

# THE EXPRESSway

EXECUTIVE AND TECHNICAL INFORMATION FROM

Jotne JOTNE EPM TECHNOLOGY No. 11



## Enabling interoperability through standardization



# Jotne – engineering technology

*The Jotne Group may seem as if it is made up of a disparate collection of businesses, but if you take a closer look at Jotne's history and background, you will find a common thread linking them all.*

From a small beginning as EPM Consultants nearly 30 years ago, Jotne has developed step by step in a number of directions. Yet the fundamental industrial platform of technology and engineering is common to all our businesses. Today, Jotne comprises a group of highly skilled engineering companies, which supply knowledge, products and services to the oil and gas, aerospace, defense, processing and manufacturing, transport and environmental sectors.

## About Jotne EPM Technology

Jotne EPM Technology is a member of the Jotne Group, specializing in Logistics Information Technology. Since 1990 the company has developed database solutions to handle standards such as ISO 10303 STEP, PLCS, ASD 1-5000 series etc. These are open specifications with public availability used by aerospace, space and defence-related industries to manage information about complex systems. Jotne has a staff of about 300 people, and its IT products are used by clients all over the world, including the US Department of Defense, the European Space Agency and leading aerospace/defence/space contractors. More information: [www.jotne.com](http://www.jotne.com)



The EXPRESSway

Published by Jotne EPM Technology

Issued: October 2009 / Circulation: 4,500

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Nearly eighteen years ago this understanding of technology, engineering and production formed the starting point for our expansion into the area of technical support/Information Technology systems. Jotne's software is used today by the world's leading civil aviation, space technology, oil and gas, vehicle manufacturing and defense industries. Our solutions are based on our own groundbreaking technology which takes as its starting point our customers' desire for standardized data models and data exchange formats.

Our third business area, property management, ownership and development, supports our industrial activities. In our view it is both necessary and desirable to have full control over our production facilities. Today we own all the properties in which we have operations, and see that this provides long-term security for our businesses. Our activities in the property market will eventually afford opportunities for spin-offs in the form of redevelopment projects, with our sound technical and industrial competence providing a good foundation for future investments.

Our way of thinking may be a little unusual at a time when the trend is to 'concentrate' technologies and markets. However, we believe that highly competent, all-round technological environments help to spawn and develop good ideas.

Over the years we have proved this by developing centres of excellence within several of our core businesses. Our versatility also offers us protection against changes in the business cycle. Although we must always be prepared for difficult times, we feel that the Jotne Group's ability to adapt rapidly to change puts us in a strong position to meet whatever challenges may arise in the form of growth or consolidation.

J. Aa. Sørensen, CEO Jotne Group



## Jotne Opens up North American Office

*After more than 15 years of extensive travel to remotely drive business in the North American market, Jotne is pleased to announce the opening of our first US office based out of Denver, Colorado in the summer of 2009.*

As part of his opening, James Martin has been appointed Director, North American Operations with responsibility for business development, marketing and technical liaison with North American customers.

"James is a great addition to Jotne's team," says Kjell Bengtsson, Vice President of Sales and Marketing. "James has more than 20 years of experience in the PLM, logistics and engineering software industry before Jotne with ITI TranscenData and SDRC. He has a broad range of experiences including technical marketing, business development, consulting and product management of an assortment of design, analysis, data management, interoperability and logistics software solutions. Working remotely and independently to drive a business can be very complex and cross many company and country cultures. Jim's background

is perfect for this role and he has already melded well into the Jotne EPM team."

"I am very excited for the possibilities that exist to expand the business here with the cutting-edge technology and expertise that has been coming out of the Oslo for the last 15 years," says James. "I look forward to exposing my customers to how the concepts such as PLCS, DEX's, S-Standards, SCORM, EXPRESS and more all fit together to address their interoperability and logistics challenges in the context of their business requirements."

James possesses a Masters in Mechanical Engineering from Michigan Technological University and an MBA from Xavier University. He speaks conversational Japanese and enjoys spending time with his family in the mountains near the suburbs of Denver where Jotne North America is based. His Norwegian language skills are still a work in progress.

Mr. Martin can be reached at [jim.martin@jotne.com](mailto:jim.martin@jotne.com) or 720-988-8926.



Martin Ellacott.

## The OCCAR view on the S-standards

*OCCAR is proactive in supporting and developing the ASD specifications in conjunction with PLCS, says ILS/ISS Officer 1 Martin Ellacott in OCCAR-EZ. OCCAR is the French, British, German and Italian Organization for Joint Armament Cooperation.*

At the time, Ellacott was attending the AIA/ASD Brussels meeting earlier this year where the further development of the S standards was on the agenda. After the meeting EXPRESSway asked him about the benefits he sees and expectations he has regarding the new Sx000-series Standards and PLCS?

EXPRESSway: Can you describe your expectations

for the ASD specifications?

