

Contested Operations

Course-of-action feasibility, degraded information, coalition boundaries, and human authority

DEFENSE AND NATIONAL SECURITY

A course of action remains feasible only while facts, assumptions, resources, timing, constraints, and authority remain aligned. The objective is not another briefing product. It is one inspectable decision trace that survives change.

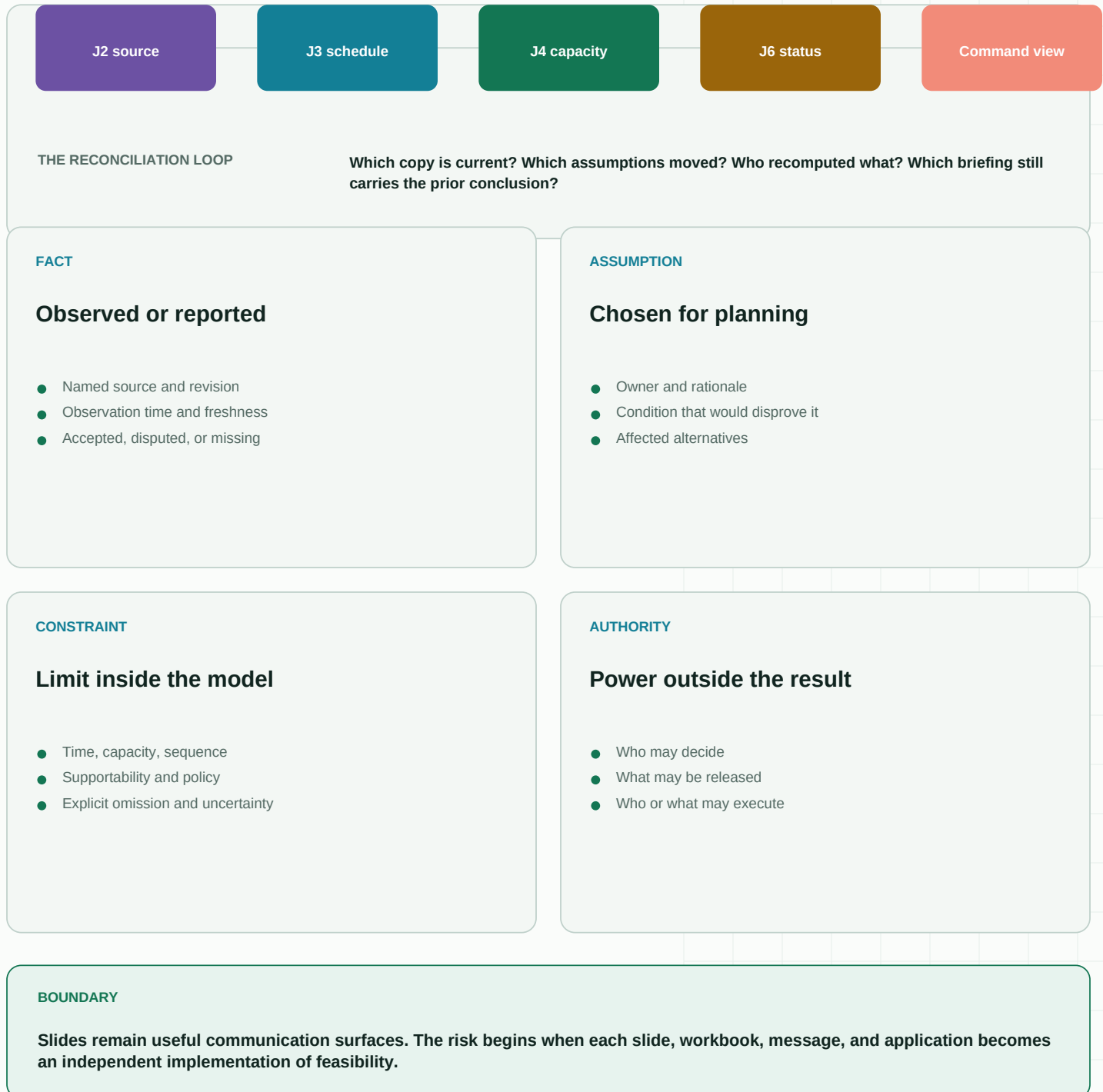
EVIDENCE BOUNDARY

Public sources establish selected institutional context. The Grid architecture, diagrams, and fictional fixtures are propositions for bounded evaluation - not evidence of deployment, legal or doctrinal sufficiency, authorization, security approval, performance, or outcome.

01 | COORDINATION GAP

Every staff product can be correct while the plan is already wrong.

The failure appears when operations, logistics, intelligence, communications, and the command summary implement the same decision in different copies and at different revisions.



02 | FEASIBILITY TRACE

Feasibility is a trace, not a color.

