# RA - Automated Detail Planning and Integrated Shipyard Ops with Engineering Data

## TEAM:

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

Austal USA, Inc.

VT Halter Marine

GD Bath Iron Works

HII – Ingalls Shipbuilding

Fincantieri Marinette Marine

Floorganise

March 2023

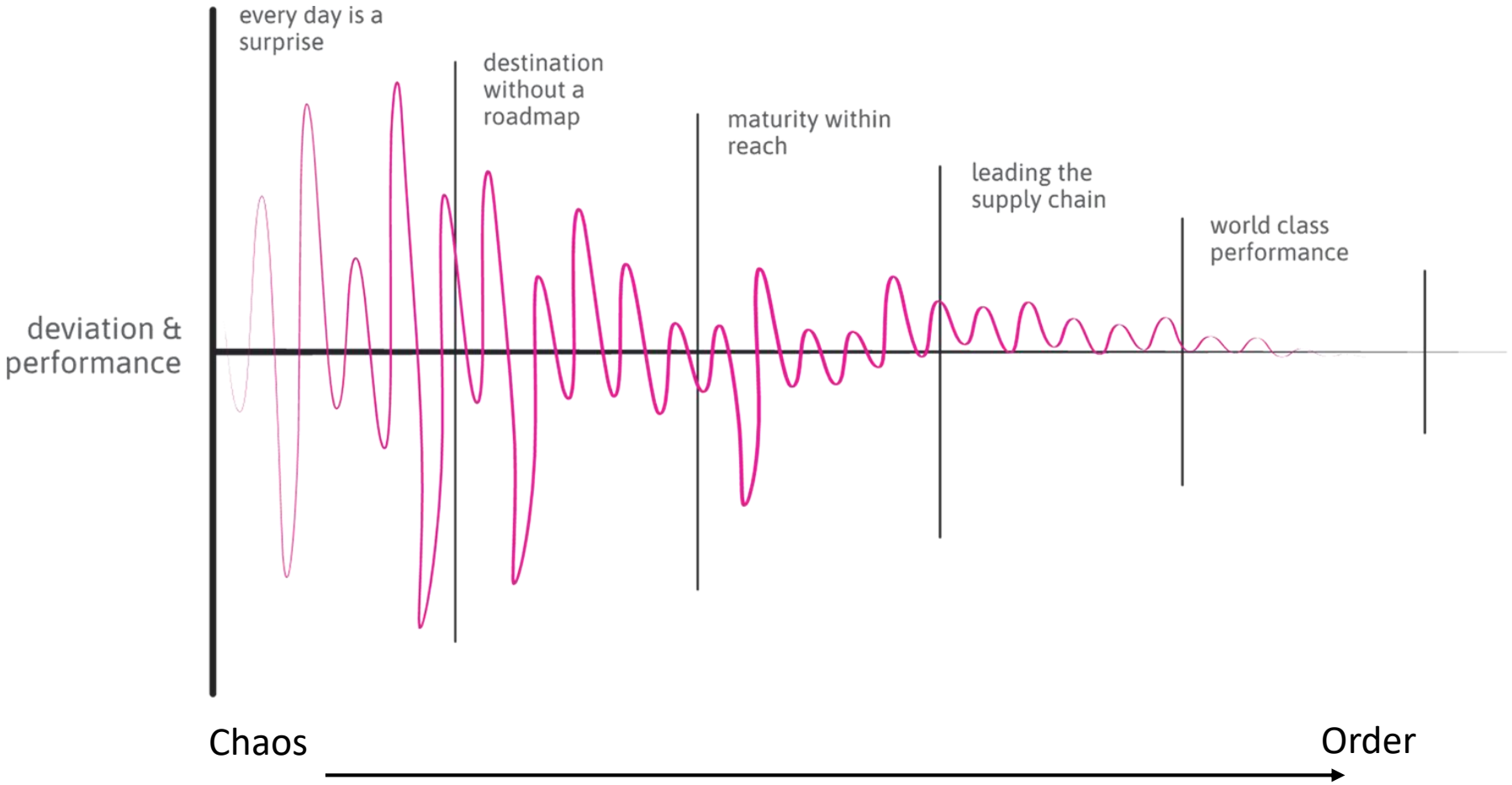
ALL PANEL MEETING CHARLESTON SC

# What is the Project really about…

**Increasing** the **efficiencies** of shipyard planning, down to the shop floor using the information from the 3D design model to support earlier procurement, planning, resource (equipment, shops, personnel, etc..) planning in advance of the design actually being finished

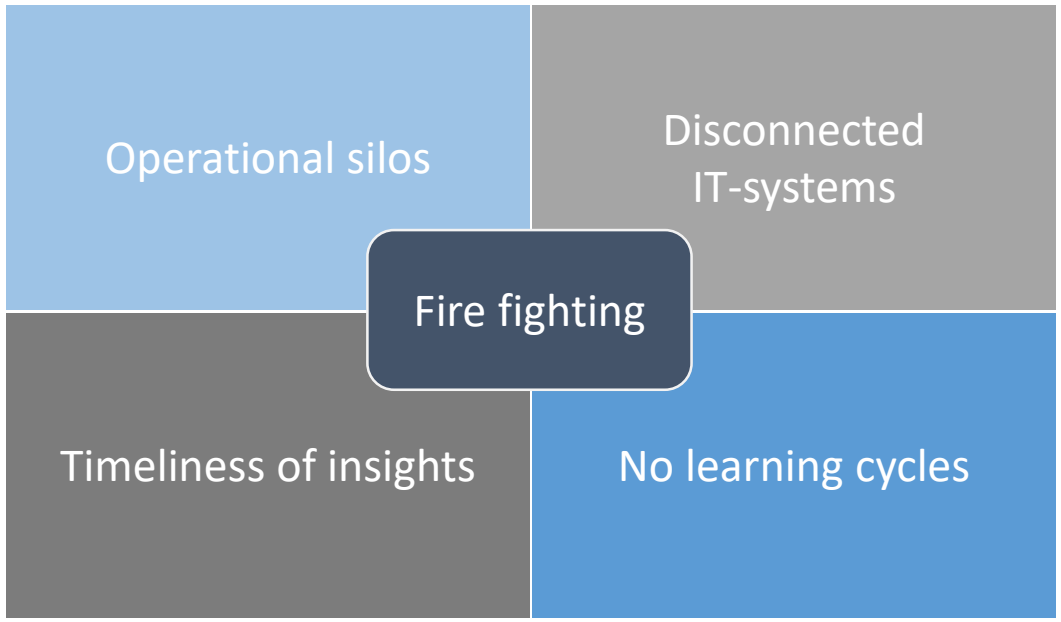
- Yard specific knowledge
- Project controls
- Detail planning
- Shop floor control
- 4- 6 week plans
- Equipment
- Drawings
- Hours/progress
- Dashboards/KPI's

