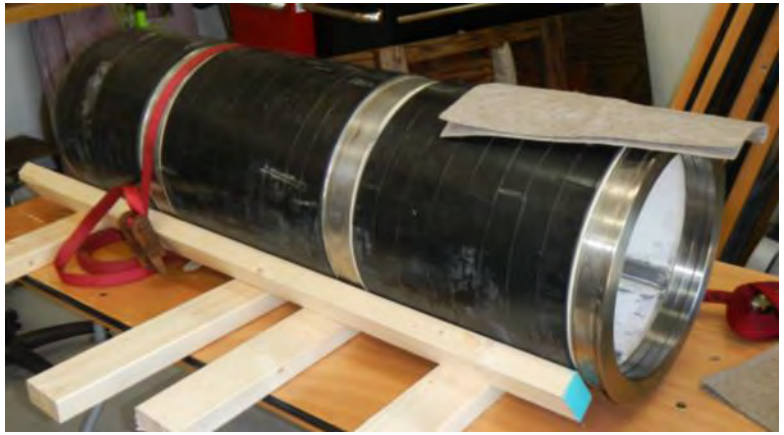
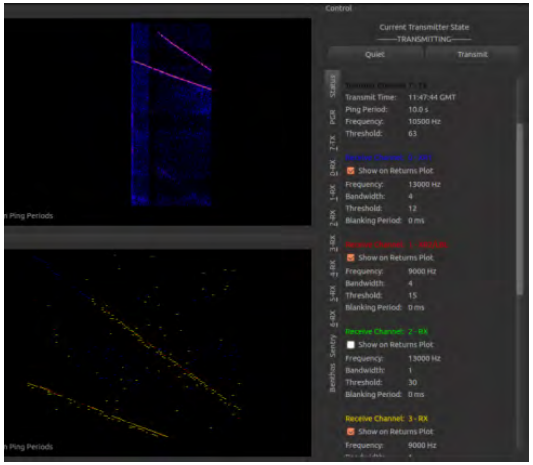
Battery Upgrade

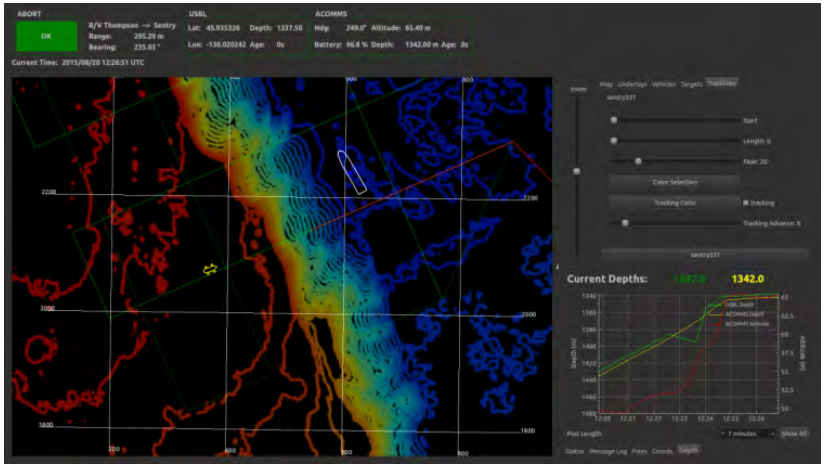
- New 1 atm batteries
- New ceramic housing
  - Old one had 300 dives = time to check
  - Old one inspected, serviced, and ready to use again in the future
- 2x the total power
  - Upgraded charging means similar turn around times
  - ~25-28 hour multibeam missions with 90-100km of track line
  - ~50+ hour photo missions with ~125km track line



User Interfaces

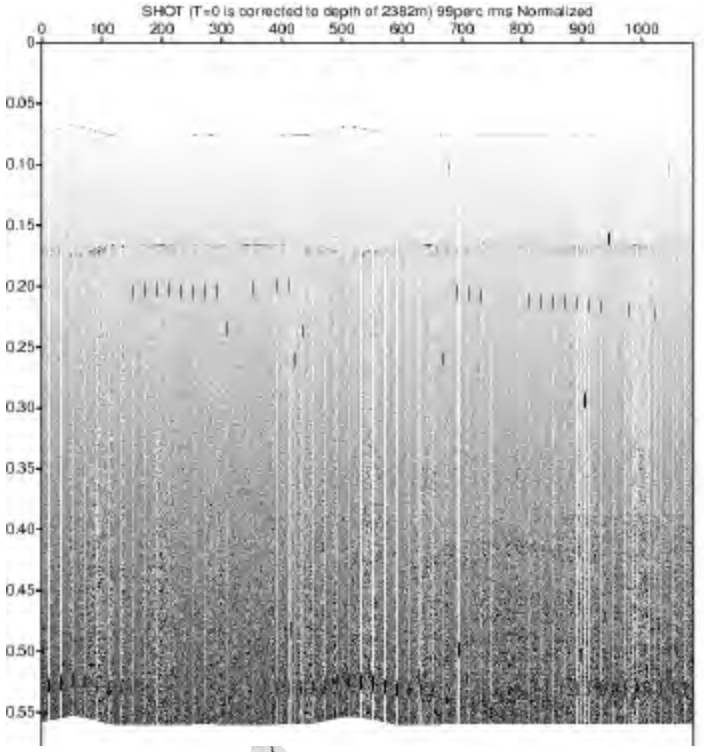
- NavG interface
  - Substantial additions to situational awareness
  - Now decent science, bridge, and watchstander interface
- PGR
  - Significant improvement to non-USBL tracking of *Sentry*
  - Removes last of topside legacy software no longer supportable
  - Adds logging and other features
- *Sentry* Sitter
  - Integrated seamless acoustic comms for Micromodem and Sonardyne
- Pre/post dive – many new scripts. Predive has shortened by ~30min over the last 2 years, postdive by similar





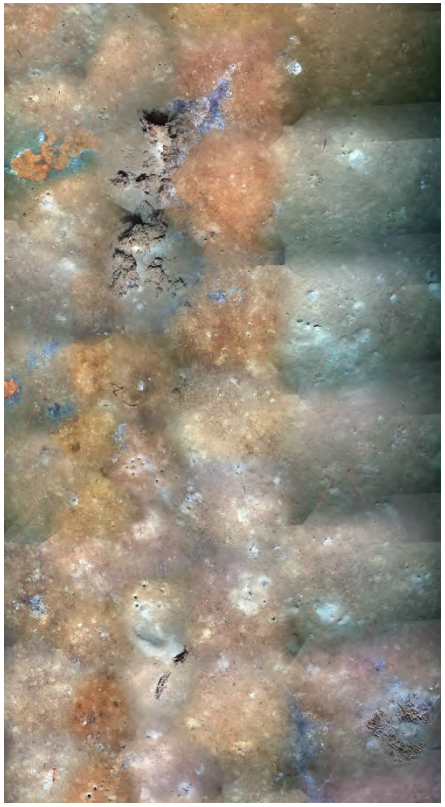
Data Pipelines

- MB system sidescan and sub-bottom pipelines fully online and highly automated
  - Navigated SEGY & strip plots for SBP
  - Navigated JSFs and strip plots for Sidescan
- New Multibeam tool makes process even more highly automated
  - Maps within 20 – 60 minutes of recovery now common – though not guaranteed
  - Very simple to use the basics but preserves advanced functionality



Photomosaics

- Mosaicing pipeline in process
- Getting results, but not automated enough to implement as standard
- Hoping to finish before end of the year, but may not have sufficient engineering resources – new position posting open



Sentry Upgrades
Metadata

- New scripts configure and read all possible data from instruments (e.g., serial num, cal constants, etc.)
- All responses logged
- Logs parsed by post processing
- Table created for dive report
- Should be in every dive report by end of year for some sensors
- Remaining sensors to be implemented next year

1.1 sentry338 Devices

Instrument	Model	Serial Num.	Comments
USBL	Sonardyne AvTrak2	U001A91	
DVL	RDI Navigator (300kHz)		
Magnetometer	APS 1540	APS 0689 Ver: 3.85BD7716F	
	APS 1540	APS 0688 Ver: 3.85BD7716F	
	APS 1540	APS 0690 Ver: 3.85BD7716F	
CTD	SBE 49	S/N: 222	

