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Purpose and application

Testing and Inspection for 10 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

Testing and Inspection for 10 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
F03-L01	Non-destructive testing	Accreditation concerns the declared body competence; neither a test report nor a personnel credential automatically certifies the inspected product.
F03-L02	Materials testing	Test competence and sample results do not imply conformity of an unrepresented lot, product family or future production.
F03-L03	Calibration and metrology	A calibration capability is not product conformity or assurance that every later user measurement is suitable for its decision.
F03-L04	Inspection body activities	An inspection competence result does not certify every inspected item or convert internal inspection into third-party certification.
F03-L05	Management-system certification bodies	Accreditation of the body does not certify the body own consultancy work or establish conformity of every client without a separate case decision.
F03-L06	Product, process and service certification bodies	Body accreditation is not blanket product approval; one instance test cannot authorise indefinite family production.
F03-L07	Personnel certification bodies	A personnel credential does not itself authorise aircraft release, restricted testing or every task performed by the employer.
F03-L08	Validation and verification bodies	Accreditation concerns body competence and is not endorsement of every future statement it issues.
F03-L09	Proficiency activity providers	No universal proficiency score or assigned-value recipe is supplied; the technical profile must justify them for the actual exercise.
F03-L10	Reference material producers	A nominal value with unknown provenance cannot support metrological traceability or a broader property claim.

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.

State	Sufficient basis	Required next action
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.

P04 — Geometry and reference systems

Frame origin/orientation, epoch, time scale, coordinate units, transformation and covariance.

Derivation and evidence: Validated transformation and independent known-answer checks.

Completion test: Correct frame and time are maintained through every interface.

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.

P11 – Communication and timing

Distance, frequency/wavelength, gain/loss, noise, rate, margin, latency, event time, age, clock error and outage.

Derivation and evidence: Validated end-to-end budget and adverse service tests.

Completion test: Required quality, delay and integrity conditions all pass.

P12 – Human and protective response

User/task, representative conditions, essential steps, feasible intervention, health-support interface and emergency resources.

Derivation and evidence: Specialist criteria and observed performance.

Completion test: Every essential protection is effective; no invented universal physiological limit.

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.

P15 — Security and command authority

Identities, roles, privileges, keys/trust, target, validity window, command sequence, integrity and interruption response.

Derivation and evidence: Written test authorisation and deployed workflow validation.

Completion test: No prohibited authority or unverified command state is accepted.

P16 — Reliability and availability

Population, exposure, failure definition, observation, dependencies, confidence model, downtime and maintenance exclusions.

Derivation and evidence: Prospective statistical design plus engineering mechanism evidence.

Completion test: The actual demonstrated bound meets the approved claim; zero failures is not zero risk.

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

F03-L01 – Non-destructive testing

Competence to perform defined non-destructive evaluation techniques for stated material/product sectors, geometries, defect mechanisms and access conditions. Technique-specific methods may include visual/optical, penetrant, magnetic, ultrasonic, radiographic, electromagnetic or other justified approaches; none is granted merely by this catalogue.

Application-specific parameters: Technique and method version; material/geometry; target defect mechanism; range and access; equipment/software; reference items; personnel/task authority; detection limits; acceptance criteria; actual site/mobile use.

Profile boundary	Detail
Technical emphasis	technique-specific non-destructive examination
Failure / evidence risks	a reference indication can fail to represent the installed flaw and access conditions
Representative witnessing	Witness each technically distinct technique family from preparation to report, including representative difficult boundaries and an adverse or ambiguous indication.
Change and requalification triggers	Technique/principle; equipment/software; personnel; reference item; geometry/material; acceptance method; location/access; automated interpretation.
Outcome limitation	Accreditation concerns the declared body competence; neither a test report nor a personnel credential automatically certifies the inspected product.

F03-L01-R01 – Retained subject control

Define the exact technique, material sector, defect and access boundary; group methods only where a documented technical relationship supports representative witnessing.

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 19; 62 and Annex AL.

F03-L01-R02 – Retained subject control

Verify practical operator and technical-supervision competence, justified task-specific prerequisites and employer authorisation. A general personnel badge does not authorise every technique.

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 19; 62 and Annex AL.

F03-L01-R03 – Retained subject control

Qualify procedures, equipment, reference artefacts, software and environmental conditions for the actual inspection task and required interpretation.

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 19; 62 and Annex AL.

F03-L01-R04 — Retained subject control

Demonstrate detection limitations and relevant false-positive/false-negative behaviour; a successful easy reference check is not proof of every installed defect.

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 19; 62 and Annex AL.

F03-L01-R05 — Retained subject control

Preserve item identity, preparation, actual settings/conditions, observations, indication interpretation, reporting and any inaccessible region in a complete technical trail.

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 19; 62 and Annex AL.

F03-L01-R06 — Retained subject control

Retain adverse work, comparison evidence, re-examinations and change effects; hazardous sources require separate permissions and specialist safe procedures.

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 19; 62 and Annex AL.

F03-L01-R07 — Mission and environment transfer

For non-destructive testing, define the qualified or evaluated envelope for technique-specific non-destructive examination. 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

F03-L01-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a reference indication can fail to represent the installed flaw and access conditions. 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

F03-L01-R09 — Configuration and data identity

Bind technique-specific non-destructive examination 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

F03-L01-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: witness actual preparation, difficult boundaries, indication interpretation and false-negative 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

F03-L01-R11 — Receiving interface and bounded output

Deliver the bounded output to authorised method signatory and result recipient. 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

F03-L01-R12 — Independent release and continuing validity

Evaluate F03-L01 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: witness actual preparation, difficult boundaries, indication interpretation and false-negative limitations The reviewer records the affected F03-L01 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 authorised method signatory and result recipient.

F03-L02 — Materials testing

Competence for specified mechanical, physical, chemical, thermal and other material-characterisation methods on defined samples and parent populations. Include specimen preparation, orientation, conditioning, instrument control, data treatment and bounded interpretation.

Application-specific parameters: Property/measurand; material/matrix; parent and specimen identity; geometry/orientation; conditioning; equipment/rate/control; range; calibration/reference; data processing; uncertainty; sampling responsibility.

Profile boundary	Detail
Technical emphasis	material testing and specimen-to-parent inference
Failure / evidence risks	a valid specimen test can be wrongly attributed to an unrepresented lot or orientation
Representative witnessing	Follow one specimen from parent selection and custody through preparation, actual execution, raw data, processing and report; review an invalid-test/retest decision.
Change and requalification triggers	Material/matrix; specimen geometry; preparation; equipment/software; control rate/range; reference method; site; intended inference.
Outcome limitation	Test competence and sample results do not imply conformity of an unrepresented lot, product family or future production.

F03-L02-R01 — Retained subject control

Define each measurand, material matrix, range and method, including the customer intended decision and limits of sample-to-parent inference.

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 19; 62 and Annex AL.

F03-L02-R02 — Retained subject control

Trace specimen location, orientation, machining/preparation and conditioning to the actual material lot or component without substituting a convenient representative label.

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 19; 62 and Annex AL.

F03-L02-R03 — Retained subject control

Verify apparatus performance, reference basis, control conditions, data-acquisition software and uncertainty appropriate to the 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 19; 62 and Annex AL.

F03-L02-R04 — Retained subject control

Validate modified methods and matrix/interference effects where relevant; retain blanks, recovery/reference checks and failed validation trials.

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 19; 62 and Annex AL.

F03-L02-R05 — Retained subject control

Record raw response, anomalies, invalid tests, fracture or failure observations and the prospectively authorised basis for any retest.

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 19; 62 and Annex AL.

F03-L02-R06 — Retained subject control

Release complete reports with actual performer, method, conditions, units, uncertainty and limitations; maintain field-specific continuing-validity 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 19; 62 and Annex AL.

F03-L02-R07 — Mission and environment transfer

For materials testing, define the qualified or evaluated envelope for material testing and specimen-to-parent inference. 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

F03-L02-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a valid specimen test can be wrongly attributed to an unrepresented lot or orientation. 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

F03-L02-R09 — Configuration and data identity

Bind material testing and specimen-to-parent inference 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

F03-L02-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 specimen selection, preparation, conditioning, raw response and population boundary. 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

F03-L02-R11 — Receiving interface and bounded output

Deliver the bounded output to materials-test signatory and product technical 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

F03-L02-R12 — Independent release and continuing validity

Evaluate F03-L02 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 specimen selection, preparation, conditioning, raw response and population boundary. The reviewer records the affected F03-L02 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 materials-test signatory and product technical authority.

F03-L03 — Calibration and metrology

Competence to establish and report defined measurement quantities, ranges and uncertainties under specified laboratory, on-site or mobile conditions. Scope capability and individual calibration results remain distinguishable.

Application-specific parameters: Quantity/measurand; range; method; reference chain; environmental conditions; correction model; uncertainty contributions and coverage; device/configuration; laboratory/mobile site; signatory.

Profile boundary	Detail
Technical emphasis	calibration quantity, range and uncertainty capability
Failure / evidence risks	a quoted best capability can understate uncertainty in an actual mobile or adverse environment
Representative witnessing	Witness representative range and method families, inspect reference/correction evidence and reconstruct a complete uncertainty-to-certificate trail including a failed check.
Change and requalification triggers	Quantity/range; reference standard; method; environment; equipment/software; uncertainty model; mobile location; authorised signatory.
Outcome limitation	A calibration capability is not product conformity or assurance that every later user measurement is suitable for its decision.

F03-L03-R01 — Retained subject control

Define the quantity, range, device classes and conditions for which calibration capability is claimed, including mobile or customer-site 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 19; 62 and Annex AL.

F03-L03-R02 — Retained subject control

Verify the actual reference chain, competent service results and applicable uncertainty, rather than infer traceability from a provider logo.

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 19; 62 and Annex AL.

F03-L03-R03 — Retained subject control

Maintain a complete uncertainty model, significant corrections, environmental contributions and dependence where relevant for the claimed capability.

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 19; 62 and Annex AL.

F03-L03-R04 — Retained subject control

Demonstrate actual implementation on representative devices and ranges; do not publish a smaller uncertainty than the body can achieve under the declared 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 19; 62 and Annex AL.

F03-L03-R05 — Retained subject control

Report the specific calibrated item, method, conditions, results/corrections, uncertainty and authorised signatory with a clear relationship to the raw 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 19; 62 and Annex AL.

F03-L03-R06 — Retained subject control

Use intermediate checks, prospective interval reviews and adverse-equipment look-back analysis to protect earlier results and customer decisions.

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 19; 62 and Annex AL.

F03-L03-R07 — Mission and environment transfer

For calibration and metrology, define the qualified or evaluated envelope for calibration quantity, range and uncertainty capability. 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

F03-L03-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a quoted best capability can understate uncertainty in an actual mobile or adverse environment. 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

F03-L03-R09 — Configuration and data identity

Bind calibration quantity, range and uncertainty capability 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

F03-L03-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: recalculate the actual uncertainty budget with corrections, dependence and use conditions. 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

F03-L03-R11 — Receiving interface and bounded output

Deliver the bounded output to calibration signatory and instrument user. 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

F03-L03-R12 — Independent release and continuing validity

Evaluate F03-L03 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: recalculate the actual uncertainty budget with corrections, dependence and use conditions The reviewer records the affected F03-L03 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 calibration signatory and instrument user.

F03-L04 — Inspection body activities

Competence to inspect defined products, installations, processes or services at stated lifecycle stages. The declared independence relationship may be third-party or an explicitly identified internal/related relationship; wording must match the actual arrangement.

Application-specific parameters: Object and lifecycle stage; inspection criteria; independence relationship; methods; sample/access; instruments; personnel judgement; location; reporting; detection and scope limitations.

Profile boundary	Detail
Technical emphasis	inspection object, access and independence relationship
Failure / evidence risks	remote imagery may not show a concealed characteristic required for the inspection conclusion
Representative witnessing	Trace an actual inspection from request and relationship declaration through observation, interpretation and report, including an inaccessible feature and an adverse finding.
Change and requalification triggers	Inspection object/stage; independence model; technique; personnel; equipment; remote method; sampling; site; acceptance criteria.
Outcome limitation	An inspection competence result does not certify every inspected item or convert internal inspection into third-party certification.

F03-L04-R01 — Retained subject control

Identify the inspected object, stage, criteria and relationship to design, production, ownership or service; do not imply independent third-party status where absent.

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 19; 62 and Annex AL.

F03-L04-R02 — Retained subject control

Define inspection methods, sampling, access, instrument use, records and the judgement competence needed to reach the stated conclusion.

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 19; 62 and Annex AL.

F03-L04-R03 — Retained subject control

Demonstrate personnel authority and practical ability with representative objects and ambiguous/adverse cases, not only document 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 19; 62 and Annex AL.

F03-L04-R04 — Retained subject control

Validate remote imagery, scans, drones or automated classification for the intended property and expose inaccessible features and detection 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 19; 62 and Annex AL.

F03-L04-R05 — Retained subject control

Preserve actual inspection observations, technical interpretations, deviations, opinions and complete reports linked to the evaluated 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 19; 62 and Annex AL.

F03-L04-R06 — Retained subject control

Control nonconforming work, complaints, reinspection, changes and outsourced evidence with independent decisions appropriate to the claimed relationship.

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 19; 62 and Annex AL.

F03-L04-R07 — Mission and environment transfer

For inspection body activities, define the qualified or evaluated envelope for inspection object, access and independence 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

F03-L04-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: remote imagery may not show a concealed characteristic required for the inspection conclusion. 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

F03-L04-R09 — Configuration and data identity

Bind inspection object, access and independence 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

F03-L04-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 inspection plan, access limits, original images and independently justified supplementary 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

F03-L04-R11 — Receiving interface and bounded output

Deliver the bounded output to inspection signatory and accepting asset 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

F03-L04-R12 — Independent release and continuing validity

Evaluate F03-L04 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 inspection plan, access limits, original images and independently justified supplementary evidence. The reviewer records the affected F03-L04 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 inspection signatory and accepting asset owner.

F03-L05 — Management-system certification bodies

Competence and impartial operation of a body providing management-system certification for specified schemes, sectors, organisational scopes and consequence levels. The full application-to-decision cycle is within scope, not just audit delivery.

Application-specific parameters: Scheme/profile and version; sector; organisational/site boundaries; audit and specialist competence; readiness/implementation methods; time/site rules; independent decision; surveillance; public claims.

Profile boundary	Detail
Technical emphasis	management-system certification decisions
Failure / evidence risks	a complete audit report can conceal inadequate competence for a mission-critical technical boundary
Representative witnessing	Review complete accepted and refused certification cases, witness representative audits and examine independent decision, surveillance and appeal records.
Change and requalification triggers	New scheme/sector; technical or criticality scope; decision outsourcing; personnel; time/site model; digital audit platform; ownership.
Outcome limitation	Accreditation of the body does not certify the body own consultancy work or establish conformity of every client without a separate case decision.

F03-L05-R01 — Retained subject control

Define actual scheme and sector competence, legal responsibility and the organisation holding final certification decision 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 19; 62 and Annex AL.

F03-L05-R02 — Retained subject control

Verify admission, conflict screening, audit-team competence and necessary technical specialists for each accepted organisational scope.

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 19; 62 and Annex AL.

F03-L05-R03 — Retained subject control

Apply appropriate readiness/implementation, time and site requirements; an AF 9100 claim uses its full controlling provisions rather than a generic audit-duration shortcut.

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 19; 62 and Annex AL.

F03-L05-R04 — Retained subject control

Demonstrate evidence-led auditing of real processes, outputs, adverse records and systemic controls with accurate completed coverage.

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 19; 62 and Annex AL.

F03-L05-R05 — Retained subject control

Separate evaluation from independent review/decision, close in-scope nonconformities before new grants/renewals/extensions and preserve dissent and actual dates.

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 19; 62 and Annex AL.

F03-L05-R06 — Retained subject control

Maintain surveillance, change, renewal, remedies, mark control and truthful status history; control outsourced audits without transferring retained final responsibility.

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 19; 62 and Annex AL.

F03-L05-R07 — Mission and environment transfer

For management-system certification bodies, define the qualified or evaluated envelope for management-system certification decisions. 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

F03-L05-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a complete audit report can conceal inadequate competence for a mission-critical technical boundary. 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

F03-L05-R09 — Configuration and data identity

Bind management-system certification decisions 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

F03-L05-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 application, team coverage, evaluated sites, findings, independent review and final system wording. 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

F03-L05-R11 — Receiving interface and bounded output

Deliver the bounded output to certification decision function and public registry 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

F03-L05-R12 — Independent release and continuing validity

Evaluate F03-L05 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 application, team coverage, evaluated sites, findings, independent review and final system wording. The reviewer records the affected F03-L05 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 certification decision function and public registry custodian.

F03-L06 – Product, process and service certification bodies

Bodies evaluating and certifying defined products, processes or services through instance or ongoing conformity models. Specify technical evaluation capability, production/service controls, sampling, independent decisions and continuing claim rules.

Application-specific parameters: Object family; intended use; instance/ongoing model; criteria and methods; sampling; technical experts; outsourced laboratories; production/delivery controls; surveillance; labels; decision authority.

Profile boundary	Detail
Technical emphasis	object-specific product, process or service certification
Failure / evidence risks	supplier competence can be confused with acceptance of the actual evaluated object
Representative witnessing	Witness a representative technical evaluation and trace its sample/configuration through external evidence, independent review, certificate scope and continuing controls.
Change and requalification triggers	Object family; conformity model; criterion/method; lab/provider; production site; critical software; label or surveillance method.
Outcome limitation	Body accreditation is not blanket product approval; one instance test cannot authorise indefinite family production.

F03-L06-R01 – Retained subject control

Identify each object and conformity model, separating process qualification, routine acceptance and independent certification.

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 19; 62 and Annex AL.

F03-L06-R02 – Retained subject control

Complete technical profiles with actual characteristics, conditions, methods, uncertainty, essential failures and permitted claim boundaries before evaluation.

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 19; 62 and Annex AL.

F03-L06-R03 – Retained subject control

Demonstrate competence in the necessary product/process/service methods; an organisational auditor alone does not cover every specialist evaluation.

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 19; 62 and Annex AL.

F03-L06-R04 — Retained subject control

Verify representative test or service evidence and relevant production/delivery controls for an ongoing family rather than rely on one favourable prototype.

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 19; 62 and Annex AL.

F03-L06-R05 — Retained subject control

Retain final independent review and decision responsibility, evaluate outsourced technical results and close all in-scope nonconformities for new positive outcomes.

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 19; 62 and Annex AL.

F03-L06-R06 — Retained subject control

Control marks, sample/product identity, changes, complaints, surveillance and historical corrections according to the chosen instance or ongoing model.

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 19; 62 and Annex AL.