# DEVELOPING OPERATIONAL PERFORMANCE
## THROUGH ENHANCED PREDICTABILITY AND PRODUCTIVITY



# FOUR MAJOR CAUSES

## FOR DAILY FIRE FIGHTING ON THE DECK PLATE



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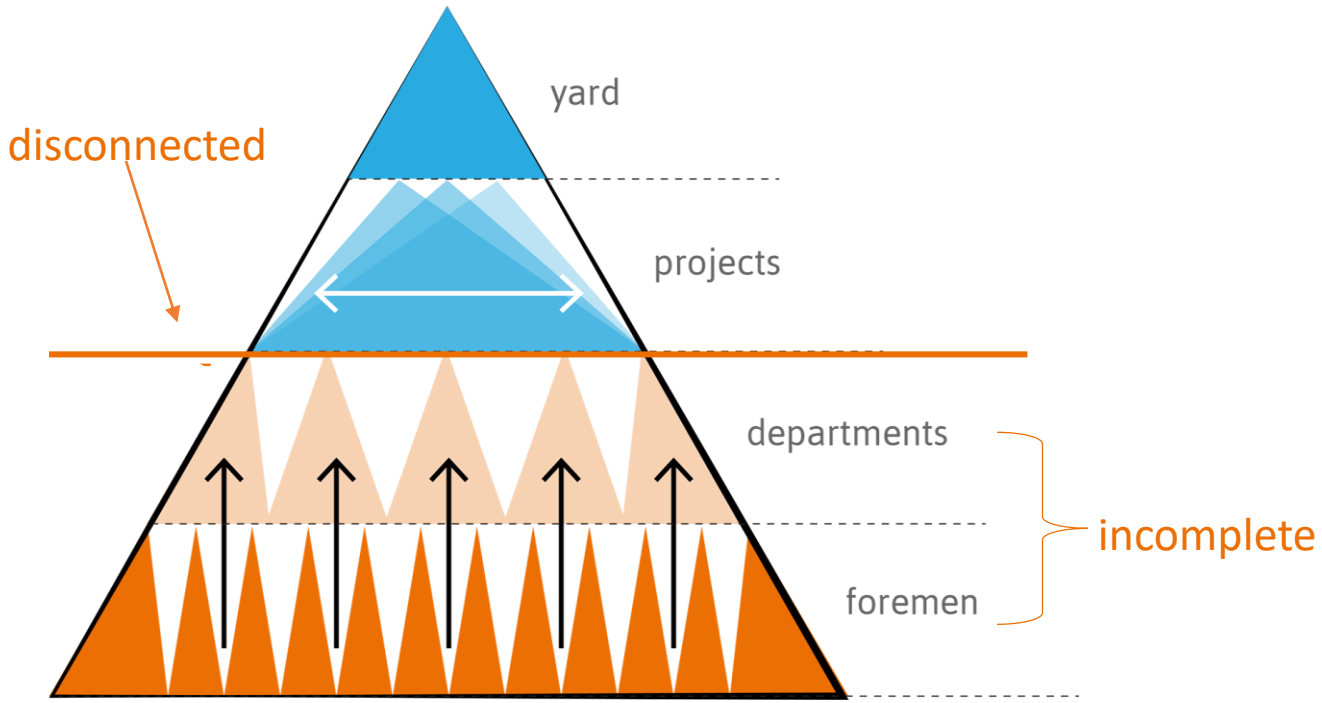
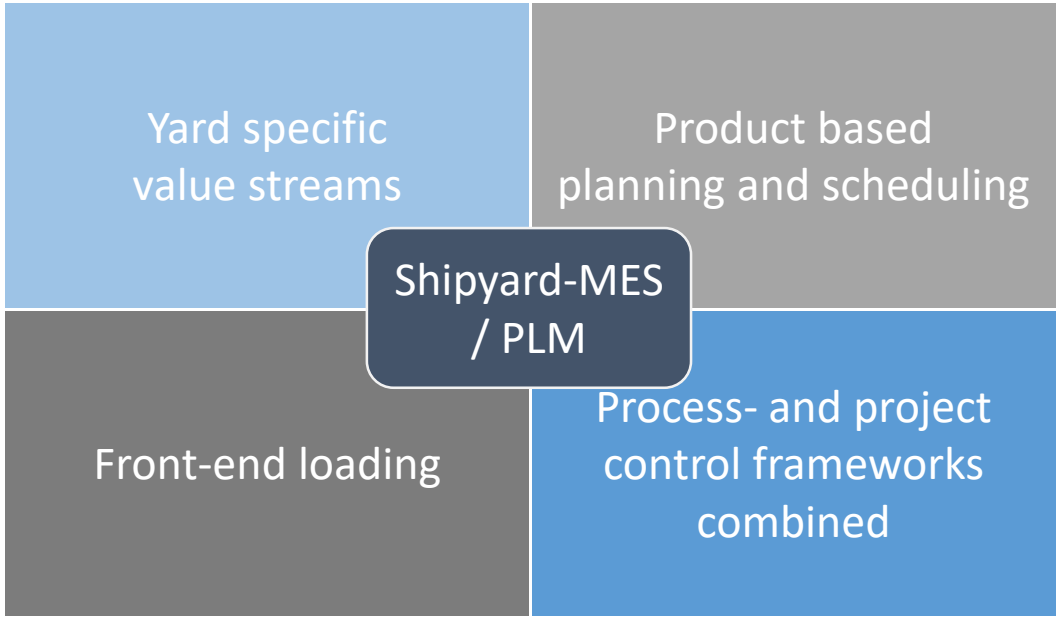
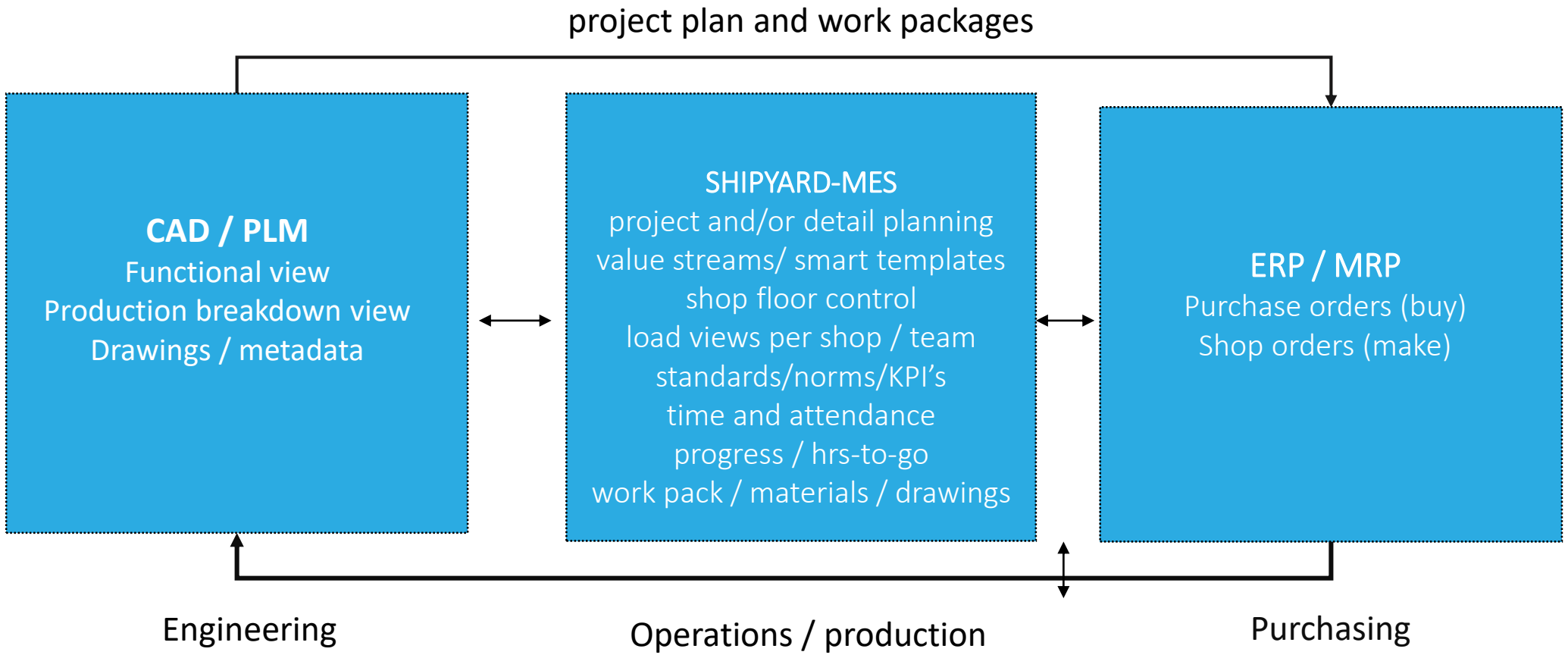



