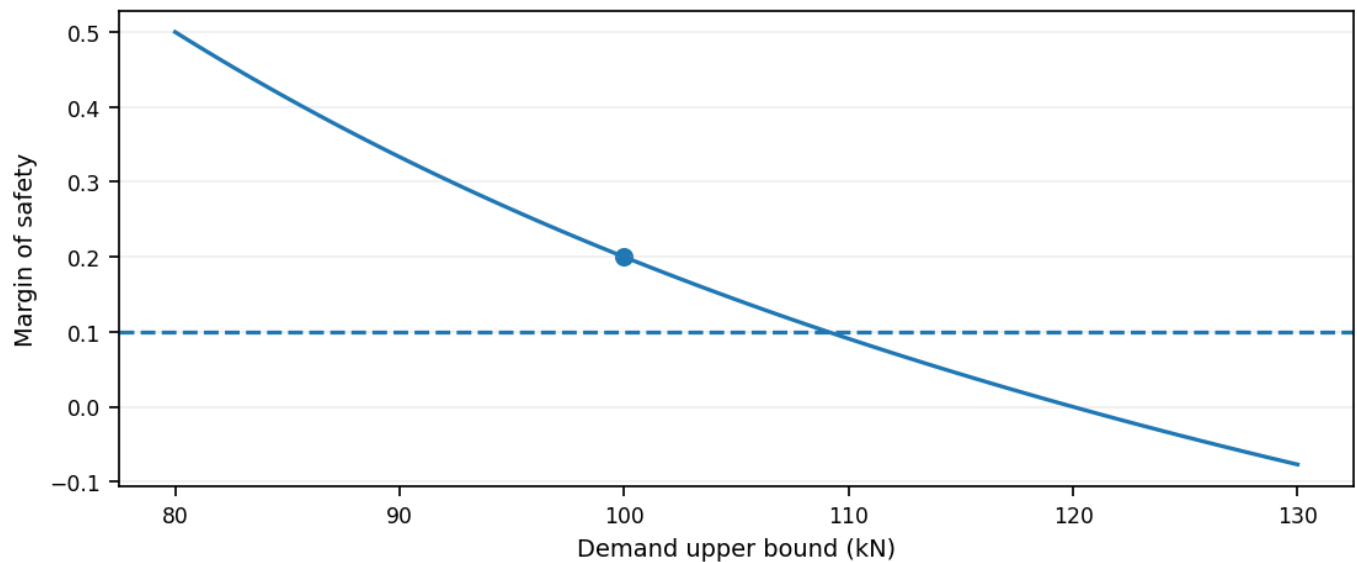


Figure Q18 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q19 Vibration spectral integration and units

Source: ASTRA Annex AM, Q19, page 218. All numerical inputs in this example are synthetic.

$$a_{\text{rms}}^2 = \int S_a(f) df$$

$$a_{\text{rms}} = \sqrt{a_{\text{rms}}^2}$$

Variables and units

S_a is acceleration power spectral density. With g^2/Hz and Hz , the integrated variance is g^2 . The specified conventional acceleration conversion is 9.80665 m/s^2 per g .

Example inputs

Synthetic flat PSD= $0.04 \text{ g}^2/\text{Hz}$ from 20 to 120 Hz; no content outside that illustrative band.

Calculation and checks

1. Bandwidth= $120-20=100 \text{ Hz}$.
2. Variance= $0.04 \times 100 = 4 \text{ g}^2$.
3. RMS= $\sqrt{4} = 2 \text{ g} = 19.6133 \text{ m/s}^2$.

Decision interpretation: The integration is correct for the stated flat spectrum. It does not define a test severity or establish qualification.

Validity limits: Real piecewise spectra, control methods, fixture dynamics, cross-axis behaviour, time duration and response limits require an approved profile. Do not integrate a logarithmic amplitude representation as though it were a linear PSD.

ASTRA connections: 42; Annex T; 77

Integration of the synthetic flat acceleration PSD

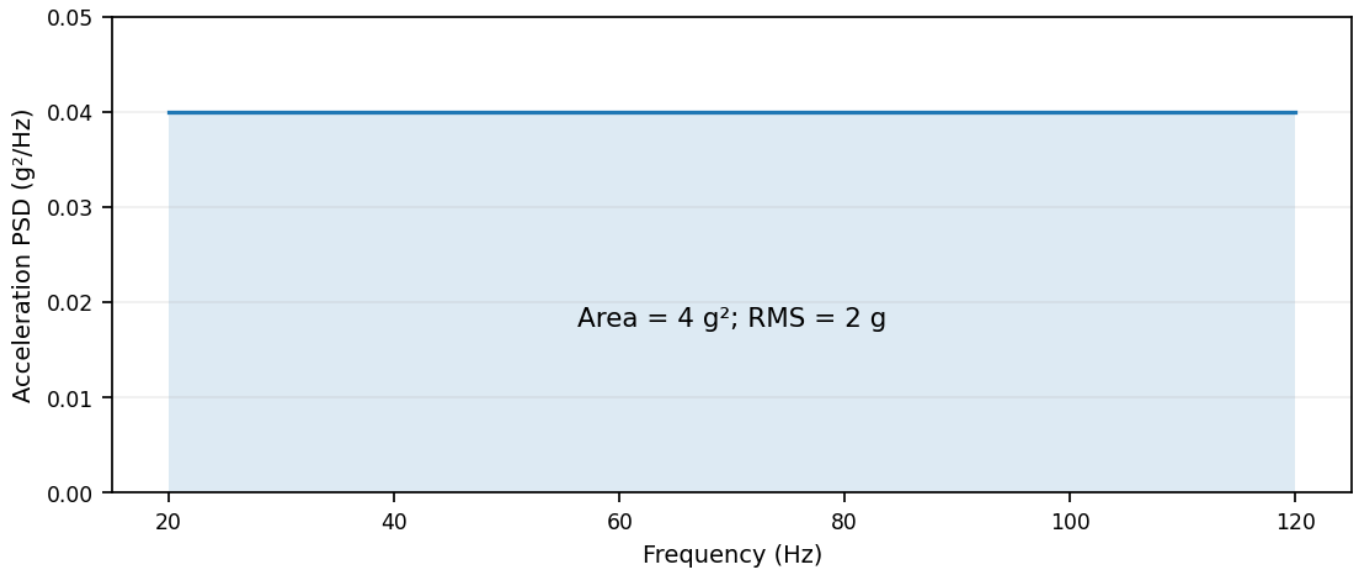


Figure Q19 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q20 Cumulative fatigue screening

Source: ASTRA Annex AM, Q20, page 219. All numerical inputs in this example are synthetic.

$$D = \sum (n_i / N_i)$$

Variables and units

n_i is applied cycles at condition i ; N_i is an appropriate evidence-based reference life for that same condition. The linear damage model is a screening assumption.

Example inputs

Synthetic $n_1=1,000$; $N_1=10,000$; $n_2=5,000$; $N_2=20,000$. Example screening acceptance $D \leq 0.50$.

Calculation and checks

1. Contribution 1 = $1,000 / 10,000 = 0.10$.
2. Contribution 2 = $5,000 / 20,000 = 0.25$.
3. Total $D = 0.35 \leq 0.50$.

Decision interpretation: The example passes only the stated linear screening predicate. This does not establish remaining life or qualified reuse.

Validity limits: Sequence effects, scatter, mean stress, environment, overload, damage detection and model applicability require separate evidence. Neither $D=1$ nor the example 0.50 is prescribed here as a universal limit.

ASTRA connections: 36.4; 55.5; 65.1; 70.4

Linear cumulative-damage screening

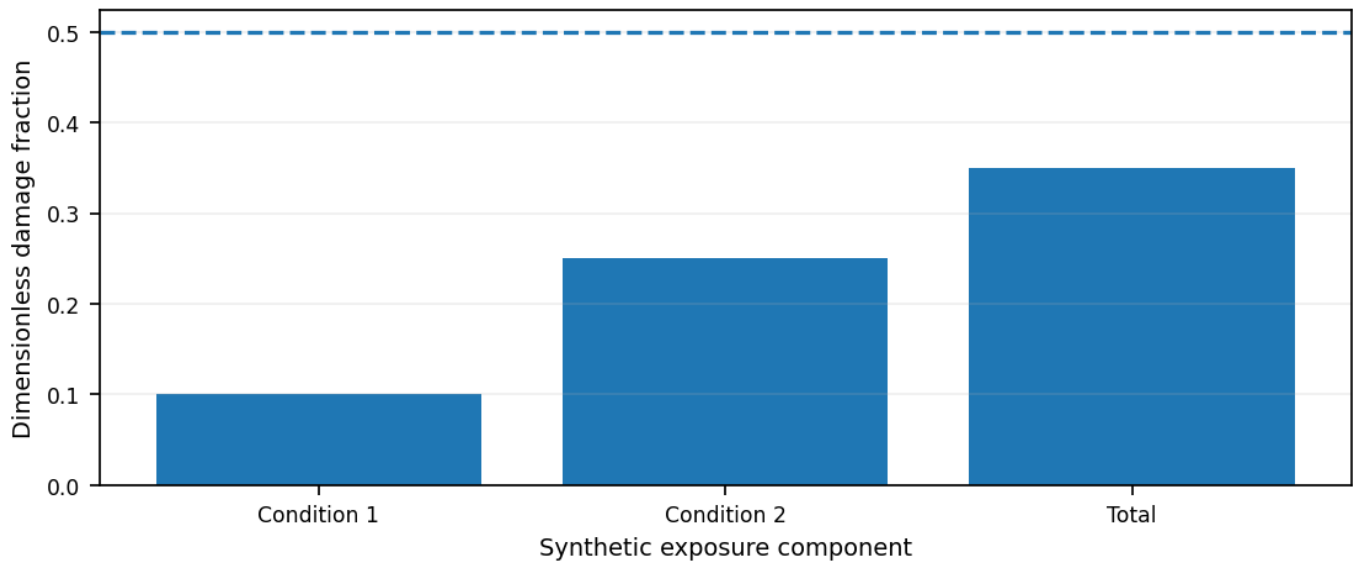


Figure Q20 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q21 Accumulated dose bookkeeping

Source: ASTRA Annex AM, Q21, page 220. All numerical inputs in this example are synthetic.

$$D_{\text{total}} = \sum(dose_rate_i \times exposure_time_i)$$

$$D_{\text{assessment}} = F \times D_{\text{total}}$$

Variables and units

All contributions must represent the same physical dose quantity, material, location and shielding/configuration basis. F is a separately justified uncertainty or design factor.

Example inputs

Synthetic rates: 0.20 Gy/day for 50 days and 0.05 Gy/day for 200 days; illustrative F=1.5; accepted example tolerance lower bound=30 Gy.

Calculation and checks

1. Segment 1=0.20×50=10 Gy.
2. Segment 2=0.05×200=10 Gy.
3. Total=20 Gy; factored assessment=1.5×20=30 Gy.
4. The assessment equals the inclusive example tolerance bound.

Decision interpretation: The numerical dose predicate passes at equality for this example. No other radiation-effect mechanism is closed by that comparison.

Validity limits: Do not add device absorbed dose, human equivalent dose and unrelated quantities. Single-event susceptibility, displacement damage, rate effects and model validity require their own qualified specialist evidence. No exposure or source-handling procedure is provided.

ASTRA connections: 35.2–35.3; 65.4; 76.4

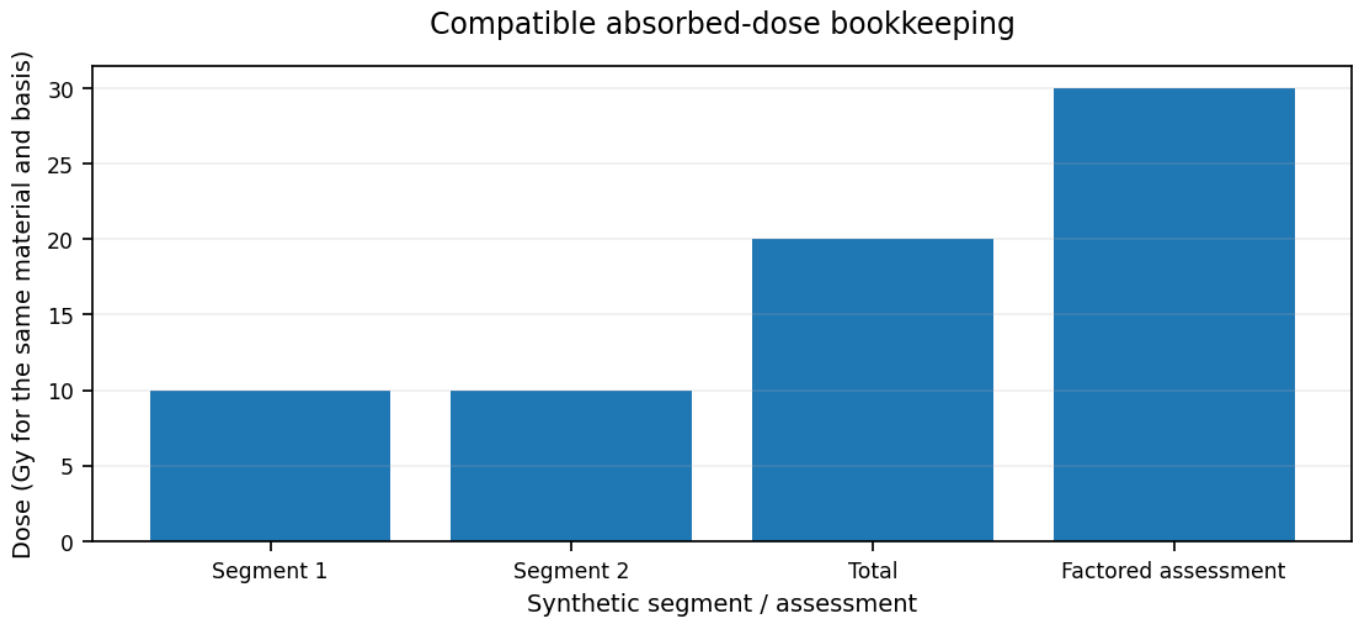


Figure Q21 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q22 Process consumables, recovery and unusable inventory

Source: ASTRA Annex AM, Q22, page 221. All numerical inputs in this example are synthetic.

Gross demand = number_of_units × unit_rate × duration

Usable feed need = gross demand × (1-recovery_fraction)

Stock requirement = feed need + unusable allowance + reserved amount

Variables and units

This is a non-physiological process-resource example. Recovery is credited only when quantity, quality and availability are demonstrated for the same duty.

Example inputs

Synthetic four identical process units; 2 kg/day/unit for 10 days; validated illustrative recovery=60%; unusable allowance=5 kg; reserve=8 kg; stock=50 kg.

Calculation and checks

1. Gross demand=4×2×10=80 kg.
2. Fresh usable feed need=80×(1-0.60)=32 kg.
3. Stock requirement=32+5+8=45 kg.
4. Headroom=50-45=5 kg.

Decision interpretation: The example quantity requirement is met. It supplies no crew-consumption rate or health criterion.

Validity limits: Availability, recovery timing, quality, contamination, storage losses and common-resource failure are separate checks. A calculated recycling benefit cannot substitute for demonstrated usable output.

ASTRA connections: 64.4; 73.3; 75.4–75.5

Usable consumables and retained reserves

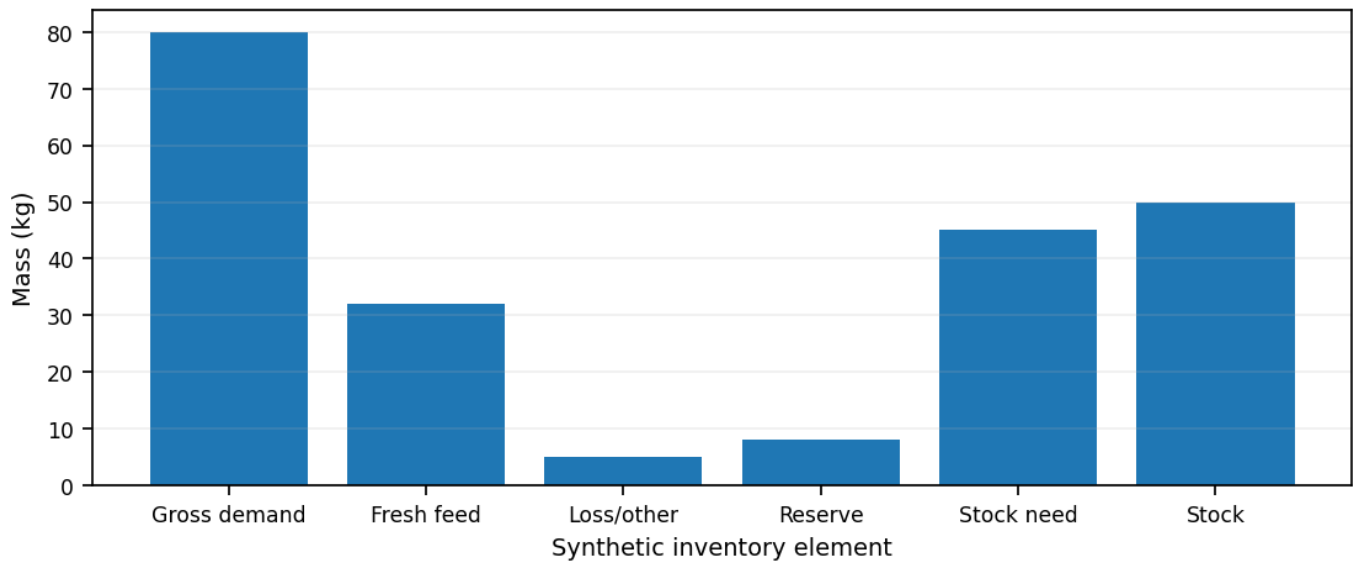


Figure Q22 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q23 Material genealogy, yield and retained work

Source: ASTRA Annex AM, Q23, page 222. All numerical inputs in this example are synthetic.

Input = good + reject + tests + losses + work_in_progress

First-pass yield = accepted_first_pass_output/input

Variables and units

All quantities shall use a consistent lot and period. Recovered material remains linked to its origin and is not counted twice as new production.

Example inputs

Synthetic input=500 units; good first-pass=410; reject=30; destructive tests=10; process losses=20; work in progress=30.

Calculation and checks

1. Reconciliation=410+30+10+20+30=500 units.
2. First-pass yield=410/500=82%.
3. If 20 rejected units are later recovered, the recovery does not increase original input or first-pass output.

Decision interpretation: The quantity balance closes. Technical identity, condition and acceptance evidence still determine whether the 410 outputs are eligible.

Validity limits: A closed balance does not prove authenticity, completeness or material quality. Mixing quantities with different units or unverified scrap/recovery transfers invalidates the reconciliation.

ASTRA connections: 18.4; 48.4; Annex AC; 75.4

Original input reconciliation

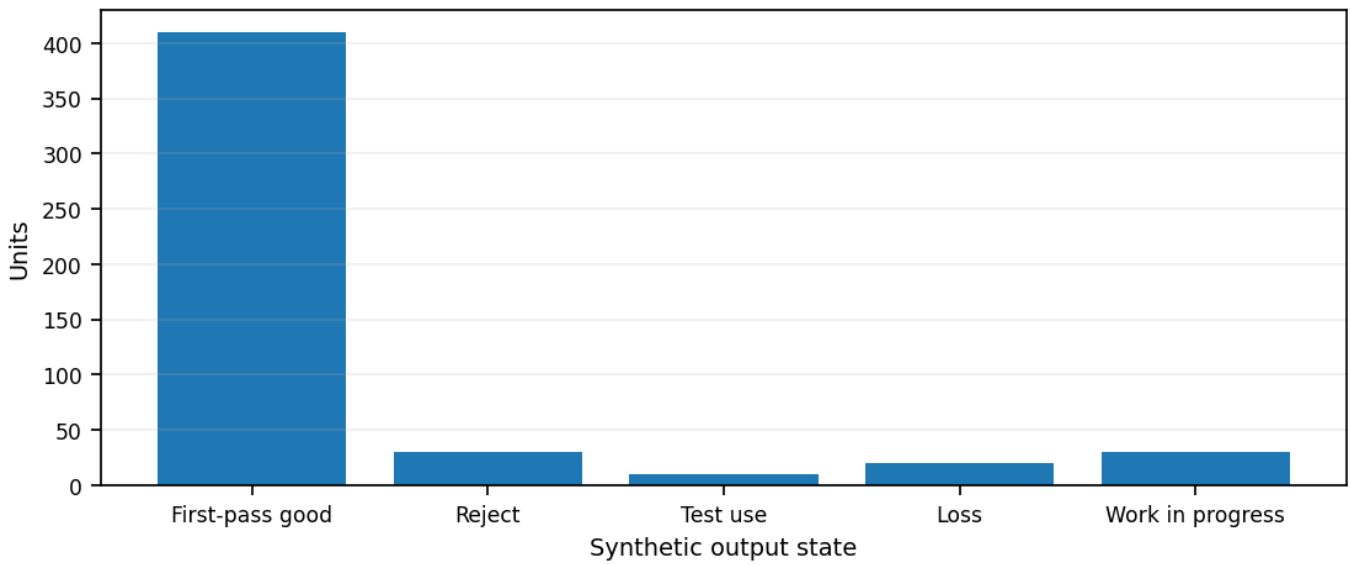


Figure Q23 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

8 Assessment and adverse-case programme

Challenge	Expected handling	Evidence retained
PR-004: Resolve every applicable domain — required basis missing	Unknown applicability is HOLD; absent equipment or budget never establishes N/A.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-004: Approve exclusion and re-open triggers — handover or review incomplete	Only independently justified exclusions receive N/A; an unexamined consequential interface remains HOLD.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-009: Define the method family technically — required basis missing	No unrelated technique is added because it shares a performer or report template.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-009: Review change and corrective retest — handover or review incomplete	A fresh favourable run does not validate earlier affected output or automatically extend method scope.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-010: Freeze the quantitative contract — required basis missing	Invalid or missing essential inputs remain HOLD; the assessor does not supply an undocumented limit.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-010: Replay and report independently — handover or review incomplete	Unresolved replay disagreement blocks the dependent acceptance even where the nominal arithmetic appears plausible.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-013: Separate evidence gap, technical failure and finding — required basis missing	HOLD is not proof of product failure, but a demonstrated control failure still needs an appropriate finding.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-013: Close with prospective evidence — handover or review incomplete	No grant, renewal or extension with an open in-scope finding; later correction does not backdate earlier validity.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-028: Map the complete change population — required basis missing	A cosmetic filename or edition-label change cannot hide a changed technical basis.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-028: Close without abandoning terminal duties — handover or review incomplete	Only demonstrably complete obligations are closed; remaining duties stay assigned after programme or provider cessation.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.

