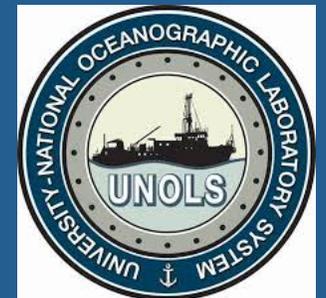


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# Update on R/V *Roger Revelle* Mid Life Refit

Bruce Appelgate, Zoltan Kelety, and Lee Ellett, RVTEC 2019



## AGOR 23 Class Service Life Extension Program

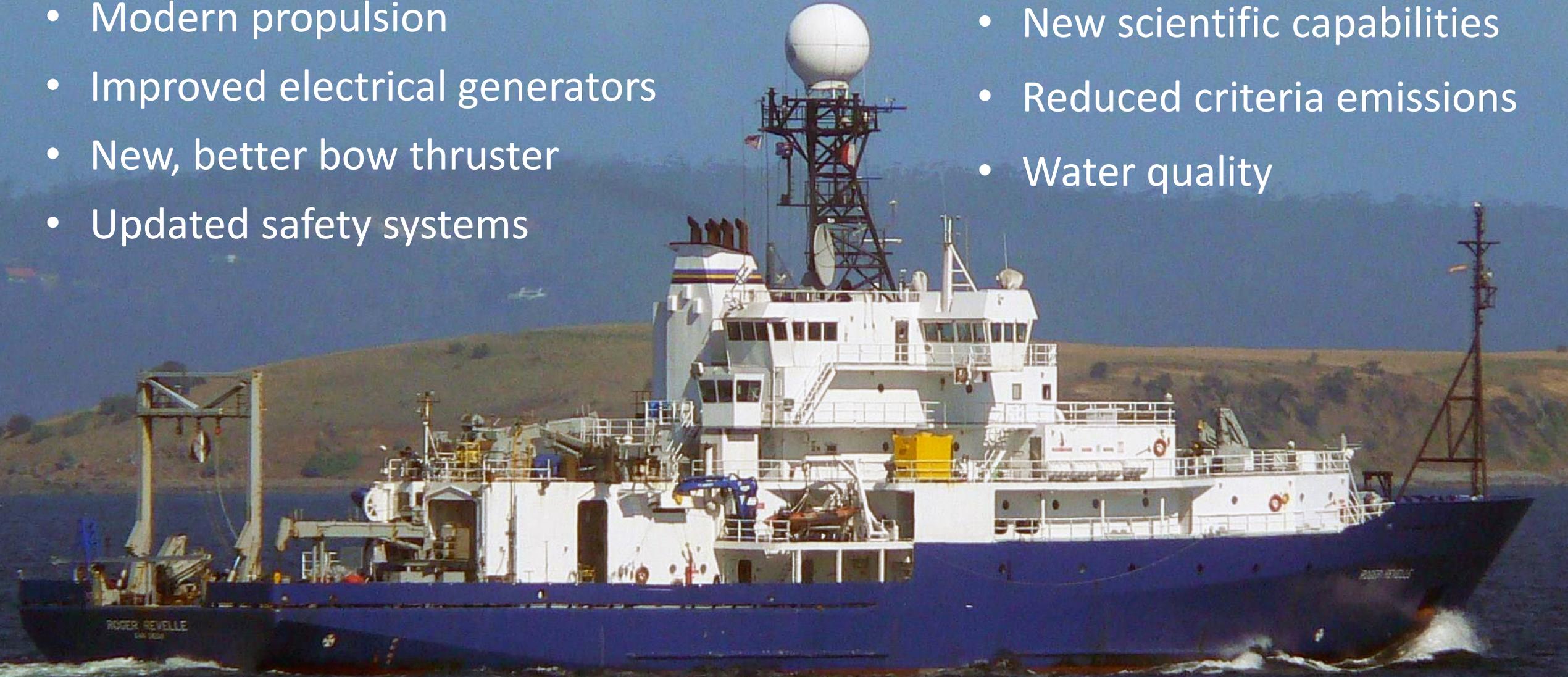
The Global Class ships *Thompson G. Thompson* (1992), *Roger Revelle* (1996), and *Atlantis* (1997) had a 30 year design life

- ONR is focused **primarily on life extension** of the basic ship (hull, mechanical, electrical) – extending the 30 year service life to 45 years
- Ensuring reliability, maintainability and regulatory compliance are key parts of the primary goal
- Science upgrades, making ships green are **secondary goals**