# FIVE MAIN SOLUTIONS
## TO DEVELOP PREDICTABILITY AND PRODUCTIVITY



# Shipyard integration



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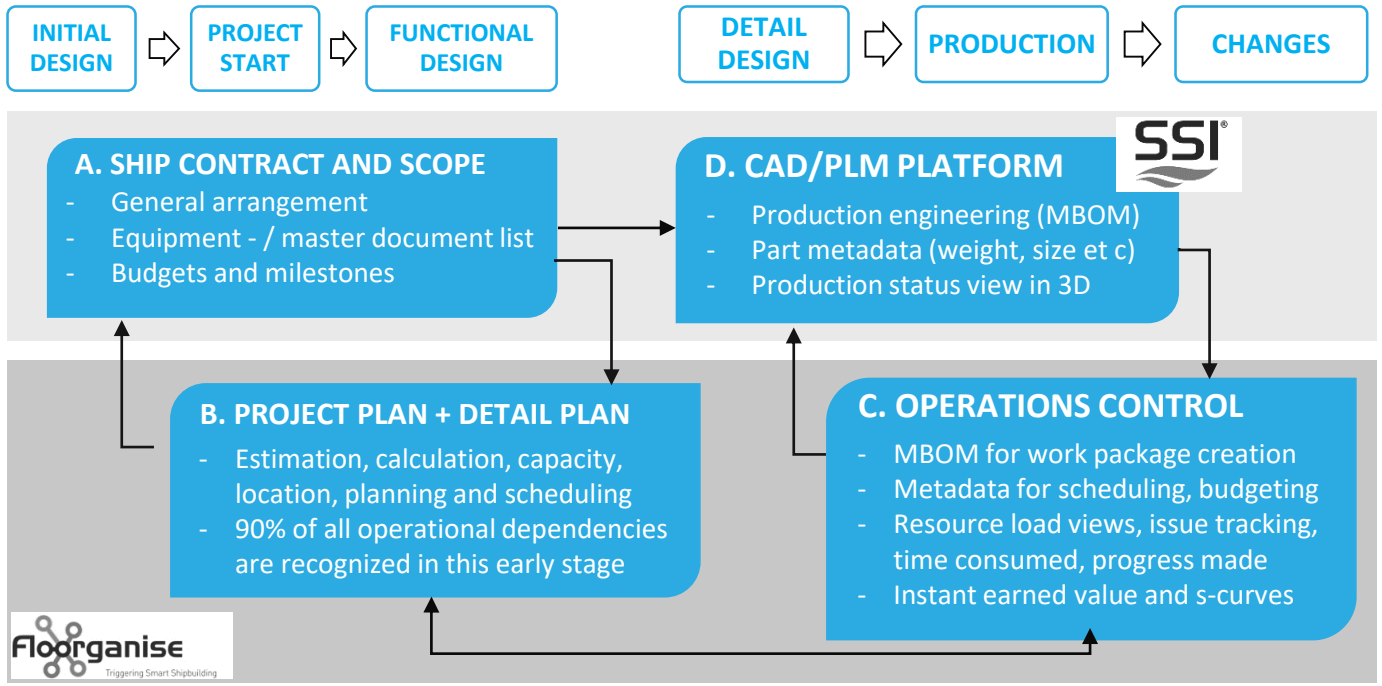

