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Purpose and application

PDF record architecture, field dictionary, manual review rules and blank capture sheets for Technical Methods, Equipment and Validity Register. This replaces only the planned delivery format for this issue: it is not an executable spreadsheet, access-control system, database or automatic decision engine.

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 Purpose, ownership and state separation

Equipment fitness is method- and range-specific. A calibration due date and a comparison participation record do not establish satisfactory current performance. Preserve the last demonstrated valid state and dependent output population.

Proposed; verification planned; validated within limits; authorised; restricted; suspect; out of service; requalification required; restored; retired. Actual method and equipment statuses remain separate.

The named custodian allocates persistent IDs and administers records under actual permission. Technical acceptance, independent decisions and public publication have separate authorities. All tables inherit the common record payload from Annex M. A printed row, a formula specification or a linked identifier alone does not demonstrate an underlying event.

2 Relational field dictionary

Methods

Field	Meaning and control
method_id	Persistent unique identifier for this entity or record. Resolve every parent link to the correct actual object; do not reuse or infer a missing identity.
version	Exact controlled version or technical state supporting this record. Retain before/after history and verify match to the actual evaluated configuration.
measurand_or_task	Record the actual measurand or task for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
range_conditions	Precisely bounded activity, location, method, object or subject. Include relevant conditions and exclusions and retain separate responsibility for every claimed outcome.
site	Precisely bounded activity, location, method, object or subject. Include relevant conditions and exclusions and retain separate responsibility for every claimed outcome.
validation_record	Usable original source reference and version, responsible origin, permitted access and relevance to the named purpose. A reference existing in the register is not proof of validity.
authorised_persons	Actual responsible legal entity or person and their role/scope. Distinguish the performer, custodian, evaluator, independent decision maker and issuer.
limitations	Record the actual limitations for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
release	Attributable action of a competent authorised function, including independence and conflicts where required. Link the authentic instrument; no prefilled approval is implied.

Equipment

Field	Meaning and control
equipment_id	Persistent unique identifier for this entity or record. Resolve every parent link to the correct actual object; do not reuse or infer a missing identity.
configuration	Exact controlled version or technical state supporting this record. Retain before/after history and verify match to the actual evaluated configuration.
location	Record the actual location for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
method_links	Precisely bounded activity, location, method, object or subject. Include relevant conditions and exclusions and retain separate responsibility for every claimed outcome.
range_resolution	Precisely bounded activity, location, method, object or subject. Include relevant conditions and exclusions and retain separate responsibility for every claimed outcome.
acceptance_record	Usable original source reference and version, responsible origin, permitted access and relevance to the named purpose. A reference existing in the register is not proof of validity.
calibration_record	Usable original source reference and version, responsible origin, permitted access and relevance to the named purpose. A reference existing in the register is not proof of validity.
due_date	Actual event or controlled period with a declared time basis. Keep creation, occurrence, review, decision and expiry distinct; preserve original deadlines and historical gaps.
status	Dataset-specific permitted state with the actual transition reason, authority and date. Do not conflate evidence receipt, case progress, conformity or current holder authority.

Validity and comparisons

Field	Meaning and control
activity_id	Persistent unique identifier for this entity or record. Resolve every parent link to the correct actual object; do not reuse or infer a missing identity.
method_family	Precisely bounded activity, location, method, object or subject. Include relevant conditions and exclusions and retain separate responsibility for every claimed outcome.
plan_basis	Record the actual plan basis for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
reference_or_provider	Record the actual reference or provider for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
actual_result	Record the actual actual result for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
uncertainty	Defined numerical or categorical value with units, denominator/population, source, assumptions and applicable validation. Unknown, zero and not-applicable are not interchangeable.
satisfactory_review	Attributable action of a competent authorised function, including independence and conflicts where required. Link the authentic instrument; no prefilled approval is implied.
adverse_action	Record the actual adverse action for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.

Excursions and impact

Field	Meaning and control
event_id	Persistent unique identifier for this entity or record. Resolve every parent link to the correct actual object; do not reuse or infer a missing identity.
affected_resource	Usable original source reference and version, responsible origin, permitted access and relevance to the named purpose. A reference existing in the register is not proof of validity.
last_valid_state	Dataset-specific permitted state with the actual transition reason, authority and date. Do not conflate evidence receipt, case progress, conformity or current holder authority.
suspect_interval	Record the actual suspect interval for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
outputs_and_recipients	Record the actual outputs and recipients for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
hold	Record the actual hold for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
correction	Record the actual correction for this dataset, with scope, source and limitations. Use the controlling procedure and field relationships; retain corrections and reviewer accountability.
resumption_authority	Attributable action of a competent authorised function, including independence and conflicts where required. Link the authentic instrument; no prefilled approval is implied.

3 Common fields and integrity checks

Required identity or field	Content and interpretation
Record ID	Unique persistent identifier; do not reuse a withdrawn or superseded identifier for a different record.
Template / schema version	Identify this form version and any controlled continuation or equivalent record mapping.
Case and evaluated object ID	Connect to the actual application, asset, person, programme, method or statement.
Legal entity and actual performer	Distinguish accountable organisation, issuer, applicant and subcontracted performer.
Family / module and outcome class	Use the retained family/module and correct accreditation, recognition, qualification, certification, verification or validation class.
Scope / technical profile ID and version	Identify the exact version; a title alone is insufficient.
Site / station / delivery mode	Record physical, remote, mobile and partner-delivery boundaries that affect this record.
Configuration / method / statement version	Identify the actual technical baseline and conditions evaluated.
Creation date and time basis	Use the actual creation date; state time zone when a clock or sequence depends on time.
Relevant event / awareness / decision dates	Keep distinct dates separate. Use a linked chronology where more than one event exists.
Accountable author and role	Identify who recorded the information and within which task authority.
Reviewer / approver and authority	Identify the responsible review or approval function; blank does not mean approved.
Evidence references and versions	Link accessible original evidence, including adverse, missing or superseded items.
Record status and purpose	Use the relevant allowed states; evidence status and conformity status are separate.
Access / confidentiality class	Record authorised access; do not put protected operational detail in a public field.
Retention basis / custody / hold	Name the controlling retention rule, custodian and any preservation hold.
Correction / supersession history	Link the original, reason, person, actual date and affected downstream records.

Before accepting a record, verify unique identity, valid parent relationships, exact profile and configuration, actual time sequence and authorised origin. Check for duplicate keys, missing essential values, rejected evidence, unresolved findings, expired roles and unsupported public status. A successful key lookup is not proof that the linked source is true or relevant.

