



***Topgallant***<sup>®</sup> Product Data Management and Collaborative Software  
for Shipbuilding

## NSRP Panel Meeting – San Diego

Presented by:

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# Agenda



- I. Company and *Topgallant*<sup>®</sup> Overview
- II. Released Products
- III. Under Development
- IV. Research Programs
- V. US vs. EU shipbuilding
- VI. How Atlantec-es can help U.S. shipbuilders

# Atlantec Enterprise Solutions



- Focused on interoperability solutions for the shipbuilding industry
- Founded in 1999, steadily growing since
- Offices in Germany and in the USA

## Clients

HDW, Germany  
Aker Yards Germany  
Aker Yards Finland  
NWSC, Carderock  
Flensberger

## Partners

Dassault Systems (CAD)  
AVEVA (Tribon-CAD)  
Alma (Nesting-CAM)  
Logimatic (ERP)  
ShipConstructor

## U.S. Research Partners

Electric Boat  
Penn State ARL  
DRS

Marinette Marine  
Gibbs & Cox  
NGNNS

NGSS  
Bollinger Shipyards  
UNO

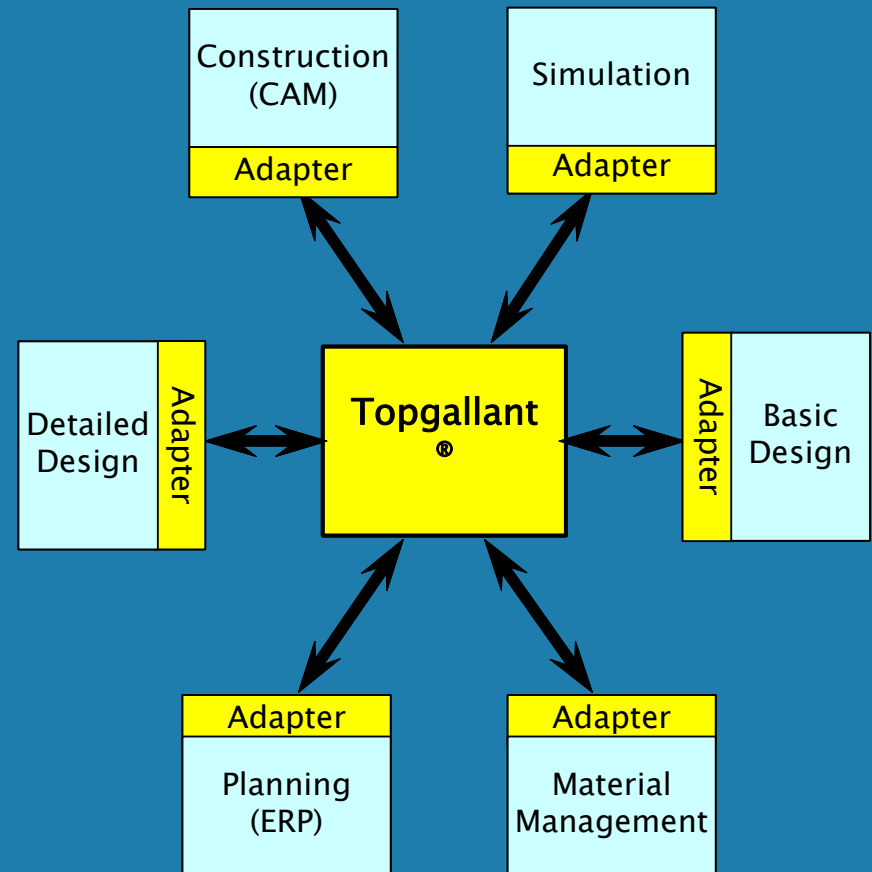
# Topgallant®

Collaboration for Design and Production



Data Model based on ISE STEP Schema

A standards-based information management system designed for managing complex information exchanges and for collaboration in design and production



- Manages Distributed Information flow
  - Product Data Management (versions, dependencies)
  - process/workflow support and monitoring
- Enables Design and Production at Multiple Sites
- Decouples Design/Production systems
- Based upon Industry Standards
  - includes STEP: ISO 10303 (AP214, 215, 216, 218, 227 & 238), WfMC and X.500
  - XML representation
  - ISE compliant