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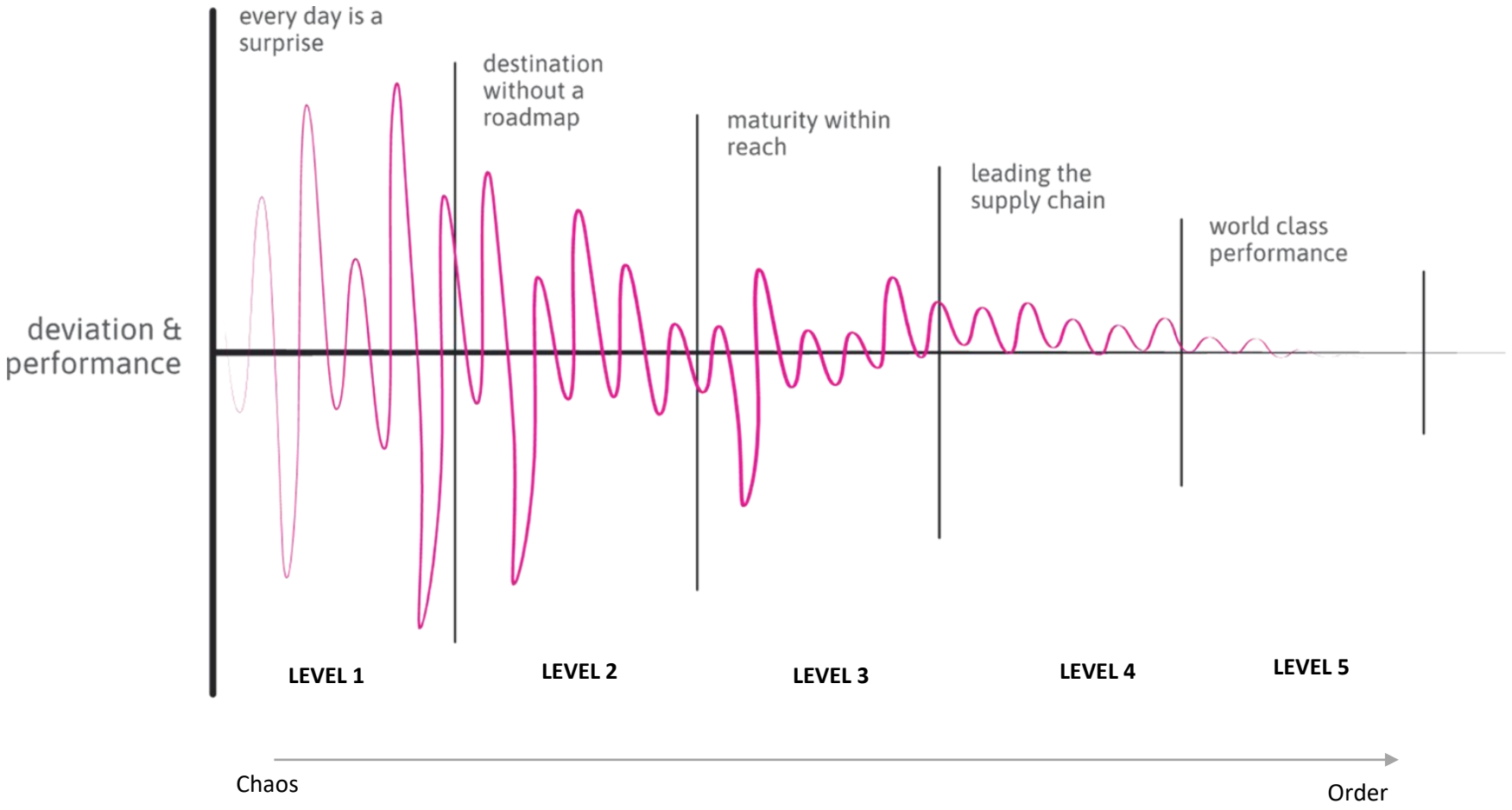