4 Manual operation, calculations and test cases

Create

Establish the actual triggering event and correct dataset. Allocate a unique ID, complete common and specific payload, retain the source and record unfilled essential fields as gaps rather than favourable defaults.

Review

A competent reviewer examines meaning, scope, evidence and event chronology. Where an independent decision is needed, route the versioned dossier to the separately authorised function instead of letting the custodian decide.

Update

Append changes with previous value, new value, reason, actual actor/date and decision reference. Retain superseded sources and historical state. Never reset a clock by copying the row into a new sheet.

Reconcile

Compare the expected population to actual records by identity, relationships, field semantics and permissible state. Confirm all exceptions, omissions and duplicates are accounted for before export or cutover.

Retain and recover

Use controlled access, retention, backups and actual recovery tests in the operational repository. This PDF provides the recording design only; test the deployed system and receiving custody independently.

Safe test	Expected result
Duplicate record ID	Detect collision and retain the original; do not silently overwrite or merge unrelated records.
Missing source / wrong configuration	Mark the dependency unavailable or mismatched and hold any affected positive conclusion.
Open finding / expired role	No unsupported grant, renewal, extension or unauthorised action. Preserve event-time assessment.
Old backup / missing later events	Reconcile post-backup history and current status before return to assured use.
Equal counts but substituted records	Fail semantic reconciliation; identify the actual missing and substituted identities.
Synthetic data in a public export	Exclude test records from live recipients and claims.

Manual calculations: count distinct record IDs, not duplicate appearances. Outstanding count = required population minus independently verified completed population only when both sets use the same definition and membership. A percentage is undefined if the denominator is absent or zero; do not display a favourable default. Calendar/month calculations follow Annex H. Any implemented formula requires separate known-answer, boundary and invalid-input tests.

1 Completion workflow and validation contract

PDF record architecture, field dictionary, manual review rules and blank capture sheets for Technical Methods, Equipment and Validity Register. This replaces only the planned delivery format for this issue: it is not an executable spreadsheet, access-control system, database or automatic decision engine.

Open a working copy, retain its code and existing field names, and enter record identity before technical details. Complete common identity, the original module fields, all triggered assurance extensions, independent review and receiving handover. An expression of interest, prepared application, test design or unsigned record is not a live positive outcome. Record blank, missing, invalid and disputed information explicitly rather than replacing it with favourable text.

Input group	Validation before reliance	Invalid / incomplete response
Identity and configuration	Stable IDs; actual object and performer; correct profile, method and loaded configuration.	HOLD dependent use; resolve wrong-object or wrong-version evidence.
Numbers and units	Finite real values; compatible units; ordered limits; non-negative uncertainty; unrounded source retained.	Reject malformed inputs. Blank, NaN or infinity is not zero.
States and evidence	Received/reviewed/accepted evidence states separate from PASS/FAIL/HOLD/N/A.	UNSET is not a fifth favourable state; preserve the gap.
People and time	Current competence, conflict clearance and authority at actual event time; declared time convention.	Later renewal cannot validate an earlier unauthorised action.

Input group	Validation before reliance	Invalid / incomplete response
Approval and custody	Authentic approval instrument, exact permitted action and actual receiving acceptance.	No approval inferred from a typed name, file presence or sending a message.

The PDF stores entered text but does not enforce access rights, numerical logic, identity verification, automatic deadlines or live registry states. A competent authorised person applies the checks. Local digital systems require their own validation. Printing may omit text that exceeds a visible field: complete the continuation record and reference it from the parent field.

2 Acceptance and original record preservation

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

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

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

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

Positive-decision conjunction

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

3 Source and record relationship 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
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
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
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
19.3 / 32	Method performance and detection	Requirement, objective evidence and local child predicates
19.10 / 33	Comparisons and validity programme	Requirement, objective evidence and local child predicates
19.12 / 33	Technical witnessing for accreditation	Requirement, objective evidence and local child predicates
25.6 / 43	Proficiency and reference-material activities	Requirement, objective evidence and local child predicates
41.2 / 62	Integrated route and hidden characteristics	Requirement, objective evidence and local child predicates
42.4 / 64	Data acquisition, uncertainty and protective limits	Requirement, objective evidence and local child predicates
62.2 / 88	Mandatory parameter completion	Explicit verification and acceptance predicate
62.3 / 88	Evidence validity before conformity	Explicit verification and acceptance predicate

ASTRA ID / page	Source subject	Implementation use
62.4 / 88	Four requirement states	Explicit verification and acceptance predicate
62.7 / 89	Decision replay and consistency	Explicit verification and acceptance predicate
64.2 / 92	Geometry, reference frames and event time	Explicit verification and acceptance predicate
64.5 / 92	Heritage and similarity	Explicit verification and acceptance predicate
75.3 / 114	Essential variables and remote monitoring	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
77.5 / 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

4 Detailed module implementation

AF-AST-PR-009 – Technical Witnessing and Method-Family Coverage

Implementation basis: 12.3 (p. 23); 13.3 (p. 25); 19.12 (p. 33); 41.2 (p. 62); 62.3 (p. 88); 64.5 (p. 92); 75.3 (p. 114); 77.2 (p. 118); 77.3 (p. 118); 77.7 (p. 119)

X09.1 Define the method family technically

Group only common principles, geometry/material ranges, equipment, competence and failure mechanisms. Identify unique or high-consequence boundaries that cannot be inferred.

Completion / hold: No unrelated technique is added because it shares a performer or report template.

X09.2 Observe the complete task

Follow identification, preparation, setup, essential execution, raw data, interpretation, reporting and independent release within safe authorised arrangements.

Completion / hold: A selected favourable demonstration cannot replace missing essential preparation or interpretation evidence.

X09.3 Challenge hidden and remote properties

State what is directly measured, validly inferred or unknown and test relevant difficult boundaries and false-negative mechanisms.

Completion / hold: Process telemetry or nominal equipment output cannot replace an unobservable required product property.

X09.4 Review change and corrective retest

After an interruption, source change or failed witness, preserve originals and define corrective demonstration including the original failed mechanism.

Completion / hold: A fresh favourable run does not validate earlier affected output or automatically extend method scope.

Record contract: the actor records the input baseline, actual work, deviations, result and evidence link; the named receiving function acknowledges access and the permitted next action. A returned or incomplete handover retains the original event history. Use the associated FR modules and RG record links; no document or database field confers actual authority.