Ellacott: We in OCCAR-EA see the ASD Suite of standards to be highly beneficial to our Organization. They offer internationally recognized, up to date and well maintained specifications that are used widely by our member and participating states and also by our Industrial counterparts. They are applicable to our Through Life Programme Management approach and offer an integrated 'one stop shop' for ILS and LSA guidance. As with S1000D and S2000M we expect the new specifications to be adopted widely by European defense programs in the future.

EXPRESSway: How does PLCS tie into all this?

Ellacott: PLCS is the way forward for through life data exchange activities. PLCS is also supported by our Customers and Industry and it is very important for Collaborative programs to be able to specify and control essential support information throughout a defense system's life. It is OCCAR-

EA's policy to specify PLCS for data and information management and we expect PLCS to continue its evolution and become first choice for European defense programs.

EXPRESSway: So can you review the applicability to OCCAR-EA?

Ellacott: OCCAR is proactive in supporting and developing the ASD specifications and PLCS. We consider the ASD suite of standards and PLCS to reflect best practice. They meet our corporate vision to be "a centre of excellence, and first choice in Europe, in the field of collaborative acquisition of defense equipment" and as such we have incorporated them into our procedures. They are most applicable to OCCAR-EA because it is essential to specify internationally recognized standards and specifications rather than National ones for collaborative programs. There is no doubt that for OCCAR-EA, the S-standards are to be a central part of any effort to globalize effective collaboration within the aerospace industry.

# The S-standards will cover technical documentation needs



Carl-Johan Wilén

*If there is one man whose attendance was significant for the Brussels meetings earlier in 2009 addressing the launch of new S-standards, it was Carl-Johan Wilén from Saab Aerotech. As one of the original founders of the ASD S1000D standard, Wilén and Albert Grabmeier from EADS were central to the Aerospace Industries of Europe (ASD) Customer Support Committee.*

According to Wilén, the S1000D standard as used in all major multinational NATO programs will cover all the needs of technical documentation. Having lived 35 years of his life in the world of information management with 25 of these years focused on aerospace standards, Wilén is pleased to see the growing interest around these standards and expects continued rapid development for years to come.

S1000D is a functional specification for generation, maintenance and transmission of technical documentation in digital format, using a common source database. According to Wilén, S1000D is maintained by a collaborative international organization with military, civil and industrial participation under the umbrella of ASD, the Aerospace Industries Association (AIA) and the Air Transportation Association (ATA). S1000D supports all features of page oriented and interactive electronic technical publications. The standard was initiated as early as 1985 by European defense customers and European industry, but did not obtain global recognition until the AIA engaged in 2001. Later in 2006, the civil aviation industry joined and by this time, the specification had become widely accepted.

### UNDER THE UMBRELLA OF ASD

As the foundation of the S-standards, S1000D is enhanced by other important logistics specifications. One of these is S2000M which covers material provisioning and is also used by NATO. S2000M is managed by the Maintenance and Co-ordination Group (MCG) which is a collabora-

tive international organization under the NATO Maintenance & Supply Agency (NAMSA). This standard is defined by Wilén as a functional specification

for material management of defense products, based on integrated data processing and electronic data interchange. Wilén, Grabmeier and their colleagues in ASD are working hard to define S2000M further to the point where it will be applied similar to S1000D.

On top of S1000D and S2000M, another specification is S4000M, the procedure handbook for the development of scheduled maintenance programs for military air systems. There is also S3000L, the international procedure handbook for Logistic Support Analysis (LSA). Finally, it is also worthwhile to mention the newly arrived S5000F which



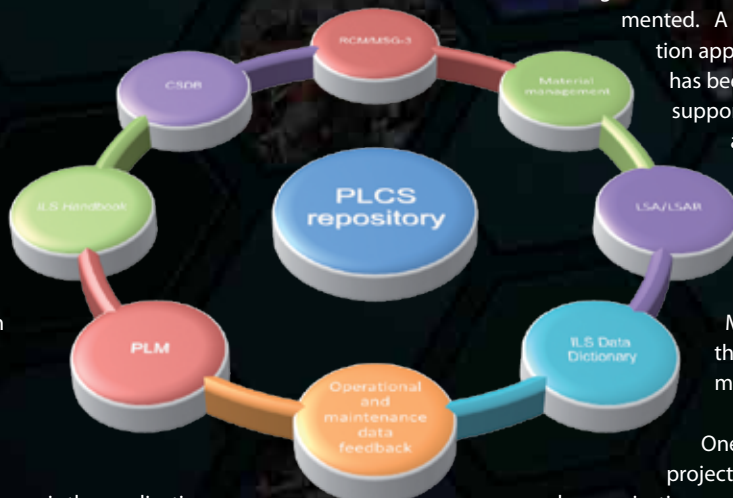
June 2009 and the full lineup will be in place at the beginning of 2010. If readers of this issue of EXPRESSway should have any observations, they should be sent to European chairman of ASD: Peter Eichmüller (peter.eichmueller@eads.com) or to his U.S. counterpart Bill Foreman (bill.foreman@boeing.com)

### STANDARDS SUPPORTED BY A PLCS REPOSITORY

While each of these individual standards is groundbreaking, it's even more important that all of them are supported by PLCS. This support extends from S1000D upwards to S9000D, the latter being a data dictionary that will be broadly implemented. A key direction the implementa-

tion approach for these standards that has been taken is through a centrally supported PLCS repository that acts as a essential hub of information.

