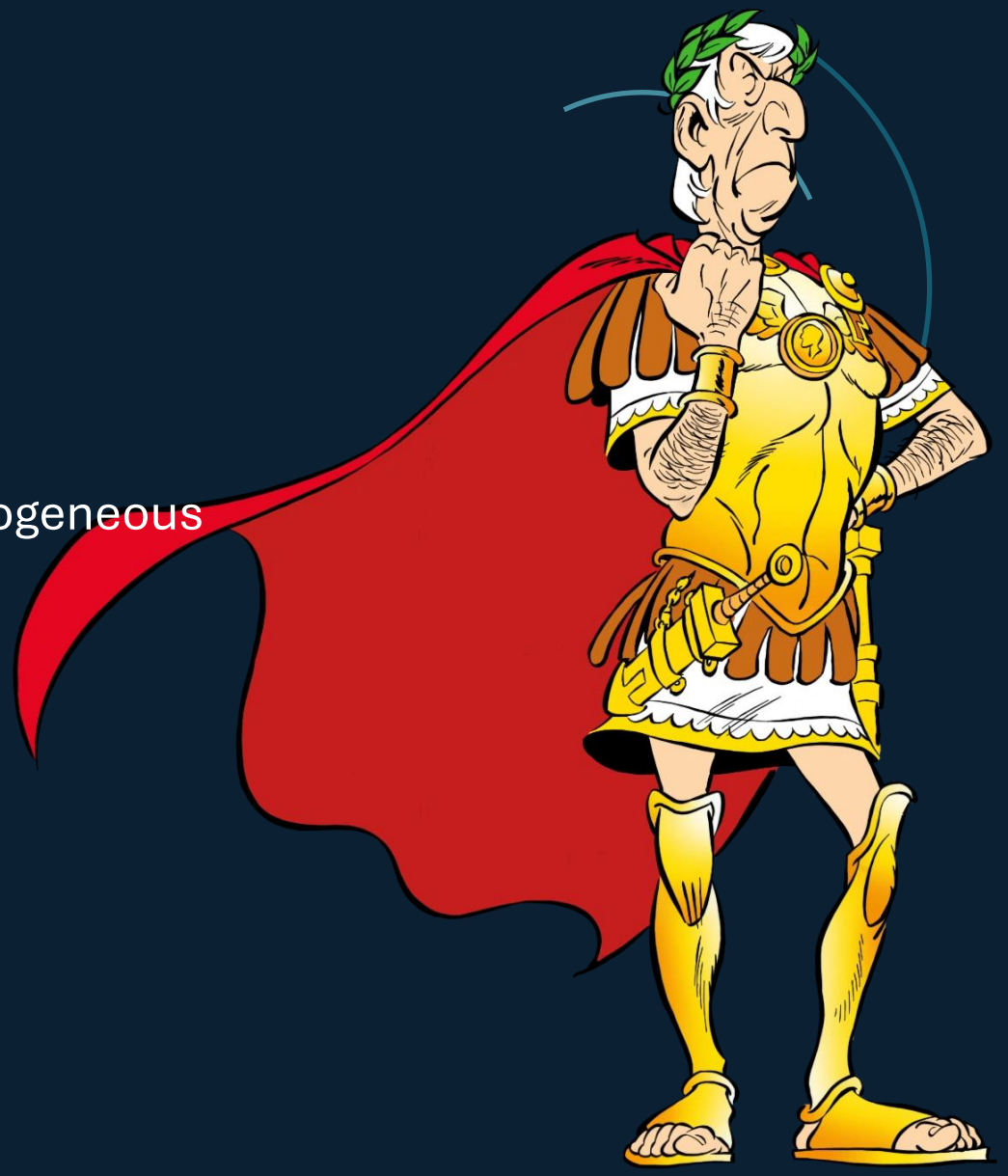
CA2X2 FORUM 2026 | PROGRESS UPDATE

NATO Centralized Simulation Repository

CSR-CAESAR

Progress Towards a Common Data Foundation for Heterogeneous M&S Environments

Requirements Analysis completed | Architecture & Design in progress



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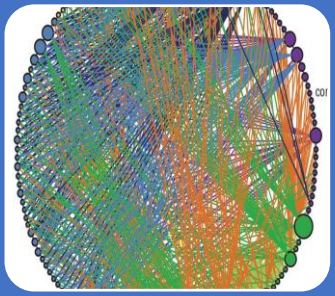
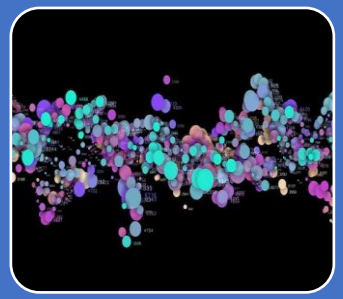
The Problem: Divergent Simulation Data

Heterogeneous systems repeatedly rebuild and reinterpret similar information.



