

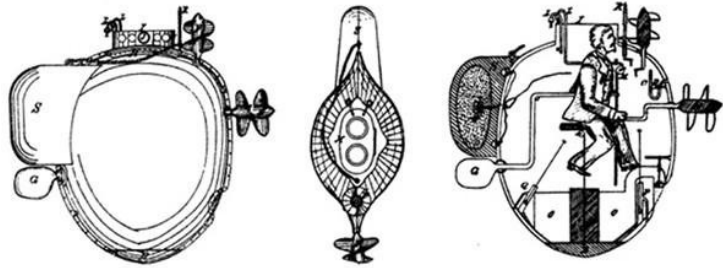


Hanwha Shipbuilding for National Shipbuilding Research Program All Panel Meeting

26 February 2025

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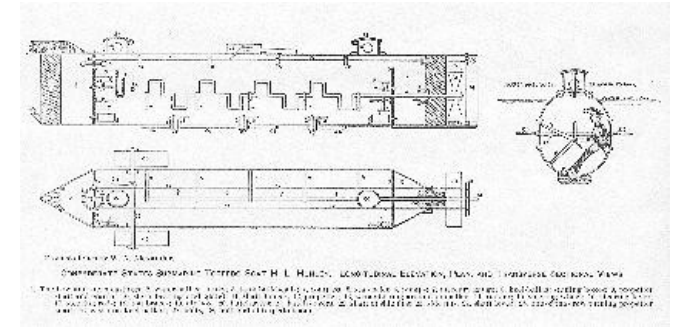
Early NSRP Projects



Bushnell's Turtle
New York Harbor
7 Sep 1776



Bushnell & Battle of the Kegs
Philadelphia Riverfront
6 Jan 1778



H. L. Hunley
Charleston Harbor &
Blockade
Feb 1864

Agenda

Hanwha Philly Shipyard

National Multi-mission Security Vessel (NSMV)

Hanwha Ocean

R&D

KSS-III Submarine

Digital Twin



Hanwha Philly Shipyard

Fast facts

Founded in 1997 via public-private partnership with City of Philadelphia and State of Pennsylvania; acquired by Aker in 2005

~1,500 personnel on site

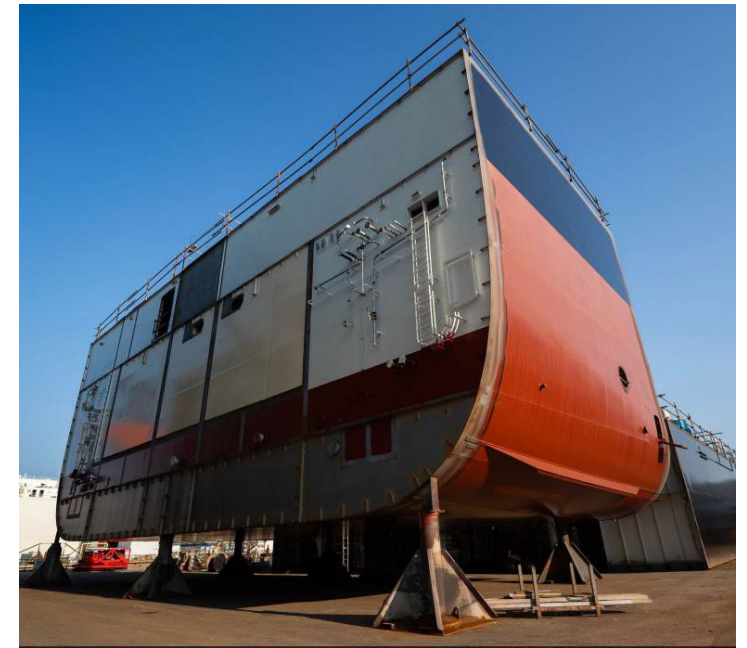
>\$300M annual revenue(2024)

