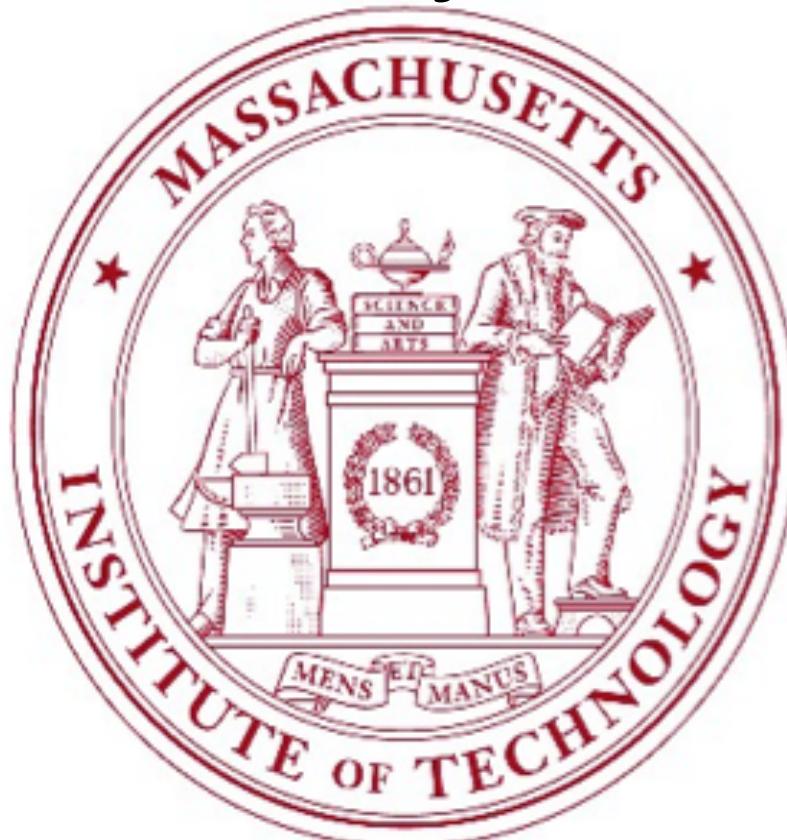


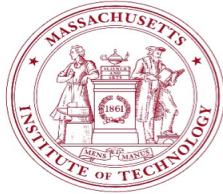
2.704 Conversion Project



LT Brandy Dixon

LT Kathleen McCoy

LT Matthew Strother

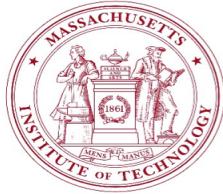


SECDEF FY15 Budget Review



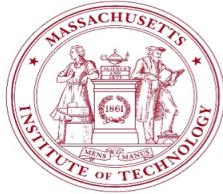
Pentagon Briefing Room, Monday February 24, 2014

- “We chose further reductions in troop strength and force structure in every military service – active and reserve – in order to sustain our readiness and technological superiority, and to protect critical capabilities like Special Operations Forces and cyber resources.”
- “The military must be ready and capable to respond quickly to all contingencies and decisively defeat any opponent should deterrence fail.”
 - Secretary of Defense Chuck Hagel



Background

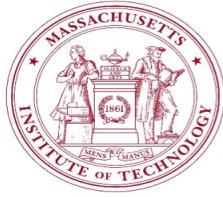
- Mission: Rapid response to world crises
- Constraint: Shrinking budget
- Solution: Quick conversion of decommissioning ship to provide SOF support



CONOPS



- Converted and ready for deployment as quickly as possible
- Deploy for specific mission
- Stay on station for 30-90 days
- Decommission upon return to port