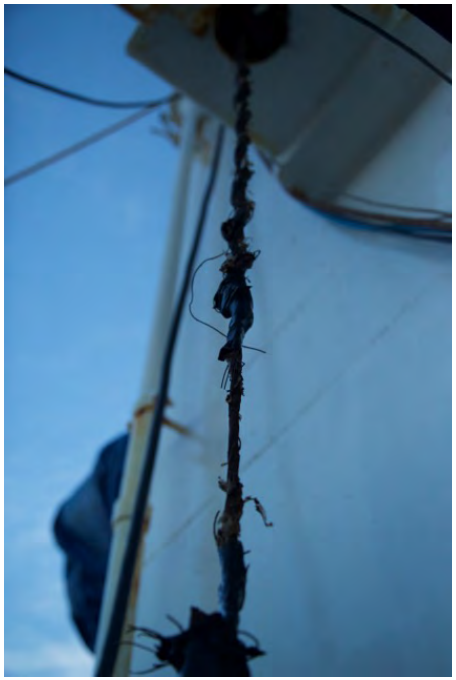
Normal *Jason* Upgrades

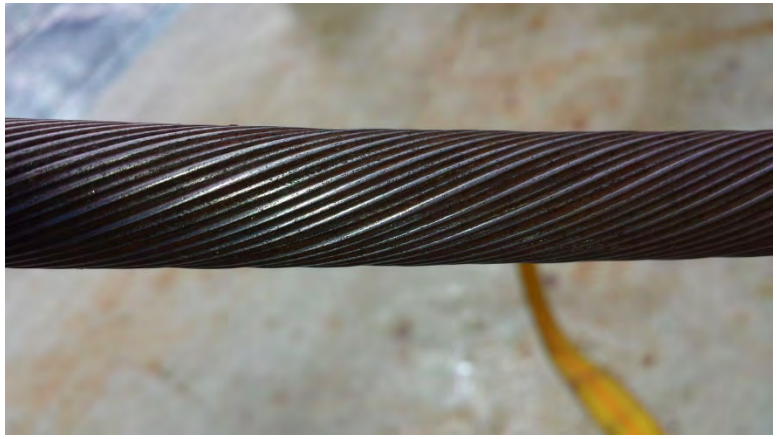
- **New recovery line technique**
  - Line direct to *Medea,* faster and safer
- **Syntactic elevator flotation**
- **Upgraded elevator frames**
- **New ‘Minivator’**
- **New LARS HPU**
  - Faster crane motion, safer, quieter, deck testing of manips
- **New navigation & dynamic positioning system**
- **DVDs eliminated**
- **New ‘K’ tube .681 cable**
- **Improved framegrabber**
- **Data delivered on hard drive**

Revelle EOM Cable Failure

- Deployed onboard the *Roger Revelle* PI Craig Moyer December 2014
- During a dive the weather deteriorated with a worsening forecast and the decision was made to recover early however the recovery was delayed in order to accomplish the maximum science
- Recovery was attempted but abandoned with ROV redeployed to 750 meters to await more favorable conditions
- Upon recovery, at a location 470 meters from the surface, an area of severe damage to the main cable was discovered
- Recovery of *Jason* was completed after 48 hours in gale conditions
- Nearly 6,000 meters of wire was jettisoned after inspection revealed periodic corrosion of the armor to this point.
- The cruise was completed with no further difficulty

Revelle Cable Damage





Suggestions for Further Consideration

Users (NDSF)

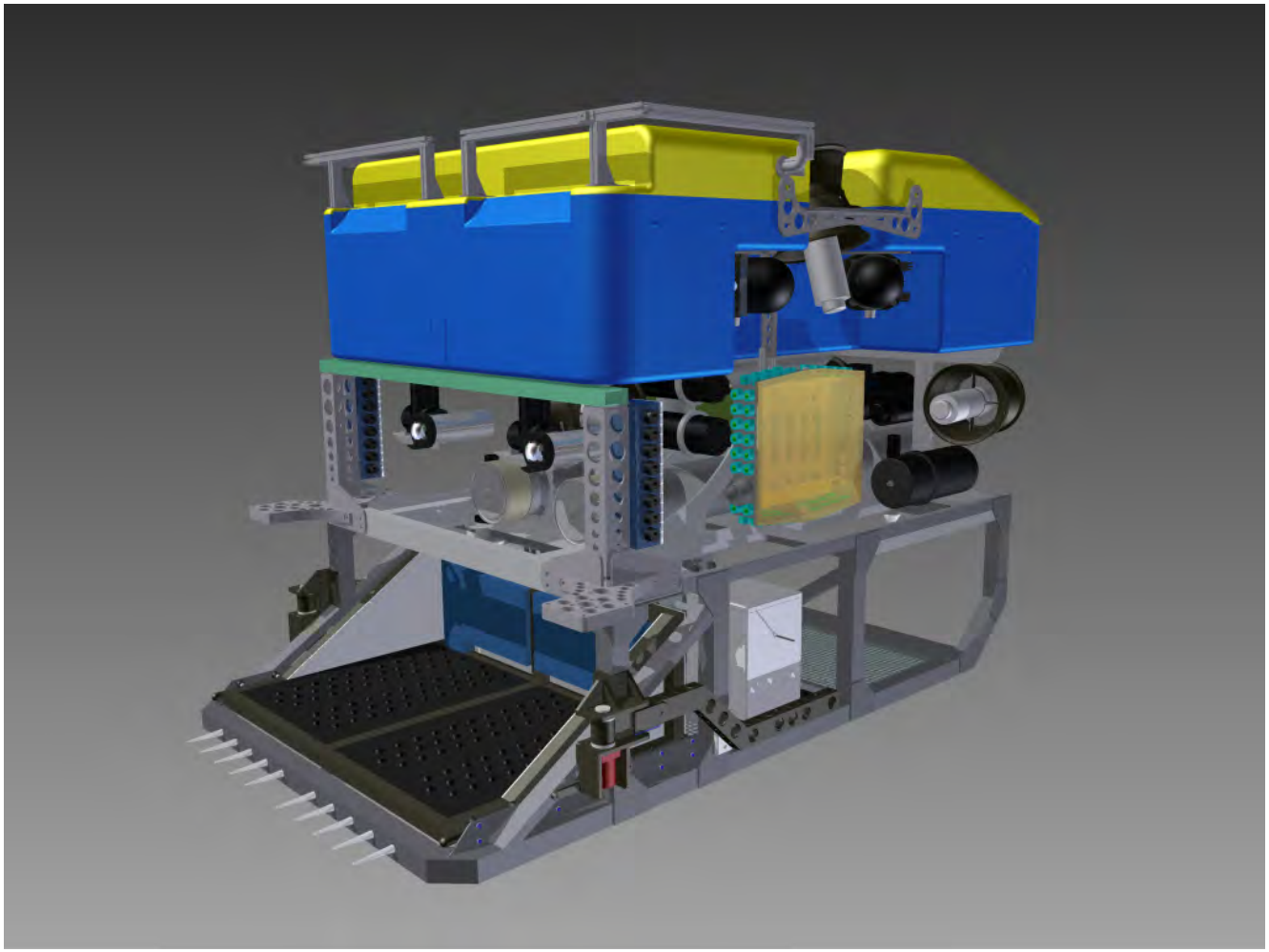
- Make prudent choices of risk/reward and communicate this to the stakeholders
- Ensure planning for deck operations and communications reviewed and understood for every activity
- Do not deploy payload to a fixed depth for extended periods of time without consideration/inspection for fatigue or wear

Facility Operator (Wire Pool)

Ensure a 360 degree process to incorporate lessons learned become practice:

- Cleaning, lubrication and storage standards
- Periodic inspection with appropriate and detailed guidance to the operators/users
- Representative testing
- Review criteria and readiness of cables for service
- Ensure all operators are aware and informed

Jason OOI Upgrade



OBJECTIVE:

Modifications to the *Jason* system to enable routine operation and maintenance of OOI/RSN components

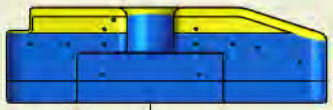
Upgrade Details

- New *Jason* frame for thru-frame lifts up to 4,000 lbs
- Single body ops, umbilical direct to *Jason*
- New higher strength umbilical 5,000 m
- New LARS crane
- Reduces deck space requirements
- Short turnaround tool skid swap
- Improves serviceability of vehicle components
- Increases free space in science bay

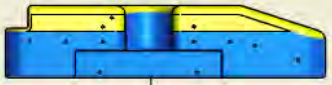
Modular Vehicle Layout

MODULAR VEHICLE LAYOUT

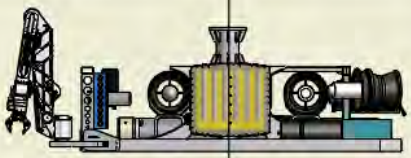
HZ-30 FOAM BLOCK
6500 METER DEPTH OPERATION
Sea State Package Deployment Limts:
SS3 - 4000 LB Deployments to 3000 Meters
SS4 - 3000 LB Deployments to 3000 Meters
SS5 - No Package Deployments, Only Neutral Vehicle Operations



