LOTAR International Project Report for 2025

Aircraft have very long lifecycles. There can be 80 years between the initial design for a new program and the end of life of the last one delivered. Throughout the product lifecycle, the data defined for archiving and retrieval must be provided in a standardized format that can be read and reused regardless of changes to the original IT environment. Ensuring this is the goal of LOTAR.

LOTAR is a project under the joint auspices of the aerospace industry association AIA and ASD, as well as PDES, Inc. and prostep ivip. It aims to develop, implement, test, pilot, publish, and maintain standards for long-term archiving and retrieval of digital product and technical information. This includes CAD and PDM data, composites, wire harnesses, MBSE artifacts, and CAE simulation data. The multi-part standard describes both the information content and the processes for recording, storing, managing, and accessing information. The documents are published as parts of the EN/NAS-9300 series of standards.

Focal Points & Concrete Results 2025

Basic & Common (B&C) Process Parts:

The B&C Workgroup published the LOTAR Overview Data Flow (Part 010) and LOTAR Fundamentals and Concepts (Part 003) which incorporated Description Methods (Part 004). LOTAR Requirements (Part 002) is available through ASD-STAN as a preliminary DIN EN9300-002 while NAS and EN versions go through AIA and ASD-STAN balloting. The working group has nearly finished resolving comments from internal ballot for the new standard for LOTAR Metadata (Part 021).

3D Mechanical CAD with PMI:

The team continued the systematic review of its domain-specific documents. The new edition of Part 110 (3D Geometry) is ready for publication ballot, and Part 120 (Graphic PMI) has been reviewed and confirmed as-is. Part 115 (Assembly Structure) is in review to extend the scope to geometry at assembly level. The 3rd pilot project for Assembly Product Manufacturing Information demonstrated the usage of STEP AP242 Edition 4 Domain Model XML. The work group contributes to the identification of requirements for STEP AP242 Edition 5.

PLM:

The PLM Workgroup made significant headway on the LOTAR standard for product data in the "as planned" stage (Part 230), particularly regarding aligning PLM concepts with the STEP standard. The Product Structure Validation Property standard (Part 205) is now on external publication ballot stage and a prototype has been tested and presented last year. The definition of common use cases with the PDM Interoperability Forum was continued. The LOTAR standard for product data in "as designed" (Part 210) is published and available via the LOTAR website.

Composites:

The Composites WG provided support for enhancements to the composite data model for AP242 Edition 4, which included the addition of limited length and application indicators (LLAI) and updates to the Composite Material Recommended Practices. The team supported a joint project with WG15 (STEP-NC/AP238) for the use of AP242 composite data in downstream manufacturing and NC processes for automated layup. Part 300 (Fundamentals and concept for Long Term Archiving & Retrieval of Composite Information) is now in internal ballot for publication in 2026.

Electrical Wire Harness:

The Electrical Workgroup's objective is to identify and maintain the data necessary for defining a wiring harness. The design and analysis processes must encompass both electrical (ECAD) and mechanical (MCAD) data. The team's primary focus was on the Electrical Harness contents of the AP242 Domain Model. The team actively contributes to and supports the activities of the Interoperability Forum for Electrical Wiring Interconnection Systems (EWIS-IF), with a particular emphasis on

advancing interoperability, updating technical documentation, and developing new test cases based on real-world use cases. Key areas of focus include mating capabilities, signal management, conductive protections, and the handling of complex cable assemblies.

MBSE:

The year began with active participation at the INCOSE IW in Seville, supporting the transition to SysML v2 and standardized digital engineering. Key milestones included the “Stratoliner” demonstrator, MIC-core integration with the LOTAR manifest, and continued development of a validation tool for archive packages. The team contributed to global outreach through publications and collaboration with INCOSE initiatives, including MBSE-DE Integration Forum and utilizing ISO 42010 (Architecture Description Frameworks). Guidelines for Engineering Design Integration were drafted to align with OMG CASCARA. Reviews for Part 500 (MBSE Fundamentals and Concepts) advanced to public comment.

Organizational / Technical Challenges

The boundary conditions in the Aerospace industry remain challenging and limit the LOTAR project’s ability to progress on a number of topics, specifically the validation of new concepts in pilot projects. These tests are an important building block for the LOTAR standard in that they ensure the published requirements are implementable and supported in commercial tools. In addition, limited availability of domain experts is a hindrance across all areas.

On the plus side, the project has updated its infrastructure to support collaborative work on document drafts more efficiently and is supporting the combination of several meetings into a single overarching event to boost on-site participation.

What is Planned for 2026

Despite the challenges, the project team aims at maintaining its high momentum while continuing to recruit new team members. The Basic & Common parts team plans on publishing Part 021 for Metadata, revising Part 005 for Authentication and Verification, and starting an update for Part 007 (Terms and References). The 3D Mechanical WG will review existing documents and create two new standard parts for Semantic PMI at assembly level, and structural joins.

The PLM team's objective is to revisit the LOTAR standard part Fundamentals and Concepts (Part 200) and to send an edition 2 for internal ballot, as well as to complete the ballot for Part 230 (product data in the "as planned" stage) and publish it. In the Composites area, the domain's Fundamentals and Concepts document (Part 300) will be published. Working with the CAx-IF for testing new Composite functionalities will continue.

The Electrical team will shift toward finalizing and expanding the scope of ongoing activities. The test case plan includes the definition of mating, updating older test cases, and developing scenarios for multiple harnesses hooked together. There will be a particular emphasis on hierarchical assembly joints as well as signal and signal harness management. The team will also explore the relationship with MBSE, ensuring that developments align with broader systems engineering practices.

The MBSE group itself will continue its close collaboration with INCOSE, starting with supporting the MBSE Integration Forum at the International Workshop in Torrance, CA, USA. Concerning the LOTAR Standard, internal drafts for Part 515 (Validation and Verification requirements) and Part 520 (Analytical models described by specifications or executable code and equations) will be created.

Project Coordination Team's Statement:

"It is encouraging to see the progress the project team has made over the past year, as is evident by the recently published standard documents. The growing interest in LOTAR from industries other than Aerospace, as well as in archiving data in domains not yet in scope of the project, opens up a lot of possibilities for the future. It will be great to see the project grow."

Project Chairs' Statement:

"2025 was a very productive year for LOTAR as we published several new LOTAR parts and revisions to existing parts, with more to come soon. We started a discussion on how to "re-brand" LOTAR to emphasize the relevance to operational business needs (not just preservation) and encourage industry to participate and work with the vendors through the forums to implement capabilities to meet those needs. Last but not least, we started thinking about extending the scope of LOTAR domain activity through restarting Modeling & Simulation, and initiating Electronics and Software working groups."

Participants

Europe: Airbus Commercial Aircraft, Leonardo

Americas: The Boeing Company, Embraer, GE, Gulfstream, Lockheed Martin, Raytheon Technologies

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