AF-AST-PR-010 – Measurement Traceability, Uncertainty and Decision Rules

Implementation basis: 8.2 (p. 18); 8.3 (p. 18); 9.4 (p. 20); 9.5 (p. 20); 62.2 (p. 88); 62.3 (p. 88); 62.4 (p. 88); 62.7 (p. 89); 64.2 (p. 92); 77.3 (p. 118); 77.6 (p. 119)

X10.1 Freeze the quantitative contract

Define the measurand, model, corrected result, units, bounds, inclusivity, actual configuration, uncertainty interpretation and prospective predicate.

Completion / hold: Invalid or missing essential inputs remain HOLD; the assessor does not supply an undocumented limit.

X10.2 Propagate actual uncertainty and dependence

Retain source distributions, sensitivity coefficients, covariance and model discrepancy. Distinguish standard uncertainty, expanded coverage and unbounded knowledge gaps.

Completion / hold: A copied instrument capability or assumed independence cannot replace a use-specific uncertainty budget.

X10.3 Apply state logic without rounding bias

Evaluate the full interval or a prospectively approved alternative with unrounded finite inputs. Preserve PASS, FAIL, HOLD and approved N/A as separate states.

Completion / hold: Boundary overlap remains HOLD; invalid evidence is not converted into a proven product defect.

X10.4 Replay and report independently

Recompute a boundary case with the same frozen inputs, identify any different assumptions and record scope-limited reporting and recipient corrections.

Completion / hold: Unresolved replay disagreement blocks the dependent acceptance even where the nominal arithmetic appears plausible.

Record contract: the actor records the input baseline, actual work, deviations, result and evidence link; the named receiving function acknowledges access and the permitted next action. A returned or incomplete handover retains the original event history. Use the associated FR modules and RG record links; no document or database field confers actual authority.

AF-AST-PR-011 – Continuing Validity, Comparisons and Proficiency Activities

Implementation basis: 9.2 (p. 19); 9.6 (p. 20); 19.3 (p. 32); 19.10 (p. 33); 25.6 (p. 43); 62.3 (p. 88); 64.5 (p. 92); 77.2 (p. 118); 77.5 (p. 118); 77.7 (p. 119)

X11.1 Design a purposeful validity programme

Define the measurand or task, coverage, reference basis, participant independence, frequency rationale and adverse-performance response.

Completion / hold: Participation alone is not satisfactory performance or demonstrated detection capability.

X11.2 Separate assigned-value and participant uncertainty

Review preparation, homogeneity, stability, transport, characterisation and uncertainty before attributing differences to a participant.

Completion / hold: Unstable or non-representative challenge material cannot support an unqualified competence conclusion.

X11.3 Evaluate limited and adverse results

Preserve nonresponses, invalid runs, outliers and unrepresented fields. Where an external exercise is unavailable, document a technically equivalent challenge and limitations.

Completion / hold: A missing comparison is not an automatic pass; accepted alternatives must test the actual claimed ability.

X11.4 Close causes and historical extent

Test occurrence and escape causes, re-execute the original adverse mechanism and review outputs that depended on the deficient method.

Completion / hold: New satisfactory performance restores only a bounded current capability after independent acceptance; old evidence is not rewritten.

Record contract: the actor records the input baseline, actual work, deviations, result and evidence link; the named receiving function acknowledges access and the permitted next action. A returned or incomplete handover retains the original event history. Use the associated FR modules and RG record links; no document or database field confers actual authority.

5 Workflow and relationship diagram

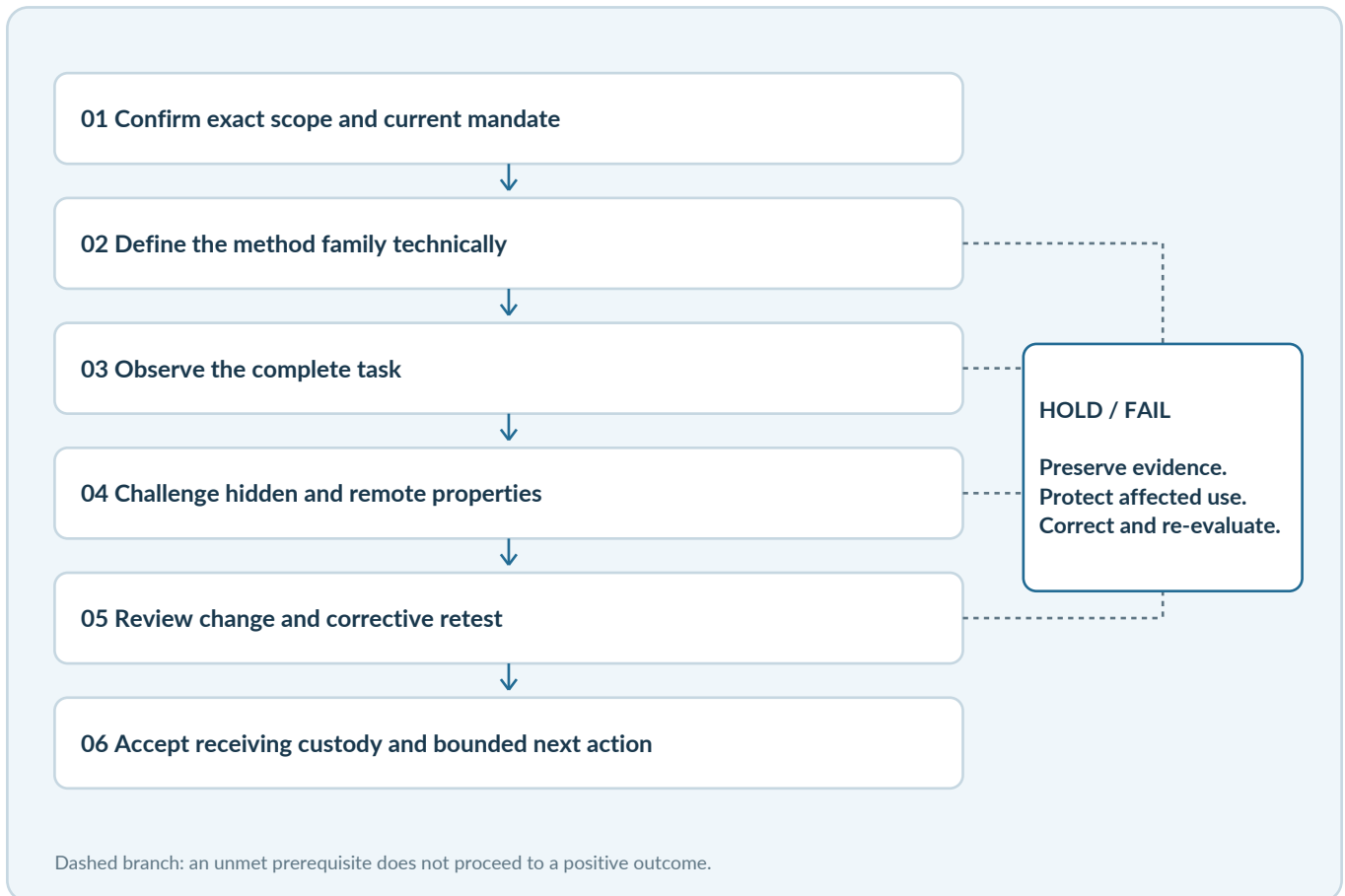
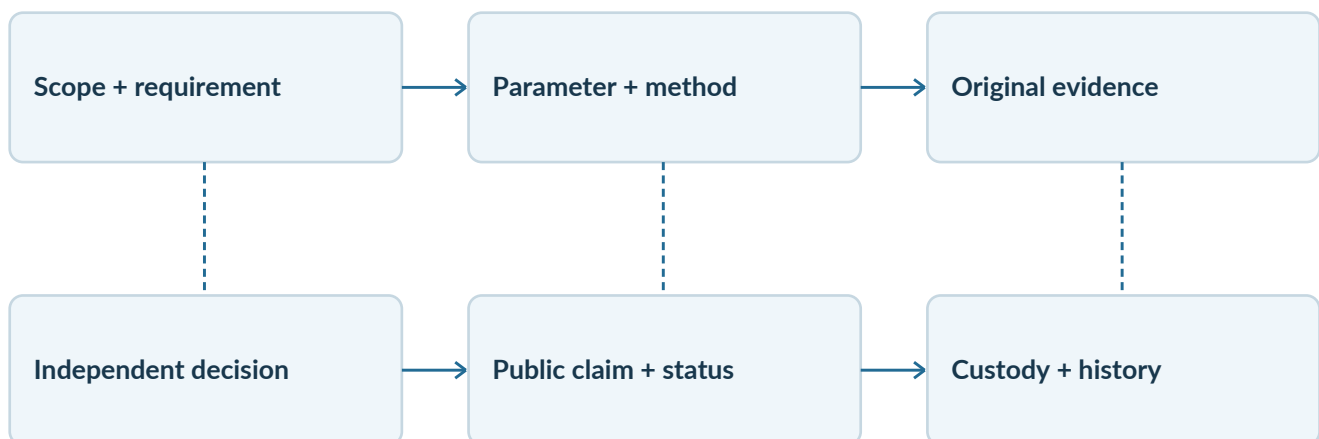