Before local reliance, also select every relevant AP01–AP48 challenge in the core. Keep fictional tests isolated from live credentials, commands and recipients. For each test define the requirement, precondition, expected response, execution steps, actual observations, evidence, defect consequence, correction, retest and acceptance. This publication supplies test designs and examples, not completed local validation records.

9 Source requirement crosswalk

The references below use the supplied 248-page FIRST EDITION. Each row retains the original clause identifier and source page. The operating instructions in this document elaborate implementation; they do not replace the full source condition or its applicable annexes. A reference to a whole chapter requires selection of every triggered subclause, not only the examples printed here.

ASTRA ID / page	Source subject	Implementation use
1.3 / 10	Object and responsibility tuple	Requirement, objective evidence and local child predicates
1.5 / 11	Activity-based applicability	Requirement, objective evidence and local child predicates
8.2 / 18	Equipment identity and fitness	Requirement, objective evidence and local child predicates
8.3 / 18	Traceability and calibration	Requirement, objective evidence and local child predicates
9.4 / 20	Measurement model and uncertainty	Requirement, objective evidence and local child predicates
9.5 / 20	Decision rules and boundary results	Requirement, objective evidence and local child predicates
11.3 / 22	Existing evidence and reuse	Requirement, objective evidence and local child predicates
12.3 / 23	Method-family witnessing	Requirement, objective evidence and local child predicates
13.3 / 25	Witness control	Requirement, objective evidence and local child predicates
14.1 / 25	Finding formulation and classification	Requirement, objective evidence and local child predicates
14.2 / 25	Immediate protection and notifications	Requirement, objective evidence and local child predicates
14.3 / 26	Occurrence, escape and systemic extent	Requirement, objective evidence and local child predicates
14.4 / 26	Plans, closure and effectiveness	Requirement, objective evidence and local child predicates
14.5 / 26	Existing status and new grants	Requirement, objective evidence and local child predicates
18.1 / 30	Process or product object	Requirement, objective evidence and local child predicates
18.2 / 30	Qualification plan	Requirement, objective evidence and local child predicates
18.3 / 30	Essential variables and point-of-use control	Requirement, objective evidence and local child predicates
18.4 / 30	Materials, genealogy and authenticity	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
18.5 / 30	First article and production readiness	Requirement, objective evidence and local child predicates
18.6 / 31	Capability and monitoring	Requirement, objective evidence and local child predicates
18.7 / 31	Excursion, change and requalification	Requirement, objective evidence and local child predicates
18.8 / 31	Product release and continuing claim	Requirement, objective evidence and local child predicates
19.12 / 33	Technical witnessing for accreditation	Requirement, objective evidence and local child predicates
30.2 / 48	Controlled transition	Requirement, objective evidence and local child predicates
30.4 / 48	Scope withdrawal and learner/customer protection	Requirement, objective evidence and local child predicates
31.3 / 49	Actual adoption record	Requirement, objective evidence and local child predicates
32.1 / 50	Mission definition and accountable boundaries	Requirement, objective evidence and local child predicates
32.2 / 50	Lifecycle assurance plan	Requirement, objective evidence and local child predicates
32.3 / 50	Gates and irreversible commitments	Requirement, objective evidence and local child predicates
32.4 / 50	Integrated assurance case	Requirement, objective evidence and local child predicates
32.5 / 51	Handover and long-life accountability	Requirement, objective evidence and local child predicates
32.6 / 51	Through-life feedback and reassessment	Requirement, objective evidence and local child predicates
33.1 / 51	Requirement quality and allocation	Requirement, objective evidence and local child predicates
33.2 / 51	Multidisciplinary interfaces	Requirement, objective evidence and local child predicates
33.3 / 52	Configuration states and genealogy	Requirement, objective evidence and local child predicates
33.4 / 52	Change impact and independence	Requirement, objective evidence and local child predicates
33.5 / 52	Engineering budgets and margins	Requirement, objective evidence and local child predicates
33.6 / 52	Verification closure and model limitations	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
34.1 / 53	Approval and operational responsibility	Requirement, objective evidence and local child predicates
34.2 / 53	Installation and integrated compatibility	Requirement, objective evidence and local child predicates
34.3 / 53	Complete unmanned-system boundary	Requirement, objective evidence and local child predicates
34.4 / 53	Advanced mobility and ground interfaces	Requirement, objective evidence and local child predicates
34.5 / 53	Electric, hybrid and alternative-energy systems	Requirement, objective evidence and local child predicates
34.6 / 54	Continued operation and configuration feedback	Requirement, objective evidence and local child predicates
35.1 / 54	Mission architecture and dependencies	Requirement, objective evidence and local child predicates
35.2 / 54	Environment definition and tailoring	Requirement, objective evidence and local child predicates
35.3 / 54	Parts, materials and suitability	Requirement, objective evidence and local child predicates
35.4 / 55	Contamination and cleanliness	Requirement, objective evidence and local child predicates
35.5 / 55	Ground segment and command assurance	Requirement, objective evidence and local child predicates
35.6 / 55	Mission readiness and uncertainty acceptance	Requirement, objective evidence and local child predicates
36.1 / 55	Precise activity and authority	Requirement, objective evidence and local child predicates
36.2 / 56	Site, vehicle and payload compatibility	Requirement, objective evidence and local child predicates
36.3 / 56	Readiness and hazardous-work separation	Requirement, objective evidence and local child predicates
36.4 / 56	Reuse and accumulated exposure	Requirement, objective evidence and local child predicates
36.5 / 56	Recovery, re-entry and end-of-operation interfaces	Requirement, objective evidence and local child predicates
36.6 / 56	Learning without automatic scope expansion	Requirement, objective evidence and local child predicates
37.1 / 57	Operational state and authority	Requirement, objective evidence and local child predicates
37.2 / 57	Tracking, coordination and environmental responsibility	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
37.3 / 57	Servicing and assembly boundaries	Requirement, objective evidence and local child predicates
37.4 / 57	In-space manufacturing and process evidence	Requirement, objective evidence and local child predicates
37.5 / 58	Remote changes and interruption	Requirement, objective evidence and local child predicates
37.6 / 58	Disposal and verifiable closure	Requirement, objective evidence and local child predicates
38.1 / 58	Environment-specific mission concept	Requirement, objective evidence and local child predicates
38.2 / 58	Mobility and integrated resource assurance	Requirement, objective evidence and local child predicates
38.3 / 59	Remote autonomy and human intervention	Requirement, objective evidence and local child predicates
38.4 / 59	Surface infrastructure and resource activities	Requirement, objective evidence and local child predicates
38.5 / 59	Maintenance, retrieval and inaccessible evidence	Requirement, objective evidence and local child predicates
38.6 / 59	Responsible completion and knowledge preservation	Requirement, objective evidence and local child predicates
40.1 / 61	Contractual, technical and lawful boundaries	Requirement, objective evidence and local child predicates
40.2 / 61	Multi-domain integration	Requirement, objective evidence and local child predicates
40.3 / 61	Mission-support road and off-road vehicles	Requirement, objective evidence and local child predicates
40.4 / 61	Maritime and underwater systems	Requirement, objective evidence and local child predicates
40.5 / 61	Heavy plant and industrial infrastructure	Requirement, objective evidence and local child predicates
40.6 / 62	Controlled technology and long-life support	Requirement, objective evidence and local child predicates
41.1 / 62	Material identity and technical suitability	Requirement, objective evidence and local child predicates
41.2 / 62	Integrated route and hidden characteristics	Requirement, objective evidence and local child predicates
41.3 / 62	Thermal, joining and surface processes	Requirement, objective evidence and local child predicates
41.4 / 63	Composites, bonding and additive manufacture	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
41.5 / 63	Electronics, harnesses, optics and critical assembly	Requirement, objective evidence and local child predicates
41.6 / 63	Production readiness, transfer and continuing control	Requirement, objective evidence and local child predicates
42.1 / 63	Requirement-led test strategy	Requirement, objective evidence and local child predicates
42.2 / 64	Test tailoring and representativeness	Requirement, objective evidence and local child predicates
42.3 / 64	Combined environments and test sequence	Requirement, objective evidence and local child predicates
42.4 / 64	Data acquisition, uncertainty and protective limits	Requirement, objective evidence and local child predicates
42.5 / 64	Failure, retest and independent judgement	Requirement, objective evidence and local child predicates
42.6 / 64	Laboratories and complete reports	Requirement, objective evidence and local child predicates
43.1 / 65	Integrated energy boundary	Requirement, objective evidence and local child predicates
43.2 / 65	Batteries and electrical storage	Requirement, objective evidence and local child predicates
43.3 / 65	Hydrogen, fuels and chemical energy	Requirement, objective evidence and local child predicates
43.4 / 65	Propulsion and rotating equipment	Requirement, objective evidence and local child predicates
43.5 / 66	Ground support and emergency interfaces	Requirement, objective evidence and local child predicates
43.6 / 66	Qualification, change and release	Requirement, objective evidence and local child predicates
44.1 / 66	Lifecycle and architectural assurance	Requirement, objective evidence and local child predicates
44.2 / 66	Source, build and loaded configuration	Requirement, objective evidence and local child predicates
44.3 / 67	Verification and target representativeness	Requirement, objective evidence and local child predicates
44.4 / 67	Tool and generated-output reliance	Requirement, objective evidence and local child predicates
44.5 / 67	Release and update integrity	Requirement, objective evidence and local child predicates
44.6 / 67	Long-term support and digital retirement	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
45.1 / 67	Intended use and prohibited use	Requirement, objective evidence and local child predicates
45.2 / 68	Data provenance and evaluation independence	Requirement, objective evidence and local child predicates
45.3 / 68	Performance and uncertainty	Requirement, objective evidence and local child predicates
45.4 / 68	Human oversight and safe fallback	Requirement, objective evidence and local child predicates
45.5 / 68	Release, drift and bounded adaptation	Requirement, objective evidence and local child predicates
45.6 / 68	Assurance decisions remain attributable	Requirement, objective evidence and local child predicates
46.1 / 69	Decision purpose and model authority	Requirement, objective evidence and local child predicates
46.2 / 69	Verification, validation and uncertainty	Requirement, objective evidence and local child predicates
46.3 / 69	Twin synchronisation and stale state	Requirement, objective evidence and local child predicates
46.4 / 69	Replacement or reduction of physical work	Requirement, objective evidence and local child predicates
46.5 / 69	Model-based maintenance and remaining life	Requirement, objective evidence and local child predicates
46.6 / 70	Reproducibility and independent access	Requirement, objective evidence and local child predicates
47.1 / 70	Safety-security dependency analysis	Requirement, objective evidence and local child predicates
47.2 / 70	Identity, access and privileged actions	Requirement, objective evidence and local child predicates
47.3 / 70	Supply-chain and dependency integrity	Requirement, objective evidence and local child predicates
47.4 / 71	Connected production and operational technology	Requirement, objective evidence and local child predicates
47.5 / 71	Update trust and cryptographic transition	Requirement, objective evidence and local child predicates
47.6 / 71	Incident recovery and assured return	Requirement, objective evidence and local child predicates
48.1 / 71	Critical suppliers and actual performers	Requirement, objective evidence and local child predicates
48.2 / 71	Flow-down and acknowledgement	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
48.3 / 72	Provenance and counterfeit prevention	Requirement, objective evidence and local child predicates
48.4 / 72	Split, merge, logistics and storage	Requirement, objective evidence and local child predicates
48.5 / 72	Diminishing sources and replacement evidence	Requirement, objective evidence and local child predicates
48.6 / 72	Performance, transfer and exit	Requirement, objective evidence and local child predicates
54.1 / 78	Hazards, assumptions and essential controls	Requirement, objective evidence and local child predicates
54.2 / 78	Stop authority and escalation	Requirement, objective evidence and local child predicates
54.3 / 79	Emergency capability and exercises	Requirement, objective evidence and local child predicates
54.4 / 79	Occurrence, escape and affected population	Requirement, objective evidence and local child predicates
54.5 / 79	Learning and protected reporting	Requirement, objective evidence and local child predicates
55.1 / 79	Define the claim before the calculation	Requirement, objective evidence and local child predicates
55.2 / 79	Failure mechanisms and dependencies	Requirement, objective evidence and local child predicates
55.3 / 80	Demonstration and inference limitations	Requirement, objective evidence and local child predicates
55.4 / 80	Maintainability and support conditions	Requirement, objective evidence and local child predicates
55.5 / 80	Life decisions and uncertainty	Requirement, objective evidence and local child predicates
56.5 / 81	Export, migration and meaningful recovery	Requirement, objective evidence and local child predicates
61.3 / 86	Dependent documents and compatibility	Explicit verification and acceptance predicate
62.1 / 88	Atomic requirement record	Explicit verification and acceptance predicate
62.2 / 88	Mandatory parameter completion	Explicit verification and acceptance predicate
62.3 / 88	Evidence validity before conformity	Explicit verification and acceptance predicate
62.4 / 88	Four requirement states	Explicit verification and acceptance predicate
62.5 / 89	No compensation or favourable default	Explicit verification and acceptance predicate
62.6 / 89	Exceptions, tailoring and unresolved conflict	Explicit verification and acceptance predicate
62.7 / 89	Decision replay and consistency	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
63.1 / 90	Domain selection without geographic omission	Explicit verification and acceptance predicate
63.2 / 90	Object and activity rather than a universal label	Explicit verification and acceptance predicate
63.3 / 90	Environment, phase and mode matrix	Explicit verification and acceptance predicate
63.4 / 90	No automatic new programme family	Explicit verification and acceptance predicate
63.5 / 91	Unknown and future environments	Explicit verification and acceptance predicate
63.6 / 91	Interface and lifecycle closure	Explicit verification and acceptance predicate
64.1 / 92	Mission environmental baseline	Explicit verification and acceptance predicate
64.2 / 92	Geometry, reference frames and event time	Explicit verification and acceptance predicate
64.3 / 92	Uncertainty, scenarios and design envelope	Explicit verification and acceptance predicate
64.4 / 92	Resource budgets and coupled margins	Explicit verification and acceptance predicate
64.5 / 92	Heritage and similarity	Explicit verification and acceptance predicate
64.6 / 93	Baseline maintenance and irreversible decisions	Explicit verification and acceptance predicate
65.1 / 94	Structures, mechanisms and deployment	Explicit verification and acceptance predicate
65.2 / 94	Thermal control and thermal protection	Explicit verification and acceptance predicate
65.3 / 94	Power generation, storage and distribution	Explicit verification and acceptance predicate
65.4 / 94	Avionics, electronics and radiation effects	Explicit verification and acceptance predicate
65.5 / 95	Attitude, pointing, sensing and control interfaces	Explicit verification and acceptance predicate
65.6 / 95	Payload function and scientific or service output	Explicit verification and acceptance predicate
65.7 / 95	Integrated platform acceptance	Explicit verification and acceptance predicate
68.7 / 101	Status and long-term custody	Explicit verification and acceptance predicate
69.1 / 102	Consent and exact intervention	Explicit verification and acceptance predicate
69.2 / 102	Interface compatibility	Explicit verification and acceptance predicate
69.3 / 102	Relative-state and completion evidence	Explicit verification and acceptance predicate
69.4 / 102	Interruptions and safe boundaries	Explicit verification and acceptance predicate
69.5 / 103	Transferred material, energy and data	Explicit verification and acceptance predicate
69.6 / 103	Post-intervention configuration and service claim	Explicit verification and acceptance predicate
70.1 / 104	Distinct release objects	Explicit verification and acceptance predicate
70.2 / 104	Integrated environment and interface verification	Explicit verification and acceptance predicate
70.3 / 104	Test and hazardous-work readiness	Explicit verification and acceptance predicate
70.4 / 104	Reuse and cumulative history	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
70.5 / 105	Return, landing and recovery interfaces	Explicit verification and acceptance predicate
70.6 / 105	Readiness decision and post-event learning	Explicit verification and acceptance predicate
71.1 / 106	Destination-specific conditions	Explicit verification and acceptance predicate
71.2 / 106	Surface mobility and interaction	Explicit verification and acceptance predicate
71.3 / 106	Atmospheric and buoyant exploration	Explicit verification and acceptance predicate
71.4 / 106	Subsurface and ocean-world interfaces	Explicit verification and acceptance predicate
71.5 / 107	Long darkness and resource interruption	Explicit verification and acceptance predicate
71.6 / 107	Construction and surface infrastructure	Explicit verification and acceptance predicate
71.7 / 107	Autonomy and limited intervention	Explicit verification and acceptance predicate
71.8 / 107	Completion, samples and remaining duties	Explicit verification and acceptance predicate
72.1 / 108	Time horizon and recoverability	Explicit verification and acceptance predicate
72.2 / 108	Solar and extreme thermal exposure	Explicit verification and acceptance predicate
72.3 / 108	Low-flux and limited-power missions	Explicit verification and acceptance predicate
72.4 / 108	Autonomy during long communication delay	Explicit verification and acceptance predicate
72.5 / 108	Ageing and long-term digital support	Explicit verification and acceptance predicate
72.6 / 109	Scientific instruments and observation integrity	Explicit verification and acceptance predicate
72.7 / 109	Future-domain feasibility and responsible closure	Explicit verification and acceptance predicate
74.1 / 112	Mission-specific protection classification	Explicit verification and acceptance predicate
74.2 / 112	Contamination pathways and control allocation	Explicit verification and acceptance predicate
74.3 / 112	Scientific cleanliness and background	Explicit verification and acceptance predicate
74.4 / 112	Sample identity and custody	Explicit verification and acceptance predicate
74.5 / 113	Return-chain containment and receiving readiness	Explicit verification and acceptance predicate
74.6 / 113	Anomalies, unknown state and release of information	Explicit verification and acceptance predicate
74.7 / 113	Disposition and residual responsibility	Explicit verification and acceptance predicate
75.1 / 114	Process purpose and environment	Explicit verification and acceptance predicate
75.2 / 114	Inputs, feedstock and source variability	Explicit verification and acceptance predicate
75.3 / 114	Essential variables and remote monitoring	Explicit verification and acceptance predicate
75.4 / 114	Yield, mass balance and circularity	Explicit verification and acceptance predicate
75.5 / 115	Logistics, storage and compatibility	Explicit verification and acceptance predicate
75.6 / 115	Maintenance, spares and distributed production	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
75.7 / 115	Handover, resource claims and closure	Explicit verification and acceptance predicate
76.1 / 116	System boundary and conversion chain	Explicit verification and acceptance predicate
76.2 / 116	Beamed and remote energy services	Explicit verification and acceptance predicate
76.3 / 116	Cryogenic, chemical and pressure interfaces	Explicit verification and acceptance predicate
76.4 / 116	Nuclear and radiation-source governance	Explicit verification and acceptance predicate
76.5 / 117	Infrastructure availability and failure propagation	Explicit verification and acceptance predicate
76.6 / 117	Degradation, environmental claims and retirement	Explicit verification and acceptance predicate
77.1 / 118	Requirement-to-method completeness	Explicit verification and acceptance predicate
77.2 / 118	Campaign design and article pedigree	Explicit verification and acceptance predicate
77.3 / 118	Measurement and uncertainty readiness	Explicit verification and acceptance predicate
77.4 / 118	Combined effects and sequence	Explicit verification and acceptance predicate
77.5 / 118	Original data and invalid tests	Explicit verification and acceptance predicate
77.6 / 119	Numerical and attribute acceptance	Explicit verification and acceptance predicate
77.7 / 119	Retest and corrective verification	Explicit verification and acceptance predicate
77.8 / 119	Independent campaign closure	Explicit verification and acceptance predicate
78.1 / 120	Released digital configuration	Explicit verification and acceptance predicate
78.2 / 120	Operational domain and prohibited behaviour	Explicit verification and acceptance predicate
78.3 / 120	Evaluation data and model credibility	Explicit verification and acceptance predicate
78.4 / 120	Human authority and consequential decisions	Explicit verification and acceptance predicate
78.5 / 121	Security and trusted updates	Explicit verification and acceptance predicate
78.6 / 121	Monitoring, drift and adaptation	Explicit verification and acceptance predicate
78.7 / 121	Recovery and semantic portability	Explicit verification and acceptance predicate
79.1 / 122	Protect people and essential assets before mission success	Explicit verification and acceptance predicate
79.2 / 122	Emergency feasibility and resources	Explicit verification and acceptance predicate
79.3 / 122	Loss of contact and uncertain physical state	Explicit verification and acceptance predicate
79.4 / 122	Affected populations and historical decisions	Explicit verification and acceptance predicate
79.5 / 122	Terminal evidence and responsible transfer	Explicit verification and acceptance predicate
79.6 / 123	Learning and sustained accountability	Explicit verification and acceptance predicate
80.1 / 124	One complete application schedule	Explicit verification and acceptance predicate
80.2 / 124	Domain and verification completeness	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
80.3 / 124	Competent independent closure	Explicit verification and acceptance predicate
80.4 / 124	Bounded claim and publication	Explicit verification and acceptance predicate
80.5 / 124	Continuing conformity and change	Explicit verification and acceptance predicate
80.6 / 125	Completion boundary	Explicit verification and acceptance predicate

Appendix A — Controlling source requirements

The following text is reproduced from the supplied ASTRA FIRST EDITION. The clause identifier and page refer to that 248-page source. These excerpts and their evidence fields must be read with all triggered normative annexes. Newly authored implementation steps elsewhere in this document do not amend the core standard.

1.3 — Object and responsibility tuple

Source: AF-AST-STD-001, page 10.

Each application shall identify the responsible legal entity, actual performer, object type, family and module, sites and remote functions, configuration or programme version, lifecycle role, applicable period, criticality, profile and exclusions. Products, services, processes, people, supplier scopes, educational programmes, assessment providers and environmental statements are separate objects. A combined dossier may share evidence but shall provide a separate conclusion and status history for each claimed object. Where a duty is outsourced, the record shall identify both the performer and the organisation retaining accountability.

Required evidence: Complete scope tuple; separate requested outcomes; actual-performer map.

1.5 — Activity-based applicability

Source: AF-AST-STD-001, page 11.

The applicant shall make a reasoned applicability decision for every common and family requirement. Non-applicability requires the actual activity and retained responsibility to be absent, without undermining a claimed outcome. Small size, another certificate, customer nomination or outsourcing alone does not justify exclusion. A provider that changes from distribution to repair, or from laboratory testing to product certification, shall reassess its scope before making the broader claim. Technical reviewers shall approve material exclusions and record the supporting evidence.