Design Philosophy

1. Minimize Conversion Timeline
2. Maximize SOF Support Capability



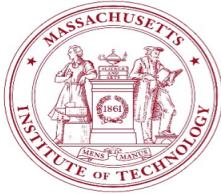
Aircraft Requirements

<u>Requirement</u>	<u>Threshold</u>	<u>Objective</u>
Embarked Aircraft		
MH-47 Chinook	0	2
MQ-8C Fire Scout	2	4
MH-AH-6 Little Bird	2	4
SH-60 Seahawk	2	4
Hangar Requirements	Sufficient space to store all embarked aircraft Aviation maintenance workshop connected to hangar	Same as Threshold
Flight Deck Requirements	Navy Deck Strength and Aviation Certified deck to meet NAVAIR requirements. 1 Helicopter Pad	Same as Threshold 2 Helicopter Pads



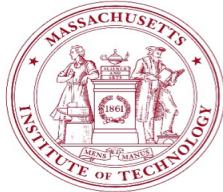
Boat Requirements

<u>Requirement</u>	<u>Threshold</u>	<u>Objective</u>
Embarked Boats		
RHIB	4	6
MK5	2	4
SOC-R	1	2
Boat Launch Requirements	Launch or Recovery of any one boat in less than 30 minutes	Same as Threshold



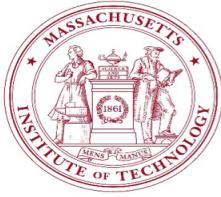
Hull Type Selection

- Hulls Considered: LST, CV, LHA, and LSD
 - LST required significant topside rearrangement, means longer conversion.
 - CVs are poor choice due to large size, age, and steam plant.
 - LHA is larger than needed.
 - LSD is appropriately sized, and has a DG plant.
- Hull Selection: Whidbey Island Class LSD



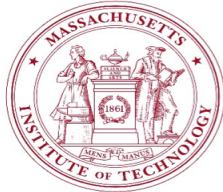
USS Whidbey Island (LSD 41)