BZ-26 FOAM BLOCK (OPTIONAL)
3000 METER DEPTH OPERATION
Sea State Package Deployment Limts:
SS4 - 4000 LB Deployments to 3000 Meters
SS5 - No Package Deployments, Only Neutral Vehicle Operations

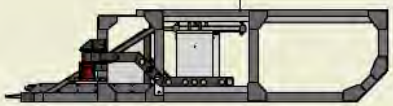


6 HOUR CHANGE OVER (Mobe)



VEHICLE - General Specs
Depth Capability: 6,500 Meters; 3,000 Meters
Size & Weight : 12'(Length)x7.25'(Width)x8'/7.6'(Height), 10,500 lbs/ 9200 lbs
On-Site Speed: 1.5 knot forward, 0.5 knot lateral, 1.0 knot vertical
Sea State 5 Operation
Through Frame Lift Capable: 4000 lb pacakages via Latches/Winch

3 HOUR CHANGE OVER (Mobe & At Sea)



STANDARD JASON TOOLSKID
Specifications in Toolskid Options

OOI HEAVY LIFT TOOLSKID
Specifications in Toolskid Options

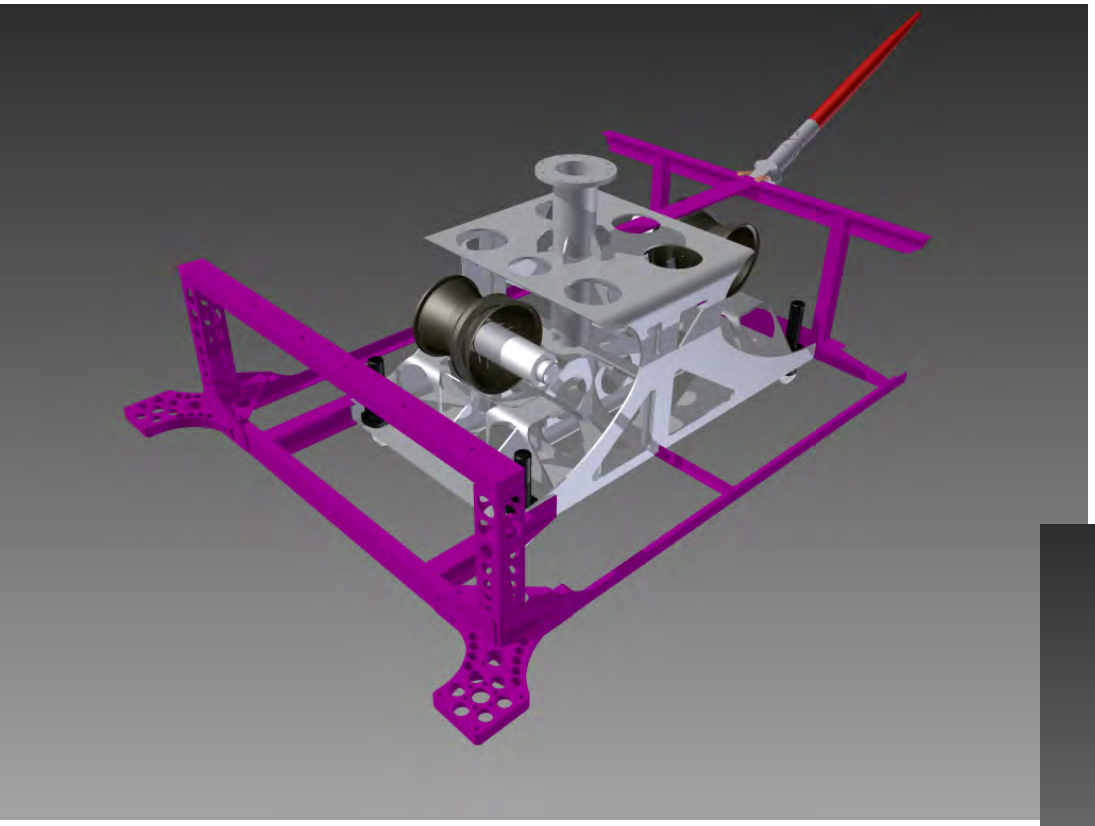
WOODS HOLE OCEANOGRAPHIC INSTITUTION
Deep Submergence Laboratory
Challenger Drive, WOODS HOLE, MA, 02543