It is exactly these types of scenarios that Jotne EPM Technology envisioned many years ago when defining the EXPRESS Data Manager (EDM) as a database that focused on standards based management.



One last important future ASD projects worth mentioning will be the harmonization and integration of data between the ILS Specifications. Proper harmonization of data always involves development of the relevant data model to be able to manage all product related ILS information in one common repository. Jotne EPM Technology looks forward to being an integral part of this future activity through the application of Jotne EXPRESS data modeling technology and expertise in addition to our long proficiency in international standards development.

### ABOUT ASD-STAN

ASD-STAN establishes, develops and maintains standards requested by the European aerospace industry. It is well recognized as the European body for the development of global aerospace standards by the International Aerospace Quality Group (IAQG).

Read more at: [www.asd-stan.org](http://www.asd-stan.org).

is the application handbook for operational and maintenance data feedback. Wilén is grateful for all the work that Jotne EPM Technology and others have done to make these standards successful through consulting, prototyping and involvement in standards organizations.

### THE THIRD GENERATION

Having been long in the world of the S-standards, the continued near and long-term evolution of the standards is always on Wilén's mind. The third generation Integrated Logistic Support (ILS) standards, of which the S-Standards are central, are close to completion and the management umbrella where all the above mentioned standards are placed under is the ILS Handbook called SX000I.

Wilén considers the official publication event held June 2009 as crucial for the new S-standard advancement. As part of the official publication, a six month comment period was started and all remarks will be forwarded to and discussed within the S3000L/S4000M expert groups. The official launch of S3000L and S4000M started in

# Jotne EPM's Jochen Haenisch Award for standardization work

*Jochen Haenisch from Jotne EPM Technology was awarded the prestigious International William J. Conroy Standards Professional Award in May of 2009. This award is given each year by PDES Inc. for the individual from the technical community who has shown exceptional leadership in the development or implementation of Product Data Exchange standards.*

Haenisch is Director of International Standardization and Director of Defense and Aeronautics at Jotne and has been involved in standards development for over 20 years. The award ceremony took place in British Columbia, Canada.

Jochen's selection was unanimous due to his proven providing outstanding international standardization work. Haenisch has participated actively in the development of methodology and product model standards in several international committees within the international standardization committee ISO. He has been a key resource in the ISO TC184/SC4 standards development community during the past two decades. Jochen



Jochen Haenisch (left) and Howard Mason.

has attended most plenary meetings of the SC and the TC, for several years as head of the Norwegian delegation. For several of the STEP standards he has been Project Leader. Currently he is deputy convener of ISO/TC 184/SC 4/WG 12, Common resources.

Jochen is also a world-recognized expert in the EXPRESS language. He has provided significant support to the maintenance of the EXPRESS

language reference manual and tools associated with implementation aspects of the standard. This experience that Jochen has is critical in the current projects that Jotne EPM Technology is involved in that include expanding the standards in aerospace via the LOTAR international PDM interoperability working group. His experience in understanding and guiding PLCS related projects will be critical as more companies become aware of the breadth of possibilities that PLCS provides.

## Product Data, Documentation and E-learning (SCORM)

*Norway's leading provider of e-learning, Mintra AS, has been involved in several international projects which aims for new methods and systems to facilitate efficient development of advanced training and documentation solutions based on updated product data.*

Today, a great deal of work is being done twice due to the lack of integration between tools for developing training and documentation respectively, says Mr. Ivar Viktil, Managing Director of Mintra AS.

Over the last couple of years, Mintra together with several companies from both Europe and the United States have looked into how SCORM, the

leading standard for e-learning, can be integrated with S1000D, a similar standard for technical documentation.

SCORM - Sharable Content Object Reference Model, is a collection of standards and specifications for e-learning. It defines communications between client side content and Learning Management Systems. SCORM is a specification of the Advanced Distributed Learning (ADL) Initiative. Mintra and most other e-learning companies have adopted the standard.

The next natural step will be to look into how Product Life Cycle Support (PLCS) can take this harmonization even further. We need to ensure that learning data and technical documentation are developed and maintained based on consistent data for Integrated Logistic Support data (ILS), continues Viktil.

