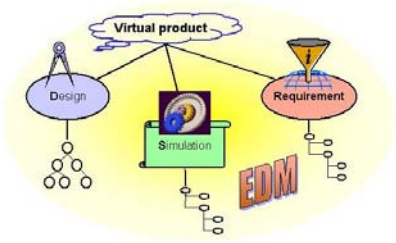

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VIVACE WP3.4

DELIVERABLE D3.4.6_2

INTERFACE WITH STANDARDISATION BODIES ACTIVITIES, TRAINING MATERIAL & DISSEMINATION MATERIAL

(SECOND RELEASE)

by

M. Teuber (MTU Aero Engines GmbH)

Abstract:

This document describes how the dissemination and exploitation of the VIVACE EDM Framework task is handled. It contains techniques which should be used and describes which important persons or companies should be informed. It is defined how this information task will be managed in the last working period. This includes the planning forecast for the VIVACE Forum 2 and Forum 3. Appropriate steps and activities for dissemination and training are sketched.

Dissemination:

PU

Deliverable/Output n°:	**D3.4.6_2**	**Issue n°:**	**1.1**

Keywords:

EDM, dissemination, exploitation, training, standardisation bodies

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1. EXECUTIVE SUMMARY

The global target in the VIVACE EDM Framework task is the development and validation of an innovative Engineering Data Management Framework. This framework will enable several partners involved in the aircraft and engine development process to share requirement, product and simulation data. Simulation data should be understood in a broader sense, i.e. covering the functional aspects, the behavioural as well as the geometrical aspects all along the life cycle, starting with early phases.

The target of this document is to disseminate and exploit the results of this VIVACE EDM Framework task so that within the European aerospace industry there is a common understanding on EDM related concepts, needs and objectives.

This document lists the dissemination and exploitation steps for the distribution of the results of the VIVACE EDM Framework work task.

The targets groups, the companies concerned and people involved are defined. The dissemination and exploitation strategy is outlined in a roadmap showing how the generated WP3.4 results will be distributed by using different tools like presentations, web pages, bringing in standardisation etc.

The preparation of the 2006 Forum 2 is described with proposed actions. There is also a forecast to Forum 3. Suitable steps for exploitation activities which have to be initiated are outlined.

2. STRATEGY FOR INTERFACE WITH STANDARDISATION BODIES ACTIVITIES, TRAINING MATERIAL & DISSEMINATION MATERIAL

Goal of VIVACE is to spread the gained results for the benefit of the aerospace companies irrespective whether they are OEM's or suppliers. The Software Users have to know about the enhanced abilities and the advantages of the new processes. The companies are the key for influencing IT-providers to improve their software products due to the needs of this new processes and techniques. The users shall adjust their software strategy to ensure the implementation of these enhanced possibilities. The using companies also can ask their supplying IT-Providers to adjust their software to the functional demands needed.

To ease this process the existing standards have to be reviewed in order to check whether they cover the extended functionalities, and to propose modifications in existing standards or creation of new ones otherwise. These adjusted or newly generated standards will provide a shared understanding how the new EDM processes will work. This will also result common rules for interfaces and adjustments required.

The objectives above can be achieved by using communicative devices such as articles in professional journals, participation with presentations in exhibitions, forums or seminars, direct visits at the concerned companies and internet presence where all relevant details are placed. Standardisation committees can be used to propose the results of the EDM research activities as standards.

To make this possible articles have to be free for unlimited publication. These articles should be of different kind insofar as they should be in the form of easy to read documents as leaflets, internet pages and or presentation(s) but detailed enough to show the new processes and their requirements. There should also be a prototype with which we can show how the new technologies work. It is recommended that there is access to this demonstrator for any interested user to gain to a detailed understanding of the elaborated details and procedures.

3. TARGET GROUPS TO BE INFORMED OR TRAINED

The results of the EDM Work Package shall be published. We need to ensure that the results are distributed to the IT-suppliers generating EDM software or customising adjustments. As mentioned before we also have to inform the main aerospace companies and their suppliers.