TITLE

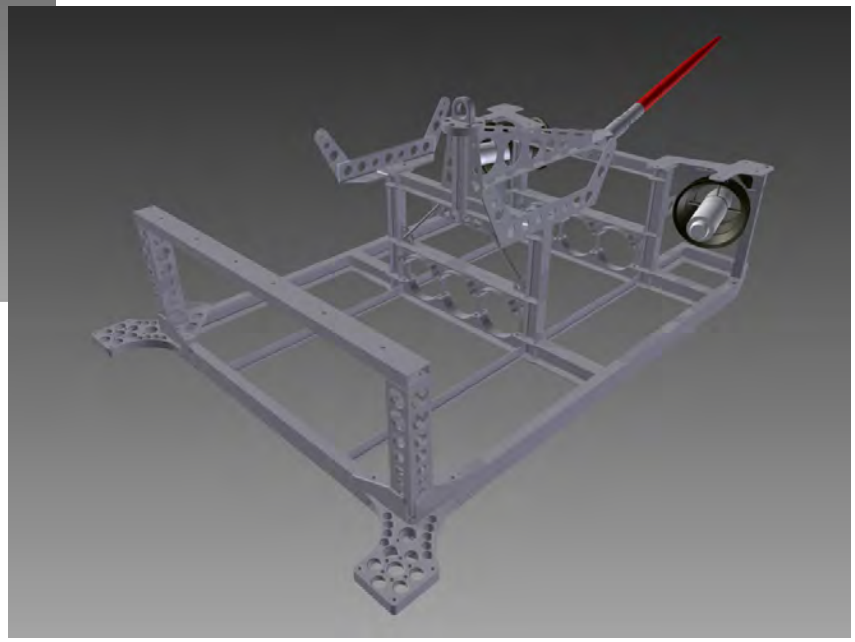
SIZE B | DWG NO Jason_2015 | REV

SCALE | SHEET 1 OF 2

New Frame *vs.* Existing



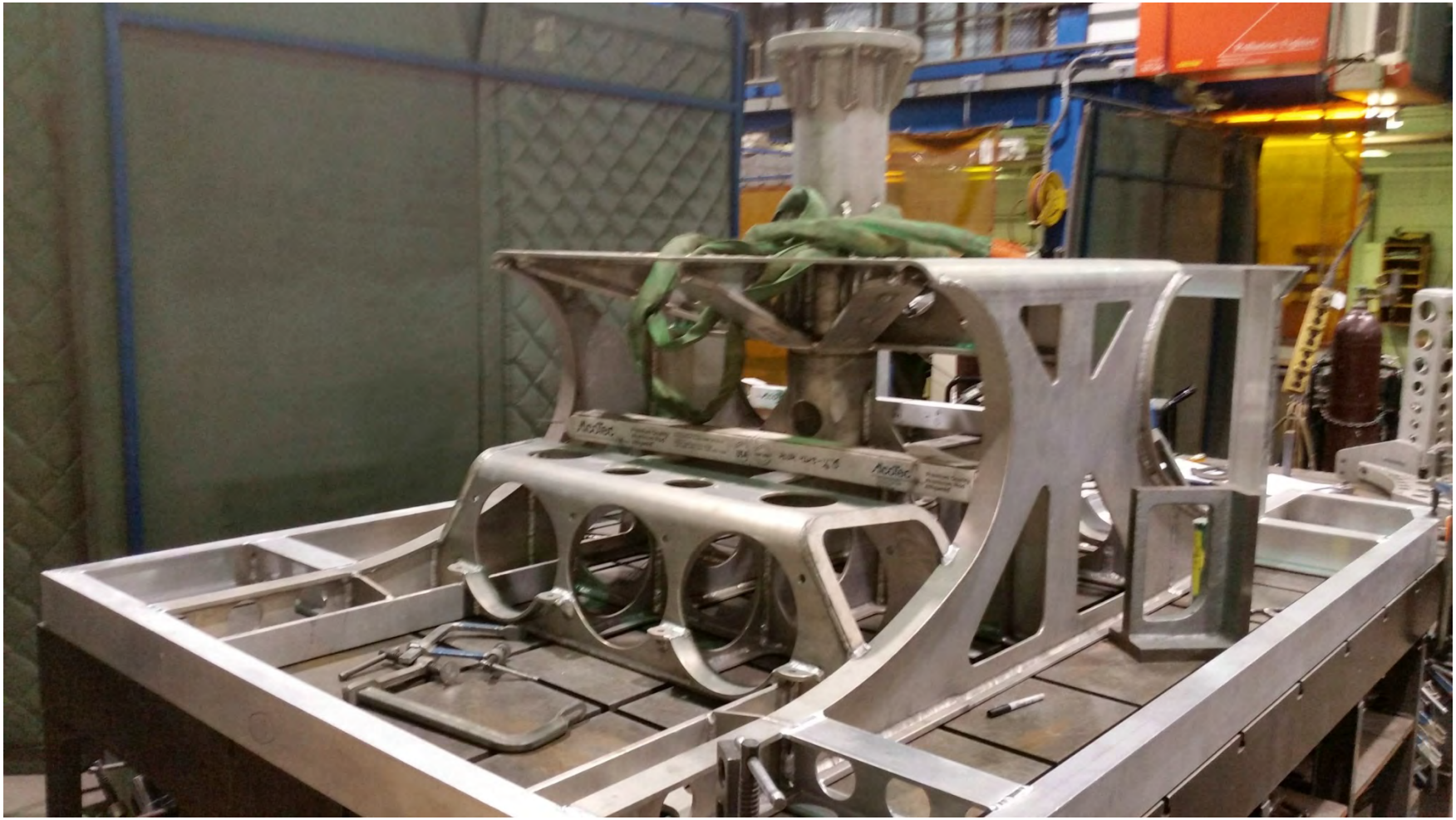
New frame load path



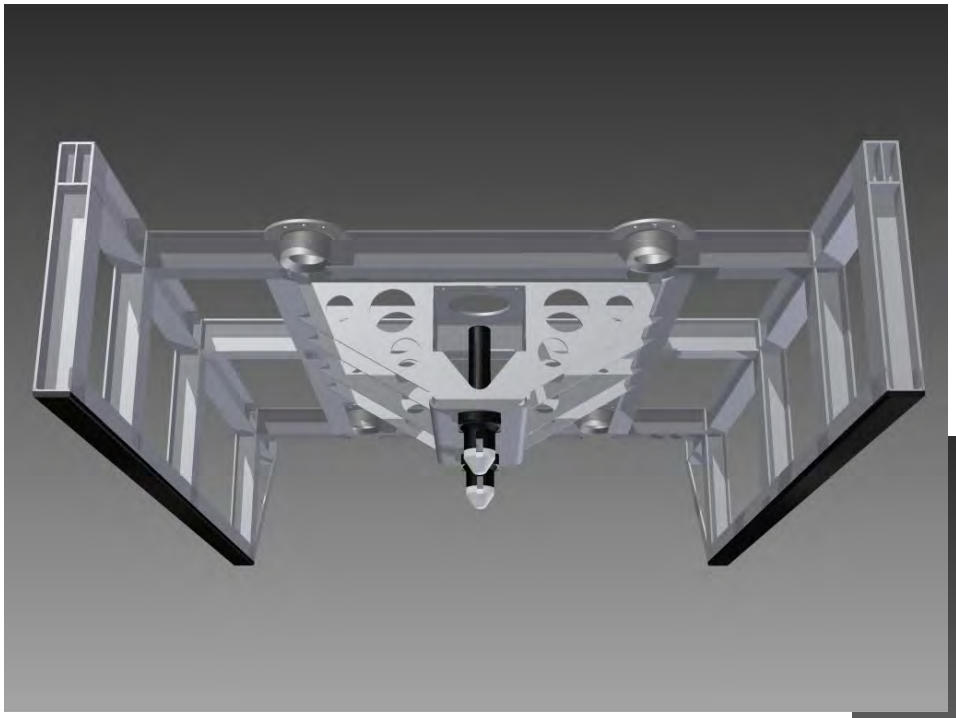
Old frame not capable of withstanding additional loads