PLCS is an international standard used in ILS to validate links between engineering changes,

maintenance activities, and technical documentation. By applying PLCS principles, we create an opportunity to subject technical learning content to rigorous ILS configuration processes. PLCS might also be extended to support Training Needs Analysis (TNA). PLCS has demonstrated its ability to hold and manage product support data through the life of a product.

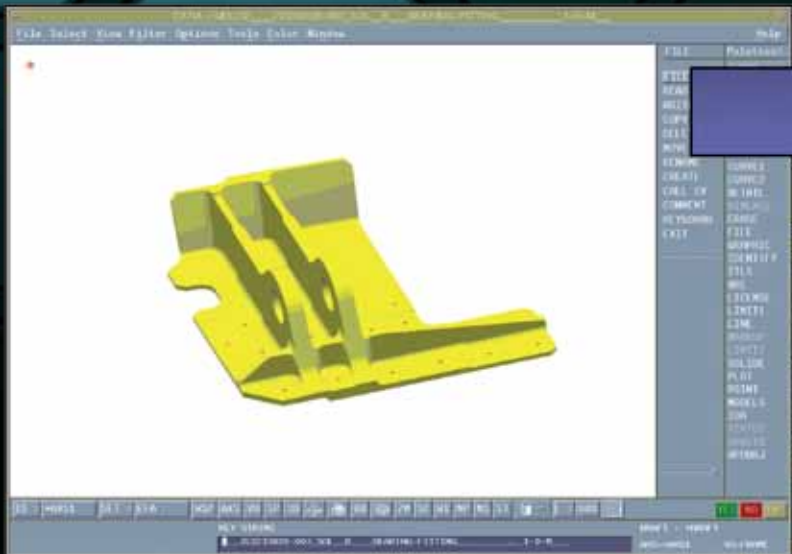
Today there is not a vendor-neutral communication protocol between content development tools and a common source database which would facilitate the life cycle support of technical content for learning.

We believe it's necessary to work internationally, with well accepted standards within each field, to achieve a break-through in our work to integrated computer-based training and technical documentation. We also need to work together with the best expertise available in this important matter and have already learned a lot from Jotne EPM Technology on PLCS, concludes Mr. Viktil.

# LOTAR choose Jotne EPMT for PLM Interoperability

## About LOTAR:

LOTAR International is a working group jointly hosted by the ProSTEP iVIP Association, PDES Inc, AIA, and ASD-Stan. Its aim is to develop a standard designed to provide the capability to store digital product information in a standard neutral form that can be read and reused throughout its lifecycle, independent of changes in the IT application environment originally used to create it. The multi-part standard covers both the information content and the processes required to ingest, store, administer, manage and access the information.



*Jotne EPM Technology has been selected as a service provider to the LOTAR International team that is investigating and developing standards for the long-term archival of digital product data.*

Work has been ongoing for a number of years within LOTAR to address the digital archiving of 3D CAD parts with associative manufacturing information. This next step involves understanding the requirements and developing the approach for long-term archival of PDM or product structure data and this is where Jotne's expertise will be applied.

The work that Jotne will be performing for the LOTAR team will address the need for Long Term Archiving and Baseline definition of PDM data 'as designed'. PDM/PLM data often defines the

product structure as the system of parent-child relationships that characterizes the component hierarchy for an aircraft or other manufactured products. The Jotne work will help the LOTAR members describe the product structure of a mature design that may be delivered to manufacturing organizations to create aircraft products and eventually used for archival.

Jotne will be working with the team as a whole and individual companies to help them answer the key following questions in order to optimize and standardize their data retention process in regards to product structure:

- Why are we archiving the data?
- What are the business requirement?
- What are the regulatory requirements?

- Are there beneficial Organizational Requirements?

Jotne will be coordinating to find the answers to these questions for the LOTAR members and implementing the first pilot of a standards based approach to solving this complex problem. By taking this next step, LOTAR International with Jotne's help will enable aerospace companies to start considering the full extent of their digital data when addressing their archival challenges.

## Jotne participates at defense suppliers' forum at Akershus Fortress

On September 2nd Jotne's Kjell Bengtsson presented Jotne's approach to better cooperation between members of the defense industry at the defense suppliers' forum arranged by FSi (the association for defense and security industry) and KDA (Kongsberg Defense and Aerospace). The forum gave the opportunity for tier II and III members of the FSi to expose themselves as potential subsuppliers and

contracting partners for tier I members as well as meeting with representatives from the Norwegian Armed Forces. The minister of defense, Anne-Grethe Strøm-Erichsen, opened the forum. An important element was a parallel seminar with NAMSA (NATO Maintenance and Supply Agency).