The key players for the realisation of the widely spread usage of the new processes are:

- IT provider:

  In the EDM environments, we are using commercial software from IT providers that are customized to our needs. To make sure that this software fits to our needs and customisation demands, the IT providers have to be aware of the new methods and needs worked out by our VIVACE project. They must adjust their software to the needs of the defined results and generate new software or capabilities if required.

- User companies

  They are all companies who design and/or manufacture aircrafts, engines, equipment or components. A lot of work is delegated to smaller suppliers; sub-contractors or third tier suppliers. These smaller companies take over a comprehensive share in our current and future aircraft and engine projects. They are of different size and often limited in their capabilities.

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- Standardisation committees

  These committees are responsible for identification of results and determine which have to be standardised by any standardisation body (e.g. ACD former AECMA, ISO, STEP etc). The existing standards for the EDM processes either for the data sets or the workflows we use have to be surveyed in order to check whether or not they are sufficient for the new processes. If a lack of functionalities is discovered in existing standards with regard to our EDM work package results, it will be necessary to initiate improvements of existing norms or the generation of new standards.

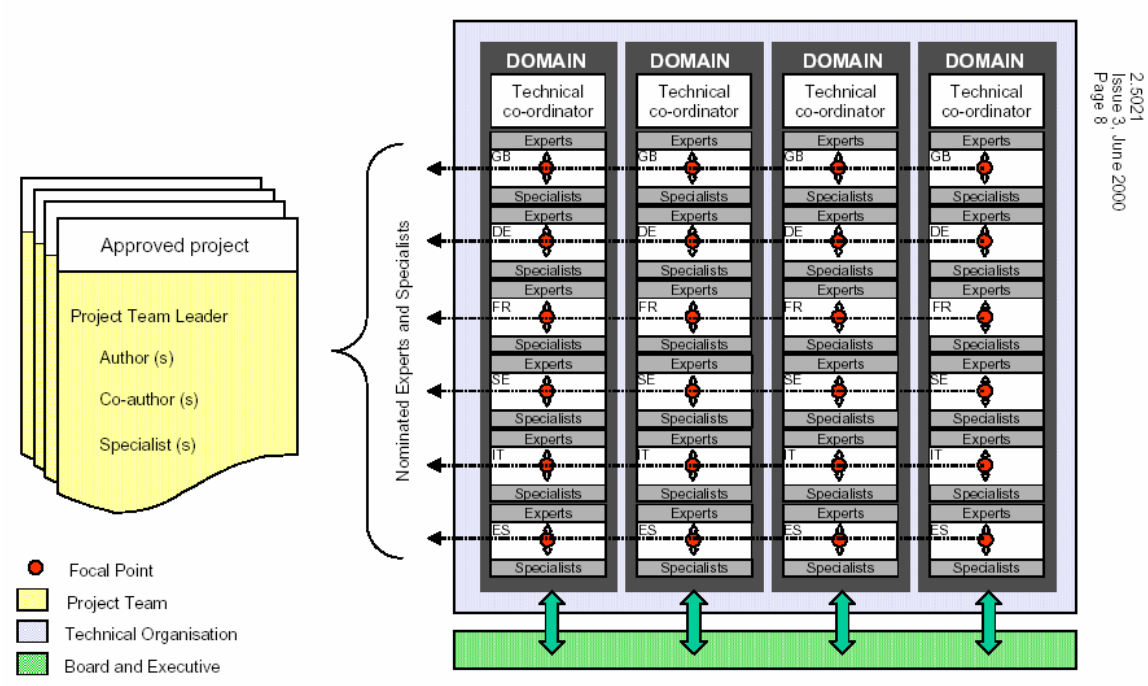

Figure 1 AECMA: Schematic diagram showing the main components in the standardisation process

Creating new standards or modifying of existing standards will force the IT companies to develop proper software to enable the widely spread usage of these new processes. In addition, the user companies are forced to implement the new technologies in their businesses.

