Business Technologies and Ship Design & Material Technologies Joint Panel Meeting

Vancouver, BC, Canada

RA Project

LiftShip3

NSRP RA Project
(2019-483-010)

August 20 – 22, 2024

LiftShip3

TEAM:

ShipConstructor Software USA, Inc. (SSIUSA)(Lead)

Fincantieri Marinette Marine

Austal USA, Inc.

Ship Architects, Inc.

Genoa Design International, LTD

ATA Engineering

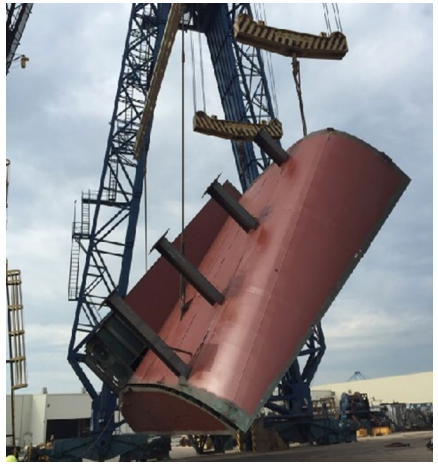
Altair Engineering

NAVSEA NSWC Carderock

NSRP
NATIONAL SHIPBUILDING RESEARCH PROGRAM™
Taking Shipbuilding and Repair to the Next Level

Why are the LiftShip projects Important?

- **Automation and Efficiency**
  - The projects have helped to automate large-scale lift preparation and analysis, which if adopted, can significantly reduce the man-hours associated with (FE) mesh generation, analysis, and the creation of lifting arrangement drawings



Altair HyperWorks®

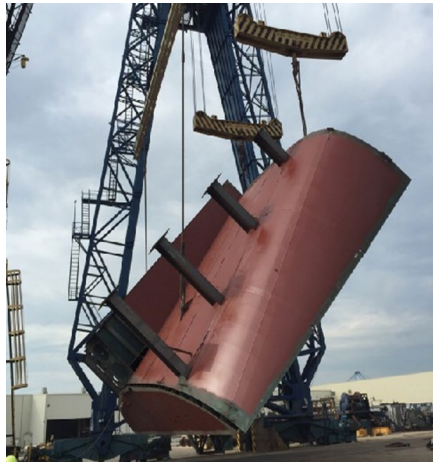
ATA ENGINEERING, INC.

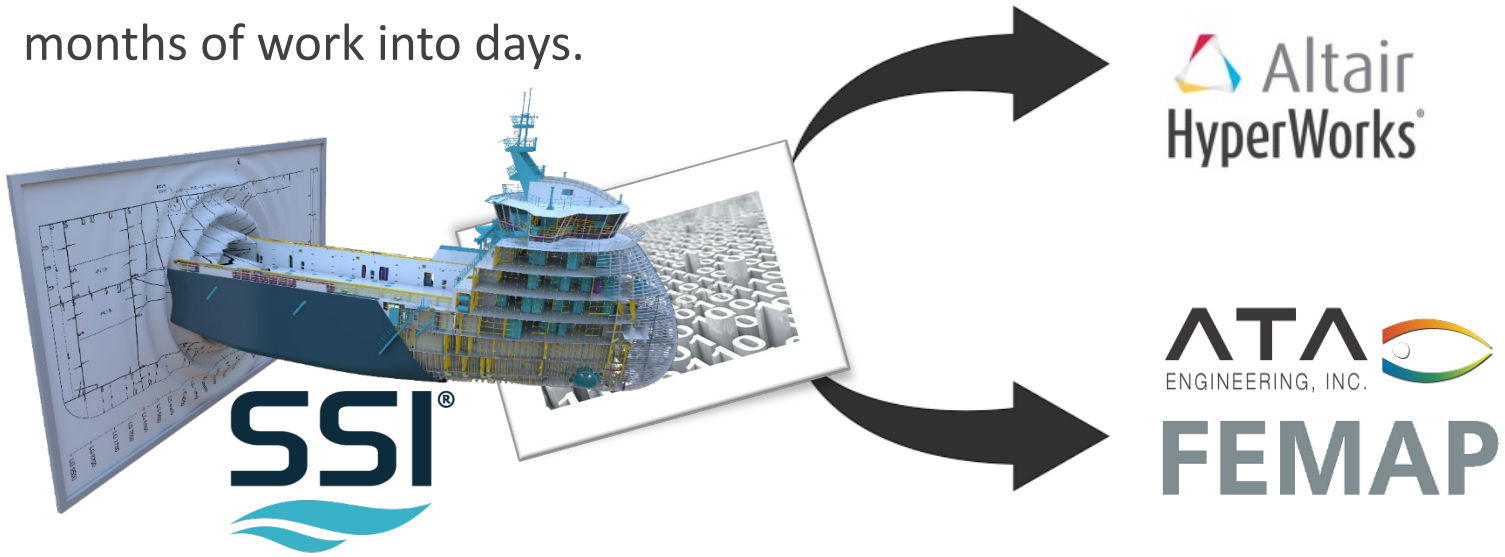
FEMAP

Why are the LiftShip projects Important?

❖ Cost Reduction

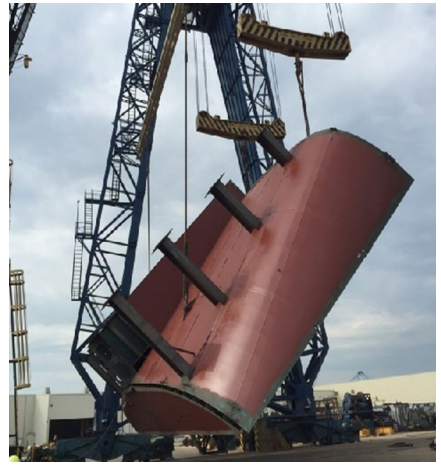
- **Rapid model creation:** Complex models are ready for meshing and analysis in hours which leads to cost savings and efficiency.
- **Multiple scenario analysis** : possible for optimal lifting configurations.
- **Time savings :** 40:1 to 60:1 in FEA model generation, transforming man-months of work into days.





Why are the LiftShip projects Important?

- **Improved Decision Making**
  - These projects have enabled the presentation of FE Analysis results in a clear and concise manner, aiding shipyard engineers in determining the feasibility of lifts and making informed decisions.



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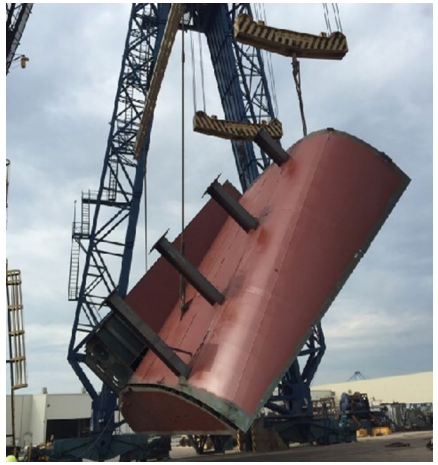
Why are the LiftShip projects Important?

- **Innovation and Ease of Adoption**
  - These projects have enabled the shipyards the framework to adopt benefits identified by the program using toolsets they already have in place.
  - Each of the software participants have included these capabilities within their core offerings.



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Project Background LiftShip (2018-438)

May 2018- April 2019

NSRP ASE INVESTMENT: $1.1M

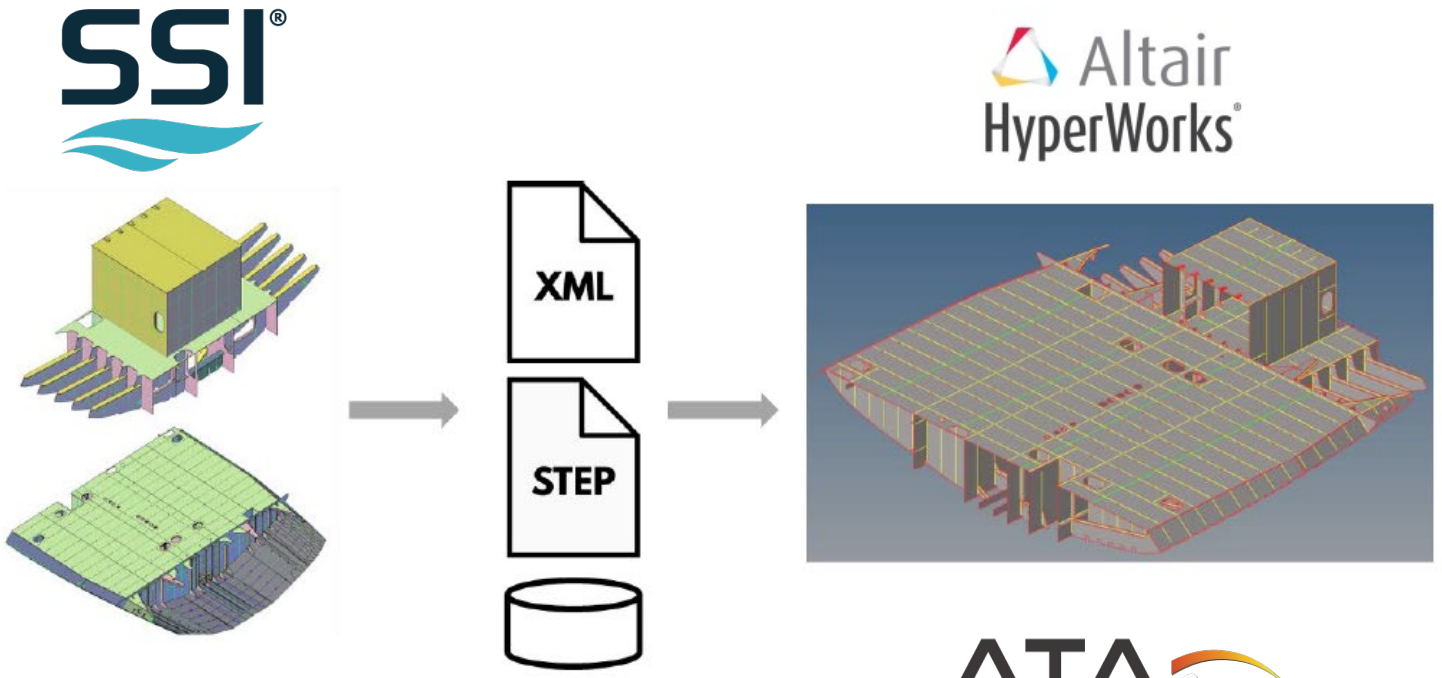
INDUSTRY INVESTMENT: $1.7M

Project Team:

- ShipConstructor Software USA, Inc.
- Austal USA
- Bollinger Shipyards Lockport, LLC
- Conrad Shipyard, LLC
- VT Halter Marine
- Ship Architects, Inc.
- Altair Engineering
- ATA Engineering

Project Background LiftShip(2018-438)

- Objective: To automate the process of preparing and analyzing large-scale lifts, and to generate comprehensive lift packages that include production drawings, Bill of Material, and other necessary components.
- Technology Areas: The project focused on several technology areas, including the generation of lift package output drawings from ShipConstructor, exporting models for FEA, and identifying deformation limits to ensure the appropriateness of lifts.
- FEA Integration: It aimed to integrate FEA into the lift analysis process, providing feedback on the feasibility of lifts and potential deformations.
- Benefits: The project sought to reduce man-hours associated with FE mesh generation, analysis, and the creation of lifting arrangement drawings, ultimately leading to cost savings.



Completed Successfully

Project Background LiftShip2 (2019-451-003)

September 2020 – August 2022

NSRP ASE INVESTMENT: $1.8M

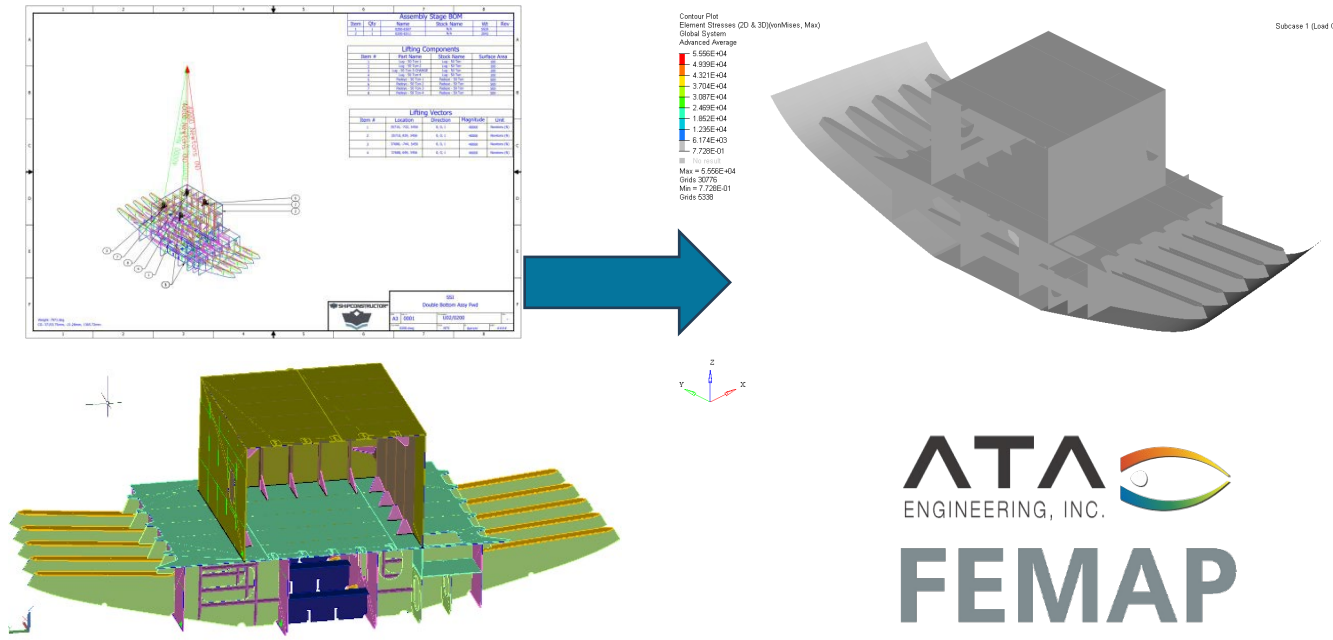
INDUSTRY INVESTMENT: $1.1M

Project Team:

- ShipConstructor Software USA, Inc.
- Ingalls Shipbuilding
- VT Halter Marine
- Austal USA
- Genoa Design International
- Ship Architects, Inc.
- ATA Engineering
- Altair Engineering

Project Background LiftShip2(2019-451-003)

- Objective: To enhance the process of complex lift and turn operations and providing a more efficient and user-friendly FEA experience.
- Technology Areas: Enhancement of the FEA software to improve its efficacy in complex lifts & turns while ensuring seamless data integration with ShipConstructor as well as visualization tools of the FEA results.
- FEA Integration: Automated Model Generation, Scenario-based analysis, and Level of Detail Management.
- Benefits: Efficiency, Accuracy, Usability, and Cost-effectiveness.



