MODEL BASED ACQUISITION AND SUPPORT

Digital enterprise enabling affordable and dominant naval defence capability

DASSAULT SYSTEMES

There are many challenges to delivering the next generation of naval defence capabilities. The complexity of systems and the constant evolution of threats will require greater agility than before. Budgetary constraints will drive the need for predictable delivery and informed decision making, maximising capability and availability within an affordability envelope. The increasing complexity of the environment will therefore mandate interoperability with other defence systems and collaboration throughout the supply chain.

Responding to these challenges will require a transformation in the acquisition process, with new and collaborative ways of working between defence agencies and their suppliers. Traditional document-centric approaches will be abandoned in favour of connected and trusted models, providing a digital or virtual twin, an executable virtual representation of a physical system of systems that delivers unique capabilities. A collaborative platform will be required to connect the dots between delivery partners.

Many defence organisations are already adopting these principles and moving towards model based acquisition.

The **3D**EXPERIENCE® platform is unique, enabling collaborative model based acquisition and delivering the benefits required by naval defence programs - a step change in capability whilst assuring value for money and schedule predictability.

We will go through the four key challenges in delivering such a successful program:

1. Bringing together expertise and enabling them to work as one enterprise (integrating innovation);
2. Once connected affording them the ability to decide on the best solution (optimizing capability);
3. Using the same connectivity to manage the complexity of execution (improving outcomes);
4. How to upgrade through-life maintaining a dominant capability (maintaining capability).

For many, adopting a model-based digital enterprise has been vital to commercial success and part of a dramatic transformation in terms of thinking, culture and ways of working.

INTEGRATING INNOVATION

Digital enterprise enabling market exploitation and integration

Delivering affordable and dominant capability requires the naval defence industry to exploit the best solutions, expertise and innovation across industry. The first challenge is how to successfully collaborate, share and integrate information across an extended enterprise.

The **3D**EXPERIENCE platform facilitates a transformation from exchanging documents to working with data and models, thereby creating a single and shared authoritative 'source of the truth' of technical data information and knowledge across a digital enterprise. This would help program decision makers to have the right information when they need it, providing an integrated platform to review the performance of the digital or virtual twin before it is created. The move away from sharing documents has seen commercial industry work seamlessly as one enterprise, where supply chains work from the same models and data set therefore eliminating cost, errors and resulting schedule delays.

Sharing information and data, enables robust identification, enforcement and protection of the different categories of IP (Security, Export Control, Commercial); secure access to sensitive and classified data; and the ability for partners to leverage their previous investments in software tools and capabilities. This approach encompasses all partners, suppliers and engineers across functions, domains and geographies.

> ***"We are expecting more than this from the partnership with Dassault Systèmes. It's also the ability to interact with digital continuity with all our partners, with certification organizations like Bureau Veritas for example, and with our customers in France and abroad."***

Olivier de la Bourdonnaye, Executive Vice President Naval Programs, Naval Group

OPTIMISING CAPABILITY

Digital models enabling rapid and informed decision making

The naval defence industry continues to struggle with overall affordability and all programs are required to make informed decisions on optimising capability within an affordability envelope. The second challenge is therefore how to define, evaluate, compare options and make informed decisions using data generated from many different systems, across a network of partners.

Digital models can be used as a versatile representation of a system, entity or process, spanning all disciplines, allowing stakeholders to simulate alternative solutions and through collaboration, make data driven decisions.

The **3D**EXPERIENCE platform facilitates interoperability by bringing data objects from many sources together into a single data model, from design to operations. The integral digital or virtual models (twins) enabling informed trade-offs:

- Using digital or virtual models to support engineering activities and decision making across the lifecycle through simulation;
- Improving efficiency of operations by using digital models to orchestrate activities;
- Digital representation of systems by integrating work products across the enterprise;
- Accelerating decision making by formalizing development, integration and use of digital models from concept to in-service support.

“Since the 1980s, we’ve continually optimized cruise ship design with state-of-the-art technologies and, now, a new age is beginning”

said Technical Director, Meyer Werft.