Required evidence: Approved applicability matrix; technical rationale; review triggers and version history.

8.2 — Equipment identity and fitness

Source: AF-AST-STD-001, page 18.

Equipment, software-controlled instruments, fixtures, tools and reference artefacts shall be uniquely identified and suitable for the required range, resolution, accuracy, uncertainty and duty. Verify acceptance before first use, after repair or configuration change, and when validity is questioned. Records shall include version, location, maintenance, checks, restrictions and status. Calendar calibration alone shall not establish fitness for every method or specimen. Out-of-service equipment shall be prevented from supporting an authorised result.

Required evidence: Equipment register; acceptance and checks; method suitability; restricted-use controls.

8.3 — Traceability and calibration

Source: AF-AST-STD-001, page 18.

Measurement results shall have a technically appropriate documented connection to accepted reference quantities or justified reference bases, with uncertainty contributions and competent calibration evidence. Verify the actual service range and result, not only the provider's logo. Where direct reference traceability is not technically possible, document the alternative reference, method validation and limitations. Do not claim metrological traceability from an unverified manufacturer declaration or a broken chain of comparisons.

Required evidence: Calibration chain; certificates/results; uncertainty contributions; justified alternative basis.

9.4 — Measurement model and uncertainty

Source: AF-AST-STD-001, page 20.

Evaluate uncertainty appropriate to the reported result and decision. Identify measurand, significant corrections, input distributions, sensitivity coefficients, dependence, sample preparation and environmental effects. The calculation shall distinguish standard and expanded uncertainty, coverage factor, units and coverage interpretation. Known material bias shall be corrected or explicitly handled through an approved model, not hidden in a convenient uncertainty allowance. A result shall not inherit an uncertainty copied from an unrelated calibration capability.

Required evidence: Uncertainty budget; corrections; covariance; units; coverage and applicability justification.

9.5 – Decision rules and boundary results

Source: AF-AST-STD-001, page 20.

Agree the decision rule before evaluation and record its treatment of false acceptance, false rejection, uncertainty and criticality. Annex G sets the full-interval rule and alternative-rule controls. Conformity demonstrated, nonconformity demonstrated and indeterminate are separate outcomes under that rule. Indeterminate work remains held from acceptance pending valid disposition. Repeating observations until one passes, rounding a borderline value into compliance or changing the specification after seeing the result is not a valid resolution.

Required evidence: Pre-agreed rule; unrounded inputs; outcome; hold and authorised disposition.

11.3 – Existing evidence and reuse

Source: AF-AST-STD-001, page 22.

Review prior reports, approvals and certificates for authenticity, issuer competence, actual method, site, period, conditions and configuration. Identify precisely which requirement and decision use they support and what remains to be evaluated. Include adverse results and restrictions. Another outcome shall not be declared equivalent solely from a similar title or scope label. Evidence reuse may reduce repeated document requests but cannot remove necessary local implementation, witnessing or independent decision.

Required evidence: Reuse matrix; authenticity/scope checks; residual gaps; controlled access to original evidence.

12.3 – Method-family witnessing

Source: AF-AST-STD-001, page 23.

Group methods only when common principles, equipment, competence, ranges and failure mechanisms justify representativeness. Witness each distinct method or capability family, including material extremes and high-consequence tasks. A single demonstration shall not cover unrelated techniques merely because one employee performs them. Include the whole relevant task from preparation and identity through data interpretation and reporting. Map any unobserved part to valid supplementary evidence or exclude it from the granted scope.

Required evidence: Witnessing plan; family grouping rationale; observed limits; supplementary evidence.

13.3 – Witness control

Source: AF-AST-STD-001, page 25.

Record the actual task, date, site, equipment, software, personnel, conditions, method version and acceptance basis. Observe essential steps directly where required and prevent coached performance from being misrepresented as routine independent work. Controlled simulation is acceptable only where the profile justifies its fidelity and restrictions. Live work shall not be made unsafe to create a demonstration. A missing essential observation requires supplementary evidence, reassessment or restricted scope, not a presumed pass.

Required evidence: Witness log; essential steps; simulation validity; unobserved-step disposition.

14.1 – Finding formulation and classification

Source: AF-AST-STD-001, page 25.

A finding shall identify the exact requirement and version, objective evidence, gap, affected object/site/period and classification rationale. Use critical, major, minor and observation categories as defined in Annex G. An observation is not a substitute for a demonstrated failure. Several local failures may together establish systemic breakdown. Determine technical containment separately from administrative grade so that an immediate hazard is not delayed by debate over wording.

Required evidence: Requirement–evidence–gap record; classification; extent and protective decision.

14.2 – Immediate protection and notifications

Source: AF-AST-STD-001, page 25.

Upon a credible critical concern, the responsible organisation shall protect people and affected work immediately, preserve evidence and notify required recipients. A holder shall notify its operator within 24 hours of awareness; earlier applicable duties remain. On a substantiated critical concern, the operator shall suspend the affected status or impose an effective evaluated restriction within 24 hours. An independent duty function with a pre-existing mandate may act

urgently, followed by prompt independent review.

Required evidence: Awareness and action times; containment; notification/acknowledgement; status decision.

14.3 – Occurrence, escape and systemic extent

Source: AF-AST-STD-001, page 26.

The organisation shall determine why the problem occurred and why existing controls did not prevent or detect it. Identify affected and potentially affected outputs, sites, learners, reports, suppliers and configurations, including those already delivered. Test causal explanations with evidence. Training, a revised procedure or blaming an operator alone is not sufficient where workflow, capacity, interface, equipment or management conditions contributed. Preserve rejected hypotheses and material uncertainty.

Required evidence: Population trace; tested causes; occurrence/escape controls; systemic review.

14.4 – Plans, closure and effectiveness

Source: AF-AST-STD-001, page 26.

Submit a corrective-action plan within 30 calendar days of finding notification. Verify major closure within 60 days and minor closure within 90 days, while immediate protection remains separate. Define effectiveness criteria and observation exposure before closing. Review changes for unintended effects. A new finding number, changed owner, amended report or rescheduled plan shall not restart the original clock. Missed deadlines trigger the affected status action in Annex H, not an automatic extension.

Required evidence: Accepted plan; original due dates; implementation and effectiveness evidence; verified closure.

14.5 – Existing status and new grants

Source: AF-AST-STD-001, page 26.

Initial grants, renewals and extensions require closure of every in-scope nonconformity. An existing status may continue with a local minor only after adequate protection, reviewed cause and extent, accepted plan and a reasoned independent conclusion that essential controls remain intact. A major compromising ongoing conformity requires suspension, unless an independently demonstrated unaffected scope can be restricted. A future promise of correction is not present competence.

Required evidence: Independent continuation/restriction rationale; closed findings for grant; current protection.

18.1 – Process or product object

Source: AF-AST-STD-001, page 30.

The application shall distinguish a qualified process from a conforming product configuration, family, lot or serial. A process scope shall identify site, equipment, material/geometry range, essential variables and outputs. A product scope shall identify technical requirements, intended use, configuration, production basis, acceptance and support. Combined evaluation is permissible only with separate criteria and conclusions. A machine approval shall not become approval of every process run or product made using it.

Required evidence: Process/product scope; technical profile; distinct decision boundary.

18.2 – Qualification plan

Source: AF-AST-STD-001, page 30.

Before unrestricted use, demonstrate the proposed process under representative conditions and justified extremes. The plan shall identify material sources, geometry, equipment, personnel, software, environment, repetitions, measurements and acceptance criteria. Retain failed and excluded runs and their technical disposition. Qualification by similarity shall identify differences, mechanisms and why retained evidence bounds them. A generic supplier capability declaration or a single favourable prototype shall not replace a technically complete qualification.

Required evidence: Qualification matrix; representative trials; failed-run history; approved process window.

18.3 – Essential variables and point-of-use control

Source: AF-AST-STD-001, page 30.

Identify variables and combinations capable of affecting hidden or critical properties, including preparation and post-processing. Define authorised ranges, monitoring, alarms, hold points, personnel and reaction plans. Record actual variables against each run and output identity. A requirement to maintain an approved window shall not be replaced by an average result that hides an excursion. Critical software recipes, machine programmes and tooling shall have controlled identity and change approval.

Required evidence: Essential-variable register; controlled instructions; run records; excursion detection.

18.4 – Materials, genealogy and authenticity

Source: AF-AST-STD-001, page 30.

Demonstrate traceability of material, feedstock, consumables and components to actual products and process runs. Control mixing, splitting, blending, reuse, condition, shelf/out-time and source changes. Validate digital genealogy and reconcile quantities. A certificate of origin is not proof of every required material property. Suspect or counterfeit input shall be isolated, investigated and traced through affected output before a conformity claim is maintained.

Required evidence: Material genealogy; quantity balance; input suitability; suspect-output trace.

18.5 – First article and production readiness

Source: AF-AST-STD-001, page 30.

Account for all applicable characteristics of a production-representative article using actual results, current data, material evidence, qualified processes and controlled software. A partial first article requires a justified changed/unchanged characteristic analysis. Production readiness shall additionally address resources, measurement capability, operators, suppliers, process stability and unresolved risks. One conforming article shall not replace ongoing controls or establish capability for untested variants.

Required evidence: Characteristic accountability; actual route; partial/full rationale; readiness decision.

18.6 – Capability and monitoring

Source: AF-AST-STD-001, page 31.

Distinguish process stability, statistical capability and individual-output acceptance. Statistical indices require suitable data, subgrouping, measurement capability and a justified model. Do not pool incompatible configurations to improve an index or recalculate limits merely to conceal a drift. For low-volume or one-off work, use a technically justified combination of qualification and individual verification rather than an unsupported capability claim. The profile shall define the actual criteria, not a universal index threshold.

Required evidence: Study design; model/stability review; monitoring; justified low-volume alternative.

18.7 – Excursion, change and requalification

Source: AF-AST-STD-001, page 31.

After an excursion, identify the potentially affected interval and outputs from the last valid state. Additional inspection is acceptable only when capable of detecting the effect; a superficial pass cannot erase an inherently hidden defect mechanism. Changes to site, material, geometry, equipment, software, personnel or post-processing shall trigger requalification review. Receiving capability shall be demonstrated before transfer. Release restrictions remain until the required evidence and approvals are restored.

Required evidence: Affected population; technical disposition; change impact; full/partial requalification.

18.8 – Product release and continuing claim

Source: AF-AST-STD-001, page 31.

Product release shall use the agreed technical criteria and instance evidence independently of the organisation's system status. An ongoing family claim requires controlled production, surveillance, change notification and field feedback. A one-time test shall not authorise indefinite output. Labels shall state the exact scope and required restrictions. Safety or mission claims, including suitability for space or defense applications, require the corresponding application-specific evidence and approvals.

Required evidence: Unit/lot acceptance; family surveillance; approved labels; in-service feedback and limitations.

19.12 – Technical witnessing for accreditation

Source: AF-AST-STD-001, page 33.

The accrediting team shall witness representative activities for every distinct method family or inspection capability and examine a complete application-to-report trail. Include adverse work, authorised sign-off, uncertainty, outsourced results and subsequent controls. Similar-method grouping requires a written technical rationale. An organisational audit with no relevant technical observation is not a completed laboratory or inspection competence evaluation. The final scope shall match the actual demonstrated capability, locations and limitations.

Required evidence: Witness coverage; complete case trail; independent scope review; accreditation decision.

30.2 – Controlled transition

Source: AF-AST-STD-001, page 48.

For a new profile or substantive version, identify affected holders, evidence gaps, changed methods, competence, system updates, communications and effectivity. Set a technically justified transition that does not waive immediate safety duties. Preserve the basis of previous decisions and state when additional assessment is needed. Neither indefinite grandfathering nor automatic retrospective invalidation is presumed. A future requirement is not applied as though it had governed an earlier decision.

Required evidence: Transition plan; holder impact; competence/tool updates; actual effective versions.

30.4 – Scope withdrawal and learner/customer protection

Source: AF-AST-STD-001, page 48.

Before closing a profile or provider operation, identify active holders, open cases, pending appeals, unresolved findings, learners, records, status, contracts and financial duties. Notify affected parties and arrange lawful transfer or teach-out as relevant. A closure shall not erase adverse evidence or imply continued authority. Preserve access to historical decisions and correction channels. If urgent cessation is required, prioritise protection and accurate communication while completing residual obligations.

Required evidence: Closure plan; affected-party notices; transfer/teach-out; retained records and remedies.

31.3 – Actual adoption record

Source: AF-AST-STD-001, page 49.

Record the authenticated legal operator, technical approval, consultation completion, competent institutional adoption, signatories, effective date, applicable instruments and any necessary compatibility amendments. Keep edition date distinct from legal or operational effectivity. Uncompleted approval fields shall not be filled with assumed names or dates. Programme-wide adoption alone shall not activate every listed technical scope; each profile requires the independent readiness and scope decision in Annex P.

Required evidence: Authentic adoption; completed compatibility conditions; individual scope activation.

32.1 – Mission definition and accountable boundaries

Source: AF-AST-STD-001, page 50.

The responsible organisation shall establish an approved mission or service concept describing intended beneficiaries, objectives, success conditions, operating environments, duration, interfaces and constraints. The concept shall distinguish mission success from protection of people, essential infrastructure and the environment when success is no longer achievable. Normal, degraded, emergency, maintenance and retirement conditions shall be considered. Every assumption supplied by another organisation shall have an owner and a means of verification. Commercial ambition or a planned demonstration shall not be recorded as an established operational capability.

Required evidence: Mission concept; responsibility boundary; scenario set; success and protective-state criteria; external-assumption register.

32.2 – Lifecycle assurance plan

Source: AF-AST-STD-001, page 50.

The assurance plan shall connect requirements, design, procurement, manufacturing, integration, verification, acceptance, operation, support and retirement. It shall identify activities that require independent challenge, critical characteristics, technical specialists, resources, records and decision authorities. The organisation shall update the plan when mission

duration, operating conditions, suppliers or architecture change. Planning shall include failures during development and operation, not only the nominal delivery sequence. A supplier's assurance plan may provide inputs, but the integrator shall retain responsibility for the completeness of the integrated assurance argument.

Required evidence: Lifecycle assurance plan; interface allocation; critical-characteristic register; review and update history.

32.3 – Gates and irreversible commitments

Source: AF-AST-STD-001, page 50.

Each lifecycle gate shall have defined entry conditions, required technical evidence, unresolved-issue rules, independent review and an accountable exit decision. A gate may authorise limited further development without authorising production, operational deployment or an ASTRA outcome. Conditions shall identify permitted work, prohibited commitments, an owner and closure evidence. Before an irreversible action, the responsible authority shall explicitly review remaining uncertainty and recovery limitations. A schedule milestone, procurement expenditure or successful presentation shall not substitute for a technical gate decision.

Required evidence: Gate criteria; configuration-specific review dossier; decision and conditions; verified closure before dependent action.

32.4 – Integrated assurance case

Source: AF-AST-STD-001, page 50.

The organisation shall maintain an argument linking each material safety, performance and mission claim to requirements, assumptions, configuration, evidence and limitations. The case shall expose adverse evidence, competing explanations, common dependencies and unresolved uncertainty. It shall distinguish analysis, simulation, observed demonstration and service experience. Independent review shall challenge whether the evidence supports the actual claim rather than merely whether documents exist. An accepted component or qualified supplier shall not establish the acceptability of every integrated configuration or operational scenario.

Required evidence: Claim-evidence map; assumption and uncertainty records; counter-evidence; independent challenge; bounded conclusions.

32.5 – Handover and long-life accountability

Source: AF-AST-STD-001, page 51.

Handover shall reconcile the as-built or as-delivered configuration, accepted changes, operating instructions, competent personnel, support arrangements, restrictions and unresolved duties. The receiving organisation shall confirm usable access to the information necessary for its role. Long-life programmes shall address loss of suppliers, tools, software services and original expertise. Record transfer shall preserve meaning and history; it shall not be presented as transfer of regulatory privileges or an expanded conformity scope. Responsibilities for later defects and corrections shall remain identifiable after commercial completion.

Required evidence: Handover manifest; receiving acceptance; support and knowledge-preservation plan; continuing-duty allocation.

32.6 – Through-life feedback and reassessment

Source: AF-AST-STD-001, page 51.

The organisation shall connect incidents, maintenance findings, production changes, field data and user feedback to the original requirements and assurance case. Material new evidence shall trigger review of affected configurations and earlier conclusions. The review shall distinguish a changed operating context from an error in the original evidence. Restrictions, corrective actions and recipient communications shall be proportionate to the supported extent. An operational history without a reported failure shall not close a hazard that the monitoring system was unable to detect.

Required evidence: Feedback-to-configuration trace; affected-population review; updated case; corrective and communication records.

33.1 – Requirement quality and allocation

Source: AF-AST-STD-001, page 51.

Requirements shall be identifiable, verifiable, internally consistent and assigned to an accountable implementation and acceptance function. The organisation shall record the technical basis, intended use, units, tolerances where relevant, environment and consequence of failure. Derived requirements shall retain their relationship to parent needs and constraints. Ambiguous terms such as future-ready or aerospace-grade shall be translated into evaluable conditions before they are used for acceptance. Requirements that are not yet technically defined shall remain open and shall

prevent the dependent positive conclusion.

Required evidence: Requirement baseline; allocation and rationale; verification method; unresolved-definition register.

33.2 – Multidisciplinary interfaces

Source: AF-AST-STD-001, page 51.

Interface definitions shall address relevant mechanical, structural, electrical, thermal, fluid, data, timing, human and organisational characteristics. They shall identify the provider and receiver, valid configurations, ownership, assumptions, error handling and change-notification duties. Integration reviews shall examine incompatible assumptions between individually acceptable subsystems. Units, coordinate frames, reference times and version conventions shall be explicit. Interface acceptance shall include abnormal inputs and loss of a supporting service where material to the intended use.

Required evidence: Interface-control baseline; owner acknowledgements; compatibility review; integrated verification and anomalies.

33.3 – Configuration states and genealogy

Source: AF-AST-STD-001, page 52.

The configuration system shall distinguish intended, designed, built, tested, delivered, installed and currently operated states. Each technical result shall identify the state actually evaluated, including relevant software, parameters, materials and modifications. Serial, batch, assembly and parent-child relationships shall survive splitting, replacement and repair. Configuration identity shall not be inferred from a commercial product name alone. Where a legacy baseline is incomplete, the organisation shall establish the uncertainty and necessary verification before extending the assurance claim.

Required evidence: Configuration register; as-built and as-operated records; genealogy; test-to-configuration links; legacy gap review.

33.4 – Change impact and independence

Source: AF-AST-STD-001, page 52.

A proposed change shall identify affected requirements, interfaces, hazards, qualification evidence, manufacturing controls, maintenance data, training and public claims. The review shall state which prior evidence remains valid and why, what becomes invalid and what new demonstration is required. The design or technical authority shall approve the technical disposition, while the independent conformity function separately determines any effect on ASTRA status. A document version, new software version or relocated process shall not automatically inherit its predecessor's evidence.

Required evidence: Before-and-after baseline; impact map; retained-evidence argument; new tests; separate technical and status decisions.

33.5 – Engineering budgets and margins

Source: AF-AST-STD-001, page 52.

Relevant mass, power, energy, thermal, structural, timing, memory, communication and consumable budgets shall have a baseline, owner, allocation, uncertainty treatment and review trigger. Margin definitions shall be consistent across subsystem and system levels so that the same reserve is not counted more than once. Cumulative changes and degraded conditions shall be reviewed. A positive arithmetic balance shall not establish physical adequacy where the underlying model, environmental assumption or failure scenario is unsupported.

Required evidence: Budget register; allocation and margin definitions; uncertainty; cumulative-change review; approved technical basis.

33.6 – Verification closure and model limitations

Source: AF-AST-STD-001, page 52.

The verification matrix shall link each requirement to an approved method, representative configuration, evidence and acceptance decision. Unverified interfaces and waived observations shall remain visible. A model shall be credible for the particular decision and conditions in which it is used; a visual match or successful numerical execution is insufficient. Extrapolation beyond validated conditions requires explicit justification and independent review. Verification closure shall not be declared by counting completed tests when a required function or failure condition remains unexamined.

Required evidence: Verification matrix; coverage and configuration review; model limitations; requirement-specific closure.

34.1 – Approval and operational responsibility

Source: AF-AST-STD-001, page 53.

The organisation shall identify the applicable design, production, maintenance and operational approval interfaces and the holders of those responsibilities. The technical profile shall define aircraft or equipment configuration, intended operation, environment, limitations and supporting obligations. ASTRA conformity shall not be described as an airworthiness certificate, flight clearance or operating licence. A change of operator, configuration or intended use shall trigger review of whether the existing evidence and permissions remain relevant.

Required evidence: Responsibility and permission matrix; aircraft/equipment profile; operating boundary; change review.

34.2 – Installation and integrated compatibility

Source: AF-AST-STD-001, page 53.

Equipment integration shall address mounting and loads, power quality, electromagnetic effects, thermal management, software and data interfaces, timing, access and human interaction as applicable. The organisation shall evaluate failure propagation and common resources, including assumptions about other installed systems. Component qualification shall be distinguished from installed-system demonstration. Modifications shall update affected maintenance data, spares, training and configuration records. Unassessed installation effects shall remain a limitation even where the component carries a valid separate conformity result.

Required evidence: Installation assessment; integrated test matrix; interface results; affected-support update records.

34.3 – Complete unmanned-system boundary

Source: AF-AST-STD-001, page 53.

An unmanned-system assurance case shall include the aircraft, control station, command links, navigation sources, remote personnel, software, external services and operating environment. It shall define the operational domain and the response to wrong, late, unavailable or unauthorised information. Safe responses to communication loss and degraded navigation shall be demonstrated under the approved technical basis. A remote pilot, geofence or automated protective function shall not be presumed effective without evidence for its relevant failure conditions.

Required evidence: System boundary; domain and dependency map; contingency validation; human-authority and link-loss evidence.

34.4 – Advanced mobility and ground interfaces

Source: AF-AST-STD-001, page 53.

Programmes using novel aircraft architectures shall demonstrate compatibility with the actual landing site, supporting infrastructure, energy service, passenger movement and emergency arrangements. The profile shall distinguish prototype demonstration from routine service capability. Ground operations, training and maintenance shall reflect the delivered architecture rather than assume conventional-aircraft equivalence. Evidence shall include representative disruptions and degraded support conditions. A vertiport or charging capability result shall not independently establish aircraft suitability or permission to conduct a passenger operation.

