

Memorandum of Understanding
between the
LOTAR International Engineering Analysis &
Simulation Working Group
and
NAFEMS

1 Purpose

The principals represented by this Memorandum of Understanding (MoU) are LOTAR International's Engineering Analysis and Simulation Working Group and NAFEMS. The purpose of this MoU is to define the desired level of cooperation between the principals in assisting CAE vendors to accelerate the development and implementation of the Standard for the Exchange of Product model data (ISO 10303), usually referred to as STEP, and to capture engineering analyses for long term archiving and retrieval. Initial efforts will focus on fostering the development of interfaces for the ISO STEP AP209 edition 2 "Multidisciplinary analysis and design" standard.

2 Background

The [LOTAR International](#) consortium combines the efforts of Aerospace and Defense manufacturers to create and promote standards for long-term archiving and retrieval, (LOTAR), of digital product and technical data, based on standardized approaches and solutions, mainly relying on ISO 10303 STEP standards. During the 4th quarter of 2014, the domain of Engineering Analysis and Simulation (EAS) was added to the scope of its activities and the [LOTAR EAS Working Group](#) (EAS WG), was created in December 2014.

Although the scope of the LOTAR EAS WG is across all of the technical disciplines associated with engineering analysis and simulation, its initial focus is on **Structural Analysis: quasi-static linear internal loads finite element analysis (FEA) for total vehicles** (metallic and composite structures). The LOTAR Parts (documents) to be developed, will be published as EN/NAS 9300 – 6xx standards, and will be based on the ISO [STEP AP209 edition 2 standard "Multidisciplinary analysis and design."](#)

NAFEMS is the international association for the Engineering Analysis community and seeks to create awareness of current and evolving techniques in numerical simulation of physical processes, to deliver appropriate education and training for them, and to encourage standards in their use. Its membership is drawn from industry, software suppliers, government, and academia from around the world and continues to grow at an encouraging rate. Much of its technical work is conducted through a number of specialist working groups and one of these, the Simulation Data Management Working Group, has worked to establish best practices for capturing simulation context and pedigree along with the analysis - which is essential to LOTAR.

LOTAR has been keeping the working groups within NAFEMS apprised of its activities. Several members of the Simulation Data Management Working Group are also members of the LOTAR EAS Working Group.

Implementation of the AP209 standard will rely on interfaces to map the EAS data from proprietary analysis formats to the AP209 format and vice versa. To foster collaboration in developing these STEP AP209 edition 2 interfaces, and to support testing and robust implementations thereof, the existing CAX Implementer Forum ([CAX-IF](#)), which has been focused on mechanical CAD, will be extended to cover engineering simulation and analysis by creating the CAE-IF as a new workgroup within the existing infrastructure.

Several CAD vendors also produce CAE products (FEA pre-/postprocessors, FEA solvers, process automation, workflow management, etc.), but there are companies that currently produce only CAE products. Many of these companies are members of NAFEMS as well.

At the direction of the LOTAR EAS WG, Rod Dreisbach approached NAFEMS with a request to support the EAS WG in reaching out to the international CAE vendors. This support includes the following basic tasks:

- Contribute to a joint communique to the CAE vendors (signed by both NAFEMS and LOTAR EAS WG representatives) inviting them to a presentation outlining:
 - The efforts of the EAS WG to develop standards for LOTAR
 - The near-term plans for a Pilot Study related to developing ISO STEP AP209 ed2 interfaces that are underway and further defining recommended practices for their use
 - Plans for developing ISO STEP AP209 ed2 interfaces via the CAE-IF
- Provide a distribution list of representatives of CAE vendors that are members of NAFEMS
- Confirm the desire to collaborate in educating users and vendors of best practices and methods of capturing engineering analyses for long term archiving and retrieval

3 LOTAR International – Engineering Analysis & Simulation (EAS)

3.1 Introduction

By engaging NAFEMS, the CAE vendors that approach the EAS WG will be introduced to the CAX-IF, especially for developing interfaces (which supports data exchange to international standard format suitable for LOTAR)