F03-L06-R07 — Mission and environment transfer

For product, process and service certification bodies, define the qualified or evaluated envelope for object-specific product, process or service certification. 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

F03-L06-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: supplier competence can be confused with acceptance of the actual evaluated object. 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

F03-L06-R09 — Configuration and data identity

Bind object-specific product, process or service certification 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

F03-L06-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 instance/ongoing model, technical tests, routine controls and independent bounded outcome. 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

F03-L06-R11 — Receiving interface and bounded output

Deliver the bounded output to certification authority and holder of the exact object claim. 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

F03-L06-R12 — Independent release and continuing validity

Evaluate F03-L06 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 instance/ongoing model, technical tests, routine controls and independent bounded outcome The reviewer records the affected F03-L06 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 certification authority and holder of the exact object claim.

F03-L07 — Personnel certification bodies

Bodies independently assessing competence against defined jobs, roles, levels and practical tasks. Learning provision, secure examination, certification, employer task authorisation and occupational licensing remain distinct.

Application-specific parameters: Job/task profile; level and prerequisites; knowledge/practical blueprint; essential steps; evaluator competence; exam security; independence; credential limits; maintained practice; renewal and remedies.

Profile boundary	Detail
Technical emphasis	personnel certification and essential practical skills
Failure / evidence risks	a high aggregate score can conceal failure of one essential task or an insecure identity check
Representative witnessing	Review task analysis, observe practical assessment and trace a candidate attempt through independent decision, credential scope, currency and a failed/reassessment case.
Change and requalification triggers	Role/level; task blueprint; practical method; scoring; essential steps; delivery mode; assessor; renewal rules; generated assessment content.
Outcome limitation	A personnel credential does not itself authorise aircraft release, restricted testing or every task performed by the employer.

F03-L07-R01 — Retained subject control

Validate the actual role/task profile and fair prerequisite basis with a coherent relationship between claimed competence and assessed activities.

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 19; 62 and Annex AL.

F03-L07-R02 — Retained subject control

Secure candidate identity, question/scenario content, attempts, scoring and authorised accommodations without changing the competence being assessed.

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 19; 62 and Annex AL.

F03-L07-R03 — Retained subject control

Demonstrate representative practical assessment and separately record each essential safety, integrity and independence step.

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 19; 62 and Annex AL.

F03-L07-R04 — Retained subject control

Control training/examination relationships and ensure independent decisions rather than a guaranteed credential from course purchase or attendance.

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 19; 62 and Annex AL.

F03-L07-R05 — Retained subject control

Preserve failed attempts, justified remediation and equivalent reassessment; apply the complete applicable source minima without averaging an essential failure into a 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 19; 62 and Annex AL.

F03-L07-R06 — Retained subject control

Issue bounded credentials and maintain actual currency, renewal, complaint/appeal and correction processes separate from employer or statutory privileges.

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 19; 62 and Annex AL.

F03-L07-R07 — Mission and environment transfer

For personnel certification bodies, define the qualified or evaluated envelope for personnel certification and essential practical skills. 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

F03-L07-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a high aggregate score can conceal failure of one essential task or an insecure identity check. 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

F03-L07-R09 — Configuration and data identity

Bind personnel certification and essential practical skills 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

F03-L07-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: review the blueprint, authentic attempts, separate essential-step outcomes and independent decision. 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

F03-L07-R11 — Receiving interface and bounded output

Deliver the bounded output to personnel decision function and credential 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

F03-L07-R12 — Independent release and continuing validity

Evaluate F03-L07 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: review the blueprint, authentic attempts, separate essential-step outcomes and independent decision. The reviewer records the affected F03-L07 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 personnel decision function and credential custodian.

F03-L08 — Validation and verification bodies

Bodies evaluating specified historical or prospective claims for defined sectors, methods, data and assurance forms. Statement preparation and independent evaluation of the same statement must be separated.

Application-specific parameters: Statement type; sector; boundary/period; methodology; intended users; assurance form; materiality; strategic risk; evidence access; technical reviewers; independent conclusion; later correction.

Profile boundary	Detail
Technical emphasis	statement validation or verification competence
Failure / evidence risks	a sound calculation can still concern the wrong boundary or an unverified future assumption
Representative witnessing	Trace a complete engagement from acceptance through strategy, actual testing, misstatement resolution, independent conclusion and subsequent correction handling.
Change and requalification triggers	Claim type/sector; methodology; assurance form; data source; materiality method; personnel; digital tools; geographic/period boundary.
Outcome limitation	Accreditation concerns body competence and is not endorsement of every future statement it issues.

F03-L08-R01 — Retained subject control

Define competence for the actual claim, sector, data, method and assurance form rather than claim unrestricted verification 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 19; 62 and Annex AL.

F03-L08-R02 — Retained subject control

Separate client statement preparation and consultancy from independent validation/verification roles and final decision responsibility.

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 19; 62 and Annex AL.

F03-L08-R03 — Retained subject control

Accept the engagement with prospective boundaries, materiality, assurance objective, resources and evidence plan.

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 19; 62 and Annex AL.

F03-L08-R04 — Retained subject control

Demonstrate actual substantive and control testing, estimation challenge, source reconciliation and preservation of misstatements and corrections.

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 19; 62 and Annex AL.

F03-L08-R05 — Retained subject control

Independently review sufficiency and issue appropriately bounded conclusions that distinguish historical facts from future assumptions.

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 19; 62 and Annex AL.

F03-L08-R06 — Retained subject control

Preserve exact statement versions, communicate later material errors and maintain continuing competence and lawful evidence 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 19; 62 and Annex AL.

F03-L08-R07 — Mission and environment transfer

For validation and verification bodies, define the qualified or evaluated envelope for statement validation or verification competence. 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

F03-L08-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a sound calculation can still concern the wrong boundary or an unverified future assumption. 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

F03-L08-R09 — Configuration and data identity

Bind statement validation or verification competence 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

F03-L08-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 engagement purpose, claim, materiality, data rights, source records and independent conclusion. 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

F03-L08-R11 — Receiving interface and bounded output

Deliver the bounded output to verification authority and statement 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

F03-L08-R12 — Independent release and continuing validity

Evaluate F03-L08 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 engagement purpose, claim, materiality, data rights, source records and independent conclusion The reviewer records the affected F03-L08 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 verification authority and statement owner.

F03-L09 — Proficiency activity providers

Providers designing and administering competence-comparison exercises for specified methods, materials and participant populations. A laboratory accreditation does not automatically confer this specialised capability.

Application-specific parameters: Exercise purpose; technical field; participants; item design; assigned-value basis; homogeneity/stability; uncertainty; statistical evaluation; confidentiality; reporting; appeals and corrections.

Profile boundary	Detail
Technical emphasis	proficiency exercise design and participant comparisons
Failure / evidence risks	apparent participant disagreement may arise from unstable or non-homogeneous comparison material
Representative witnessing	Reconstruct an exercise from planning and item evidence to assigned values, received data, calculations, reports and one adverse or corrected outcome.
Change and requalification triggers	Item/material; technical field; assigned-value method; statistical model; software; participant population; distribution/storage conditions.
Outcome limitation	No universal proficiency score or assigned-value recipe is supplied; the technical profile must justify them for the actual exercise.

F03-L09-R01 — Retained subject control

Define the technical purpose, participant population, method boundaries and what performance conclusions the exercise can validly support.

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 19; 62 and Annex AL.

F03-L09-R02 — Retained subject control

Demonstrate suitable item production/selection, identity, homogeneity, stability, packaging and distribution over the intended exercise 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 19; 62 and Annex AL.

F03-L09-R03 — Retained subject control

Establish and justify assigned values, reference basis, uncertainty and performance-evaluation models prospectively.

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 19; 62 and Annex AL.

F03-L09-R04 — Retained subject control

Control participant confidentiality, submission identity, instructions, timing, collusion/influence risks and handling of incomplete or exceptional results.

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 19; 62 and Annex AL.

F03-L09-R05 — Retained subject control

Report methods, statistical assumptions, limitations, individual outcomes and justified corrections without converting participation into satisfactory performance.

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 19; 62 and Annex AL.

F03-L09-R06 — Retained subject control

Validate provider competence, software, data handling and independent review for the specialised route before live release.

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 19; 62 and Annex AL.

F03-L09-R07 — Mission and environment transfer

For proficiency activity providers, define the qualified or evaluated envelope for proficiency exercise design and participant comparisons. 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

F03-L09-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: apparent participant disagreement may arise from unstable or non-homogeneous comparison material. 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

F03-L09-R09 — Configuration and data identity

Bind proficiency exercise design and participant comparisons 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

F03-L09-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: separate assigned-value uncertainty, stability, transport and participant evidence before evaluation. 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

F03-L09-R11 — Receiving interface and bounded output

Deliver the bounded output to exercise technical owner and each participant recipient. 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

F03-L09-R12 — Independent release and continuing validity

Evaluate F03-L09 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: separate assigned-value uncertainty, stability, transport and participant evidence before evaluation. The reviewer records the affected F03-L09 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 exercise technical owner and each participant recipient.

F03-L10 — Reference material producers

Producers of reference materials for specified properties and intended uses, including production control, characterisation, homogeneity, stability, uncertainty, documentation and distribution.

Application-specific parameters: Material/matrix; property; intended use; production lot; characterisation design; reference basis; homogeneity/stability; uncertainty; packaging/storage; certificate/statement; monitoring.

Profile boundary	Detail
Technical emphasis	reference-material characterisation and supplied units
Failure / evidence risks	a characterised batch may not remain stable in the actual dispatched units or use period
Representative witnessing	Trace one reference-material lot through source, production, homogeneity/stability, characterisation, uncertainty, issue and monitoring.
Change and requalification triggers	Matrix/property; production method; contributing laboratories; characterisation model; packaging; storage; stability or uncertainty basis.
Outcome limitation	A nominal value with unknown provenance cannot support metrological traceability or a broader property claim.

F03-L10-R01 — Retained subject control

Define the reference material, property, matrix, intended use and limitations before selecting production and characterisation 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 19; 62 and Annex AL.

F03-L10-R02 — Retained subject control

Control source materials, production, lot identity, contamination, packaging and distribution so the characterised material corresponds to supplied units.

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 19; 62 and Annex AL.

F03-L10-R03 — Retained subject control

Demonstrate relevant homogeneity and stability under intended storage, transport and use conditions with a technically justified design.

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 19; 62 and Annex AL.

F03-L10-R04 — Retained subject control

Justify property characterisation, reference basis, uncertainty and the competence of contributing methods or laboratories.

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 19; 62 and Annex AL.

F03-L10-R05 — Retained subject control

Provide documentation linking property values, uncertainties, instructions, validity/conditions and limitations to the actual lot and responsible issuer.

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 19; 62 and Annex AL.

F03-L10-R06 — Retained subject control

Investigate changes or adverse stability evidence, correct affected documentation and notify users; ordinary testing accreditation is not this specialised 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 19; 62 and Annex AL.

F03-L10-R07 — Mission and environment transfer

For reference material producers, define the qualified or evaluated envelope for reference-material characterisation and supplied units. 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

F03-L10-R08 — Essential properties and observability

Identify the failure and evidence risks specific to this subject: a characterised batch may not remain stable in the actual dispatched units or use period. 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

F03-L10-R09 — Configuration and data identity

Bind reference-material characterisation and supplied units 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

F03-L10-R10 — Subject-specific adverse demonstration

Challenge the following mechanism through a safe authorised test, independent record review or controlled simulation appropriate to this subject: review sampling, homogeneity, stability, property value, uncertainty and distribution history. 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

F03-L10-R11 — Receiving interface and bounded output

Deliver the bounded output to reference-material producer and authorised users. 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

F03-L10-R12 — Independent release and continuing validity

Evaluate F03-L10 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: review sampling, homogeneity, stability, property value, uncertainty and distribution history The reviewer records the affected F03-L10 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 reference-material producer and authorised users.

T01–T38 Verification-domain completion cards

These are the same 38 Annex T planning domains, not new programme families and not ready-to-run hazardous test procedures. Each application completes the method, severity, duration, article, fixture, measurement, uncertainty, safety and acceptance basis prospectively. Qualification, acceptance, screening and research are separate purposes.

T01 – Mechanical material properties

Scope and application parameters: Parent lot, product form, sampling location, specimen direction and condition, preparation, loading/control method, response variables, acceptance basis and uncertainty.

Required evidence and report: Trace the specimen to its parent, preparation and conditioning; verify apparatus and raw response, valid failure mode, processing and population inference.

Claim boundary: A favourable coupon from a different location or thermal history cannot qualify the delivered material. Retain invalid fractures and retest reasons.

Stage	Domain-specific implementation record
Prospective test contract	For mechanical material properties, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T02 – Physical and chemical characterisation

Scope and application parameters: Measurand, matrix, preparation, blanks, reference basis, calibration range, interference, detection capability, recovery and uncertainty.

Required evidence and report: Follow receipt through preparation, instrument sequence, controls, corrected result and report. Review reference suitability and contamination pathways.

Claim boundary: A non-detect must retain the actual method limit; it is not proof of zero content. A reference for another matrix may not validate the analysis.

Stage	Domain-specific implementation record
Prospective test contract	For physical and chemical characterisation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T03 – Dimensional and geometric metrology

Scope and application parameters: Datums, reference frames, feature definitions, temperature basis, fixture deformation, probe/software, alignment, correction, sampling and uncertainty.

Required evidence and report: Reconstruct a feature result from the released drawing and actual measurement programme, instrument status, environmental data and unrounded acceptance decision.

Claim boundary: A changed alignment or drawing version can invalidate apparently in-limit results. Calibration range alone does not establish fitness for a tight tolerance.

Stage	Domain-specific implementation record
Prospective test contract	For dimensional and geometric metrology, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T04 – Non-destructive evaluation

Scope and application parameters: Technique, relevant defect mechanism, material, geometry, surface/access condition, reference artefacts, equipment, personnel, procedure and detection boundary.

Required evidence and report: Witness setup, sensitivity checks, examination, interpretation and reporting for representative features, including a difficult or adverse case.

Claim boundary: One easily detected artificial indication does not prove reliable detection of all service defects. Record inaccessible features and false-negative limitations.

Stage	Domain-specific implementation record
Prospective test contract	For non-destructive evaluation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T05 – Static structural strength and stiffness

Scope and application parameters: Load cases, boundary conditions, load introduction, fixture stiffness, structural configuration, strain/displacement response, instrumentation and acceptance rationale.

Required evidence and report: Connect the approved structural requirement to the representative article, load path, setup verification, original response and independent technical conclusion.

Claim boundary: An unrepresentative constraint can change the failure mode. A fixture failure or altered load path requires validity review, not automatic article acceptance.

Stage	Domain-specific implementation record
Prospective test contract	For static structural strength and stiffness, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T06 – Fatigue, durability and damage growth

Scope and application parameters: Duty and exposure spectrum, sequence, representative defects, environment, inspection intervals, damage measures, model, confidence and life inference.

Required evidence and report: Preserve initial condition, accumulated cycles or exposure, inspections, interruptions, repairs and failure observations across the complete demonstration.

Claim boundary: Do not infer unlimited service life from a short run or count correlated repeats as independent trials. Changes and unknown exposure remain visible.

Stage	Domain-specific implementation record
Prospective test contract	For fatigue, durability and damage growth, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T07 – Fracture and joint integrity

Scope and application parameters: Material condition, interface geometry, specimen orientation, defect representation, method validity, environmental effects and applicable acceptance criteria.

Required evidence and report: Trace the tested joint or fracture specimen to material and process history; review raw behaviour, validity conditions and the exact allowed inference.

Claim boundary: A strength value alone may not establish joint durability or fracture behaviour. Results outside method-validity conditions require a limited or invalid classification.

Stage	Domain-specific implementation record
Prospective test contract	For fracture and joint integrity, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T08 – Modal and structural dynamic characterisation

Scope and application parameters: As-tested mass/configuration, support conditions, excitation and response positions, sensor loading, acquisition, identification method and correlation objective.

Required evidence and report: Connect original response data to identified dynamic properties and the model/configuration used for the intended engineering decision.

Claim boundary: A good visual correlation can conceal incorrect modes or boundary conditions. Identify unobserved responses and uncertainty before model reliance.

Stage	Domain-specific implementation record
Prospective test contract	For modal and structural dynamic characterisation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T09 – Sine and random vibration

Scope and application parameters: Mission-derived input, axes, spectral/time definition, fixtures, control channels, notching rationale, operating modes, response limits and cumulative exposure.

Required evidence and report: Verify the actual setup, command/control/response history, interruptions, functional checks and relation to the deployed configuration.

Claim boundary: Tailoring or notching requires prospective technical justification. A successful control-channel trace alone does not prove representative article exposure.

Stage	Domain-specific implementation record
Prospective test contract	For sine and random vibration, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T10 – Mechanical and separation shock

Scope and application parameters: Actual environmental basis, article and fixture transmission, measurement bandwidth, sampling, sensor positions, analysis method and authorised protection.

Required evidence and report: Review safe specialist readiness, representative setup, original transient data, channel validity, functional checks and configuration-specific interpretation.

Claim boundary: Missing bandwidth or saturated channels can make a recorded event invalid. No hazardous generation settings or universal shock level are prescribed.

Stage	Domain-specific implementation record
Prospective test contract	For mechanical and separation shock, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T11 – Acoustic exposure

Scope and application parameters: Spectral and temporal environment, article operating state, chamber/field conditions, sensor locations, spatial distribution and structural response limits.

Required evidence and report: Link the required exposure to actual measured conditions, article configuration, validity checks, anomalies and post-exposure function.

Claim boundary: An average acoustic level can conceal inappropriate spectral or spatial conditions. Assess combined structural effects and test-article representativeness.

Stage	Domain-specific implementation record
Prospective test contract	For acoustic exposure, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T12 – Thermal-vacuum performance

Scope and application parameters: Pressure and temperature basis, heat paths, thermal interfaces, operating modes, sensor locations, stabilisation criteria and functional acceptance.

Required evidence and report: Trace the mission requirement through fixture/thermal setup, original pressure and temperature history, operation and complete anomaly disposition.

Claim boundary: A chamber set point is not the article condition. An interrupted cycle or altered heat path requires review of representativeness and accumulated exposure.

Stage	Domain-specific implementation record
Prospective test contract	For thermal-vacuum performance, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T13 – Thermal balance and model correlation

Scope and application parameters: Energy inputs, boundary conditions, thermal interfaces, equilibrium definition, sensor uncertainty, model parameters and independent comparison criteria.

Required evidence and report: Preserve measured inputs/responses and distinguish calibration data from validation data; assess residuals, sensitivity and intended model use.

Claim boundary: Tuning until the same observations match does not independently validate the model. Extrapolation to another environment must be expressly justified.

Stage	Domain-specific implementation record
Prospective test contract	For thermal balance and model correlation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T14 – High/low temperature and cycling

Scope and application parameters: Intended operating/storage duty, transition and dwell basis, article temperature, modes, functional measurements and cumulative history.

Required evidence and report: Connect technical requirements to actual article conditions and relevant checks before, during and after exposure, with original interruptions retained.

Claim boundary: A nominal chamber cycle or recovery pass does not demonstrate every function during extremes. Separate storage and powered-operation conclusions.