Required evidence: Aircraft-site interface dossier; support readiness; representative service validation; separate operational permissions.

34.5 – Electric, hybrid and alternative-energy systems

Source: AF-AST-STD-001, page 53.

The organisation shall examine coupled electrical, thermal, mechanical, chemical and control-system hazards for the actual energy architecture and duty cycle. It shall define supported operating and storage limits, degradation treatment, protection, isolation and emergency interfaces through competent technical work. Maintenance, ground support and responders shall receive controlled information relevant to their role. Environmental benefit and technical interchangeability are separate claims; a low-carbon supply statement shall not establish that a fuel or energy system is compatible with the aircraft.

Required evidence: Integrated energy-hazard case; qualified limits; support instructions; compatibility and claim separation.

34.6 – Continued operation and configuration feedback

Source: AF-AST-STD-001, page 54.

Continuing assurance shall connect operational anomalies, maintenance findings, updates, equipment substitutions and changes in the operating environment to affected aircraft configurations. The organisation shall preserve life and condition information and communicate restrictions through the actual responsible approval holders. Data-driven

monitoring may support this process only within its validated detection boundary. A fleet-wide statistical improvement shall not justify continued use of a specific configuration with an unresolved essential control or unsupported maintenance release.

Required evidence: Fleet/configuration trace; occurrence and maintenance feedback; update approvals; actual release and restriction records.

35.1 – Mission architecture and dependencies

Source: AF-AST-STD-001, page 54.

The organisation shall establish the mission architecture, lifecycle responsibilities, communication and support dependencies, expected duration and repairability assumptions. The assurance boundary shall include the interactions between payload, spacecraft platform, launch interface and ground segment. Commercial or rapid-development objectives shall not remove evidence needed for irreversible mission commitments. A technically successful subsystem shall not be described as a complete successful mission where ground, communications or end-of-life responsibilities remain unresolved.

Required evidence: Mission architecture; role and interface matrix; duration and support assumptions; integrated assurance plan.

35.2 – Environment definition and tailoring

Source: AF-AST-STD-001, page 54.

Relevant mechanical, acoustic, thermal, vacuum, radiation, charging, electromagnetic, contamination and material-degradation environments shall be identified from the intended mission. Qualification and acceptance strategies shall state their different purposes and the rationale for selected conditions. Test-article differences, fixture effects, cumulative exposure, limitations and potential over-test shall be reviewed. Tailoring shall preserve the required confidence in the actual application; a familiar terrestrial test or previous mission label shall not be used as an unexplained substitute.

Required evidence: Mission-environment specification; tailored verification matrix; article differences; exposure and limitation reviews.

35.3 – Parts, materials and suitability

Source: AF-AST-STD-001, page 54.

Parts and materials shall be selected using provenance, relevant performance evidence, mission consequence and susceptibility to the actual environment. The organisation shall examine whether screening, derating, additional qualification or protective design is needed under its approved technical basis. Commercial or heritage status alone shall neither establish nor rule out suitability. Changes of manufacturer, process, source or intended exposure shall be assessed. Missing lot or configuration information shall remain an explicit uncertainty rather than be replaced by a catalogue description.

Required evidence: Parts/materials assurance plan; suitability and provenance records; mission-specific qualification; change controls.

35.4 – Contamination and cleanliness

Source: AF-AST-STD-001, page 55.

Contamination control shall identify sensitive surfaces, assemblies, materials and operations and the relevant particulate, molecular or biological concerns. Requirements shall govern preparation, cleaning, storage, integration, transport and acceptance methods. Exposure history and deviations shall be linked to actual articles. Where planetary-protection obligations apply, the responsible organisation shall identify the actual requirements and permissions and retain verification evidence. An ASTRA statement of cleanliness shall not be presented as an independent authorisation for restricted planetary activities.

Required evidence: Contamination budget or criteria; sensitive-item register; handling records; measured acceptance and required permissions.

35.5 – Ground segment and command assurance

Source: AF-AST-STD-001, page 55.

Ground systems shall have controlled configurations, validated procedures and accountable command authority. The organisation shall address command origin, integrity, timing, compatibility and prevention of unintended actions. Readiness work shall include rehearsals, outages, handovers, anomaly response and limitations of telemetry. The absence of a received alarm shall not prove the absence of a hazardous state when communication or sensing is inadequate.

Critical remote actions shall use the review and protective controls justified by consequence.

Required evidence: Ground baseline; command-authority records; rehearsal and outage evidence; telemetry interpretation limits.

35.6 – Mission readiness and uncertainty acceptance

Source: AF-AST-STD-001, page 55.

Before mission commitment, reconcile the delivered configuration, qualification results, open anomalies, ground readiness, operating procedures, available resources and end-of-life plan. Unresolved essential conditions shall block the dependent positive release. A permitted limited development decision shall state what remains prohibited. The accountable technical authority shall record residual uncertainty and limitations without claiming that every possible mission condition has been demonstrated. Subsequent evidence shall update the actual mission assurance case and relevant recipients.

Required evidence: Integrated readiness dossier; independent review; bounded decision; unresolved-duty and limitation register.

36.1 – Precise activity and authority

Source: AF-AST-STD-001, page 55.

The profile shall identify the responsible legal entities, launch or re-entry service, site, vehicle or article, configuration, support equipment and relevant approval interfaces. The organisation shall distinguish vehicle design assurance, site capability, mission readiness and an individual operational permission. Contracts shall identify retained responsibilities across customers and subcontractors. No conventional-airport, generic laboratory or broad aerospace-system result shall automatically confer competence for launch or re-entry activities.

Required evidence: Exact activity/site profile; permissions; responsibility and interface agreements; distinct outcome boundaries.

36.2 – Site, vehicle and payload compatibility

Source: AF-AST-STD-001, page 56.

The organisation shall verify compatibility of the actual vehicle, payload, ground support, utilities, data exchange and handling interfaces. It shall examine the consequences of a changed payload, supporting system or operating condition on earlier evidence. The applicable technical authorities shall resolve inconsistent interface assumptions before dependent use. Acceptance shall be based on the actual configuration; the presence of an interface drawing or a previous successful operation shall not establish compatibility of a materially changed arrangement.

Required evidence: Configuration-specific interface matrix; reviewed changes; integration checks; unresolved-interface controls.

36.3 – Readiness and hazardous-work separation

Source: AF-AST-STD-001, page 56.

Operational readiness shall verify necessary people, equipment, approved technical data, protective functions, communication, emergency interfaces and stop authorities. Technical acceptance criteria and protective stop conditions shall be distinguished. The ASTRA assessment shall examine whether competent authorised organisations implement their controls, not direct a launch, set hazardous operating parameters or substitute for public safety decisions. Inaccessible essential evidence shall result in an appropriate scope restriction or hold rather than a presumption of safe capability.

Required evidence: Readiness review; current specialist procedures; protective-function evidence; lawful witnessing and approval boundaries.

36.4 – Reuse and accumulated exposure

Source: AF-AST-STD-001, page 56.

Reusable articles shall retain identity, configuration, prior flights or uses, maintenance, refurbishment, repairs and accumulated relevant exposure. The organisation shall define how the reuse decision is supported by inspection capability, life assessment and qualified repair or replacement. A successful prior mission shall not reset life or conceal damage. Unknown history shall remain a controlled uncertainty. New materials, repair methods or changed duties shall undergo technical review before previous qualification is relied upon.

Required evidence: Article history; exposure and condition record; inspection and repair evidence; configuration-specific reuse decision.

36.5 – Recovery, re-entry and end-of-operation interfaces

Source: AF-AST-STD-001, page 56.

The assurance plan shall identify the responsible parties for recovery, containment of residual hazards, custody, transport, environmental obligations and subsequent examination. Expected behaviour and evidence limitations shall be explicit where direct access is not possible. Disposal or recovery shall not be claimed complete from an unverified signal or an unchanged plan. The organisation shall retain actual completion evidence and communicate unsuccessful, partial or uncertain outcomes accurately to the relevant authorities and recipients.

Required evidence: Recovery/disposition responsibilities; actual status evidence; custody record; limitations and recipient communication.

36.6 – Learning without automatic scope expansion

Source: AF-AST-STD-001, page 56.

After each relevant operation or development event, review anomalies, interface deviations, protective actions and changes in the technical basis. Separate lessons about a particular configuration from claims about an entire vehicle or site family. A new payload class, service mode, site or re-entry concept shall require an assessed extension before an expanded ASTRA claim is used. Operational experience may support an equivalence argument, but shall not replace evidence for a new failure mechanism.

Required evidence: Post-event review; bounded experience argument; extension assessment; updated profile and readiness basis.

37.1 – Operational state and authority

Source: AF-AST-STD-001, page 57.

The operator shall maintain the identity and configuration of the space asset, relevant operating states, authorised commands, current restrictions and responsible personnel. Handover between ground teams and external service providers shall preserve assumptions, unresolved anomalies and authority limits. Telemetry-derived state shall be distinguished from direct observation and unverified inference. Where the state necessary to support an action is unknown, the approved decision process shall retain the uncertainty and apply the protective boundary defined for the mission.

Required evidence: Asset/configuration record; command and duty authority; state confidence and limitations; handover evidence.

37.2 – Tracking, coordination and environmental responsibility

Source: AF-AST-STD-001, page 57.

The programme shall identify its applicable tracking, coordination, collision-information, debris-prevention and end-of-life responsibilities. Data sources, age, reference systems, uncertainty and dependency on other operators shall be recorded where material. The organisation shall not present a coordination message or nominal plan as proof that every external hazard is controlled. Changes in mission duration, orbit or support availability shall trigger review of the assurance case and remaining resources under the actual approval framework.

Required evidence: Responsibility register; data-provenance and uncertainty records; coordination evidence; updated end-of-life assessment.

37.3 – Servicing and assembly boundaries

Source: AF-AST-STD-001, page 57.

A servicing or assembly activity shall identify participating assets, interface configurations, ownership, consent, technical responsibilities and safe-state assumptions. The evidence plan shall address limited inspection access, communication delay, remote verification and the consequences of failure to complete the intended task. Prior acceptance of each separate asset shall not prove compatibility of their interaction. The organisation shall establish the basis on which completion, partial completion or an unverified result will be recorded and independently reviewed.

Required evidence: Authorised activity boundary; interface and consent records; remote verification plan; exact completion criteria.

37.4 – In-space manufacturing and process evidence

Source: AF-AST-STD-001, page 57.

Manufacturing in an inaccessible environment shall connect input material identity, process configuration, relevant environmental conditions, monitoring capability and output requirements. The organisation shall identify which properties are directly measured, inferred through a validated model or not observable. A terrestrial process qualification shall not automatically qualify in-space use. Monitoring data may replace a physical acceptance activity only when the equivalence is technically supported and prospectively approved for the defined product and process boundary.

Required evidence: Environment-specific qualification; material genealogy; sensor/model validity; output acceptance and observability limitations.

37.5 – Remote changes and interruption

Source: AF-AST-STD-001, page 58.

Software, command sequences, process parameters and operational procedures shall remain configuration controlled. The change review shall examine interruptions, partial execution, stale data, recovery and the technical feasibility of rollback. A returned communication link or successful software restart shall not by itself confirm that a physical process or asset state has been restored. The responsible authority shall reconcile what actually occurred before permitting dependent use or a completed-service claim.

Required evidence: Change and update dossier; interrupted-action records; reconciled physical/digital state; restoration authority.

37.6 – Disposal and verifiable closure

Source: AF-AST-STD-001, page 58.

End-of-life planning shall address foreseeable failure, remaining resources, support continuity and evidence of actual completion. The organisation shall preserve unresolved obligations and explain whether a final state is observed, inferred or unknown. Loss of contact shall not be labelled successful disposal without adequate evidence. Programme or provider closure shall identify a receiving custodian for necessary records and notifications. Public claims shall describe the bounded achievement rather than guarantee perpetual orbital safety or universal sustainability.

Required evidence: Disposal feasibility review; actual completion record; open-duty allocation; retained history and accurate public statement.

38.1 – Environment-specific mission concept

Source: AF-AST-STD-001, page 58.

The organisation shall define the intended surface environment, mission duration, mobility or service objectives, communication constraints, energy dependencies and support assumptions. Requirements shall address conditions relevant to the actual mission, including dust or contamination, terrain interaction, thermal exposure and access limitations. Terrestrial vehicle or industrial qualification shall be treated as evidence with a stated boundary, not automatic proof of suitability. Unsupported assumptions shall remain open before any dependent technical or conformity decision.

Required evidence: Surface mission concept; environmental and dependency specification; applicability of terrestrial evidence; open assumptions.

38.2 – Mobility and integrated resource assurance

Source: AF-AST-STD-001, page 58.

A mobility-system assurance case shall connect structure, locomotion, power, thermal control, autonomy, sensing, communications and payload interfaces. The programme shall assess coupled resource demands and degradation across the planned mission rather than demonstrate each subsystem only in isolation. Requirements and margins shall identify uncertainty and credible loss of a supporting service. The organisation shall define the evidence needed for restricted operation and safe cessation when mission objectives can no longer be achieved.

Required evidence: Integrated resource budgets; interface validation; degraded-condition analysis; bounded operating and cessation criteria.

38.3 – Remote autonomy and human intervention

Source: AF-AST-STD-001, page 59.

The operational-domain definition shall specify the authority allocated to automation and remote personnel and the conditions under which human intervention is feasible. Communication delay, incomplete sensing and limited observation shall be included in validation. A nominal human-approval step shall not be treated as effective where there is insufficient time or information to act. Material adaptation outside the approved envelope shall require renewed assurance before the changed behaviour is relied upon.

Required evidence: Authority and intervention model; scenario validation; sensing limits; change and adaptation controls.

38.4 – Surface infrastructure and resource activities

Source: AF-AST-STD-001, page 59.

Infrastructure, construction, handling and resource-processing activities shall have defined ownership, technical boundaries, environmental assumptions and acceptance criteria. The organisation shall assess material properties, connection interfaces, inspection accessibility, maintenance and decommissioning within its actual responsibility. Demonstrating a laboratory process shall not establish deployment readiness of an integrated remote facility. Specialist permissions and environmental obligations remain separate from the ASTRA evaluation, and no resource-rights claim is created by this standard.

Required evidence: Infrastructure or process profile; representative qualification; interface evidence; permissions and end-of-life responsibilities.

38.5 – Maintenance, retrieval and inaccessible evidence

Source: AF-AST-STD-001, page 59.

The assurance strategy shall identify what can be maintained, inspected, retrieved or replaced and what must remain supported by remote evidence. Diagnostic and health-monitoring methods shall be validated for the relevant failure mechanisms and shall expose false-negative and missing-data limitations. Where a physical condition cannot be established, the remaining uncertainty shall be retained. An apparently normal telemetry stream shall not replace evidence of an unobservable critical property or an inaccessible required inspection.

Required evidence: Supportability and access analysis; diagnostic validation; inaccessible-property register; approved restrictions.

38.6 – Responsible completion and knowledge preservation

Source: AF-AST-STD-001, page 59.

The organisation shall maintain the mission record, materials and configuration history, command and data provenance, anomalies and final-state evidence. Closure shall address environmental and protection obligations, remaining hazardous inventories, long-term custody and the ability to interpret records after tool or staff changes. Scientific results, engineering demonstrations and operational capability claims shall be identified separately. A research success shall not be relabelled as a fully qualified production or service capability without its own evidence and decision.

Required evidence: Complete mission dossier; final-state limitations; record custody; separate research and conformity conclusions.

40.1 – Contractual, technical and lawful boundaries

Source: AF-AST-STD-001, page 61.

The organisation shall identify actual quality, safety, security, configuration, verification and support obligations and the parties entitled to accept the work. Contractual acceptance, mission-performance evidence and legal permission shall remain separate. Controlled or classified information shall be reviewed through authorised arrangements that still provide adequate independent evidence. An inaccessible essential record shall lead to a held or limited claim, not acceptance based solely on the authority or reputation of the submitting party.

Required evidence: Obligation and acceptance matrix; access authorisations; protected evidence strategy; exact scope and limitations.

40.2 – Multi-domain integration

Source: AF-AST-STD-001, page 61.

Air, land, maritime, space and connected digital systems shall be assessed for interface compatibility, environmental exposure, common dependencies and safe degraded behaviour. The organisation shall define safe states for training, storage, transport, maintenance and non-operational use. Individually accepted equipment shall not be assumed to form an acceptable integrated platform. Hazardous tests shall remain separately authorised, with competent specialists responsible for the applicable procedures and protective limits.

Required evidence: Multi-domain interfaces; integrated verification; safe-state definitions; separate hazardous-test authorisations.

40.3 – Mission-support road and off-road vehicles

Source: AF-AST-STD-001, page 61.

The profile shall define actual duty, load, terrain, climate, transport, support and occupant requirements. Integration of mission equipment shall examine effects on structure, stability, braking, steering, energy, thermal behaviour, visibility and maintenance where relevant. A commercial chassis or component result shall not establish suitability of the modified configuration. Civil-use and mission-specific obligations shall both be identified when they apply, without presenting ASTRA as a substitute vehicle approval.

Required evidence: Duty profile; configuration and integration assessment; representative qualification; maintenance and approval interfaces.

40.4 – Maritime and underwater systems

Source: AF-AST-STD-001, page 61.

The assurance basis shall identify relevant structural, corrosion, pressure, electrical, propulsion, watertight-integrity and human-system requirements. Critical boundaries, joints, coatings and machinery shall retain material, qualification, inspection and through-life condition evidence. Inspection accessibility and deterioration shall be addressed before installation or concealment. Applicable customer and competent-authority decisions remain separate from the ASTRA result. A surface-system qualification shall not establish suitability for a different submerged duty or pressure environment without technical justification.

Required evidence: Maritime duty basis; critical-boundary records; qualified fabrication and inspection; deterioration and access plan.

40.5 – Heavy plant and industrial infrastructure

Source: AF-AST-STD-001, page 61.

Industrial assets supporting aerospace or defense work shall have a defined design basis, operating limits, utilities, protective functions and lifecycle responsibilities. Fabrication, installation and commissioning shall distinguish completed construction from verified functional and integrated performance. Hidden work shall be inspected before it becomes inaccessible where required. Bypasses, temporary repairs and overrides shall have bounded authority and verified restoration. This standard is not a structural, pressure-system or nuclear design code.

Required evidence: Asset integrity dossier; as-built records; commissioning results; temporary-condition controls; applicable technical basis.

40.6 – Controlled technology and long-life support

Source: AF-AST-STD-001, page 62.

The organisation shall identify obligations for access, transfer, end use, publication and technical support through competent authorised review. Supply due diligence shall address provenance, unauthorised substitution, conflicts and misuse concerns. Long-life support shall preserve field configurations, repair data, software maintainability, diminishing sources and qualified substitutions. Cannibalisation or refurbishment shall retain prior life and origin; unknown history shall not be reset. Membership or an ASTRA credential does not authorise a controlled transfer.

Required evidence: Controlled-technology review; supplier due diligence; field-history and obsolescence plan; substitution and custody records.

41.1 – Material identity and technical suitability

Source: AF-AST-STD-001, page 62.

The organisation shall define material composition or type, condition, relevant properties, processing history and acceptance evidence appropriate to intended use. Receipt, storage, shelf life, out-time, mixing, splitting and reuse shall preserve identity and suitability. Recycled or reclaimed content shall satisfy the same applicable technical requirements; an environmental benefit shall not replace qualification. A material certificate shall be linked to the actual supplied lot and reviewed for its technical relevance, not accepted solely because a certificate exists.

Required evidence: Material specification; lot genealogy; storage and out-time record; suitability and substitution decisions.

41.2 – Integrated route and hidden characteristics

Source: AF-AST-STD-001, page 62.

The production route shall identify every process stage, branch, handover and external performer that can affect a required characteristic. Essential variables shall include relevant preparation and downstream treatment, not only the main machine cycle. Qualification shall cover representative materials, geometry, equipment, software, personnel and environmental conditions. Final inspection shall not be assumed capable of detecting all latent process defects. The route shall preserve failed runs, rework and technical restrictions through product acceptance.

Required evidence: Route and dependency map; qualification matrix; essential variables; hidden-property rationale; original run history.

41.3 – Thermal, joining and surface processes

Source: AF-AST-STD-001, page 62.

Thermal treatment, joining, brazing, soldering, chemical preparation, plating, conversion, spray, organic coating and mechanical surface enhancement shall have scope-specific qualified procedures. The organisation shall identify the actual equipment, materials, essential variables, monitoring, verification and requalification triggers. Changes affecting hidden properties shall receive competent technical review. This standard establishes the assurance payload; it does not supply universal treatment temperatures, chemical formulations, energy settings, joining parameters or acceptance limits.

Required evidence: Qualified procedure and window; equipment and personnel scope; actual process history; verified properties and change review.

41.4 – Composites, bonding and additive manufacture

Source: AF-AST-STD-001, page 63.

Composite and bonded products shall retain constituent identity, storage and out-time, surface preparation, lay-up or assembly, tooling, cure and inspection evidence. Additive work shall retain feedstock history, machine and software state, digital build identity, orientation, monitoring and post-processing. Qualification shall address the relevant product geometry and property variations. A qualified machine, material or sensor shall not approve every output. In-process monitoring may support acceptance only within a validated detection and decision boundary.

Required evidence: Constituent/build genealogy; qualified process envelope; representative property evidence; monitoring limitations; post-process acceptance.

41.5 – Electronics, harnesses, optics and critical assembly

Source: AF-AST-STD-001, page 63.

Assembly assurance shall control component suitability and authenticity, loaded configuration, interconnections, contamination-sensitive operations, fixtures, tools and essential checks. Concealed or irreversible steps shall retain contemporaneous evidence. The organisation shall distinguish visual workmanship, electrical or functional performance and system-level suitability. Rework and part substitution shall be technically reviewed and traceable. A successful bench test shall not establish compatibility with every installation, and a supplier's broad qualification shall not replace actual assembly-route evidence.

Required evidence: Assembly baseline; component and software identity; concealed-step records; functional results; reviewed rework and installation limits.

41.6 – Production readiness, transfer and continuing control

Source: AF-AST-STD-001, page 63.