3.2 Functional Roles

- Act as the point of contact for technical questions that might arise
- Guide the overall collaboration efforts and schedule
- Govern the policies for the collaboration efforts
- Draft the communique, share it with NAFEMS, jointly agree to its form/content (affixing the logos of LOTAR International and NAFEMS), and jointly sign the communique.
- Ensure the vendor distribution list (DL) is complete.
- Transmit the complete DL to NAFEMS for communication to the CAE vendors
- Ensure that the DL is used for the intended purpose
- Manage the CAE vendor feedback to the invitation
- Deliver the presentation to the CAE vendors

- Engage in collaboration with the CAE vendors under the auspices of the CAx-IF.

4 NAFEMS

4.1 Introduction

NAFEMS has been active in supporting the development and implementation of ISO 10303 STEP since its inception, including collaborating with PDES, Inc., the international industry/government consortium that has been engaged in creating the standard from day one. Furthermore, ProSTEP iViP has also been active in developing STEP and collaborating with NAFEMS.

4.2 Functional Roles

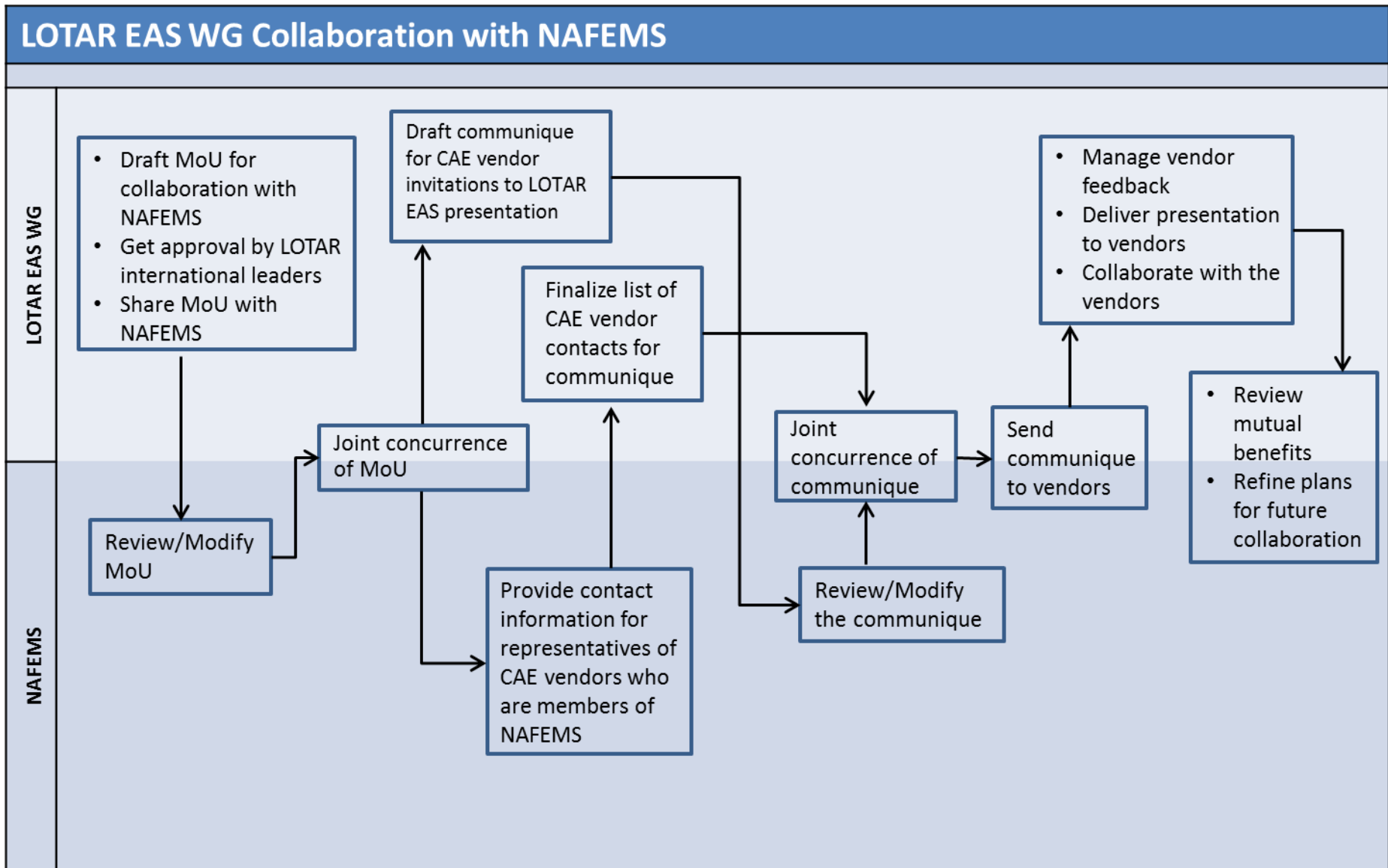
- Provide contact information for representatives of the CAE vendors who are members of NAFEMS (the person, location and CAE vendor they represent) – the goal is to contact appropriate personnel who can aid in making decisions to engage in developing the interfaces. The DL is not exclusive. If the EAS WG has established relationships with development staff at other CAE vendors, they can be added to the DL.
- Review the communique (and assure that it complies with their policies, which may require additional caveats or disclaimers), jointly agree to its form/content (affixing the logos of LOTAR International and NAFEMS), and agree to co-sign and distribute it to the complete DL (including CAE vendors that are not contributed by NAFEMS)
- Ensure that the DL is used for the intended purpose of inviting CAE vendor participation in the development and implementation of ISO STEP AP209 edition 2 interfaces.
- Send the initial communication from the LOTAR-EAS to the vendor network describing the LOTAR initiative and outlining what the EAS WG would be looking for from our vendor members. NAFEMS can ask the vendor network to nominate appropriate individuals from their organisation to participate
- The initial communication would ask the vendor network members to confirm by email that they are interested in participating
- Review the confirmation emails received, if there is no expression of interest from a vendor that NAFEMS feels would have a strong interest in participating NAFEMS may follow up in personal email communications.

