Interoperating Simulation and Command and Control Systems for Next Generation Targeting Experimentation

Connecting the synthetic battlespace to operational C2 so NATO can exercise decisions, observe consequences and build traceable evidence.

Decision support **Automated data collection** **Analysis**

Dr. Alberto De Paoli Staff Officer (Modelling & Simulation) HQ SACT

NATO UNCLASSIFIED

Next Gen Targeting: operational problem and objectives

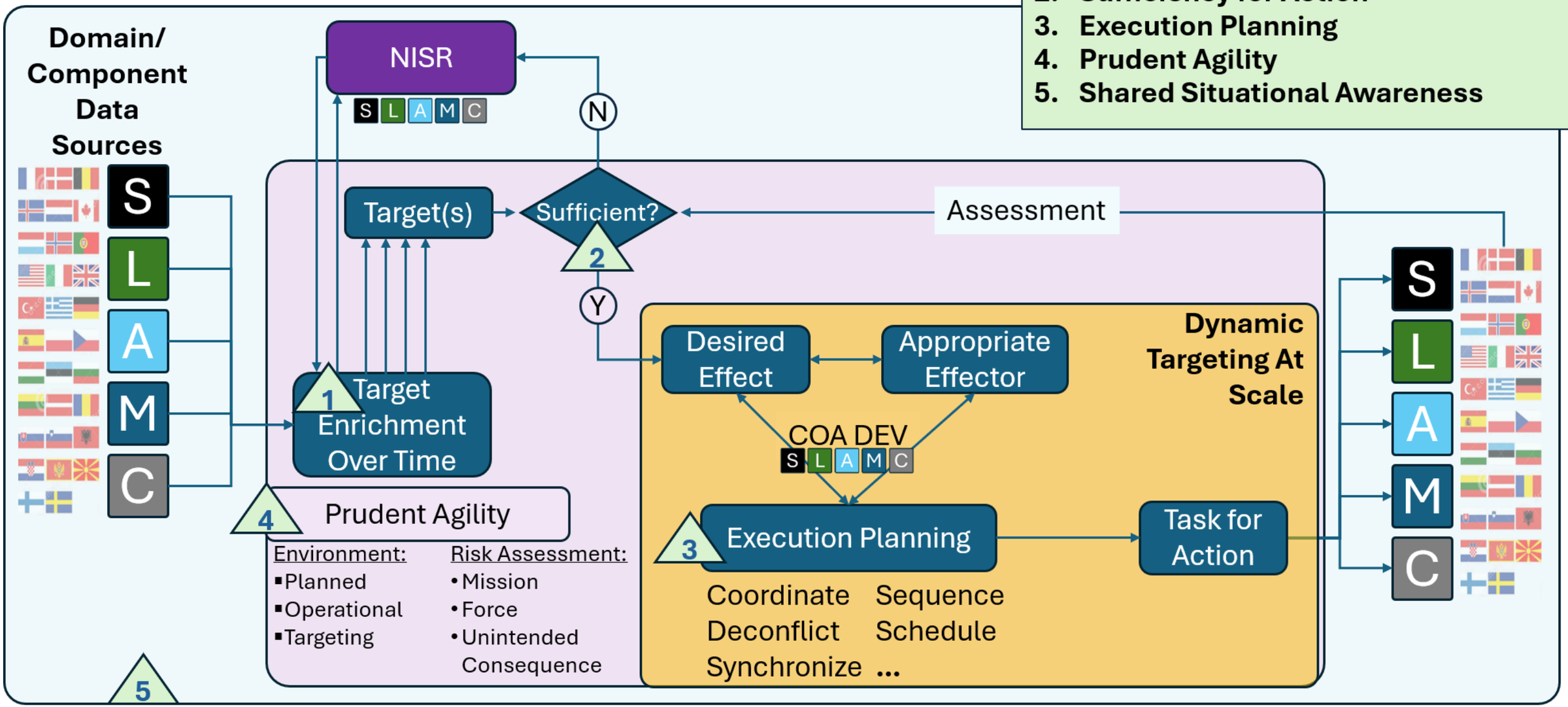
High-intensity conflict generates more actionable information than existing joint targeting workflows can process.