Figure — Implementation sequence for AF-AST-PR-009. Explanatory diagram; the source prerequisites and actual authority remain controlling.



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.

6 Worked recording and calculation examples

The worked calculations below reproduce the supplied standard's Annex AM examples. Charted extensions are newly computed synthetic illustrations of those equations, not measured mission performance or new universal limits. A result is usable only when the actual inputs, model, units, uncertainty and approved application predicate are valid. A successful arithmetic check is not field validation.

AM.Q01 Measurement uncertainty and covariance

Source: ASTRA Annex AM, Q01, page 200. All numerical inputs in this example are synthetic.

$$u_c^2 = \sum (c_i^2 u_i^2) + 2\sum (i < j) (c_i c_j \text{cov}_{ij})$$

$$U = k u_c$$

Variables and units

u_i is a standard uncertainty; c_i is a sensitivity coefficient; cov_{ij} is covariance; k is the justified coverage factor. Variance terms carry squared output units.

Example inputs

Synthetic direct sum: $c_1=c_2=1$; $u_1=0.003$ mm; $u_2=0.004$ mm. First assume independence, then correlation $\rho=0.5$. Illustrative $k=2$.

Calculation and checks

1. Independent variance = $0.003^2 + 0.004^2 = 0.000025$ mm².
2. $u_c = 0.005$ mm; $U = 0.010$ mm for the stated k .
3. Correlated covariance = $0.5 \times 0.003 \times 0.004 = 0.000006$ mm².
4. Correlated variance = $0.000025 + 2 \times 0.000006 = 0.000037$ mm².
5. Correlated $u_c = 0.0060827625303$ mm; $U = 0.0121655250606$ mm.

Decision interpretation: The correlated model produces a larger uncertainty. No PASS/FAIL follows until an approved specification and decision rule are applied.

Validity limits: The linear propagation model requires a valid measurement function and adequate approximation. $k=2$ is not a universal guarantee of 95% coverage. Known bias requires correction or explicitly justified treatment; uncertainty does not conceal missing requirements.

ASTRA connections: 9.4–9.5; Annex G; 62; 77

Standard and expanded uncertainty

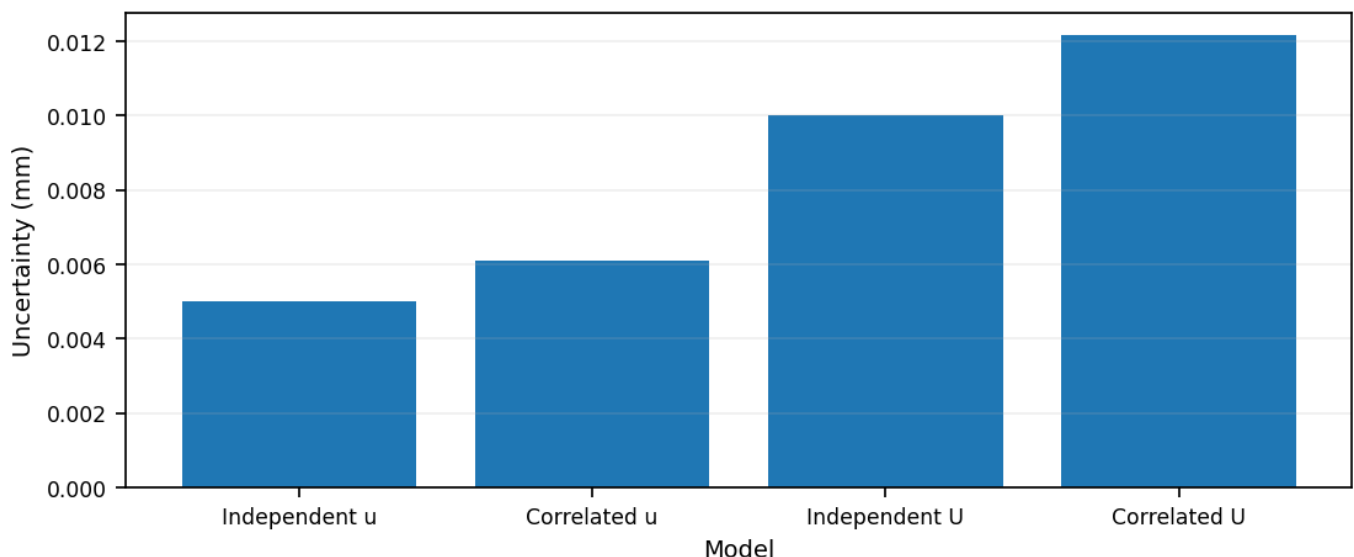


Figure Q01 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q02 Inclusive limits and four distinct measurement outcomes

Source: ASTRA Annex AM, Q02, page 201. All numerical inputs in this example are synthetic.