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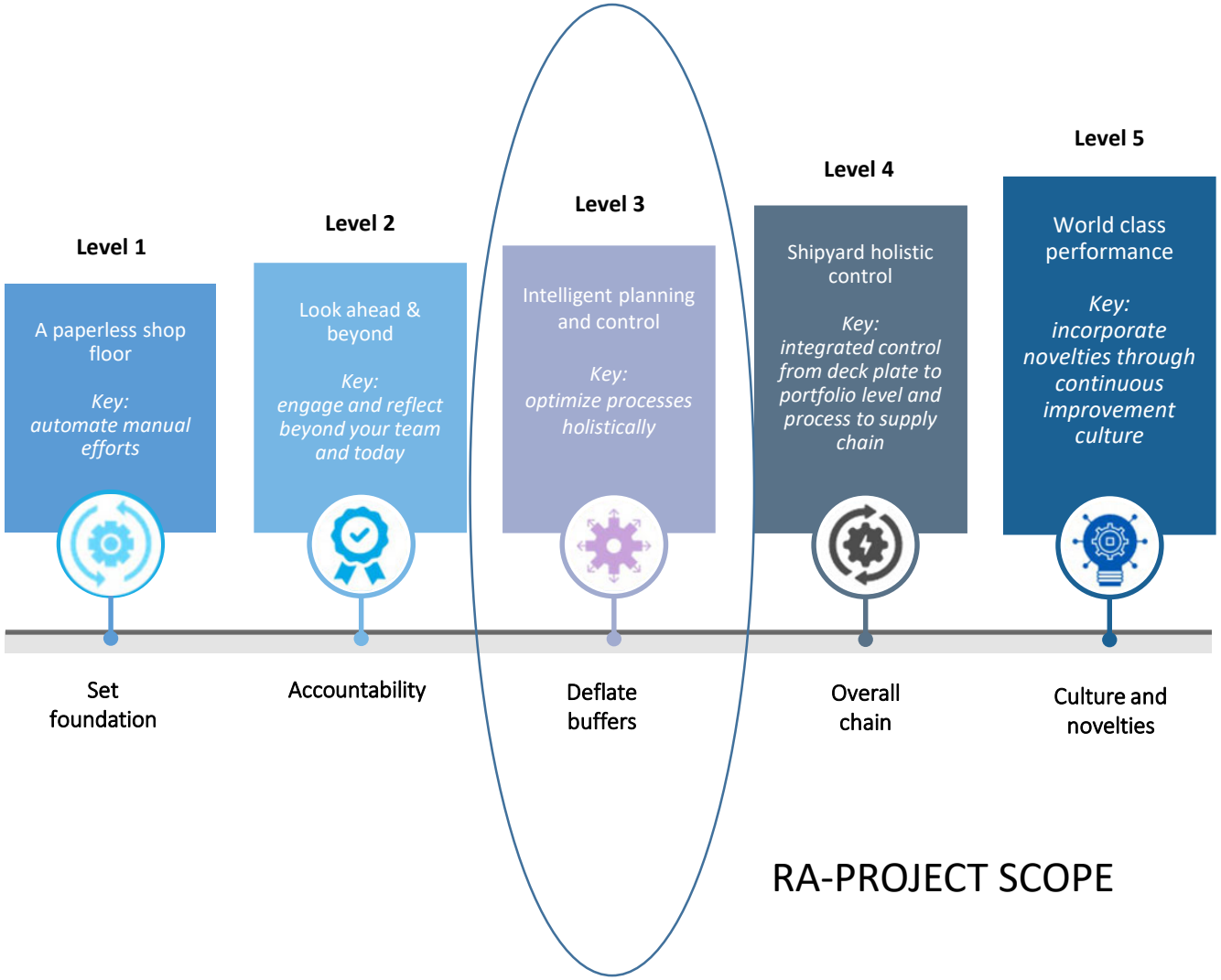



Philly
Shipyard

# Bottom line result

## RECOGNITION FROM REFINED GRANULARITY IN PLANNING AND CONTROL

| Variables in planning | Method 1<br>Manual detail planning (l3) | Method 2<br>Automated planning (l3/l4/l5) | Efficiency gain |
|---|---|---|---|
| Production cost price per hull | 3,500 x 37 x 60 = € 7,77mio | 3,500 x 32 x 60 = € 6,72mio | € 1,050,000 |

# RA - Project Scope

- Stand up Pilot Program: Experimental or Production
- Improve Shipyard efficiency- cost-price, lead time
- Digitization of engineering, organizational, and physical shipbuilding process
- Integrated SY MES platform.
- Capture specific SY Values Streams in MES
- Using Rolling-Wave-Method Production Planning
- Early released BOM from PLM integrates with engineering data
  - 3D detail design model sequencing, budgeting, resource allocation, production progress recognition
- Facilitate closed loop operational performance
  - recognition of production progress, consumed hours, load views, and risks by direct roll ups to project controls

# RA - Project Tasks 1 of 2

1. **Conduct Project Kickoff Meeting**
   - Review Project SOW, team member roles, invoicing and reporting requirements, project milestones and major deliverables. The Project Team will coordinate tasking and begin guiding the team members on associated work.
   - Deliverable: Project Management Plan, Kickoff Meeting Presentation
2. **Provide Software to Project Shipyards**
   - Project Team Member Shipyards shall receive all cost shared software from ShipConstructor and Floorganise. The Project Team Member Shipyards shall install the provided software.
3. **Software Workshop and creation of the digital shipyard**
   - The users from the Project Team Member Shipyards will participate in a software educational workshop where they will create their digital shipyard inside of the Floor2Plan software to be used for their pilot project block.
4. **Project Team Member Shipyards provide value stream processes for the pilot block**
   - The Project Team Member Shipyards shall develop and provide their value stream processes for systems and associated spaces for their pilot block.
5. **Project Team Member Shipyards to select or develop a pilot block**
   - The block shall be suitable for actual shipyard manufacturing by populating the block with hull structure, systems, components, and equipment. The pilot block shall have product hierarchy established. If there is not a block available that is ITAR compliant, the SSI OSV demonstration model is available for public use and distribution.
6. **Develop a Primavera P6 schedule**
   - The Project Team Member Shipyards shall develop a schedule with a WBS in Primavera P6; however, other scheduling tools are acceptable although Primavera P6 is preferred.
7. **Develop a schedule in Floor2Plan**
   - The Project Team Member Shipyards shall use the Primavera P6 schedule to develop a schedule within the Floorganise Floor2 Plan software application.
8. **Project Team Member Shipyards to select or develop a pilot block**
   - The Project Team Member Shipyards shall develop and / or generate drawings for the pilot Block, that will support the Floor2Plan shop floor control modules for front line supervisors. This block selection and development should result in providing digital work packages and data to support the shipyard's overall multi-project workload distribution.