Operational problem	Project response
Manual transfers and approval delays	Ambition: reduce time to decision by more than 75% across the targeting cycle
Disconnected national and domain workflows	Identify interoperability gaps and propose changes to standards and joint fires processes
Staff workload and slow adaptation	Deliver a targeting Minimum Viable Product, demonstrate AI/ML use cases and train staff
Human control in faster workflows	Develop a Human–Machine Teaming CONOPS for Multi-Domain Joint Effects

Experimentation findings will also inform capability programmes such as ARTEMIS and AFSC. Performance objectives remain to be demonstrated.

Next Generation Targeting

1. Target Enrichment
2. Sufficiency for Action
3. Execution Planning
4. Prudent Agility
5. Shared Situational Awareness



A connected experimentation campaign

Event	Main contribution	Operational question
CWIX 2026	Multinational information exchange and increasing mission complexity	Does information flow consistently across systems and echelons?
Bold Quest 2026	Sensor-to-shooter integration and joint fires	Can participating capabilities coordinate cross-domain effects?
DiBaX, Latvia 19–30 October 2026	Staff-led experimentation combining live and virtual activity	How does performance change with and without NGT?

Who: NGT / LCIX Integration
What: Conduct NGT's 3rd Experiment that blends live and virtual testing
Where: Latvia
When: 19-30 OCT 2026
Why: This will be the first experiment that tests the tool with a staff to discover measurements in success and friction

Exercise Objectives

1. **Cross Border Target Execution**
2. **Simulation that enables HICON (JFC Reps) to easily see how decisions to shape the deep and help the BN Staffs**
3. **Compare with and without NGT**
4. **Integration of LCIX**
   - Cell to Cell tactical orchestration
   - Find Poo

DiBaX focus

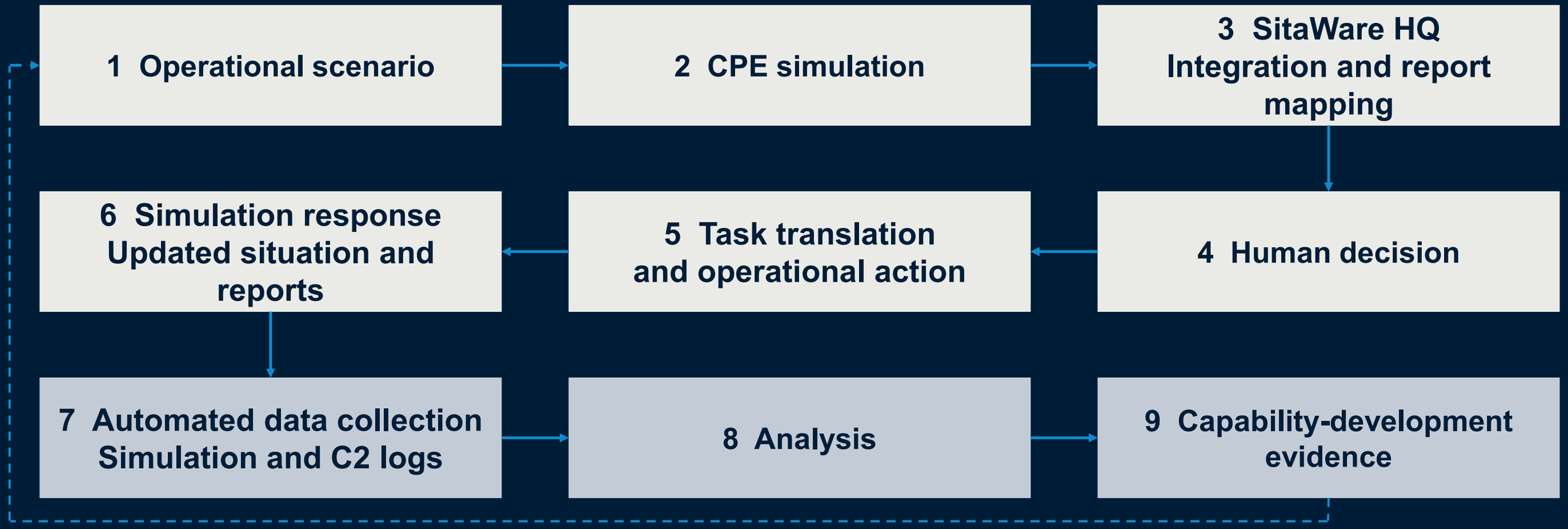
Cross-border targeting, higher-command visibility and integration with Layered Counter-UAS.