# *Topgallant*<sup>®</sup> Change Manager



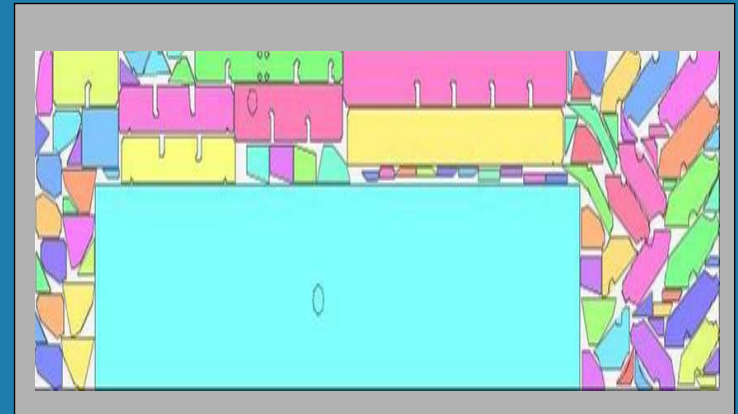
- Installed at HDW in Germany
- Now part of Thyssen Krupp Marine Group. HDW has built merchant ships, surface combatants, and submarines
- Change Manager sequences the SAP ERP System with the Tribon design system.
- Last minute design changes are monitored by Change Manager and makes sure that all changes are synchronized with the ERP system.

# Topgallant® Plate Production

1<sup>st</sup> Application from CAD-CAM-Connector  
SBIR installed at Aker Germany

## *Automated Nesting System:*

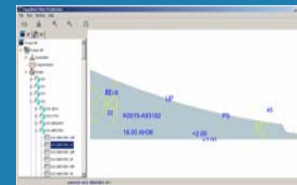
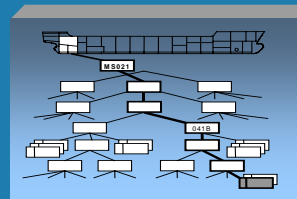
- Complete Plate Processing and Management System
- Extracts all steel plates from CAD-system plus externally defined geometries
- Selects and releases complete assemblies for nesting
- Eliminates manual nesting – automatic nesting jobs
- Employs production rules allowing collaboration between yards and design agents
- Manages the steel plate storage
- Controls nesting software



# Topgallant® Assembly Production

## 2<sup>nd</sup> CAD-CAM-Connector Application

- Changes Design to Production Geometry based on predicted material deformation
- Generates an assembly tree and assigns production processes
- Applies customized dimensional rules
- Provides feedback loop for production dimensional data; bridges Engineering & Quality Control