# RA - Project Tasks 2 of 2

9. **Project Team Member Shipyards to develop digital work packages using Floor2Plan**
   - Shipyards shall develop (digital) work packages for weekly routines using the 3D Production Model, work packages contain per front line supervisor: Planned finish date, hours budgeted, hours worked by the team per work package. These digital work packages should contain all parts or components associated with the work package and their status. Relations and dependencies from other trades for this work package (preceding, succeeding activities) will be established. Resources or persons within the team of the front-line supervisors available for the work shall also be defined. Drawings will be used as well as existing data from the 3D production model to produce the digital work packages using Floor2Plan.
10. **Floor2Plan software to provide shipyards with the weekly assignments**
    - Data from Floor2Plan will be pushed to shipyard systems, laptops and / or tablets
11. **Project Team Member Shipyards to status the pilot block inside of Floor2Plan**
    - Project Team Member Shipyard production to perform status within Floor2Plan for the pilot Block (rolling up to project level controls in P6 after approval)
12. **Floor2Plan to provide updates to the Project Member Shipyards**
    - Floor2Plan will provide status of the work through a revised Gantt Chart including a critical path validation (by recognizing the critical chain of operational activities/processes)
13. **Project Management, Weekly Team Meetings, Reports**
    - This task will serve to manage the project tasks and schedule, manage the project team meetings, develop required reports, complete Phase 1 tasking successfully, conduct Go / No-Go Assessment Meeting, and manage the remaining tasks, schedule, and similar activities with Phase 2 of the project. Additionally, the Technology Transfer and Implementation Plan shall be reviewed and revised accordingly.
14. **Project Demonstration**
    - Demonstrate the project at an open meeting
15. **Technology Transfer Events**
    - Various Technology Transfer Events as detailed in the Technology Transfer and Implementation Plan.

# RA - Project Schedule – Phase 1

| Phase | Milestone | Deliverable Title | Due Date |
|---|---|---|---|
| **1** | 01 | Kick-off Meeting – ***SSIUSA Mobile, AL and Virtual*** | **Complete 6/30/23** |
| **1** | 01a | Project Management Plan | **Working** |
| **1** | 01b | Kick-off Meeting Presentation | **Complete 6/30/23** |
| **1** | 02 | Quarterly Report 1 | **Completed - 6/20/2023** |
| | | Software Workshop – ***Mobile, AL*** | **~ 8/15/2023** |
| **1** | 02a | Software Workshop Summary Report | **~ 8/17/2023** |
| **1** | 03 | Quarterly Report 2 | 9/20/2023 |
| | | Quarterly Meeting 2- ***Virtual***<br>Assess progress supporting the shipyard's value streams and identifying a block or developing a block suitable for the pilot that is ITAR compliant | 11/17/2023 |
| **1** | 04 | Quarterly Report 3 | 12/20/2023 |
| | | Quarterly Meeting 3- ***Virtual***<br>Assess progress on the scheduling aspect | 2/16/2024 |
| **1** | 05 | Quarterly Report 4 | 3/20/2024 |
| **1** | | PH1 Quarterly Meeting 4 - ***Virtual or Marinette WI***<br>Test & Evaluation Workshop (Go/No-Go) | 5/17/24 |

# RA - Project Schedule – Phase 2

| Phase | Milestone | Deliverable Title | Due Date |
|---|---|---|---|
| **2** | 06 | Tech Transfer & Implementation Plan Update | **6/19/2024** |
| **2** | 07 | Quarterly Report 5 **(* Recommended GO/ NO-GO Date)** | 6/20/2024 |
| | | PH2 Quarterly Meeting 5 - ***Virtual***<br>Assess progress on the development of work packages | 8/16/24 |
| **2** | 07a | Work Package Summary Report | 8/17/2024 |
| **2** | 08 | Quarterly Report 6 | 9/20/2024 |
| | | PH2 Quarterly Meeting 6 - ***Virtual***<br>Assess progress on the weekly assignments | 11/15/24 |
| **2** | 09 | Quarterly Report 7 | 12/20/2024 |
| **2** | 09a | Progressing Summary Report | 2/15/2025 |
| | | PH2 Quarterly Meeting 7 – ***Virtual***<br>Assess progress on the shipyard status within Floor2Plan | 2/21/25 |
| **2** | 10 | Quarterly Report 8 | 3/20/2025 |
| | | PH2 Final Workshop / Demo – ***SSIUSA Mobile, AL*** | 5/21/25 |
| **2** | 11 | Final Report and Project Results Summary | 5/26/2025 |

# RA - Project Roles and Relationship

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

ATI
ADVANCED TECHNOLOGY INTERNATIONAL

**NSRP Technical Representative**

Nick Laney

- Oversight

GENERAL DYNAMICS
NASSCO

**Program Technical Representative**

Dan Sfiligoi (GD-NASSCO)

- Oversight

FINCANTIERI
MARINETTE MARINE

GENERAL DYNAMICS
Bath Iron Works

INGALLS
SHIPBUILDING
A Division of HII

**Participating Shipyards**

- Coordinate work packages internally within the shipyard
- Facilitate that the right specialists, with the rights skills and the right mandate are available at the right time
- Provide input and feedback for the various project tasks
- Facilitate management decision making where needed
- Support training efforts, process value stream review sessions
- Provide testing and validation of concepts and systems
- Complete tasks, deliverables and provide input for others
- Provide support and feedback for project reports and planning

# RA - Project Roles and Relationship

**NSRP Technical Representative**

Nick Laney

- Oversight

**Program Technical Representative**

Dan Sfiligoi (GD-NASSCO)

- Oversight

**Project Lead**

- Coordinate meetings, milestones and tasks
- Manage expectations of participants and deliverables
- Produce project reports, deliverables, success criteria

Project Participant

- Provide software installation, integrations and configuration
- Provide software testing, training, and support
- Sustain alignment between usage and project objectives
- Complete tasks, deliverables and provide input for others
- Provide support and feedback for project reports and planning