Before routine production or transfer, verify process qualification, first-article characteristic accountability, measurement capability, workforce competence, source controls and actual receiving-site implementation. Separate process stability, capability indices and individual acceptance. Low-volume work shall use an appropriate evidence strategy rather than an unsupported statistical claim. After an excursion or change, trace affected populations from the last demonstrated valid state and establish what new evidence is necessary before unrestricted use resumes.

Required evidence: Production-readiness dossier; receiving capability; monitoring design; affected-population and requalification decisions.

42.1 – Requirement-led test strategy

Source: AF-AST-STD-001, page 63.

The organisation shall select inspection, analysis, demonstration or testing according to the requirement and intended decision. The plan shall identify the actual article, configuration, environment, acceptance criterion, method, instrumentation, uncertainty, competent personnel and protective arrangements. Qualification, production acceptance, workmanship screening and research shall be distinguished. A catalogue of tests shall not be treated as a complete verification programme until every applicable requirement and material interface has an adequate method and evidence path.

Required evidence: Requirement-to-method matrix; test purpose; article/configuration identity; approved criteria and safety review.

42.2 – Test tailoring and representativeness

Source: AF-AST-STD-001, page 64.

Test conditions shall be derived from the actual technical and obligation basis. The organisation shall explain specimen geometry, material condition, mounting, fixtures, boundary conditions, input locations, operating modes and differences

from the deployed article. Similarity arguments shall identify relevant differences and failure mechanisms. Tailoring, reduced exposure or substitution of analysis shall have prospective technical approval. No universal vibration level, temperature, radiation dose, acoustic spectrum or electromagnetic severity is imposed by this standard.

Required evidence: Tailoring rationale; environment definition; specimen and fixture review; approved deviations and retained limitations.

42.3 – Combined environments and test sequence

Source: AF-AST-STD-001, page 64.

The verification strategy shall evaluate whether environmental stresses interact and whether the order of exposure affects the conclusion. Cumulative damage, preconditioning, repairs, software changes and prior unsuccessful tests shall remain part of the article history. The organisation shall distinguish necessary qualification margin from unrepresentative over-test. Where separate tests cannot demonstrate a coupled effect, an additional integrated method or justified analysis shall be established. A passed individual test shall not automatically bound every combination of operating conditions.

Required evidence: Sequence and interaction analysis; article exposure history; cumulative-effect review; additional integrated evidence.

42.4 – Data acquisition, uncertainty and protective limits

Source: AF-AST-STD-001, page 64.

Instrumentation and software shall be suitable for the required range, bandwidth, accuracy, synchronisation and uncertainty. The organisation shall retain original data, transformations, calibration and configuration evidence. Technical acceptance and safety-stop criteria shall be specified separately. An interruption, missing channel or unexpected protective action shall be recorded and assessed before restart. Restoring the test setup shall not establish that the article remains representative or that the interrupted evidence supports the intended conclusion.

Required evidence: Measurement-chain dossier; raw data; uncertainty and timing; stop/restart records; article-validity review.

42.5 – Failure, retest and independent judgement

Source: AF-AST-STD-001, page 64.

Failed, invalid and indeterminate results shall remain identifiable with their original conditions. A retest shall follow an approved technical rationale and account for selection effects, changed articles, repairs and repeat exposure. The organisation shall not test repeatedly until a favourable result appears or revise acceptance criteria after seeing the data. The independent reviewer shall examine coverage, adverse evidence and limitations. Any product concession shall remain separate from a conformity claim that requires the original criterion to be fulfilled.

Required evidence: Failure and validity classification; retest rationale; original/revised configuration; independent acceptance or hold.

42.6 – Laboratories and complete reports

Source: AF-AST-STD-001, page 64.

Testing shall use demonstrated method-specific competence, suitable facilities, traceability and continuing-validity controls. Reports shall identify actual performer, article, method/version, conditions, deviations, results, uncertainty where relevant, decision rule and supported conclusion. Subcontracted data and opinions shall be distinguishable. A laboratory competence outcome does not approve every tested product, and an article qualification does not accredit the laboratory. The final report shall expose untested characteristics and restrictions on inference to a broader family.

Required evidence: Laboratory scope and validity; complete test report; subcontractor identity; independent review and limited inference.

43.1 – Integrated energy boundary

Source: AF-AST-STD-001, page 65.

The organisation shall define the complete energy-system boundary and the interactions among mechanical, electrical, thermal, chemical and control functions. Requirements shall cover transport, storage, charging or fuelling, operation, maintenance and end of life as applicable. Common dependencies and abnormal states shall be considered. Separate component results shall not establish integrated protection where failure can propagate across interfaces. Every critical limit and protective function shall have an approved technical basis and a method of verification.

Required evidence: Energy architecture; lifecycle hazard analysis; requirement and protection map; integrated verification.

43.2 – Batteries and electrical storage

Source: AF-AST-STD-001, page 65.

Battery assurance shall retain cell and module provenance, configuration, manufacturing consistency, protective controls, thermal management and actual operating history. Qualification shall address relevant degradation and credible abnormal conditions under the approved application basis. State estimates and health-monitoring outputs shall identify their model and uncertainty. Reuse or second-life use shall require a new suitability assessment without erasing prior history. An acceptable nominal capacity or successful functional check shall not establish complete safety or fitness for another duty cycle.

Required evidence: Storage-system baseline; provenance and life history; qualification; monitoring validation; reuse decision.

43.3 – Hydrogen, fuels and chemical energy

Source: AF-AST-STD-001, page 65.

The assurance case shall identify material compatibility, containment, supply quality, contamination, detection, protective isolation and emergency interfaces appropriate to the actual architecture. Supply-chain and ground-service responsibilities shall be explicit. Technical interchangeability shall be separately demonstrated from a sustainability or provenance claim. The organisation shall maintain current specialist procedures for hazardous work and verify the competence and permissions of actual performers. This standard does not prescribe fuel formulations, operating pressures or hazardous handling instructions.

Required evidence: Compatibility and containment basis; supply-quality evidence; competent authorised procedures; separate environmental claims.

43.4 – Propulsion and rotating equipment

Source: AF-AST-STD-001, page 65.

Propulsion and rotating machinery shall have controlled requirements for operating envelope, duty, life, materials, balance, lubrication, thermal behaviour and protection as relevant. Critical parts and process histories shall remain traceable. Changes to speed, load, controls, materials or installation shall be reviewed against qualification and life evidence. The organisation shall distinguish a development performance result from acceptance of a delivered configuration. This clause sets evidence and responsibility requirements rather than design parameters or performance optimisation instructions.

Required evidence: Duty and envelope basis; critical-part genealogy; qualification and acceptance; change and life-management records.

43.5 – Ground support and emergency interfaces

Source: AF-AST-STD-001, page 66.

Ground energy delivery, charging or fuelling equipment shall be compatible with the supported system and maintained in the verified configuration. Handover shall include relevant limitations, protective actions and incident information. The organisation shall evaluate common utilities, communication dependencies and restoration after interruption. Emergency arrangements shall be exercised safely with the actual responsible parties. Availability of energy or a connected interface alone shall not establish suitability for a particular aircraft, vehicle or space system.

Required evidence: Ground-system compatibility; service capability; protective-function checks; emergency and restoration evidence.

43.6 – Qualification, change and release

Source: AF-AST-STD-001, page 66.

The qualification dossier shall reconcile system requirements, component evidence, integrated behaviour, material histories, test limitations and support capability. Essential unresolved hazards or invalid evidence shall block the dependent positive decision. After a protective event, anomaly or material change, the organisation shall review affected articles and earlier conclusions. Resumption requires actual technical acceptance. An ASTRA status or a completed commercial delivery shall not substitute for the authorised release required for the specific energy system or operation.

Required evidence: Complete qualification dossier; independent review; anomaly impact; resumption and release authority.

44.1 – Lifecycle and architectural assurance

Source: AF-AST-STD-001, page 66.

The organisation shall define requirements, architecture, implementation, integration, verification, release, maintenance and retirement for software and programmable hardware. Assurance depth and independence shall be matched to consequence and actual obligations. Architecture shall address interfaces, timing, resource limits, partitioning, fault containment and recovery where relevant. The absence of physical wear shall not be used to dismiss systematic defects, configuration errors, data corruption or environmental change. Purchased artefacts shall remain within the same assigned assurance responsibility.

Required evidence: Digital lifecycle plan; allocated requirements; architecture and consequence review; supplier responsibilities.

44.2 – Source, build and loaded configuration

Source: AF-AST-STD-001, page 66.

Source, generated code, logic, configuration, tools, dependencies and build instructions shall have controlled identities and attributable changes. The released artefact shall be linked to the reviewed baseline and the actual loaded target. Reproducibility shall be demonstrated where necessary for the intended assurance claim. Unapproved dependencies and embedded secrets shall be controlled. A software version label alone shall not establish which settings, data, model weights or external services influenced the delivered behaviour.

Required evidence: Source and review records; build/dependency manifest; artefact identity; loaded-configuration verification.

44.3 – Verification and target representativeness

Source: AF-AST-STD-001, page 67.

Verification shall address requirements, interfaces, boundaries, invalid inputs, timing, resource exhaustion, failure handling and regression. Coverage criteria shall be justified by the technical basis rather than an unexplained universal percentage. Differences between host, simulated and deployed execution shall be assessed. Uncovered behaviour, unresolved anomalies and tool limitations shall remain visible. Passing tests shall not establish completeness when the test set omits an essential condition or was not executed on a representative target.

Required evidence: Verification plan; traced test results; coverage and target-difference analysis; anomaly disposition.

44.4 – Tool and generated-output reliance

Source: AF-AST-STD-001, page 67.

Tools whose failure can create or conceal a defect shall be assessed for intended use, consequence and independent detection. Validation shall include known-answer, boundary, missing-input and prohibited-state cases. Generated calculations, code, technical statements and references shall receive competent verification before becoming controlled evidence. The organisation shall prevent unauthorised disclosure to external services. Neither successful tool execution nor a convincing generated explanation establishes the truth of the input, physical model or engineering conclusion.

Required evidence: Tool-risk and validation record; verified generated outputs; access controls; accountable technical approval.

44.5 – Release and update integrity

Source: AF-AST-STD-001, page 67.

A release shall identify approved functionality, configuration, dependencies, unresolved limitations, installation conditions and support obligations. Updates shall verify origin, integrity, compatibility and intended target before use. Interruption, failed installation, rollback and restoration shall be evaluated for the actual architecture. A security fix shall also be assessed for effects on timing, safety and qualification. The organisation shall not assume that changing a version number closes the original defect or retrospectively validates affected earlier outputs.

Required evidence: Release and update manifest; compatibility review; interrupted-update tests; rollback limits; affected-output decisions.

44.6 – Long-term support and digital retirement

Source: AF-AST-STD-001, page 67.

Long-life digital systems shall have a plan to preserve source or equivalent support access, build environments, licences, technical knowledge and records necessary for maintenance. Dependence on a cloud service or supplier shall be assessed before commitment. Migration, replacement or emulation shall preserve required behaviour and evidence meaning. Retirement shall address data custody, residual vulnerabilities, user notification and prevention of unauthorised reuse. Cryptographic signing alone shall not guarantee permanent readability or technical validity.

Required evidence: Support and obsolescence plan; access arrangements; migration tests; retirement and record-custody decisions.

45.1 – Intended use and prohibited use

Source: AF-AST-STD-001, page 67.

Each AI use shall have an accountable owner, intended purpose, operational domain, affected decisions, permitted authority and prohibited applications. The organisation shall examine foreseeable harms, security exposure, human limitations and whether a simpler, more verifiable method can meet the need. Development and experimental uses shall be separated from released operational use. A vendor's capability claim or a benchmark result shall not establish the suitability of the deployed system for a high-consequence application.

Required evidence: AI use-case register; alternatives and consequence review; domain and authority limits; release boundary.

45.2 – Data provenance and evaluation independence

Source: AF-AST-STD-001, page 68.

Datasets shall retain collection sources, rights, versions, labelling methods, relevant populations, operating conditions and known limitations. Training, tuning and evaluation partitions shall prevent leakage or unjustified overlap. The organisation shall preserve difficult, rare and adverse conditions needed for the intended use. Synthetic data shall be identified and its representativeness justified. A large dataset or overall accuracy score shall not establish coverage of a materially different population, environment or critical failure scenario.

Required evidence: Dataset manifest; partition and labelling controls; scenario coverage; synthetic-data limitations; independent evaluation design.

45.3 – Performance and uncertainty

Source: AF-AST-STD-001, page 68.

Acceptance criteria shall be fixed before evaluation and define relevant errors, denominators, exposure, uncertainty and essential protective conditions. Results shall be examined by meaningful operating condition or subgroup rather than only in aggregate. False acceptance, missed detection, unavailable output and indeterminate behaviour shall be distinguishable. A model confidence score is not automatically a calibrated probability of correctness or a probability of safe operation. Material evidence gaps shall prevent the dependent positive conclusion.

Required evidence: Prospective performance criteria; stratified results; uncertainty and calibration review where relevant; essential-failure record.

45.4 – Human oversight and safe fallback

Source: AF-AST-STD-001, page 68.

The organisation shall demonstrate that responsible people have sufficient information, time, competence and technical ability to intervene. Fallback shall be feasible in the actual operating environment and shall not rely on a failed common resource without justification. Invalid, missing, adversarial or out-of-domain inputs shall be considered under the approved threat and hazard model. A nominal manual-override button or requirement to review every result shall not count as an effective control without representative evidence.

Required evidence: Oversight task analysis; intervention and fallback tests; abnormal-input response; validated operating restrictions.

45.5 – Release, drift and bounded adaptation

Source: AF-AST-STD-001, page 68.

Model weights, preprocessing, dependencies, thresholds, sensor configuration and deployment conditions shall form an identifiable released baseline. Monitoring shall define relevant drift, changed exposure, failure indicators and accountable response. Adaptation outside the approved envelope requires renewed impact review and verification before reliance. The organisation shall retain earlier versions and explain the validity of previous conclusions after a change. An autonomous improvement claim shall not remove the need to demonstrate continued fulfilment of essential requirements.

Required evidence: Model release card; drift and response plan; adaptation boundary; change approvals; retained historical baselines.

45.6 – Assurance decisions remain attributable

Source: AF-AST-STD-001, page 68.

AI may support search, document review, classification and anomaly detection within validated limitations. It shall not independently grant, renew, suspend or restore an ASTRA outcome. The authorised decision maker shall have access to verifiable source evidence, understand material limitations and record the reasoned decision. Generated transcripts, images or observations shall not be presented as authentic events. Independent reviewers shall challenge automation bias and the risk of several tools repeating the same unsupported source.

Required evidence: Approved decision-support use; source verification; human review and decision; generated-content identification; independence checks.

46.1 – Decision purpose and model authority

Source: AF-AST-STD-001, page 69.

Every relied-upon model shall identify its owner, decision purpose, physical or operational target, version, inputs, outputs and authorised use boundary. The organisation shall distinguish an illustrative model, an engineering prediction, a synchronised digital twin and an acceptance model. Visual realism or a common data format shall not establish technical credibility. A model validated for one output or range shall not automatically support a different decision, configuration or environment.

Required evidence: Model identity and purpose; authority and use limits; target/configuration association; versioned assumptions.

46.2 – Verification, validation and uncertainty

Source: AF-AST-STD-001, page 69.

The organisation shall verify the implementation and validate the model against relevant observations for the claimed use. It shall evaluate input quality, numerical effects, calibration, sensitivity, dependence and uncertainty as appropriate. Calibration and validation evidence shall be distinguishable. Material discrepancy shall be investigated rather than concealed through repeated tuning to the same evidence. The final conclusion shall state the limits of the demonstrated domain and the consequences of relying on extrapolation.

Required evidence: Verification and validation plan; independent comparison data; sensitivity and uncertainty; discrepancy and extrapolation review.

46.3 – Twin synchronisation and stale state

Source: AF-AST-STD-001, page 69.

A digital twin shall maintain a traceable association with the actual asset and identify the source and age of updates. The system shall detect relevant missing, stale, inconsistent or wrong-configuration information. Maintenance and replacement shall update both physical and model records without erasing prior states. The organisation shall define what decisions remain permissible when synchronisation is lost. A visually current dashboard shall not be treated as proof that the underlying configuration is current.

Required evidence: Asset-twin identity; update and timestamp controls; stale-state response; configuration reconciliation.

46.4 – Replacement or reduction of physical work

Source: AF-AST-STD-001, page 69.

Where modelling replaces or reduces physical testing, inspection or practical observation, the organisation shall provide a prospective equivalence argument. It shall address failure mechanisms, validated domain, uncertainty, independent review and the material properties or behaviours that remain unobserved. The actual technical and legal obligations shall be checked before removal of a required activity. Cost, speed or model convenience alone shall not justify a reduction in necessary evidence.

Required evidence: Test-replacement rationale; validated equivalence; residual physical evidence; approval and restrictions.

46.5 – Model-based maintenance and remaining life

Source: AF-AST-STD-001, page 69.

A predictive or remaining-life output shall identify the asset history, degradation mechanism, observable inputs, model assumptions and uncertainty. The organisation shall validate the output for the intended maintenance decision and retain mandatory inspection or life-limit obligations. Absence of an alert shall not establish integrity where the model cannot detect the relevant mechanism. A new duty, repair, missing history or changed sensor shall trigger reassessment before the model supports an extended use decision.

Required evidence: Asset-history linkage; degradation and model validity; uncertainty; interval/life decision; changed-duty review.

46.6 – Reproducibility and independent access

Source: AF-AST-STD-001, page 70.

The evidence dossier shall retain sufficient model definition, input data, parameter settings, tool version and execution records to reconstruct the conclusion. Proprietary restrictions shall be managed through authorised access without accepting an inaccessible essential model by reputation. Independent review shall address the engineering relevance as well as computational correctness. Export and migration shall preserve units, field meaning, relationships and known limitations. A successful file transfer shall not establish successful model transfer.

Required evidence: Reproducible execution package; lawful independent access; engineering review; semantic migration checks.

47.1 – Safety-security dependency analysis

Source: AF-AST-STD-001, page 70.

The organisation shall identify assets, trust boundaries, suppliers, users and interfaces whose loss of integrity, availability, authenticity or confidentiality can affect assured outcomes. Threat and safety analyses shall be coordinated where protective measures can interfere with emergency or degraded operation. Engineering records, machine programmes, maintenance data and product updates shall be included, not only office systems. Assumptions about shared infrastructure and external services shall have named owners and demonstrable controls.

Required evidence: Asset and trust-boundary inventory; joint hazard/threat review; dependency ownership; approved protective controls.

47.2 – Identity, access and privileged actions

Source: AF-AST-STD-001, page 70.

Access shall follow verified identities, necessary privileges and actual roles. Human, machine and service identities shall be controlled throughout their lifecycle. Privileged release, maintenance and status actions shall have authentication and attribution appropriate to consequence. Emergency access shall be bounded, logged and reviewed. Shared credentials shall not obscure who performed an action. Changes in employment, supplier access or responsibilities shall promptly trigger the relevant permission review and removal.

Required evidence: Access and role matrix; identity lifecycle; privileged approvals; emergency logs; event-time authority checks.

47.3 – Supply-chain and dependency integrity

Source: AF-AST-STD-001, page 70.

The organisation shall maintain a relevant inventory of digital components and dependencies, their provenance, supported versions and channels for vulnerability information. Disposition shall consider actual exposure, exploitability, safety consequences and available protection. An inventory is not proof that every component is secure. Supplier changes, unsupported software and inaccessible update mechanisms shall trigger technical and continuity review. The organisation shall identify the actual party responsible for remediation and for informing affected users.

Required evidence: Dependency inventory; provenance; vulnerability assessment; support commitments; remediation and notification records.

47.4 – Connected production and operational technology

Source: AF-AST-STD-001, page 71.

Connected equipment shall protect authorised machine programmes, process parameters, monitoring data and essential functions. Segmentation, access, backup, monitoring and degraded operation shall be selected according to the actual process risk. Patches and security tools shall be assessed for compatibility with timing, safety and production qualification. When immediate change is inappropriate, a documented compensating-control decision shall have an owner, limits and review. Operational continuity shall not excuse unbounded unsupported risk acceptance.

Required evidence: Operational-technology architecture; authorised configuration; patch review; compensating controls; restoration tests.

47.5 – Update trust and cryptographic transition

Source: AF-AST-STD-001, page 71.

Updates shall verify origin, integrity, authority, compatibility and intended target configuration. The organisation shall control signing and other trust dependencies, key custody, expiry, revocation and migration. A future algorithm transition shall be planned according to product life and actual risk; this standard does not declare a particular algorithm universally

suitable. Recovery and rollback shall not silently reintroduce an unacceptable vulnerability. Evidence-preservation needs shall be considered separately from live-system authentication.

Required evidence: Update trust model; key and certificate governance; interruption/rollback tests; migration and archival-validation plan.

47.6 – Incident recovery and assured return

Source: AF-AST-STD-001, page 71.

Incident handling shall preserve evidence, contain affected use, identify impacted products and decisions, notify responsible parties and control restoration. Returning a service to availability shall be separated from verifying its data and configuration integrity. Exercises shall test recovery objectives and the meaning of restored records. Missing original evidence shall remain a gap in the dependent conclusion. An incident closure shall include the actual technical return authority and follow-up actions, not only a completed support ticket.

Required evidence: Incident and affected-output record; integrity checks; recovery exercise; authorised return and continuing actions.

48.1 – Critical suppliers and actual performers

Source: AF-AST-STD-001, page 71.

The organisation shall identify suppliers and sub-tier performers according to the technical consequence of their outputs. The scope shall record what each party actually performs, where it operates, its competent personnel, process or method capability and necessary evidence access. A trading or coordinating organisation shall not claim direct performance of outsourced work. Shared ownership, customer nomination or another certificate shall not remove the commissioning organisation's retained acceptance and oversight responsibilities.

Required evidence: Supplier/performance map; criticality; exact capability checks; retained-responsibility and access records.

48.2 – Flow-down and acknowledgement

Source: AF-AST-STD-001, page 71.

Purchasing and subcontract terms shall transmit relevant specifications, configuration, quality and safety conditions, changes, inspection, evidence, notification and retention duties to the actual level of performance. The organisation shall verify acknowledgement and implementation, not only that standard terms were attached to a purchase order. Conflicting instructions shall be resolved before dependent work. Onward delegation and substitution shall be controlled, with technical acceptance distinct from commercial approval.

Required evidence: Requirement flow-down matrix; sub-tier acknowledgement; actual implementation checks; controlled substitution.

48.3 – Provenance and counterfeit prevention

Source: AF-AST-STD-001, page 72.