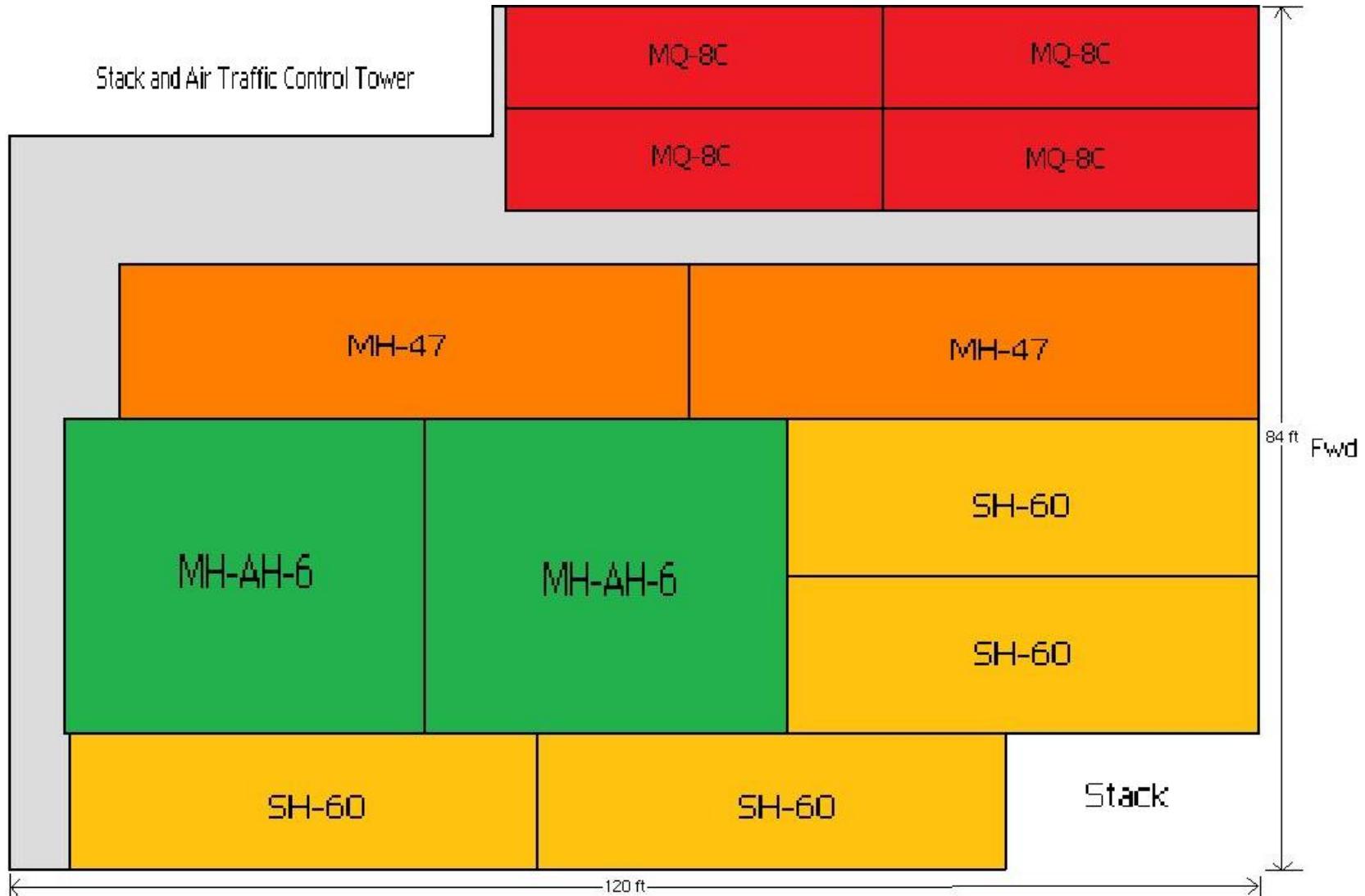


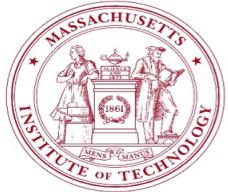
Modification 1: Topside Hangar

- Overview
 - Remove cranes, boats, and nearby superstructure
 - Raise deck to be flush with flight deck
 - Add hangar
- Benefits
 - **Fastest conversion time**
 - **Supports 12 SOF aircraft**
 - Maintains current well deck
 - Maintains current flight deck
 - Straight path from flight deck to medical
- Drawbacks
 - Space constrained by existing structure
 - Loss of crane capability