# Jotne Active in Fall 2009 Interoperability Events



*As part of a more aggressive push into the North American market with the recent addition of the first US office based out of Denver from June 2009, Jotne is active at an assortment of events where global data product interoperability will be discussed.*

October 2009 is a busy month starting off with the Aerospace Industries Association (AIA) Products Support Conference. At this event, DoD and Industry keynotes feature presentations and discussions organized to provide the logistics and sustainment attendees with a broad understanding of where changes will effect Product Support the most.

Immediately following this is another AIA event titled "S1000D: Realizing the Benefits of Integrated Logistics Support (ILS) - From Vision to Realization". Jotne plans to exhibit and VP of Sales and Marketing Kjell Bengtsson journeys from Norway to present: "A PLCS repository - The data spider". This presentation is focused on the approach taken for implementation of a PLCS repository managing data between customer PDM and ILS systems through the use of PLCS DEX and ASD logistics standards.

Later in October 2009, Jotne will take advantage of their new membership in the CATIA Operators Exchange (COE) to present and exhibit at the COE Aerospace-Defense workshop in Ft. Worth, Texas. Director of North America Jim Martin comments that, "This yearly event brings together many of the major aerospace and defense companies that

have a need for the interoperability and logistics support solutions that Jotne provides. I am looking forward to presenting an overview of many of the topics such as PLCS, DEXs and how these tie into PLM Interoperability and Logistics Support." In November 2009, Jim Martin continues to represent Jotne at the Global Product Data Interoperability Summit. The event this year is of special interest for Jotne since it's the first time Boeing and Northrop Grumman have joined forces to co-host. The event this year combined three previous separate conferences into one including: The Boeing Product Data Exchange Conference, The Boeing SOA deep dive, and the Northrop Grumman PLM Summit. The Summit's theme, "Common Information in a Changing World," reflected its focus on service-oriented architecture (SOA), product lifecycle management (PLM) and the shared data standards these product development solutions depend on.

Finally, in addition to these new and exciting events in the North American market, Jotne is still actively involved in the European events that are important to PLM and logistics customers. These include: Nordic Defense 2009 in Sweden, Defense Logistics 2009 in London and looking early in 2010, the 6th NATO Life Cycle Management Conference. While Jotne knows that 2009 has been a difficult year for many of our customers, we continue to remain active in these events as to simplify our client's ability to work with us and find new solutions to improve their business situation.

 buildingSMART



Similar to PLM systems and their relationship to manufacturing, establishing a proper IT environment for buildings and their infrastructure is an important part of operations and logistics. Better buildings provide better work environments and productivity for workers plus reduced facility management cost that relieve tight building maintenance budgets. While PLCS, ASD Sx000 and SCORM are the preferred standards for product life cycle support, buildingSMART is the interoperability alliance that manages standards for the Architecture, Engineering and Construction / Facilities Management (AEC/FM) industry. Comparable to STEP as the interoperability format for manufacturing, Industry Foundation Classes or IFC is the international specification for product data exchange and sharing for AEC/FM.

So how does this all tie together at Jotne EPM technology? Both STEP and IFC have the EXPRESS information modeling language is the basis for their definition. The EDMmodelServer™ provide a unique tool for the synthesis of product, operations and support in the built environment and the manufacturing environment. It's important to remember that the basis of any interoperability specification is a robust data model. With the EXPRESS data model as the foundation for building and manufacturing models and the core of Jotne EPM's technology, we are uniquely positioned with our technology and expertise to handle the most complex situations.

# A new global aerospace language



In front: Nadia Rincon Turpin (Jotne EPM Technology). From left: Francis Arbusti (Thales Alenia Space), Kjell Bengtsson (Jotne EPM Technology), Arne Tøn (Jotne EPM Technology), Rune Eriksen (The Norwegian Space Centre), Massimo Bandecchi (ESA-ESTEC), Jochen Haenisch (Jotne EPM Technology), Jean-Luc LeGal (CNES).

*Massimo Bandecchi is head of Systems and Concurrent Engineering in Directorate of Technical and Quality Management at the European Space Agency (ESA), specifically at the technical centre which is the European Space Research and Technology Centre (ESTEC). He is very clear when he says that without the standards that are now being implemented through the work of Jotne EPM Technology and others, his organisation would have significant problems reaching their defined goals.*

According to Bandecchi, it is not only the large players like ESA that benefit greatly from the efforts of Jotne EPM Technology and others. Through projects like Symphony, smaller players will also get access to the new global "language" that is being developed by the standards organisations, and implemented in the aerospace industry through products like the Open Concurrent Design Server (OCDS) from Jotne EPM Technology.

Bandecchi provides the following example. "If you are a company producing small screws for use in satellites, you do not need the full implementation of OCDS which would be an unnecessary overstretching of resources," he says. "It would be sufficient for a smaller company to use what we can call OCDS Lite that will allow selective implementation of OCDS. A central part of the project we have with Jotne EPM Technology involves filling in the small company gaps so all can take advantage of this new global language, without spending more resources than needed," says Bandecchi in this interview with EXPRESSway. He emphasizes that the project is about developing OCDS functionality to improve multi-site operation (the standalone OCDS Lite), and to add functionality related to requirements management, CAD data handling and mission profile data handling.