4. ROADMAP / ACTIONS

Some deliverables generated in the ongoing work for Work Package 3.4 are restricted for internal usage in VIVACE. Therefore we need dedicated articles presentations and software which are free for open publication to show the common content of the work done. We also need presentations like the Forum 1 demonstration which can be freely used for comprehensive demonstration and exploitation activities. Further, we should identify which standards have to be improved due to the results of WP3.4.

To gain this material we have to review the deliverables created so far. If this material is usable for publication but not yet declared public we should check whether the status of the generated deliverables can be changed to public status or identify which modifications must be made to create the public status. If this status cannot be achieved new articles, publications etc. have to be generated for the distribution exploitation and training. The material classified as public should be generated in parallel to the preparation for Forum2 which is scheduled for completion at M30. It is also planned to have the EDM framework

definition finished and the EDM demonstrator prototype to be nearly ready at M30. As soon as the EDM framework definition and the demonstrator prototype are nearly finished we can analyse the achieved results and define the generation of dissemination & training material in more detail.

The following actions and roadmap represent a rough planning which will be worked out in more detail as a result of work done in the DOW3 Period. Since as a consequence not all details are currently known the current planning cannot be more precise. To enhance the planning workshops have to be set up in accordance with the overall VIVACE work

4.1. EXPLOITATION

It's the intention of VIVACE to exploit the results gained. We propose to use the elaborated benefits of our work package in the joint development of the next generation of aircraft and engines by the main partners – Airbus, RR plc, Snecma, DASSAV, BAES, THAV, VAC, Avio, etc. Since we develop the EDM technology on the basis of real-case problem solving we ensure a smooth move to the new VIVACE EDM methods and solutions. This also helps to integrate the results in the VIVACE partner companies. Since it is a fact that technology providers such as MSC, DAS-SY, etc collaborate in the development of the VIVACE EDM tools we lay the groundwork that the VIVACE output will influence their software products. This is supported by the adjacent described activities and actions done during the forums as well as the ongoing work.

The above describes how the VIVACE results will be made available to the entire aeronautical supply chain. So not only the leading companies have been implementing the VIVACE EDM methods but also the companies in the supply chain will get access to these new developments.

4.2. TRAINING ACTIVITIES

To achieve the targets defined in chapter 2 we have to exploit the EDM WP3.4 results, and therefore, to set up trainings. In a first step these trainings should be applied to members of the VIVACE project especially from the participant's of SP3 and assuming that the confidentiality of the demonstrated examples does not prevent this also from the other VIVACE members in SP1 & 2. The training can be held during/parallel to the VIVACE forums 2 and 3. Having these trainings in parallel to the forum 2 & 3 is the easiest way to get the VIVACE member in touch with the EDM demonstrator and the trainers of the WP3.4. In the trainings we show the new processes and tools for EDM. If the training cannot be held as described above, we have to set up dedicated training sessions. In the VIVACE internal trainings we can publish the deliverables we created as part of our VIVACE activities.

The prepared VIVACE-internal trainings will provide a basis for the training of the external companies which are not members of VIVACE. For these companies we use all the material (e.g. articles, presentation and - if available the WEB-demonstrator) which are declared public.

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4.3. ACTIONS

The activities listed below show the planning for the DOW3 period. Especially the Forum2 participation and the impact on standardisation bodies as well as the general publication efforts are listed.

No.	Activity	Responsible	Due Date
1	Identification of IT providers to be informed about the EDM WP Results	All WP members	March 2006
2	Identification of aerospace companies to be informed about the EDM WP Results	All WP members	March 2006
3	Selection of journals where the results of the VIVACE EDM WP should be published	All WP members	March 2006
4	definition of articles to be written	TBD	June 2006
5	Selection of events WP members/companies should join	All WP members	March 2006
6	Definition of the participants	TBD	June 2006
7	Impact in standardisation bodies	CRC-F; Airbus F	Dec 2006
8	Preparation of Forum2 Trainings for VIVACE members including papers, prototypes and training scenarios.	MSC, CRC-F, NN	June 2006
9	Preparation of Forum2 trainings for all interested companies	MSC, CRC-F, NN	June 2006
10	Publication of the EDM demonstrator	MSC, CRC-F	Jan 2008