Stage	Domain-specific implementation record
Prospective test contract	For high/low temperature and cycling, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T15 – Thermal shock

Scope and application parameters: Rapid-transition rationale, thermal gradients, article condition, exposure sequence, instrumentation, hidden-damage mechanisms and post-exposure methods.

Required evidence and report: Review whether the controlled method represents the real transition and whether subsequent examinations can detect the relevant damage.

Claim boundary: No universal transition severity is assumed. Passing an external inspection cannot exclude hidden damage outside the inspection capability.

Stage	Domain-specific implementation record
Prospective test contract	For thermal shock, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T16 – Humidity and condensation

Scope and application parameters: Moisture exposure, condensation mechanism, enclosure/installation, operating state, absorption/recovery, electrical/material measures and acceptance.

Required evidence and report: Trace conditioning, original environmental readings, relevant function and recovery history to the specific article and material state.

Claim boundary: A dry recovery measurement may conceal failure during condensation. Do not generalise from an unrepresentative sealed specimen to an installed system.

Stage	Domain-specific implementation record
Prospective test contract	For humidity and condensation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T17 – Altitude, pressure and decompression

Scope and application parameters: Pressure history, rate/transition basis, enclosure configuration, operating mode, protective limits, instrumentation and specialist permissions.

Required evidence and report: Evaluate approved specialist readiness, representative boundaries, original measurements and functional response to actual conditions.

Claim boundary: Container pressure and internal component pressure may differ. Unmeasured critical response or unsafe test boundaries prevent a supportable conclusion.

Stage	Domain-specific implementation record
Prospective test contract	For altitude, pressure and decompression, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T18 – Corrosion and salt exposure

Scope and application parameters: Substrate/coating, preparation, damage condition, relevant exposure mechanism, duration basis, inspection criteria and service-life inference.

Required evidence and report: Preserve material and surface-process genealogy, exposure conditions, observed degradation and the approved interpretation of accelerated testing.

Claim boundary: Hours of accelerated exposure are not automatically years of service. Appearance alone may not establish retained structural or electrical performance.

Stage	Domain-specific implementation record
Prospective test contract	For corrosion and salt exposure, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T19 – Fluid and chemical compatibility

Scope and application parameters: Actual substance identity, material state, contact and environmental conditions, property changes, contamination and functional acceptance.

Required evidence and report: Connect authorised exposure and analytical methods to the representative material or assembly and its post-exposure properties.

Claim boundary: A material trade name or nominal substance category does not cover changed formulations. Separate environmental provenance from technical compatibility.

Stage	Domain-specific implementation record
Prospective test contract	For fluid and chemical compatibility, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T20 – Sand and dust

Scope and application parameters: Particle/environment basis, ingress and abrasion mechanisms, interfaces, seals, operating state, sensitive surfaces and cleanliness criteria.

Required evidence and report: Trace exposure and functional checks to the installed configuration and the actual particle and environment specification.

Claim boundary: Unrepresentative particles or sealed interfaces can invalidate inference. A clean external surface does not establish internal contamination control.

Stage	Domain-specific implementation record
Prospective test contract	For sand and dust, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T21 – Water, rain and ingress

Scope and application parameters: Installation orientation, direction and nature of exposure, seals, drains, connections, operating state, detection method and acceptance boundary.

Required evidence and report: Observe preconditioning/setup, original exposure, internal/functional checks and post-test condition using the approved method.

Claim boundary: A pass in one orientation or connector state does not establish every installation. Record water detection limits and changes made before retest.

Stage	Domain-specific implementation record
Prospective test contract	For water, rain and ingress, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T22 – Icing, freezing and thawing

Scope and application parameters: Application-specific exposure, moisture/ice mechanism, transition history, operating state, relevant function and safe specialist limits.

Required evidence and report: Review the environmental rationale, representative configuration, actual measurements and safe functional verification through the declared conditions.

Claim boundary: Do not substitute a simple freeze cycle for another icing mechanism. The profile does not provide aircraft de-icing procedures or operational clearance.

Stage	Domain-specific implementation record
Prospective test contract	For icing, freezing and thawing, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T23 – Solar, ultraviolet and weathering

Scope and application parameters: Spectrum and exposure, material condition, temperature/moisture interaction, degradation measures and acceleration assumptions.

Required evidence and report: Link controlled exposure and property measurements to the claimed material/application and state the boundary of ageing inference.

Claim boundary: A shortened accelerated programme cannot demonstrate a service duration without a supported mechanism and model. Retain relevant spectral differences.

Stage	Domain-specific implementation record
Prospective test contract	For solar, ultraviolet and weathering, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T24 – Fire, flammability, heat, smoke and relevant toxic effects

Scope and application parameters: Application-specific material/assembly, mounting, conditioning, separate measured properties, method/acceptance basis, instrumentation and authorised safety controls.

Required evidence and report: Review specialist permissions and method suitability; trace original observations for each required property to the actual specimen and configuration.

Claim boundary: Flame behaviour, heat release, smoke and toxic-effect measures are not interchangeable. A passing small specimen does not automatically approve a complete installation.

Stage	Domain-specific implementation record
Prospective test contract	For fire, flammability, heat, smoke and relevant toxic effects, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.

Stage	Domain-specific implementation record
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T25 – Outgassing and contamination

Scope and application parameters: Material/process history, particulate or molecular criterion, collection and measurement, sensitive surfaces, handling and preservation.

Required evidence and report: Trace sensitive-item history through sampling or exposure, blanks/reference checks, measured values and actual contamination acceptance.

Claim boundary: A generic clean label or one bulk-material result does not establish every assembly surface or subsequent handling condition.

Stage	Domain-specific implementation record
Prospective test contract	For outgassing and contamination, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T26 – Accumulated radiation and displacement effects

Scope and application parameters: Mission exposure basis, device/material lot and configuration, relevant degradation, authorised specialist method, measurements and inference limits.

Required evidence and report: Review the specialist evidence and relation between tested conditions, observed degradation and the actual mission requirement.

Claim boundary: No universal dose, source-handling procedure or environmental equivalence is supplied. Unknown lot/configuration and unsupported mission extrapolation remain holds.

Stage	Domain-specific implementation record
Prospective test contract	For accumulated radiation and displacement effects, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T27 – Single-event susceptibility

Scope and application parameters: Actual device/lot, operating state, relevant event definition, specialist exposure basis, detection system, event statistics and mission inference.

Required evidence and report: Trace original observations, valid monitoring, configuration and statistical assumptions to the bounded specialist conclusion.

Claim boundary: No observed event in inadequate exposure does not prove immunity. Distinguish detection failure, interrupted observation and zero valid events.

Stage	Domain-specific implementation record
Prospective test contract	For single-event susceptibility, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T28 – Charging and electrostatic effects

Scope and application parameters: Relevant charge paths, material state, bonding, interfaces, environment, protective behaviour and authorised test boundary.

Required evidence and report: Verify configuration, instrumentation, actual stimulus/response and protection under the approved specialist method.

Claim boundary: A handling-control check does not demonstrate all installed charging environments. No generic hazardous discharge settings are prescribed.

Stage	Domain-specific implementation record
Prospective test contract	For charging and electrostatic effects, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T29 – Electromagnetic emissions and immunity

Scope and application parameters: Conducted/radiated paths, ports, frequencies and modes from actual basis, installation, cables, instrumentation, uncertainty and functional criteria.

Required evidence and report: Trace representative setup and equipment state to original emissions/immunity data, monitored functions, anomalies and independent decision.

Claim boundary: A benign operating mode or changed cable arrangement can invalidate coverage. A component result is not automatic installed-system compatibility.

Stage	Domain-specific implementation record
Prospective test contract	For electromagnetic emissions and immunity, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T30 – High-intensity radiated-field assurance

Scope and application parameters: Mission/installation basis, coupling paths, shielding/bonding, representative system modes, method, instrumentation and specialist capability.

Required evidence and report: Review installed-system reasoning and specialist evidence, including how reduced or alternative testing bounds actual interfaces.

Claim boundary: An unrelated emissions test cannot establish this capability. Tailoring and model reliance require prospective justified approval and visible residual gaps.

Stage	Domain-specific implementation record
Prospective test contract	For high-intensity radiated-field assurance, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T31 – Lightning-effects assurance

Scope and application parameters: Relevant direct/indirect effects, installation and bonding, current technical basis, configuration, protective functions and safe specialist method.

Required evidence and report: Trace declared effects to representative interfaces, original specialist results, functional response and installation-specific acceptance.

Claim boundary: A protected component or coupon does not establish every aircraft path. No hazardous generation, field application or universal severity instructions are included.

Stage	Domain-specific implementation record
Prospective test contract	For lightning-effects assurance, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T32 – Power quality and electrical transients

Scope and application parameters: Supply architecture, interfaces, operating modes, disturbance basis, protective response, timing, acquisition and performance criteria.

Required evidence and report: Review actual supply and target configuration, original waveform/data, relevant functions and interruption/recovery behaviour.

Claim boundary: A nominal input rating or post-test power-on check cannot demonstrate behaviour during the required disturbances.

Stage	Domain-specific implementation record
Prospective test contract	For power quality and electrical transients, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T33 – Insulation, bonding, grounding, harness and shielding

Scope and application parameters: Circuit and installation identity, terminations/routing, workmanship, electrical properties, tools, method limits and installed interfaces.

Required evidence and report: Trace configuration and assembly records through relevant electrical checks, uncertainty, concealed-step evidence and final acceptance.

Claim boundary: Continuity alone does not establish insulation, bonding or shielding performance. Preserve rework, routing differences and installation restrictions.

Stage	Domain-specific implementation record
Prospective test contract	For insulation, bonding, grounding, harness and shielding, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.

Stage	Domain-specific implementation record
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T34 – Leakage, pressure and containment

Scope and application parameters: Boundary/material/joint identity, approved technical basis, measurement range/sensitivity, conditions, protective limits and specialist authority.

Required evidence and report: Verify readiness and instrumentation and trace the exact boundary through original test evidence, validity, repair and accepted disposition.

Claim boundary: A test of one sealed subassembly does not establish the complete installed boundary. No universal pressure or hazardous procedure is supplied.

Stage	Domain-specific implementation record
Prospective test contract	For leakage, pressure and containment, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T35 – Energy storage protection and degradation

Scope and application parameters: Cell/module/system identity, history, duty, coupled hazards, protection, monitoring model, uncertainty and qualified limits.

Required evidence and report: Link source and life evidence to controlled qualification, actual protective performance, degradation and separate reuse decisions.

Claim boundary: Nominal capacity or one bench pass does not establish safety or another duty cycle. Protect original adverse data and unknown history.

Stage	Domain-specific implementation record
Prospective test contract	For energy storage protection and degradation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.

Stage	Domain-specific implementation record
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T36 – Propulsion and integrated functional performance

Scope and application parameters: Approved duty/envelope, configuration, critical-part genealogy, measurement, interfaces, protective functions and qualification purpose.

Required evidence and report: Trace the representative configuration through authorised specialist readiness, raw functional results, anomalies and exact acceptance.

Claim boundary: A development performance point is not general operational qualification. No propulsion design settings or performance optimisation instructions are provided.

Stage	Domain-specific implementation record
Prospective test contract	For propulsion and integrated functional performance, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T37 – Software, AI, cyber and model validation

Scope and application parameters: Intended use, target/domain, source/build/model/data versions, test independence, error criteria, adverse cases, security scope and human authority.

Required evidence and report: Connect each relied-upon function to its source requirements, representative tests, original failures, independent review and accepted release.

Claim boundary: High average accuracy, tool execution or a signed build does not prove safe use. Cyber tests require explicit authorisation; models retain purpose-specific limits.

Stage	Domain-specific implementation record
Prospective test contract	For software, ai, cyber and model validation, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.

Stage	Domain-specific implementation record
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

T38 – Human, service and operational interfaces

Scope and application parameters: Representative users/tasks, workload, conditions, information, handovers, dependencies, intervention ability, protected response and service measures.

Required evidence and report: Observe safe representative performance and adverse interfaces, preserving assistance, failures, actual response time and receiving acknowledgement.

Claim boundary: A demonstration by one expert or a nominal human override does not prove capability for all users. Availability and correctness remain different measures.

Stage	Domain-specific implementation record
Prospective test contract	For human, service and operational interfaces, identify the actual measurand or attribute, mission/environment basis, modes, sample/population, criterion and intended inference. Record why this method addresses the relevant failure mechanism.
Readiness and execution	Reconcile article identity and exposure history, representative boundary conditions, fixture interactions, instrument range/bandwidth, synchronisation, calibration, raw-data custody, authorised people and separate safety-stop rules.
Adverse evidence challenge	Use an intentionally incomplete data set or wrong configuration in a safe offline check. Confirm the dependent result is HOLD rather than silently passing. Retain interruption, sensor saturation, failed runs and the technical basis for any retest.
Independent completion	Recalculate the result with unrounded inputs and a validated uncertainty model. State what was tested, what was not observable, which characteristics passed or failed and what further work is required.

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.

AK02 – Test facilities and technical providers

Environmental, structural, materials, calibration and inspection services, including mobile and remote work.

Mandatory profile content: Method, range, uncertainty, environment, site, signatory and provider relationship.

Source acceptance boundary: Actual method competence and valid result evidence are separately demonstrated.

Source connection: 8, 9, 19, 25, 42, 77

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.

Dossier step	Evidence and decision control
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.
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.

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.

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.

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.
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.

AK21 – Interplanetary cruise and deep-space missions

Spacecraft, relays, science operations and long-delay mission support.

Mandatory profile content: Duration, communications, resources, remote autonomy, radiation and repairability.

Source acceptance boundary: Human and autonomous actions are feasible within actual timing and resource limits.

Source connection: 35, 64–67, 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.

AK22 – Solar and heliophysics missions

Solar observations and missions with relevant thermal, plasma and radiation extremes.

Mandatory profile content: Time-varying flux, geometry, surface degradation, charged environment and instrument calibration.

Source acceptance boundary: Protection and data-quality evidence cover the actual mission envelope, not a screening equation alone.

Source connection: 35, 64, 65, 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.

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.

AK23 – Outer-system and distant observatories

Low-flux, long-life, long-delay science and infrastructure applications.

Mandatory profile content: End-of-life power, thermal survival, data return, ageing and long-term support.

Source acceptance boundary: Required lifetime and survival margins are met with credible continuity and data integrity.

Source connection: 35, 55, 65, 66, 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.

AK25 – Human exploration and surface habitats

Crew transport interfaces, habitation, exploration support and emergency protection.

Mandatory profile content: Users, tasks, duration, life support, radiation/environment, health-support and safe-return assumptions.

Source acceptance boundary: Every essential human protection and feasibility predicate is supported by specialists.

Source connection: 39, 54, 71, 73

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.

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.

AK30 – Ground, communication and navigation services

Mission control, RF/optical links, timing, data processing, relays and PNT support.

Mandatory profile content: Deployed configuration, authority, source-to-user integrity, delay, uncertainty and recovery.

Source acceptance boundary: Availability, correctness, authority and completion are separately demonstrated.

Source connection: 10, 23, 51, 56, 66, 67

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

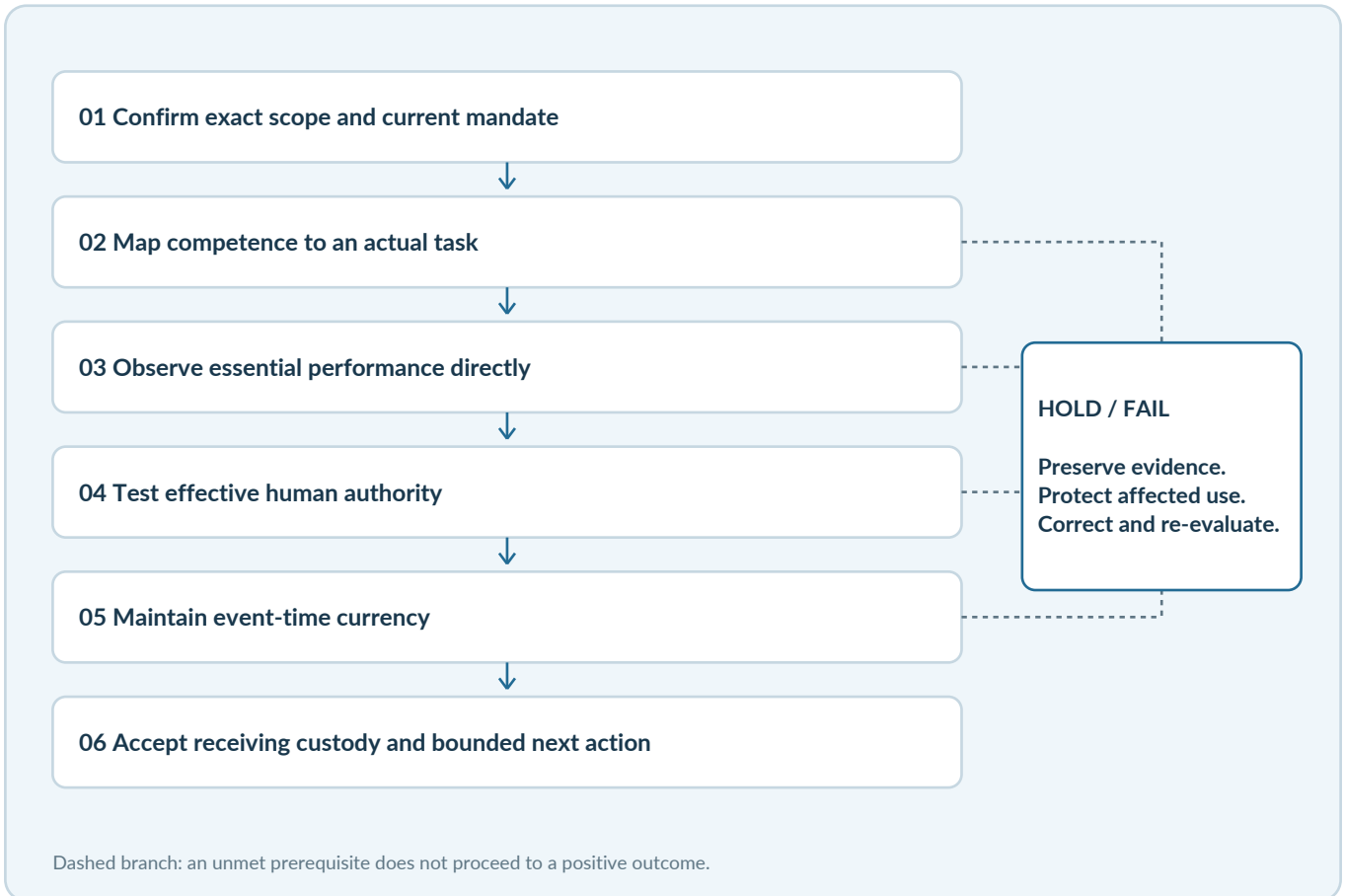
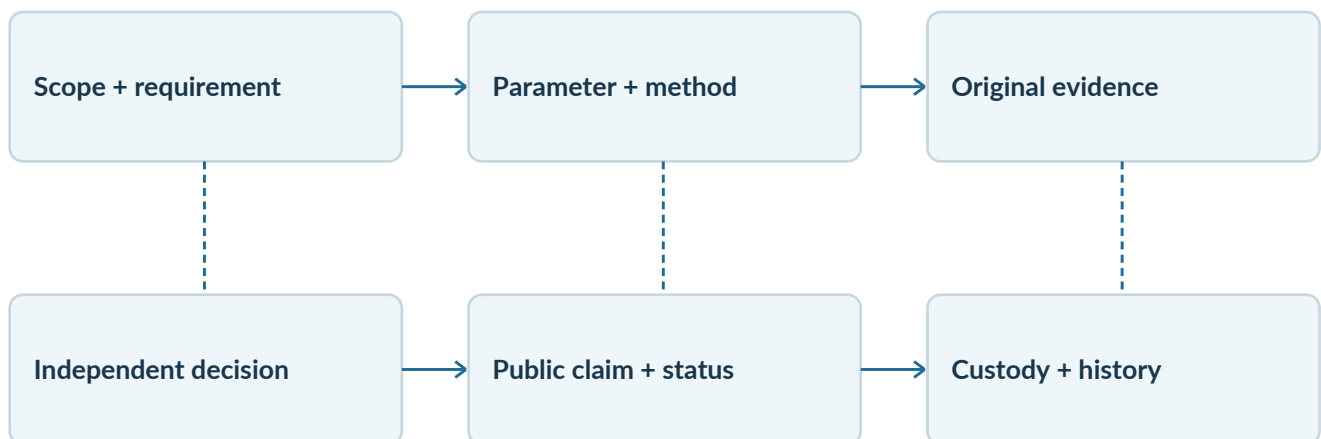


Figure — Implementation sequence for AF-AST-PR-005. Explanatory diagram; the source prerequisites and actual authority remain controlling.



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

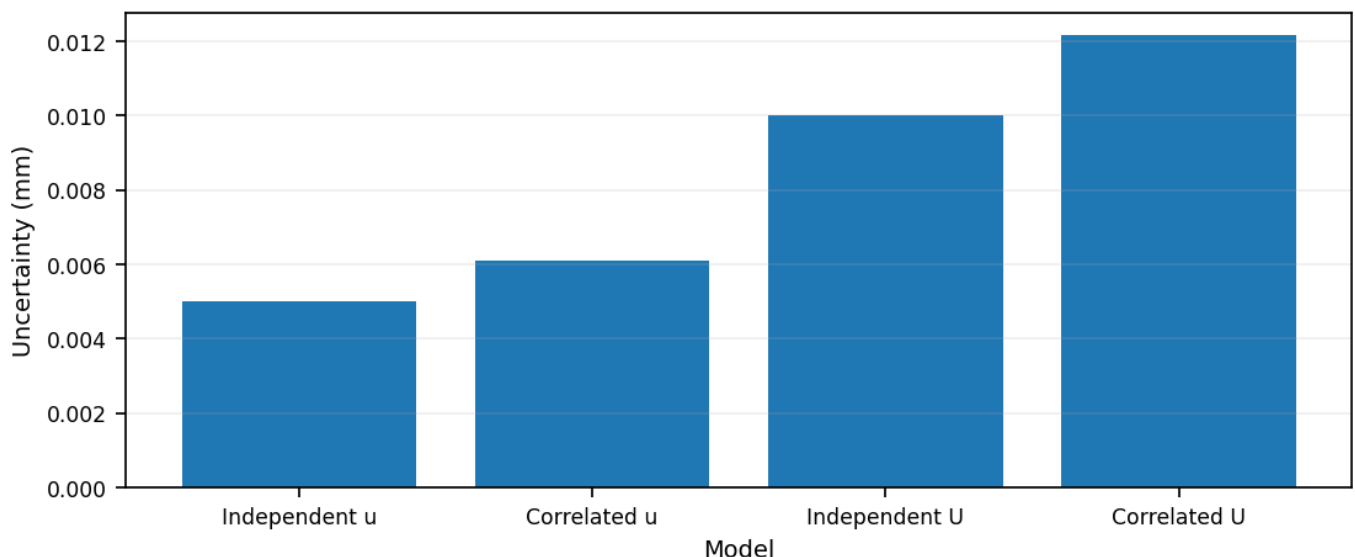


Figure Q01 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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

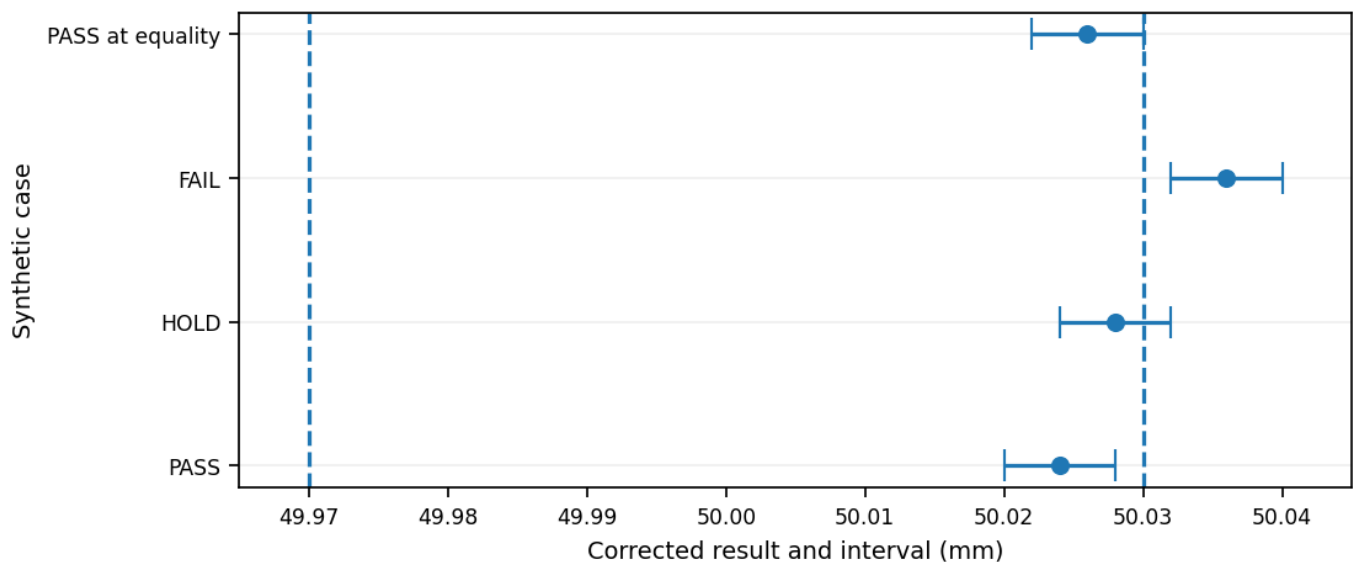


Figure Q02 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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. $\ln(0.05)/\ln(0.90) = 28.433158...$; 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

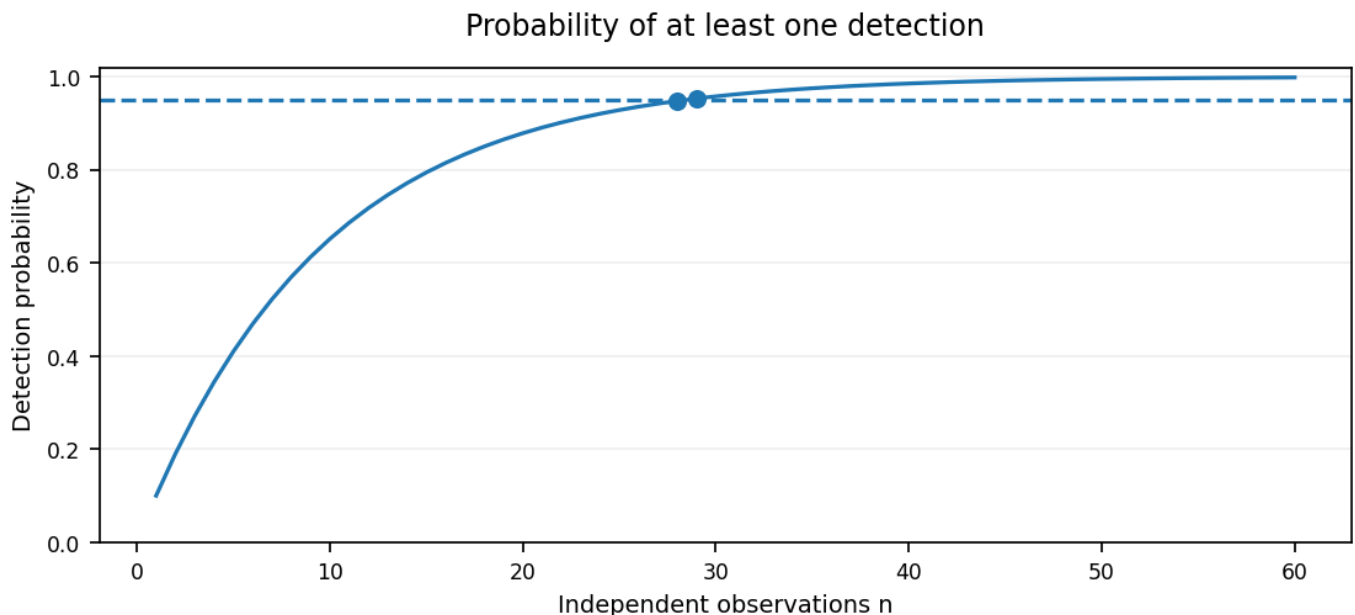


Figure Q06 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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

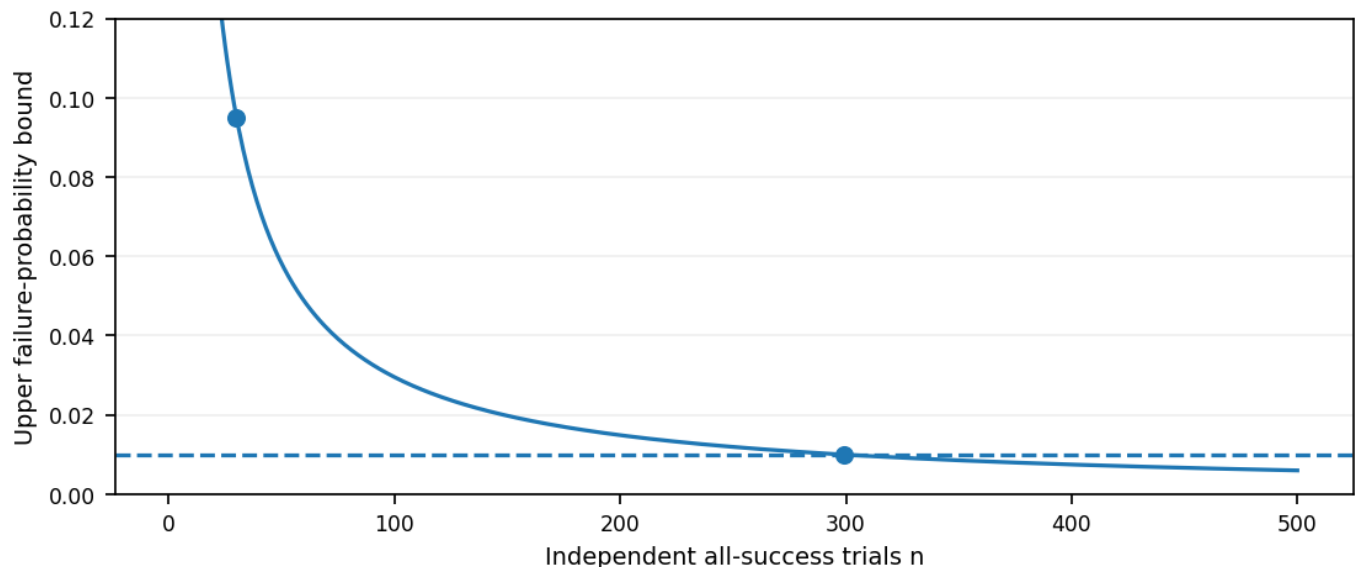


Figure Q07 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q08 No failures during exposure: exponential bound

Source: ASTRA Annex AM, Q08, page 207. All numerical inputs in this example are synthetic.

$$\lambda_{\text{upper}} = -\ln(\alpha)/T$$

$$\text{MTBF}_{\text{lower}} = T/[-\ln(\alpha)]$$

Variables and units

T is total comparable exposure time under a justified constant-rate model; $\alpha=1$ -confidence; no failures occur. λ has reciprocal-time units.

Example inputs

Synthetic $T=800$ operating hours; one-sided confidence=95%, $\alpha=0.05$.

Calculation and checks

1. $-\ln(0.05) = 2.9957322736$.

$$2. \lambda_{\text{upper}} = 2.9957322736/800 = 0.003744665342 \text{ h}^{-1}.$$

$$3. \text{MTBF}_{\text{lower}} = 800/2.9957322736 = 267.0465606 \text{ h}.$$

Decision interpretation: The observed zero-failure record supports only the stated model-based lower bound, not infinite mean life.

Validity limits: Ageing, wear-out, maintenance quality, heterogeneity and common causes may violate the constant-rate assumption. MTBF is not a guaranteed individual life and does not extend a mandatory life limit.

ASTRA connections: 55; 79

Zero failures: constant-rate model bound

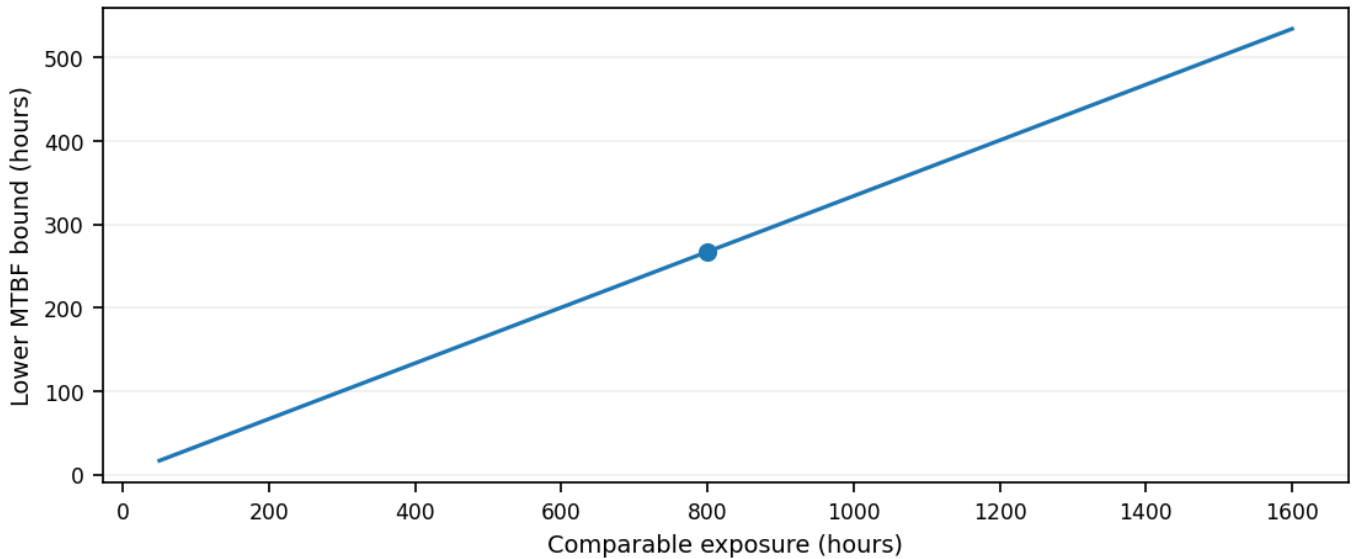


Figure Q08 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q12 Radiative heat rejection screening

Source: ASTRA Annex AM, Q12, page 211. All numerical inputs in this example are synthetic.

$$Q_{\text{rad}} = \epsilon \sigma A (T_{\text{hot}}^4 - T_{\text{sink}}^4)$$

Variables and units

ϵ is effective emissivity under the stated grey-surface model; $\sigma = 5.670374419 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$; A is effective radiating area; all temperatures are kelvin.

Example inputs

Synthetic $\epsilon = 0.80$, $A = 2 \text{ m}^2$, $T_{\text{hot}} = 300 \text{ K}$, $T_{\text{sink}} = 200 \text{ K}$; simplified full-view conditions. Heat load = 500 W; example required reserve = 10%.

Calculation and checks

- $T_{\text{hot}}^4 - T_{\text{sink}}^4 = 300^4 - 200^4 = 6.5 \times 10^9 \text{ K}^4$.
- $Q_{\text{rad}} = 0.80 \times \sigma \times 2 \times 6.5 \times 10^9 = 589.7189396 \text{ W}$.
- Required capacity at the example reserve = $500 \times 1.10 = 550 \text{ W}$.
- Screening headroom over reserved requirement = 39.7189396 W .

Decision interpretation: This simplified screening balance passes the example capacity predicate. It is not integrated thermal qualification.

Validity limits: Real view factors, absorbed external flux, temperature-dependent properties, contact conduction, multi-node geometry and transient behaviour require appropriate models. Celsius cannot be used in the fourth-power term. The constant is general physical knowledge, not an ASTRA invention.

ASTRA connections: 35.2; 65.2; 72.2

Radiative heat rejection: screening only

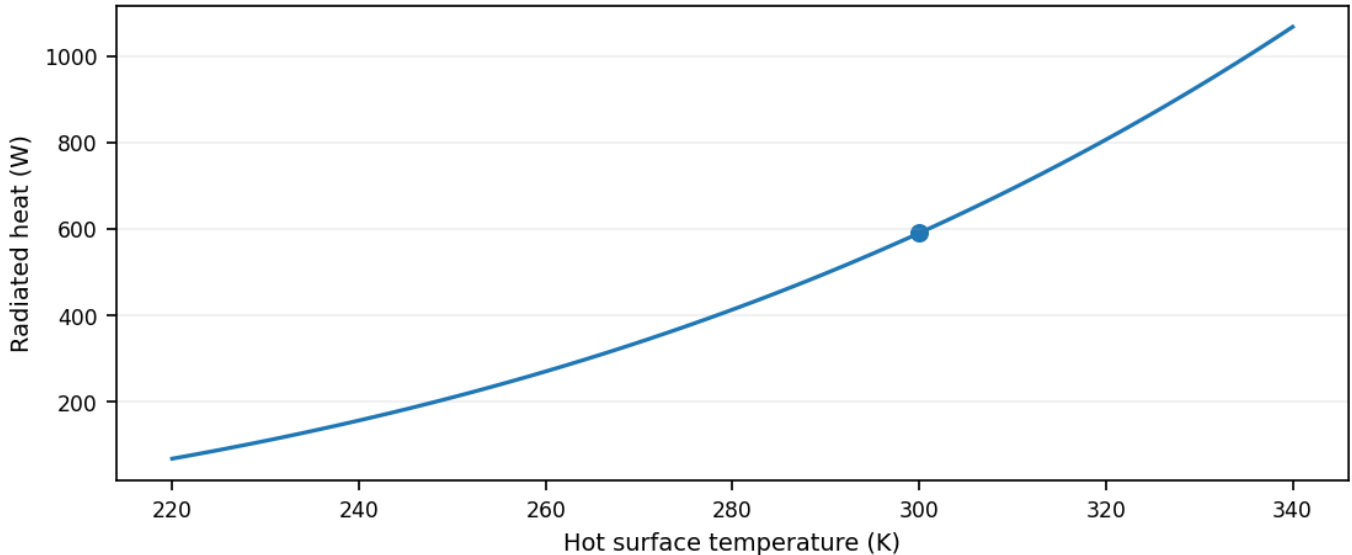


Figure Q12 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q13 Transient thermal imbalance

Source: ASTRA Annex AM, Q13, page 212. All numerical inputs in this example are synthetic.

$$C_{th} \frac{dT}{dt} = Q_{in} - Q_{out}$$

$$\Delta T \approx (Q_{in} - Q_{out}) \Delta t / C_{th}$$

Variables and units

C_{th} is effective thermal capacitance in J/K. The finite step is valid only over a range where the lumped assumptions and net heat are adequately constant.