>\$1B backlog

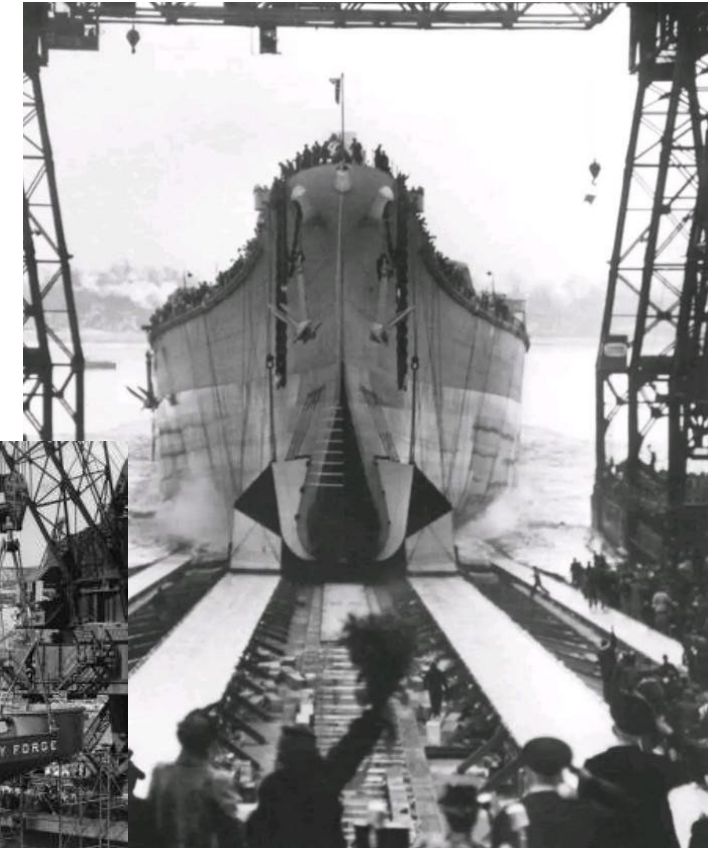
32 new build deliveries since 2003

Industry-leading Safety/HSE program

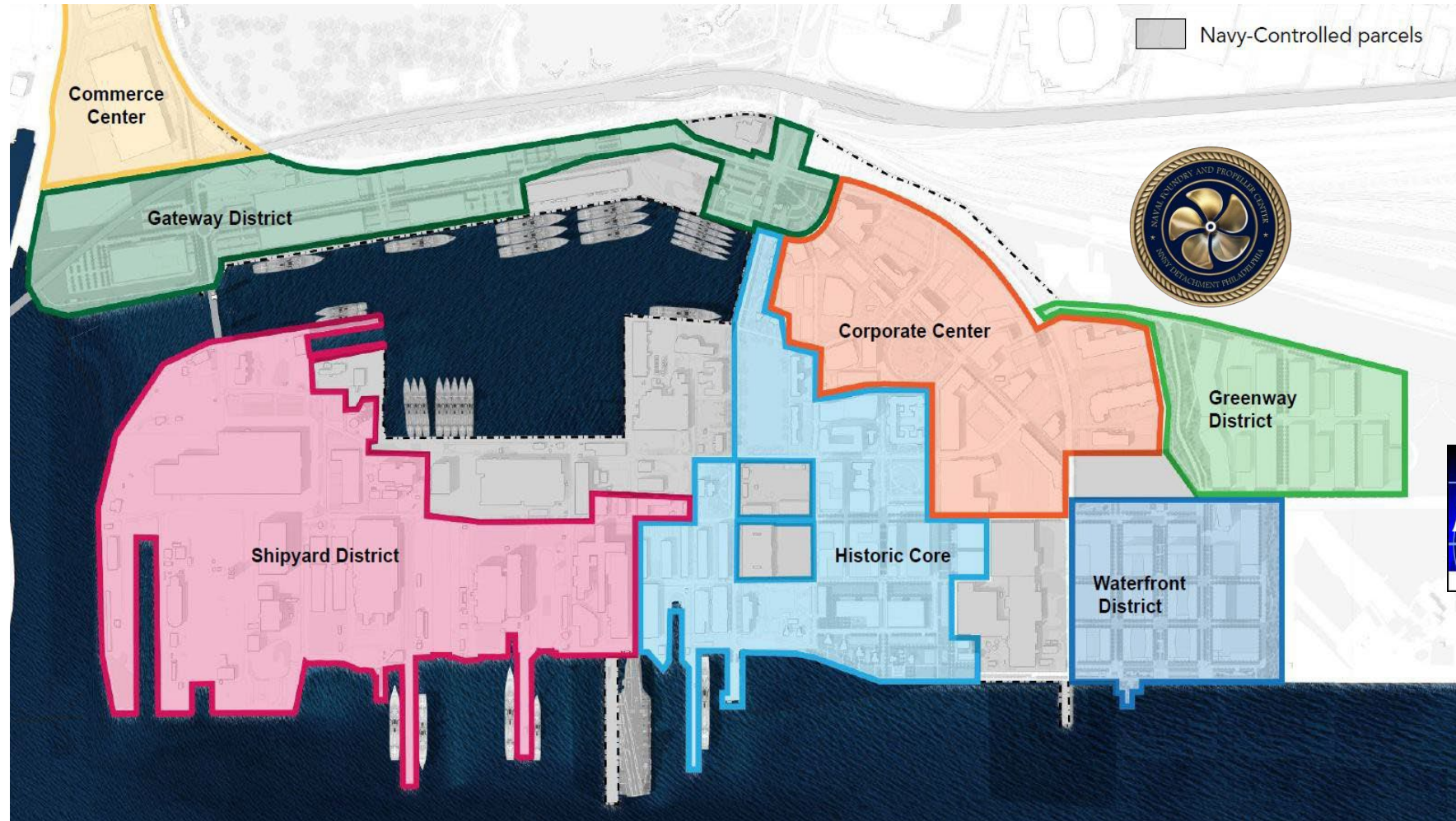