Load Path Heat Treat

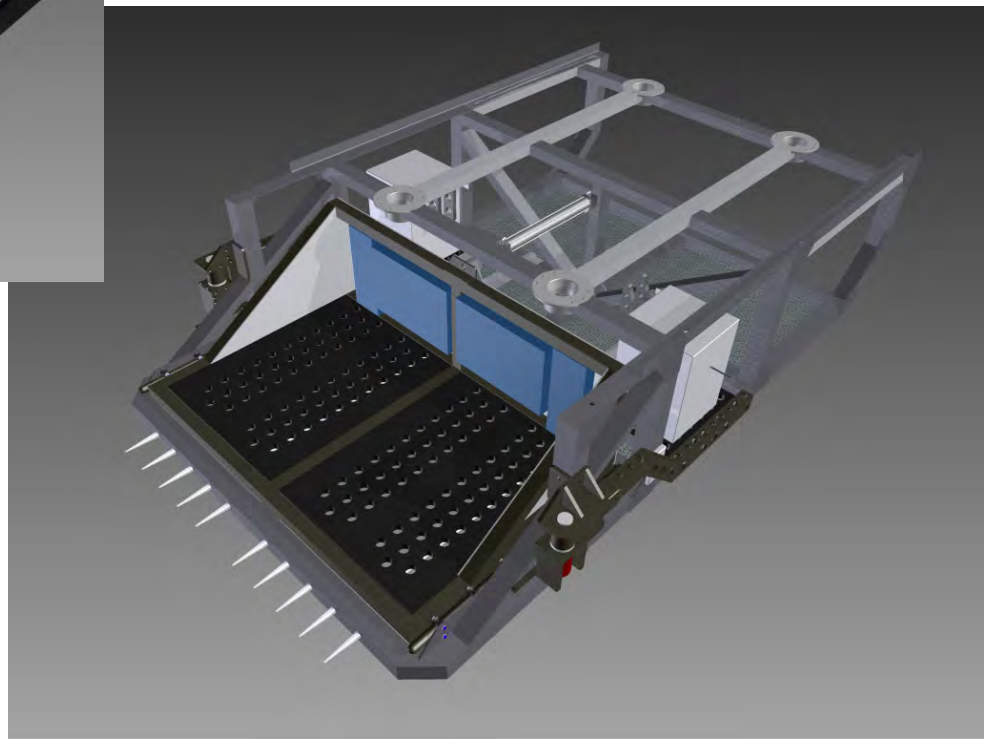
Frame Welding



Swappable Tool Skid

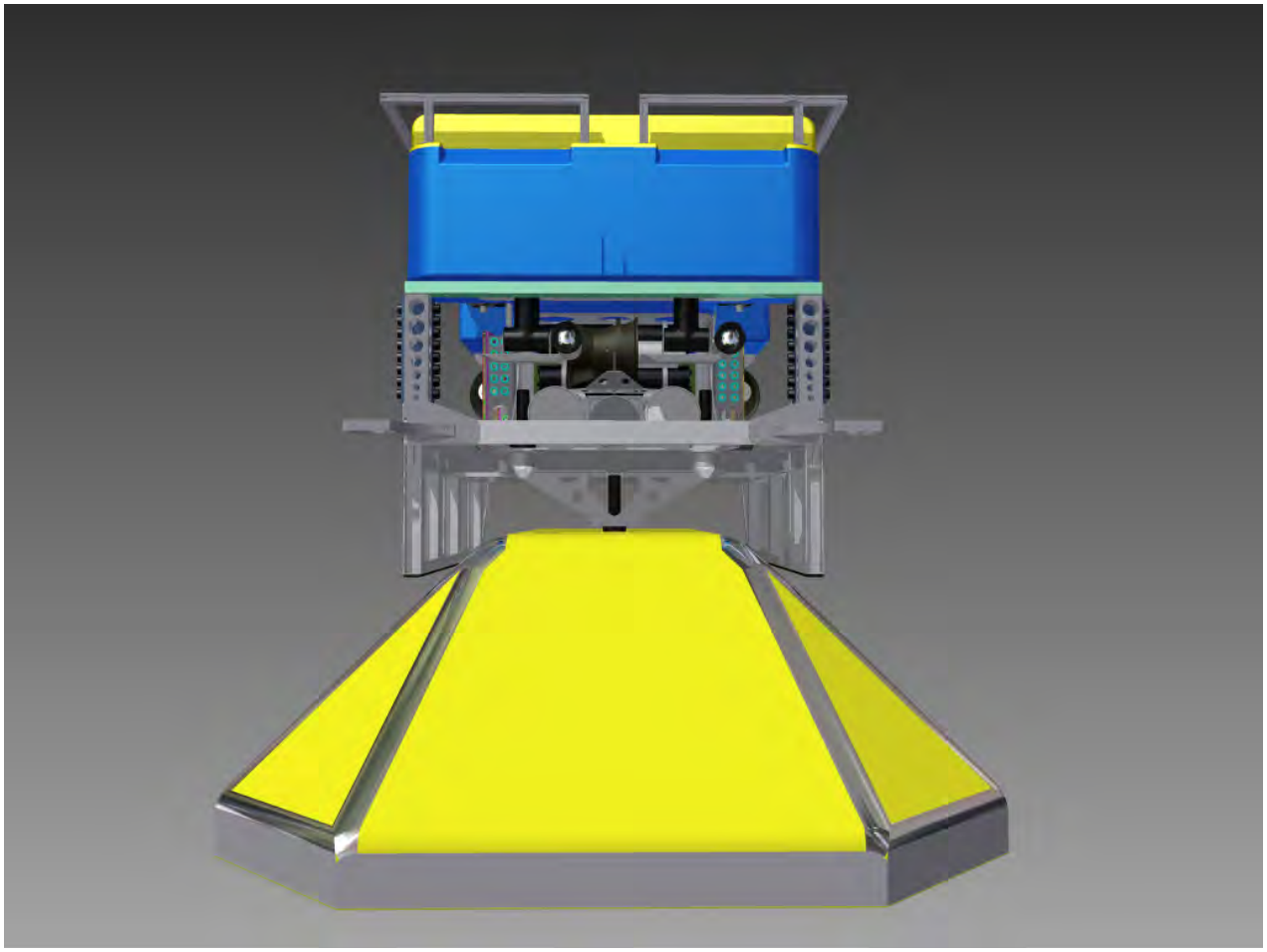


OOI skid
Releases for packages
No aft science bay
Smaller basket



Jason skid – similar to existing design, additional aft bay space

Package Attachment



RSN Benthic Node

Overboard Handling System: Layout

Existing Rapp Winch power van. *Mounted on top of winch to use less deck space.*

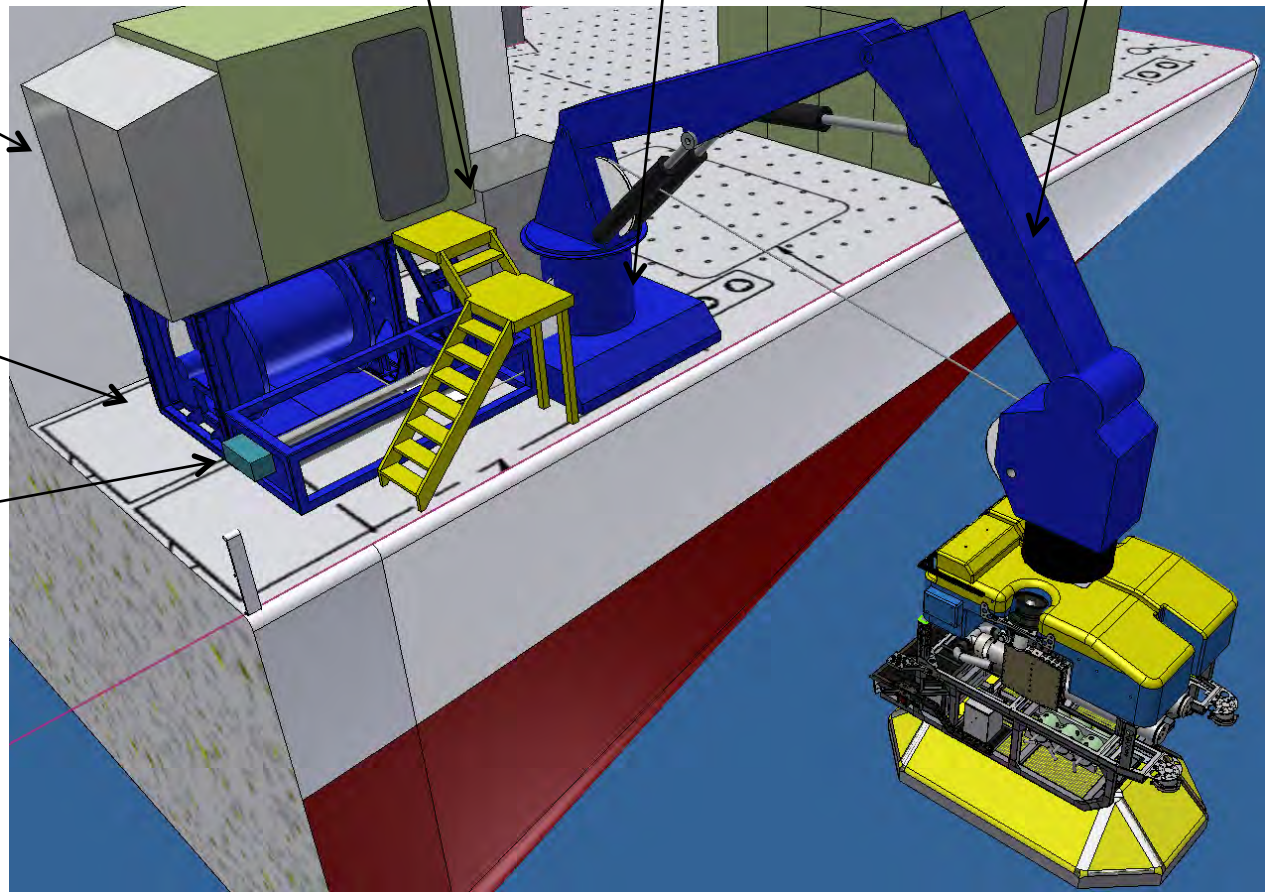
Recently purchased Airline Hydraulic HPU. *Mounted on top of LARS Base to use less deck space.*

In-house LARS Base. *Allows winch to mount to either forward or inboard edge depending on ship.*

North Pacific Crane Co. LARS *Includes latching docking head.*

Existing Rapp Winch with new drum and Lebus for 0.842” cable

New Rapp Level Wind for 0.842” cable in new side-mount position. *Braced against LARS base for reduced winch deck loads.*