ESA has pioneered the use of Concurrent Engineering in their Concurrent Engineering Facility (CDF) at ESTEC. Until now, the CDF has been based on utilizing Excel spreadsheets for calculation, sharing and transfer of subsystem information. This previous approach made collaboration between different organizations much more difficult. The new CDF Integrated Design Model (IDM) is used by European national space laboratories and private companies alike to accelerate space program development.

The OCDS project has defined the second generation CDF software defined on a centralized, standards based server to improve data sharing and interoperability. The OCDS solution is now



Massimo Bandecchi

in the final test and deployment phase at ESTEC, and if the enthusiasm Bandecchi displays is any sign of how he sees the results of these tests, the OCDS and Symphony have a golden future within ESA-ESTEC.

"We awarded Jotne EPM Technology the Symphony Project because of this project's broad application to the aerospace industry," says Bandecchi. "Norway is one 18 member countries and contributors to ESA and this means that experienced and skilled Norwegian companies with relevant technologies can be awarded project funds from ESA. Jotne EPM Technology was a perfect candidate and it was an easy decision to award them the Symphony project."

# Welcome to PDE 2010 in Norway

*The 12th annual NASA/ESA Product Data Exchange (PDE) workshop will be co-hosted by Jotne EPM Technology and held in Norway May 18-20, 2010. The entire team at Jotne heartily welcomes everyone to come and join us in Oslo.*

As the man responsible for planning this event from the European Space Agency side, the EXPRESSway sought out Hans Peter de Köning for his views on a workshop that started way back at the NASA Goddard Space Flight Centre in 1997.

EXPRESSway: Can you give us your ideas and vision regarding PDE and why is it so important to the space community?

Hans Peter: Reliable electronic exchange of the data during the life cycle of a (space) system is essential to improve the efficiency and effectiveness of the engineering, and indeed all other life cycle activities and processes. Unfortunately, as many projects have experienced too often, getting the right data at the right moment to the right stakeholder is an enormous challenge. Finding the right version of the data and details of changes from previous versions can be very inefficient and frustrating. Many individual disciplines within engineering (e.g. mechanical, electrical, optical, radio frequency communication, software) and non-engineering (e.g. cost, project management) in space projects now have well established methods and tools. Our feeling is that the next round of improvements needs to come from better integration of the life cycle processes and the project teams. The discussions that occur at PDE help drive these improvements.

EXPRESSway: In many industries including space, large software vendors will often try to convince customers that this improvement can be made by the national bodies, OEM and partners using the same systems. Why doesn't NASA or ESA simply take this approach?

Hans Peter: It is impossible to standardize software tools that are used across the whole space industry due to the different business goals of the customers and suppliers. This is also complicated by the existence of legacy systems and the cost and schedule impacts of developing software applications.

EXPRESSway: What about standardization of database tools which has also been suggested as a way to get all partners in a particular space program unified?

Hans Peter: It is also not desirable to standardize the database tools because of a number of factors including:



Hans Peter de Köning

- The use of different tools promotes innovation and healthy competition between the tool developers, and therefore ultimately benefits the end-users.
- Subcontractors and lower-tier suppliers should not be required to master the complete set of database tools that are used by all their customers and prime contractors. Being obliged to use many different tools, and to acquire and maintain skills in each of them, often creates prohibitive license and training costs for small and medium size enterprises.

EXPRESSway: It's obvious you feel strongly that open data exchange and archiving standards and interfaces are needed. Can you describe a situation where lack of decent PDE tools would make him it very difficult to complete a project?

Hans Peter: In space projects there is often a large international industrial consortium performing the development. In particular with large scientific space projects involving cooperation between e.g. ESA, NASA or JAXA, different design and analysis tools are used. In order to enable joint system level analysis and verification such as checking interfaces etc, we must have a reliable exchange of models and results in order to bring the project to suitable conclusion. In short, we must allow different systems that communicate with the same language. Without it nothing works.

EXPRESSway: Can you tell a little bit about your job in ESA such that our readers can put your PDE interest in perspective?

Hans Peter: Within ESA I work mainly on two subjects: Space Thermal Analysis and data exchange standardization. Space thermal analysis is my original expertise as I had graduated with a degree in Applied Physics from Delft University of Technology. I have long specialized in numerical

heat transfer and work in the space industry as a thermal engineer before joining ESA.