A useful finding moves from the current observation through assumptions, constraints, authored alternatives, and review to the exact decision that was authorized.

01 SOURCE

Observation

Source, observed time, revision, freshness, confidence, and conflict.

02 STAFF

Assumptions

Planning choices remain separate from accepted facts and declare invalidators.

03 MODEL

Constraints

Time, space, capacity, sequence, supportability, policy, and authority.

04 STAFF

Authored COAs

Only deliberate alternatives and branches enter the evaluation set.

05 MODEL

Feasibility finding

Feasible, infeasible, conditional, or unresolved with binding reasons.

06 AUTHORITY

Decision and effect

Recommendation, command decision, tasking, execution, and outcome stay distinct.

BOUNDARY

A missing node should produce an unresolved or conditional state, not a confident briefing color. Every accepted node needs source, time, revision, and ownership.

03 | GOVERNED MODEL

Represent what the staff knows - and what it does not.

The model is valuable when it exposes omissions and invalidation paths. It becomes dangerous when qualitative uncertainty is converted into invented precision.

NAMED STATE

Facts and assumptions

- Identity, revision, observed or effective time
- Freshness, uncertainty, dispute
- Accepted source owner

DEPENDENCY PATH

What moves when state changes

- Activities and resources
- Timing and sequencing
- Views and explanations

AUTHORED SPACE

Alternatives and constraints

- Only represented branches
- Known omissions
- Feasible, infeasible, conditional, unresolved

REVIEW RECEIPT

Decision and coordination

- Exact model revision
- Binding reasons and risks
- Authority, release, submission, acknowledgment

Finding	Meaning	Required explanation	Next state
Feasible	All represented gates pass	Margin, assumptions, omissions	Eligible for review
Infeasible	A represented hard constraint fails	Binding constraint and sensitivity	Reject or author a new branch
Conditional	A represented gate depends on external action	Named condition and authority	Await evidence or decision
Unresolved	Evidence is missing, stale, or conflicting	Missing source or conflict	Stop and resolve

BOUNDARY

A solver result is not proof of global optimality, operational superiority, or success. It is a result over the represented objective, constraints, alternatives, tolerances, and evidence state.

04 | WORKED FIXTURE

Course Echo: one changed capacity fact moves the conclusion.

The fixture is deterministic and fictional. It evaluates two authored branches; it does not discover the best military course or model adversary action, route risk, crew status, fuel, protection, or competing demand.

AUTHORED ARITHMETIC

waves = ceil(6 movements / available transports)

Each wave takes 40 minutes. Start 08:00Z. Window closes 08:45Z.

State	Assets	Waves	Completion	Finding	Boundary
Baseline L-441	6	1	08:40Z	Feasible; 5 min margin	Not ordered or completed
Changed fact L-442	5	2	09:20Z	Infeasible; 35 min late	Newer is not self-validating
Branch A: wait 15	5	2	09:35Z	Infeasible	Delay does not restore capacity
Branch B: request asset 06	6 if approved	1	08:40Z if approved	Conditional	Recommendation is not allocation

BOUNDARY

Branch B becomes feasible only if the external reallocation is authorized and bound to the exact branch revision. A modeled margin does not allocate the transport or execute movement.

05 | DEGRADED OPERATIONS

Northstar: disconnection never enlarges authority.

A disconnected node may retain an attributable result. It cannot claim indefinite currency, silently absorb a conflict, widen releasability, or treat degraded communications as permission.