Step 1: Extract detailed hull design

Step 2: Assign assembly process

Step 3: Apply total shrinkage values

Step 4: Update detailed design

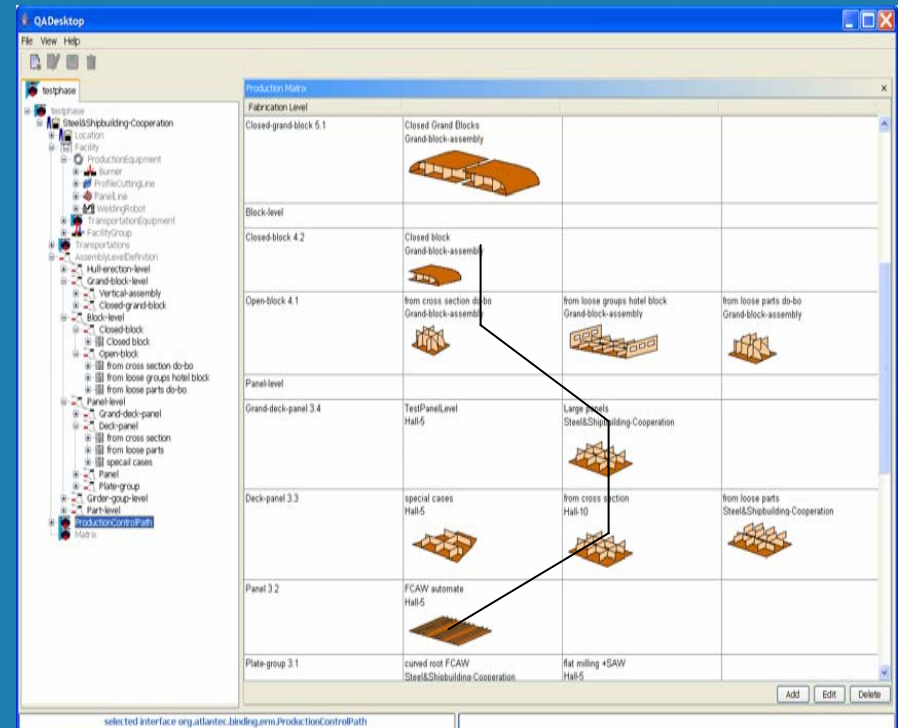
Step 5: Update files for nesting

## 1. Defines Production Resources:

- Buildings
- Facilities
- Assembly Levels
- Production Control Path
- Fabrication Matrix
- Production-specific Rules

## 2. User-defined rules

## 3. Multiple-Site Production



Example of a production control path as defined by a fabrication matrix

# Aker Yards Finland Project



- Implementation at Turku, Helsinki, and Rauma Shipyards
- First Application: Genesis Class (220K GT Cruise Ship)
- Applies dimensional quality control to grand block assemblies
  - Simulates Grand Block assemblies
  - Predicts shrinkage based on past empirical measurements
  - Feeds dimensional changes back to CAD system
  - Adjusts piece part dimensions pre-fabrication to remain true to designed dimensions

# Topgallant® Tx-Check

Checks Data Quality of Engineering Designs



Proposed development work for Thyssen Krupp Marine Systems(TKMS) for data quality software which checks:

- Structural guidelines
- Consistency with special formats
- Manufacturing defaults
- Logical dependence in the data
- Source of errors

*Designed for multiple –site collaboration*

Aker Yards, Germany, Atlantec–es, Fr. Lürssen Werft,  
Germanischer Lloyd, SMK Ingenieurbüro, Universität Rostock

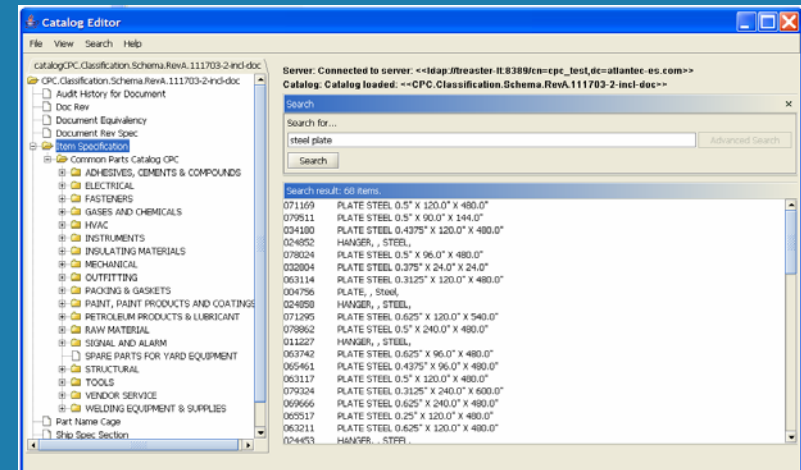
- Development of enterprise–specific logical arguments regarding quality–assurance in the design and production
- Reduce production re–work by securing correct working documents, and automating inspections to a defined quality criteria,
- Early error detection
- Minimize quality control checking of engineering data
- Increase quality of ship attribute data
- Addresses quality issues with data: has every point value been defined, logical curves created, appropriate design rules applied and satisfied?

# Common Parts Catalog – (CPC)

## Information Management System



- Part data standardization
- Inter-shipyard cataloging system that enables part and document data management
- Parts Identification per specific hull
- Enables data sharing across the shipbuilding industry, including:
  - New construction yards
  - Supply chain
  - Military & non-military customers



# Common Parts Catalog

## Part Design Class SBIR



*ONR SBIR Phase II collaborative effort between MMC, DRS, ShipConstructor, Gibbs & Cox and Atlantec-es*