Inputs shall retain verifiable source, lot or serial identity, condition, life status and relevant conformity evidence. Suspect, altered or counterfeit items shall be segregated and traced through potentially affected outputs. Investigation shall preserve originals and avoid treating suspicion as a final misconduct finding before sufficient review. A visually convincing certificate, searchable identifier or supplier logo shall not establish authenticity. Source changes and exceptional procurement shall receive risk-based technical review.

Required evidence: Provenance and receipt records; authenticity checks; suspect-item containment; affected-output and investigation history.

48.4 – Split, merge, logistics and storage

Source: AF-AST-STD-001, page 72.

Material and part identity shall survive split lots, repackaging, kitting, pooling, return and transport. Quantities, units, ownership or custody and relevant environmental conditions shall reconcile. A quantity balance does not by itself prove correct identity or suitability. Shelf life, out-time, damage and transport excursions shall remain attached to the actual items. Customer-selected or supplied material shall be clearly identified, with limitations on the organisation's independent source claims.

Required evidence: Movement and genealogy record; quantity reconciliation; storage/transport conditions; excursion and eligibility decisions.

48.5 – Diminishing sources and replacement evidence

Source: AF-AST-STD-001, page 72.

The organisation shall plan for unavailable suppliers, obsolete parts, unsupported software and loss of technical knowledge. Replacement shall examine function, interfaces, materials, process differences, qualification and life evidence. A physically interchangeable part shall not automatically be technically equivalent. The review shall define retained evidence and additional demonstration before release. Support contracts and access arrangements shall be assessed for actual continuity, including the possibility of provider cessation or inaccessible digital tools.

Required evidence: Obsolescence register; substitution/equivalence argument; additional qualification; support and access plan.

48.6 – Performance, transfer and exit

Source: AF-AST-STD-001, page 72.

Supplier monitoring shall include adverse results, changes, delivery and technical performance using defined populations and denominators. A systemic failure shall trigger review of dependent sources and products, not merely reassignment to a new supplier. Transfers shall verify receiving capability and preserve open findings, technical restrictions and historical records. Exit shall identify remaining warranties, notifications, record custody and unresolved obligations. Changing a supplier or issuer shall not make unsupported evidence valid.

Required evidence: Supplier performance review; systemic extent; transfer acceptance; open-duty and custody records.

54.1 – Hazards, assumptions and essential controls

Source: AF-AST-STD-001, page 78.

Hazard analysis shall identify credible consequences, relevant exposure, uncertainty, common causes and human or organisational dependencies. The organisation shall select methods appropriate to the system and maintain the analysis as the configuration and context evolve. Essential protective controls shall be identifiable and verified. Multiplying ordinal severity and likelihood categories shall not be presented as a physical probability or used to hide an unassessed severe consequence.

Required evidence: Hazard log; analysis basis; essential-control map; uncertainty and independent technical challenge.

54.2 – Stop authority and escalation

Source: AF-AST-STD-001, page 78.

Responsible personnel shall be able to stop or restrict affected work when an essential protective condition is absent or credible serious concern arises. The organisation shall define who can authorise temporary protection, technical restart and independent status decisions. Those roles shall not be confused. Urgent action shall preserve evidence and comply with the existing notification clocks in Clause 14 and Annex H. Debate about finding classification shall not delay necessary protection.

Required evidence: Stop and duty mandates; actual concern/action times; protection; separate restart and status records.

54.3 – Emergency capability and exercises

Source: AF-AST-STD-001, page 79.

Emergency arrangements shall identify actual people, communication, equipment, access, external interfaces and limitations. Exercises shall be authorised, safe and representative of the capability being claimed. The organisation shall distinguish discussion-based review from demonstrated operational coordination. Findings shall have accountable correction and follow-up. A planned exercise or signed service agreement shall not count as completed evidence of capability where essential resources were not available or could not perform their assigned role.

Required evidence: Emergency plan; resource availability; exercise design and actual observations; verified corrective action.

54.4 – Occurrence, escape and affected population

Source: AF-AST-STD-001, page 79.

Investigation shall examine both why an event occurred and why existing controls failed to prevent or detect it. The organisation shall preserve original evidence, competing explanations and uncertainty. Population tracing shall include already delivered products, services, reports and decisions that share relevant causes. Replacing a person or issuing training shall not alone close a systemic weakness in work design, resources, interfaces or measurement. Later correction shall not be backdated to legitimise earlier unsupported work.

Required evidence: Occurrence/escape analysis; population and dependency trace; tested causes; historical impact and recipient action.

54.5 – Learning and protected reporting

Source: AF-AST-STD-001, page 79.

Reporting routes shall protect good-faith concerns and preserve fair response to allegations. The organisation shall evaluate weak signals, near misses, repeated local failures and suppressive incentives without equating allegation with established misconduct. Lessons shall be translated into verified changes in methods, interfaces, training or assurance criteria through the appropriate controlled process. A declining report count shall not be assumed to demonstrate improvement where reporting access or culture has deteriorated.

Required evidence: Protected intake; impartial investigation; reporting-quality review; implemented and verified lessons.

55.1 – Define the claim before the calculation

Source: AF-AST-STD-001, page 79.

Every quantitative reliability or availability claim shall identify the population, configuration, operating domain, exposure, duration, failure definition and observation boundary. The organisation shall distinguish predictions, simulations, demonstrations and field observations. Availability shall state which downtime categories are included. A percentage without its denominator, conditions and exclusions shall not be used as acceptance evidence. A changed mission duration or duty shall trigger review of the claim and supporting assumptions.

Required evidence: Metric dictionary; configuration/population; exposure and failure definitions; actual model or observation basis.

55.2 – Failure mechanisms and dependencies

Source: AF-AST-STD-001, page 79.

The analysis shall consider applicable degradation, common causes, dormant failures, maintenance-induced defects, shared software and external-service dependencies. Independence assumptions shall be justified rather than selected for convenient arithmetic. The organisation shall identify mechanisms not represented by a chosen statistical model and provide complementary engineering evidence. Demonstrating each component independently shall not establish system reliability when common resources or interfaces can defeat several functions simultaneously.

Required evidence: Mechanism and dependency analysis; model assumptions; complementary verification; common-cause review.

55.3 – Demonstration and inference limitations

Source: AF-AST-STD-001, page 80.

Demonstration plans shall establish prospective acceptance rules, representativeness, sample selection, confidence and treatment of incomplete or failed trials. Rare-event claims shall not be inferred from insufficient routine testing without a defensible statistical and engineering basis. Repeated or dependent observations shall not be counted as independent opportunities without justification. Changes to the article or test conditions shall remain visible. Annex AG illustrates calculation logic using labelled synthetic data only.

Required evidence: Demonstration plan; actual exposure and failures; confidence and dependence basis; qualified inference.

55.4 – Maintainability and support conditions

Source: AF-AST-STD-001, page 80.

Maintainability shall consider diagnostic capability, access, tools, spares, skills, human error, restoration checks and relevant logistics. Timing results shall identify start and stop definitions and whether administrative or waiting time is excluded. A rapid repair under laboratory conditions shall not be presented as operational support performance without a justified comparison. The organisation shall demonstrate that protective features and the released configuration are restored after maintenance, not merely that the equipment starts again.

Required evidence: Support and repair task analysis; representative time observations; restoration checks; stated exclusions.

55.5 – Life decisions and uncertainty

Source: AF-AST-STD-001, page 80.

Life-limited and condition-dependent assets shall retain actual service, storage, repair and relevant exposure histories. Remaining-life conclusions shall identify the technical model, inspection capability, uncertainty and responsible authority. Missing history shall not be reset to zero, and a passed functional test shall not erase an unresolved degradation mechanism. Changes in duty, repair or material shall trigger review. ASTRA duration and surveillance dates do not extend

the technical life of an item.

Required evidence: Life/exposure record; valid condition evidence; model and uncertainty; actual life decision and restrictions.

56.5 – Export, migration and meaningful recovery

Source: AF-AST-STD-001, page 81.

Transfer shall preserve readable evidence, identities, versions, field semantics, units, time zones, approvals, relationships and current and historical status. Reconciliation shall examine meaning as well as counts; equal file totals may conceal substitutions or missing links. Recovery shall distinguish availability from integrity and reconcile events after the selected recovery point. A sent archive is not accepted custody. The receiving function shall demonstrate usable access and acknowledge continuing duties before dependent cutover.

Required evidence: Export manifest; semantic reconciliation; preserved source; recovery integrity; receiving acceptance and custody.

61.3 – Dependent documents and compatibility

Source: AF-AST-STD-001, page 86.

The responsible custodian shall identify every affected profile, manual, procedure, checklist, form and register before use of this text. Existing 108-title architecture and F01–F08 codes shall remain stable. Newly added requirements shall be mapped to the actual dependent documents; a previous checklist shall not be assumed to cover them. Actual constitutional and legal obligations remain separately applicable.

Verification: Reconcile the dependency register against selected requirements and operating versions.

Acceptance / hold rule: Every required operating document is available, consistent and authorised for the intended use. Unresolved conflicts place dependent use on HOLD.

62.1 – Atomic requirement record

Source: AF-AST-STD-001, page 88.

Each assessed requirement shall have a stable identifier, one accountable owner, an applicability trigger, defined object and configuration, required behaviour or characteristic, observable conditions, verification method and acceptance predicate. Compound statements shall be separated into individually testable rows without deleting any condition. Terms such as adequate, suitable, promptly or representative shall be resolved through the explicit records in this clause before they support an acceptance decision.

Verification: Inspect each requirement row and its linked method, boundary and predicate.

Acceptance / hold rule: Every applicable row is evaluable without inventing an object, limit, observation or decision role. Unresolved essential terms result in HOLD.

62.2 – Mandatory parameter completion

Source: AF-AST-STD-001, page 88.

An application-dependent value shall be entered in a controlled parameter schedule before the relevant test or evaluation. Each entry shall state symbol, meaning, unit, inclusive or exclusive bounds, uncertainty treatment, operating modes, technical derivation, source evidence, approver and change trigger. A declared value is not adequate merely because the applicant selected it. The independent reviewer shall challenge whether it bounds the claimed environment and consequence.

Verification: Recalculate derivations and check mission, interface and obligation coverage.

Acceptance / hold rule: The complete parameter set is approved prospectively. A blank, TBD, unsupported factor or undefined threshold blocks the dependent release.

62.3 – Evidence validity before conformity

Source: AF-AST-STD-001, page 88.

The evaluator shall first determine whether evidence belongs to the correct object, configuration, period, method and authorised performer and whether it is usable for the intended inference. Only valid relevant evidence shall enter a conformity predicate. Rejected, corrupted, missing, unobservable or wrong-version evidence shall remain identified. Evidence may be valid and show failure; an invalid test is not a valid pass or a valid proof of product failure.

Verification: Check provenance, configuration, method capability, original data and uncertainty separately from result classification.

Acceptance / hold rule: Validity is established before PASS or FAIL is assigned; otherwise use HOLD with an explicit invalidity or evidence-gap reason.

62.4 – Four requirement states

Source: AF-AST-STD-001, page 88.

A requirement state shall be PASS, FAIL, HOLD or N/A. PASS means the approved predicate is satisfied by valid evidence. FAIL means valid evidence demonstrates that the predicate is not satisfied. HOLD means applicability, method, evidence, uncertainty or authority is not sufficiently resolved. N/A means the trigger and retained responsibility are absent and independent approval of that exclusion is recorded. Missing equipment, budget, access or time shall not justify N/A.

Verification: Execute the truth table in Annex AL using actual scope and evidence.

Acceptance / hold rule: Exactly one current state is assigned with reason and traceable evidence. All earlier states are retained.

62.5 – No compensation or favourable default

Source: AF-AST-STD-001, page 89.

A positive conformity decision shall require PASS for every applicable mandatory requirement, closure of every in-scope nonconformity, valid independent competence and actual authority. N/A rows shall have approved reasons; HOLD and FAIL rows shall not contribute a favourable default. Weighted scores, averages, majority votes, programme membership or good results in another discipline shall not compensate for an unmet condition.

Verification: Reconcile the complete requirement population with the decision dossier; test missing and negative cases.

Acceptance / hold rule: The Boolean conjunction in Annex AL is true. Otherwise no positive grant, renewal or extension is permitted.

62.6 – Exceptions, tailoring and unresolved conflict

Source: AF-AST-STD-001, page 89.

An exception shall identify the affected requirement, technical basis, permissible authority, scope, consequence and independent review. It shall not waive a mandatory ASTRA gate or an applicable binding obligation. Tailoring shall define how a requirement is met in the actual application, not silently remove it. If two applicable requirements cannot both be satisfied, the responsible authorities shall resolve the conflict before dependent work; an assessor shall not choose the easier rule.

Verification: Review each exclusion, alternative method and concession against controlling requirements.

Acceptance / hold rule: No unapproved exception or unresolved conflict affects a positive conclusion; any known departure remains visible in its separate technical disposition.

62.7 – Decision replay and consistency

Source: AF-AST-STD-001, page 89.

A decision shall be reproducible from the same frozen requirements, parameter values, original evidence, calculation version, uncertainty model and role assignments. Two competent reviewers reaching different results shall identify the differing input, predicate, assumption or expertise before closure. Interpretation records may clarify a term but shall not change limits after results are known. Equation inputs shall retain unrounded values.

Verification: Independently replay a selected boundary case and reconcile every difference.

Acceptance / hold rule: The replay produces the same supported state, or the case remains HOLD pending a controlled technical resolution.

63.1 – Domain selection without geographic omission

Source: AF-AST-STD-001, page 90.

The mission owner shall assess every domain in Annex AK and record applicable, not applicable or not yet determined. The scope shall include terrestrial preparation, launch and recovery interfaces as well as the in-space activity. Earth orbit, cislunar and libration-region operations, solar and planetary missions, small bodies, ocean-world exploration and interstellar precursor concepts shall not be excluded solely because they differ from conventional satellite operations.

Verification: Compare the mission concept and responsibility map with all Annex AK domain rows.

Acceptance / hold rule: Every domain has a reasoned disposition. Any unassessed domain that can affect a required outcome remains HOLD.

63.2 – Object and activity rather than a universal label

Source: AF-AST-STD-001, page 90.

The claimed object shall be identified as a system, subsystem, component, material, process, service, facility, software artefact, person, educational programme, assessment provider or statement. Record what is designed, built, tested, operated, maintained or retired, by whom and where. A phrase such as all space, space-qualified or complete mission assurance shall not replace the exact boundaries and limitations of the evaluated object.

Verification: Compare application, technical schedule, evidence and proposed public wording.

Acceptance / hold rule: The object and activities agree throughout the dossier; unsupported sector-wide or geographically unlimited claims are prohibited.

63.3 – Environment, phase and mode matrix

Source: AF-AST-STD-001, page 90.

For each applicable domain, define mission phase, operating mode, intended duration, exposure, interfaces, repairability, accessible evidence and credible degraded states. Include dormant storage, transport, separation, commissioning, routine service, communication outage, servicing, retirement and loss-of-mission conditions when relevant. A qualification for one phase shall not automatically cover another phase with different loads, resources or observability.

Verification: Review the complete phase-by-mode matrix and its verification links.

Acceptance / hold rule: Every safety-, mission- or claim-relevant cell has accepted evidence or an explicit restriction; no essential unexamined cell is passed by analogy.

63.4 – No automatic new programme family

Source: AF-AST-STD-001, page 90.

Space-domain tags organise technical applicability within F01–F08. They shall not be counted as additional accreditation families, new public privileges or independently active programmes. The technical owner shall map each space activity to the existing object route and applicable clauses, then define a dedicated profile where the actual method, environment or competence differs. A portfolio listing is not scope activation.

Verification: Check domain tags against family, module, object and activation records.

Acceptance / hold rule: Every granted space scope has a valid family connection and independently complete profile; no authority is inferred from the catalogue.

63.5 – Unknown and future environments

Source: AF-AST-STD-001, page 91.

For a novel environment or technology, the technical owner shall document known conditions, uncertain mechanisms, missing measurements, model limitations and the evidence needed to resolve them. Restricted research may continue only inside its approved protective boundary. An operational or conformity claim shall not be issued until the essential criteria and evidence are complete. Existing equations shall not be extrapolated beyond their validity without a tested justification.

Verification: Examine novelty analysis, experiment authority and unresolved-condition register.

Acceptance / hold rule: Unknown essential behaviour is not recorded as safe or conforming. Development status and permitted work are explicit.

63.6 – Interface and lifecycle closure

Source: AF-AST-STD-001, page 91.

The scope shall include relevant upstream and downstream duties, including supplied design data, ground services, communications, receiving facilities, environmental custody and long-term records. Transfers shall identify the sender, receiver, evidence and acceptance. A contractor delivering one subsystem shall not be made responsible for unrelated mission duties, but an integrator shall not exclude duties it retains because they are performed by others.

Verification: Trace each interface to an accountable performer and retained owner.

Acceptance / hold rule: No essential responsibility, evidence handover or terminal obligation is orphaned.

64.1 – Mission environmental baseline

Source: AF-AST-STD-001, page 92.

The baseline shall define relevant mechanical, thermal, pressure, radiation, plasma, charging, electromagnetic, contamination, micrometeoroid, dust, gravitational and atmospheric conditions by phase and location. Each selected model or data source shall have identity, applicable domain, uncertainty and update responsibility. The omission of a mechanism shall be justified technically, not by lack of a test facility.

Verification: Audit environment-to-requirement and environment-to-test traceability.

Acceptance / hold rule: All material environments and coupled effects are bounded by approved assumptions and evidence; undefined exposure blocks qualification acceptance.

64.2 – Geometry, reference frames and event time

Source: AF-AST-STD-001, page 92.

Trajectory- and geometry-dependent information shall identify frame origin, orientation, epoch, time scale, units, state covariance and transformation version. An exchanged position or orientation shall not be accepted without enough metadata to transform it consistently. Surface-relative, body-fixed, inertial and local engineering coordinates shall remain distinct. Event time, receipt time and ground processing time shall not be merged.

Verification: Recompute selected transformations and challenge wrong-frame and stale-epoch inputs.

Acceptance / hold rule: Transformations meet the approved error and time bounds; incompatible or ambiguous metadata produces HOLD.

64.3 – Uncertainty, scenarios and design envelope

Source: AF-AST-STD-001, page 92.

Define nominal, bounding, dispersed and degraded scenarios and how they support design, test and operational limits. Record whether uncertainty is statistical, epistemic, model discrepancy or an unbounded knowledge gap. Extreme values shall not be combined as independent random variables without justification. A confidence level shall name its variable, population and model rather than describe the whole mission.

Verification: Review scenario construction, dependencies and sensitivity to uncertain inputs.

Acceptance / hold rule: The accepted envelope covers the declared decisions; unsupported extrapolation is excluded or held.

64.4 – Resource budgets and coupled margins

Source: AF-AST-STD-001, page 92.

Mass, power, energy, thermal rejection, timing, data, attitude-control resources and consumables shall have explicit allocation and reserve ownership. Account for concurrent loads, common reserves, environmental degradation, ageing, unavailable recharge and terminal obligations. The same reserve shall not be credited to two simultaneous needs. Positive scalar totals shall not replace transient, local or coupled analysis.

Verification: Reconcile subsystem and system budgets by phase and condition; independently check Annex AM calculations used.

Acceptance / hold rule: Each required margin meets its prospectively approved value under all selected bounding conditions; no reserve is double allocated.

64.5 – Heritage and similarity

Source: AF-AST-STD-001, page 92.

A heritage argument shall compare actual design, materials, manufacturing source, mission exposure, software, interfaces and life history. Identify unchanged evidence, invalidated evidence and new demonstration. Successful service of a related design shall be accepted only for characteristics and mechanisms it actually supports. Lack of a recorded failure shall not prove performance of an unmonitored critical characteristic.

Verification: Review a difference matrix and trace each retained conclusion to applicable original evidence.

Acceptance / hold rule: Every material difference has a technical disposition and sufficient evidence before the new claim is accepted.

64.6 – Baseline maintenance and irreversible decisions

Source: AF-AST-STD-001, page 93.

Changes to mission duration, geometry, environment, operating mode, supplier or external service shall trigger a documented impact review. Before an irreversible commitment, the decision maker shall reconcile the current environmental baseline, actual configuration, evidence, reserves, unresolved issues and protective options. Commercial schedules shall not be used as substitute evidence.

Verification: Compare the frozen readiness dossier with the actually delivered configuration and latest accepted mission assumptions.

Acceptance / hold rule: Every essential gate is complete and all permitted actions are stated; otherwise the irreversible commitment remains blocked.

65.1 – Structures, mechanisms and deployment

Source: AF-AST-STD-001, page 94.

The organisation shall define structural and mechanism functions, materials, interfaces, loads, thermal distortion, life, release states and deployment observability. Qualification shall address relevant manufacturing variability, lubrication or surface condition, storage ageing, constraints and incomplete deployment. Final configuration and any mechanical lock or restraint state shall be independently verified where it affects an essential function.

Verification: Review configuration-specific load, test, inspection, mechanism and deployment evidence.

Acceptance / hold rule: Each required function and structural criterion is met in its approved envelope; unknown restraint or deployment state blocks dependent operation.

65.2 – Thermal control and thermal protection

Source: AF-AST-STD-001, page 94.

Thermal assurance shall account for heat generation, solar and planetary inputs, conduction, radiation, thermal storage, contact conductance, coatings, degradation and operating modes. Distinguish steady-state screening equations from transient qualification. Temperature limits shall identify the actual item, location, mode and measurement uncertainty. A single temperature sensor shall not represent all critical locations without a validated relationship.

Verification: Review thermal models, instrumentation, balance correlation and hot/cold/transient test coverage.

Acceptance / hold rule: All required temperatures and gradients meet approved bounds including uncertainty and model discrepancy; unresolved critical locations remain HOLD.

65.3 – Power generation, storage and distribution

Source: AF-AST-STD-001, page 94.

Power assurance shall identify end-of-life generation, eclipses or outages, duty cycle, distribution losses, peak demand, storage state, switching, grounding and protective isolation. Both available power and stored energy shall satisfy their distinct requirements. Protective tests shall use separately authorised safe procedures. A nominal capacity statement shall not demonstrate usable capacity under ageing and mission temperature.

Verification: Reconcile phase budgets and examine actual storage, conversion and protection evidence.

Acceptance / hold rule: Power, energy and recovery predicates all pass; adequate average generation does not compensate for an unsupported peak or outage condition.