Acquired by Hanwha in December 2024



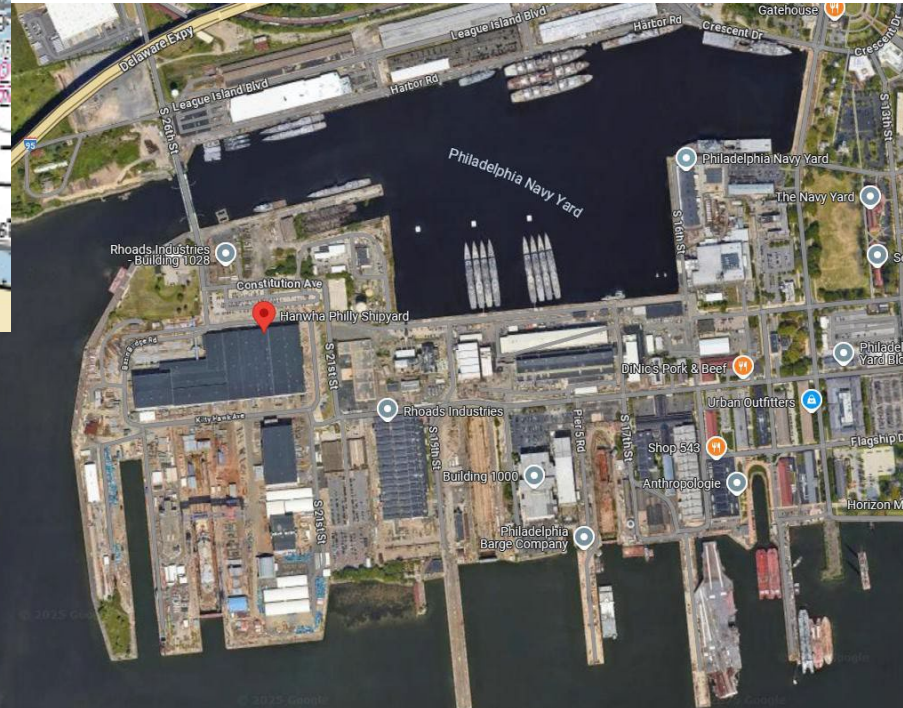
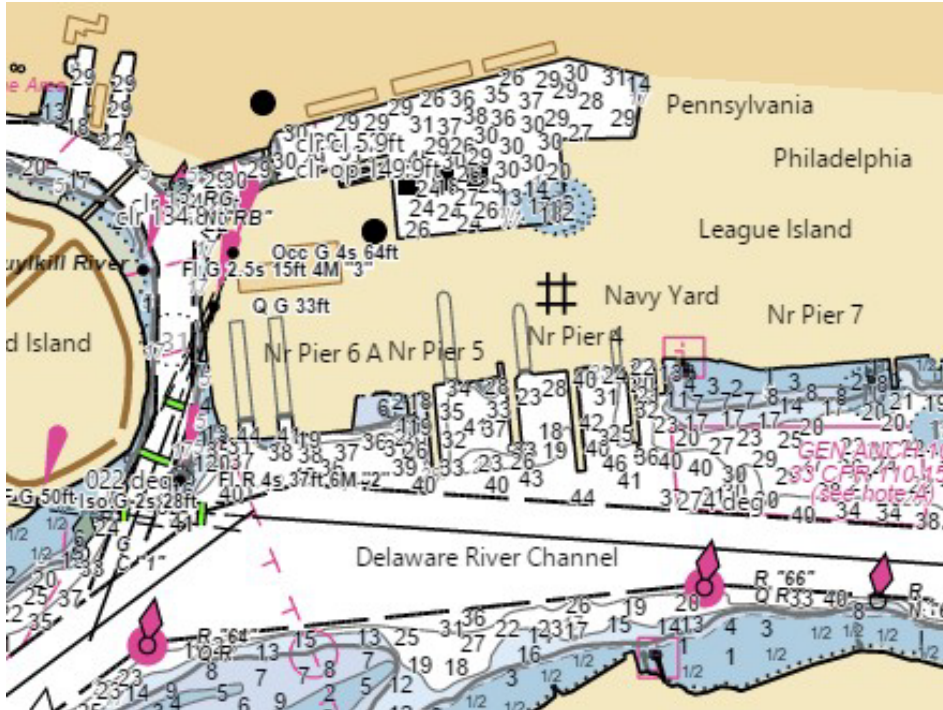
Rich history in shipbuilding