- Extends CPC Benefits to Engineering
- Plan to develop STEP-based interoperability tools to help exchange design data between:
  - Shipyards,
  - Design agents,
  - Other defense contractors
  - Vendors
  - Navy
- Parts in neutral format – STEP Compliant
- Enables Shipyards, Design Agents, Suppliers, and Systems Integrators to share parts models using different CAD Systems
- Added 3D viewing capability

# Assembly Simulation

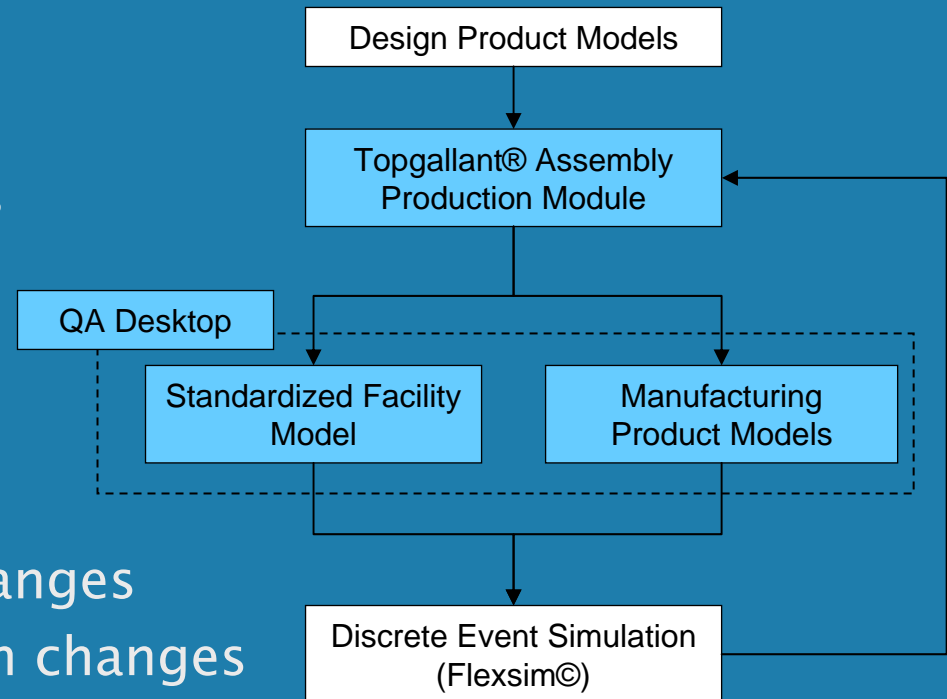
Automating Assembly Planning through Simulation



*Phase I SBIR awarded 23<sup>rd</sup> March, 2007  
PSU-ARL, Marinette Marine, Atlantec-es*

## Benefits

- Automate simulation models
- Increase planning fidelity
- Optimize work sequencing
- What-if, trade-off studies
- Reduce planning time
- Rapidly adjust for design changes
- Rapidly adjust for production changes



## DOD/Army Research Lab STTR Project

- Status: In Award Negotiations
- Partners – UNO and Intergraph
- Project Objective: Develop an adaptive cross-domain interoperability toolkit

# U.S. Shipyard Customers



# U.S. vs. EU Yards – Contrasts



## US

Low-level of production  
Design Focused  
Cost Plus  
Large Work Force  
Multiple Change Orders  
Low degree of Automation  
General Purpose Software  
Large Vendors  
In-House Focus

## EU

Ship Factory  
Production Focused  
Fixed Price  
Small Work Force  
Product-few changes  
Highly Automated  
Shipbuilding Software  
Small Vendors  
Sub-Contractor Focus

\*Applies mainly to large primes. Second tier resembles EU yards in several categories

# Topgallant Advantages



- Supports collaboration in engineering and production
- Supports Design and Production at separate locations
- Manages last-minute changes in design or production
- Reduces business disruptions due to software changes / upgrades
- Integrates and automates Engineering and Production
- Provides powerful production support tools
- Provides Configuration Management – Hull effectivity (manages changes by contract and by hull)
- Increases productivity in steel production and hull assembly operations

# How Atlantec-es Can Help US Yards



- Topgallant® is already used by three Major European Shipyards
- Focused on Production Support Applications which were identified as major problem in benchmarking study
- Reduce rework and manual data entry
- Lower software implementation costs
- A solution in some major NPDI areas
- Provide affordable automation to the Second Tier