65.4 – Avionics, electronics and radiation effects

Source: AF-AST-STD-001, page 94.

The device and board assurance record shall retain manufacturer, lot, configuration, screening, operating state and environment-specific suitability. Total-dose degradation, displacement effects and single-event behaviour shall be assessed separately when triggered. System response, error containment, recovery and residual data integrity shall be demonstrated. Radiation values shall state material, location, quantity and model; incompatible dose quantities shall not be combined.

Verification: Inspect parts genealogy, mission susceptibility analysis, specialist results and integrated recovery tests.

Acceptance / hold rule: All triggered mechanisms have accepted application-specific evidence; a part label or dose-only result does not close unexamined single-event behaviour.

65.5 – Attitude, pointing, sensing and control interfaces

Source: AF-AST-STD-001, page 95.

The assurance case shall define pointing, knowledge, stability, alignment, jitter, timing, observability, actuator limits and degraded modes for the actual payload and mission. Coordinate frames and error budgets shall be explicit. Verification shall include sensor loss, stale data, actuator saturation and misleading measurements within a safe test arrangement. This clause does not specify guidance or manoeuvre commands.

Verification: Trace error allocation to integrated measurement and closed-loop verification on representative configuration.

Acceptance / hold rule: Required performance and protective-state predicates pass; undetected loss of critical observability remains an essential gap.

65.6 – Payload function and scientific or service output

Source: AF-AST-STD-001, page 95.

Payload requirements shall identify intended outputs, calibration, dynamic range, contamination sensitivity, pointing or timing needs, processing and delivered data quality. Instrument performance, system suitability and scientific interpretation are separate conclusions. Changes in compression, processing or calibration shall retain raw or reconstructable data and algorithm identity. Marketing resolution or accuracy figures shall state the tested conditions and limitations.

Verification: Reconstruct selected output products from identified inputs, calibration and processing.

Acceptance / hold rule: Output criteria are met for the stated domain; unsupported scientific or service claims are not inferred from a functioning instrument.

65.7 – Integrated platform acceptance

Source: AF-AST-STD-001, page 95.

The integrator shall reconcile all subsystem configurations, resource allocations, interfaces, anomalies, software loads, protective controls and operating restrictions. Individually accepted subsystems shall be examined for common-cause failures and conflicting assumptions. Verify the delivered system rather than a earlier demonstration model. Remaining development actions shall not be presented as completed flight acceptance.

Verification: Conduct independent configuration, interface and evidence closure across the complete integration dossier.

Acceptance / hold rule: All applicable integration gates pass; each unresolved essential interface blocks the dependent mission or system conclusion.

68.7 – Status and long-term custody

Source: AF-AST-STD-001, page 101.

Closure shall record whether an asset is operating, restricted, dormant, disposed, lost or unknown using verified evidence and defined meanings. Loss of communication shall not be labelled successful disposal. Assign remaining notices, monitoring and records to an actual custodian. A closed commercial contract does not close an unresolved technical or environmental obligation.

Verification: Trace final-state evidence and accepted transfer of residual duties.

Acceptance / hold rule: Terminal claims match observed or explicitly bounded inferred states, and every continuing duty has a receiving owner.

69.1 – Consent and exact intervention

Source: AF-AST-STD-001, page 102.

Record participating assets, owners, consent, service objective, configuration, permitted interventions and prohibited actions. Design assurance, service-provider competence and permission for a specific operation shall remain separate. An assumed common ownership or commercial order shall not replace the actual technical authority and access rights needed for the intervention.

Verification: Check the consent and authority chain against the declared operation and assets.

Acceptance / hold rule: All required authorities and compatible scope boundaries are valid before intervention; otherwise the activity remains blocked.

69.2 – Interface compatibility

Source: AF-AST-STD-001, page 102.

Define and verify relevant mechanical, structural, electrical, fluid, thermal, communications, software, timing and contamination interfaces. The evidence shall identify as-operated rather than merely as-designed configurations. Damage, ageing, unknown modifications and inspection accessibility shall be considered. Individually qualified assets shall not be assumed jointly compatible.

Verification: Review interface-control records, difference analysis and representative integrated verification.

Acceptance / hold rule: Every essential interface criterion passes for both participating configurations; unknown critical interfaces remain HOLD.

69.3 – Relative-state and completion evidence

Source: AF-AST-STD-001, page 102.

The service plan shall define which relative states, contact conditions, connection states and completed tasks must be observed or inferred. Sensor limitations, occlusion, stale telemetry, model uncertainty and ambiguous indications shall have explicit handling. A single contact indication shall not by itself prove secure structural, electrical or fluid connection when those are separate requirements.

Verification: Challenge incomplete and contradictory indications using authorised representative simulations or tests.

Acceptance / hold rule: Each claimed state has sufficient valid evidence and meets its own predicate; ambiguous state cannot be treated as complete.

69.4 – Interruptions and safe boundaries

Source: AF-AST-STD-001, page 102.

The assurance case shall identify safe interruption states, autonomy limits, human intervention feasibility, shared failures and irreversible actions. Recovery and abort assumptions shall be validated for the actual environment and available resources. This standard does not authorise an assessor to command an intervention or select hazardous operational parameters.

Verification: Review the approved scenario set and evidence for required protective transitions.

Acceptance / hold rule: All essential interruption and protective-state requirements are demonstrated within the authorised envelope.

69.5 – Transferred material, energy and data

Source: AF-AST-STD-001, page 103.

Transfers shall preserve identity, quantity, units, condition, custody and eligibility of materials, consumables, energy attributes or digital products. Metering, losses, residuals and cross-contamination shall be addressed. Quantity reconciliation shall not be used as proof of chemical, mechanical or functional suitability. Receiving acceptance shall be explicit.

Verification: Reconcile sending and receiving records and inspect suitability evidence.

Acceptance / hold rule: Both identity/quantity and technical eligibility checks pass; unexplained differences or contamination keep the transfer result open.

69.6 – Post-intervention configuration and service claim

Source: AF-AST-STD-001, page 103.

The final dossier shall state actual work, replacement items, software, repairs, observations, limitations, failed attempts, configuration and receiving authority. Verify affected functions and update maintenance, life and operating information. Partial completion shall remain partial. Service completion shall not imply recertification of the whole receiving asset or extension of its life without separate evidence.

Verification: Review post-intervention verification and receiving acknowledgement.

Acceptance / hold rule: The bounded service predicate is met, affected protections are restored and residual responsibilities are accepted.

70.1 – Distinct release objects

Source: AF-AST-STD-001, page 104.

The profile shall distinguish vehicle design, payload integration, site capability, mission readiness, individual operating permission and recovery capability. Each object shall identify responsible entity, configuration, environment, evidence and decision authority. A spaceport capability result shall not release a vehicle or a specific launch.

Verification: Compare all requested results with their actual evidence and authority paths.

Acceptance / hold rule: No merged or unbounded approval is issued; each required object-specific gate is independently supported.

70.2 – Integrated environment and interface verification

Source: AF-AST-STD-001, page 104.

Integration shall address actual handling, transport, mounting, loading, acoustic, dynamic, thermal, electrical, data, separation and contamination interfaces. Verification shall use approved mission-specific conditions and representative fixtures and configurations. Previously accepted payloads shall be reassessed when interface conditions or launch-service assumptions change.

Verification: Reconcile interface and environment matrices with qualification, acceptance and delivered configuration.

Acceptance / hold rule: All required interface criteria are met; undeclared differences or missing essential demonstrations block integrated acceptance.

70.3 – Test and hazardous-work readiness

Source: AF-AST-STD-001, page 104.

Before consequential tests, verify competent authorised performers, approved procedures, protected facilities, instrumentation, exclusion boundaries, independent checks and stop authority. Technical acceptance limits and protective shutdown limits shall be separate. No universal energetic, pressure or thermal operating values are supplied by this standard.

Verification: Inspect real readiness records and safe witnessing arrangements.

Acceptance / hold rule: All prerequisite protections and measurement capabilities exist before testing; missing permissions or protective functions prohibit the activity.

70.4 – Reuse and cumulative history

Source: AF-AST-STD-001, page 104.

Reusable structures, mechanisms, thermal protection, tanks, energy systems and electronics shall retain actual use, exposure, storage, damage, repairs, refurbishment and replacement history. Eligibility shall rely on validated inspection and degradation models for the particular item. A successful prior flight or a cosmetically restored surface shall not reset life or close hidden damage uncertainty.

Verification: Trace item history to approved reuse criteria and measured condition.

Acceptance / hold rule: All required life and condition predicates pass; missing critical history or inaccessible required inspection blocks reuse acceptance.

70.5 – Return, landing and recovery interfaces

Source: AF-AST-STD-001, page 105.

The return assurance case shall identify entry, descent, landing, retrieval, containment, transport and receiving duties within the declared responsibility. Define expected observations and evidence of completion, including unreachable, partial and uncertain outcomes. Public safety, environmental and controlled-material permissions shall be separately confirmed.

Verification: Review the approved return/recovery dossier, communication and custody arrangements.

Acceptance / hold rule: The stated return or recovery claim has sufficient actual evidence; a planned route or lost signal cannot be reported as successful completion.

70.6 – Readiness decision and post-event learning

Source: AF-AST-STD-001, page 105.

Before commitment, reconcile configuration, qualification, ground readiness, people, support, open anomalies and required terminal resources. After the event, preserve original observations, failures and near misses and assess consequences for subsequent vehicles and payloads. Schedule pressure shall not downgrade a blocking finding.

Verification: Independently review the frozen pre-event dossier and subsequent anomaly-to-population analysis.

Acceptance / hold rule: Every essential gate passes at the actual commitment time; later success does not legitimise an unsupported earlier release.

71.1 – Destination-specific conditions

Source: AF-AST-STD-001, page 106.

Define the actual body or environment, region, season or illumination assumptions, terrain, atmosphere, pressure, temperature, radiation, dust, electrostatic effects, gravity and access limitations. The profile shall separate measured conditions from inferred and unknown conditions. A terrestrial, lunar or planetary analogy shall not establish a universal environment specification.

Verification: Examine destination/region assumptions, uncertainty and required evidence.

Acceptance / hold rule: All essential environmental inputs are bounded for the declared mission; missing critical environmental knowledge retains a development or restricted status.

71.2 – Surface mobility and interaction

Source: AF-AST-STD-001, page 106.

Mobility assurance shall define load, terrain interaction, traction or anchoring, stability, dust effects, sensing, energy, thermal behaviour and recoverability relevant to the actual vehicle. Representative tests shall identify differences in gravity, soil or surface material, pressure and scale. A laboratory traverse shall not be equated with full mission access or survivability.

Verification: Review integrated mobility and resource tests and the justified analogue-transfer argument.

Acceptance / hold rule: Required mobility and protective-state predicates pass for the approved envelope; unsupported terrain classes remain excluded.

71.3 – Atmospheric and buoyant exploration

Source: AF-AST-STD-001, page 106.

Atmospheric vehicles shall have defined environmental profiles, materials, structural, buoyancy or flight functions, energy, communication and terminal responsibilities. Pressure, composition, corrosion, turbulence and inaccessible maintenance shall be considered when triggered. Airworthiness or site results from a different planetary or terrestrial context shall not be inherited without technical justification.

Verification: Review environment-specific material, structural and functional qualification and data validity.

Acceptance / hold rule: Every essential environmental and functional condition is supported for the stated domain; unvalidated atmosphere assumptions block broader claims.

71.4 – Subsurface and ocean-world interfaces

Source: AF-AST-STD-001, page 106.

Subsurface or liquid-environment exploration shall identify pressure, thermal, chemical, access, communication, containment and biological/scientific contamination concerns. Verify boundary integrity, sensor observability, retrieval assumptions and evidence custody without providing hazardous access procedures. A surface-system qualification shall not establish suitability for submerged or subsurface duty.

Verification: Review pressure-boundary and environmental evidence through authorised specialist assessment.

Acceptance / hold rule: All triggered boundary, protection and observation predicates pass; uncertain containment or retrieval capability remains explicitly restricted.

71.5 – Long darkness and resource interruption

Source: AF-AST-STD-001, page 107.

Mission planning shall identify darkness, unavailable recharge, thermal survival, communications gaps and delayed resupply. Energy and consumable reserves shall include degradation, uncertainty, interruptions and terminal duties. Restart after dormancy shall verify state and protection, not only a successful boot.

Verification: Recalculate resource and survival budgets and review representative dormant/restart tests.

Acceptance / hold rule: All required survival and recovery conditions meet approved criteria without double-counted reserves; missing state evidence keeps restart dependent actions held.

71.6 – Construction and surface infrastructure

Source: AF-AST-STD-001, page 107.

Habitats, pads, utilities, handling systems, civil works and resource facilities shall have a defined design and environment basis, material provenance, site assumptions, inspection strategy and acceptance authority. Hidden work and critical interfaces shall be verified before concealment. Demonstrating a manufacturing technique shall not establish readiness of an integrated surface installation.

Verification: Trace design and material records through construction, commissioning and receiving acceptance.

Acceptance / hold rule: Every essential structural, utility, environmental and operational interface has valid completion evidence before use.

71.7 – Autonomy and limited intervention

Source: AF-AST-STD-001, page 107.

Autonomous surface work shall define sensing coverage, permitted domain, adaptation limits, command authority, safe cessation and human intervention feasibility. Validation shall include occlusion, unfamiliar conditions, delayed information, partial execution and loss of a shared resource. Human oversight shall not be credited when delay or observability prevents meaningful intervention.

Verification: Challenge the approved autonomous envelope and required protective transitions.

Acceptance / hold rule: All essential scenarios pass; out-of-domain behaviour is limited or stopped under the approved protective design.

71.8 – Completion, samples and remaining duties

Source: AF-AST-STD-001, page 107.

The mission dossier shall distinguish science acquisition, engineering demonstration, collected sample custody, completed construction, final asset state and environmental closure. Unreachable assets shall retain a stated confidence basis and unknowns. Responsibilities for contamination, residues, hazardous inventories and interpreting long-term records shall survive mission and supplier closure.

Verification: Review final-state evidence, sample manifests and accepted residual-duty assignments.

Acceptance / hold rule: Each conclusion is limited to its demonstrated object and evidence; no lost contact or incomplete transfer is relabelled as complete closure.

72.1 – Time horizon and recoverability

Source: AF-AST-STD-001, page 108.

The mission basis shall define duration, distance-dependent communication, resource evolution, repairability, replacement feasibility and the period over which responsibility and evidence must remain usable. A planned future repair, relay or supplier service shall not be credited as available without supported commitments and a demonstrated capability basis.

Verification: Review life and support assumptions against mission phases and credible loss cases.

Acceptance / hold rule: Essential mission and protective functions remain supported for the declared duration; speculative future services are not favourable defaults.

72.2 – Solar and extreme thermal exposure

Source: AF-AST-STD-001, page 108.

Solar, close-body and thermal-extreme missions shall define time-varying flux, geometry, shadowing, surface properties, degradation and transient response. Protection shall be qualified at the relevant material, assembly and system levels. Inverse-square screening and steady-state radiation equations are only applicable within their stated assumptions and do not close transient or coupled behaviour.

Verification: Review environment-specific models, uncertainty, qualified materials and correlated tests.

Acceptance / hold rule: Required temperature, gradient, integrity and functional limits are met throughout the approved envelope; unexamined coupled effects remain HOLD.

72.3 – Low-flux and limited-power missions

Source: AF-AST-STD-001, page 108.

Distant missions shall evaluate end-of-life generation, storage, conversion, thermal support, communication and command survival concurrently. Prioritised load shedding and dormant modes shall have validated authority and state-recovery rules. Average energy sufficiency shall not hide a time-local peak or thermal survival failure.

Verification: Reconcile resource profiles and perform representative low-resource and recovery verification.

Acceptance / hold rule: Every essential resource and protection predicate passes; unavailable generation or unsupported recovery is not treated as normal service.

72.4 – Autonomy during long communication delay

Source: AF-AST-STD-001, page 108.

The mission shall identify decisions that cannot wait for ground response and bound the authority assigned to onboard functions. Validation shall account for delayed or unavailable external information, model mismatch, finite stored procedures and safe terminal behaviour. Ground approval received after the hazardous event would occur is not an effective preventive control.

Verification: Evaluate latency arithmetic and scenario-based autonomous response evidence.

Acceptance / hold rule: Protective authority is executable within the approved response time; otherwise redesign, restriction or additional evidence is required.

72.5 – Ageing and long-term digital support

Source: AF-AST-STD-001, page 108.

The assurance plan shall address materials ageing, accumulated environment, clock stability, memory integrity, software dependencies, obsolete tools, lost expertise and cryptographic migration. Preserve executable or reconstructable models and interpretable data dictionaries. Availability of a signed file does not establish its future readability or the continued correctness of its engineering meaning.

Verification: Review long-life evidence and test migration, recovery and independent reconstruction.

Acceptance / hold rule: Essential historical and current evidence remains usable and required support has accepted continuity arrangements.

72.6 – Scientific instruments and observation integrity

Source: AF-AST-STD-001, page 109.

Observation claims shall identify instrument calibration, alignment, background effects, processing, timing, uncertainty and data-loss conditions. Engineering acceptance of an instrument shall be separated from a scientific inference from its output. Changes in reduction software shall retain earlier processing and the reason for differences.

Verification: Reprocess a representative observation from identified source data and calibration.

Acceptance / hold rule: The stated technical data-quality criteria are met; disputed scientific interpretation is not declared certain by an ASTRA engineering result.

72.7 – Future-domain feasibility and responsible closure

Source: AF-AST-STD-001, page 109.

Very long-range or novel propulsion and infrastructure concepts shall identify what has actually been demonstrated and what remains theoretical or unvalidated. Requirements may define a future scope, but no operational capability shall be granted from aspiration alone. The final record shall preserve terminal-state uncertainty, remaining obligations and custody after active support ends.

Verification: Review demonstration-state claims, technical gaps and actual terminal evidence.

Acceptance / hold rule: Only the demonstrated bounded capability is recognised; speculative performance and unknown final states remain clearly identified.

74.1 – Mission-specific protection classification

Source: AF-AST-STD-001, page 112.

The responsible function shall identify destinations, return paths, scientific objectives, exposed materials, biological payloads and applicable protection duties. Forward contamination, backward contamination and scientific interference shall be assessed separately. The selected obligations and technical criteria shall be documented before mission or facility design decisions that depend on them.

Verification: Review destination, pathway and consequence analysis with qualified independent specialists.

Acceptance / hold rule: Every triggered protection duty has an explicit owner, criterion and verification path; an undefined classification remains HOLD.

74.2 – Contamination pathways and control allocation

Source: AF-AST-STD-001, page 112.

Map contamination sources, transport pathways, contact interfaces, releases and receiving environments across manufacture, test, integration, operation, collection, return and disposition. Allocate controls to actual performers and preserve interface assumptions. A cleaning or containment declaration shall not establish effectiveness without method-specific evidence for the relevant material and pathway.

Verification: Inspect the pathway map and validated evidence for each relied-upon control.

Acceptance / hold rule: All essential pathways are controlled to the approved technical basis; inaccessible required evidence prevents a favourable conclusion.

74.3 – Scientific cleanliness and background

Source: AF-AST-STD-001, page 112.

Define species, particulates, molecular residues or other backgrounds capable of affecting the specific measurement. Reference samples, witness materials, blanks, calibration and contamination history shall have traceable identity and handling. A broad cleanliness classification shall not establish suitability for an instrument with a different detection limit or scientific objective.

Verification: Review measurement-specific contamination budgets and actual verification results.

Acceptance / hold rule: Required cleanliness and background predicates pass within method uncertainty; uncharacterised contamination remains a limitation on the affected output.

74.4 – Sample identity and custody

Source: AF-AST-STD-001, page 112.

Each sample shall retain origin description, collection event, container, seal or interface identity, mass or quantity where known, conditions, contamination history, transfers, subdivisions and authorised access. Unknown provenance shall remain unknown. Splitting or pooling shall preserve parent-child links and shall not create duplicate inventories.

Verification: Reconcile original collection, custody, receiving and subdivision records.

Acceptance / hold rule: The sample and its history are unambiguous and usable for the claimed purpose; missing essential links block the dependent sample conclusion.

74.5 – Return-chain containment and receiving readiness

Source: AF-AST-STD-001, page 113.

Where containment or restricted receiving applies, verify compatible transport, return vehicle, retrieval, custody, receiving facility, authorised personnel and contingency arrangements. The profile shall define the evidence needed to establish boundary integrity and safe transfer without specifying hazardous treatment methods. A ready spacecraft does not establish readiness of an absent receiving facility.

Verification: Review the complete return-to-receiving chain and authorised representative integrity demonstrations.

Acceptance / hold rule: Every essential interface and receiving capability is accepted before dependent return commitments; otherwise the chain remains incomplete.

74.6 – Anomalies, unknown state and release of information

Source: AF-AST-STD-001, page 113.

Loss of containment indication, unverified seal condition, missing samples or unexplained contamination shall trigger preservation, restriction and qualified review. Do not equate absent alarms with demonstrated integrity. Technical data and scientific interpretations shall retain limitations; public statements shall not imply a sample is harmless or pristine solely because its custody form is complete.

Verification: Examine anomaly decisions, actual observations and bounded reporting.

Acceptance / hold rule: Only supported technical conclusions are released; uncertainty and unresolved protection duties remain visible.

74.7 – Disposition and residual responsibility

Source: AF-AST-STD-001, page 113.

Final disposition shall identify sample, container, residue, facility, record and long-term custody obligations. Transfer shall include receiving acceptance and usable evidence. Mission completion shall not terminate a continuing protection or scientific-record duty. The custodian shall preserve genuine access conditions and correction channels after organisational closure.

Verification: Trace final-state evidence and accepted residual duties.

Acceptance / hold rule: No required custody or protection obligation is abandoned and no unverified disposal is claimed complete.

75.1 – Process purpose and environment

Source: AF-AST-STD-001, page 114.

Define intended output, material properties, environment, equipment, software, tooling, personnel or autonomous role, inspection access and downstream use. Distinguish research yield, qualified process capability and product acceptance. A terrestrial qualification shall not automatically transfer to a different gravity, vacuum, thermal, contamination or radiation environment.

Verification: Review environment differences and the process-to-property qualification argument.

Acceptance / hold rule: All essential output properties and influential conditions have an approved evidence path; unsupported transfer remains HOLD.

75.2 – Inputs, feedstock and source variability

Source: AF-AST-STD-001, page 114.