Philadelphia Navy Yard



The Yard's Shipbuilding District



- Docks: 5 (1 inactive)
- Piers: 6 (plus wharf space)
- Slipways: 3 (HPSI 2, PIDC 1)
- Channel depth: 45ft (Delaware River)
- Naval Inactive Ship Maintenance Facility (NISMF)



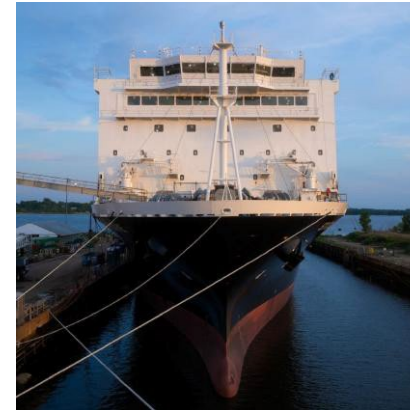
National Security Multi-Mission Vessel (NSMV)



NSMV-1 Empire State

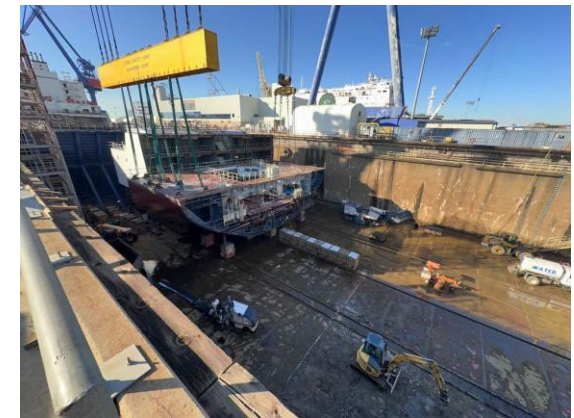


NSMV-2 Patriot State

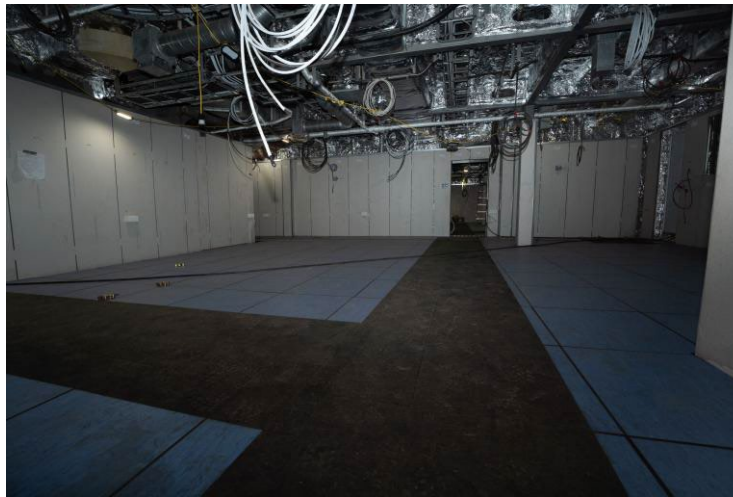


NSMV-3 State of Maine

NSMV-4 Lone Star State



NSMV Interior



Philly can be C-C-C-Cold



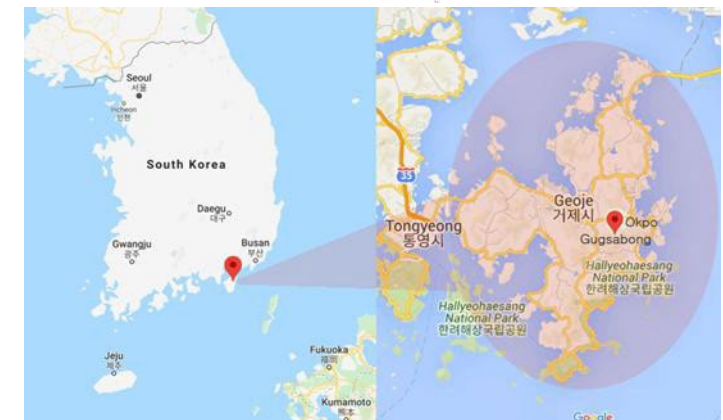


Hanwha Ocean



FOUNDED 1973
SHIPYARD 1200+ acres
WORKFORCE 21,000+

BUILDING CAPACITY
50 Commercial
5 Offshore
5 Subs / Warships





Maintenance, Repair, and Overhaul (MRO) Services



USNS Wally Schirra (T-AKE-8)



Automation (Welding and Painting)

This automation robot system enhances efficiency, quality, and safety while reducing costs, strengthening competitiveness in shipbuilding.



- The 1st generation welding robot (17 kg)
 - Capable of automatic welding in confined areas
 - Can be positioned easily and quickly
- 1 robot can handle the 3 skilled labourer's workload
 - Significantly increases quality