# Good Intentions: *Roger Revelle* Midlife Refit

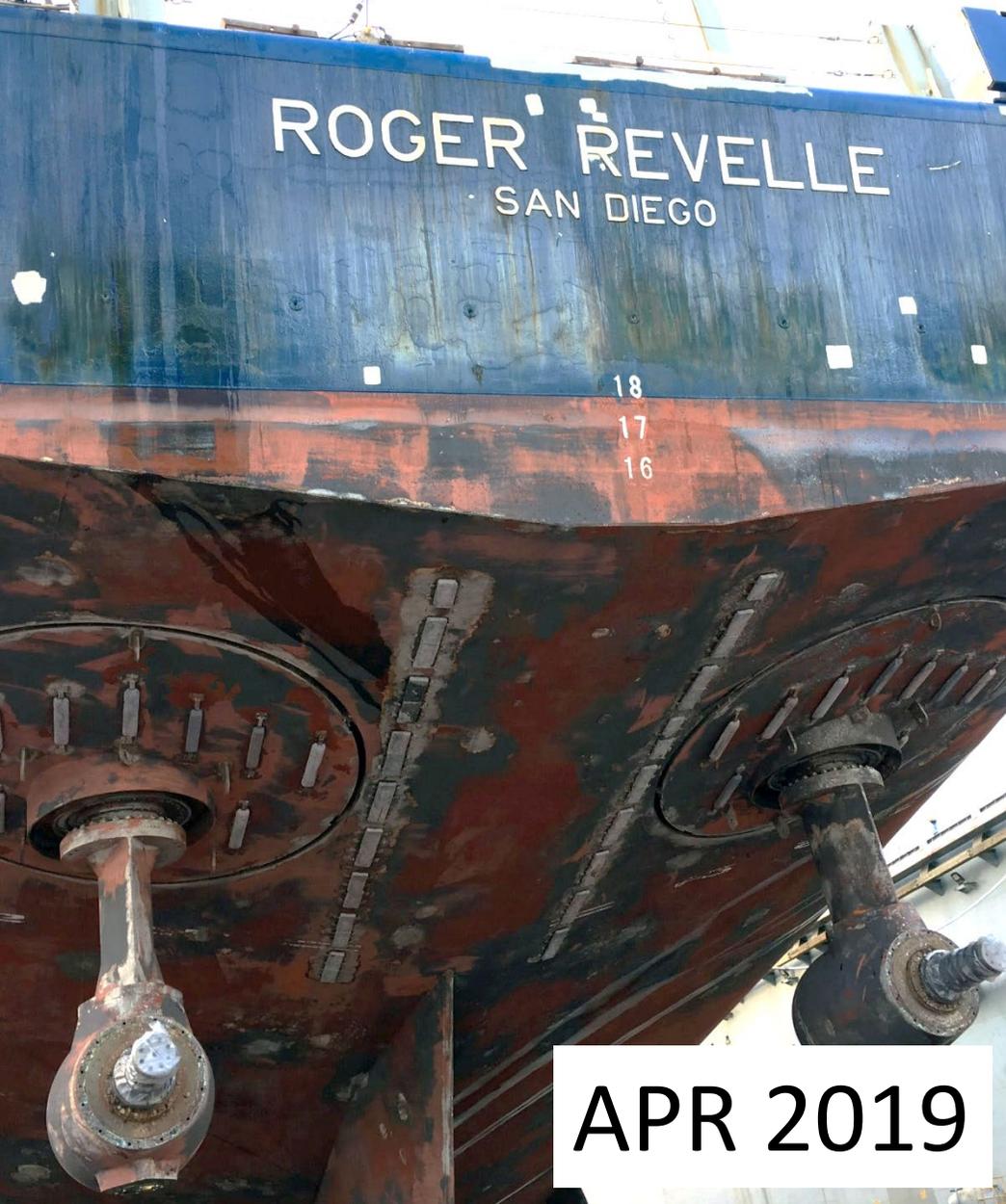


- Modern propulsion
- Improved electrical generators
- New, better bow thruster
- Updated safety systems
- New scientific capabilities
- Reduced criteria emissions
- Water quality



R/V *Roger Revelle*, Hobart 2015

# Schedule: R/V *Roger Revelle* Midlife



APR 2019

# Schedule: R/V *Roger Revelle* Midlife



APR 2019

One Year  
(366 days)



APR 2020

# Schedule: R/V *Roger Revelle* Midlife



## One Year (366 days)

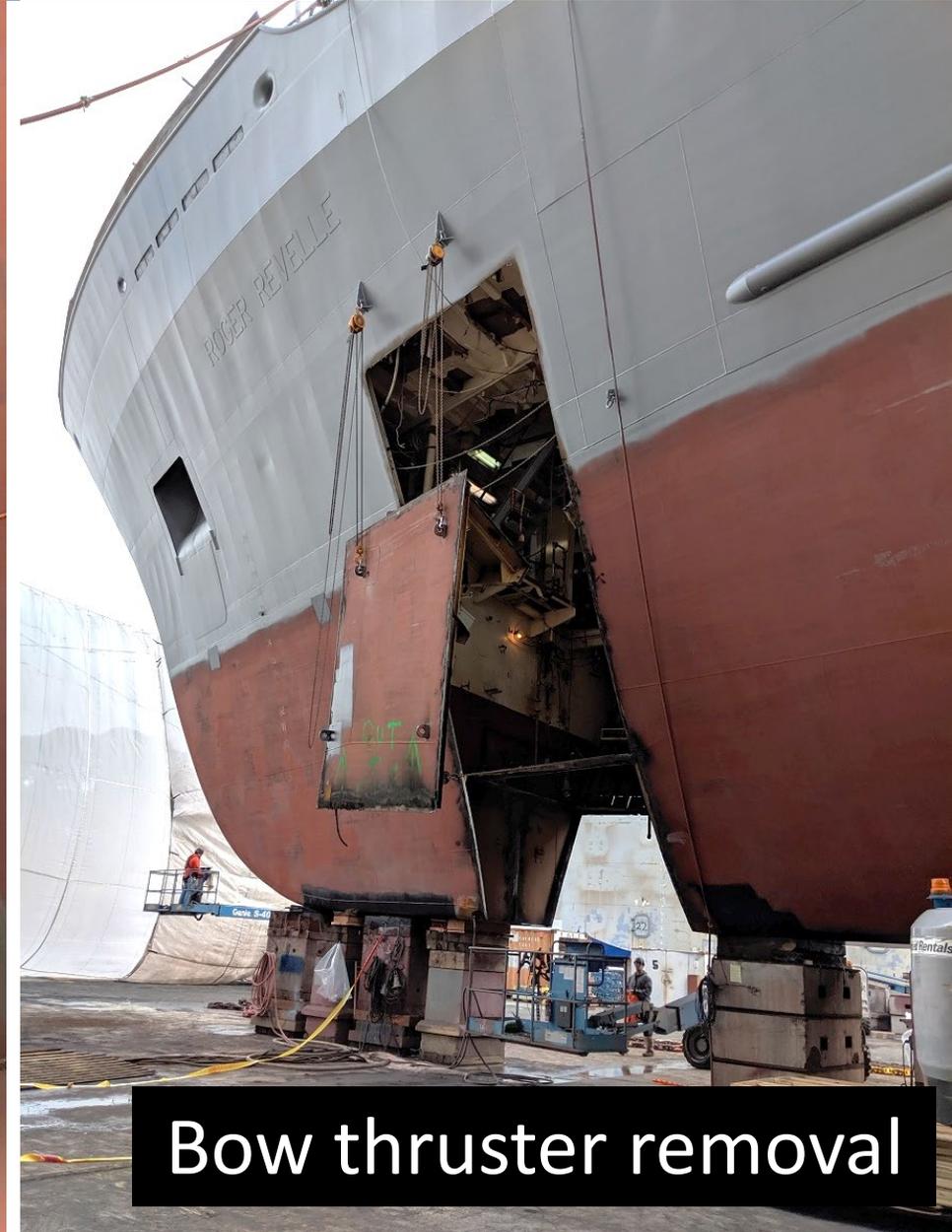
Work Package	
S-01	RR Shipyard Contract Technical Spec
WP-1	Repower
WP-2	Bow Thruster Replacement
WP-5	Z-Drive Inspection and Maintenance
WP-6	Ballast System Piping
WP-7	Ballast Treatment System Installation
WP-8	Firemain System Piping Replacement
WP-9	Potable Water System Modifications
WP-10A	A/C Spaces General
WP-10B	A/C Controls Upgrades
WP-10C	AHU-5 Zone Redesign
WP-10D	Bow Thruster Room A/C
WP-10E	AHU-2 Makeup Air Upgrades
WP-11A	HVAC Makeup Air Upgrades
WP-11B	Generator Room Supply Fan Noise Mitigation