Overboard Handling System: Specs

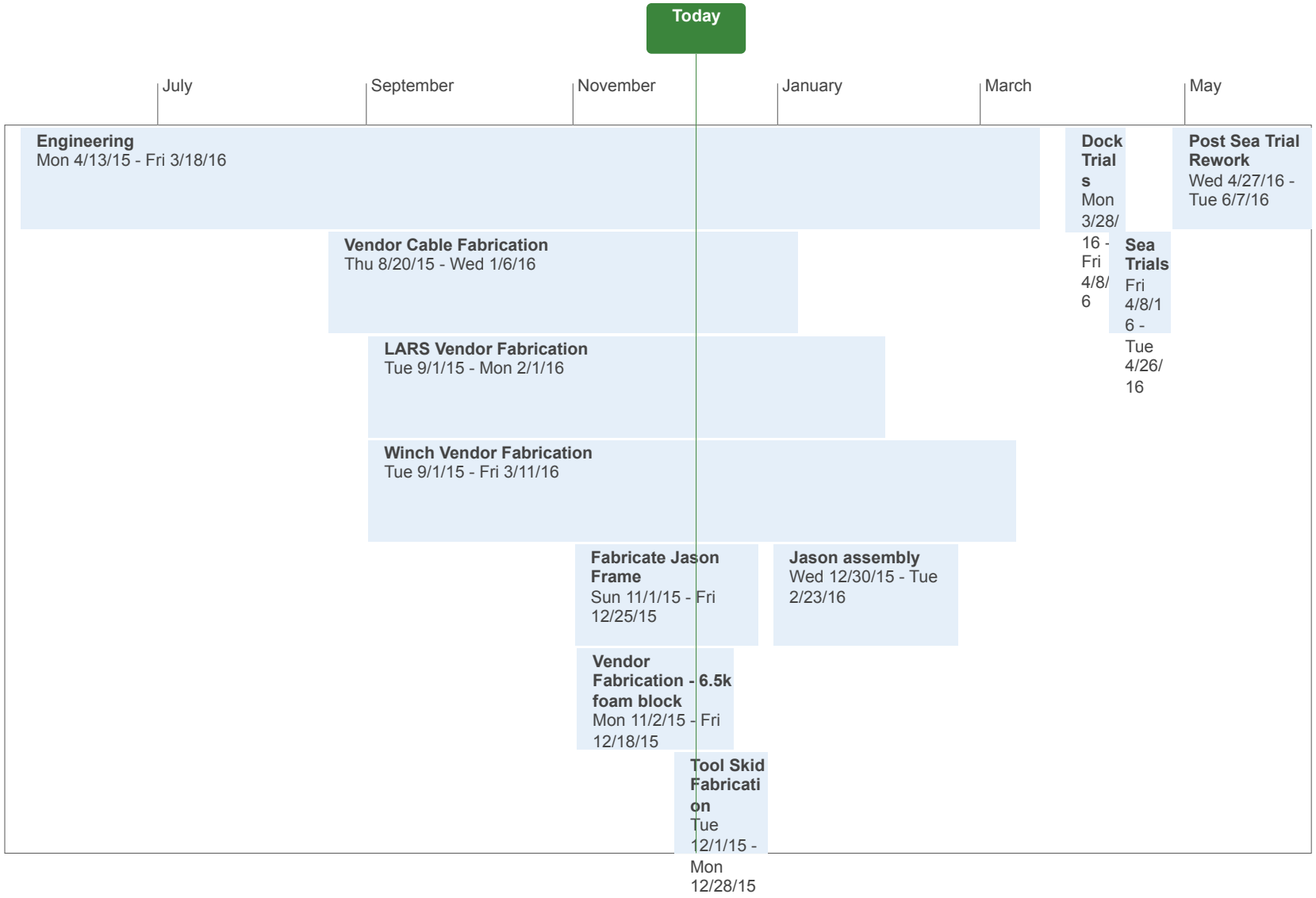
LARS Crane

- 20 ft reach in Sea State 4 (package deployment)
- 14,000 lb capacity includes 4,000 lb packages
- Features snap load attenuation via gas accumulator springs
- Latching docking head with powered sheave to prevent cable slack in sheave train
- Can ship knuckled as one piece with base and HPU

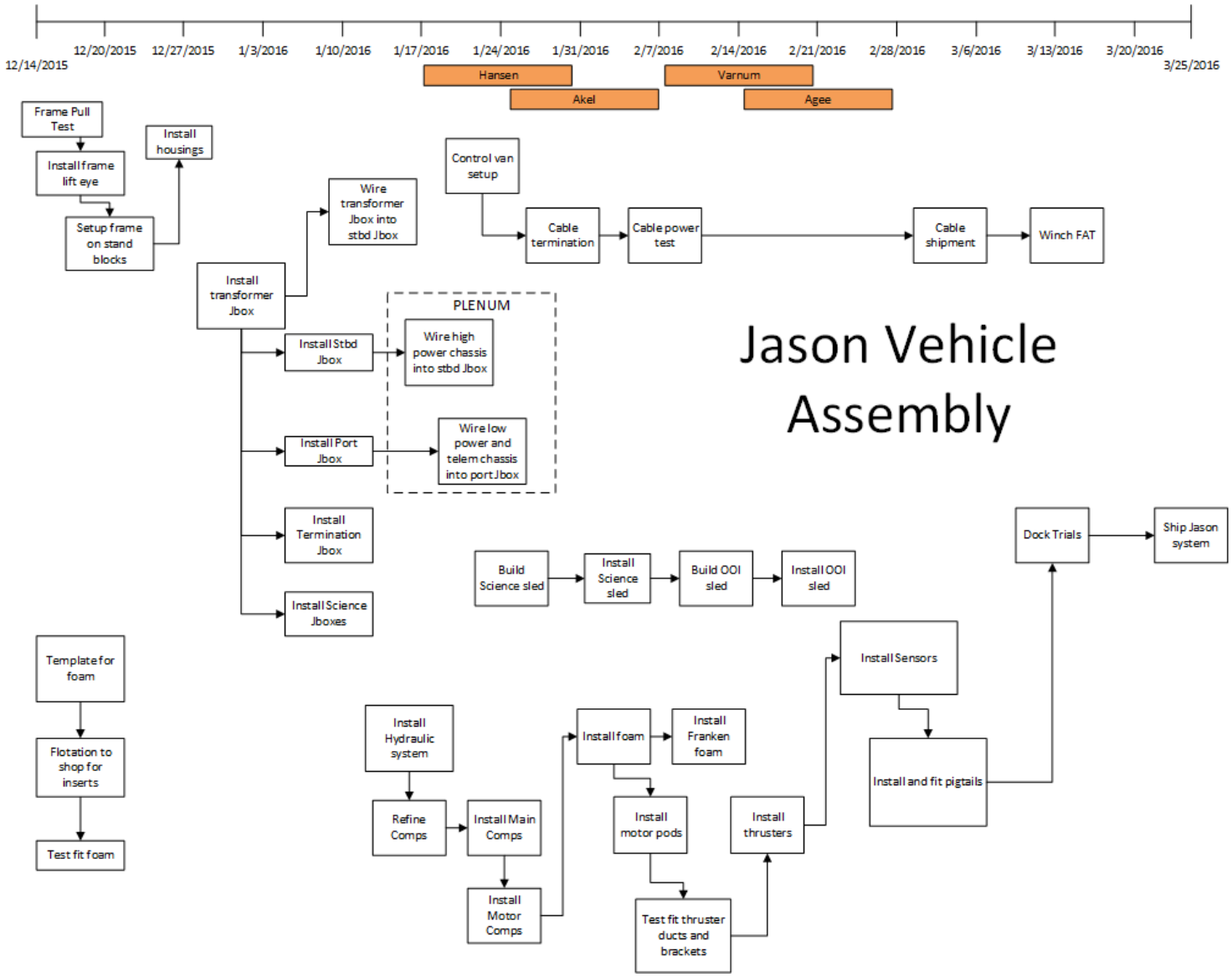
Winch

- Carries 5,000 m of 0.842” cable
- Active heave compensation reduces motion during deployment
- Can be converted back to original 0.681” cable use using original drum and level wind