Heterogeneous M&S systems like JTLS-GO, JCATS, and Command PE repeatedly rebuild and reinterpret similar military information.

System-specific interpretations lead to repeated data preparation, separate validation, and divergent representations.



Limited data reuse across Computer Assisted Exercise (CAX), Wargame (CAW), and Analysis (CAA) activities.

Core issue: **Similar entity labels do not guarantee equivalent data, semantics, or modelling behaviour.**

Project Objective: Test a Common Data Layer

CSR-Caesar investigates whether a neutral representation can support controlled reuse.

Evaluation boundary
Data interoperability only
No claim of runtime federation or equivalent simulation behaviour
Not a storage project

A centralized, sanitized, validated, and reusable dataset capability for NATO M&S activities.

1. Validated reusable initialization data
2. Controlled reuse across CAX, CAW, CAA
3. Reduced preparation and initialization effort
4. Neutral model instead of N-to-N conversions
5. Source-information-preserving exchange

PoC Scope: Initialization Data and Supported Systems

The current scope targets data needed to initialize and configure NATO simulation systems.

Main data categories include ORBAT structures, Platforms & equipment, Sensors & detection, Weapons & engagement, and Model-specific parameters.

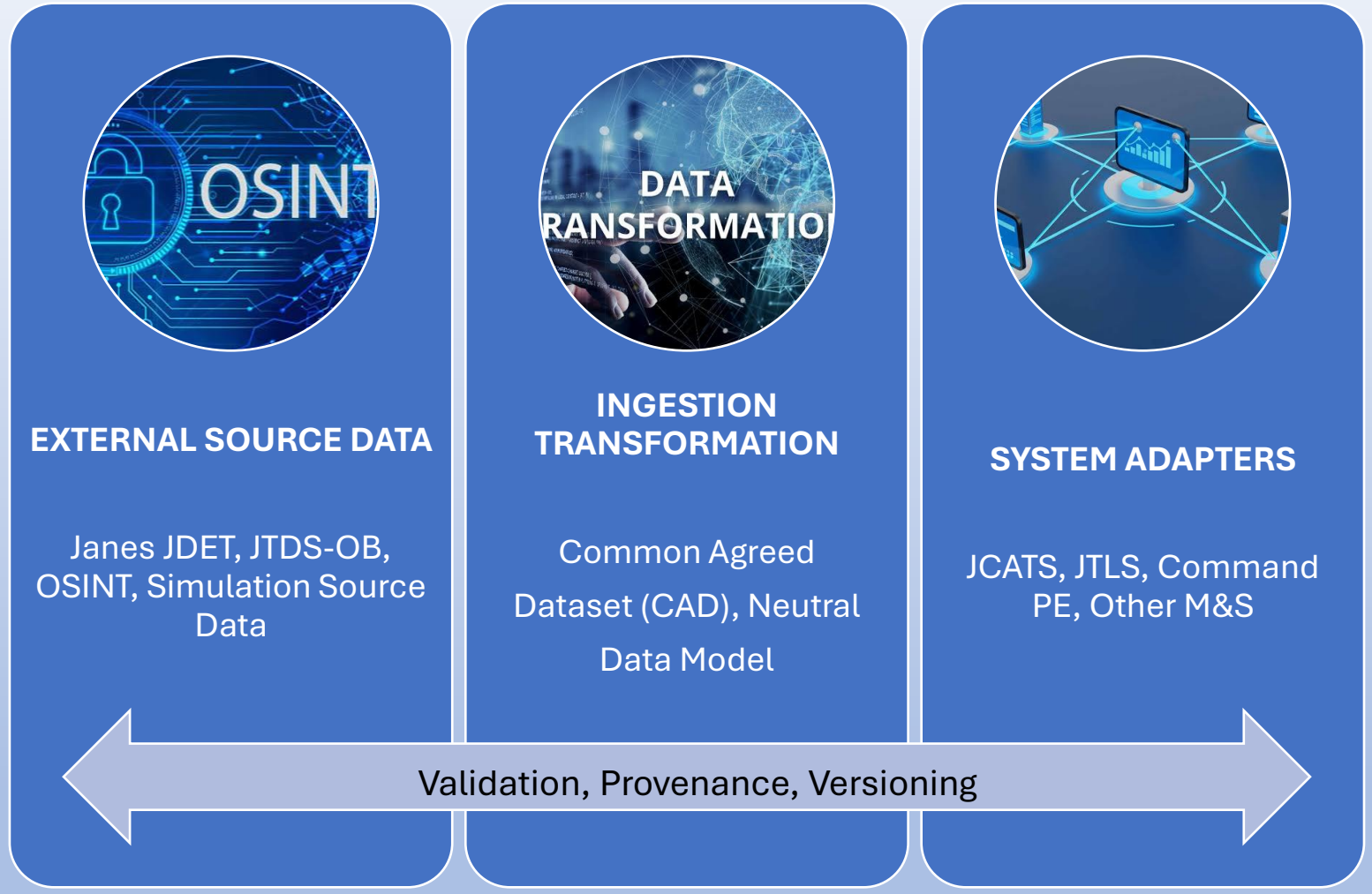
Systems examined are JTLS-GO, JCATS, Command PE