In order to fulfill the need for the exchange of thermal analysis models between different space thermal analysis tools I was one of the main developers of the "Thermal Analysis for Space" Standard which is based on the STEP and known as "STEP-TAS". This work took a long time but resulted in a very well adopted solution that is used in many space projects since 2003. Currently STEP-TAS is being supported with import/export facilities for at least five major space thermal analysis tools. Gradually the work done on thermal data exchange standardization evolved into more general data exchange standardization work in the framework of the European Cooperation of Space Standardization (ECSS). In particular, two Technical Memoranda were key: E-TM-10-23 "Engineering database" and E-TM-10-25 "System Engineering - Engineering design model data exchange (CDF)". The first is an ambitious long term development to create a common conceptual data model for all data in the space system life cycle, using the systems engineering data as a hub to share and consolidate the data from all other disciplines. The second one is a short term model for the exchange of all data needed in early development phases 0 and A (mission need and analysis, feasibility study, conceptual design) and exchanging the data between concurrent design facilities.

EXPRESSway: It sounds like you are ready for Norway 2010 and new learning experiences that will improve PDE in the space industry!

Hans Peter: I am looking forward to not only the intellectual challenge that occurs at every PDE event but also the beautiful environment that Norway will provide in the springtime. We members of the space community greatly appreciate the efforts that Jotne EPM Technology is undertaking to host this event.

# The Symphony Project



*Symphony is a partnership project with the European Space Agency (ESA) for the French space organization CNES. In this project, the Open Concurrent Design Server (OCDS) solution that was developed for ESA will be deployed in the CNES concurrent design facility. In addition, the OCDS solution will be extended with new functionality as specified by CNES. The project is supported technically by Thales Alenia Space through a related contract.*

#### **THE SYMPHONY PARTNERSHIP WITH THALES ALENIA SPACE**

Thales Alenia Space (TAS) is a European leader for satellite systems and at the forefront of orbital infrastructures. They are also one of Jotne EPM Technology's partners in the Symphony project, a venture intended to expand the capabilities of the original OCDS product.

TAS is a joint venture between Thales (67%) and Finmeccanica (33%) and forms a Space Alliance with Telespazio. The company has 11 industrial sites in four European countries (France, Italy, Spain and Belgium) with over 7,200 employees worldwide and is a worldwide leader in telecommunication, radar, optical Earth observation, defense and other sciences. They are at the heart of high-performance satellite technologies in both the civil and defense sectors, and a perfect partner for a company like Jotne EPM Technology when developing their products for the space industry.

Francis Arbusti as the Symphony Study manager in the Advance Projects Satellite System Engineering Science and Optical Observation Business Unit of Thales Alenia Space had much to say about

this project. "Thales Alenia Space work together with Jotne EPM in the framework of the Symphony project for activities related to definition of concurrent engineering models," Arbusti says. He emphasizes that it is the Cannes location of Symphony that Jotne EPM Technology and TAS are collaborating on. "With more than 2000 persons, Cannes is the site where the major parts of institutional or observation satellites under French leadership are defined, built, tested and validated. What Thales Alenia Space aims at is providing the Norwegian team with industrial feedback on OCDS in order to optimize new developments," concludes Arbusti.

The Symphony project is an opportunity to apply the large data model management competences of Jotne EPM Technology with a company that has a strong heritage in satellite conception and development. The objective of this collaboration is to influence the new OCDS development activity with user requirements from a large industrial satellite company. This activity aims to be complementary to the OCDS product specification by the space European agencies.

# CASP - The Concurrent Approach

*CASP is an acronym for “Concurrent Approach across all phases and borders of the Space Project Lifecycle”.*

The European Space Agency (ESA) has been very successful in applying Concurrent Engineering (CE) in the early phases of space projects. Their Concurrent Design Facility (CDF) is a world leading laboratory for efficient development of complex multi-system projects in the early design phases.

CASP's approach is to drastically reduce the time to market, cost of development and increase the quality of the Space system.

ESA wants to explore the possibilities to use CE for all phases of space projects.

Thus, they contracted Thales Alenia Space and Jotne EPM Technology to make the CASP study, whereas one will focus on the following:

- **Concurrent Review Facility**  
Project reviews provide a comprehensive assessment of the project status against targets and requirements. A review may be done on a system or subsystem level, and involves access to technical data and expertise for all domains

- **System Budget Building**  
System Budgets Building allows the system engineer to be in contact with all disciplines in a distributed environment to allow system budgets tracking with automated extraction of subsystems/units properties and real-time discussion with all involved actors.
- **Smart Design Sessions**  
Through smart design sessions (SDS), space engineering actors can easily access and visualize wide data info to afford complex System issues from different System perspectives (e.g. physical, functional, operational) in a collaborative environment with the possibility to be multi-site.

For Jotne, the CASP project is yet another activity to broadening the use of our technology in the space sector, and builds upon the experience from two ongoing projects, OCDS and TruePLM. OCDS (Open Concurrent Design Server) was delivered to ESA to allow standards based storage of all data in the CDF.