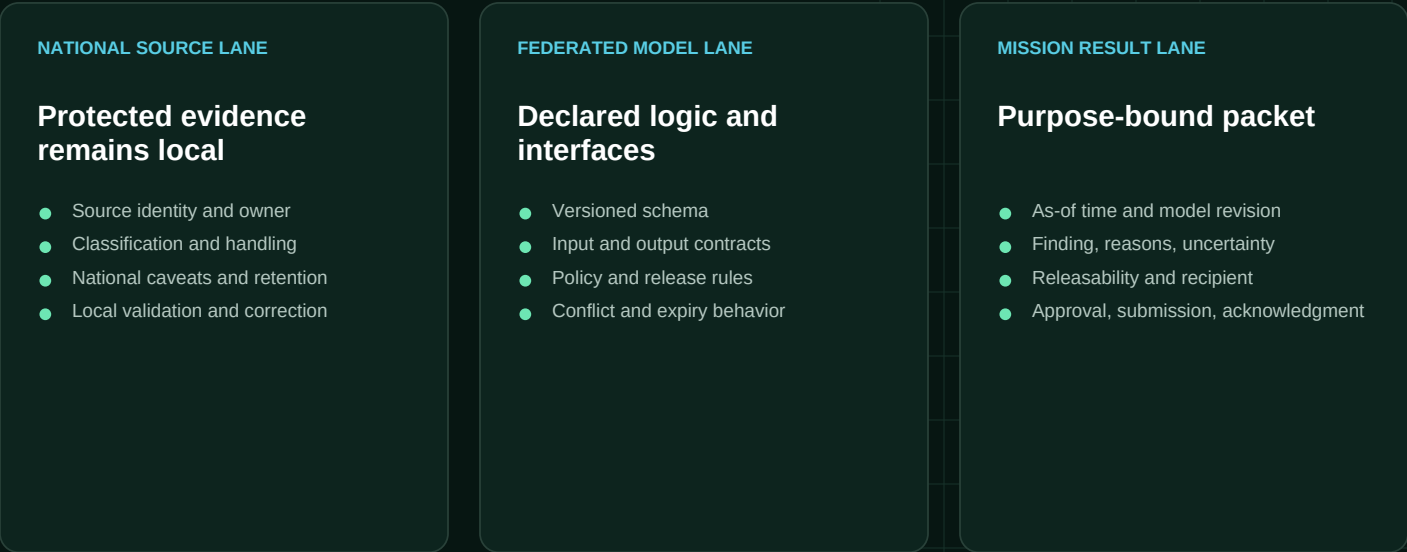
Event	Local evidence	Permitted state	Explicit stop
Connected acceptance	S-207 attributed and current	Evaluate feasibility against S-207	No operational action implied
Link loss	No later source observable	Time-qualify the prior result	No expanded permission or authority
Local branch	Binds to S-207 and declared assumptions	Draft and evaluate locally	Not releasable or authorized by default
Reconnection	S-208 arrives with conflicting capacity	Preserve both and invalidate dependents	Newest timestamp does not resolve authority
Reconciliation	Qualified owner accepts applicable revision	Recompute and issue successor state	Prior submission and effect stay separate

AS-OF DISCIPLINE

Cached data can remain attributable without remaining current. The evaluation must declare the offline window, conflict rule, expiry, fallback, and what requires reconnection or external confirmation.

Share a permitted decision packet, not an accidental data lake.

Federation should preserve sovereign source control, releasability, purpose, and authority while letting a qualified result travel with enough evidence to be understood.



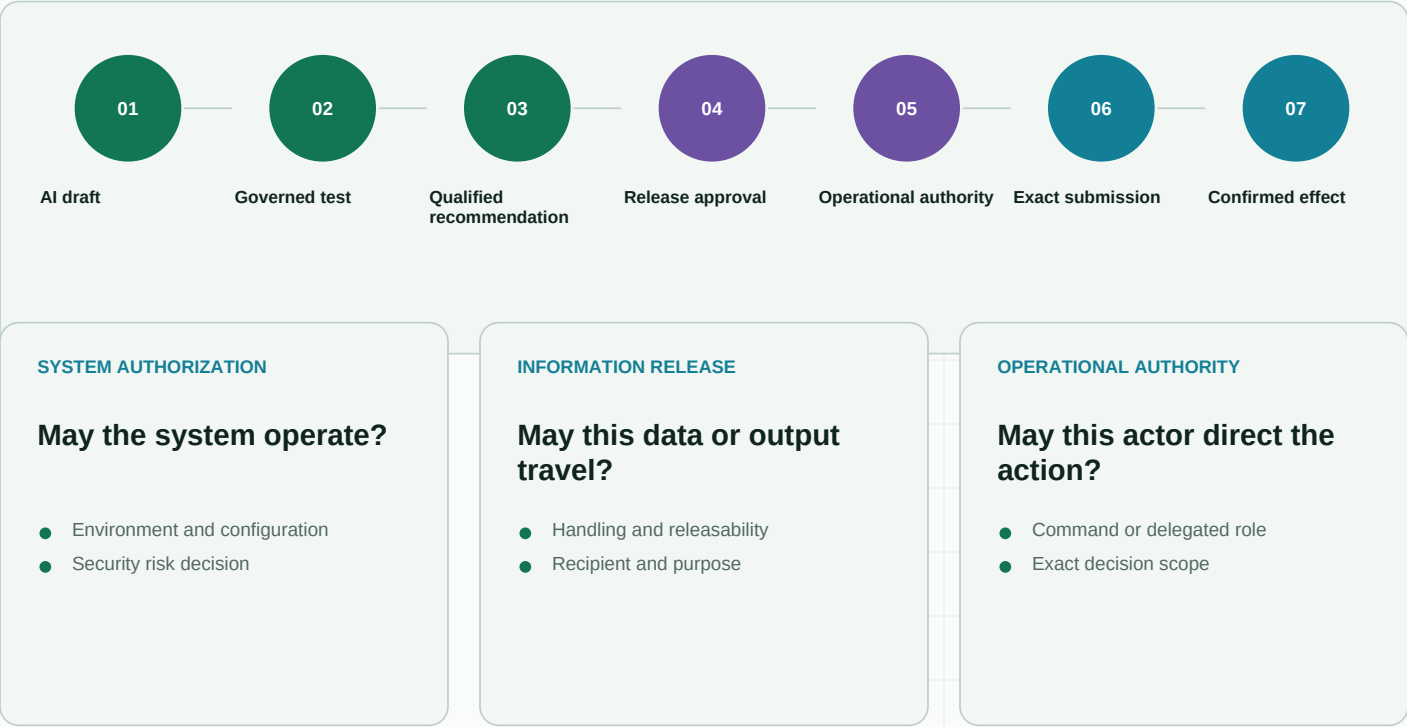
Packet field	What it contributes	What it cannot establish
Identity + revision	Which result and source state are being discussed	That all partners hold the same source data
Purpose + recipient	Why this exchange is allowed for this consumer	Permission for reuse or onward release
Finding + reasons	Represented consequence and binding constraints	Operational authority or effect
Expiry + conflict	When to stop and how disagreement remains visible	Automatic precedence of the latest message