External sources like Janes JDET, JTDS-OBS, and OSINT.

Current Scope: **Current PoC dataset activities are intended for NATO UNCLASSIFIED use.**

Conceptual architecture: common representation with traceability

Source data flows into a Common Agreed Dataset and out through system-specific interfaces.

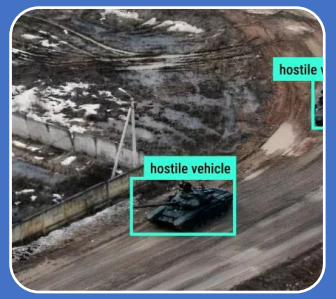


Project status: Phase 2 is in progress

Phase 1	Phase 2	Phase 3	Phase 4
Requirements Analysis	**Architecture & Design**	**Implementation**	**Demo & Final Report**
June 2026	August 2026	November 2026	February 2026
Completed	In progress	Planned	Planned

Evidence boundary: **Current findings come from Requirements Analysis and Architecture & Design.**

Phase 1 Finding: Commonality Is Not Only Schema-Level



A shared label can mask different meaning, aggregation, and model behaviour, leading to semantic differences.

Variances include units, codes, levels of aggregation (entity/aggregate), supported parameters, and underlying modelling assumptions.

Data interoperability requires explicit mapping and validation; field-to-field conversion is insufficient.

Core issue: **Common representation ≠ equivalent simulation behaviour**

Phase 2 Design: CAD and Supporting Components

Common Agreed Dataset (CAD): Relational schema with a 54-table core across four additive layers (v1-v4), plus a v5 cost-modelling addendum.