Completed Successfully

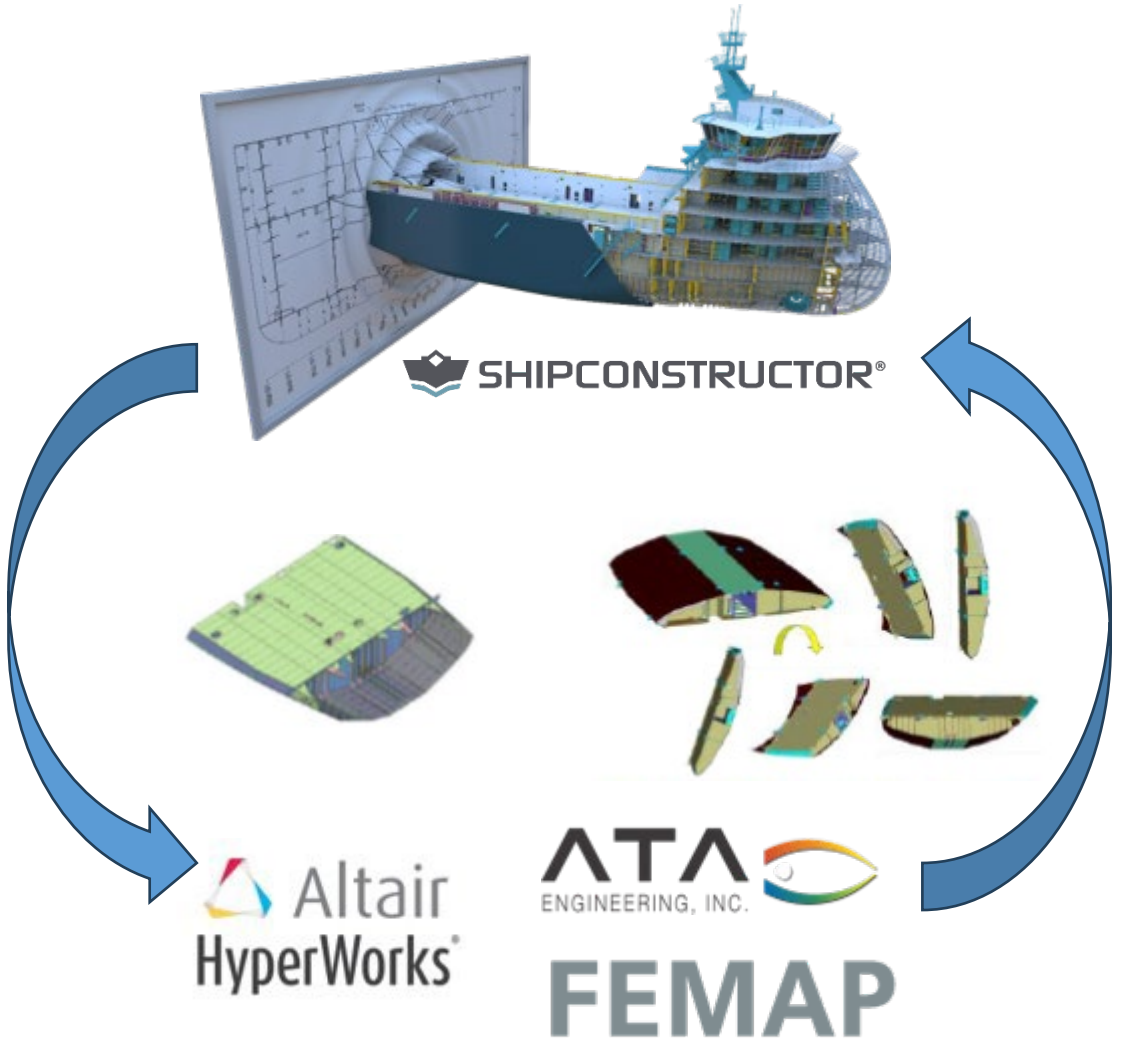
LiftShip3 (2019-483-010)