WP-12	Chiller Replacement
WP-13	Sewage System and Drain Replacement
WP-14	Ship Stores Refrigeration Equipment Replace
WP-15	Science Refrigeration System Modifications
WP-16	Uncontaminated Seawater System Modifications
WP-17	PA System
WP-18	Telephone System
WP-23	Ship Service Transformer Upgrades
WP-28	Exterior Ballast and Fuel Tank Vent Modifications
WP-30	Oily Water Separator (OWS) Replacement
WP-32	Crane Replacement
WP-33	Anchor and Chain Maintenance
WP-34	Overhead Lighting Upgrades
WP-35	Steel Replacement
WP-36	Drydocking
WP-37	General Maintenance
WP-38	Multibeam Gondola

# Equipment Removals

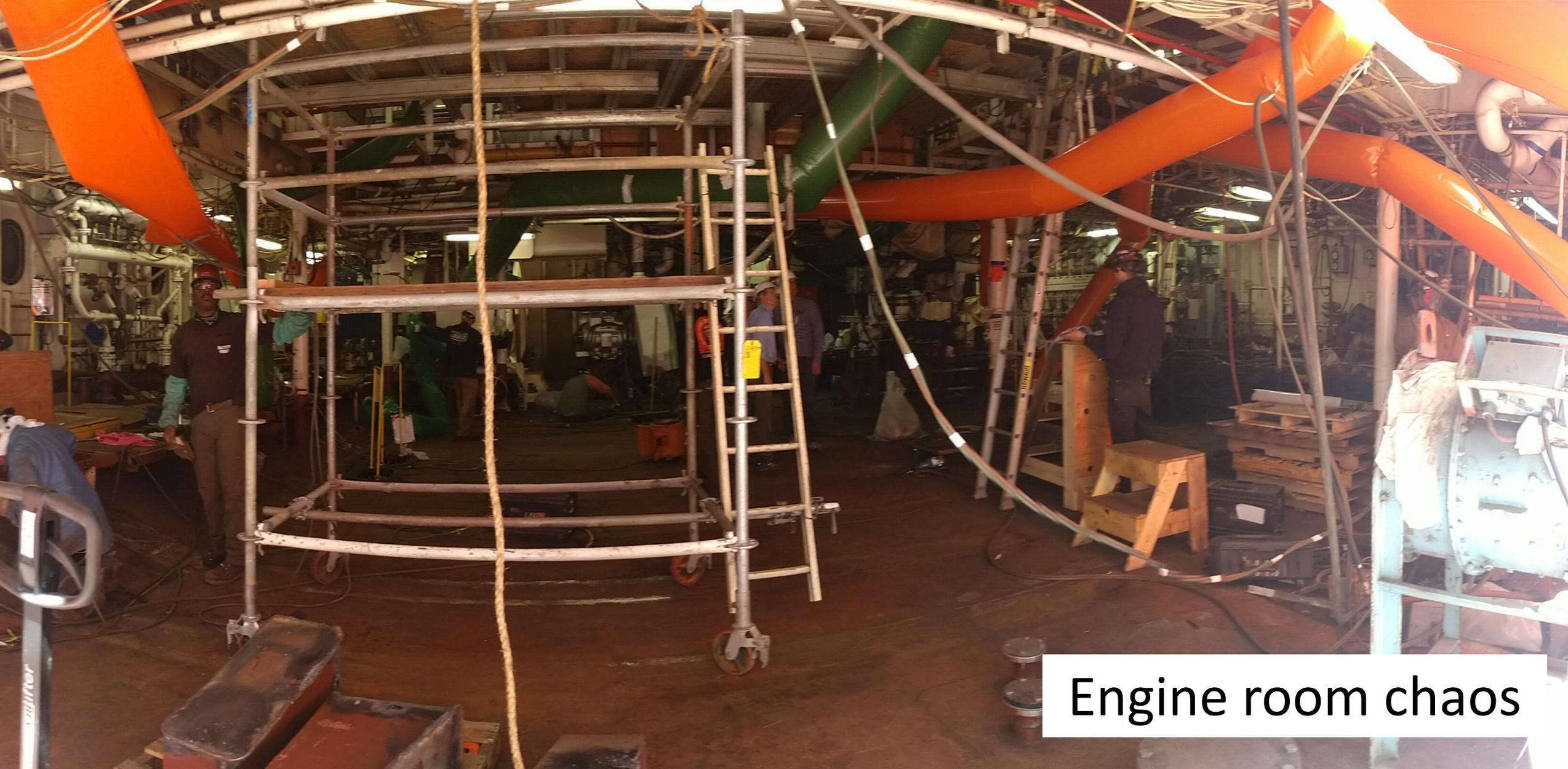


Engine room hull cut



Bow thruster removal

# Dude, where's my ship?



Engine room chaos

# Diesel and Generator Rotation Mismatch



Caterpillar diesel engine and Siemens generator each manufactured to run counterclockwise, but no agreement on orientation