 - Expedites the welding process

Welding Robot



- The 2nd generation welding robot is being developed to weld small structures in and out of the vessel.
- Digital Twin Technology is applied to synchronize the actual working robot.

Painting Robot

Automation (Cabling)

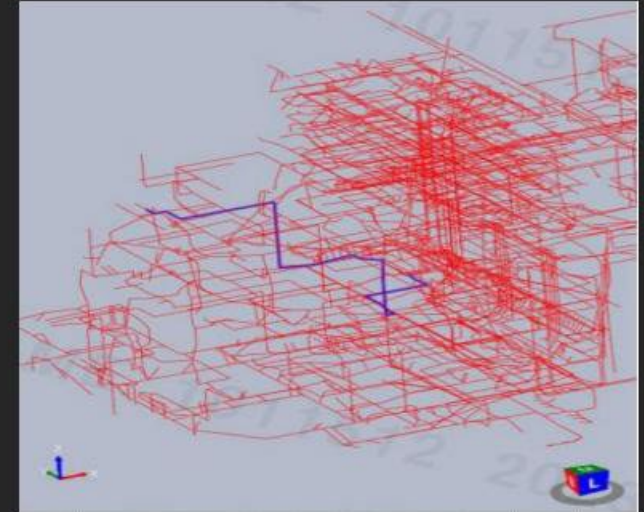
- Find optimum cable routing considering required rules and overfill in cable way based on AI and Digital Thread
- Reducing the installation time by approximately 14%



Cabling Machine



Cables



Cable Modeling

Technical Training

- 100,000 employees so far enhanced their technical skills for the past 22 years
- As of 2024, 120 training sessions for 2,400 employees are underway
- Training Courses : Welding (14 courses), Hull (4 courses), Electricity (5 courses), Plumbing, Painting (2 courses) and Scaffolding (1 course)



Training (VR Painting)

- This VR painting training system safely and cost-effectively replicates real work environments, effectively reducing paint waste, errors, and safety incidents while enhancing worker proficiency.
 - The OJT period is significantly reduced from 6 months to 1~2 months, expediting dispatchment of new employees.