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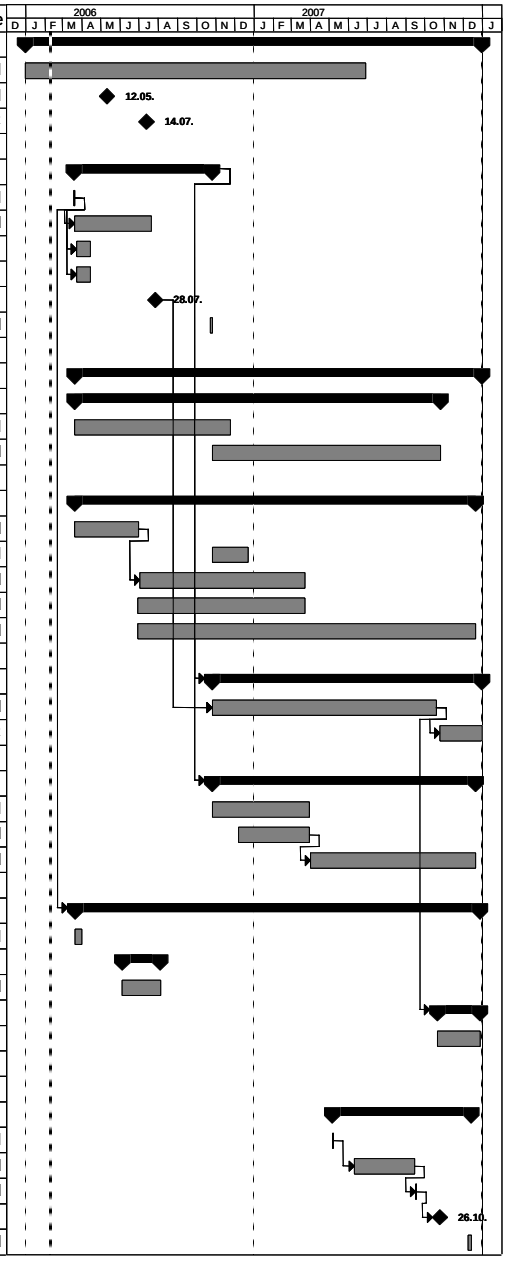
4.4. ROADMAP

In the roadmap below we define more precisely the actions which need to fulfil the requirements resulting from the general statements in chapter 4.1 and 4.2.

Nr.	action	Responsible
1	**DOW 3**	
2	Working on sub tasks	all
3	Framework definitions 90% finished	all
4	EDM prototype 90% finished	MSC
5		
6	**Forum 2 preparation**	MTU
7	Definition of the WP3.4 contribution / Kick Off	all
8	Preparation of the material/demonstration	tbd
9	Induce the invitation of relvant IT companies	CRC
10	Induce the invitation of relvant aerospace- or supplier companies	
11	Forum 2 contribution ready	
12	Forum 2	tbd
13		
14	**Training & Dissemination material**	
15	**Presentations / events**	
16	Selection of neccessary events	all
17	Allocation of participation and preparation	tbd
18		
19	**Article in professional journals**	
20	Selection of journals	tbd
21	Review of deliverables for public avaliiability	all
22	Definition of articles	tbd
23	Allocation of responsibilities	tbd
24	Publication of the articles	tbd
25		
26	**Demonstrator**	
27	Adjustment for publication	tbd
28	Accesibility localy or via Web	MSC
29		
30	**Standards**	
31	Verifikation of the impact of the WP-results on existing standards	all
32	Initiate necessary changes of exisiting standards	tbd
33	Initiate the generation of new standards	tbd
34		
35	**Exploitation and Training**	
36	Identifikation of SP3 participating companies	all
37	**Preparing of internal trainings for the forum2**	
38	Content, material and trainer	tbd
39	**WEB-Demonstrator trainings**	
40	Preparing and documentation of demonstrator scenarios	MSC, CRC
41		
42		
43	**Forum 3 Preparation**	
44	Definition of the WP3.4 contribution	all
45	Preparation of the material/demonstration	tbd
46	Allocation of responsibilities	tbd
47	Forum 3 contribution ready	
48	Forum 3	tnd