Example inputs

Synthetic $C_{th}=2,000$ J/K, $Q_{in}=120$ W, $Q_{out}=80$ W; step=60 s.

Calculation and checks

1. Net heating=40 W = 40 J/s.
2. $dT/dt=40/2,000=0.02$ K/s.
3. $\Delta T \approx 0.02 \times 60 = 1.2$ K.

Decision interpretation: A 1.2 K increase is the stated local screening result. Compare it with the approved temperature and gradient limits; no acceptance is implied without them.

Validity limits: Changing radiation, conduction, phase change, multiple nodes or temperature-dependent heat sources can invalidate constant-rate extrapolation. Do not extrapolate this 60-second calculation to mission life.

ASTRA connections: 65.2; 72.2; 77.4

Constant thermal imbalance: local screening

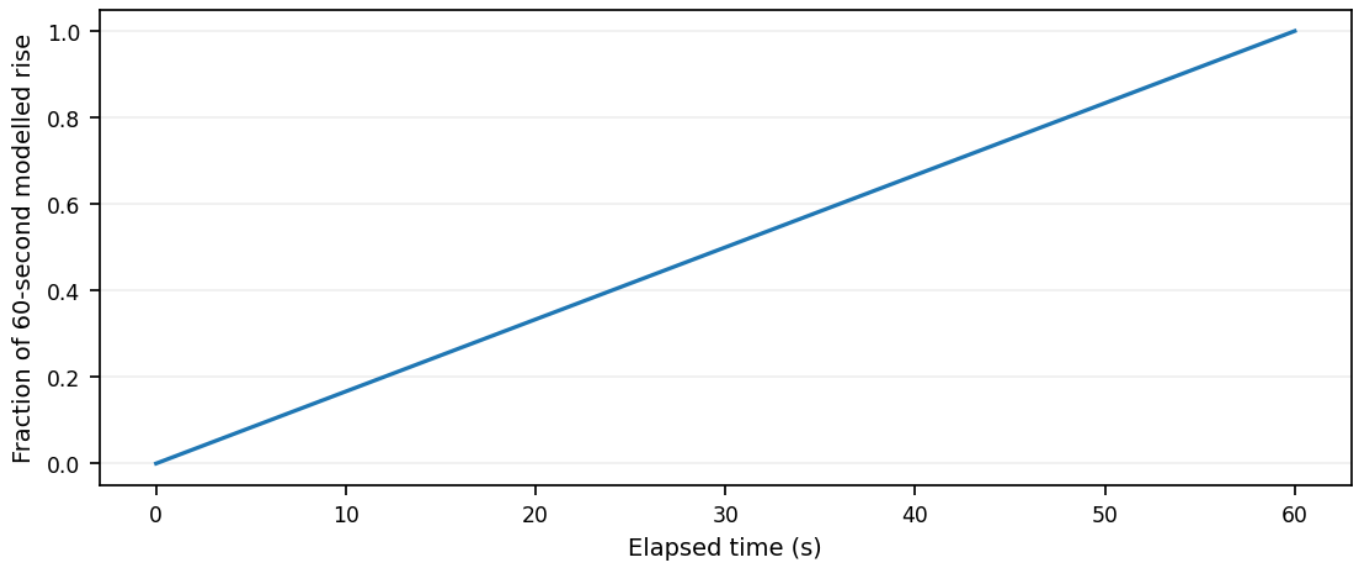


Figure Q13 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q14 Free-space loss and link margin

Source: ASTRA Annex AM, Q14, page 213. All numerical inputs in this example are synthetic.

$$L_{fs} = 20 \log_{10}(4\pi R f/c) \text{ dB}$$

$$P_r = P_t + G_t + G_r - L_{fs} - L_{other}$$

$$M_{link} = P_r - P_{threshold}$$

Variables and units

R is path length in metres; f is frequency in Hz; c=299,792,458 m/s. P_t, P_r and threshold use dBW; antenna gains and losses use compatible dB references.

Example inputs

Synthetic R=4.0×10⁸ m, f=8.4×10⁹ Hz; P_t=10 dBW, G_t=50 dBi, G_r=60 dBi, other losses=4 dB; receiver threshold=-110 dBW. Example required margin=3 dB.

Calculation and checks

1. L_{fs} ≈ 222.974568770 dB.
2. P_r = 10+50+60-L_{fs}-4 ≈ -106.974568770 dBW.
3. M_{link} ≈ 3.025431230 dB.
4. Adding 0.5 dB of actual loss reduces that margin by 0.5 dB.

Decision interpretation: The 3.025431230 dB margin passes the stated 3 dB example predicate. With the additional 0.5 dB loss, the margin is 2.525431230 dB and fails. All real losses and required receiver performance must first be supported.

Validity limits: This is far-field free-space screening, not a complete RF/optical or interference model. Do not add dB values with incompatible reference quantities. Weather, pointing, acquisition, noise and coding may govern the actual result.

ASTRA connections: 66.2

Additional loss changes the link decision

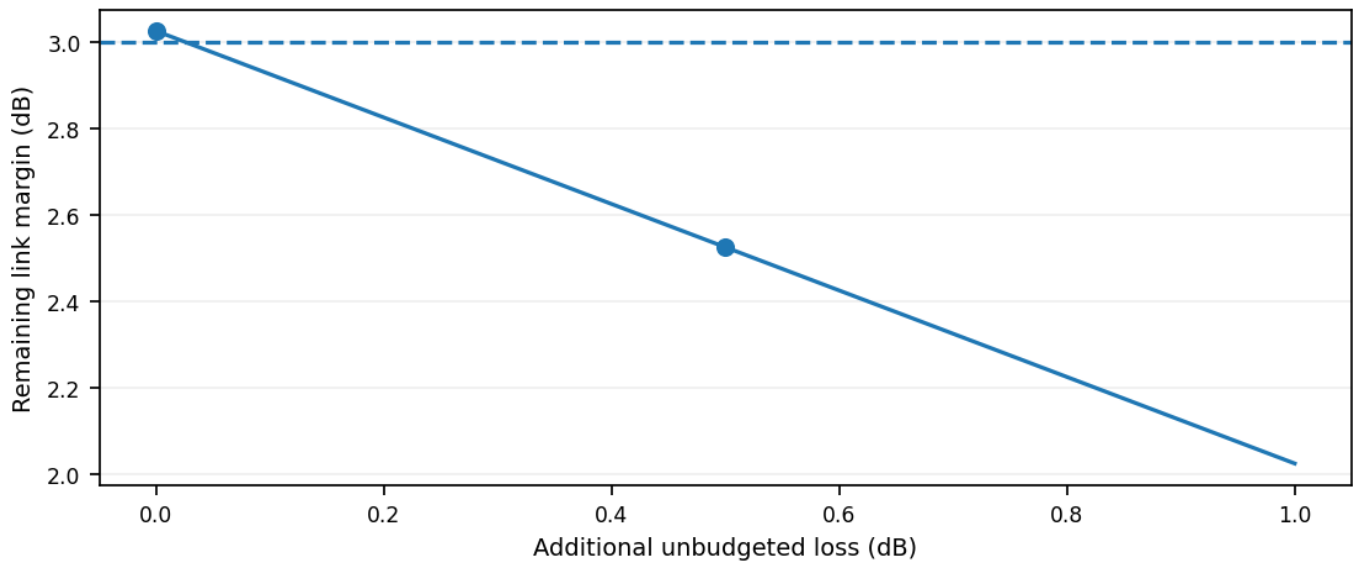


Figure Q14 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q15 Light-time and ground-intervention feasibility

Source: ASTRA Annex AM, Q15, page 214. All numerical inputs in this example are synthetic.

$$t_{\text{oneway}} = R/c$$

$$t_{\text{response}} = 2R/c + t_{\text{ground}} + t_{\text{actuation}}$$

Variables and units

R is a simplified constant path length in m; $c=299,792,458$ m/s. Processing, queueing, geometry change and other delays require additional terms where material.

Example inputs

Synthetic $R=2.25 \times 10^{11}$ m; ground processing=20 s; actuation=10 s; approved illustrative hazard-response window=1,200 s.

Calculation and checks

1. One-way light-time=750.519214196 s.
2. Round-trip propagation=1501.038428392 s.
3. Earliest modelled response=1531.038428392 s.
4. The response exceeds 1,200 s by 331.038428392 s.

Decision interpretation: The proposed ground intervention fails the example feasibility predicate and cannot be credited as the timely protective control.

Validity limits: The actual path and timing model must be used for a real mission. No communication architecture removes propagation delay; onboard protection still needs independent validation and authority.

ASTRA connections: 66.3; 67; 72.4; 73.8

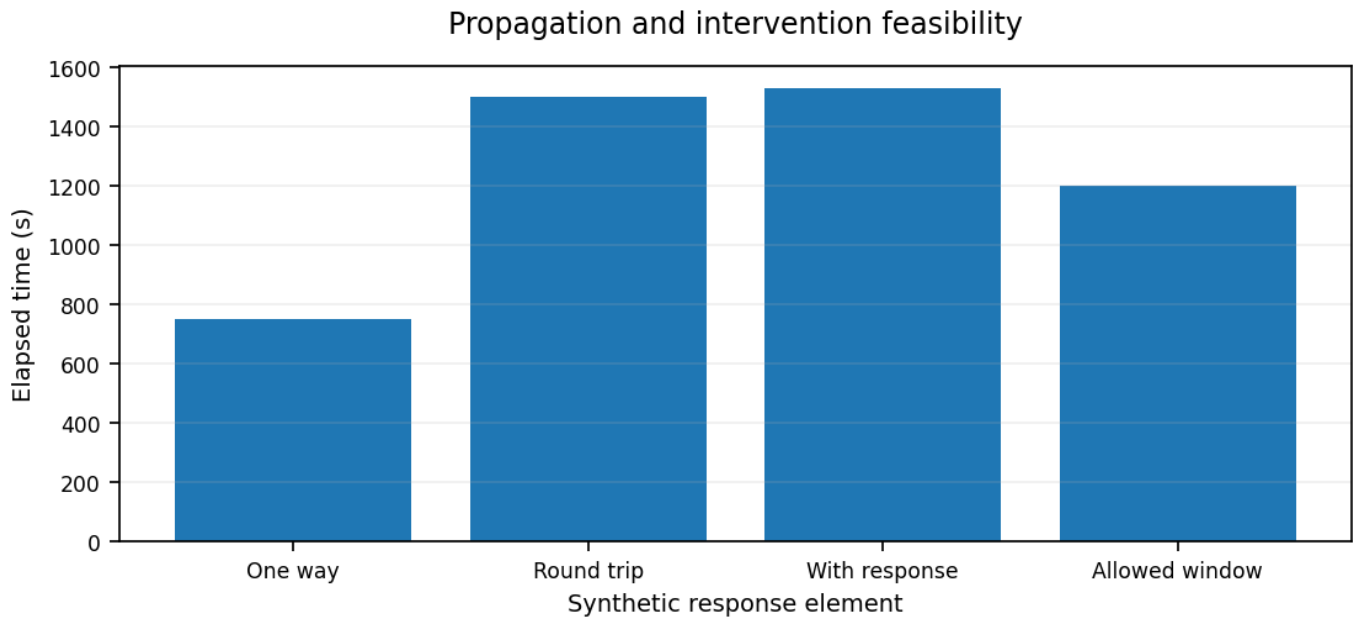


Figure Q15 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q16 Outage data storage with overhead

Source: ASTRA Annex AM, Q16, page 215. All numerical inputs in this example are synthetic.

$$B_{\text{required}} = R_{\text{data}} \times t_{\text{outage}} \times f_{\text{overhead}}$$

$$1 \text{ byte} = 8 \text{ bits}$$

Variables and units

Use a defined payload rate and explicit overhead, reserves and decimal/binary storage conventions. Avoid mixing Mbit/s and MB/s.

Example inputs

Synthetic 2.0×10^6 bit/s, 6 h outage, overhead factor=1.25; usable storage= 64×10^9 bit.

Calculation and checks

1. Outage duration= $6 \times 3,600 = 21,600$ s.
2. Required capacity= $2.0 \times 10^6 \times 21,600 \times 1.25 = 54 \times 10^9$ bit.
3. In decimal bytes this is 6.75×10^9 bytes = 6.75 GB.
4. Headroom= 10×10^9 bit; headroom/required=18.5185185%.

Decision interpretation: The example quantity fits in the stated usable capacity. Data priority, integrity and required extra reserve still need their own criteria.

Validity limits: Do not credit unvalidated compression, unavailable storage blocks or capacity already allocated elsewhere. Tests must include overflow, power interruption, duplicate delivery and recovery.

ASTRA connections: 66.3; 67.4; 78.7

Outage storage including the stated overhead

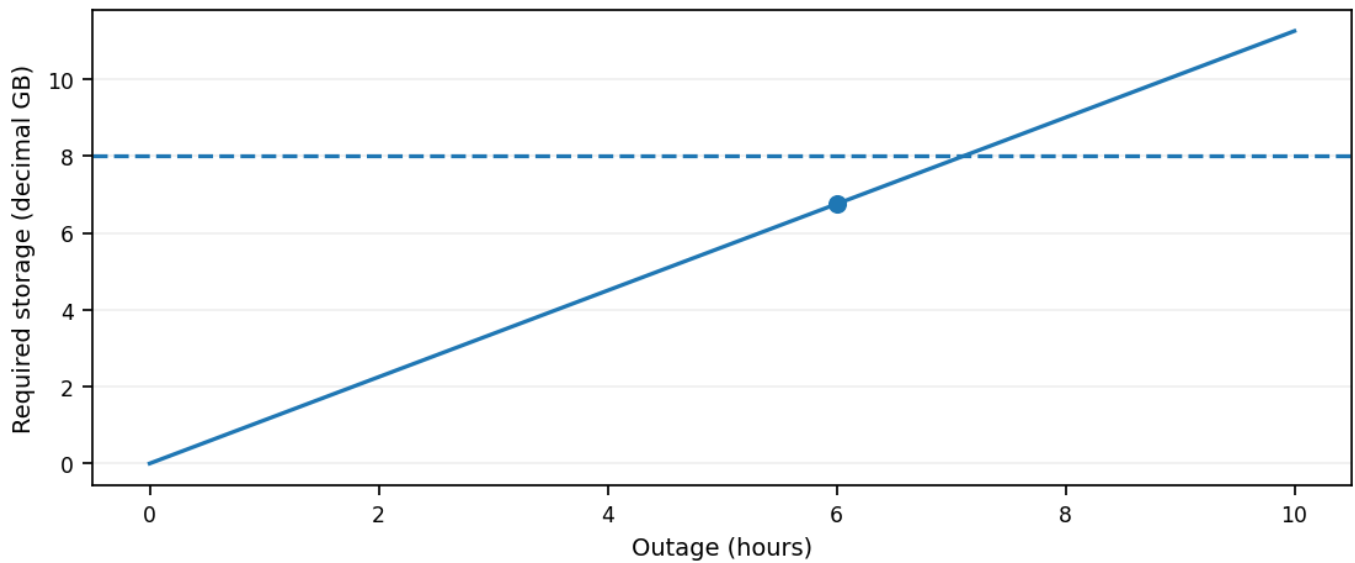


Figure Q16 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q17 Clock uncertainty and maximum data age

Source: ASTRA Annex AM, Q17, page 216. All numerical inputs in this example are synthetic.

$u_t = \sqrt{u_{\text{event}}^2 + u_{\text{sync}}^2}$ for justified independence

$U_t = k u_t$

Upper age endpoint = age_estimate + U_t

Variables and units

Time components refer to the same event and time basis. Correlation and systematic conversion errors require appropriate treatment.

Example inputs

Synthetic standard components 3 ms and 4 ms; illustrative $k=2$; maximum inclusive permitted data age=100 ms.

Calculation and checks

- $u_t = \sqrt{3^2 + 4^2} = 5$ ms; $U_t = 10$ ms.
- At age estimate 95 ms, interval=[85,105] ms: HOLD under the full-interval rule.
- At age estimate 80 ms, interval=[70,90] ms: PASS for this age criterion.

Decision interpretation: A recently received packet can still contain stale event data. The 95 ms estimate is not rounded down into acceptance.

Validity limits: This calculation does not account automatically for unrecorded queueing, an incorrect epoch or an unknown time scale. Such validity defects cause HOLD before the age predicate is evaluated.