This required replacement of generator internal fan

~ Two week schedule delay



# #3 Generator Rotor Shaft Damage



#3 generator coupling  
very hard to remove

Generator shaft found  
damaged after coupling  
removed

Not repairable,  
manufacture replacement  
6 months



Nasty  
gouge

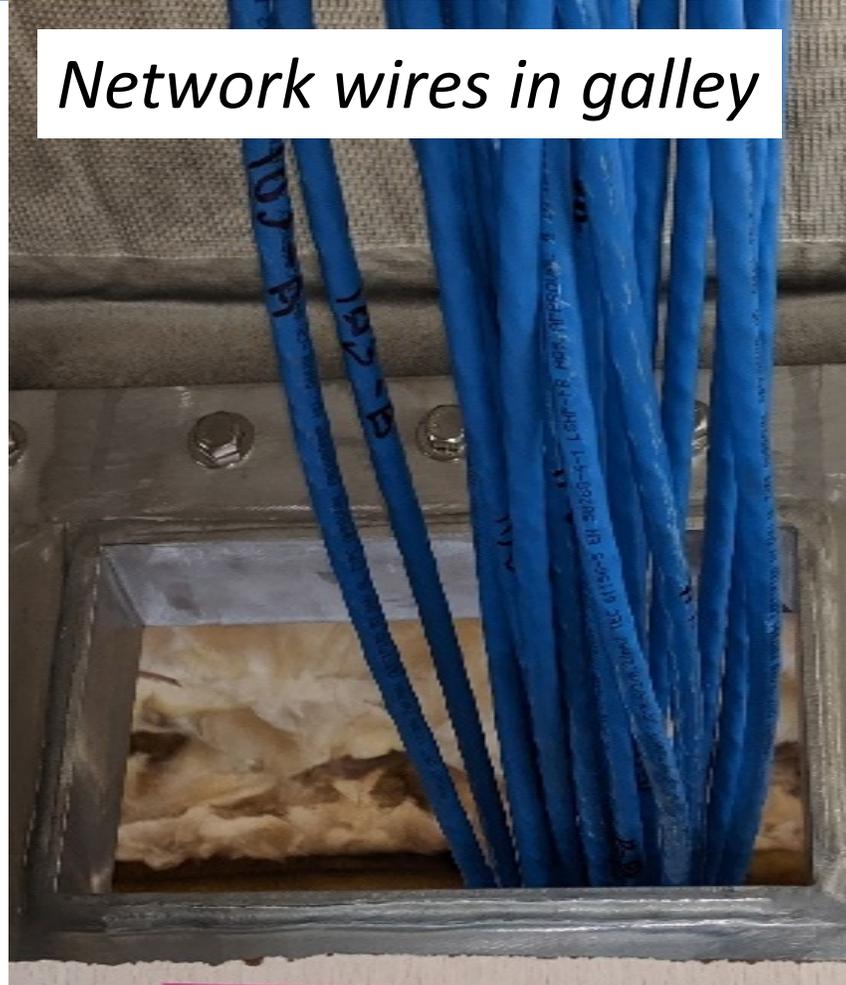
# Multi-Cable Transits / Major Attention



Fire barriers must never be defeated by penetrations.

USCG review every visit.

Final transits will be fully blocked with conforming material



# Removals are complete



# Modern Power Is Also Greener



*New diesel generator*

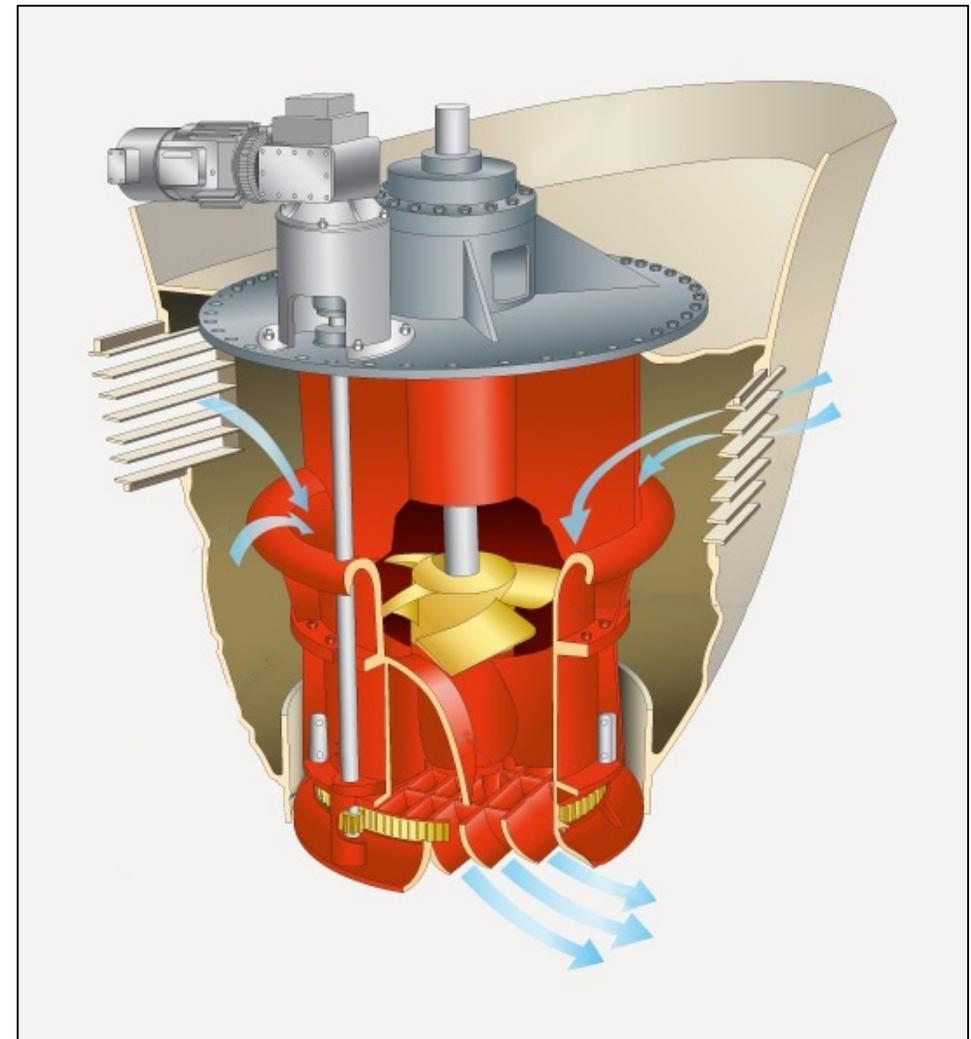


New clean EPA Tier III diesels replace old Tier I  
Reduce emissions from each engine by two-thirds