Francis Arbusti

## The Home of Symphony

*At the Concurrent Design Facility in Toulouse, France, known as “CIC” (Centre d’ingénierie Concourante) the French Space Organization CNES have their PASO (Plateau d’Architecture des Systèmes Orbitaux) office. The main responsibility of PASO is managing mission feasibility studies for orbital projects. This is also the home of the Symphony project that Jotne EPM Technology is undertaking with CNES.*

This PASO organization is based on a structure composed of a dedicated engineering team that intersects with a number of specialty groups focused on various disciplines critical to orbital project success. “PASO uses a Concurrent Design

Facility to analyse the different options during feasibility studies and exploits this information to achieve optimal trade-offs,” says PASO’s Jean-Luc Le Gal.

According to Le Gal, the CIC has been operational since September 2005 and brings about various benefits such as:

- Overall control of study progress is now better maintained
- All participants in the study have a clear depiction of the system
- Collaborative capacity is increased, not only within CNES but also with partners such as space agencies, industries and laboratories



Jean-Luc Le Gal

Le Gal says that the goal of the Symphony projects is as follows:

- Preparation of the Open Concurrent Design Server (OCDS) implementation within CIC
- Improvement on technical data exchanges with partners

# Want to learn more about the PLCS revolution?

*From the experience of working together with the world leading companies, Jotne always has relevant and up-to-date information for your organization. A recent collection is available here.*



STEP, PLCS, DEXes, AP239, S1000D, EXPRESS and other terms are often seen recently in Aerospace-Defense-Space related PLM and logistics discussions and often misunderstood or misused. These are frequently invoked as possible solutions for standards based legacy data migration, PLM data exchange, long term data retention and logistics support. What are all these, how are they related

and where they have been used to solve the interoperability and post production needs of companies? Jotne has created a short, concise video that will walk viewers through an explanation of how a typical company would go from defining the data model to creating a standards-based product data interoperability solution.



The Aerospace Industries Association (AIA), which is now a part of the LOTAR International working group in which Jotne is working, is recom-

mending the use of PLCS based solutions for its member organizations and partners. These companies encompasses most of the major aerospace organizations in North America. According to the AIA, the implementation of PLCS standards based interoperability solutions will significantly reduce the variety of engineering formats used in the creation of aerospace products, and decrease cost prohibitive technical and business challenges to working between organizations.

create the report, "Aerospace Industry Guidelines for Implementing Interoperability Standards for Engineering Data." The purpose of this document is to provide strategic and tactical guidance for the adoption by industry of a common standard-based information backbone. This will enable interoperability for product definition data across the aerospace industry and throughout the product life cycle.

Jotne was a part of the working group that helped

Find a link at the Jotne website that directs you to the AIA Guidelines.



CIMdata and many other industry analysts have concluded that effective Collaboration throughout a product's lifecycle requires the ability to accurately integrate and share product data. We can only assume that this data may be created

and used within multiple applications—and that environment must be sustained for as long as the product is in use; sometimes even longer for up to 50 or more years in aerospace and defense products. CIMDATA considers one approach to this problem is to establish and use a common or master data unified repository in which product and process information from many sources (e.g., systems, companies, etc.) can be merged and consolidated.

ceived from multiple suppliers and partners, and delivered to many customers. This report reviews the EDMmodelServer™(plcs) capabilities as a PLCS repository housing the common product and process information used across product lifecycle related applications, e.g., Product Data Management (PDM). With this approach, information owners are better able to change or update their applications and still maintain control of the information stored in the repository.

This repository must be designed to handle many product versions and configurations and distinguish between information packages re-

Please see the CIMdata report at the Jotne website



While the above mentioned PLCS video is effective for a high-level overview of many of the concepts involved in implementing a standards-based product lifecycle interoperability solution, more details are needed for an actual implementation project.

The purpose of the PLCS implementation handbook is to provide practical guidelines to project managers, solution architects, data modelers and software developers for the development and implementation of Data Exchange mechanisms that use the Product Lifecycle Support standard (PLCS) within a business environment. The handbook is meant to be an introduction to the concepts and methodology for providing software solutions that support the PLCS standard.

## The EXPRESS Data Manager™ suite of products



Jotne EPM Technology has established itself as one of the leading providers of solutions for product data technology – the open paradigm for the 21st century. Our product suite EXPRESS Data Manager™ is designed to meet the needs of engineering and manufacturing enterprises to accurately and reliably exchange and share technical data with colleagues, customers, subcontractors, suppliers and other business partners. The products

fully implement the EXPRESS data-modeling language which supports most international product data technology standards - including ISO 10303. EXPRESS Data Manager™ can be used for data-modeling, application development, data management and quality assurance. Our product suite is under constant development to adapt to changes in customer needs as well as international and industry standards. Contact us for the latest news.

[www.jotne.com/epmtech](http://www.jotne.com/epmtech)