ASTRA connections: 66.4; Annex G; 77.6

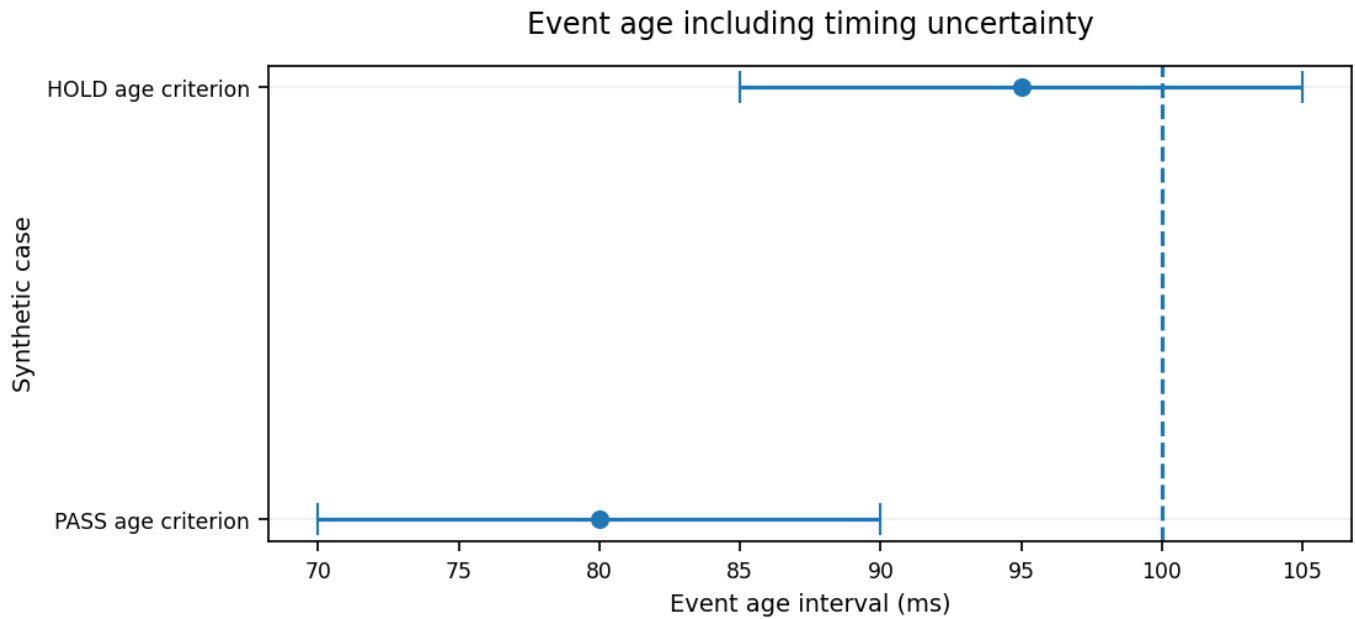


Figure Q17 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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

- Factored demand=1.25×100=125 kN.
- MS=150/125-1=0.20.
- 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

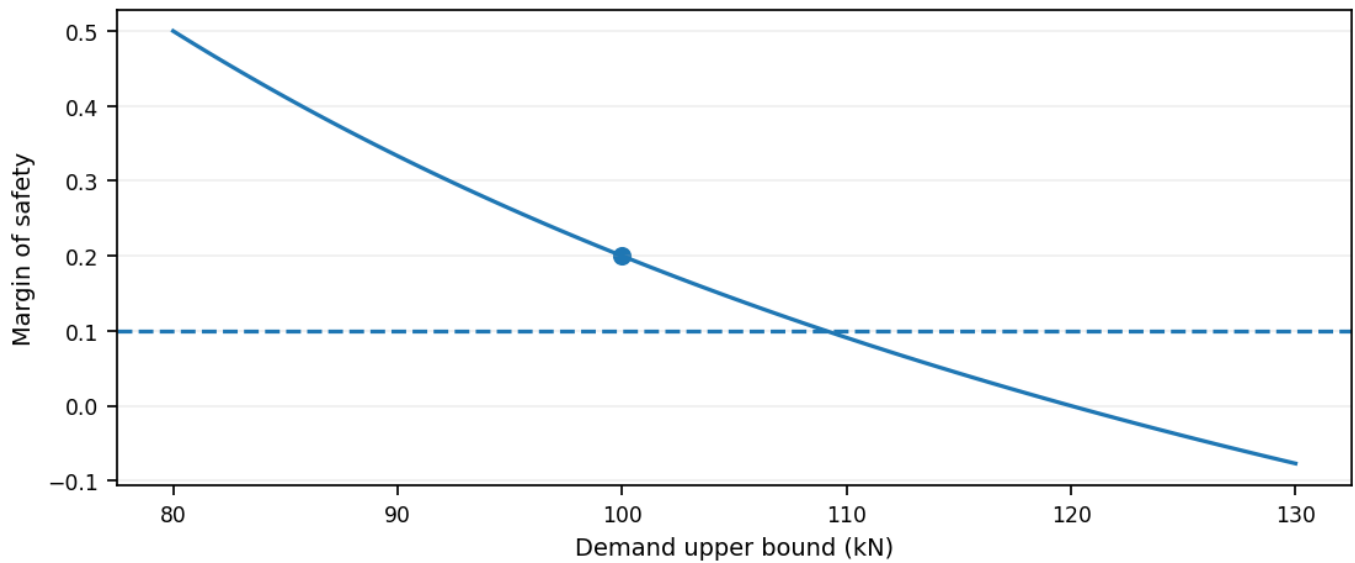


Figure Q18 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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

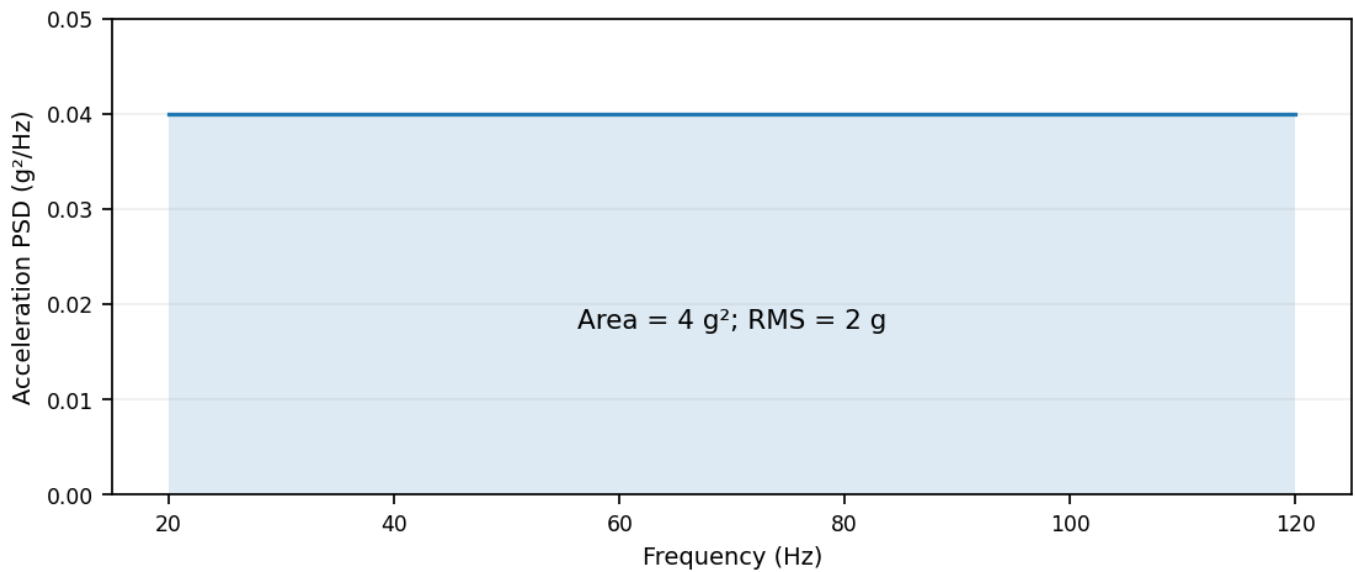


Figure Q19 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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

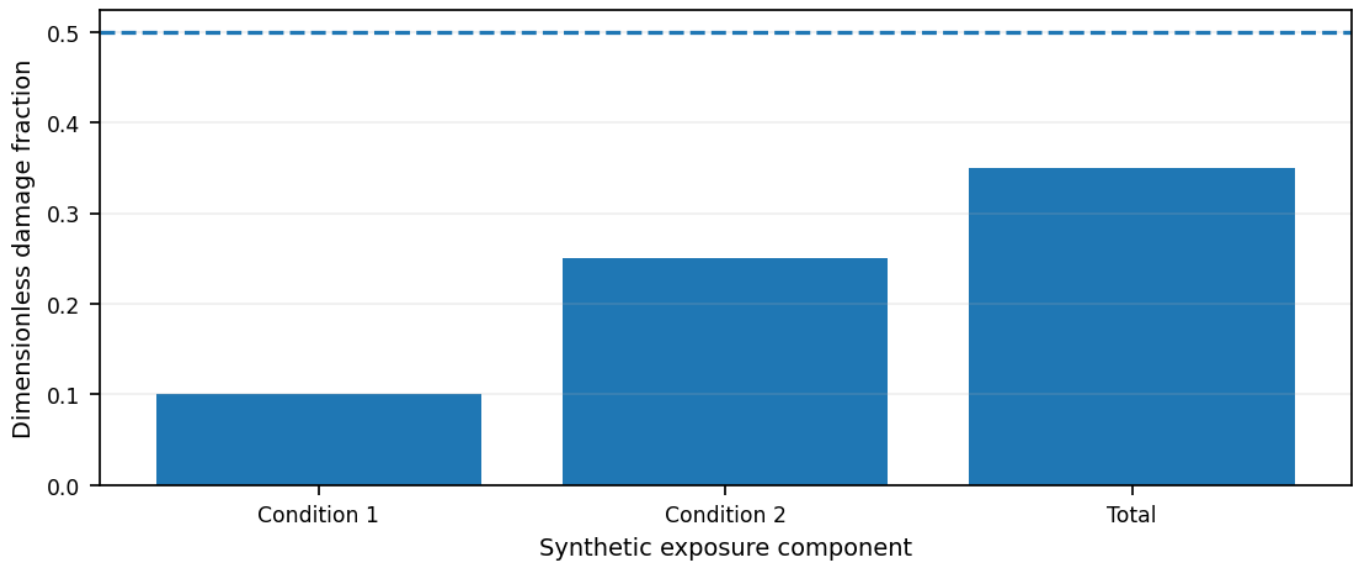


Figure Q20 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.

$$D_{\text{total}} = \sum (d_{\text{rate}_i} \times \text{exposure_time}_i)$$

$$D_{\text{assessment}} = F \times D_{\text{total}}$$

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

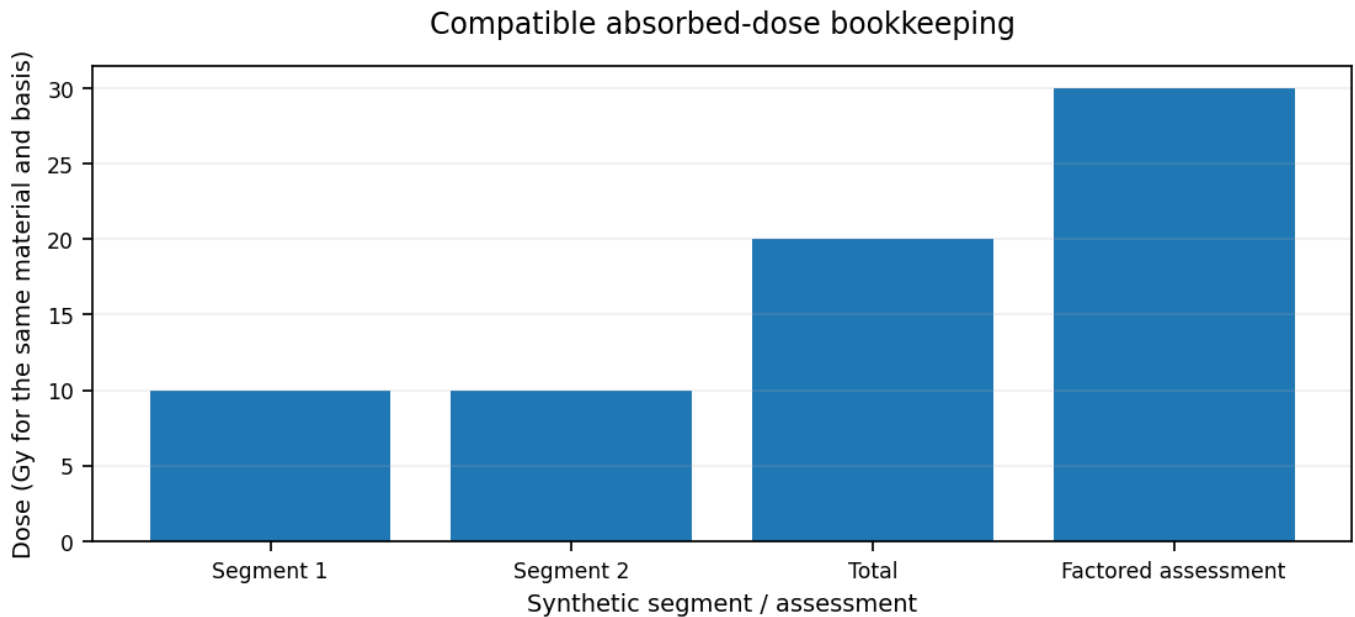


Figure Q21 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.Q25 Reliability architecture and common-cause sensitivity

Source: ASTRA Annex AM, Q25, page 224. All numerical inputs in this example are synthetic.

$R_{\text{series}} = R_1 R_2$ for independent required elements

$R_{\text{parallel}} = 1 - (1 - R_1)(1 - R_2)$ for independent full-capability alternatives

$R_{\text{with_common_event}} = (1 - q) R_{\text{parallel}}$

Variables and units

R_1 and R_2 refer to the same mission duration and domain. q is an illustrative independent probability of a common event defeating both alternatives. Perfect switching is assumed only for this example.

Example inputs

Synthetic $R_1=0.98$, $R_2=0.99$; illustrative common-event probability $q=0.01$.

Calculation and checks

1. Series result= $0.98 \times 0.99 = 0.9702$.
2. Ideal independent parallel result= $1 - (0.02 \times 0.01) = 0.9998$.
3. With the stated common event: $0.99 \times 0.9998 = 0.989802$.

Decision interpretation: The architecture and common-dependency assumptions materially change the result. Component figures alone cannot establish system reliability.

Validity limits: Unequal functions, imperfect switching, dormant failures, shared software, maintenance or external resources require a different model. The example probabilities are not actual mission data or prescribed targets.

ASTRA connections: 55.2; 68.1–68.2; 76.5

Architecture assumptions determine reliability

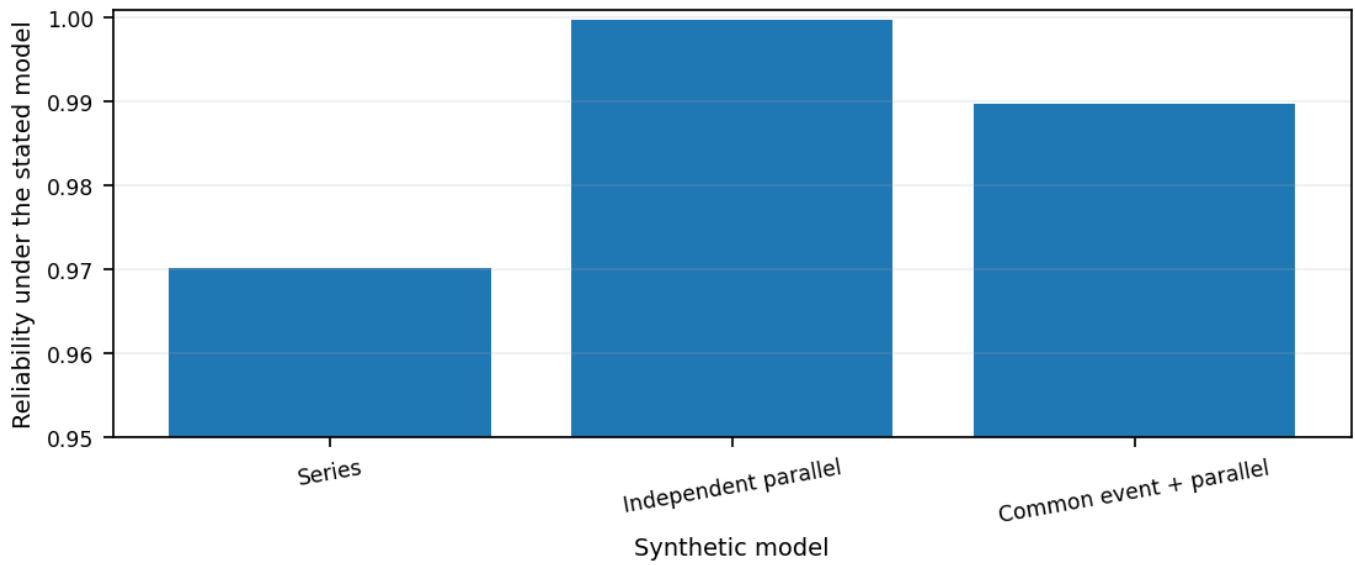


Figure Q25 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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-005: Map competence to an actual task — required basis missing	A general title or training course is not an authorisation for an unfamiliar task.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-005: Maintain event-time currency — handover or review incomplete	Later authorisation cannot validate prior out-of-scope work; assess affected earlier outputs separately.	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-011: Design a purposeful validity programme — required basis missing	Participation alone is not satisfactory performance or demonstrated detection capability.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-011: Close causes and historical extent — handover or review incomplete	New satisfactory performance restores only a bounded current capability after independent acceptance; old evidence is not rewritten.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-012: Reconcile output identity and basis — required basis missing	A report title or customer description cannot substitute for verified identity and scope.	Original input, unresolved value, affected requirement and scope; named action owner.
PR-012: Review publication against authority — handover or review incomplete	Every communicated result retains its actual event history and no unsupported broader scope.	Expected and observed state; independent replay; correction/retest; receiving acknowledgement.
PR-025: Establish a disinterested operator-review mandate — required basis missing	No self-accreditation, reciprocal nominal approval or assumed external acceptance follows from the review.	Original input, unresolved value, affected requirement and scope; named action owner.