# Bow Thruster



Original equipment: Tees White Gill Model 50T3S



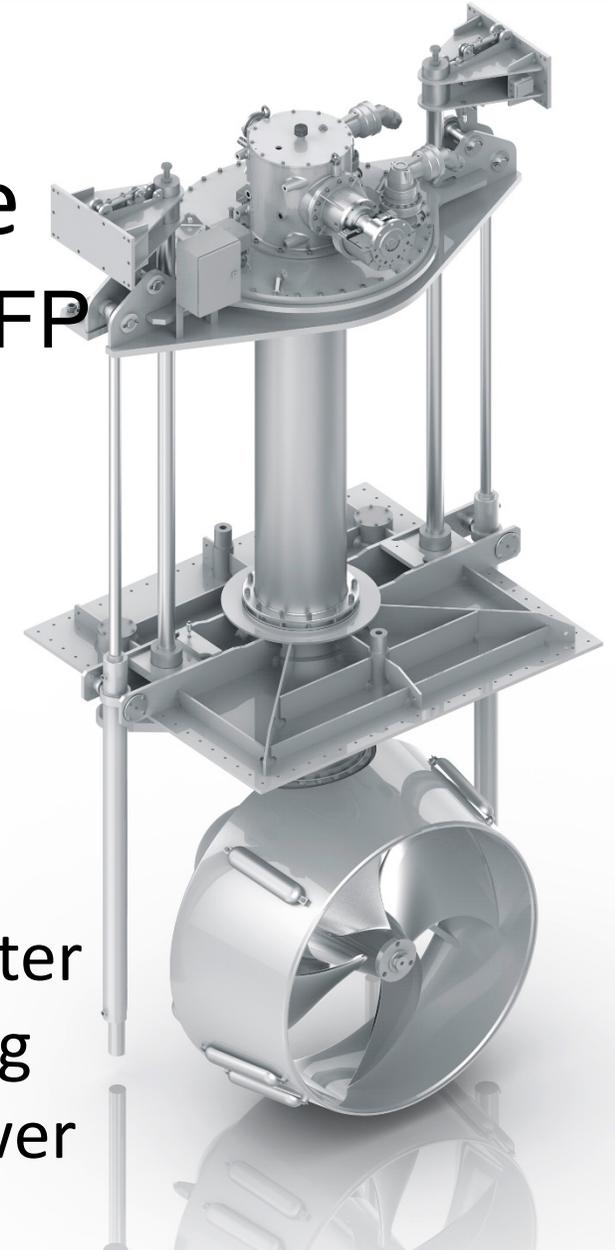
# Bow Thruster



**New: ZF Marine  
Retractable L-Drive  
Model AT 5011 RT TT-FP**

**Retracted:**  
tunnel thruster for  
maneuvering in port

**Extended:**  
360 degree azimuth thruster  
Better dynamic positioning  
less prop noise, more power



# Ballast Water Treatment System: Green

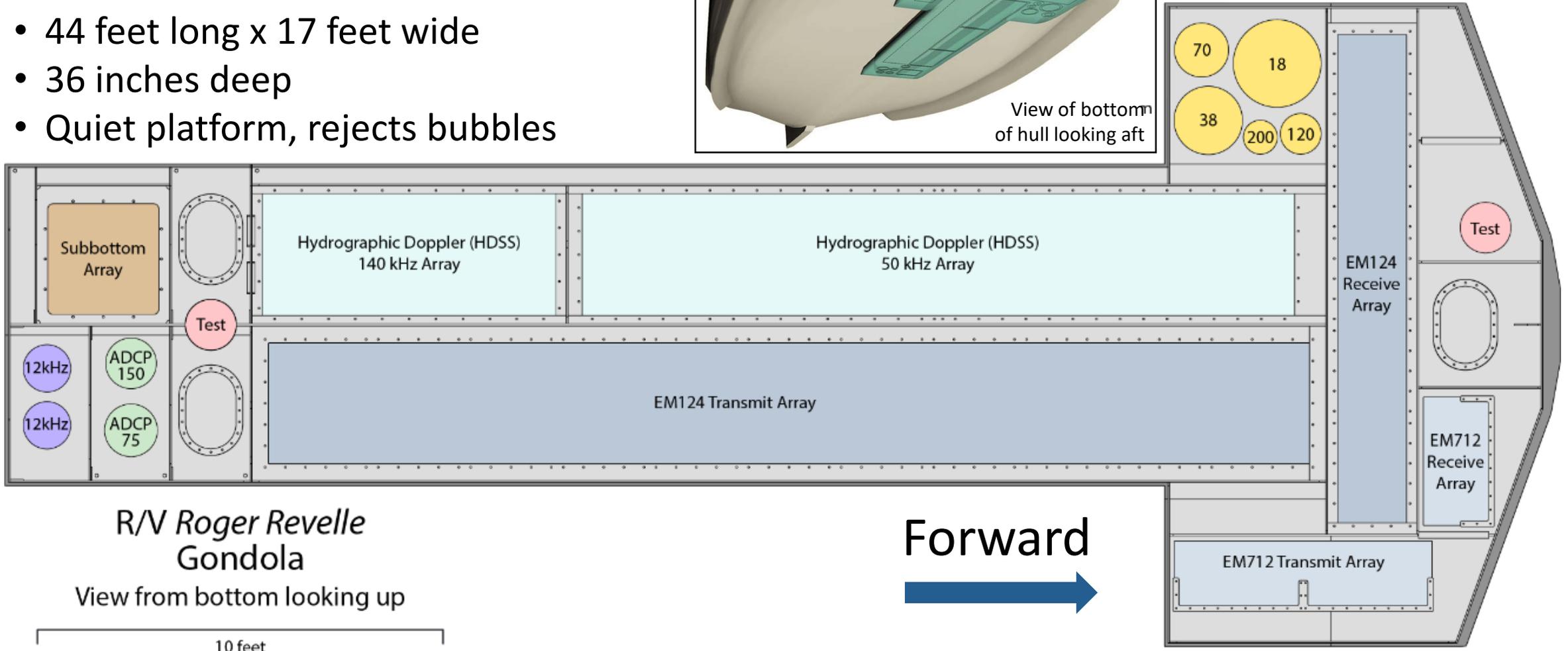
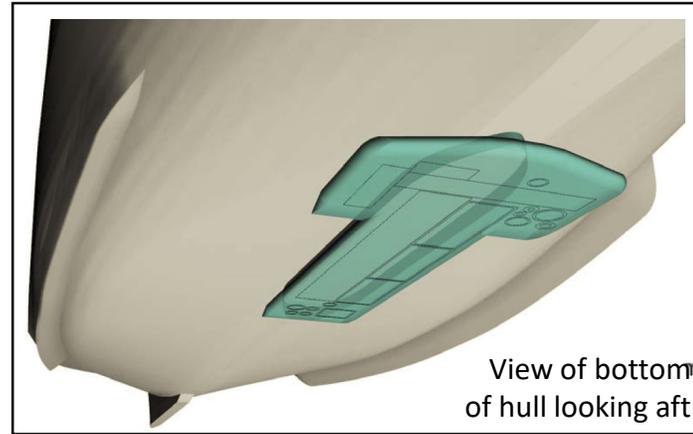