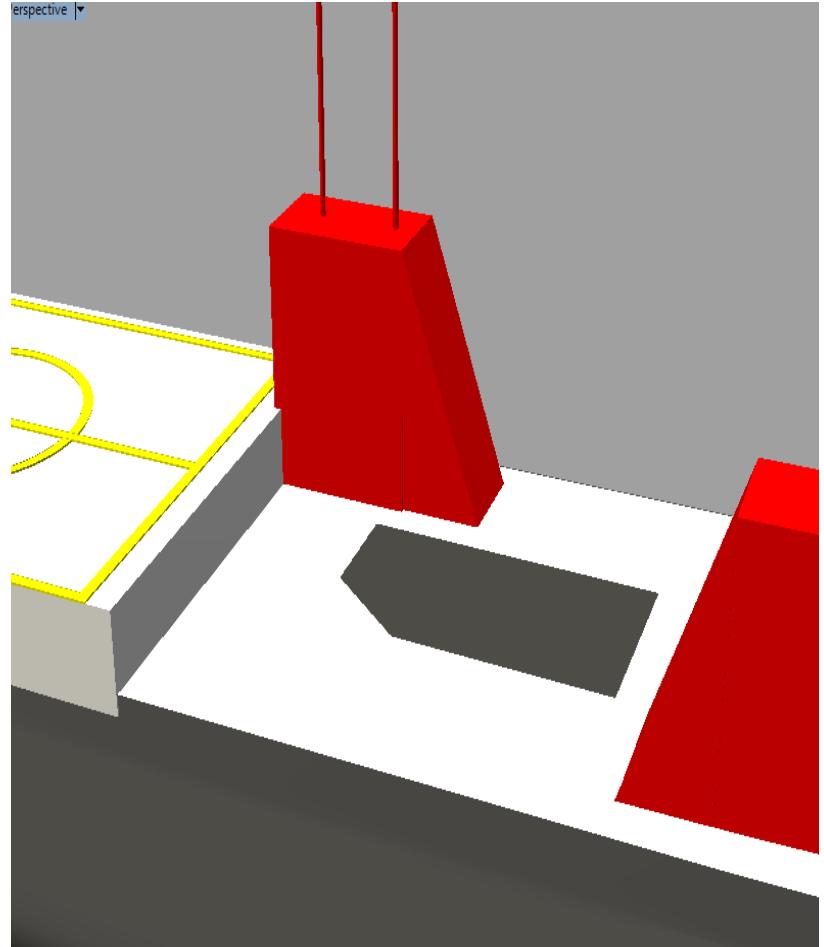
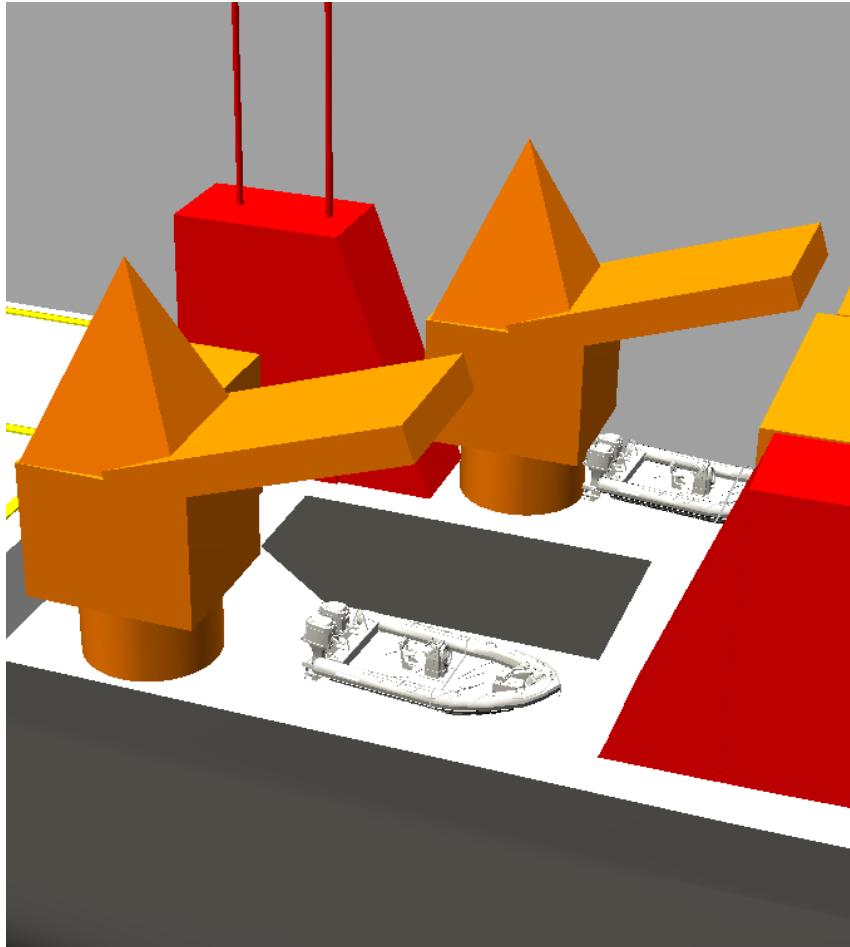


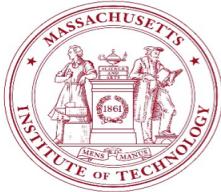
Hangar Layout



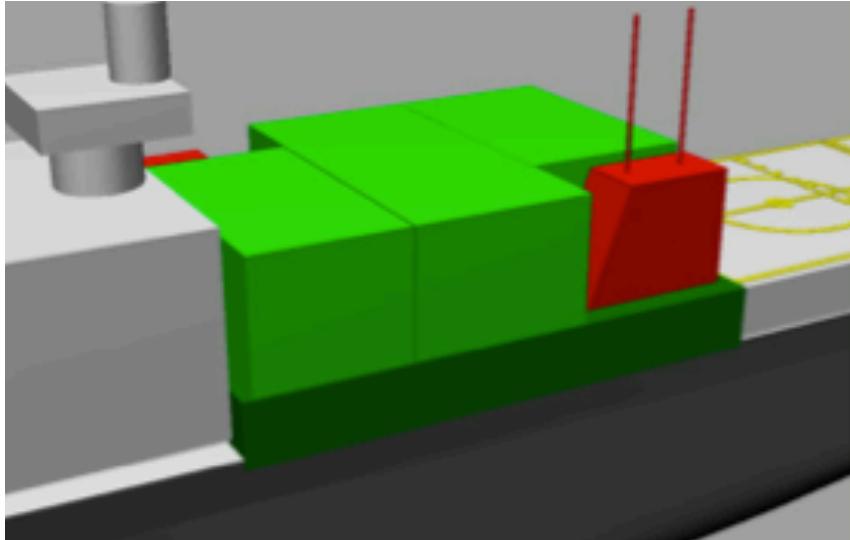


Topside Space Before/After

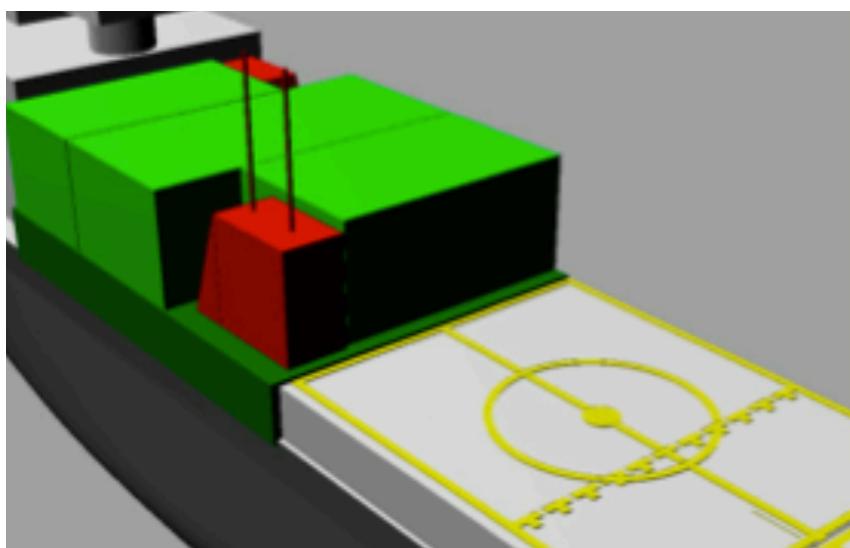


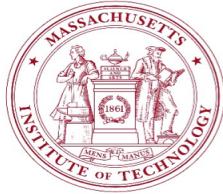


Hangar Location



- Green area represents hangar
- Red area represents exhaust stacks
- Hangar configured around exhaust stacks