PASS: $y - U \geq L$ AND $y + U \leq H$

FAIL: $y + U < L$ OR $y - U > H$

Otherwise: HOLD; invalid evidence also results in HOLD

Variables and units

L and H are inclusive specification limits; y is a corrected result; U is a non-negative expanded uncertainty with stated coverage.

Example inputs

Synthetic specification [49.970, 50.030] mm; U=0.004 mm. Results y=50.024, 50.028, 50.036 and 50.026 mm.

Calculation and checks

1. $50.024 \pm 0.004 \rightarrow [50.020, 50.028]$ mm: PASS.
2. $50.028 \pm 0.004 \rightarrow [50.024, 50.032]$ mm: HOLD, interval overlaps the upper limit.
3. $50.036 \pm 0.004 \rightarrow [50.032, 50.040]$ mm: FAIL, interval entirely above the limit.
4. $50.026 \pm 0.004 \rightarrow [50.022, 50.030]$ mm: PASS; equality is inside the inclusive upper bound.

Decision interpretation: Neither the overlapping interval nor an invalid run is rounded into acceptance. N/A is an applicability decision, not a measurement outcome.

Validity limits: Use actual endpoints for asymmetric intervals. For an upper-only limit, PASS requires the upper endpoint at or below the limit and FAIL the lower endpoint above it. A coverage interval is not automatically a probability that this particular item conforms.

ASTRA connections: Annex G; 62.3–62.5; 77.6

Inclusive full-interval decisions

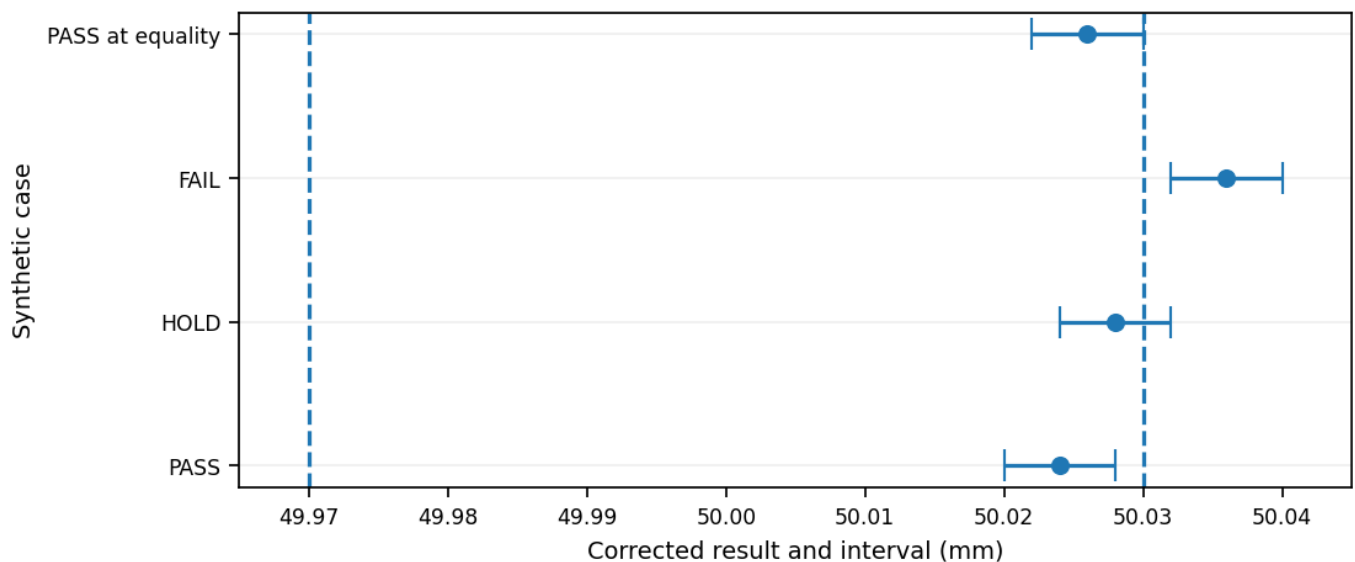


Figure Q02 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q06 Random detection sample size

Source: ASTRA Annex AM, Q06, page 205. All numerical inputs in this example are synthetic.

$$P(\text{at least one detection}) = 1 - (1-p)^n$$

$$n_{\min} = \text{ceil}[\ln(1-C)/\ln(1-p)]$$

Variables and units

p is a fixed issue probability per independent representative observation; C is the selected target detection probability; n is a positive integer.

Example inputs

Synthetic $p=0.10$ and $C=0.95$.

Calculation and checks

1. $\ln(0.05)/\ln(0.90) = 28.433158\dots$; round upward to $n=29$.

2. $P(\text{detection at } n=29) = 1 - 0.9^{29} = 0.9528987130$.

3. At $n=28$, $P = 0.9476652367$, below the specified target.

Decision interpretation: 29 is the minimum integer sample for the stated independent model; the demonstration does not certify 95% conformity.

Validity limits: This calculation is invalid for unexamined dependence, changing p , biased selection or a judgemental sample represented as random. Detection is also conditional on an effective observation method.