# Gondola = Better Sonar Performance



Gondola home for new EM124, EM712, EK80 and HDSS sonars

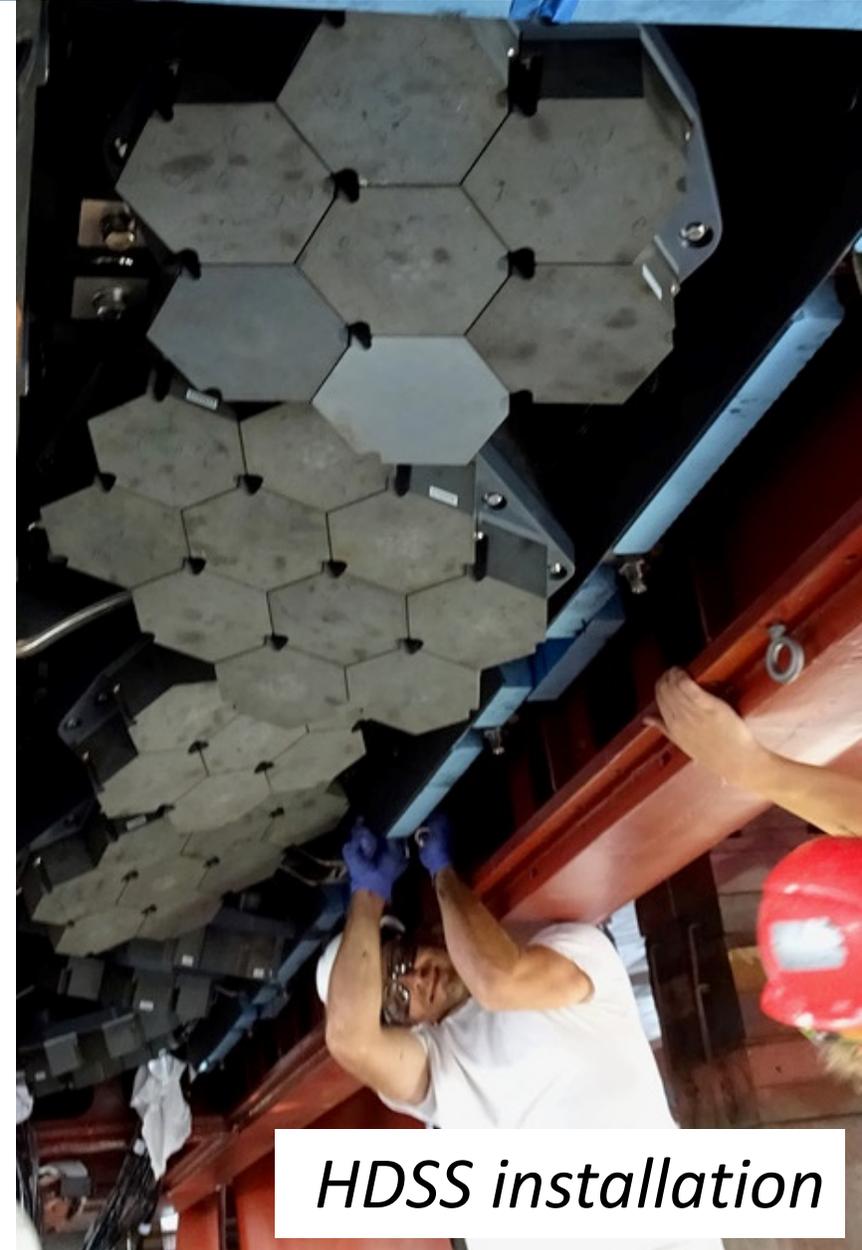
- 44 feet long x 17 feet wide
- 36 inches deep
- Quiet platform, rejects bubbles



# Gondola = Better Sonar Performance



*Gondola coming in for landing*



*HDSS installation*

# Transducer Installations



12 kHz

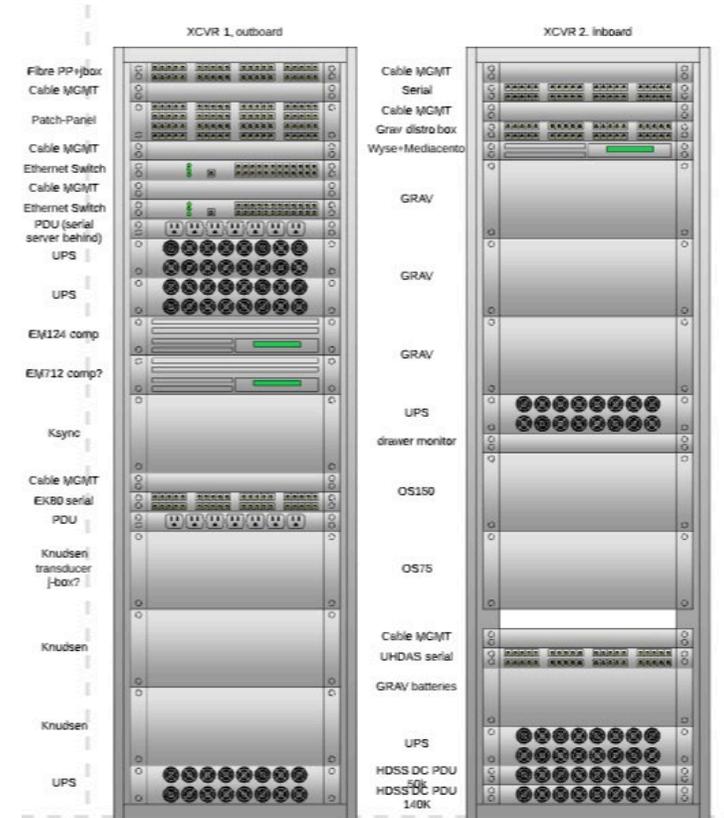
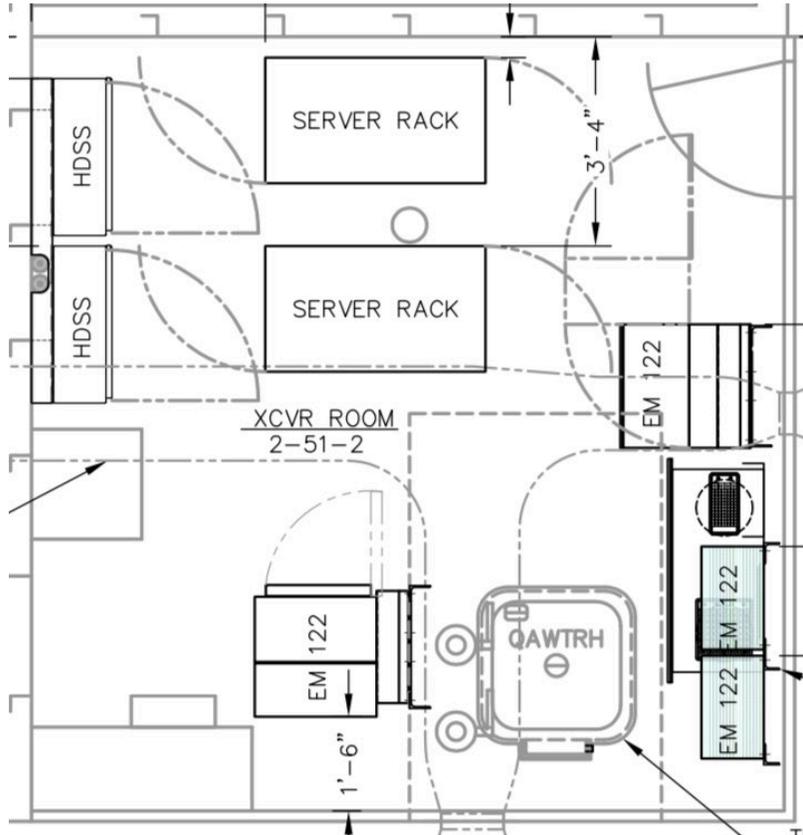
EM124 & EM712