BOUNDARY

A shared model is not a shared authority. National, coalition, information-release, and command decisions remain where the governing agreements and delegations place them.

The complete state machine must extend beyond recommendation.

AI assistance can draft and evaluate inside a declared contract. Information release, operational choice, exact submission, acknowledgment, and confirmed effect require separate evidence.



Receipt	What it can show	What still requires independent evidence
Approval	Named actor accepted an exact revision under recorded conditions	That the actor held the required authority
Adapter response	A configured endpoint received or accepted a request	That the requested action occurred
Outcome observation	A named source reported a later condition	Causation, mission success, or benefit

BOUNDARY

More tool calls do not enlarge the contract. A fallback model, disconnected mode, reviewer credential, or connected API cannot inherit authority by convenience.

Test one recurring decision under controlled operational friction.

Preserve the current staff workflow as a baseline, predeclare expected states, and retain the evidence required to reconstruct every discrepancy.

CONTROLLED EVENTS

Stress the trace

- Capacity reduction
- Stale and contradictory sources
- Shifted timing window
- Double-claimed resource
- Omitted constraint
- Missing authority
- Disconnected revision

MEASURES

Observe the work

- Source and fact integrity
- Feasibility fidelity
- Reconciliation effort
- Explanation comprehension
- Authority and coordination
- Fallback and recovery

Acceptance question	Passing evidence	A pass still does not establish
Did a source change reach every purpose-fit view?	Every surface identifies the accepted model revision and stale state	Real-time performance or availability
Did conditional stay conditional?	Missing release or operational authority prevents promotion	ATO, releasability, or command approval
Can conflict and recovery be reconstructed?	Both revisions, decisions, submissions, and acknowledgments remain linked	Interoperability or mission outcome

EVIDENCE LADDER

A successful fixture supports a product-demonstration claim inside its declared cases. Customer-controlled testing is required for actual systems and staff. Mission impact requires operational evidence beyond both.

09 | LIMITS AND SOURCES

The objective is a decision trace that survives change.

Use the canonical web paper for the full discussion, current links, and future corrections. This release is a stable circulation view.

01 JOINT STAFF	JP 5-0, Joint Planning www.jcs.mil/Doctrine/Joint-Doctrine-Pubs/5-0-Planning-Series/
02 JOINT STAFF	Sustainment: Insights and Best Practices www.jcs.mil/Portals/36/Documents/Doctrine/fp/sustainment_6ed.pdf
03 U.S. ARMY	FM 4-0, Sustainment Operations (March 2026) armypubs.army.mil/epubs/DR_pubs/DR_a/ARN46157-FM_4-0-000-WEB-1.pdf
04 GAO	DOD Needs a Comprehensive Framework for CJADC2 Investments www.gao.gov/products/gao-25-106454
05 NATO	Federated Mission Networking www.act.nato.int/activities/federated-mission-networking/
06 NATO	Data Strategy for the Alliance (2025) www.nato.int/en/about-us/official-texts-and-resources/official-texts/2025/05/05/data-strategy-for-the-alliance
07 DOD CIO	Department of Defense Zero Trust Strategy dodcio.defense.gov/Portals/0/Documents/Library/DoD-ZTStrategy.pdf
08 NATO	Summary of NATO's Revised Artificial Intelligence Strategy www.nato.int/en/about-us/official-texts-and-resources/official-texts/2024/07/10/summary-of-natos-revised-artificial-intelligence-ai-strategy

FINAL BOUNDARY

Grid does not establish doctrinal conformance, CJADC2 interoperability, security authorization, classified or CUI handling approval, coalition releasability, operational authority, real-time performance, or mission effect.