**Project Participant**

- Develop software integrations with ShipConstructor PLM
- Complete tasks, deliverables and provide input for others
- Provide support and feedback for project reports and planning
- Per shipyard
- Capture relevant value streams, KPI's, standards and norms
- Capture shipyard specific nuances, objectives and lay-out
- Install, integrate, configure and deliver shipyard-MES
- Provide software testing, training and (on-/off-site) support
- Sustain alignment between usage and project objectives

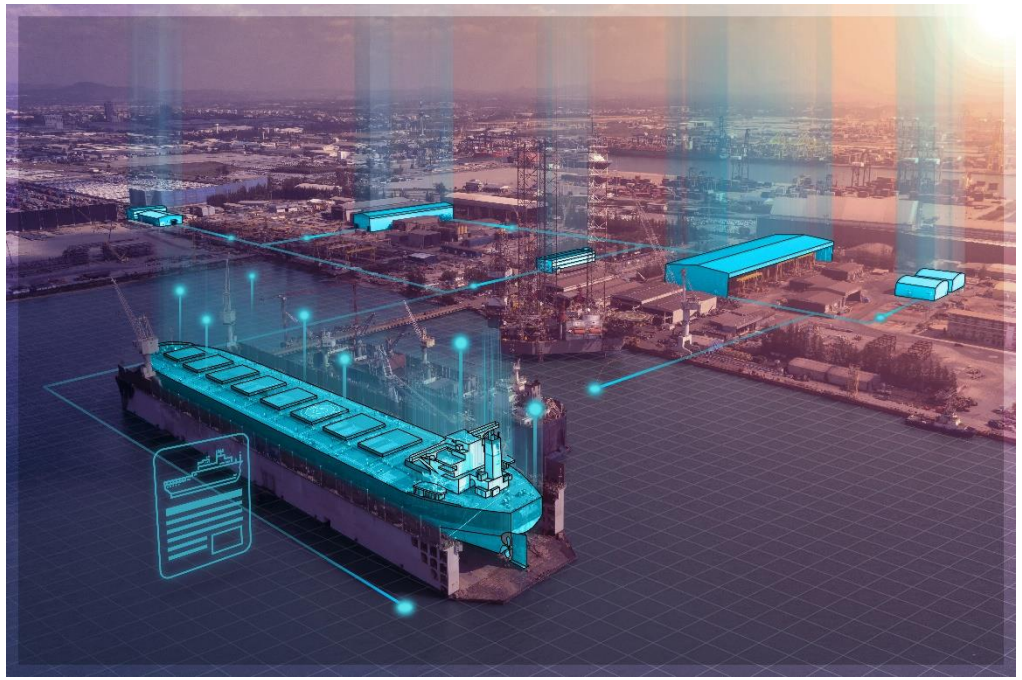
# RA - Project Approach

- Two Different Approaches
  - This is the shipyards choice
- Approach #1- Science Experiment
  - Demonstrate capability on SSI training model
  - Learn the potential of the tools
  - No interruption to current workflow
  - Starting implementation at the beginning when implementing for production.
- Approach #2- Pilot Program with real Production Block
  - Demonstrate capability on production parts
  - Uncover real problems during this RA
  - Potentially not get the full capability demonstration.

# RA - Technical Status as of Today

- Project Kicked off 6/30/23
- Project team members have begun distributing and loading software
- Reviewing Floor2plan Software Training
- Shipyard begin evaluating different approaches.
- Shipyard begin reviewing internal Value Streams

# PP - Automated Detail Planning and Instant Earned Value Control



*Applying part metadata to automate detail planning sequencing and budget setting (hours/duration) –to enhance project performance and EVMS control*

# PP - Project Team Members

**NSRP Technical Representative**
Nick Laney

**Program Technical Representative**
Jamie Breakfield (HII-Ingalls)

**Fincantieri Marinette Marine**
Ben Dorris
Sean Smith

**Fincantieri Bay Shipbuilding**
Pete Sinclair

**Austal USA**
Shawn Wilber

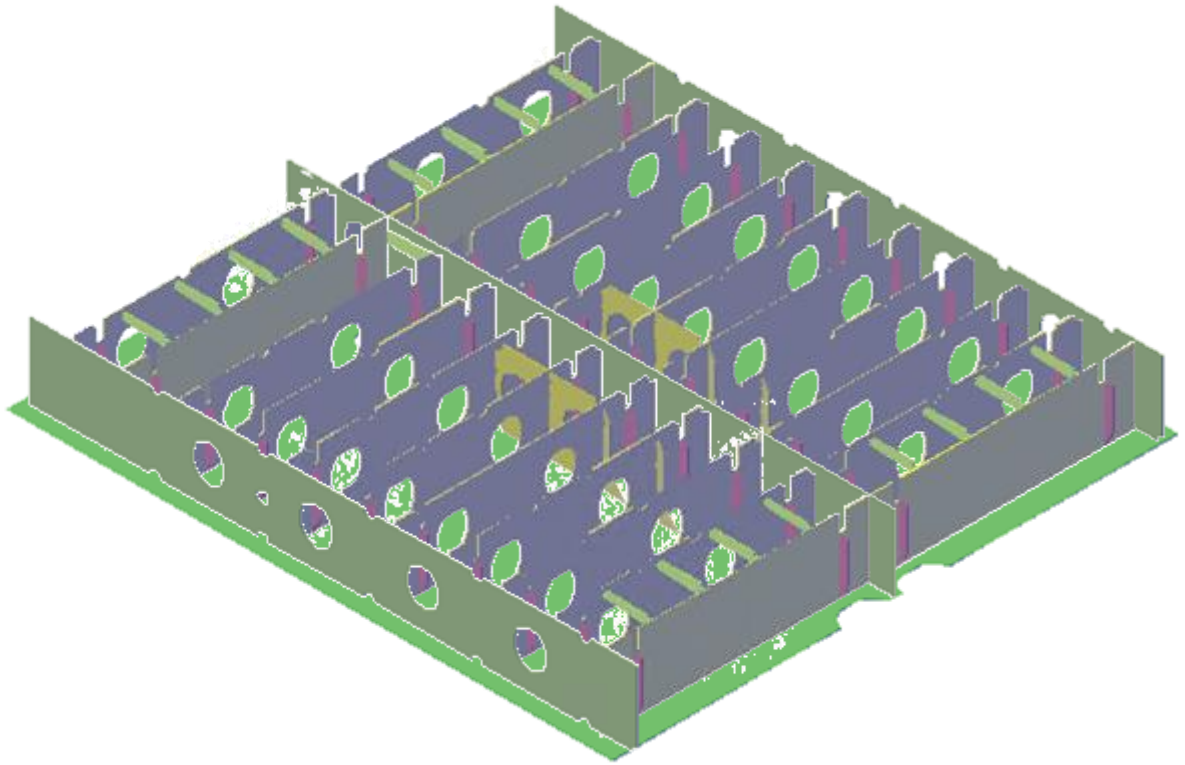
**Floorganise**
Gert Jan Biersteker
Ronald de Vries
Jon Torfi Hauksson