May 2023 – May 2025

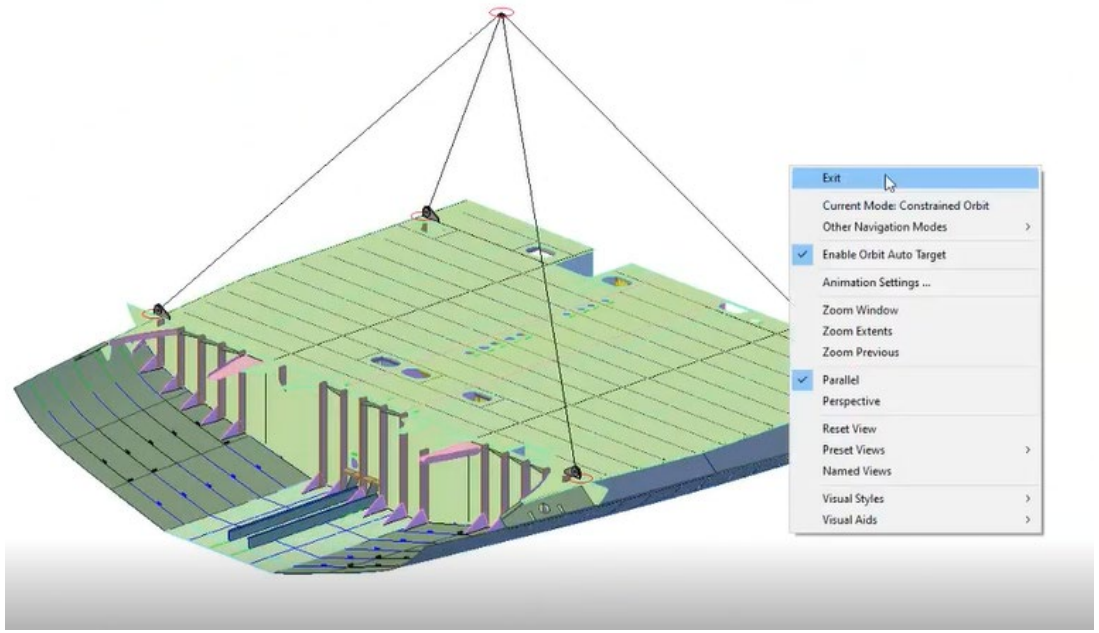
NSRP ASE INVESTMENT: $981K

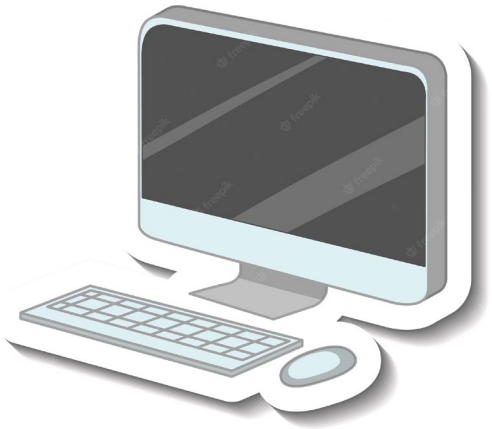
INDUSTRY INVESTMENT: $1.2M

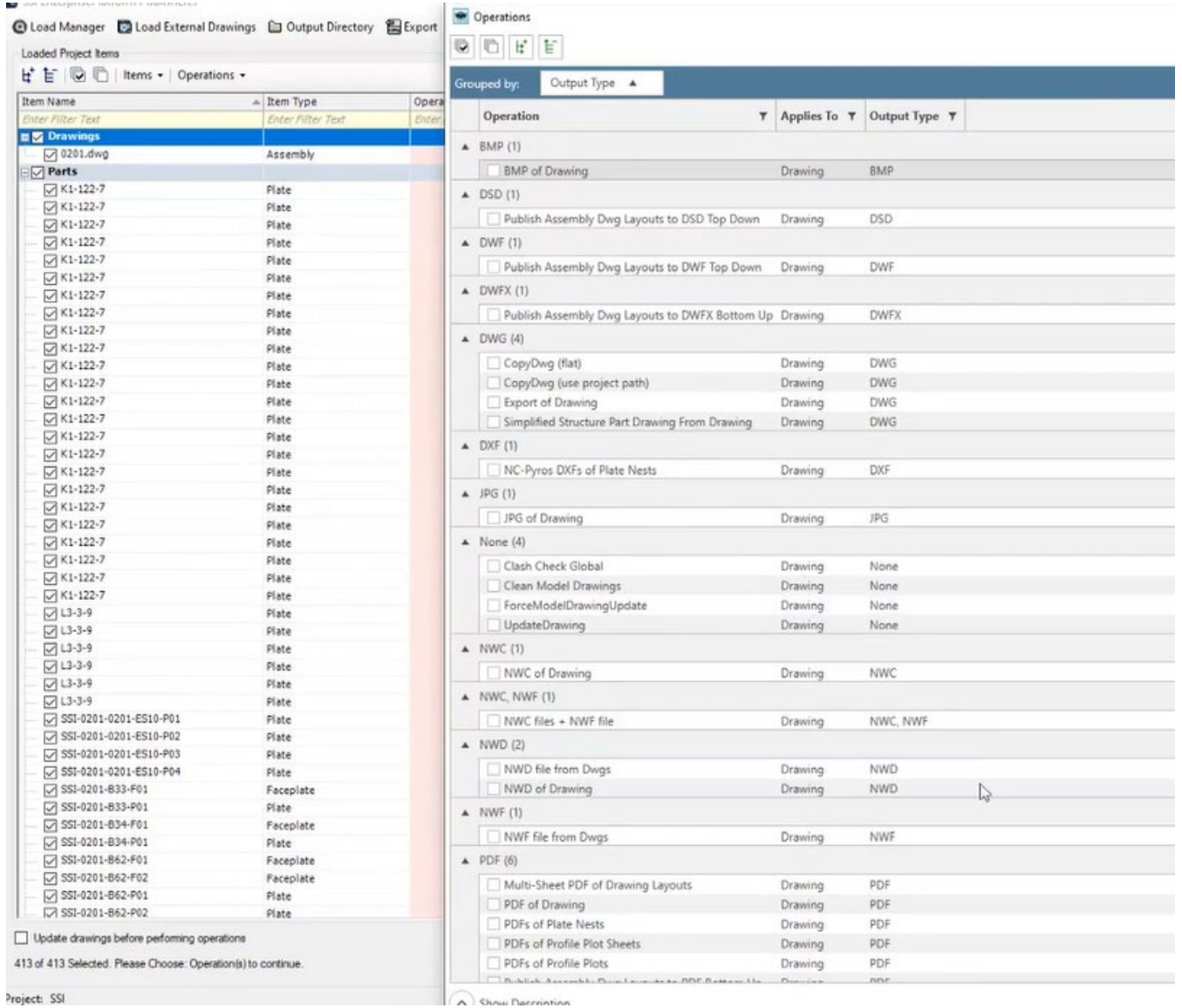
- Objective: The project's objective is to build upon the success of the previous LiftShip projects by increasing the technical functionality of data transfer between 3D models and Finite Element Analysis (FEA) software.
- Project Overview: LiftShip3 focuses on allowing structural changes identified through FEA to be incorporated back into the ShipConstructor 3D design model early in the design process.
- Goals: The project aims to synchronize changes in FEA back to the production model to support output drawings, leading to shorter design times and streamlined design evaluation processes.
- Benefits: By enhancing data transfer and model synchronization, LiftShip3 proposes to allow designers to find innovative uses for lifting structures and further ease the design process.