5 Collaboration Activities

Figure 5-1 shows the cross-functional process flow chart describing the creation of the subject MoU, the joint communique to the CAE vendors, a distribution list of vendors, and the distribution of the communique and follow-on activities.

The process described is of limited scope and duration, but may be just the beginning of continued collaboration to further the goal of defining the best practices for long-term archiving and retrieval of engineering analysis and simulation data.

Figure 5-1 – Process flow for LOTAR EAS collaboration with NAFEMS




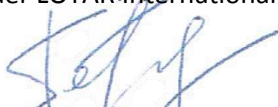
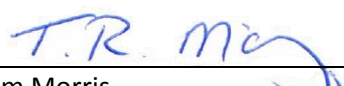


6 Duration

This MoU will be in effect from the date of signing until the end of the calendar year 2016. At that time, this agreement will be reviewed jointly by the LOTAR EAS WG and NAFEMS to identify mutual benefits of the ongoing collaboration efforts and to refresh it accordingly for future plans. During execution of this agreement, either party can choose to end the collaboration described in this MoU at any time or for any reason by giving notice via email, fax or phone call to/from the approver of one party to the approver of the other party (Rick Zuray and Jean-Yves DELAUNAY for LOTAR and Tim Morris for NAFEMS).

7 Review

The principals of this agreement will review and align the efforts established under this agreement on a regular basis, as required. This MoU is not a contractual obligation between the two principals, and in no way shall conflict with, modify, or negate clauses of any contracts which have been or are to be negotiated between the principals.

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Approve	 Tim Morris Chief Executive NAFEMS	<u>20 July 2016</u> Date: