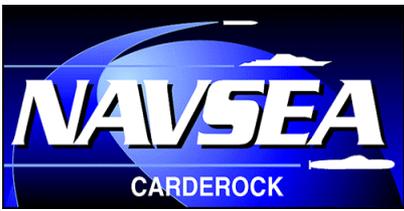


# HiCASS Industry Day

Naval Surface Warfare Center - Carderock Division  
Research and Development Related to HiCASS

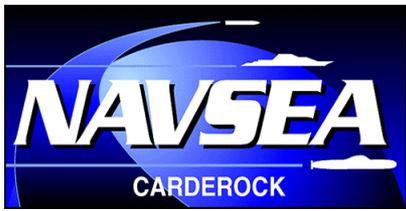
Jeff Green  
NSWCCD Code 2820  
10-23-03



# NSWC Carderock R&D

- Joint Logistics Over The Shore (JLOTS) & Seabasing Systems
  - Cargo Transfer
  - Ship to Lighter Interface
  - Ship to Ship Interface



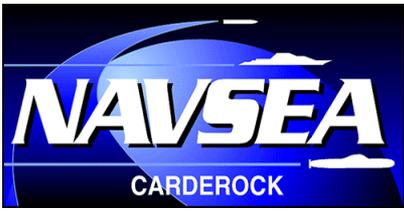


Cargo Transfer

# Shipboard Crane Systems

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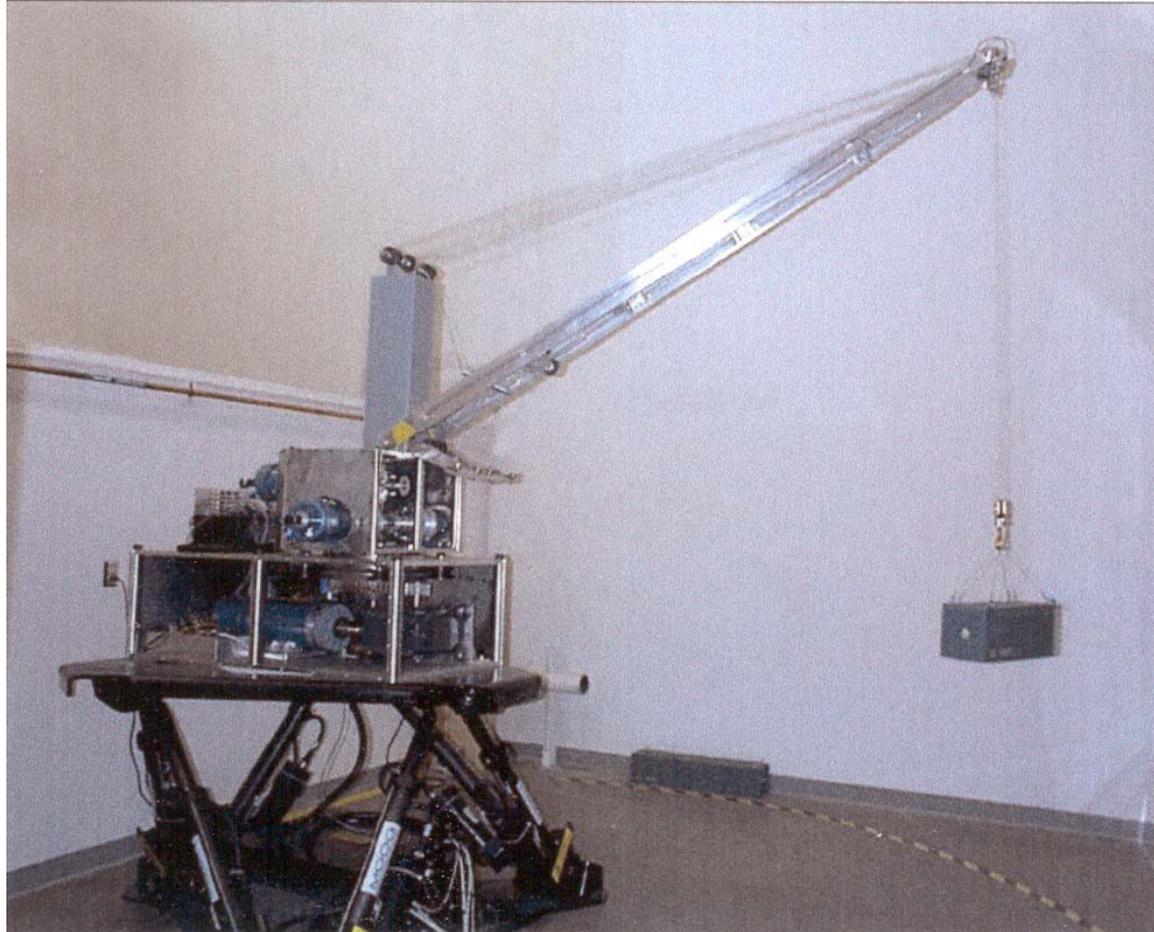
- Pendulation Control System (PCS)
- ONR ATD, transitioned to PMS 325
- Compensates for
  - Ship motions
  - Operator inputs
  - Residual cargo motions
- Development partners include:
  - Sandia National Lab
  - MacGregor Cranes
  - NSWCDD-CSS Panama City
  - Craft Engineering

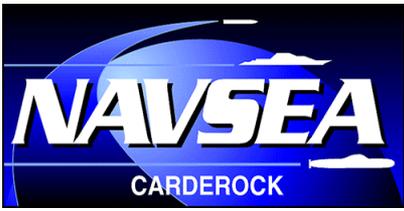


Cargo Transfer

# Shipboard Crane Systems

1/16th Scale Model



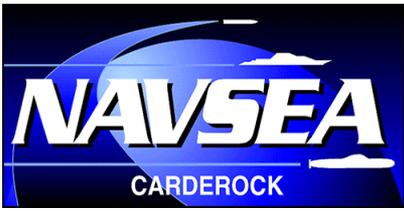


Cargo Transfer

# Shipboard Crane Systems

## Ship Motion Sensor

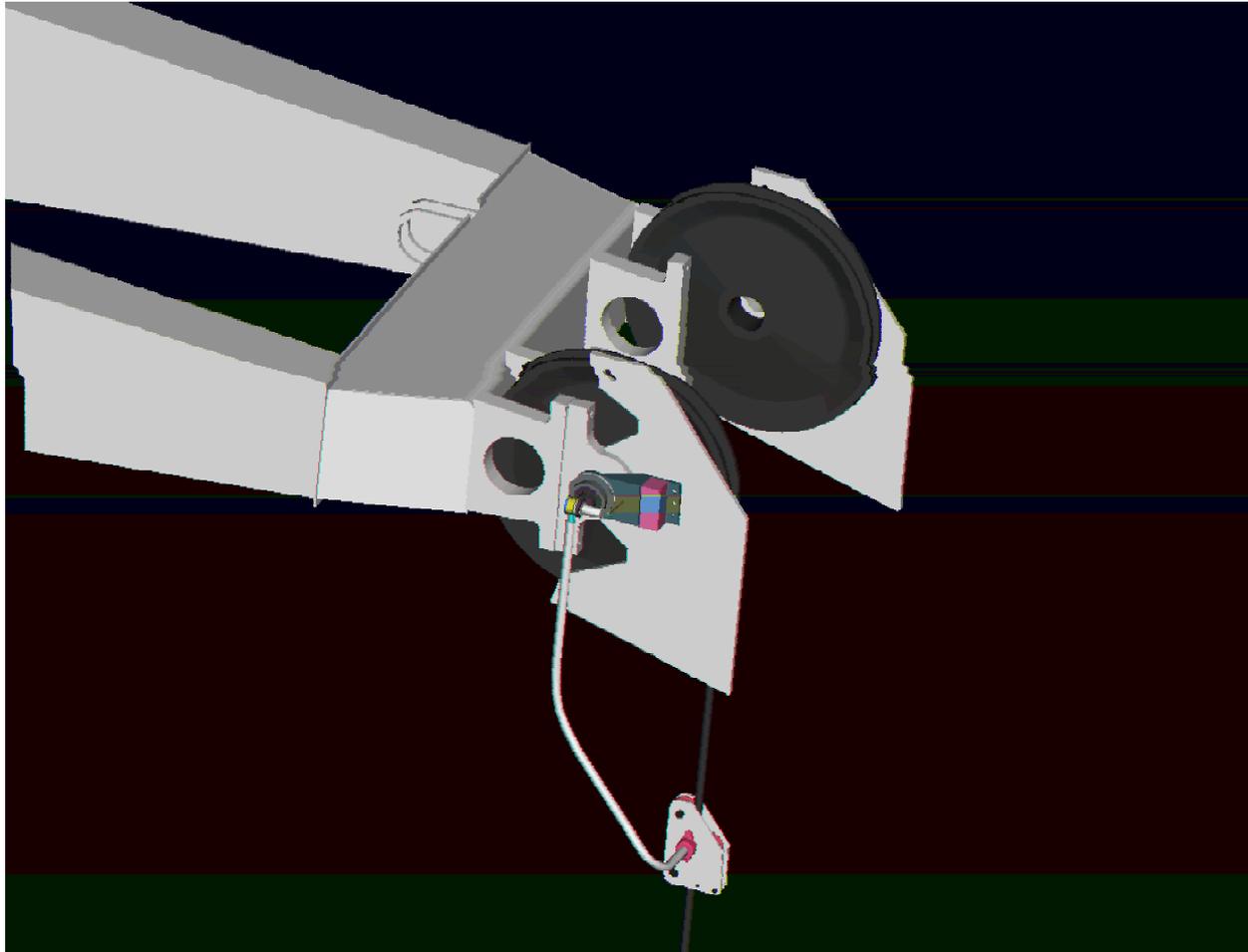


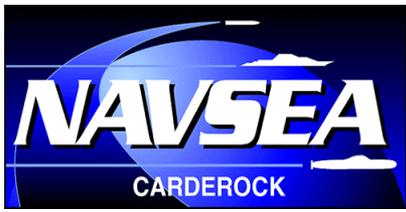


Cargo Transfer

# Shipboard Crane Systems

## Cargo Swing Sensor



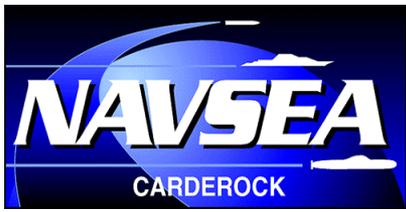


Cargo Transfer

# Shipboard Crane Systems

## Control Hardware





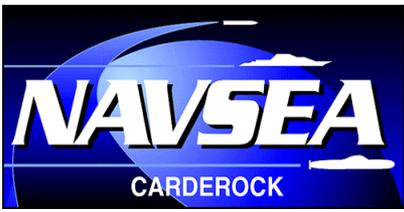
Cargo Transfer

# Shipboard Crane Systems

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HICASS PCS 2

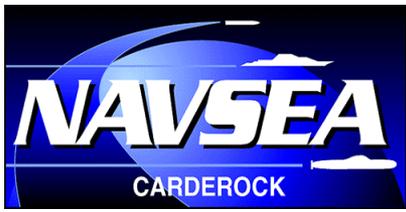


Cargo Transfer

# Shipboard Crane Systems

- Stereovision for Crane Operators
  - Camera system to provide a high quality view of operating area from multiple angles



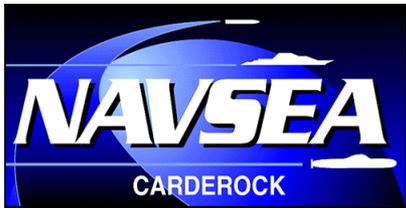


Cargo Transfer

# Shipboard Crane Systems

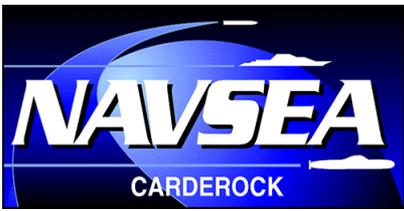
## Camera Locations





# Ship to Lighter Interface

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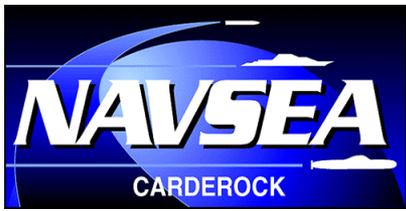


Ship to Lighter Interface

# Current Fendering

- Sausage Fenders
  - 32" x 50" foam filled cushions
  - Deployed at ship's waterline
  - Not sea state 3 capable, due to failures and interface issues



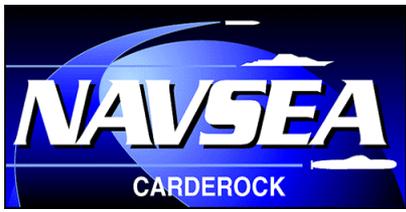


Ship to Lighter Interface

# Deep Draft Composite Fender

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- High-strength composite construction
- Configured for use with wide range of lighters
- Provides 6-foot standoff
- Provides low pressure on hull of ship
- Deep draft / high inertia stability features

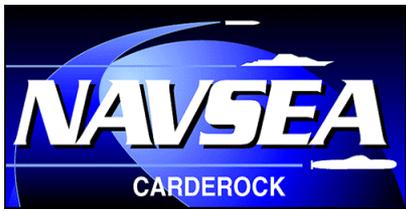


Ship to Lighter Interface

# Deep Draft Composite Fender

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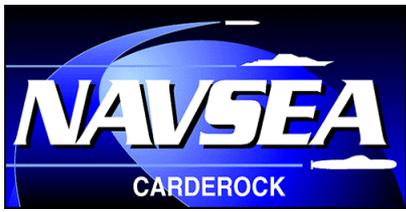


Ship to Lighter Interface

# Deep Draft Composite Fender

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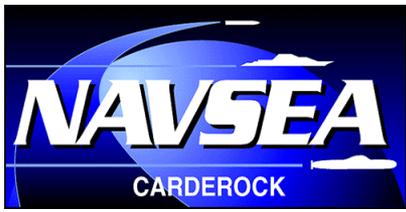


Ship to Lighter Interface

# Deep Draft Composite Fender

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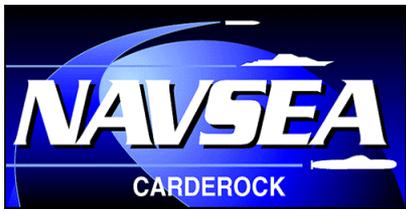


Ship to Lighter Interface

# Deep Draft Composite Fender

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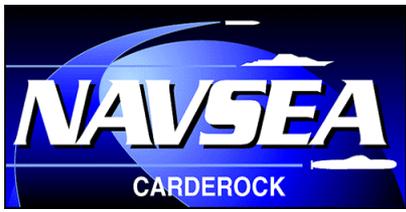




Ship to Lighter Interface

# Deep Draft Composite Fender





Ship to Lighter Interface

# Deep Draft Composite Fender





# Ramp/Platform Interface

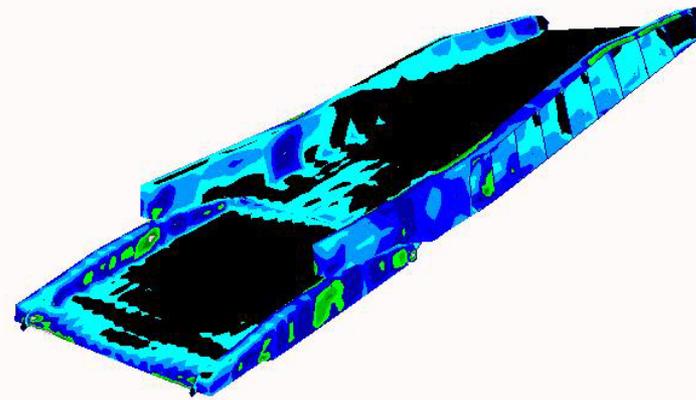
- Roll on/Roll off ship to Roll on/Roll off Discharge Facility in JLOTS
- Commercial RO/RO ramp analysis
- Goal: sea state 3 capability without ramp modifications



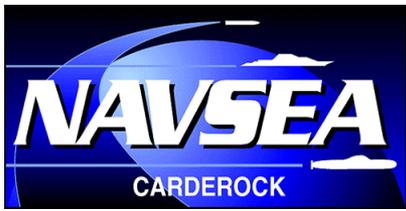
MSC.Patran 2001 r3 13-Aug-03 13:20:16

Fringe: 1T\_CENTER\_8, Static Subcase: Stress Tensor, -At Z2 (VONM)

Deform: 1T\_CENTER\_8, Static Subcase: Displacements, Translational

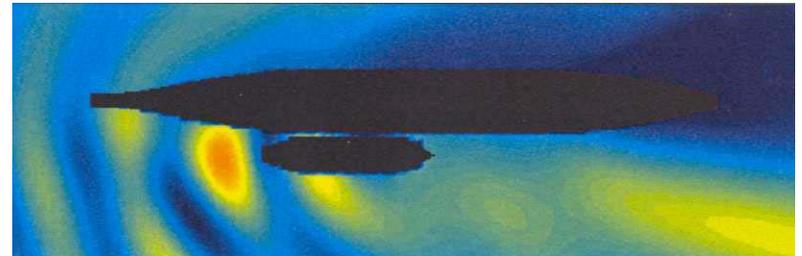
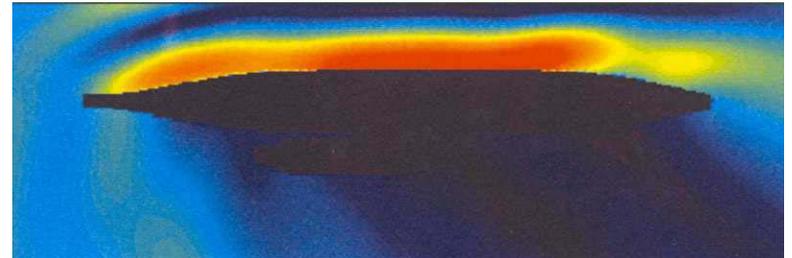


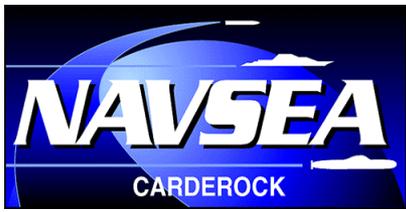
default\_Fringe :  
Max 6.77+004 @Nd 12178  
Min 1.70+002 @Nd 4700  
default\_Deformation :  
Max 4.30+001 @Nd 6437



# Ship Heading Control

- JLOTS
  - Effect of heading on localized sea state & ship motions
  - Full scale testing at JLOTS exercises
- Underway
  - Skin to Skin study and at-sea demonstration
  - Model testing





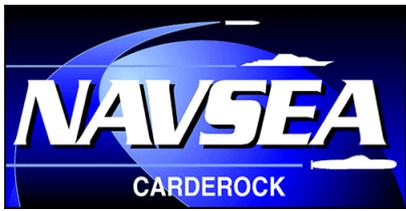
Ship to Lighter Interface

# Heading Control

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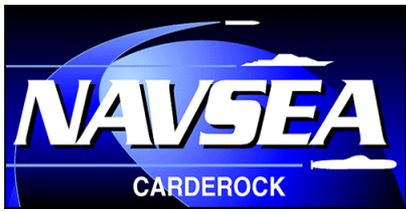
PMS 325 Model Test





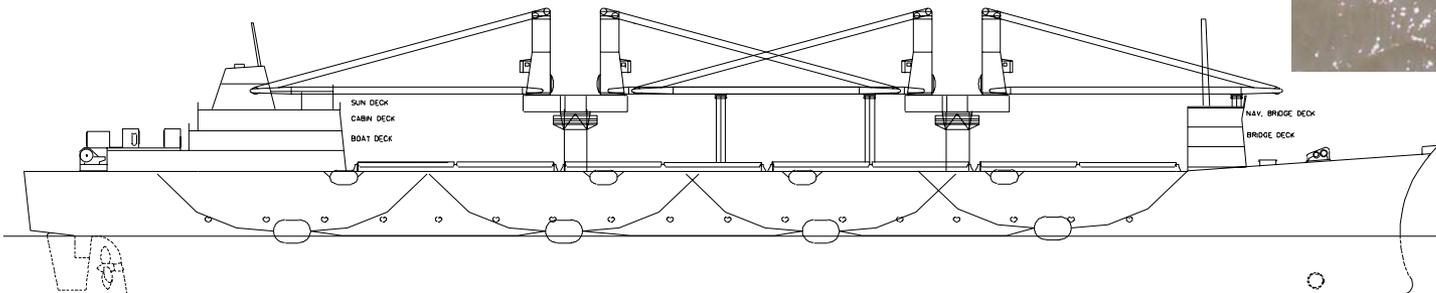
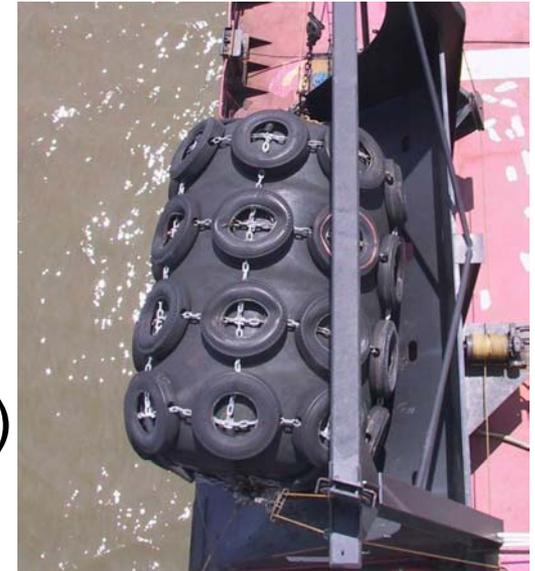
# Ship to Ship Interface

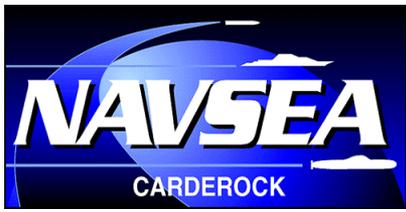
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# Mooring Systems

- At-sea and in-harbor systems
- Standard mooring & fendering systems
  - Foam filled
  - Pneumatic
  - Mooring lines & winches
- Conceptual Systems
  - Vacuum Mooring (NSWCDD-CSS)

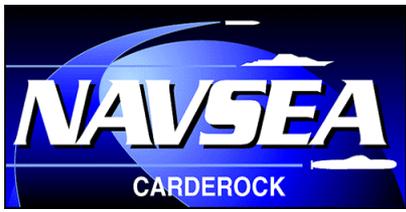




# At-Sea Demonstration

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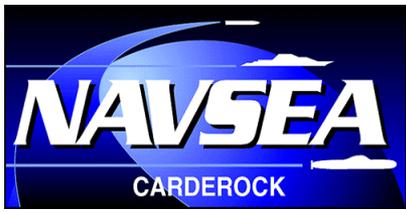
- Planning Procedures
- Mooring & Fendering System
- Approach Method
- Cargo Transfer
- Ship Roll Mitigator System
- Laser Rangefinder and Electronic Display System
- Participants Included: NSWCCD, PMS325, MARAD, NSWCDD-CSS, CSC, Skaugen PetroTrans



Ship to Ship Interface

# Skin-to-Skin Demonstration

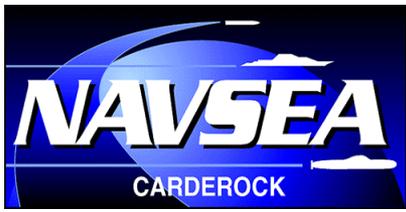




Ship to Ship Interface

# Skin-to-Skin Demonstration



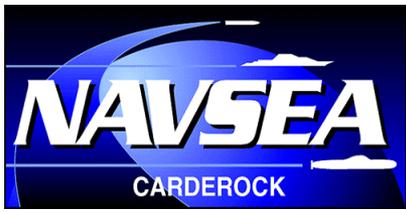


Ship to Ship Interface

# Skin-to-Skin Demonstration

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Ship to Ship Interface

# Skin-to-Skin Demonstration