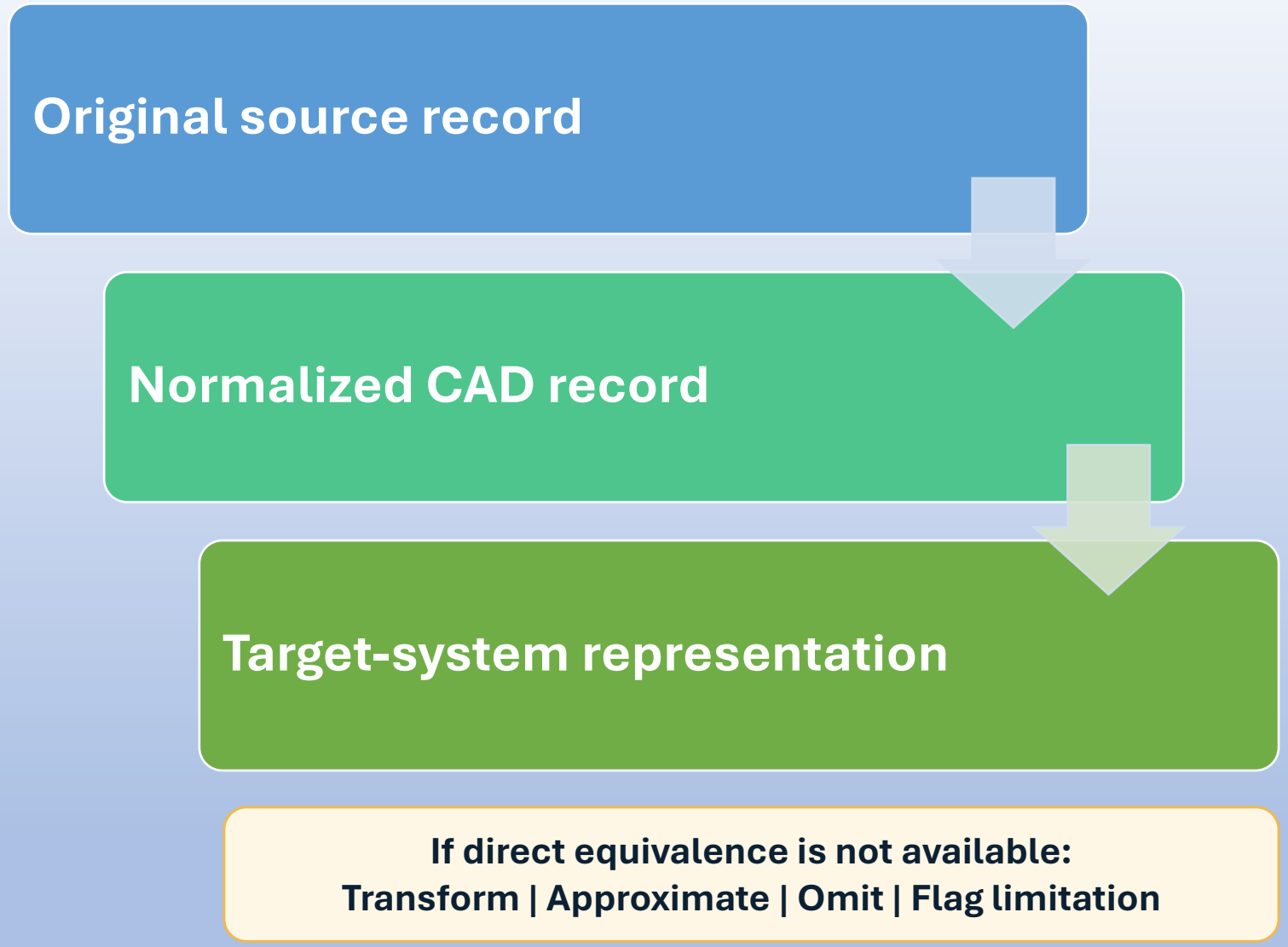
InformationSearch: External data layer integrating Janes JDET, JTDS-OBS, and OSINT (>58,000 records).

ORBAT Builder: User function to construct and modify force structures using CAD data.

Design principle: **Normalize what is common. Preserve what is different. Make transformations explicit.**

Source preservation: manage what cannot be normalized

A neutral model should expose transformation limits, not hide them.



Key distinction: **Preserving the source record inside CSR is not the same as lossless exchange with every external simulation system.**

Main Risks: Technical Feasibility Is Not Enough

A functional PoC will still require ownership, governance, and sustainment.

Semantic mismatch: Structural import can still change data meaning.

Source suitability: Data availability does not establish authority or quality.

Governance gap: Independent model changes risk re-fragmentation of data.

Sustainment risk: Data, interfaces, and standards will inevitably evolve.

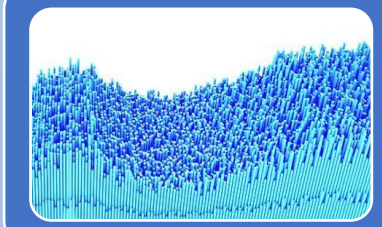
Transition Condition: **Post-PoC transition depends on evidence, not technical completion alone.**

Key Takeaways

Data interoperability is not simply schema conversion; semantic understanding is critical.

A neutral model reduces point-to-point transformation pressure, improving efficiency.

Source preservation ensures provenance, validation, and traceability of data.



External data (commercial, governmental, open-source) requires careful suitability checks for M&S use.

Strategic Consideration:

Architecture alone is insufficient without robust governance and sustainment mechanisms.

Beyond the PoC: What Transition Requires

Progression to Initial Operational Capability depends on evidence, not technical completion alone

Governance model

- A NATO Simulation Community of Interest

Minimum viable dataset

- Demonstrated exchange with agreed priority systems

Ownership & sustainment

- Defined hosting, stewardship, config mgmt

Documented limitations

- Transformation rules and known constraints recorded

Decision Gate: **Demonstrated data exchange, a validated minimum dataset, and defined ownership must be established before transition.**

CONCLUSION

Common data does not imply common simulation behaviour.

CSR-Caesar addresses the data layer of interoperability. Differences in models, algorithms, aggregation, and simulation semantics remain properties of the receiving systems.

Success measure

Can the resulting data be governed, traced, validated, transformed, maintained, and reused across different M&S systems and activities?

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