Explanation:

- Invitation of IT providers: Based on the software providers listed in the state of the art deliverable D3.4.1 the IT companies shall be invited for the Forum 2
- Invitation of aerospace companies or related providers: Good sources for identification of parties to be invited are participants in VIVACE or in similar Research projects. Inviting these companies covers most of the relevant European aerospace companies. Possibly we should invite also aerospace companies from additional other countries.

- Responsibility for articles: Dedicated person taking care of the timely provision of all necessary activities e.g. registration, call of paper and finally the preparation of the Paper, presentation etc.
- Responsibility for presentations/events: When the participation and the acting person(s) are defined they take care of all necessary actions needed to make the registration, the preparation and presentation of the defined presentation.

4.4.1. Eligible Events for Presentations

The table below lists possible events (conferences, exhibitions, etc.) where WP3.4 members can present the EDM progresses and results

No.	Date	Title of the Event	Location of the Event	Description of the Event	Web Page
1	March 22 – 24th, 2006	Second International Conference I-ESA'2006	Bordeaux, France	The conference will focus on interoperability related research areas ranging from Enterprise Modelling to define interoperability requirements, over Architecture and Platforms to provide implementation frameworks to Ontologies to define interoperability semantics in the enterprise.	http://www.i-esa.org
2	24-26 April 2006	MSC Virtual Product Development	Detroit, USA	This conference is dedicated to providing you with the latest information on the strategies and technologies that you can use immediately to enhance concept development, design, simulation, testing, manufacturing, and business performance.	http://www.mscsoftware.com/events/vpd2006/na/index.cfm
3		NAFEMS Events			http://www.nafems.org/events/nafems_events.html
4	15 March 2006	CPDA	Atlanta, USA		http://www.cpd-associates.com

4.4.2. Actions for FORUM 2 & 3 Preparation

For the VIVACE Forum 2 in 2006 and also Forum 3 in 2007 presentations and demonstrations have to be prepared.

The following actions are defined in order to be ready on time.

No.	Topic	Description	Responsible	Due Date
1	Definition of Forum 2 presentations	Presentations to be held on Forum 2 have to be defined. A form has to be completed to define the needed environment for Forum 2	All WP3.4 members	April 2006
2	Preparation of WP 3.4 Forum 2	WP3.4 presentation/demonstration with an AVI to show the WP work on the Forum 2	M.Teuber together with WP3.4 members	July 2006
3	WP3.4 Leaflet Update	The WP3.4 Leaflet has to be updated.	M.Teuber	July 2006
4	WP3.4 Poster Update	A Poster has to be prepared to represent the current WP status.	M.Teuber	July 2006
5	Definition of Forum 3 presentations	Presentations to be held on forum 3 have to be defined. A form has to be completed to define the environment required for Forum 3	All WP3.4 members	July 2007
6	Preparation of WP 3.4 Forum 3	WP3.4 presentation/demonstration with an AVI to show the WP work on the Forum 3	M.Teuber together with WP3.4 members	Oktober 2007
7	WP3.4 Leaflet Update	The WP3.4 leaflet has to be updated.	M.Teuber	Oktober 2007
8	WP3.4 Poster Update	A poster has to be prepared to represent the current WP status.	M.Teuber	Oktober 2007
9				

5. CONCLUSION

In this document the dissemination, exploitation and training task till the end of the VIVACE project has been explained. The target groups (companies and contact persons) for the activities were described and also in which way the dissemination, exploitation and training Task above can be realised. In a roadmap the required activities were defined including the preparation of documents presentations and demonstrations for VIVACE Forum2 and later also Forum 3.

