

LOTAR International Project Report for 2021

LOTAR is a project managed under the AIA, ASD-Stan, AFNeT, PDES, Inc. and prostep ivip consortiums. The project goal is to develop, implement, test, pilot, publish and maintain standards designed to provide the capability to archive and retrieve digital product and technical information, including CAD, PDM, Composites, Electrical Harness, MBSE, and CAE. The data defined for archiving and retrieval shall be in a standard form that can be read and reused throughout the product lifecycle, independent of changes to the IT environment originally used. The multi-part standard covers the information content as well as the processes required to ingest, store, administer, manage, and access the information. It is published as EN/NAS-9300.

Milestones 2021

Project Management

- Leonardo joined as a new LOTAR member on the European side
- Successful execution of all LOTAR workshops as online meetings to secure project progress despite COVID-19 restrictions. Looking forward to hopefully returning to in person meetings in 2022.

Basic & Common Process Parts (0xx)

- Updated EN/NAS 9300-001 has been finalized and submitted to ballot.
- Continued revision of Parts 002 and 003.
- Revised Part 005 concerning legal background of electronic signatures.
- Aligned Part 007 (Terms and References) across several Working Groups inside LOTAR and completed the update for internal ballot.
- Laid extensive groundwork for Part 021 on Meta Data requirements across domains.

3D Mechanical CAD with PMI (1xx)

- Launched pilot for 'assembly with fastener' to validate a first approach based on user defined attributes
- Started review of Part 100: Common concepts for 3D mechanical CAD information.

PDM (2xx)

- Worked jointly with PDM-IF on Recommended Practices for "as-designed / as-planned" test case
- Introduced new test case for Alternate/Substitute part relationships.
- Developed new test case for use of Validation Properties based on Technical Specification 200-1.
- Validated STEP mapping within Parts 210 and 230.
- Continued working with MBSE and other workgroups to integrate requirements across domains.

Composites (3xx)

- Updated Recommended Practices document supporting both LOTAR and AP242 Ed2.
- Provide necessary backlog information to the CAX-IF User Group.

Electrical (4xx)

- Evolved Parts 400 "Fundamental and concepts" and 410 "LT Archiving and retrieval of Electrical Wiring Harness for design & construction", refining the description of related essential information and associated test cases.
- Verified the capability to archive flexible electrical wiring harness definition through EWIS-IF testing.
- Conducted Electrical pilot projects for CATIA V5 and NX AP242 Ed.2 interfaces to implement and test the 'External Element Reference' mechanism, linking the electrical information to the geometry.
- Prepared a pilot creating 3 types of quality control rules in Schematron (ISO/IEC 1975) from AP242 Ed.2 SysML Domain Model, with a goal to provide a full XML validation beyond the capabilities of the AP242 Ed.2 XML schema alone.
- Contributed to EWIS-IF User Group priorities by preparing new use cases and test cases as input for EWIS-IF Implementer Group Test Rounds 3 and 4 in 2021.

MBSE (5xx)

- Continued the development of the LOTAR documentation for Parts 500 (General MBSE) and 520 (System Behavior and Simulations).
- Developed a Part 520 Simulation model use case and prototype that will archive an SSP model along with a AP243 (MoSSEC) manifest that demonstrates the V&V process.
- Developed a Part 510 requirements management use case and prototype that will demonstrate how design requirements can be linked to other models in the archive

Outlook 2022

Project Management

- Coordinate with ASD-Stan and AIA for joint publications.
- Provide feedback to OASIS on new drafts of the Reference Model and Interoperability Framework
- Continue to ensure consistency of LOTAR parts with related standardization activities, e.g., development of ISO information model standards and interoperability forums
- Aim to have at least one physical face-to-face meeting, in addition to continued online meetings

Basic & Common Process Parts (0xx)

- Coordinate resolution of comments from external ballot of Part 001 and internal ballots of Parts 002, 003, 005, and 007, while starting to work on the next batch of part updates to be done
- Update Part 005 with legal information based on European and US law. The usage of digital signatures or other secure hash algorithm-based technologies will be defined in more detail.
- Release update of Part 003 (Fundamentals and Concepts), which will fully include the previously separate Part 004 (Description Methods).
- Decide on deletion of Part 006 (Functional Architecture) since this part is completely related to OASIS. It may also be possible that Part 006 will be released just referring to OASIS (ISO 14721).
- Continue development of Part 021 for metadata
- Insert new terms and references from the 9300 series into part 007. Terms and references of ISO 10303 are not affected.

3D Mechanical CAD w/ PMI (1xx)

- Extend pilot projects to validate and deliver Part 132 on Structural joins for assembly & installation.
- Continue the review of LOTAR Part 100 and start the review of Part 115.

PDM (2xx)

- Work with the PDM-IF on
 - extension of use cases for “as-designed / as-planned”
 - new test case for Alternate/Substitute part relationships
 - new test case for use of validation properties based on 200-1 Technical Specification
- Validate STEP mapping within Part 210 and 230.
- Prepare Part 210 and Part 230 documents for internal ballot
- Continue working with MBSE and other workgroups to integrate requirements across domains.

Composites (3xx)

- Submit the LOTAR parts for composite design based on validated Recommended Practices.
- Support the enhancement of the composite capabilities in STEP AP242 Edition 3
- Start working on manufacturing information for composite parts.

Electrical (4xx)

- Mature Parts 400 “Fundamental and concepts” and 410 “LT Archiving and retrieval of Electrical Wiring Harness for design & construction”.
- Prepare new LOTAR AP242 Ed.2 Electrical pilots, including implementation of new validation properties and quality control rules.
- Contribute to the 2022 EWIS-IF User Group priorities with the preparation of new use cases and test cases, as inputs for next EWIS-IF Implementer Group Test Rounds.
- Contribute to the requirements for the MBx-IF User Group, ensuring consistent STEP AP242 Recommended Practices shared by the CAx-IF, EWIS-IF, and PDM-IF.

MBSE (5xx)

- Submit Parts 500 and 520 documentations for review and comments
- Engage other Standard Bodies and consortia to host an MBSE Implementers Forum, or equivalent, based on Team deliverables
- Identify resources for how to define and assess a Model quality standard

Participants

Europe: AFNeT, Airbus, Airbus Defence & Space, Airbus Helicopter, Leonardo

Americas: Boeing, Embraer, GE, Gulfstream, Lockheed Martin, Raytheon Technologies, Sandia National Laboratories

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