ASTRA connections: 9.3; Annex F.5; 55.3

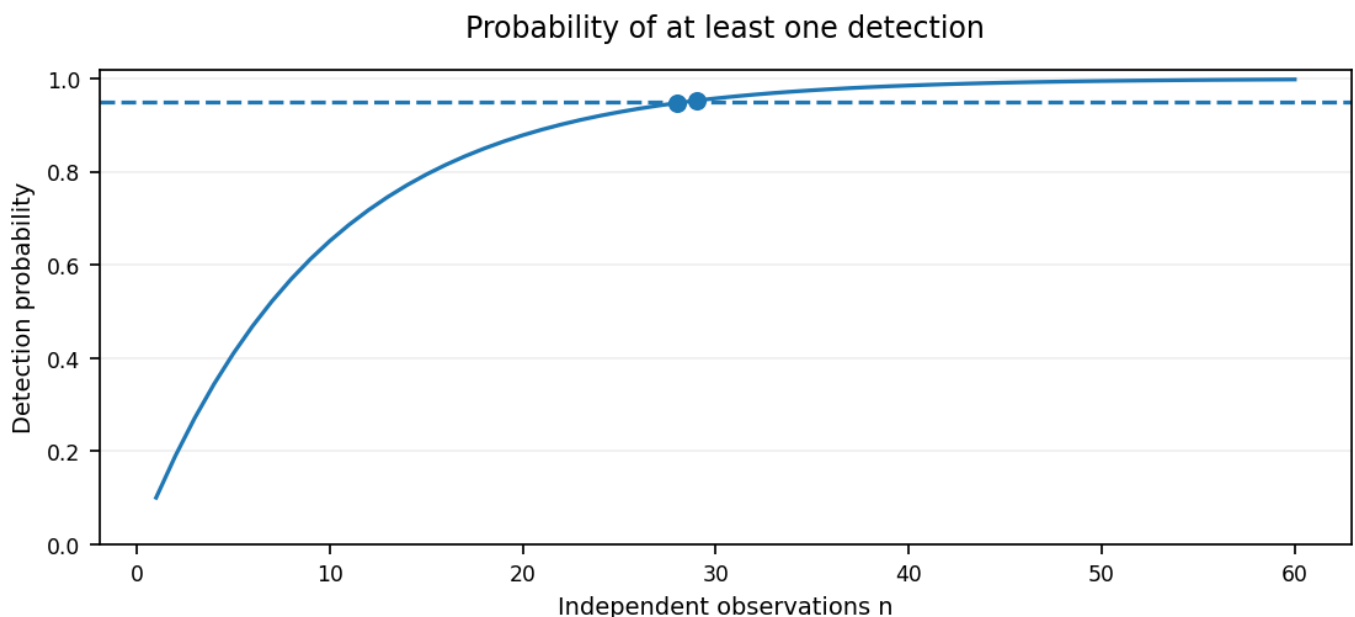


Figure Q06 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

AM.Q07 Zero observed failures and an exact binomial bound

Source: ASTRA Annex AM, Q07, page 206. All numerical inputs in this example are synthetic.

$$p_{\text{upper}} = 1 - \alpha^{(1/n)}$$

$$n_{\min} = \text{ceil}[\ln(\alpha)/\ln(1-p_{\text{target}})]$$

Variables and units

$\alpha=1$ -confidence; n is a prospectively fixed number of independent comparable binary trials; all n trials have zero observed failures.

Example inputs

Synthetic one-sided confidence 95%, so $\alpha=0.05$. Examine $n=30$ and a target upper failure probability of 0.01.

Calculation and checks

1. For $n=30$: $p_{\text{upper}} = 1 - 0.05^{(1/30)} = 0.095033853 = 9.5033853\%$.

2. For $p_{\text{target}}=0.01$: $\text{ceil}[\ln(0.05)/\ln(0.99)] = 299$.

3. For $n=299$: $p_{\text{upper}} \approx 0.0099691468$, below 1%.

Decision interpretation: Thirty successful trials do not demonstrate a failure probability below 1%. Under the specified model, 299 all-success trials are needed for that particular bound.

Validity limits: A statistical upper confidence bound is not proof of zero risk or total system safety. Nonrepresentative trials, changing configuration, adaptive stopping or unmodelled common causes invalidate this simple inference.

ASTRA connections: 55.1–55.3; 62; 77

Zero failures: one-sided 95% binomial bound

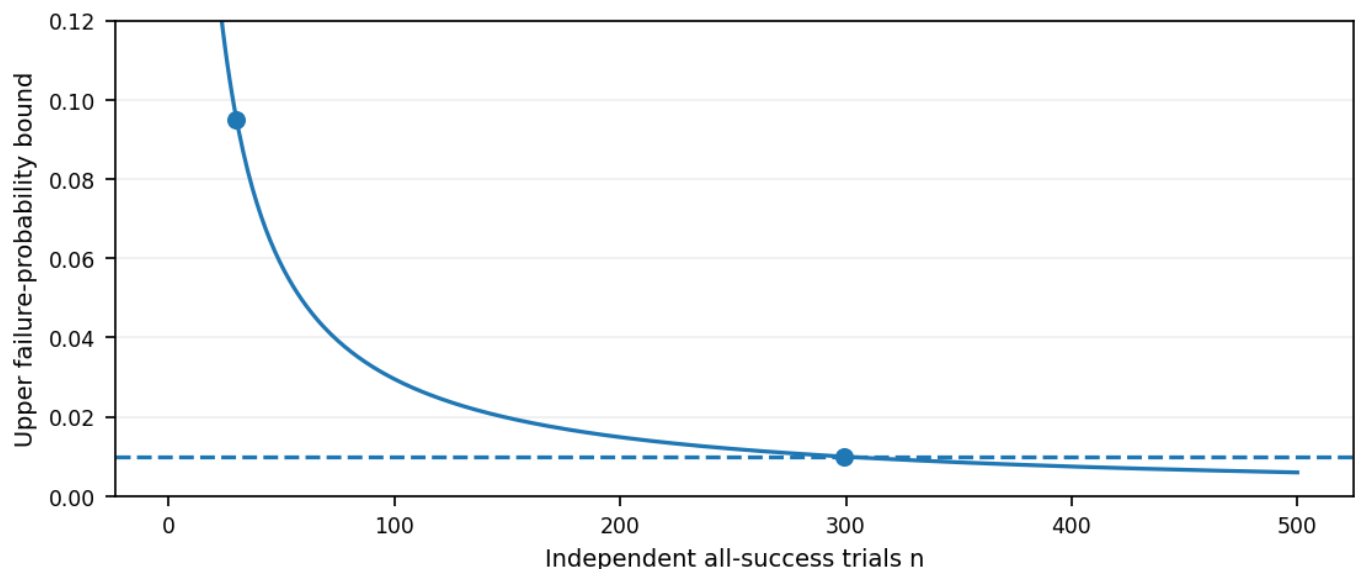


Figure Q07 – Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

Local replay record: retain the actual input manifest, source versions, calculation version, unit checks, independent recomputation, expected/observed boundary results, limitations and decision authority. Do not overwrite the teaching inputs as though they were operational data.