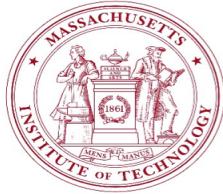




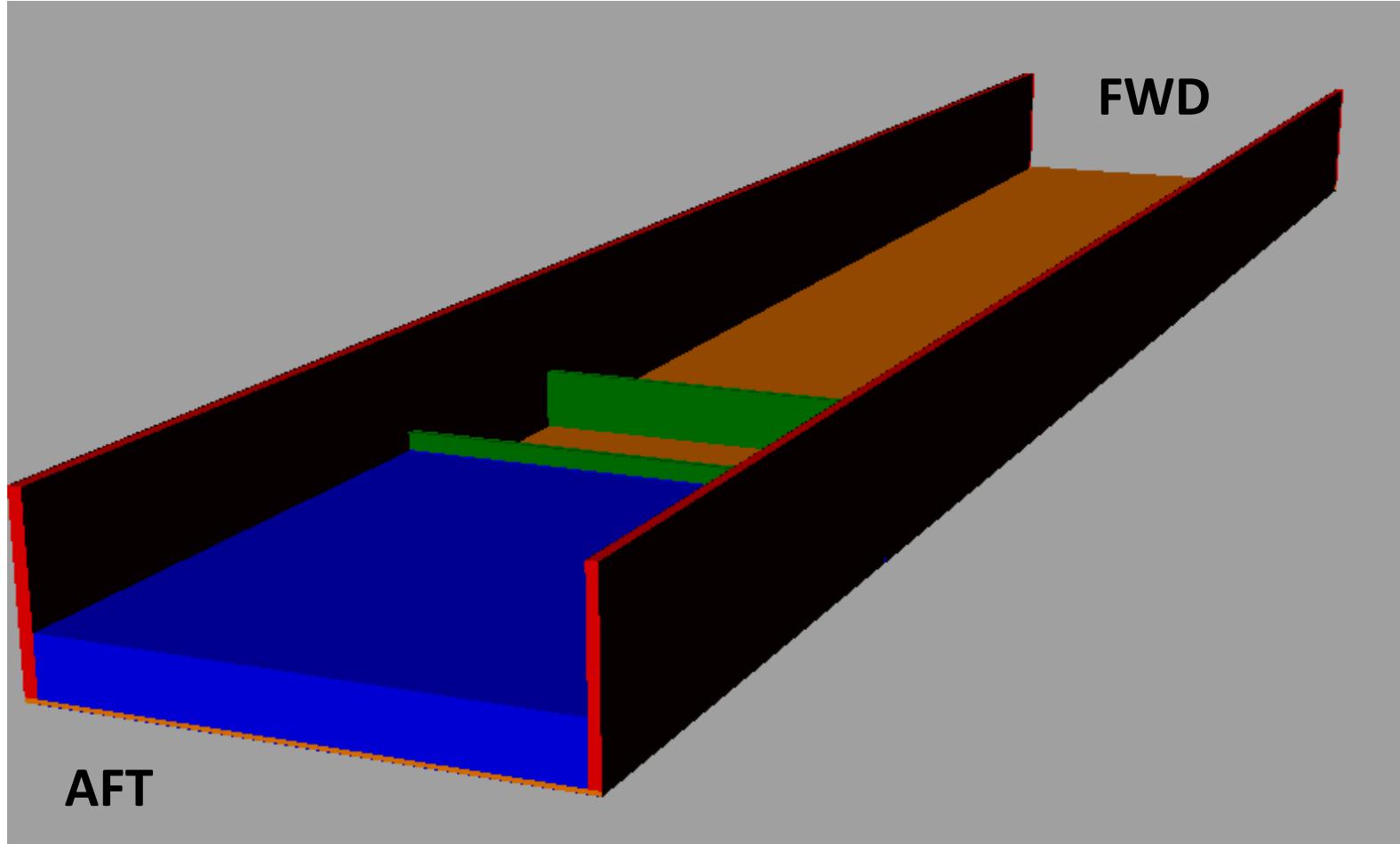
Modification 2: Well Deck Conversion

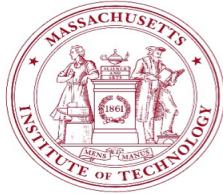


- Overview
 - Install 2 seawalls
 - Create wet, drainage, and dry portions
- Benefits
 - Solves alignment issue
 - Shortest boat launch operation time
 - Don't have to maneuver around parked craft
 - Unlaunched craft remain dry
- Drawbacks
 - Need Larger Crane