EK80 Transducers



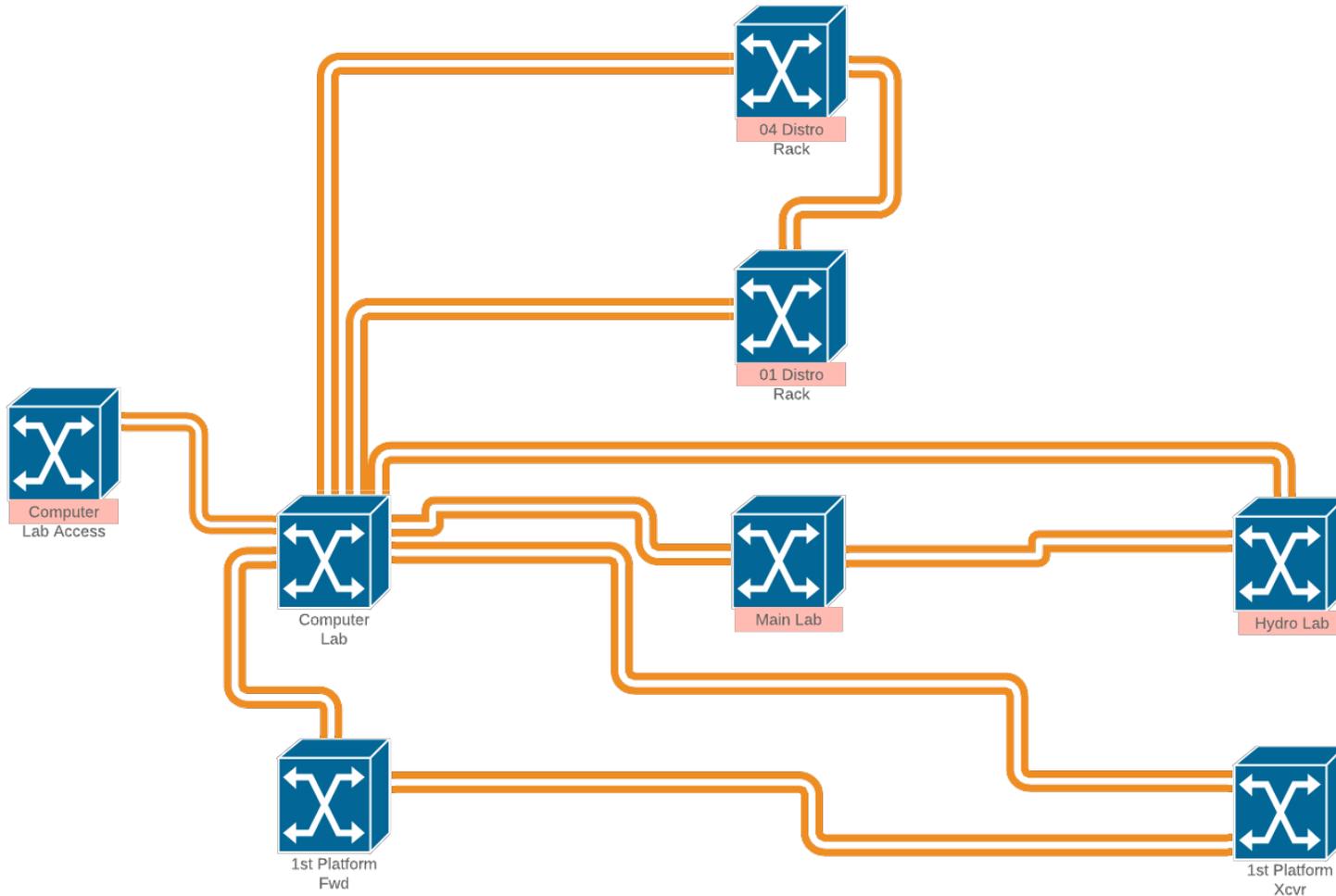
# Transceiver Room



# Shipboard Network Replacement

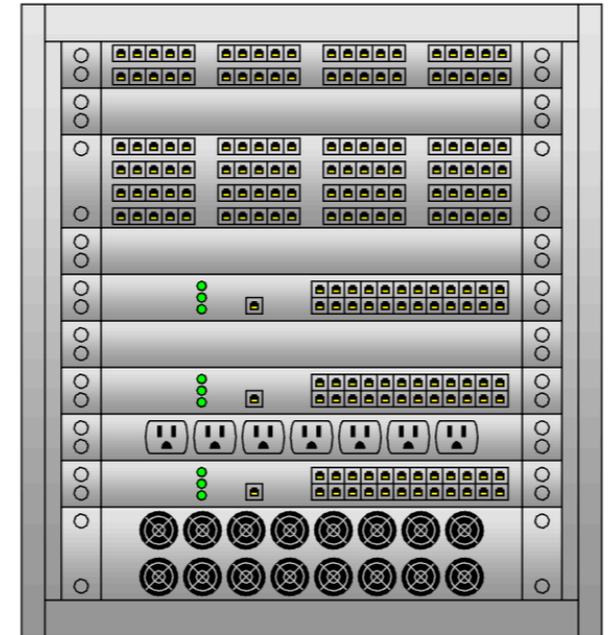


R/V Roger Revelle Fibre Distribution  
**Backbone**  
Jon Meyer | August 16, 2019