Challenge	Expected handling	Evidence retained
PR-025: Close findings and state limits — handover or review incomplete	Successful document review establishes only the stated review boundary, not universal international acceptance.	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
3.2 / 12	Accrediting and delivery entities	Requirement, objective evidence and local child predicates
6.5 / 17	Independent oversight	Requirement, objective evidence and local child predicates
7.1 / 17	Function-specific competence	Requirement, objective evidence and local child predicates
7.3 / 17	Essential steps and assessment security	Requirement, objective evidence and local child predicates
7.4 / 17	Initial assessor population	Requirement, objective evidence and local child predicates
7.5 / 18	Maintenance and inactivity	Requirement, objective evidence and local child predicates
8.1 / 18	Facility suitability and environmental control	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
8.4 / 19	Intermediate checks and due dates	Requirement, objective evidence and local child predicates
8.5 / 19	Adverse equipment findings	Requirement, objective evidence and local child predicates
8.6 / 19	Consumables, materials and reference items	Requirement, objective evidence and local child predicates
9.1 / 19	Method selection and contract fit	Requirement, objective evidence and local child predicates
9.2 / 19	Verification and validation	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
9.3 / 20	Sampling and specimen integrity	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
9.6 / 20	Continuing validity and comparisons	Requirement, objective evidence and local child predicates
9.7 / 20	Technical reporting and amendments	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
13.5 / 25	Closing and report	Requirement, objective evidence and local child predicates
19.1 / 31	Detailed technical scope	Requirement, objective evidence and local child predicates
19.2 / 31	Responsible technical management	Requirement, objective evidence and local child predicates
19.3 / 32	Method performance and detection	Requirement, objective evidence and local child predicates
19.4 / 32	NDT-specific competence	Requirement, objective evidence and local child predicates
19.5 / 32	Materials and destructive testing	Requirement, objective evidence and local child predicates
19.6 / 32	Calibration and reference capability	Requirement, objective evidence and local child predicates
19.7 / 32	Sampling and customer-supplied items	Requirement, objective evidence and local child predicates
19.8 / 32	Inspection relationships	Requirement, objective evidence and local child predicates
19.9 / 33	Inspection judgement and remote methods	Requirement, objective evidence and local child predicates
19.10 / 33	Comparisons and validity programme	Requirement, objective evidence and local child predicates
19.11 / 33	Nonconforming laboratory or inspection work	Requirement, objective evidence and local child predicates
19.12 / 33	Technical witnessing for accreditation	Requirement, objective evidence and local child predicates

ASTRA ID / page	Source subject	Implementation use
25.1 / 42	Activity-specific provider controls	Requirement, objective evidence and local child predicates
25.2 / 42	Management-system certification	Requirement, objective evidence and local child predicates
25.3 / 42	Product, process and service certification	Requirement, objective evidence and local child predicates
25.4 / 43	Personnel certification	Requirement, objective evidence and local child predicates
25.5 / 43	Validation and verification bodies	Requirement, objective evidence and local child predicates
25.6 / 43	Proficiency and reference-material activities	Requirement, objective evidence and local child predicates
28.1 / 45	Mandatory scope content	Requirement, objective evidence and local child predicates
29.3 / 47	Independent accrediting-operator review	Requirement, objective evidence and local child predicates
30.3 / 48	Reliance and cooperation agreements	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
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

ASTRA ID / page	Source subject	Implementation use
35.6 / 55	Mission readiness and uncertainty acceptance	Requirement, objective evidence and local child predicates
39.1 / 60	Intended users and representative conditions	Requirement, objective evidence and local child predicates
39.2 / 60	Workload, information and error recovery	Requirement, objective evidence and local child predicates
39.3 / 60	Life-support and habitation responsibilities	Requirement, objective evidence and local child predicates
39.4 / 60	Emergency response and safe-return assumptions	Requirement, objective evidence and local child predicates
39.5 / 60	Maintenance and worker protection	Requirement, objective evidence and local child predicates
39.6 / 60	Human authority in automated systems	Requirement, objective evidence and local child predicates
41.2 / 62	Integrated route and hidden characteristics	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

ASTRA ID / page	Source subject	Implementation use
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
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

ASTRA ID / page	Source subject	Implementation use
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
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
57.1 / 81	Role-specific competence and scope	Requirement, objective evidence and local child predicates
57.3 / 82	Practical assessment and maintained practice	Requirement, objective evidence and local child predicates
57.5 / 82	Independent accrediting-operator review	Requirement, objective evidence and local child predicates
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
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

ASTRA ID / page	Source subject	Implementation use
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
66.1 / 96	End-to-end service definition	Explicit verification and acceptance predicate
66.2 / 96	Link and performance budgets	Explicit verification and acceptance predicate
66.3 / 96	Delay and feasible intervention	Explicit verification and acceptance predicate
66.4 / 96	Data age and time uncertainty	Explicit verification and acceptance predicate
66.5 / 97	Position and navigation-support integrity	Explicit verification and acceptance predicate
66.6 / 97	Secure command and relay interfaces	Explicit verification and acceptance predicate
66.7 / 97	Outage, recovery and service evidence	Explicit verification and acceptance predicate
67.3 / 98	Receipt, execution and completion	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
73.1 / 110	Population, mission and human tasks	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
73.2 / 110	Integrated life support	Explicit verification and acceptance predicate
73.3 / 110	Consumables and survival time	Explicit verification and acceptance predicate
73.4 / 110	Habitat integrity and interfaces	Explicit verification and acceptance predicate
73.5 / 111	Human factors and effective authority	Explicit verification and acceptance predicate
73.6 / 111	Extravehicular activity and individual equipment	Explicit verification and acceptance predicate
73.7 / 111	Medical capability and health-data boundaries	Explicit verification and acceptance predicate
73.8 / 111	Emergency, refuge and safe return	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
75.3 / 114	Essential variables and remote monitoring	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

ASTRA ID / page	Source subject	Implementation use
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
80.1 / 124	One complete application schedule	Explicit verification and acceptance predicate
80.2 / 124	Domain and verification completeness	Explicit verification and acceptance predicate
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.

3.2 — Accrediting and delivery entities

Source: AF-AST-STD-001, page 12.

The legal entity making an accreditation decision shall be identified separately from the applicant body and from the entity providing the assessment services being accredited. It shall not accredit itself or its own assessment operation, including through nominal reciprocal arrangements. It shall not also deliver the conformity-assessment services it accredits or applicant-specific consultancy compromising that accreditation. Related training, sector engagement and shared administration shall be assessed for actual influence, finances, access and ownership, with a genuinely independent arrangement where separation is necessary.

Required evidence: Legal delivery model; related-activity analysis; independent oversight and liability arrangements.

6.5 — Independent oversight

Source: AF-AST-STD-001, page 17.

The oversight function shall have protected access to unedited results, conflict information, trends and resources needed to challenge programme management. It shall report material unresolved threats to a disinterested constitutional route. Implicated officers shall not select their own investigator or control the evidence made available. Oversight may recommend restrictions, reassessment or governance correction; it shall not replace competent case findings with a preferred commercial result.

Required evidence: Oversight mandate; access and budget; independent reports; resolved or escalated threats.

7.1 — Function-specific competence

Source: AF-AST-STD-001, page 17.

The operator shall define separate competence requirements for application review, audit leadership, specialist evaluation, sampling, laboratory sign-off, independent review, decisions and appeals. Profiles shall state technical fields, methods, criticality, language, professional judgement, evidence interpretation and access permissions. A person may hold several roles only when separately qualified and case independence remains valid. No generic aerospace assessor designation shall imply mastery of all eight families.

Required evidence: Role profiles; technical authorisation matrix; case coverage check.

7.3 — Essential steps and assessment security

Source: AF-AST-STD-001, page 17.

Knowledge and practical criteria shall be fixed before candidate evaluation. Every predesignated essential safety, integrity and independence step shall be passed; component scores shall not be averaged to conceal failure. Equivalent reassessment shall follow evidenced remediation and preserve earlier attempts. Examination questions, scenarios, identity checks and scoring shall be secured and validated. An automated score or AI recommendation shall not be the sole authority for a practical competence decision.

Required evidence: Assessment blueprint; component/essential-step results; secured attempts; independent authorisation.

7.4 — Initial assessor population

Source: AF-AST-STD-001, page 17.

Where no established ASTRA assessor population exists, at least two independent competent professionals shall assess each candidate against the stated role and technical criteria. Their own competence and conflicts shall be documented. Comparable prior work may satisfy specified experience elements only after verification; programme knowledge, witnessed performance and independence shall not be waived. Honorary titles, reciprocal self-approval and attendance at an introductory meeting shall not create assessor authority.

Required evidence: Initial-panel qualifications; equivalence map; witnessed task; remaining scope restrictions.

7.5 – Maintenance and inactivity

Source: AF-AST-STD-001, page 18.

Maintain relevant development, current practice and observed performance at the intervals in Annex D. Review poor reports, inconsistent decisions, complaints, new technologies and changes in methods as well as activity counts. Failure to meet the applicable role minimum shall suspend independent role use until reviewed supervised reactivation. An individual shall notify limitations and request support rather than accept a task outside the authorised scope. Restoration does not erase earlier affected-work concerns.

Required evidence: Practice/development logs; witnessed reviews; suspension and reactivation; prior-work assessment.

8.1 – Facility suitability and environmental control

Source: AF-AST-STD-001, page 18.

Work locations shall support the actual method, product, learner or service conditions. Identify and monitor relevant temperature, contamination, vibration, electromagnetic, access, lighting, space and utility constraints. Separate incompatible activities and protect articles and records. Temporary, mobile, customer-owned and remote facilities shall meet the same relevant suitability conditions. An adverse environmental excursion shall be linked to the work it could affect and shall not be closed merely by restoring room conditions.

Required evidence: Facility scope; environmental limits and logs; excursion/affected-work review.

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.

8.4 – Intermediate checks and due dates

Source: AF-AST-STD-001, page 19.

The responsible technical person shall set calibration and verification intervals using use, drift, environment, history, consequence and applicable requirements. Conduct intermediate checks where needed to detect loss of capability between calibrations. A due date shall not be extended retrospectively because capacity is unavailable. Any prospective interval change requires recorded technical evidence and approval. Checks shall challenge actual measuring functions rather than merely confirm that the equipment powers on.

Required evidence: Interval rationale; intermediate checks; prospective approved changes; actual-use status.

8.5 – Adverse equipment findings

Source: AF-AST-STD-001, page 19.

When equipment is damaged, out of tolerance, misconfigured or otherwise suspect, stop affected use and determine the last demonstrated valid state. Review prior results, associated lots, decisions and recipients, using the likely error mechanism and uncertainty. Recalibration restores equipment evidence only after acceptance; it does not by itself establish the validity of prior work. Amend or withdraw reports and notify affected parties when their conclusions are no

longer supported.

Required evidence: Quarantine; look-back interval; impacted results; corrected reports and notifications.

8.6 – Consumables, materials and reference items

Source: AF-AST-STD-001, page 19.

Control receipt, identity, condition, shelf or out-time, storage, preparation and permitted reuse of materials, standards, test specimens and consumables. Establish suitability and homogeneity/stability where reference items support method validity. Prevent contamination, substitution and expired material use. Externally supplied reference values shall be reviewed for intended use and uncertainty; a nominal value with unknown provenance shall not support an unjustified calibration or conformity conclusion.

Required evidence: Material/reference register; custody; validity and expiry; suitability review.

9.1 – Method selection and contract fit

Source: AF-AST-STD-001, page 19.

Before work, select a method suitable for the actual object, property, range, operating conditions and intended decision. Resolve contradictory or obsolete customer instructions and disclose methods outside demonstrated capability. The method shall define preparation, setup, execution, data treatment, acceptance and limitations sufficiently for competent reproducibility. A familiar method name shall not establish fitness for a new material, geometry, low-level concentration, digital system or service context.

Required evidence: Reviewed method request; authorised procedure; scope/range suitability; resolved ambiguities.

9.2 – Verification and validation

Source: AF-AST-STD-001, page 19.

Verify established methods in the actual implementation. Validate new, non-standard or materially modified methods for the intended use, addressing relevant bias, precision, selectivity, sensitivity, range, robustness and uncertainty. Establish acceptance criteria before validation data are assessed. Retain failed trials and restrictions. Method transfer between sites, instruments, software or personnel requires evidence that material performance remains valid; a shared procedure number does not demonstrate successful transfer.

Required evidence: Validation/verification plan; raw results; acceptance analysis; transfer and limitation records.

9.3 – Sampling and specimen integrity

Source: AF-AST-STD-001, page 20.

When sampling is within scope, establish the population, selection method, sample size, locations, conditions, randomisation where relevant, transport and preparation. Address sampling contributions to uncertainty and limitations of inference. A result from a client-selected item shall identify that boundary. Sample identity and chain of custody shall survive splitting, pooling, consumption and subcontracting. Reject or condition work on unsuitable specimens before interpreting the result as representative.

Required evidence: Sampling plan; population and selection; custody; deviations and restricted inference.

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.

9.6 – Continuing validity and comparisons

Source: AF-AST-STD-001, page 20.

Maintain a planned programme of internal controls and independent or interlaboratory comparison appropriate to each significant technical field. Participation alone is not satisfactory performance. Investigate adverse results, assign causes and assess prior reports. Where a suitable comparison is unavailable or impracticable, approve a technically justified alternative with evidence of challenge and limitations; lack of participation opportunity shall not be described as external proof of competence. Review coverage as methods and volumes change.

Required evidence: Validity-monitoring plan; comparison results; justified alternatives; adverse-result actions.

9.7 – Technical reporting and amendments

Source: AF-AST-STD-001, page 20.

Reports shall identify issuer, client, actual item, scope, method/version, conditions, dates, results, units, uncertainty where needed, deviations, decision rule, conclusion, limitations and authorised signatory. Identify subcontracted results and opinions separately. A report shall not imply that untested characteristics or future production were examined. Amendments shall preserve the original, state the reason and affected conclusion, and reach recipients who relied on an incorrect result.

Required evidence: Attributable report; raw-data linkage; subcontracted-result identity; amendment and recipient log.

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.

13.5 – Closing and report

Source: AF-AST-STD-001, page 25.

Communicate evidence-based findings, affected scope, immediate protection and the distinction between team recommendation and final decision. Acknowledge factual corrections without erasing valid adverse evidence. Issue the final evaluation report within 14 calendar days of evaluation closure; exceptional delay shall be explained without moving an already notified finding clock. The report shall state actual time, methods, samples, sites, witnesses, criteria, limitations, findings and recommendation.

Required evidence: Closing record; findings and original notification dates; final actual-coverage report.

19.1 – Detailed technical scope

Source: AF-AST-STD-001, page 31.

The laboratory or inspection body shall define method families, materials/items, measured properties, ranges, conditions, sites, mobile activities and limitations. Calibration scopes shall state measurement quantities and demonstrated uncertainty capability. Inspection scopes shall state object, stage, criteria and independence relationship. An unrestricted description such as all aerospace tests is insufficient. Flexible scope shall be bounded prospectively and shall not authorise a new measurement principle, site or technical field without competence review.

Required evidence: Method/range/site schedule; relationship declaration; controlled flexibility limits.

19.2 – Responsible technical management

Source: AF-AST-STD-001, page 31.

Appoint technical managers and authorised signatories with demonstrated competence for their actual methods and conclusions. Record who approves methods, performs work, interprets results, releases reports and evaluates complaints. Shared staff shall have manageable workloads and substitution arrangements. Independence required by the claimed result shall be demonstrated structurally and in practice. Laboratory staff shall be able to stop work and refuse an unsupported result without commercial retaliation.

Required evidence: Technical appointments; signatory scope; workload/deputies; stop-work authority.

19.3 – Method performance and detection

Source: AF-AST-STD-001, page 32.

Demonstrate method suitability for relevant defect mechanisms or measurands, specimen preparation, surfaces, geometry, matrix effects, interference, access and environmental conditions. For qualitative inspection, evaluate false-positive and false-negative behaviour where material. Detection capability shall be tied to technique, task, equipment and person. A successful reference check on an easy artefact shall not prove the ability to detect every relevant defect in an installed structure.

Required evidence: Method validation; challenge specimens; detection limitations; authorised interpretation.

19.4 – NDT-specific competence

Source: AF-AST-STD-001, page 32.

NDT work shall identify technique, material/product sector, equipment, procedure and acceptance basis, with qualified task personnel and technical supervision. Establish training, experience, practical demonstrations, vision or physical requirements only where justified by the task, periodic re-examination and employer authorisation. Industrial qualification shall not be equated with a general personnel badge. Hazardous-source use requires separate lawful authorisation and safe operating arrangements; this standard supplies no source-handling or exposure instructions.

Required evidence: NDT role/technique matrix; practical evidence; employer authority; controlled safety permissions.

19.5 – Materials and destructive testing

Source: AF-AST-STD-001, page 32.

Control sampling location, specimen geometry, orientation, machining/preparation, conditioning and traceability to parent material. Demonstrate relevant apparatus performance, rate/control conditions, data acquisition and result processing. Record invalid tests, fractures or anomalies and the reason for any retest. Chemical and physical methods shall address relevant contamination, blank, recovery, reference-material and calibration effects. A result shall be limited to the actual specimen and justified population inference.

Required evidence: Specimen-parent links; conditions; raw data; validity and retest disposition.

19.6 – Calibration and reference capability

Source: AF-AST-STD-001, page 32.

Calibration shall report the actual quantity, range, method, conditions, result, corrections and uncertainty with suitable traceability. Scope capability shall be supported by a technically complete uncertainty budget and demonstrated implementation. Where an external calibration supports another method, verify that its uncertainty and range are sufficient for the intended use. A scope schedule shall not advertise a smaller uncertainty than the body can actually

achieve under the stated conditions.

Required evidence: Calibration scope; uncertainty evidence; reference chain; demonstrated capability.

19.7 – Sampling and customer-supplied items

Source: AF-AST-STD-001, page 32.

Contract review shall establish who sampled the item and which population is represented. At receipt, verify identity, condition, deviations, quantity and requested work. Resolve unsuitable or ambiguous items before work; where proceeding is justified, state limitations in the result. Maintain storage, preparation, transport, consumption and disposal records. A customer's unverified description shall be clearly identified rather than silently adopted as a laboratory observation.

Required evidence: Receipt and custody; sampling responsibility; deviations; report limitations.

19.8 – Inspection relationships

Source: AF-AST-STD-001, page 32.

Identify whether inspection is independent third-party activity or is performed within a declared ownership, design, production or service relationship. Assess the risks and required separation for the actual claim; do not imply third-party independence when it is absent. Separate inspected-work responsibility from inspection judgement sufficiently to meet the agreed independence requirement. Internal inspection may support technical evidence, but it shall not be relabelled as an independent certification of that work.

Required evidence: Relationship analysis; independence controls; accurately worded report and scope.

19.9 – Inspection judgement and remote methods

Source: AF-AST-STD-001, page 33.

Inspection procedures shall specify acceptance criteria, technique, access, sampling, instruments, records and the competence needed for judgement. Record inaccessible features and limitations of visual, remote or automated methods. Drone imagery, digital scans and AI classification shall be validated for their intended inspection purpose. Absence of an observed defect does not demonstrate absence of a defect outside the method's detection or access capability. Escalate uncertain classifications before release.

Required evidence: Inspection plan; method validity; access/detection limits; reviewed judgement.

19.10 – Comparisons and validity programme

Source: AF-AST-STD-001, page 33.

For each significant technical field, define risk-based reference checks, blind or duplicate work, comparison participation and other validity controls. Before granting a new scope, examine available satisfactory comparison evidence or an independently accepted alternative that directly challenges the claimed ability. No arbitrary score shall compensate for unresolved poor performance. Record investigation, affected historical work and successful corrective verification. Programme enrolment alone shall not be counted as a satisfactory result.

Required evidence: Validity coverage map; comparison/alternative results; investigations; restored capability.

19.11 – Nonconforming laboratory or inspection work

Source: AF-AST-STD-001, page 33.

A designated person shall evaluate the significance of nonconforming work, stop or restrict it, assess prior results, notify affected clients where necessary and authorise resumption only after correction is demonstrated. The response shall address method, equipment, personnel, environment and data mechanisms. A corrected report shall identify what changed and why. Do not erase an adverse report merely because a new sample gives a better result.

Required evidence: Nonconforming-work record; prior-report assessment; amended reports; resumption authority.

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.

25.1 – Activity-specific provider controls

Source: AF-AST-STD-001, page 42.