Retain origin, composition or material type, condition, contamination, storage, reuse, mixing and representative property evidence for feedstock. Local or recovered resources shall have a characterised variability and sampling basis. A claimed resource abundance shall not establish usable quantity or technical eligibility. Source substitution shall be assessed before use.

Verification: Trace input lots and samples to process runs and accepted property evidence.

Acceptance / hold rule: Input identity and suitability meet approved criteria; uncertain composition or life history is not replaced by a nominal source label.

75.3 – Essential variables and remote monitoring

Source: AF-AST-STD-001, page 114.

The qualified envelope shall identify influential variables, combinations, tolerances, monitoring performance and reaction rules. Retain actual variable histories, interruptions and sensor gaps by output identity. Remote telemetry shall support acceptance only for properties and mechanisms demonstrated to be observable or validly inferred. A successful process command does not prove the intended material transformation occurred.

Verification: Review representative qualification, sensor/model validation and raw production history.

Acceptance / hold rule: All required variables and output characteristics are supported; an unobservable essential property requires additional evidence or a restricted outcome.

75.4 – Yield, mass balance and circularity

Source: AF-AST-STD-001, page 114.

Material accounting shall separate input, good output, reject, sample consumption, process loss, recovered material, work in progress and unknown difference. Internal recirculation shall not be counted repeatedly as new resource production. Mass closure and yield are different measures; neither proves safety or material performance. Units and measurement uncertainty shall be explicit.

Verification: Independently reconcile the material ledger and separately review quality acceptance.

Acceptance / hold rule: Balances meet the approved uncertainty-based criterion and all claimed good output is technically accepted; unexplained losses or duplicate recovery remain open.

75.5 – Logistics, storage and compatibility

Source: AF-AST-STD-001, page 115.

Logistics shall preserve item identity, custody, configuration, life, condition and applicable environmental exposure through packaging, handling, transport, transfer and storage. Receiving systems shall confirm mechanical, fluid, electrical,

data and contamination compatibility where relevant. Planned delivery shall not be counted as physically received usable inventory.

Verification: Inspect the complete shipment and receiving chain, including excursions and damage.

Acceptance / hold rule: Only accepted usable inventory enters mission budgets; unknown or restricted items are segregated in both physical and digital records.

75.6 – Maintenance, spares and distributed production

Source: AF-AST-STD-001, page 115.

On-demand or remote production of replacement parts shall satisfy the same applicable design, material, process and acceptance requirements as other sources. Digital files, authorised build configuration, inspection capability and life history shall be controlled. A successfully printed shape shall not establish structural, electrical or environmental suitability. Missing original supply does not waive qualification.

Verification: Review replacement authorisation, production genealogy and configuration-specific verification.

Acceptance / hold rule: Every essential replacement predicate passes before use; unsupported functional or life equivalence is prohibited.

75.7 – Handover, resource claims and closure

Source: AF-AST-STD-001, page 115.

The final claim shall state actual production, quality, quantity, conditions, uncertainty, exclusions and accepted receiving responsibility. Demonstration of a resource process creates no ownership, extraction right or operating permission. Waste, residues, hazardous inventories and long-term custody shall have accepted disposition.

Verification: Reconcile reported outputs, accepted products, rights/permissions and final-state evidence.

Acceptance / hold rule: The claim is bounded to measured and accepted achievement; undeveloped scale-up and unknown disposition remain separate.

76.1 – System boundary and conversion chain

Source: AF-AST-STD-001, page 116.

Define energy source, conversion, storage, distribution, loads, interfaces, heat rejection and terminal duties. Identify normal and degraded states, common dependencies, exposure and maintenance accessibility. Component efficiency or nameplate power shall not be represented as available end-to-end service capability.

Verification: Trace energy and thermal balances across the actual architecture and conditions.

Acceptance / hold rule: Every essential stage and interface meets approved functional and protective requirements.

76.2 – Beamed and remote energy services

Source: AF-AST-STD-001, page 116.

A remote energy-service profile shall identify transmitter, receiver, conversion, alignment, intervening environment, control authority and protection of unintended recipients. The assurance case shall address wrong-target, lost-tracking, interrupted-service and emergency shutdown conditions through authorised safe demonstrations. A received-power measurement alone shall not close protection or permission requirements.

Verification: Review written scope, compatible interfaces, performance evidence and safe protective tests.

Acceptance / hold rule: Delivery and all triggered protective predicates pass; no hazardous or unauthorised operation is justified by a positive efficiency value.

76.3 – Cryogenic, chemical and pressure interfaces

Source: AF-AST-STD-001, page 116.

Specialised energy storage and transfer shall define relevant material compatibility, containment, thermal behaviour, quality, monitoring, protective isolation and emergency interfaces. Actual pressure, composition, exposure and handling limits shall be approved by competent specialists for the specific system. This publication shall not be used as an operating procedure.

Verification: Review authorised technical basis, qualification, inspection and integration evidence.

Acceptance / hold rule: Every essential containment and protection condition is supported; missing hazardous-work authority blocks the activity.

76.4 – Nuclear and radiation-source governance

Source: AF-AST-STD-001, page 116.

Where a mission uses a nuclear or other controlled radiation source, the organisation shall identify the actual competent authorities, permissions, safety case, transport, launch/operation interfaces, security, emergency responsibilities and end-of-life duties. Independent specialist access shall be sufficient for the bounded evaluation. ASTRA shall not grant source-handling, reactor-design or public-safety permission.

Verification: Verify the existence, scope and authenticity of required specialist approvals and integration evidence.

Acceptance / hold rule: All relevant permissions and assurance interfaces are complete; a generic aerospace credential cannot substitute for them.

76.5 – Infrastructure availability and failure propagation

Source: AF-AST-STD-001, page 117.

Utilities, storage, conversion and networks shall be evaluated for common failures, load prioritisation, restoration, fire or containment interfaces and dependence on external support. Protection of people and essential assets shall be distinguished from mission-service continuity. A shared resource cannot be credited as independent backup to itself.

Verification: Review dependency analysis and safe tests of loss, isolation and restoration.

Acceptance / hold rule: Every essential protective path remains effective under the approved failure set; unsupported independence is not credited.

76.6 – Degradation, environmental claims and retirement

Source: AF-AST-STD-001, page 117.

Capacity, conversion and loss models shall reflect ageing and relevant exposure. Environmental claims shall use a separately defined lifecycle boundary and shall not imply technical interchangeability or complete safety. Retirement shall preserve hazardous inventory, terminal protection, custody and monitoring duties.

Verification: Reconcile actual condition, model validity, separate environmental statements and final disposition.

Acceptance / hold rule: Technical life and terminal conditions are met independently of environmental metrics; unknown inventories remain open obligations.

77.1 – Requirement-to-method completeness

Source: AF-AST-STD-001, page 118.

The verification matrix shall include every applicable requirement, object/configuration, method, test or analysis purpose, criterion, uncertainty, evidence and authorised conclusion. Inspection, analysis, demonstration and testing shall be selected for the actual failure mechanism. Annex T domains guide coverage but are not ready-made methods. A complete test list shall not replace requirement-level closure.

Verification: Reconcile the requirement population, test matrix and actual evidence using stable identifiers.

Acceptance / hold rule: Every applicable requirement has a valid completed evidence path; any essential uncovered row remains HOLD.

77.2 – Campaign design and article pedigree

Source: AF-AST-STD-001, page 118.

Define qualification articles, flight or service articles, specimens, representative differences, prior exposure, fixtures, operating modes and cumulative test sequence. Identify which conclusions may be transferred between articles and why. Failed tests, repairs and substitutions shall remain in the same historical chain.

Verification: Review specimen-to-product and test-to-configuration equivalence records.

Acceptance / hold rule: All material differences and accumulated effects are evaluated before evidence reuse; unrepresentative essential evidence is not accepted.

77.3 – Measurement and uncertainty readiness

Source: AF-AST-STD-001, page 118.

Before execution, verify instrument identity, calibration, range, bandwidth, synchronisation, environment, software, raw-data retention and uncertainty suitability. Sensor placement and spatial coverage shall represent the characteristic being accepted. Protect the article and personnel through separately specified stop conditions.

Verification: Inspect the full measurement chain and execute relevant readiness checks.

Acceptance / hold rule: All required channels are valid for the intended inference; a missing, saturated or misconfigured critical channel prevents that acceptance.

77.4 – Combined effects and sequence

Source: AF-AST-STD-001, page 118.

The technical plan shall evaluate whether individual tests adequately address coupled environments and order-dependent damage. Thermal, radiation, mechanical, electrical, contamination and software conditions shall be combined or supported by a justified integrated analysis where necessary. Over-test and under-test shall be assessed against the actual evidence purpose.

Verification: Review the interaction matrix and cumulative exposure ledger.

Acceptance / hold rule: Every material combined mechanism has adequate evidence; passing isolated tests does not automatically close unexamined combinations.

77.5 – Original data and invalid tests

Source: AF-AST-STD-001, page 118.

Retain actual setup, input and response histories, environmental conditions, interruptions, alarms, raw files, corrections, uncertainty and validity classification. An invalid run shall state what evidence remains usable and which requirement is not demonstrated. A repaired or changed article shall not silently replace the originally failed configuration.

Verification: Reconstruct a selected run from raw data and contemporaneous records.

Acceptance / hold rule: The run is independently interpretable and no failed, invalid or missing evidence is concealed.

77.6 – Numerical and attribute acceptance

Source: AF-AST-STD-001, page 119.

Quantitative decisions shall use the prospectively selected predicate and uncertainty rule. Attribute decisions shall name observable states and essential steps rather than unstructured judgement. Equality at an inclusive limit is handled as specified; empty acceptance regions, invalid units and non-finite values produce HOLD. Rounding shall not change an outcome.

Verification: Replay boundary, negative and missing-input cases using Annex AL and Annex AM.

Acceptance / hold rule: The correct state follows deterministically from valid unrounded inputs and the approved predicate.

77.7 – Retest and corrective verification

Source: AF-AST-STD-001, page 119.

Retest shall follow an approved rationale, defined scope and representative configuration. It shall preserve the original failure and address causal, exposure and selection effects. Repeated trials until a pass occurs are not an acceptance strategy. Corrective verification shall include the original failure mode and relevant regression, not merely a new favourable measurement.

Verification: Review the retest authorisation, all attempts and failure-to-correction trace.

Acceptance / hold rule: The original deficiency and affected requirements are demonstrably resolved; otherwise the claim remains failed or held.

77.8 – Independent campaign closure

Source: AF-AST-STD-001, page 119.

The final dossier shall reconcile configuration, criteria, valid results, adverse evidence, untested characteristics, uncertainty, concessions and open duties. Qualification, article acceptance, laboratory competence and ASTRA conformity shall retain separate decisions. A technical concession shall not be relabelled as fulfilment of the original criterion.

Verification: Perform independent requirement-by-requirement closure with actual decision authority.

Acceptance / hold rule: Every applicable gate for the exact claimed object passes; counts, percentages or programme completion dates alone cannot release the object.

78.1 – Released digital configuration

Source: AF-AST-STD-001, page 120.

Identify requirements, source or logic, generated artefacts, model weights, preprocessing, parameters, tools, dependencies, build environment and loaded target. A version label alone is insufficient to establish the deployed behaviour. Every consequential change shall be attributable and linked to impact, regression and actual release authority.

Verification: Reconstruct the released artefact and compare it with the loaded configuration.

Acceptance / hold rule: The evaluated and deployed digital configurations match, or all differences have accepted verification before use.

78.2 – Operational domain and prohibited behaviour

Source: AF-AST-STD-001, page 120.

Define intended tasks, users, environment, sensor and network assumptions, autonomous authority, prohibited actions and protective states. Experimental uses shall be segregated from live release. Behaviour outside the approved domain shall trigger the defined limitation or protective response rather than an unsupported autonomous expansion.

Verification: Review domain completeness and execute representative in-domain, out-of-domain and prohibited cases.

Acceptance / hold rule: All essential domain and protective conditions pass; unbounded authority or unknown out-of-domain behaviour blocks release.

78.3 – Evaluation data and model credibility

Source: AF-AST-STD-001, page 120.

Evaluation shall retain data provenance, rights, labelling, representative populations, partitions, leakage checks, synthetic contribution and adverse cases. Model verification, calibration and independent validation shall be distinguished. A high aggregate score, large dataset or visual twin is not evidence of every rare or safety-critical condition.

Verification: Inspect data partitions and independently reproduce selected performance and model-validation results.

Acceptance / hold rule: Prospective scenario-specific criteria are met with disclosed uncertainty and limitations; unsupported extrapolation remains HOLD.

78.4 – Human authority and consequential decisions

Source: AF-AST-STD-001, page 120.

Human oversight shall be validated against available information, response time, competence, workload and control access. Automated decision support may organise evidence but shall not independently issue an ASTRA grant, renewal, suspension or restoration. Generated observations and citations shall not be presented as authentic source events.

Verification: Challenge automation bias, false-source and delayed-intervention scenarios.

Acceptance / hold rule: Actual authorised people can perform every required role and source evidence remains verifiable; nominal oversight alone is insufficient.

78.5 – Security and trusted updates

Source: AF-AST-STD-001, page 121.

Protect source, build, machine instructions, operational data, identities and updates according to the actual threat and safety model. Update acceptance shall verify origin, integrity, authority, target, compatibility and interruption behaviour. Reversion to an earlier load shall not reintroduce an unacceptable defect without explicit technical disposition. Security testing requires written safe authorisation.

Verification: Review trust dependencies and execute isolated permitted and prohibited update tests.

Acceptance / hold rule: All required integrity and protective gates pass; a valid signature alone does not establish functional safety or compatibility.

78.6 – Monitoring, drift and adaptation

Source: AF-AST-STD-001, page 121.

Define detectable drift, changed exposure, failure signals, missing-data response, authority and reassessment triggers. Monitor what the method can actually observe, not every property inferred from a live dashboard. Adaptation outside the released envelope shall require renewed assurance before reliance. A monitoring gap shall not be treated as evidence of unchanged performance.

Verification: Review monitoring coverage, alert-to-action records and controlled changes.

Acceptance / hold rule: Essential performance and protection remain supported; otherwise restrict the affected use and assess earlier outputs.

78.7 – Recovery and semantic portability

Source: AF-AST-STD-001, page 121.

Export and recovery shall preserve identities, scope, configuration, evidence states, decisions, history, units, time basis, permissions and relationships. Equal file counts do not establish equal meaning. Reconcile events after the recovery point and obtain receiving acceptance before cutover. Service availability and evidence-integrity acceptance are separate.

Verification: Execute missing-link, wrong-version, interrupted-write, expired-authority and restore tests.

Acceptance / hold rule: All essential records and relationships are usable and correct; unresolved evidence loss keeps dependent decisions on HOLD.

79.1 – Protect people and essential assets before mission success

Source: AF-AST-STD-001, page 122.

The assurance case shall separate mission-success conditions from required protection when the mission objective cannot be achieved. Define credible severe consequences, essential controls, detection, escalation and authorised stop or restriction. Commercial benefit and a favourable aggregate risk score shall not override a missing essential protective condition.

Verification: Review hazard-to-control-to-verification traceability for failed-mission scenarios.

Acceptance / hold rule: Every required protective function has accepted evidence independently of mission performance metrics.

79.2 – Emergency feasibility and resources

Source: AF-AST-STD-001, page 122.

Protective and recovery plans shall identify actual people, communication, access, equipment, energy, consumables, time and external assistance. An assumed response shall be credited only within demonstrated capability and mission constraints. A rescue agreement, proposed future service or unallocated reserve shall not be counted as assured availability.

Verification: Reconcile scenario timing, resource budgets and exercised interfaces.

Acceptance / hold rule: All required protective pathways are feasible within their approved response and survival bounds.

79.3 – Loss of contact and uncertain physical state

Source: AF-AST-STD-001, page 122.

The operator shall define the distinction between missing data, confirmed failure, safe dormant state, lost asset and completed disposition. Preserve last valid observations, their age and uncertainty. The absence of an alarm or signal shall not establish safe state. An inference shall identify its model and limits and shall not be presented as direct observation.

Verification: Review the state-classification record against raw evidence and observability limits.

Acceptance / hold rule: Only a supported state is assigned; uncertain essential conditions retain UNKNOWN in operational records and HOLD in dependent acceptance.

79.4 – Affected populations and historical decisions

Source: AF-AST-STD-001, page 122.

An event shall be traced to affected configurations, fleet members, materials, methods, software, personnel, reports and prior decisions. Determine both occurrence and escape causes and test competing explanations. Changing a supplier, restarting a service or training one person shall not by itself close a shared systemic cause.

Verification: Inspect end-to-end dependency and look-back analysis with actual notifications.

Acceptance / hold rule: All materially dependent outputs are addressed; no valid adverse history is erased by later correction.

79.5 – Terminal evidence and responsible transfer

Source: AF-AST-STD-001, page 122.

Terminal-state claims shall specify the exact intended condition, permitted inference, observation method, resources and residual duties. Transfer shall preserve custody and receiving acceptance of records, hazardous inventory, notices, monitoring and unresolved remedies. A file sent or contract ended is not accepted closure.

Verification: Reconcile final-state evidence, inventory and recipient acknowledgement.

Acceptance / hold rule: Every required terminal criterion is demonstrated or openly limited, and every remaining duty has an actual receiving owner.

79.6 – Learning and sustained accountability

Source: AF-AST-STD-001, page 123.

Lessons shall be translated into controlled requirements, methods, training, resources or interfaces and verified under representative conditions. Protect good-faith reporting and distinguish allegation from substantiated misconduct. Long-term archives shall retain technical meaning, access conditions and correction responsibility after staff, tools or institutions change.

Verification: Review corrective effectiveness and test retrieval by a receiving competent reviewer.

Acceptance / hold rule: The affected controls demonstrably improve and the mission record remains interpretable; publication of a lesson alone is not closure.

80.1 – One complete application schedule

Source: AF-AST-STD-001, page 124.

The schedule shall join the object tuple, F01–F08 selection, Annex AK domains, phase/mode matrix, required methods, parameter records, competence, evidence, independent decisions and continuing controls. All triggers in Annex AO shall be resolved. Shared records may be reused after relevance review, but shall not merge distinct objects, outcome classes or actual authority.

Verification: Reconcile the full schedule with Clauses 1, 4, 62 and 63 and Annex C.

Acceptance / hold rule: No essential scope, parameter, responsibility or evidence field remains undefined before a positive decision.

80.2 – Domain and verification completeness

Source: AF-AST-STD-001, page 124.

Map every applicable domain and requirement to valid verification and to an accountable conclusion. Treat domain counts, test counts and completed checklist percentages as planning measures only. Annex T is not exhaustive of all future methods; a newly discovered material mechanism shall create a controlled additional requirement and evidence task before the affected claim proceeds.

Verification: Perform forward and reverse traceability and inspect omitted-domain reasons.

Acceptance / hold rule: Every applicable condition passes or has a justified approved N/A; no HOLD or FAIL is hidden by a coverage percentage.

80.3 – Competent independent closure

Source: AF-AST-STD-001, page 124.

The independent reviewer shall have verified technical coverage, lawful evidence access and no prohibited case relationship. Technical dissent shall be resolved by evidence, corrected scope or further work. Where a three-person panel is required, all three eligible members shall participate and the established vote rule shall apply only after the technical gates are satisfied.

Verification: Check competence, conflict, access, panel and reasoned decision records.

Acceptance / hold rule: Both the technical conjunction and applicable authority/panel rules pass; a vote cannot cure absent evidence.

80.4 – Bounded claim and publication

Source: AF-AST-STD-001, page 124.

The outcome shall identify legal holder, issuer, object, configuration, family/module, domain, site or remote responsibility, criteria, limitations, actual dates and ongoing or instance basis. Public wording shall not imply unrestricted coverage of all space, universal safety, statutory permission or external recognition without evidence. The approved cover and edition label do not change those boundaries.

Verification: Compare the actual decision with credential, registry and all proposed public representations.

Acceptance / hold rule: Published scope and status exactly match the authorised decision and preserve every material restriction.

80.5 – Continuing conformity and change

Source: AF-AST-STD-001, page 124.

Maintain surveillance, technical validity, people, resources, configuration, monitoring and actual state history under the controlling clocks. Mission, environment, population or technology changes shall trigger impact review before expanded reliance. Restoration shall preserve expiry unless a full renewal has occurred and shall not validate the suspended interval.

Verification: Audit actual completion, change and status records rather than scheduled dates alone.

Acceptance / hold rule: The current claim remains fully supported; overdue or invalidated conditions trigger the applicable restriction, suspension or withdrawal.

80.6 – Completion boundary

Source: AF-AST-STD-001, page 125.

The final document is a requirement and evidence framework. Each actual mission and technical profile shall complete its numerical limits, specialist procedures, permissions and validation. Newly authored provisions shall follow the real adoption process before binding live use. No statement in this publication guarantees that every undiscovered physical phenomenon or future technology has already been validated.

Verification: Review the final release dossier and the truthful distinction between prepared text and real implementation.

Acceptance / hold rule: Only the exact demonstrated and authorised scope is released; incomplete domains remain available for controlled development, not presumed conformity.

Appendix B — Local adoption, validation and receiving acceptance

Gate	Required evidence	Outcome when incomplete
Authority and identity	Actual operator, scoped mandate, permissible result class, named owner, independent decision and remedy functions.	No live scope release.
Requirement population	All applicable clauses and annexes mapped to child conditions, with reasons and independent approval for exclusions.	HOLD the affected conclusion.
Parameters and methods	Prospective values/attributes; technical basis; valid methods; representativeness; calibration, uncertainty and approved predicates.	No dependent acceptance.
People and evidence	Current demonstrated competence; conflict clearance; original usable source evidence; actual configuration and event times.	Reassign or obtain sufficient evidence.
Local tools and tests	Actual deployment tested with positive, boundary, missing, invalid and prohibited inputs; original failed cases retested.	No consequential reliance on unaccepted tools.
Independent closure	Every mandatory requirement PASS, approved N/A, all in-scope nonconformities verified closed, panel rules where required.	No grant, renewal or extension.
Claims and continuity	Decision-linked scope/status; source history; genuine custody, receiving access, retention, urgent notices and terminal duties.	Restrict publication or transfer until resolved.

Record authentic approval and activation in AF-AST-FR-001 and AF-AST-SC-004 or an equivalent controlled record. The edition label is not an effective date for a particular case. Preserve historical decisions under their actual controlling basis; a newer document does not retroactively create missing competence or evidence. Source: Clauses 4, 31, 61, 62 and 80; Annexes P and AR.

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