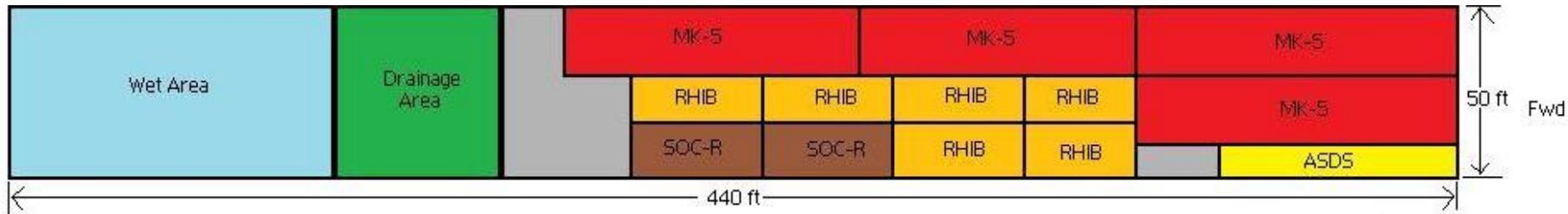
Well Deck Conversion

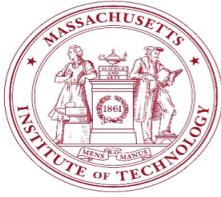




Well Deck Layout

Aft

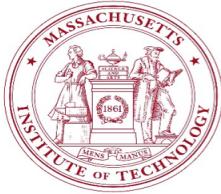




Modification 3: Compartment Arrangement



- Overview:
 - Existing spaces converted into new compartments required:
 - Hangar & Aviation Maintenance Shop
 - Helo Arms/Torpedo Magazine
 - UAV Storage- Landing Force Equipment Storeroom
 - SCIF
 - SOF Mission Spaces
 - Brig
- Benefits:
 - **Fastest conversion time**
 - Existing watertight boundaries maintained
- Drawbacks:
 - Loss of customization



Net Hull Changes

- Weight
 - 10% Margin was added to weight additions

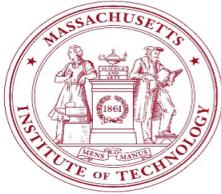
Location	Weight Change (LT)
Topside	863.324
Well Deck	-1128.876
Total	-265.552

- Sail Area
 - 10% Increase in Sail Area



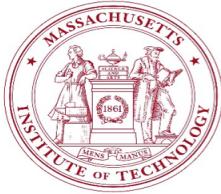
Stability Analysis

- Model
 - Original and Converted Ships modeled in Rhino, POSSE, and Asset for stability analysis.
- Results
 - Original and Converted ship displayed similar stability characteristics
 - Change in weight equated to 2-5% ballast needed to achieve the same stability.
 - Beam Winds and Rolling Sea performance unaffected by change in sail area



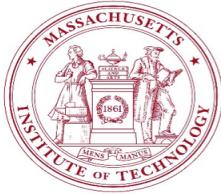
Schedule Estimation

- Major assumptions
 - Major construction components constructed off-hull
 - Components craned into place and attached
 - Modules constructed in parallel with each other, as well as in parallel with removing equipment from the ship and prepping the ship surfaces for construction
- Total Time to Complete: 4 Months



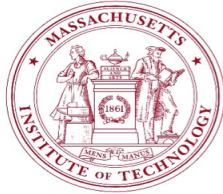
Cost Estimation

- Major assumptions
 - HY-80 steel costs \$1 per pound
 - Raw material costs account for 10% of total fabricated steel costs
 - Weight removal costs half as much as weight addition.
- Total Cost: \$30 Million
- Similar result to MIT Cost model for combatants



Areas for Further Research

- Automation of engineering systems or equipment
- Mixed Navy/MSC crew
- Revise model
- Modular construction and/or pre-staging
- Schedule refinement



Questions?