Evidence across the campaign

Operational friction, interoperability gaps and staff experience feed process changes and future requirements.

The digital experimentation loop

Operational experiment and digital evidence in one connected loop



Evidence informs the next scenario, process change or capability requirement. Controlled reruns test whether the change improves the outcome.

Mission threads expose different operational pressures

The experimentation design progresses from individual threads to simultaneous, more complex mission execution.

Mission thread	Operational pressure to examine
1 Counter-strike against mobile missile launchers	Short decision windows and moving targets
2 Strike against mobile air-defence systems	Collateral constraints and confidence in target information
3 Maritime strike against mobile C2 nodes	Cross-domain coordination and shared target status
4 Cyber-enabled power disruption	Synchronization with land manoeuvre and wider consequences
5 Deep strike against a moving convoy	Dynamic tracking and coordinated drone activity
6 Wet-gap crossing support	Changing priorities and resource conflicts
7 Strike against drone factories or supply infrastructure	Linking tactical actions to wider operational effects

M&S can evolve the situation and increase concurrency while preserving controllable conditions. Pressures shown here guide experiment design.

Measures of operational improvement

Assessment question	Objective or assessment anchor	Evidence needed
Does decision tempo improve?	Ambition: more than 75% reduction in time to decision	Comparable baseline and agreed start/end points
Can staff meet a time-sensitive window?	Target selection within 5 min of detection and effects within 30 min, conditions permitting	Detection, selection, task and effect timestamps
Does enrichment reduce manual effort?	Anchors: >20 steps, 10+ manual fields, 2–3 cluster validations, zero/single-click validation	Actual process steps, re-entry and validation actions
Does the process scale?	Concurrent-target anchors: 1s–10s, 100s, 1000s	Load, message delays and consistent target states
Can plans adapt without a restart?	Retasking speed and correct authority routing	Revision, approval and task-distribution times
Does assistance help the operator?	Decision confidence, cognitive burden and trust	Digital logs plus operator and observer feedback

Objectives and assessment anchors only. Agree KPI definitions and comparison conditions before measuring performance.

Assessment separates demonstrated capability from potential

Apply the same assessment across all five targeting activities. Judge operational usefulness and decision impact.

Level	Meaning	What the evidence must show
0	Fail / non-functional	The capability cannot support the required activity
1	Manual / static	Staff rely on manual work or repeated reconciliation
2	Augmented / assisted	The system supports staff, with human validation
3	Automated / dynamic	The workflow adapts and keeps relevant information synchronized

Observed performance

Record what happened, the conditions and the bottleneck. Keep the digital trace and the human explanation together.

Potential and capability decisions

Record what must change. Compare reruns and assess wider campaign implications with explicit assumptions.

A higher level is useful only when it improves the operational outcome while preserving human judgement.

Interoperability: a working exchange must preserve meaning

Required integration	Design questions still to resolve
SitaWare REST / TCP/IP services and APIs	Endpoints, schemas, versioning, failure handling and access
APP-11D report conversion via integration layer	Message mappings, information exchange requirements and semantic consistency
Target IDs, status, timestamps and outcomes	Entity/target identity, authoritative sources and data ownership
Continuous synchronization and event logging	Simulation time vs C2 time, pause/restart and state reconciliation

Future standards assessment • candidates, not selected project standards

C2SIM and MSDL; HLA and DIS; applicable NATO interoperability profiles, FMN requirements and STANAGs. Evaluate them against actual exchange and federation needs.

A future interoperability profile must define the exchanges, data models and federation approach needed for each operational use case.

A reusable foundation for NATO experimentation

The required combination

Decision support explores operational choices.

Automated collection records what happened.

Analysis explains the consequences and informs requirements.

If integration proves reusable

Persistent synthetic environments for experiments, training and wargaming.

Faster tests of concepts and procedures at scale.

Reusable data pipelines, AI-supported analysis and synthetic support to planning.

Further opportunity: validated digital twins of operational processes. These require sustained data, model validation and governance beyond the current project.

Integrating M&S with operational C2 gives NATO a repeatable way to turn human decisions and simulated consequences into evidence for future capability.