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

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

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

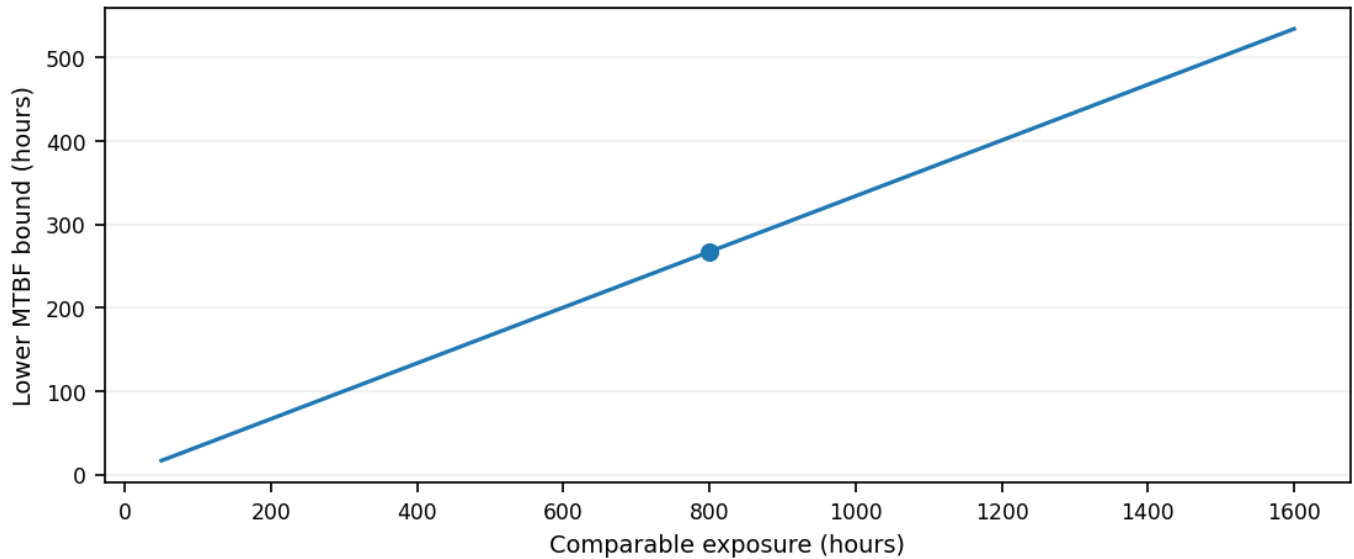


Figure Q08 — Synthetic visualisation. The axes and stated scenario define the quantity; no graph is an accreditation score, approved operating envelope or evidence of a real mission.

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.

7 Missing, invalid and prohibited input cases

Challenge	Expected handling	Evidence retained
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.

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.

F1 Retained record fields

Existing field identifiers and meanings are retained for continuity with the earlier PDF forms and register payloads. The larger response areas below are blank. Enter authentic information, link original evidence and use controlled continuations when the visible area is insufficient. Do not use the edition date as an actual case, observation or decision date.

Retained fields 1 onward

Dataset / entry ID / parent case or object

Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Profile / configuration / site and outcome boundary

Record the precise as-designed, built, tested, loaded, delivered or operated state relevant to the decision. Link versioned hardware, software, parameters, material history and interfaces; list differences and retained/new evidence explicitly.

Field name(s), actual value(s), units and source version

Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Original evidence references and purpose-specific state

Identify contemporaneous raw records, actual performer, object and configuration, conditions, timestamps, transformations and available originals. Distinguish observation, model inference, operator statement and synthetic material; preserve failed and invalid attempts.

Relevant actual event dates and declared time basis

Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Required relationship checks and unresolved exceptions

Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Reviewer / authority / actual acceptance reference

Identify the frozen dossier, current scope and source basis, reviewer competence and conflicts, all mandatory child states, finding closure and actual decision authority. Record reasons, dissent, exact limitations and genuine event time; a vote does not create evidence.

Correction history / affected recipients / custody

Retain the measurement function, raw and corrected values, units, uncertainty sources, sensitivity and dependence, coverage interpretation and unrounded computation. Independently check the applicable model and boundary predicate; invalid inputs or overlap remain HOLD where required.

Retained fields 9 onward

Entry ID, parent links and actual event for Methods

Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Actual field values — Methods

release. Use additional controlled sheets for repeated entries. Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Review, limitations, correction and custody — Methods

Retain the measurement function, raw and corrected values, units, uncertainty sources, sensitivity and dependence, coverage interpretation and unrounded computation. Independently check the applicable model and boundary predicate; invalid inputs or overlap remain HOLD where required.

Entry ID, parent links and actual event for Equipment

Record unique equipment and configuration, range, resolution/bandwidth, calibration/verification source and validity at the actual time of use. Evaluate fitness for the intended method. A power-on check or calendar due date alone does not demonstrate measuring capability.

Actual field values — Equipment

Record unique equipment and configuration, range, resolution/bandwidth, calibration/verification source and validity at the actual time of use. Evaluate fitness for the intended method. A power-on check or calendar due date alone does not demonstrate measuring capability.

Review, limitations, correction and custody — Equipment

Retain the measurement function, raw and corrected values, units, uncertainty sources, sensitivity and dependence, coverage interpretation and unrounded computation. Independently check the applicable model and boundary predicate; invalid inputs or overlap remain HOLD where required.

Retained fields 15 onward

Entry ID, parent links and actual event for Validity and comparisons

Record intended use, prospective criteria, representative positive and adverse cases, expected and observed results, raw evidence, limitations and competent review. Preserve failed cases and repeat the original failure after correction; participation or a scripted example is not successful validation.

Actual field values — Validity and comparisons

Record intended use, prospective criteria, representative positive and adverse cases, expected and observed results, raw evidence, limitations and competent review. Preserve failed cases and repeat the original failure after correction; participation or a scripted example is not successful validation.

Review, limitations, correction and custody — Validity and comparisons

Retain the measurement function, raw and corrected values, units, uncertainty sources, sensitivity and dependence, coverage interpretation and unrounded computation. Independently check the applicable model and boundary predicate; invalid inputs or overlap remain HOLD where required.

Entry ID, parent links and actual event for Excursions and impact

Entry ID, parent links and actual event for Excursions and impact Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Actual field values — Excursions and impact

resumption_authority. Use additional controlled sheets for repeated entries. Identify the actual source records and responsible reviewer for each element named in this field. Keep unknowns, rejected evidence and incomplete receiving actions visible; a completed narrative is not proof of underlying work.

Review, limitations, correction and custody — Excursions and impact

Retain the measurement function, raw and corrected values, units, uncertainty sources, sensitivity and dependence, coverage interpretation and unrounded computation. Independently check the applicable model and boundary predicate; invalid inputs or overlap remain HOLD where required.