LiftShip3 Development



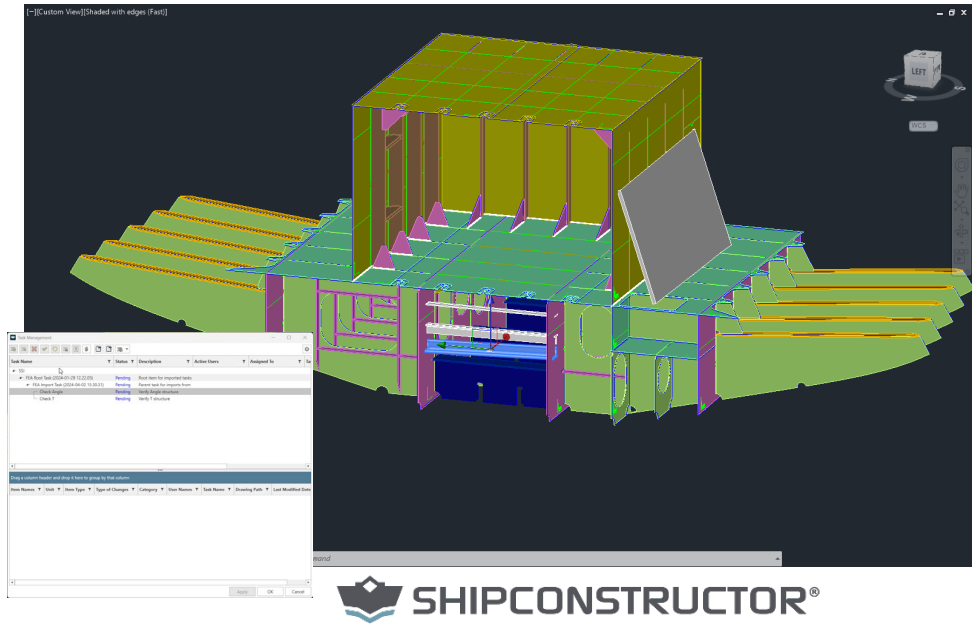


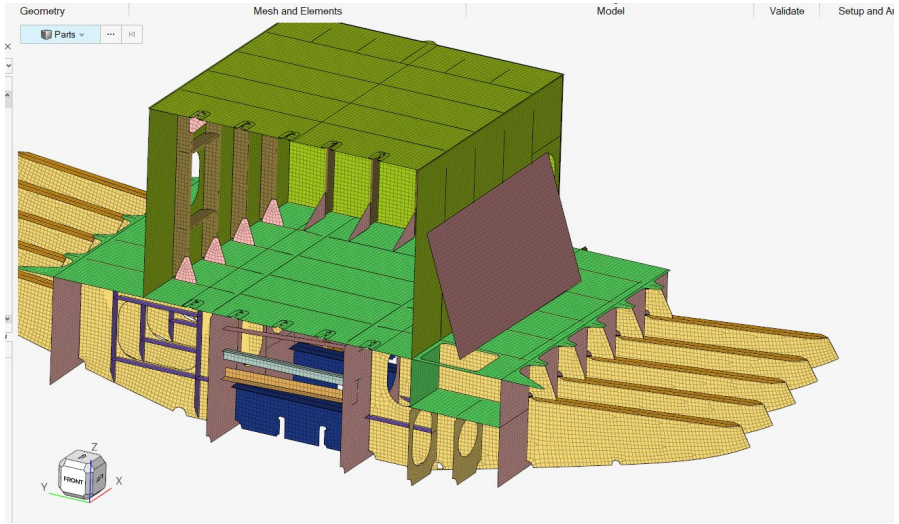


LiftShip3 Development

Post Analysis Import from FEA

Plate Parts
Stiffeners
Generated Tasks in SSI





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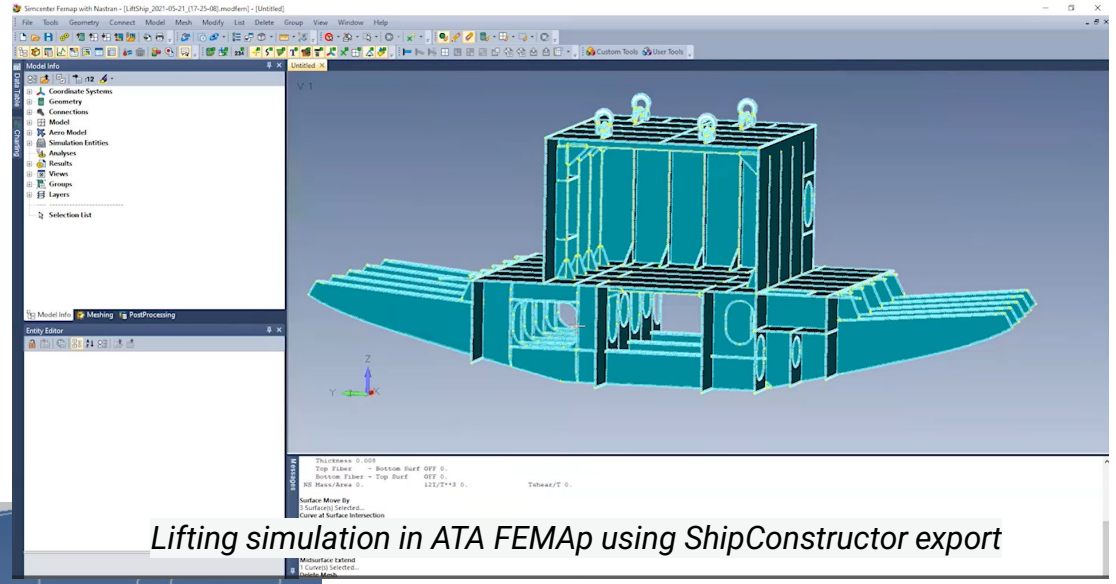
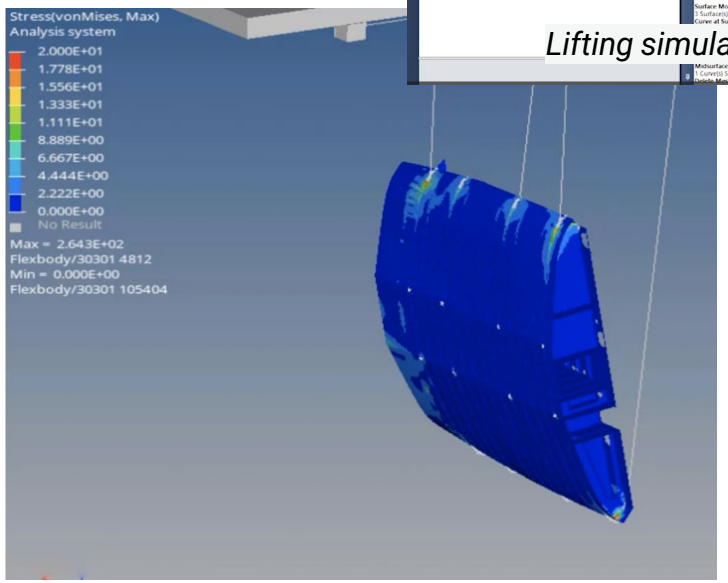
LiftShip3 Capabilities Available in SSI 2025R1.0.1

SSI 2025R1.0.1 builds on how shipyards can take advantage of Finite Element Analysis (FEA). Teams can now utilize FEA workflows to automate and refine lift preparation and analysis, enhancing safety and precision.