VR Training Apparatus



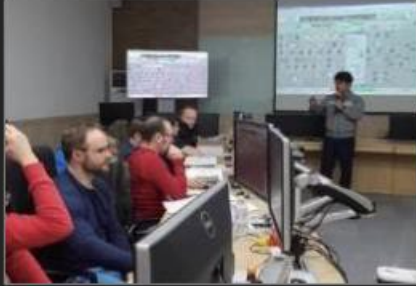
VR Training Screen

Smart Production Control

R&D Center (Seoul)

R&D Center (Geoje Island)

R&D Center (Geoje Shipyard)



VR Crew Training Center

Facility to provide crew training for Fuel Gas Supply System of LNGC and FSRU Ragas System through Virtual Simulations



Intelligent Production Technology R&D Center

- Area: 3,440 m³
- Facility for studies of production automation, machine intelligence, and Future production



Sloshing Research Center

- Sloshing model tests with two 6-DOF Motion Platforms
- The platforms are equipped with about 500ea pressure sensors and data acquire system

*DOF: Degree Of Freedom



Energy System Research Center

- Area: 8,000 m³
- The first research center in shipbuilding industry that is specialized in conducting performance and endurance tests with cryogenic liquids

KSS-III Submarine

Crew of 50

Displacement:

3,358 tons surfaced

3,705 tons submerged

Length: 274 feet long

Beam: 31.5-foot beam

Per Republic of Korea MoD



KSS-III Submarine (Habitability)

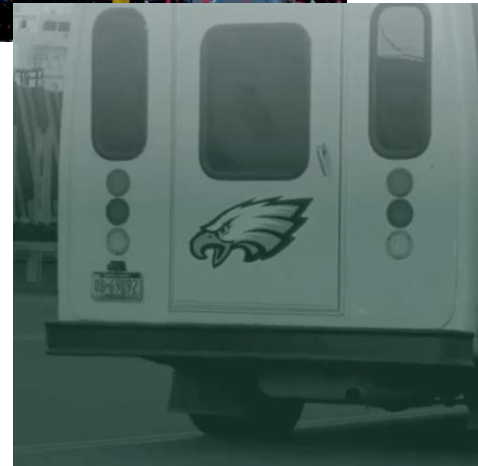
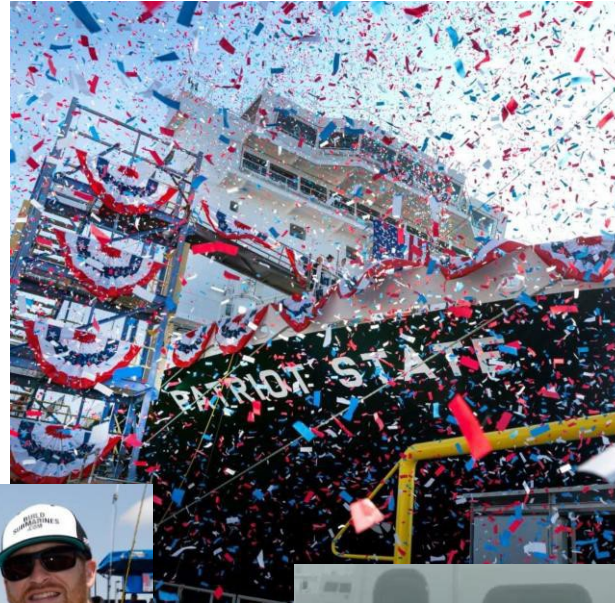
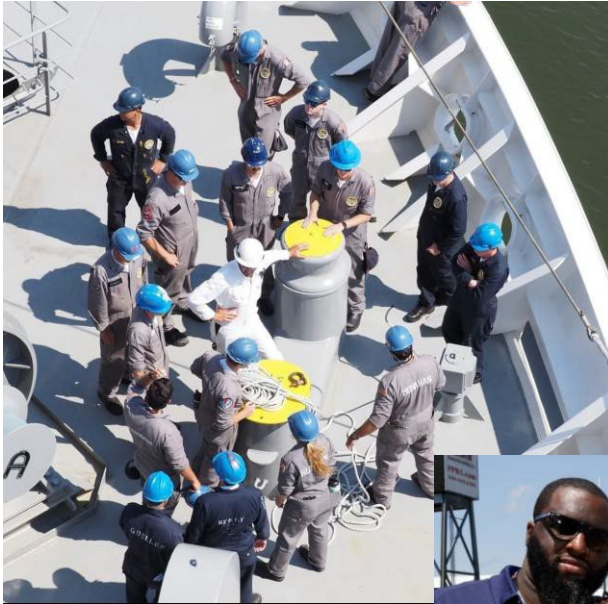
Digital Twins

Habitability Simulation

Maintainability Review

Digital Twin to Reality (CO's Cabin)

Around the Yard...and beyond





Questions?



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