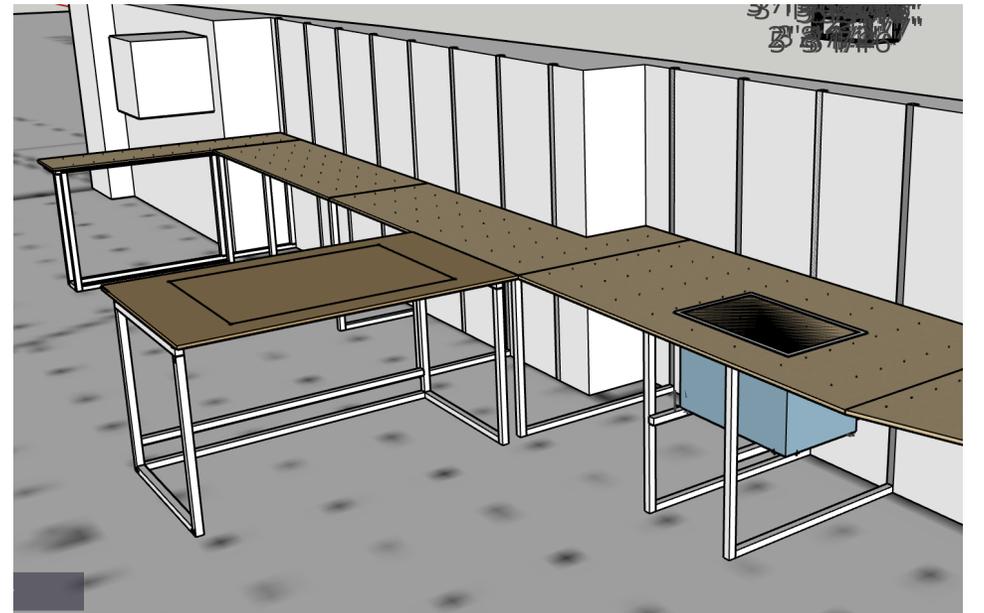
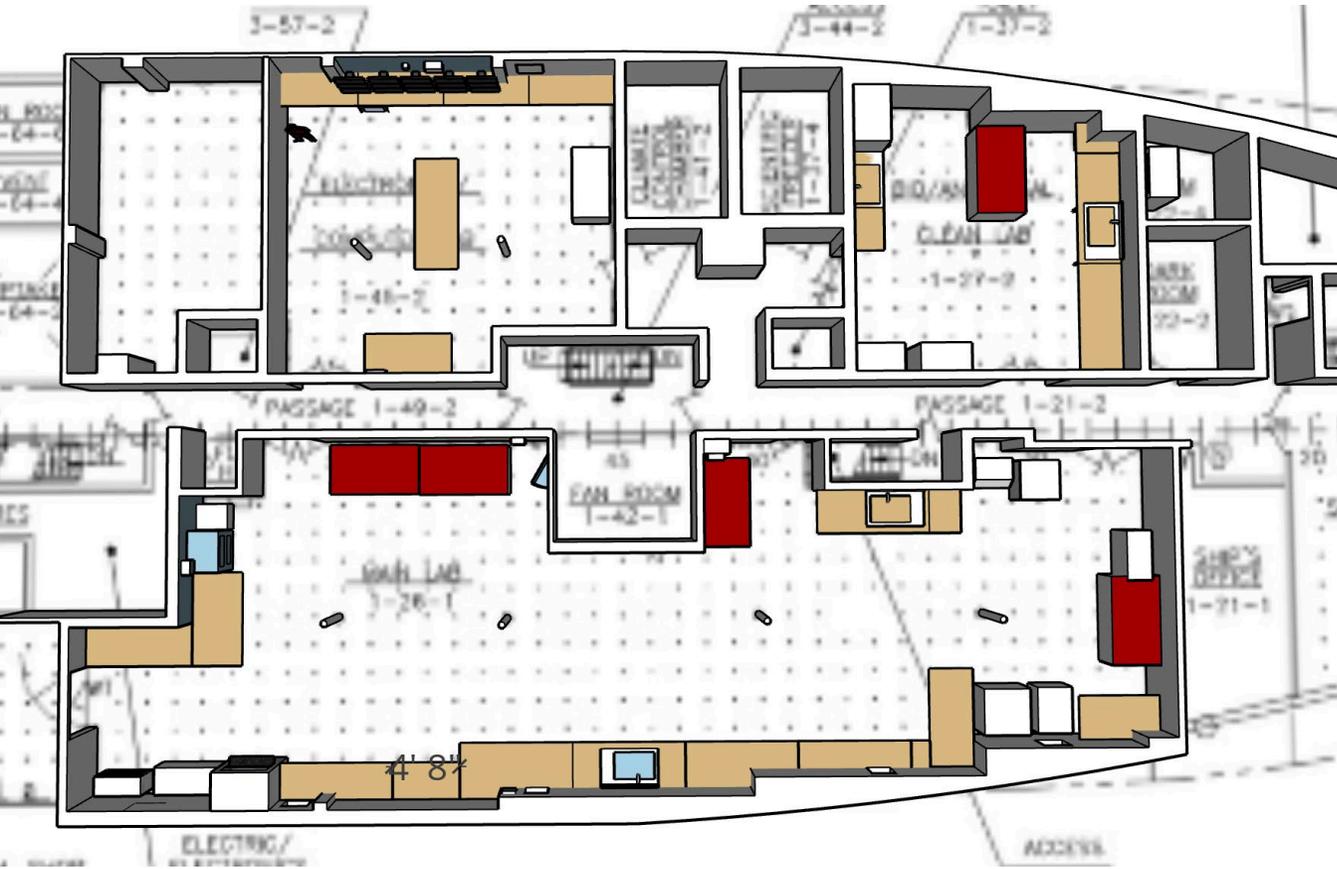


Main Lab distro

- Fibre PP+jbox
- Cable MGMT
- Patch-Panel
- Cable MGMT
- Ethernet Switch
- Cable MGMT
- Ethernet Switch
- PDU
- serial console
- UPS



# Refurbishment of Lab Spaces



Questions?

