



# LOTAR

LONG TERM ARCHIVING AND RETRIEVAL

## LOTAR Mechanical Assembly/Installation with fasteners

STEP AP242 Day  
November 27, 2019 in Hamburg/Germany



## Motivation

- Importance of Assembly Installation with fastener for aerospace industry.
  - *Example an civil aircraft can contain more than 2 millions fasteners*
- Semantic information
  - holes, fasteners and all the requirements specifying the joint definition
- Dedicated CAD/CAM application
  - feature can be defined using the COTS functionality in CAD systems, but Aerospace industries have their additional solution/method to convey the information



Source: <https://www.usinenouvelle.com>

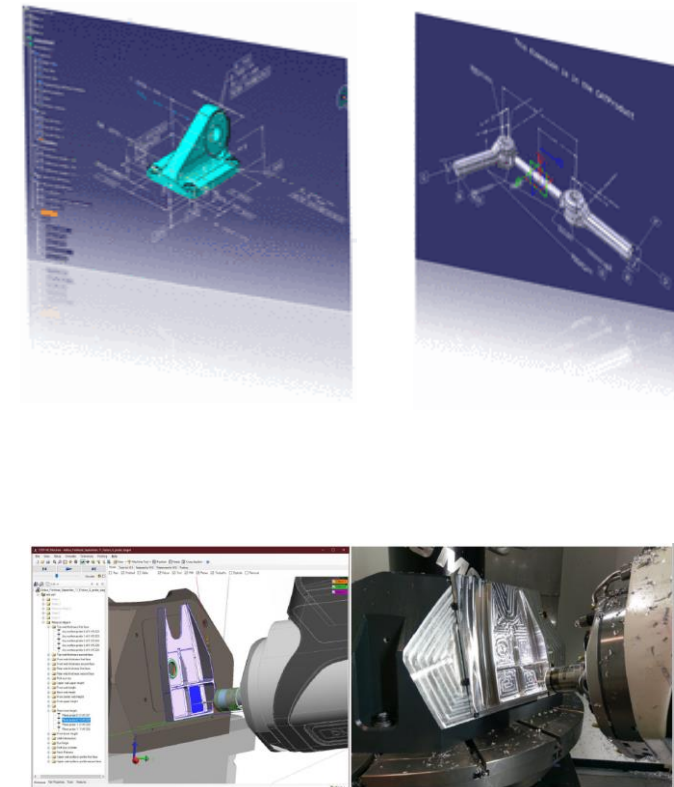
Data interoperability from design to manufacturing

# Assembly/Installation with fasteners

## LOTAR Mechanical

- LOTAR International objective: develop, test, publish and maintain standards for **long-term archiving** of digital data. EN / NAS 9300
- LOTAR Mechanical working group
  - Already released standards for LTA of **3D, Assembly structure**, Product and Manufacturing Information (**PMI**).
  - The next objective of the Mechanical working group is the **manufacturing** domain.
    - It includes Representation and Presentation of **Holes and Fasteners** with the association of Engineering and Manufacturing requirements

<http://www.lotar-international.org>

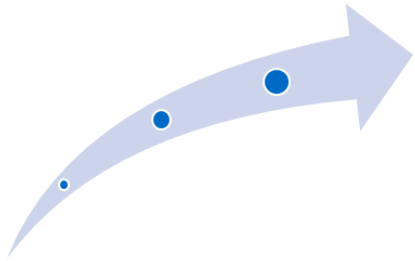


## Example of requirements

- Need to part numbers (identifiers) of fastener parts, e.g. fastener, washers, nutplates, nuts, etc.
- Need to represent fastener location and orientation.
- Need to identify the ordered sequence of how the fasteners are installed, e.g., the stackup of the fastener and the parts being joined either explicitly via geometry or implicitly.
- Fastener parts may be explicitly modeled or implicit by reference (need to define parameters for fasteners, e.g. library reference to a standard part)
- Hole features may be explicitly modeled or implicit.
- Need to associate requirements and/or specifications with a fastener instance (specific occurrence or location). Requirements may be applicable to the fastener or the hole.
- Requirement could be a text string, e.g., “Torque to XX N-m”,
- A reference to a specification, e.g., “Seal per Company Specification XXX”. Reference could be represented as a test string and/or a document reference such as URL.
- Where fastener instances share common requirements and/or specifications, need to group the instances together into a collection or group.
- Need to identify collector object to consume into MBOM

# Assembly/Installation with fasteners

## LOTAR Mechanical Pilots

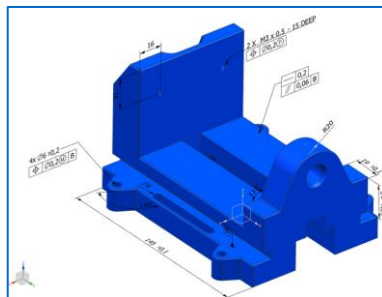
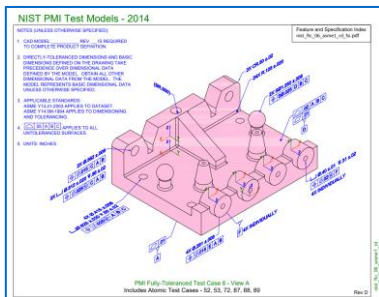


Phases planned:

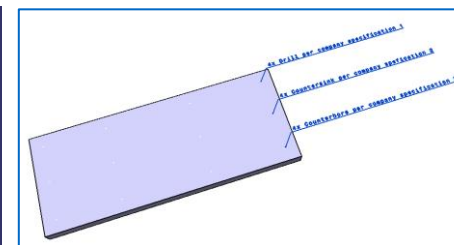
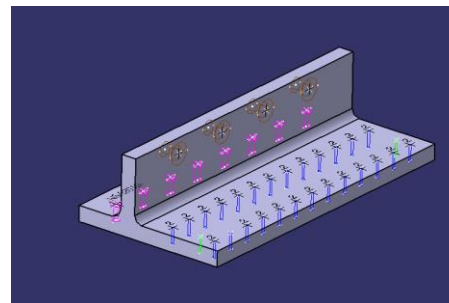
- 1) Hole definition in a part: STEP AP242 Edition 2
- 2) Simple assembly with fastener: hole and requirement, STEP AP242 Edition 2 or +
- 3) Complex assembly structure

### Test model examples

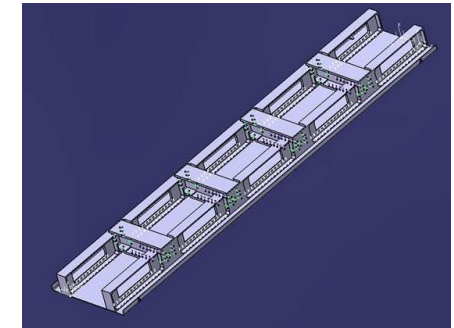
Part explicit representation of the hole



Part simplified representation of the hole



Assembly installation with fasteners



Pilots outcome (Requirement, model, recommendation ...) will be shared with the Cx Interoperability forum