“Today’s shipbuilding is a highly modern industry that requires a combination of ideas, knowledge and technology. Thanks to the 3DEXPERIENCE platform, we can foster collaborative creativity that fulfills the highest technical demands of customers worldwide from hull shape, hydrodynamics and fuel consumption, to capacity.”

> *Naval Group is the European leader in naval defence.*
> *It designs, manufactures and maintains the surface vessels and submarines of its clients.*
> *Naval Group and Dassault Systèmes' partnership is firstly the pooling of the two groups' skills and expertise, enabling PLM dedicated to the naval field and especially naval defence."*
>
> Olivier de la Bourdonnaye, Executive Vice President Naval Programs, Naval Group

NAVAL GROUP IMPROVING OPERATIONAL EXCELLENCE WITH **3D**EXPERIENCE

> *Naval Group had clearly reached the limits of the current CAD solution.*
> *To maintain our technological lead and competitiveness, we chose the **3D**EXPERIENCE platform.*
> *3DEXPERIENCE opens perspectives on more innovative solutions, which will allow us to improve our design productivity.*
> *One of the goals is to converge methods and tools within a platform shared between our different Naval Group sites, but also with our partners.*
>
> *All aspects of design are concerned, from the functional to the hull, including outfitting.*
> *Today, with the **3D**EXPERIENCE platform, we are designing mid-size frigates, which are part of the new Belharra product line.*
> *The aim is to reduce our design cycle time with the **3D**EXPERIENCE platform.*
> *The platform will allow us to standardize our design methods between our different Naval Group sites, reduce our product development cycle times, and provide the ability to take into account the constraints of product lines from the very first design activities.*
> *Collaborative work with clients will be reinforced thanks to the platform."*
>
> Patrick Miglioretti ,Manager, Hull and Outfitting, Naval Group

IMPROVING OUTCOMES

Digital enterprise enabling a step change in cost and schedule

Cost and schedule overruns plague the naval defence sector as programs gain complexity. The third challenge is how to manage this complexity across an extended supply chain, delivering commercial like outcomes in terms of cost and schedule reduction.

As design and manufacturing activities migrate into the supply chain, schedule delays and cost overruns can often be attributed to gaps between discipline silos and lifecycle phases. This requires a move away from running the program management and the product development work separately. The new way of working is to put concept and product data at the heart of program governance, allowing more informed decision and de-risking activity. This data-driven approach is vital during the concept phase, where 80% of the costs are committed. Here Defence Agencies can avoid cost divergence by using a digital or virtual twin to more closely follow the development phases and act accordingly.

The **3D**EXPERIENCE platform enables a unique model-based enterprise environment to elevate business execution, from ideation to program and project management, configuration and change management and through the implementation of systems engineering and detailed design, manufacturing, and support processes. Right from the early phases of concept proposal, analysing the data across these functions can help make more informed decisions and be a step change in cost and schedule outcomes.

“Our strategy is to become a leading edge company in ship design business. Using the 3DEXPERIENCE platform definitely helps elevate our design process to the next level”

said Roberto Prever, President, NAOS Ship and Boat Design

“We expect to reduce design time by up to 40%.”

BUREAU VERITAS 3D CLASSIFICATION

Challenge

Facing limitations with the standard classification process of new ships still largely based on 2D, Bureau Veritas needed to reach a new level of efficiency to help its clients limit cost and improve lead times.

Developed by Bureau Veritas thanks to a partnership with Dassault Systèmes and after a successful pilot program with a Naval Group Defence and Intervention Frigate, 3D Classification has helped significantly shorten design and construction process, saving 3-6 months of certification time while improving quality and safety. Clients benefit from an improved design review experience, gaining access to a digital platform that allows all stakeholders around the world to collaborate in real-time.

MAINTAINING CAPABILITY

Digital thread enabling timely and affordable upgrade

Maintaining a dominant capability through-life (30+ years), requires an embedded approach to systems engineering and technology insertion. The fourth challenge looks at how to embed a modular systems approach that underpins a timely affordable approach to capability upgrade.