**Philly Shipyard**
Michel Boeckx

**SSIUSA Team**
Rob Parker
Darren Guillory
Tyler Jones
Patrick Roberts
Peter Vihtelic

# PP-Project Goals

- Automate the detail planning process coordinated with the project plan through a direct integration with engineering data
- Automated sequencing, budgeting (hours/duration), resource allocation, and Earned Value Management System (EVMS) control.
- Integrate the 3D engineering design model to allow metadata at the part level to drive the automated planning algorithm and interoperability with ERP, planning, EVMS and shop floor control.



# PP - Project Objectives

- Introduce automated detail planning methods based on integration with engineering metadata
- Validate the project plan execution and EVMS-control instantly through planning status visualization within the 3D model. (Based on planned versus actual progress comparisons; 4D planning)
- Lower the barrier of entry for utilizing automated planning through training/workshops
- Lower communication costs for change management feedback between production and engineering
- Demonstrate additional learning and process improvement capabilities by granular production norms
- Document process workflows and integration with targeted cost reduction areas
- Produce education and training material for fast, effective implementation

# PP - Project Tasks

1. Kick Off Meeting, establish initial requirements *(All)*
2. Capture business process and data requirements *(All)*
    a. Develop To-Be process use cases and document workflow
    b. Develop detail planning output and determine alignment
    c. Review and refine requirements
3. Document data exchange requirements *(Floorganise, SSIUSA)*
    a. Document data exchange protocols
    b. Review data exchange protocols
    c. Review and refine requirements
4. Execute automated detail planning for selected block construction *(All)*
5. Demo data exchange with COTS solutions (e.g. ShipConstructor EnterprisePlatform, IFS, Primavera P6) *(Floorganise, SSIUSA)*
6. Develop final report and workshop training course materials *(All)*
7. Conduct final project workshop training event *(All)*

# PP - Project Deliverables and Major Task Schedule

| MILESTONES | Deliverable / Event | Team Member(s) | Due Date |
|---|---|---|---|
| MS 01 | Kick-off Meeting Agenda | ALL | COMPLETE- 7/10/23 |
| MS 02 | Kickoff Report with Detailed Project Schedule with Milestones | ALL | + 1 Week |
| MS 03 | Quarterly Report 1 | ALL | COMPLETE |
| MS 04 | Capture Business processes and data requirements | ALL | 07/30/2023 *Original<br>9/1/2023 * Proposed |
| MS 05 | Document Data Exchange | *Floorganise*<br>*SSIUSA* | 09/18/2023 |
| MS 06 | Quarterly Report 2 | ALL | 09/20/2023 |
| MS 07 | Execute Automated Detail Planning for selected block | ALL | 12/15/2023 *(?) |
| MS 08 | Quarterly Report 3 | ALL | 12/20/2023 |
| MS 09 | Data Exchange Test & Evaluation | ALL | 02/19/2023 |
| MS 10 | Quarterly Report 4 | ALL | 03/20/2024 |
| MS 11 | Workshop & Demonstration | ALL | 05/05/2024 |
| MS 12 | Final Report | ALL | 05/22/2024 |

**** Major Payable Deliverables***

# PP - Project Roles & Relationship

| Project Participants | Role and Key Contributions |
|---|---|
| SSI® | Project Lead<br>• Coordinate meetings, milestones and tasks<br>• Manage expectations of participants and deliverables<br>• Produce project reports, deliverables, success criteria<br>Project Participant<br>• Provide software installation, integrations and configuration<br>• Provide software testing, training, and support<br>• Sustain alignment between usage and project objectives<br>• Complete tasks, deliverables and provide input for others<br>• Provide support and feedback for project reports and planning |

# PP - Project Roles & Relationship

| Project Participants | Role and Key Contributions |
|---|---|
| Floorganise<br>Triggering Smart Shipbuilding | Project Participant<br>• Develop software integrations with ShipConstructor<br>• Complete tasks, deliverables and provide input for others<br>• Provide support and feedback for project reports and planning<br>• Per shipyard<br>• Capture relevant value streams, KPI's, standards and norms<br>• Capture shipyard specific nuances, objectives and lay-out<br>• Install, integrate, configure and deliver shipyard-MES<br>• Provide software testing, training and (on-/off-site) support<br>• Sustain alignment between usage and project objectives |

# PP - Project Roles & Relationship

| Project Participants | Role and Key Contributions |
|---|---|
| FINCANTIERI MARINETTE MARINE<br>FINCANTIERI BAY SHIPBUILDING<br>AUSTAL<br>Philly Shipyard | Project Participant<br>• Provide capacity to assess, validate, test and provide feedback on initial software system technical integrations and concepts*<br>• Coordinate work packages internally within the shipyard<br>• Facilitate that the right specialists, with the rights skills and the right mandate are available at the right time<br>• Provide input and feedback for the various project tasks<br>• Facilitate management decision making where needed<br>• Support training efforts, process value stream review sessions<br>• Provide testing and validation of concepts and systems<br>• Complete tasks, deliverables and provide input for others<br>• Provide support and feedback for project reports and planning |

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