Lifting simulation in ATA FEMAp using ShipConstructor export

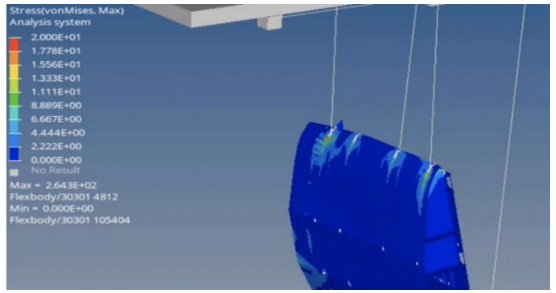


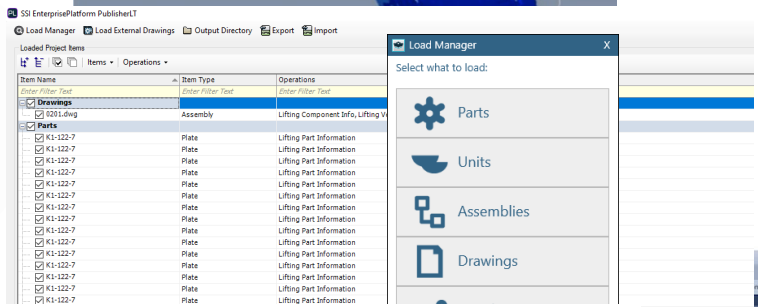
Lifting simulation in Altair HyperWorks using ShipConstructor export

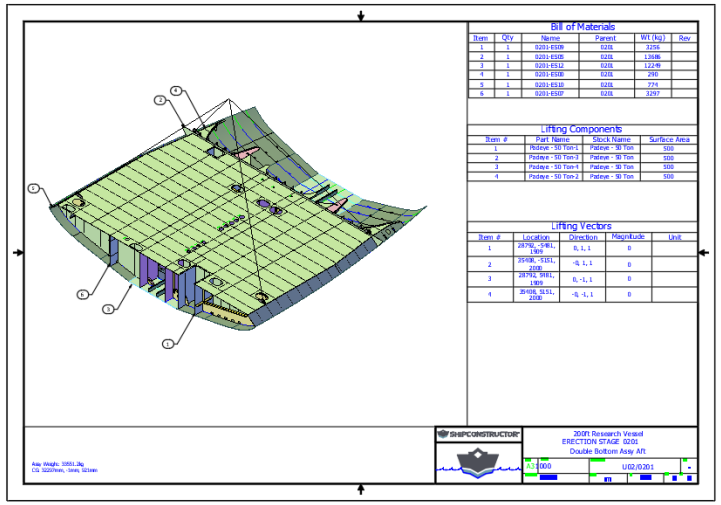
LiftShip3 Capabilities Available in SSI 20252025R1.0.1

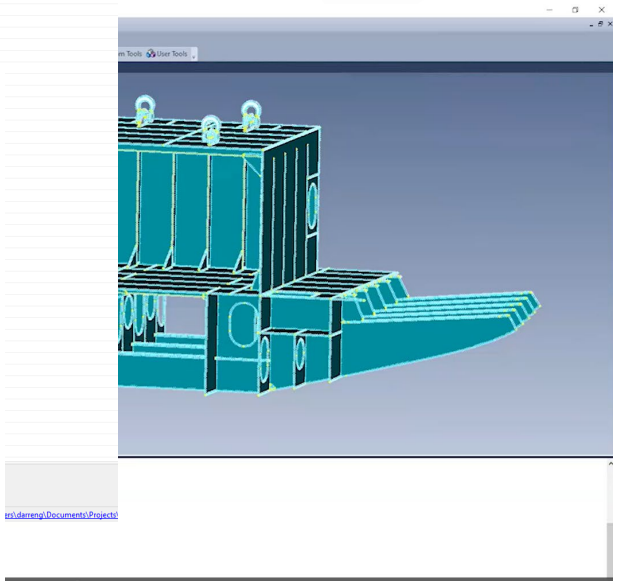
Workflows include:

- Creating lifting and turning assembly drawings and preferred stock list within ShipConstructor.
- Generating lifting and turning packages with EnterprisePlatform.
- Exporting the lifting packages into FEA tools like HyperWorks and FEMAP.
- Importing the data created by the FEA Analyst back into ShipConstructor to update the Product Model and production drawings.









LiftShip3 Status and Phase 2

- Phase 2 Funding awarded by NSRP.
- Software Vendors to provide latest software to team members.
- SSI to provide PSV project to run test scenarios for team members
- Shipyards and Desing team members to setup test environment with latest versions of software.
- Team to setup recurring meetings for test environment feedback and development strategies.
- Software vendors simplify workflow and document process for training.

AUSTAL

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Questions


SSI World Shipbuilding Conference
2024 - Americas
September 24th – 26th 2024
Golden Nugget Casino Biloxi, Mississippi, USA


Hiller