This requires a move from a product-centric to a system of systems development approach, where defence capability is designed as an evolving platform with modular technologies defined natively in a system of systems architecture, where we can:

- Change requirements according to evolving threats and see the impact on the ship builders
- Design a more modular platform (a system of systems rather than a specific mission driven asset) able to adapt to changing threats, including rapid response to urgent operational requirements (UOR)
- Secure a coherent system of systems architecture to deliver a comprehensive answer to the challenges at hand
- Take a more holistic approach, considering the systems, products and the respective capabilities and supporting services in determining the timely and affordable upgrade of key capabilities

The **3D**EXPERIENCE platform is built on a single data model and thereby enables a digital thread between a model-based reference for system engineering, systems definition, industrial means definition, and support definition and therefore gives the necessary foundation to enable an evolving platform approach, mission planning and the impact of evolving threats on the system.

Feeding this single data model with real operational data builds digital twins holding all the knowledge and know-how from across time: knowledge from the past (how was it designed, how can it be manufactured?); knowledge for the present (how can I operate it?) and knowledge about the future (what will happen under a possible scenario, or how can it be serviced?).

This virtual twin experience thereby empowers a richer and more immersive customer experience for maintaining in-service assets, getting the right data, to the right person at the right time. Through predictive analytics and condition based maintenance this could improve asset availability and, reduce costs, unscheduled maintenance, “no fault found” and response time.

“The value brought by the 3DEXPERIENCE platform to Naval Group lies in the digital continuity across design, operational upkeep and ship maintenance.”

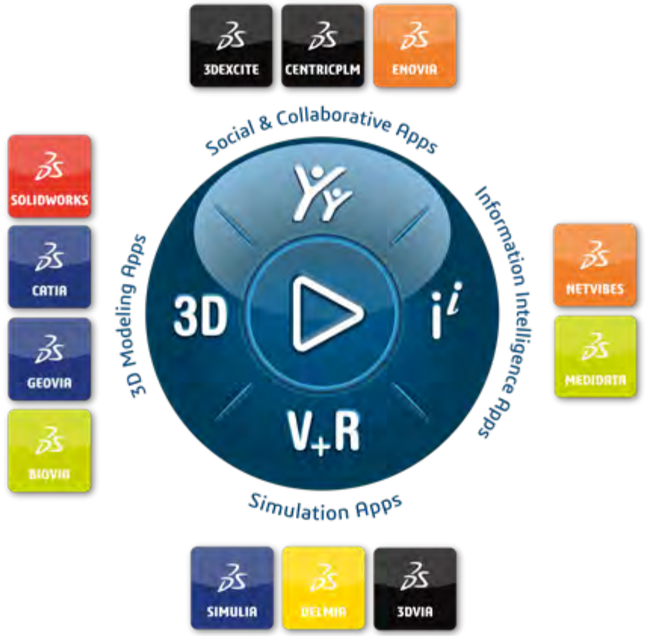
Olivier de la Bourdonnaye,
Executive Vice President Naval Programs, Naval Group

THE 3DEXPERIENCE PLATFORM

Since its inception, Dassault Systèmes has partnered with naval defence customers to support complex program development. As systems become more complex to design, build, deliver, operate, and maintain, the need to accelerate innovation, drive efficiencies and develop greater agility has increased. This requires a new way to conceptualise, design, manufacture, test, certify and sustain future naval defence capabilities.

The 3DEXPERIENCE platform was developed to modernise product development and manufacturing functions across the full program lifecycle providing a rich portfolio of Industry Solution Experiences capitalising naval defence knowledge and know- how delivered through Out-Of-The-Box Industry Process Experiences.

The **3D**EXPERIENCE platform therefore provides an integrated solution for complex programs in naval defence and supports all parts of the business value chain, breaking down the silos between functional areas and domains. Now, all users can work together in a seamless environment to see and understand how decisions impact the cost, time and performance of a program. Dassault Systèmes proposes to collaboratively assess, define, commit and deliver business value by supporting new ways of working on the **3D**EXPERIENCE platform. Working with customers to plan the journey ahead and to consider people, processes as well as technology during such transformative times.



For more information, visit www.3ds.com

DASSAULT SYSTEMES | The **3D**EXPERIENCE® Company

Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes K.K. ThinkPark Tower
2-1-1 Osaki, Shinagawa-ku, Tokyo
141-6020
Japan

Americas
Dassault Systèmes
175 Wyman Street Waltham,
Massachusetts 02451-1223
USA