F2 All-domain assurance extensions

Complete each triggered extension, or link an independently approved non-applicability record. These fields are added to support Clauses 62–80 and Annexes AK–AR. A field may reference an equivalent controlled dossier; sensitive technical information need not be copied into every form.

Mission/domain applicability

Annex AK domain ID(s), activity and retained duty; record absent triggers with independent exclusion approval. Unknown applicability is HOLD.

Phase and operating-mode matrix

Identify normal, degraded, dormant, transport, test, service, emergency and terminal states relevant to the exact object. Link each required cell to evidence.

Complete atomic requirement population

Source clause and child IDs; all separately testable conditions; accountable owner; source version and exact intended conclusion.

Prospective technical parameters

Annex AO groups; actual values or defined attributes; units, bounds and inclusivity; conditions; derivation and genuine approval before evaluation.

Evidence validity and purpose

Original source IDs, configuration, method, performer authority at event time, accessible originals, uncertainty and limits. Received does not mean accepted.

Accepted predicate and uncertainty rule

Approved numerical or attribute predicate; unrounded inputs; uncertainty/dependence; validity domain; prospective alternative-rule authorisation where used.

Current child states and unresolved conditions

PASS / FAIL / HOLD / independently approved N/A by child. Blank is unrecorded. Identify every open finding, missing parameter and unresolved limitation.

Configuration and environment difference matrix

As-designed/built/tested/delivered/operated states; source or software changes; retained and invalidated evidence; required new demonstration.

Resource and shared-dependency review

Concurrent power/energy/data/time/consumables or staff duties, common causes, reserve ownership and support availability; do not count one reserve twice.

Command, remote evidence or service completion

Actual target, actor, event and receipt times, authority, transmission/receipt/execution/completion distinction, observability and unknown physical state.

Adverse-case and boundary-test record

Relevant AP case IDs plus local challenges; preconditions, expected and observed response, raw evidence, defect, correction, retest and genuine acceptance.

Independent calculation and decision replay

Frozen inputs and versions, independent recalculation, boundary result, differences found, disposition and reviewer's actual authority.

Claim and state projection

Exact object, outcome class, family/module/domain, permitted wording, restrictions, actual dates and public/protected information boundary.

Receiving acceptance and remaining duties

Actual recipient, usable evidence access, accepted custody, incomplete tasks, terminal-state obligations, notifications and continuing owner.

Original-versus-current source distinction

Identify retained original records, transparent corrections, changed assumptions and effect on earlier outputs; do not backdate later good evidence.

Authentic approval instrument

Reference actual signed or authenticated approval and scoped authority. A typed name, PDF timestamp or blank form is not approval.

F3 Process-specific extension entries

PR-009 X1 — Define the method family technically

Group only common principles, geometry/material ranges, equipment, competence and failure mechanisms. Identify unique or high-consequence boundaries that cannot be inferred. Completion: No unrelated technique is added because it shares a performer or report template.

PR-009 X2 — Observe the complete task

Follow identification, preparation, setup, essential execution, raw data, interpretation, reporting and independent release within safe authorised arrangements. Completion: A selected favourable demonstration cannot replace missing essential preparation or interpretation evidence.

PR-009 X3 — Challenge hidden and remote properties

State what is directly measured, validly inferred or unknown and test relevant difficult boundaries and false-negative mechanisms. Completion: Process telemetry or nominal equipment output cannot replace an unobservable required product property.

PR-009 X4 — Review change and corrective retest

After an interruption, source change or failed witness, preserve originals and define corrective demonstration including the original failed mechanism. Completion: A fresh favourable run does not validate earlier affected output or automatically extend method scope.

PR-010 X1 — Freeze the quantitative contract

Define the measurand, model, corrected result, units, bounds, inclusivity, actual configuration, uncertainty interpretation and prospective predicate. Completion: Invalid or missing essential inputs remain HOLD; the assessor does not supply an undocumented limit.

PR-010 X2 — Propagate actual uncertainty and dependence

Retain source distributions, sensitivity coefficients, covariance and model discrepancy. Distinguish standard uncertainty, expanded coverage and unbounded knowledge gaps. Completion: A copied instrument capability or assumed independence cannot replace a use-specific uncertainty budget.

PR-010 X3 — Apply state logic without rounding bias

Evaluate the full interval or a prospectively approved alternative with unrounded finite inputs. Preserve PASS, FAIL, HOLD and approved N/A as separate states. Completion: Boundary overlap remains HOLD; invalid evidence is not converted into a proven product defect.

PR-010 X4 — Replay and report independently

Recompute a boundary case with the same frozen inputs, identify any different assumptions and record scope-limited reporting and recipient corrections. Completion: Unresolved replay disagreement blocks the dependent acceptance even where the nominal arithmetic appears plausible.

PR-011 X1 — Design a purposeful validity programme

Define the measurand or task, coverage, reference basis, participant independence, frequency rationale and adverse-performance response. Completion: Participation alone is not satisfactory performance or demonstrated detection capability.

PR-011 X2 — Separate assigned-value and participant uncertainty

Review preparation, homogeneity, stability, transport, characterisation and uncertainty before attributing differences to a participant. Completion: Unstable or non-representative challenge material cannot support an unqualified competence conclusion.

PR-011 X3 — Evaluate limited and adverse results

Preserve nonresponses, invalid runs, outliers and unrepresented fields. Where an external exercise is unavailable, document a technically equivalent challenge and limitations. Completion: A missing comparison is not an automatic pass; accepted alternatives must test the actual claimed ability.

PR-011 X4 — Close causes and historical extent

Test occurrence and escape causes, re-execute the original adverse mechanism and review outputs that depended on the deficient method. Completion: New satisfactory performance restores only a bounded current capability after independent acceptance; old evidence is not rewritten.

F4 Controlled continuation and receiving record

Continuation identity and parent link

Unique continuation ID, parent form and field names; actual author, time, version and access class.

Complete visible narrative / data dictionary

Include all text needed to interpret the result. Attach clearly identified tables or source data when a visible field is too small.

Independent response and limitations

Record reviewer, actual findings, disposition, scope limits and open conditions; maintain protected dissent.

Receiving acknowledgement

Actual recipient, accepted responsibilities, evidence access check, approval reference and time.

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.

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.

9.4 – 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.

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.

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.

19.10 – 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.

19.12 – 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.

25.6 – 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.

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.

42.4 – 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.

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.

62.7 – 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.

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.

64.5 – 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.

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.

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.

77.5 – 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.

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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