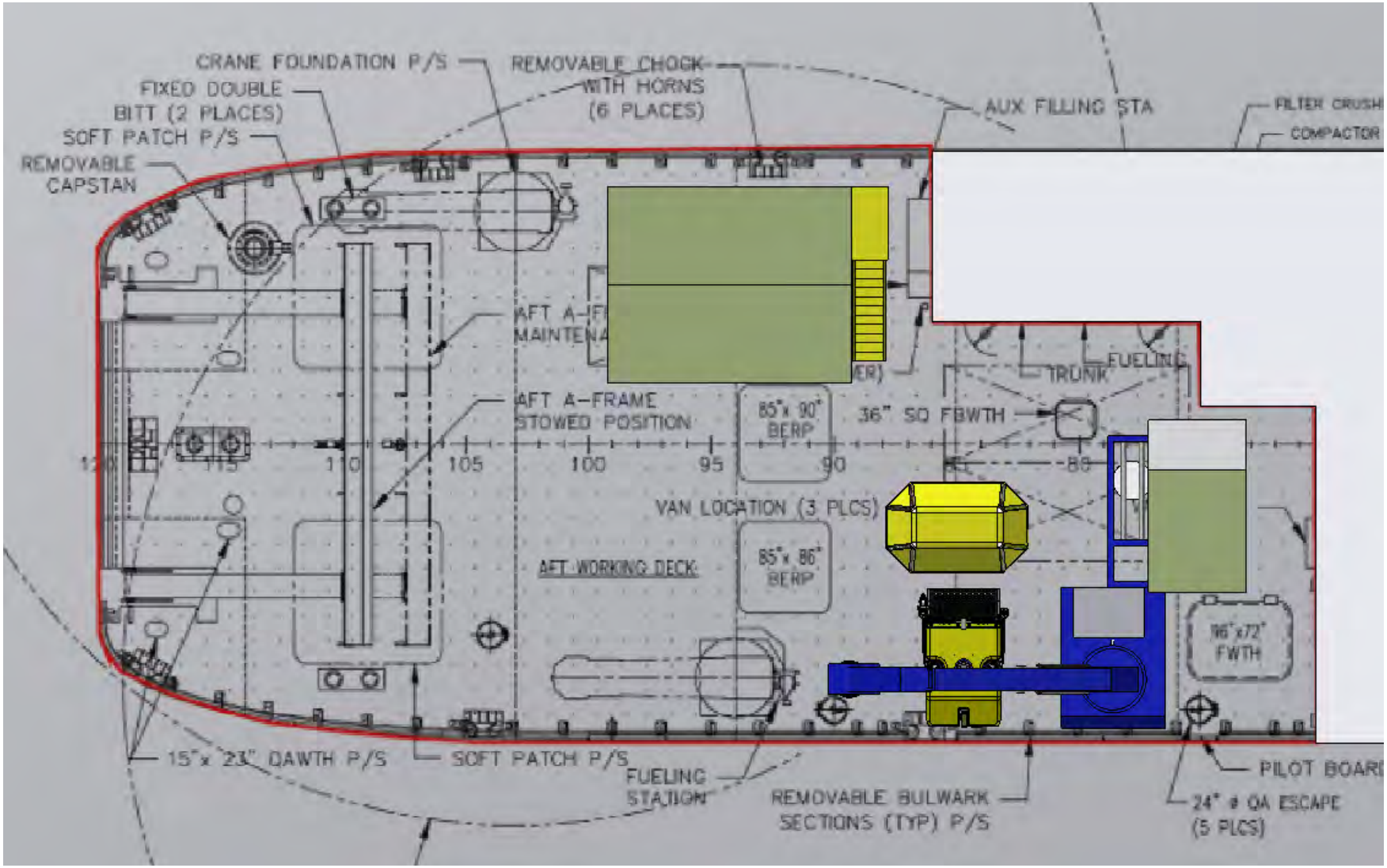
Schedule


Today
July
September
November
January
March
May
Engineering
Mon 4/13/15 - Fri 3/18/16
Dock Trials
Mon 3/28/16 - Fri 4/8/16
Post Sea Trial Rework
Wed 4/27/16 - Tue 6/7/16
Vendor Cable Fabrication
Thu 8/20/15 - Wed 1/6/16
Sea Trials
Fri 4/8/16 - Tue 4/26/16
LARS Vendor Fabrication
Tue 9/1/15 - Mon 2/1/16
Winch Vendor Fabrication
Tue 9/1/15 - Fri 3/11/16
Fabricate Jason Frame
Sun 11/1/15 - Fri 12/25/15
Jason assembly
Wed 12/30/15 - Tue 2/23/16
Vendor Fabrication - 6.5k foam block
Mon 11/2/15 - Fri 12/18/15
Tool Skid Fabrication
Tue 12/1/15 - Mon 12/28/15

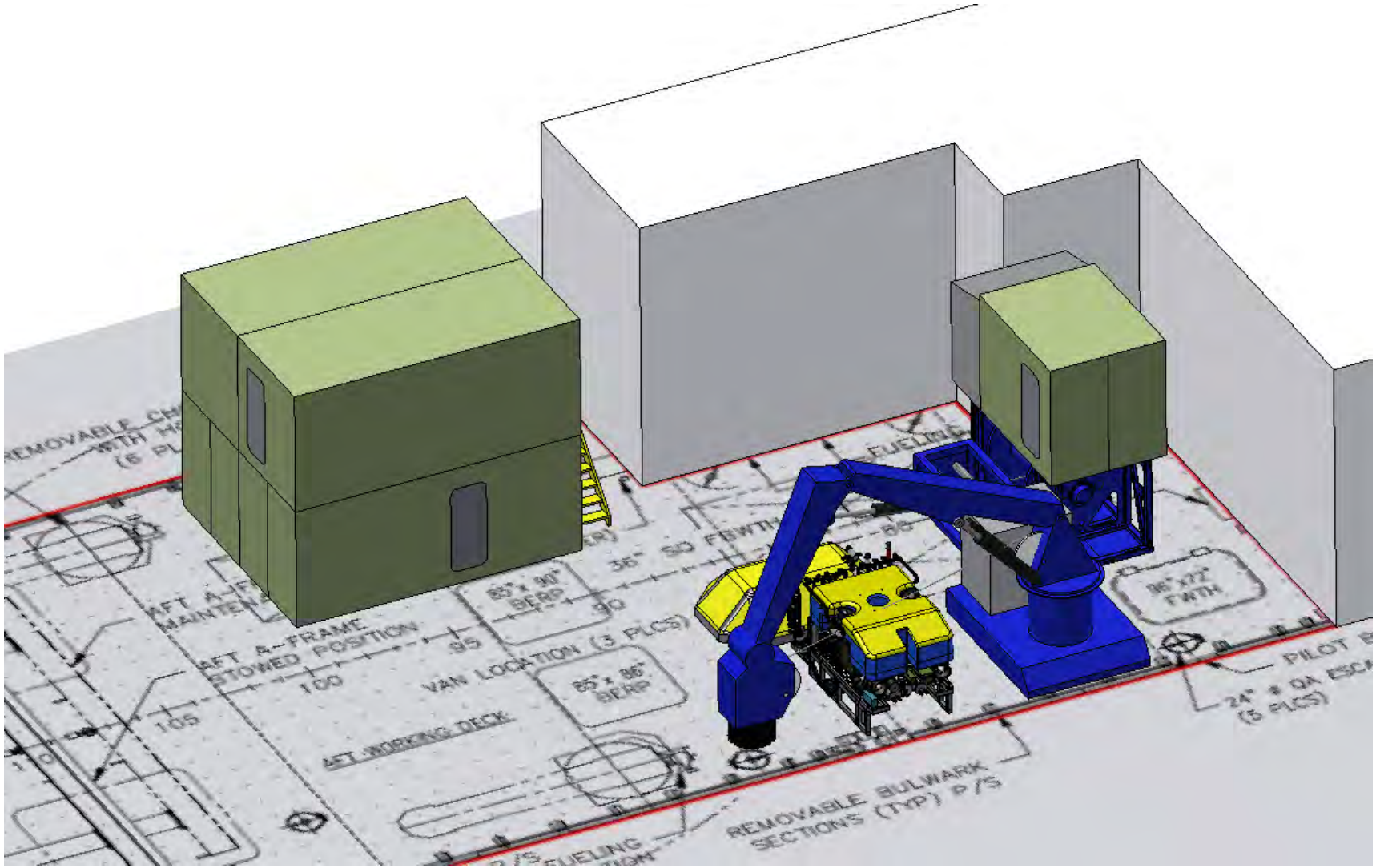
Schedule


12/14/2015
12/20/2015
12/27/2015
1/3/2016
1/10/2016
1/17/2016
1/24/2016
1/31/2016
2/7/2016
2/14/2016
2/21/2016
2/28/2016
3/6/2016
3/13/2016
3/20/2016
3/25/2016
Hansen
Akel
Varnum
Agee
Jason Vehicle Assembly
Frame Pull Test
Install frame lift eye
Setup frame on stand blocks
Install housings
Wire transformer Jbox into stbd Jbox
Control van setup
Cable termination
Cable power test
Cable shipment
Winch FAT
Install transformer Jbox
PLENUM
Install Stbd Jbox
Wire high power chassis into stbd Jbox
Install Port Jbox
Wire low power and telem chassis into port Jbox
Install Termination Jbox
Install Science Jboxes
Build Science sled
Install Science sled
Build OOI sled
Install OOI sled
Dock Trials
Ship Jason system
Template for foam
Flotation to shop for inserts
Test fit foam
Install Hydraulic system
Refine Comps
Install Main Comps
Install Motor Comps
Install foam
Install Franken foam
Install motor pods
Test fit thruster ducts and brackets
Install thrusters
Install Sensors
Install and fit pigtails