It was demonstrated which further activities are required to publicise the enhancements and insights gained. In a rough planning, the remaining steps for the publication were described.

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ANNEX

6. AVAILIABLE DISSEMINATION AND EXPLOITATION MATERIAL

6.1. STANDARDIZATION BODIES ACTIVITIES

Here we achieved the following milestones:

Preparation of standards EN9300 LOTAR, for long term archiving and retrieve of digital aeropace product information.

More specially, sending for ballots of Consensus draft

- prEN9300-003 : Fundamentals and concepts
- prEN9300-011 : Data Preparation
- prEN9300-012 : Ingest
- prEN9300-010 : Overview
- prEN9300-013 : Archival Storage
- prEN9300-014 : Retrieval
- prEN9300-015 : Remove

The standard plans to include specific parts for LTA of Systems Engineering, Analysis data, Composite, Electrical Harnesses,

Harmonisation - with the IAQG LOTAR project (1 meeting + biweekly phone calls)

- with the US PDES Inc Long Term Data Retention project

  and

- with the ProSTEP LOTAR project (in relationship with ADS Stan LOTAR).

Development of new recommended practises for exchange and long term archiving of CAD geometry (Validation Properties based on a cloud of points)

Recommendation for the use of STEP with XML (Part 28)

Contribution to the definition of "open standards for product data interoperability" used by PDES Inc

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6.2. EDM TRAINING MATERIAL & DISSEMINATION MATERIAL

6.2.1. Stand material / Leaflets

This table aims at listing all available material ready to be distributed at any exhibition or special event:

No.	Title	Location on www.mayeticvillage.com	Description	Availability
1	WP3.4 Leaflet (see annex)	Home/WP3.4/T3.4.6 /Stand material/ Leaflets	Overview about the WP3.4 EDM Framework, the goals and participants of this task	Public
2	Demonstration/ AVI	Home/WP 3.4/T3.4.6/Forum1	Video of the Demonstration (on CD)	Confidential
3				

6.2.2. Presentations

This table aims at listing all the Presentations performed during any event

No.	Date	Title of the Event	Location of the Event	Title of the Presentation	Description	Location on www.mayeticvillage.com	Availability
1	21/11/ 2004	MSC-VPD	München Germany	VIVACE: Collaborative EDM Framework	Presentation about Vivace and especial the EDM Framework. It describes the goals and purposes of the EDM task	Home/WP 3.4/T3.4.6/Presentations/Folder	VIVACE Consortium Confidential
2	20,21, 22/08/ 2005	Forum1	Warwick Great Britain	Intelligent engineering with EDM	Demonstration of the work and the Results of the EDM work package 3.4	Home/WP 3.4/T3.4.6/ Forum1	VIVACE Consortium Public
3	26/10/ 2005	MSC. Software 2005 VPD	München Germany	Engineering Data Management Framework in the Context of Virtual Aeronautical Collaborative Enterprise		http://www.mscsoftware.com/events/vpd2005/emea/orderPapers.cfm	Public
4							

This document is classified as Public

6.3. PUBLIC DECLARED AVAILIABLE MATERIAL

This table aims at listing all available material for presentations, articles and posters:

No.	Title	Location on www.mayeticvillage.com	Description	Availability
1	EDM Logo		Logo which identifies the EDM work and is used on presentations, articles, posters etc.	Public
2	EDM Presentation		Overall PowerPoint presentation of EDM	VIVACE Consortium confidential
3				

6.4. WEB-MATERIAL

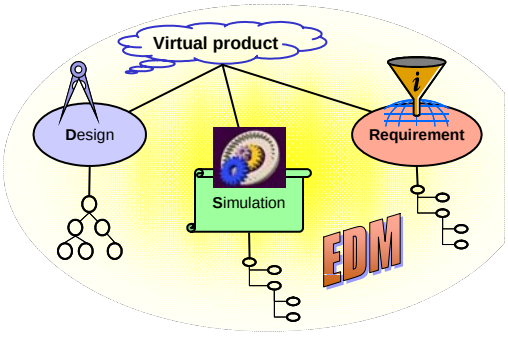
This table aims at listing all the presentations, references, etc. available on the web