A provider shall identify each assessment activity, legal responsibility, scheme/profile, methods, resources and final decision authority. Certification and verification bodies shall demonstrate their full application-to-decision process in addition to supporting technical evaluations. Personnel and external experts shall meet role-specific criteria. Requested activities lacking actual demonstration remain outside scope. The activity labels in Annex I are routing labels, not additional family counts or proof of external standing.

Required evidence: Provider activity schedule; legal/technical responsibility; complete representative process.

25.2 – Management-system certification

Source: AF-AST-STD-001, page 42.

System-certification activity shall use competent audit teams, scope review, appropriate readiness and implementation evaluation, validated time and site planning, findings, independent review and decision, and continuing surveillance. The certifying body shall retain final decision responsibility and control outsourced audit work. It shall not certify a system it designed or use a consultancy relationship to secure the result. An audit report or training certificate is not itself a management-system certificate.

Required evidence: Audit-route dossier; independence; final retained decision; surveillance.

25.3 – Product, process and service certification

Source: AF-AST-STD-001, page 42.

Define the relevant conformity model: instance evaluation or continuing family/service/process scope. Verify object identity, representative technical evidence, production or delivery controls where ongoing, sampling and decision rules. Separate qualification, routine acceptance and certification. The body shall demonstrate competence in the actual evaluation methods and scope, not rely on an organisational auditor alone. Labels and surveillance shall match the chosen model.

Required evidence: Technical model; representative evaluation; continuing controls; precise certification scope.

25.4 – Personnel certification

Source: AF-AST-STD-001, page 43.

Maintain a validated job/task profile, fair prerequisites, secure and representative knowledge/practical assessment, independent decision, credential scope, continued competence, renewal and appeal. Training and examination relationships shall not compromise independence. Essential practical failure blocks the relevant credential regardless of total score. Employer task authority and statutory privileges remain separate. Apply the relevant AF 9100 personnel provisions when that route is claimed; other profiles shall not silently alter them.

Required evidence: Role scheme; assessment validity/security; independent result; continuing competence and boundaries.

25.5 – Validation and verification bodies

Source: AF-AST-STD-001, page 43.

Demonstrate competence for the type of claim, sector, data, methodology, assurance level and intended use. Separate preparation of a client's statement from independent evaluation of it. Verify engagement acceptance, strategic analysis, risk and materiality, evidence plan, execution, misstatement resolution, independent review and conclusion. Preserve actual statement versions and communicate later material errors. Accreditation concerns the body's competence, not the truth of every statement it may issue.

Required evidence: Claim-specific competence; independent engagement trail; statement version; conclusion and correction.

25.6 – Proficiency and reference-material activities

Source: AF-AST-STD-001, page 43.

A body organising proficiency exercises or producing reference material requires a separately released technical profile. That profile shall cover competence, planning, assigned values or property characterisation, homogeneity/stability, uncertainty, participant/sample confidentiality, statistical methods, reporting and validity. These functions shall not be inferred from ordinary laboratory accreditation. Until the specialised profile and witnesses are complete, the catalogue shall show the requested activity as development, not granted scope.

Required evidence: Dedicated profile; characterisation/statistical basis; valid specialised witnessing; bounded status.

28.1 – Mandatory scope content

Source: AF-AST-STD-001, page 45.

Each outcome shall state holder and responsible issuer, unique identifier, exact class, family/module, criteria and version, evaluated object, site, technical activity, conditions/ranges, configuration or delivery version, period, decision/issue dates, status and restrictions. Identify ongoing expiry or instance boundary appropriately. The scope schedule forms part of the outcome and shall be available for verification without disclosing protected technical detail. Annex I supplies the minimum schema.

Required evidence: Decision-linked scope schedule; claim class; criteria/version; public/private split.

29.3 – Independent accrediting-operator review

Source: AF-AST-STD-001, page 47.

Before launch and at intervals no greater than 36 months, obtain an independent review of the accrediting operator's competence, impartiality, technical coverage, governance, decisions and actual implementation, with earlier review after serious concerns. The reviewers shall be competent and free of reciprocal self-approval. Their findings, limits and corrective results shall be recorded. This internal programme requirement does not itself establish membership of an external recognition arrangement or international acceptance.

Required evidence: Independent reviewers; operator evaluation; findings/closure; evidenced limits of standing.

30.3 – Reliance and cooperation agreements

Source: AF-AST-STD-001, page 48.

Any agreement to rely on another party's results shall identify parties, exact activities, acceptance conditions, competent evaluation, monitoring, territorial limits, confidentiality and withdrawal. Verify authenticity and fit for each actual use. Do not infer acceptance from an MoU title, shared event, commercial partnership or similar standard number. The party making an acceptance decision retains responsibility for that decision. Mutual familiarity is not independent competence evidence.

Required evidence: Executed bounded agreement; evidence checks; monitoring; truthful acceptance statements.

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.

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 reparability 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.

39.1 – Intended users and representative conditions

Source: AF-AST-STD-001, page 60.

The organisation shall define the relevant users, tasks, environment, expected duration, physical access, communication and operational constraints. Human-system requirements shall consider capabilities, limitations and reasonably foreseeable behaviour. Validation shall use representative users and conditions where practicable and state the limitations of substitutes or simulation. A single expert operator or ideal-condition demonstration shall not establish usability for all intended users or emergency conditions.

Required evidence: User/task analysis; representative population and scenario rationale; validation results and limitations.

39.2 – Workload, information and error recovery

Source: AF-AST-STD-001, page 60.

Interfaces and procedures shall provide understandable status, priorities, warnings and recovery information appropriate to the task. The organisation shall evaluate workload, fatigue, interruption, handover, language and the ability to recover from foreseeable errors. A warning shall not be the sole mitigation where an essential design or protective control is required. Nominal response time shall be distinguished from the time demonstrated by actual users under representative workload and degraded-information conditions.

Required evidence: Interface requirements; workload and interruption studies; observed recovery; design and protective-control decisions.

39.3 – Life-support and habitation responsibilities

Source: AF-AST-STD-001, page 60.

Where life-support or habitation systems are within scope, responsibilities shall cover the integrated environment, consumables, monitoring, maintenance, degradation and emergency interfaces. The technical basis shall identify the expected occupancy and mission duration and the consequences of loss of a supporting function. The organisation shall obtain competent specialist review appropriate to consequence and actual legal obligations. User acceptance of risk shall not replace required technical controls, independent review or operational permission.

Required evidence: Life-support responsibility matrix; occupancy/duration basis; integrated verification; independent specialist review.

39.4 – Emergency response and safe-return assumptions

Source: AF-AST-STD-001, page 60.

The organisation shall identify emergency scenarios and the interfaces on which rescue, safe return, evacuation or continued protection depend. Agreements shall be supported by evidence of actual availability and compatible communication, equipment and competence. Exercises shall be safe and representative of the response being claimed. A signed cooperation document or an optimistic recovery time shall not establish effective emergency capability where a critical resource or external service remains unavailable.

Required evidence: Scenario and dependency analysis; resource availability; exercised interfaces; corrective follow-up and limitations.

39.5 – Maintenance and worker protection

Source: AF-AST-STD-001, page 60.

Work design shall address hazards affecting people and conformity, including access, lifting, hazardous energy, exposure, fatigue and restoration after intervention. Contractors and temporary personnel shall receive relevant task controls and supervision. The organisation shall preserve stop-work and escalation rights without retaliation. This standard does not replace a complete workplace safety framework; it requires the actual obligations and competent protective arrangements to be integrated with the claimed aerospace activity.

Required evidence: Work-risk interfaces; task authorisation; contractor controls; interruption and safe-restoration records.

39.6 – Human authority in automated systems

Source: AF-AST-STD-001, page 60.

Automation shall have explicit authority limits and an identified accountable organisation. Human oversight shall be evaluated for actual information, time, skill and ability to intervene, not simply the presence of a person in a process diagram. Training shall cover limitations, misleading outputs and degraded modes. Material changes in automation, tasks or user populations shall trigger reassessment. A favourable aggregate task-completion rate shall not compensate for a failed essential protective response.

Required evidence: Authority allocation; intervention validation; representative training and assessment; change review; essential-step results.

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.

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.

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.

57.1 – Role-specific competence and scope

Source: AF-AST-STD-001, page 81.

The operator shall map actual assessment tasks to verified discipline, method, language, consequence and judgement requirements. Audit leadership, technical evaluation, independent review, decisions and appeals shall remain separate authorisations. Learning attendance and numerical experience minima shall not replace observed ability. A person competent in one method or programme shall not be assigned unrestricted aerospace authority. The case plan shall identify necessary specialists and limits before accepting the work.

Required evidence: Task-to-role and person matrix; verified entry evidence; observed performance; bounded authorisation.

57.3 – Practical assessment and maintained practice

Source: AF-AST-STD-001, page 82.

Knowledge and practical criteria shall be defined before evaluation. Essential safety, integrity and independence steps shall be separately passed. Mentored work shall identify what the candidate actually performed and what remained supervised. Continuing development, recent practice, observed performance and review feedback shall maintain the authorisation. Unmet minima or loss of currency shall suspend independent role use until the required supervised reactivation. Later renewal shall not validate prior work performed outside authority.

Required evidence: Blueprint and attempts; mentored-work records; continuing practice; suspension/reactivation; historical impact review.

57.5 – Independent accrediting-operator review

Source: AF-AST-STD-001, page 82.

The independent operator review shall examine actual governance, competence, impartiality, technical methods, resources, case trails, decisions, remedies and registry integrity. Reviewers shall be genuinely independent and have adequate protected evidence access. The interval and pre-launch requirements in Clause 29.3 remain controlling. Review findings shall have verified correction and a bounded report. Completion of this internal programme review shall not be represented as external recognition or universal international acceptance.

Required evidence: Independent mandate and reviewers; actual case sampling; findings/closure; bounded report and continuing actions.

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.

66.1 – End-to-end service definition

Source: AF-AST-STD-001, page 96.

Define source, destination, relay, ground station, user, supported modes, data class, service availability, permitted latency, correctness and authority. Separate service connectivity from integrity and from the right to use a frequency or external network. All external dependencies shall have actual service scope, ownership, availability and failure responsibility.

Verification: Trace representative data from origin to authorised use including relays and third parties.

Acceptance / hold rule: The claimed service boundary is complete and each essential dependency is supported; a link diagram alone is insufficient.

66.2 – Link and performance budgets

Source: AF-AST-STD-001, page 96.

Link calculations shall state distance, frequency or wavelength, antenna or optical characteristics, pointing, losses, noise, coding, data rate and required performance. Free-space attenuation shall not be treated as the complete link model. Atmospheric, weather, acquisition, polarisation, interference and implementation effects shall be included when material. Units and logarithmic reference quantities shall be consistent.

Verification: Independently recompute the budget and validate assumed performance against representative evidence.

Acceptance / hold rule: The worst required operating cases meet approved link and quality margins; omitted material losses or unknown receiver performance block acceptance.

66.3 – Delay and feasible intervention

Source: AF-AST-STD-001, page 96.

The service shall distinguish one-way propagation, round-trip exchange, queueing, processing, retransmission, human response and actuation delays. A ground intervention shall count as a protective control only when information and action can arrive within the validated hazard-response window. Store-and-forward or disruption-tolerant operation shall define expiration, duplicate handling, priority and stale-command rejection.

Verification: Test worst-case delay and outage scenarios using the approved mission geometry and timing model.

Acceptance / hold rule: Required responses are feasible within the approved window; a nominal human review step does not pass if communication makes it ineffective.

66.4 – Data age and time uncertainty

Source: AF-AST-STD-001, page 96.

Every consequential data item shall retain event time, time scale, receipt time, sequence, quality flags and relevant uncertainty. Clock drift, conversion error, leap or reset handling and synchronisation loss shall be bounded. Maximum data age and timing uncertainty shall be defined before use. A recent packet receipt shall not make its old event data current.

Verification: Challenge stale, duplicated, reordered, wrong-time-scale and clock-reset data.

Acceptance / hold rule: Data outside approved age or uncertainty bounds are marked unusable for the affected decision and trigger the defined protective response.

66.5 – Position and navigation-support integrity

Source: AF-AST-STD-001, page 97.

The service shall define position, velocity, orientation or time outputs, reference frame, validity interval, uncertainty, integrity indication and user reliance. The validation shall distinguish nominal error from misleading information and unavailable service. Transformations and combined sources shall preserve correlations. The provider shall not imply that a navigation-support result grants authority to conduct the receiving operation.

Verification: Compare independent truth/reference evidence and test wrong-frame, stale-source and service-loss cases.

Acceptance / hold rule: All performance and integrity predicates pass for the declared use; an unavailable or uncertain essential output is not a valid zero-error estimate.

66.6 – Secure command and relay interfaces

Source: AF-AST-STD-001, page 97.

Command-bearing links shall verify origin, authority, target, sequence, integrity, timing and permitted operation. Relays shall not enlarge the original authority. Replays, duplicates, interrupted delivery, expired credentials and compromised dependencies shall be handled through validated controls. Security tests shall remain inside written safe authorisation and shall not interfere with live assets.

Verification: Execute safe positive and prohibited command-delivery tests using isolated synthetic fixtures.

Acceptance / hold rule: Unauthorised, stale or wrong-target commands cannot pass the accepted workflow; commanded action and observed physical completion remain distinct.

66.7 – Outage, recovery and service evidence

Source: AF-AST-STD-001, page 97.

The operator shall reconcile lost data, delayed messages, incomplete transfers and state changes after an outage. Recovery shall restore meaning, configuration, authority and history as well as network availability. Report actual service measures with time windows, excluded outages and missing data. A service restoration shall not retrospectively validate dependent decisions made with unavailable or corrupted information.

Verification: Review outage timelines, replay/reconciliation logs and receiving acceptance.

Acceptance / hold rule: All necessary state and data integrity checks are complete before assured use resumes; remaining gaps are carried into the affected claims.

67.3 – Receipt, execution and completion

Source: AF-AST-STD-001, page 98.

The record shall distinguish command prepared, approved, transmitted, received, accepted, started, completed, failed and unknown. A transmission log or acknowledgement shall not be treated as verified physical completion. Completion criteria shall identify telemetry or other evidence, timing, confidence limits and independent checks needed for the actual action.

Verification: Trace a command through its full event and evidence history.

Acceptance / hold rule: Only evidence satisfying the approved completion predicate supports completed status; missing terminal evidence remains unknown or partial.

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.

73.1 – Population, mission and human tasks

Source: AF-AST-STD-001, page 110.

Define intended occupants, roles, mission duration, environmental conditions, physical access, workload, communication and reasonable variation in users. Identify essential tasks and protective actions. Validation shall state participant representativeness, assistance, training and limitations; one expert demonstration shall not establish capability for all users.

Verification: Review the user/task matrix and representative normal and degraded validation.

Acceptance / hold rule: Each essential task is demonstrated under its approved conditions; unsupported populations and tasks are excluded from the claim.

73.2 – Integrated life support

Source: AF-AST-STD-001, page 110.

Life-support requirements shall identify atmospheric, water, waste, temperature, humidity, monitoring, consumable and power interfaces appropriate to the mission. Substance-specific and physiological limits shall be set by the competent actual technical and health authorities before use. Do not infer safe habitat conditions from a single sensor or from nominal supplies. The profile shall identify correlated and common-resource failures.

Verification: Review integrated requirements, monitored quantities, sensor validity and contingency tests.

Acceptance / hold rule: Every required environmental and protective predicate is met; unspecified health limits or unverified essential monitoring block acceptance.

73.3 – Consumables and survival time

Source: AF-AST-STD-001, page 110.

Resource accounting shall separate usable inventory, delivery losses, recovery efficiency, degradation, uncertainty, crew demand, emergency reserves and terminal obligations. A theoretical recycling rate shall not replace demonstrated system recovery and quality. Define the elapsed time to protective intervention and compare it with supported remaining resources. Annex AM provides arithmetic examples, not crew-consumption prescriptions.

Verification: Recompute balances and check source data, quality and concurrent reserve allocations.

Acceptance / hold rule: All approved reserve and survival predicates pass; quantity sufficiency does not compensate for unsuitable water, atmosphere or other supplies.

73.4 – Habitat integrity and interfaces

Source: AF-AST-STD-001, page 110.

Habitat assurance shall address structural and pressure boundaries, penetrations, connections, fire behaviour, contamination, accessibility, maintenance and emergency compartments where applicable. Hidden work shall have acceptance evidence before concealment. Payload and visiting-system interfaces shall not compromise life support or escape assumptions. Structural or habitat acceptance is not a medical clearance.

Verification: Inspect configuration-specific boundary and integrated protective evidence.

Acceptance / hold rule: All essential integrity and interface conditions pass; an unknown boundary or incompatible visiting configuration blocks occupancy-dependent acceptance.

73.5 – Human factors and effective authority

Source: AF-AST-STD-001, page 111.

Displays, alerts and procedures shall identify state, urgency, limitations and required actions without ambiguous mode or priority. Workload, fatigue, interruptions, language, delayed feedback and automation bias shall be evaluated. A manual override is an effective control only when a person has the information, time, training and physical or technical ability to use it.

Verification: Observe representative task and intervention performance, including misleading and degraded information.

Acceptance / hold rule: Every essential response passes independently; aggregate usability scores do not offset a failed protective task.

73.6 – Extravehicular activity and individual equipment

Source: AF-AST-STD-001, page 111.

The profile shall define the equipment configuration, user/task, environment, interfaces, life, inspections, consumables, communications and rescue dependencies for extravehicular or analogous isolated work. Suit, vehicle, habitat and support equipment shall be evaluated as an integrated system. This standard does not prescribe physiological exposure or hazardous operating sequences.

Verification: Review qualified equipment, user fit/task evidence and integrated emergency interfaces.

Acceptance / hold rule: All relevant configuration and protective criteria pass, with actual specialist authority and supported rescue or survival assumptions.

73.7 – Medical capability and health-data boundaries

Source: AF-AST-STD-001, page 111.

The mission shall identify the qualified health functions, equipment and support access required for its actual population and duration. Engineering assurance shall verify availability, integration, power, maintenance, communication and privacy without inventing treatment protocols or clinical certification. Health information shall be restricted to authorised purposes and handled separately from public conformity records.

Verification: Check actual health-support arrangements, equipment integration and protected data access.

Acceptance / hold rule: Required support functions are demonstrably available and usable within the mission limits; undocumented specialist capacity is not credited.

73.8 – Emergency, refuge and safe return

Source: AF-AST-STD-001, page 111.

Emergency planning shall define scenario, detection, decision time, protection, refuge or return assumptions, rescue interfaces and actual resources. A cooperation agreement shall not count as demonstrated response capability without compatible personnel, access, equipment and timing. Exercises shall distinguish tabletop review from operational demonstration and shall remain safe.

Verification: Assess scenario-specific exercise and resource evidence and independently check timing feasibility.

Acceptance / hold rule: Every required protective pathway is supported; infeasible response or unavailable essential resources block the dependent human-mission claim.

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.

75.3 – 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.

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.

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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