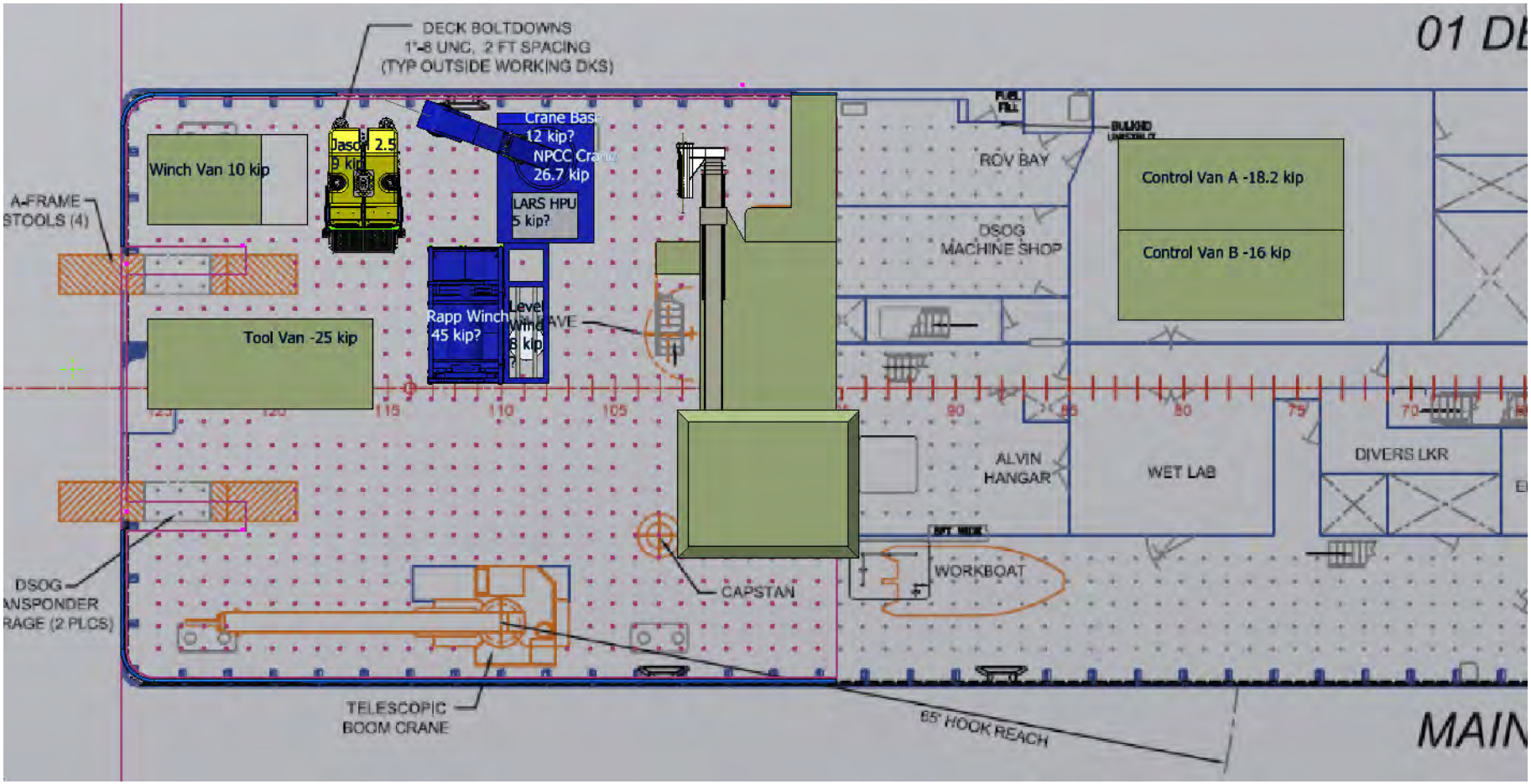
Sikuliaq


CRANE FOUNDATION P/S
FIXED DOUBLE BITT (2 PLACES)
SOFT PATCH P/S
REMOVABLE CAPSTAN
REMOVABLE CHOCK WITH HORNS (6 PLACES)
AUX FILLING STA
FILTER CRUSH
COMPACTOR
AFT A-FRAME STOWED POSITION
85'x 90' BERP
36" SQ FBWTH
TRUNK
FUELING
VAN LOCATION (3 PLCS)
AFT WORKING DECK
85'x 86' BERP
16'x72' FWTH
15"x 23" DAWTH P/S
SOFT PATCH P/S
FUELING STATION
REMOVABLE BULWARK SECTIONS (TYP) P/S
PILOT BOARD
24" ø QA ESCAPE (5 PLCS)

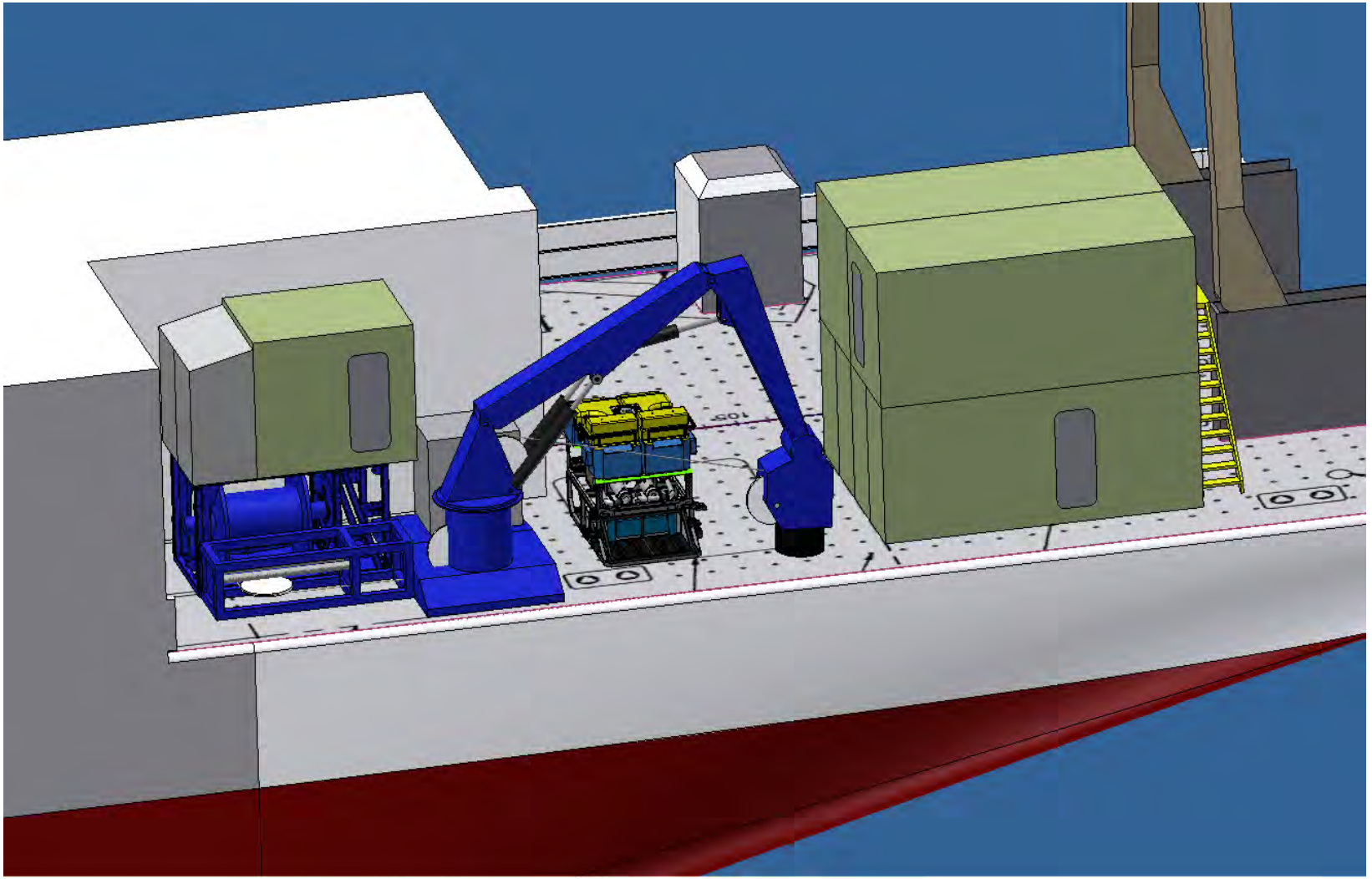
Sikuliaq


AFT A-FRAME STOWED POSITION
VAN LOCATION (3 PLCS)
AFT WORKING DECK
REMOVABLE BULWARK SECTIONS (TYP) P/S
FUELING
PILOT

Atlantis


DECK BOLTDOWNS
1"-8 UNC, 2 FT SPACING
(TYP OUTSIDE WORKING DKS)
Winch Van 10 kip
Crane Base
12 kip?
NPCC Crane
26.7 kip
LARS HPU
5 kip?
Rapp Winch
45 kip?
Tool Van -25 kip
A-FRAME
STOOLS (4)
ROV BAY
DSOG
MACHINE SHOP
Control Van A -18.2 kip
Control Van B -16 kip
ALVIN
HANGAR
WET LAB
DIVERS LKR
WORKBOAT
CAPSTAN
DSOG
TELESCOPIC
BOOM CRANE
65' HOOK REACH

Thompson



Alvin Upgrades

Navigation

- Top Lab now using updated navigation software (Nav-g/Navest); DVLNav officially retired. Progressive development and implementation of *Alvin* navigation post-processing software (developed by *Sentry* team). End goal: produce daily semi-automated, first-cut navigational maps and data for science use.

Reson Sonar

- Reinstalled and test operated during AT29-04. Some follow-on evaluation required to complete installation.

BlueView Sonar

- Installed for AT29-02 and AT29-04, initial evaluation for regular use on *Alvin*. Overall sonar is excellent but likely will install dedicated computer in-hull to improve usability.

Alvin Upgrades

In-Hull Toxicity/Flammability Testing

- First opportunity to utilize new Navy-approved testing vendor. Testing expense is approximately half previous cost.

Kongsberg PATZ Cameras

- Cameras returned from dome repair and are working well