No.	Title	Location on http://www ?	Description	Availability
1	Advanced Capabilities	http://www.vivaceproject.com/content/advanced/advanced_intro.php	General description of WP3 with a hint to EDM Framework	Public
2				

6.5. THE WP3.4 (EDM) LEAFLET

See next page

WP3.4 (EDM)
Engineering Data Management



INTRODUCTION

Today Concurrent Engineering activities during an A/C development programme are mainly organised around a static representation of the product: the Digital Mock-up (DMU). The engineering data related to this static representation is made of engineering objects such as CAD models and drawings, assembly drawings, space allocation models, or BOMs. To manage this data the Aeronautical Industry is currently moving to commercial Product Management Systems (i.e. Enovia/VPM from Dassault Systemes, Teamcenter - Engeneering/-Enterprise from UGS or Windchill from PTC). This move is considered as a complex one, as the aim is not only to support the product representation using configuration management methods (including effectivity management), but also to manage the related collaborative activities and modification processes (change management, impact analysis).

The step beyond addressed in the VIVACE EDM Work package is to manage engineering data in a broader perspective.

OBJECTIVES

The main objective of EDM framework is to develop inter-discipline data management mechanisms to achieve a whole Simulation Framework based on PLM. This objective implies:

- Delivering management mechanisms required for heterogeneous sets of data, such as requirements, CAD data, DMU data and simulation data.
- Building an environment including the required data converters to translate data from a CAD representation to a simulation representation (with translation quality aspects).
- Developing an inter-disciplinary Configuration Management environment capable of managing the consistency between CAD/DMU data and simulation data.
- Implementing rules on managed data, such as maturity rules for data exchange.
- Managing design and simulation data in a coherent way

GOALS

VIVACE WP 3.4 intends to develop and validate an innovative Engineering Data Management Framework enabling several partners involved in the aircraft and engine development process to share requirement, product and simulation data (simulation must be understood in a large sense, covering the functional aspects, the behavioural aspects as well as the geometrical aspects) all along the life cycle, starting from early phases of the product definition.

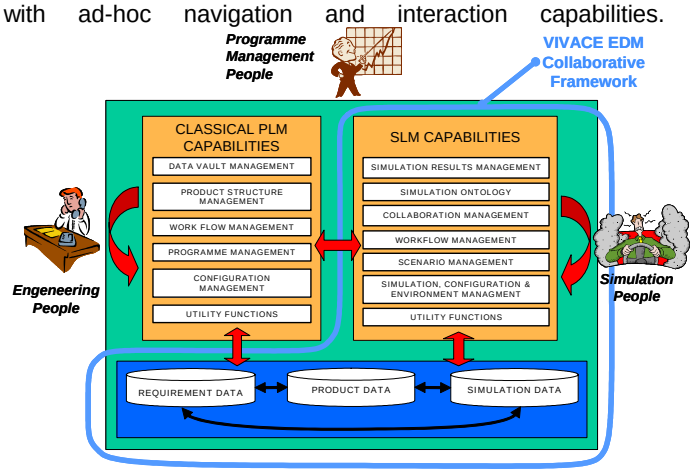
It is considered that the adoption of shared simulation data management capabilities by A/C development partners will lead to a significant enhancement of the development process. In this context the objective of the EDM work package is to develop an innovative EDM framework enabling to extend the today DMU oriented data management methods to the ***management of a full distributed modelling and simulation environment life-cycle*** (Virtual Aircraft/Virtual Enterprise).

The global aim is to develop and validate an innovative Engineering Data Management Framework enabling ***several partners involved*** in the aircraft and engine development process to ***share requirement, product and simulation data*** (simulation must be understood in a large sense, covering the ***functional aspects, the behavioural aspects*** as well as the ***geometrical aspects***) all along the life cycle, starting from early phases.

Part of the Framework covers classical PLM functions (i.e. as defined by the PDM market or by standardisation bodies like OMG) such as:

- Data vault (storage of technical objects, configuration data, model data using check-in/check-out mechanisms and maintaining revision and status data)
- Structure management (manage the technical object structures, the structure variations –i.e. revisions, affectivities- and structure views)
- Workflow management (defined and automated processes –list of actions with responsibilities- to be used for configuration management or decision making –i.e. approvals-, notification, distribution)
- Program management (manage WBS in relationship with technical objects structure, associate resources to activities, manage milestones, program analysis)
- Utility functions (data logistics –transport, translation-, communication, system administration, data security) those functions being accessible by end-users through a portal with ad-hoc navigation and interaction capabilities.

These functions are accessible by end-users through a portal with ad-hoc navigation and interaction capabilities.



The ambition of VIVACE EDM Framework is to manage a broader set of technical objects such as requirements, product information and simulation information, and links between these various types of technical objects, as described in the figure.

METHODOLOGIES

For the Functional & Technical and the Requirements analysis, the technique of the ***Zachman framework*** is used to describe the logical model as well as the Software & Physical architecture. For the Results of this Analysis and the description of the processes we will generate process models using the UML formalism.

This figure identifies "Simulation Lifecycle Management" capabilities, which mirror the PDM capabilities for the Simulation and Analysis domain: data warehousing capabilities for simulation results storage and retrieval, simulation and analysis metamodels (ontology), management of the execution of collaborative simulations (collaboration management), management of simulation scenarios, management of simulation configurations and utility functions.

Main identified risks associated to this objective are related to:

- The ability to handle this complex domain (heterogeneity of requirements, complexity of technical object structures and relationships),
- The ability to manage the development process of such a complex system as the EDM Framework
- The risk to deliver a Framework too dependant from a technology platform
- The risk to develop a Framework not compatible with operational constrains. To mitigate these risks the following approaches and actions will be undertaken:
- A spiral development lifecycle model will be used for the EDM Framework development process, ensuring iteratively the validity of the developed models. Three iterations are foreseen, each of them including analysis, development and validation activities, the results of which will be demonstrated at each of the three planned VIVACE Forums.
- A Systems Engineering process will be used, beginning with Requirement analysis, then Functional analysis and allocation and Design synthesis, with the required loops between these activities to ensure the optimal mastering of the EDM Framework system.
- Three representations of the EDM Framework will be defined and updated in parallel during the development process: a requirement model, a functional model and an implementation model. The first iteration will focus on the two first models; the second iteration will develop the implementation model and provide feedbacks to the functional model to ensure feasibility and performance of the Framework.
- The functional model will rely on standards (STEP, OMG), it will be described using UML and will allow describing all required business models. The use of the Model Driven Architecture (MDA) as proposed by OMG will guarantee an adequate independence of the function model regarding the choice of implementation technologies.

The following work process is then envisaged for the work package:

- Starting from a large external state-of-the-art and best practices analysis, the EDM partners will refine EDM work package work plan and the required quality procedures will be established. Based on this common understanding, Use Case requirements will be analysed, re-negotiated with Use Case representatives, categorised and prioritised. A global set of EDM Framework requirements will be produced, including functional requirements, performance requirements and evolution requirements.
- During the core part of the project several tasks will be carried out: Acquisition and customisation of standards, Building of the EDM framework, Link with the infrastructure Work packages, Interface with standardisation bodies. Concrete results (prototypes and documentation) will be delivered to subproject 1 & sub-project 2 use cases, based on the agreed EDM framework, for evaluation and validation.
- Starting as early as possible in the project the last set of EDM activities will consist to evaluate the results, presentation to the certification authorities, ***provide dissemination material*** and identify ***further research needs in the EDM field***.

FOR MORE INFORMATION ON VIVACE - EDM:

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