

# Sentry Upgrades Staffing



- Sean Kelley now "Sentry Operations Manager"
  - 1/3 of his time, focus on day-to-day and cruise-to-cruise issues
  - Carl Kaiser retains program management responsibility but will scale back time by approx 1/3 as Sean comes up to speed
- One new hire complete, one underway to replace attrition losses
- Significant cross training underway for Alvin Ops personnel to work with Sentry at sea









- Changed to counter-rotating props reduces "prop walk", leading to a 5-10% increase in propulsion efficiency and hence range
- Increasing max current to thrusters by 20% estimated to increase vehicle top speed to ~2.3 kts by March 2017



- New wing servo design finally underway to address greatest remaining potential mechanical failure on the vehicle
  - Direct drive and high reliability
  - Absolute position feedback



# Sentry Upgrades Data Pipelines



- MB system sub-bottom pipeline fully online and highly automated
  - Includes navigated segy files
- MB system Sidescan tool works but needs more tweaking for quality equal to commercial Windows tools
- New Multibeam tool makes process even more highly automated
  - Does not change the need for additional processing to achieve "publication quality"
- Mosaicing pipeline now working well for "flat" areas
  - Planning to use on dives of opportunity on next two cruises, then perhaps offer on a timeavailable basis as standard
- Photos can now be copied and processed at a rate of ~5,000 per hour, an approx 10x improvement







# Sentry Upgrades 850 kHz Sidescan Sonar



- Purchased with private money, now ready for routine use on Sentry
- 10 cm beam width
- Currently no spares and none budgeted will reconsider if it becomes popular





#### Sentry Upgrades Metadata



- New scripts configured to read all possible data from instruments (e.g., serial number, calibration constants)
- Should be in every dive report by the end of the year for some sensors
- Remaining sensors to be implemented next year

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2	1.1		avtrak_20160423_1925.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dv1300_20160423_1926.cfg
Magnetometer	APS 1540	0689		aps1540_0_20160423_1926.cfg
	APS 1540	0688		aps1540_1_20160423_1927.cfg
	APS 1540	0690		aps1540_2_20160423_1927.cfg
CTD	SBE 49	222		sbe49_20160423_1927.cfg
SAIL	eh A/D	11	A: 2, G: 1.00, O: 0.0016	a2d2-pods_20160423_1926.cfg
	obs A/D	14	A: 5, G: 1.00, O: 0.0018	
	Timing			tim_20160423_1931.cfg



# Sentry Upgrades Miscellaneous



- New smaller A2D replaces unsupportable system from ABE
- 50 lbs new payload from partial new foam and removal/upgrade of old equipment
- New deck status/control box
- New timing board allows more flexibility in sonar use (March 2017)
- 3 new foam pieces (March 2017) = 20+lbs additional payload
- Plan to replace all old foam late 2017 = much more payload and more reliability









# Sentry Upgrades Synergistic Activities



- Autonomous Surface Vehicle (ASV) tending demo planned for early 2018 – WHOI internal funding
- Improved telemetry via acomms (early 2018) WHOI internal funding
- Highly interactive real time data transfer and display side benefit of NOAA OER proposal to be submitted Dec 2016
- NavG 3.0 significant upgrades to user interface for all three NDSF vehicles, including basic science data in the real time vehicle control display
- NUI/NHT core software Sentry to migrate towards "core" leveraging massive investment by NSF, NOAA, WHOI, and Dalio Foundation



To continue to improve the science we deliver we need to:

- •Replace bottom follower and thruster allocation enables steeper terrain
- •Replace the electronics chassis, including computer and power distribution
- •Migrate to Nereid-CORE architecture leveraging major NSF and private investment to modernize software
- •Replace Mission Executive -> New Science Capabilities
- •Replace Planning Software

Replace Out of Date System Leverage NUI and NHT

Enable Next Generation Science

DOR



### Jason OOI Upgrade





#### **OBJECTIVE**:

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



New Jason Frame



### Through-frame lifts up to 4,000 lbs







### **Tool Skid Options**











# LARS Crane

- 20 ft reach in Sea State 4 (package deployment)
- 14,000 lb capacity ROV + 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
- Ships knuckled as one piece with base

# Winch

Carries 5,200 m of 0.842" cable
Active heave compensation reduces motion during deployment
Can be converted back to original 0.681" cable using original drum and level wind



# Single-Body Jason







# Hydraulic Latches









# **Deploying RSN Test Article**







# **Recovering RSN Package**









### **Under-Vator**



#### **Replaces elevators**





#### 1,000 lb payload





- Control van infrastructure at end of life
- Deck space for certain operations is limited
- System will be operated from a single van or dual vans
- Second van will not contain mission-critical equipment



## Single Van Layout



- Single van will accommodate 3 Jason team and 2 scientists
- Remainder of the science participants at remote station
- Remote station will have 2 x 65" split screen monitors to duplicate views in the single van
- Live communications with van to alleviate confusion





## **Dual Van Layout**







### **Control Van POV**



#### Scientist POV, single van





#### Scientist POV, dual van



## **Alvin Upgrades**



- New service release design enables faster ascent/descent rates, longer available bottom time. Removes need for basket weights (more available basket space).
- New science basket improves performance, enables variations of science space for unusual basket shapes, quick front-end basket interchanges, extendable basket (similar to Jason)





• New sensitive sample bio-box – provides positive latching with excellent sealing and insulation



## **Alvin Upgrades**



- SubC 1Cam Alpha HD video/still camera now available as HD video source to in-hull recorders and observer monitors
- Magnetometer added to sensor suite
- Acoustic modem installed on Alvin and Atlantis. Enables acomms data transfer between ship/sub (images, SMS text, other data sets). Provides Atlantis with resident acomms capability, with dedicated acomms station in the Main Lab.



- Upgrade to Sonardyne USBL new 6G (sixth generation) system arrives at end of 2016. Provides *Atlantis* with resident capability compatible with *Alvin, Jason, and Sentry.*
- Independent *Alvin* navigation computer station in *Atlantis* Main Lab provides a means for topside observers to monitor *Alvin* navigation during dives. Provides same functionality as Top Lab nav software (NAV-G).



### **Alvin Upgrades**



- New Sonardyne WMT transponder replaces LBL emergency transponder in Rescue Buoy. Provides better emergency positioning.
- Replacement 1.2L Niskin bottles for basketmounted 5-bottle rack
- New USBL burn bottles John Bailey design for use with elevators. Allows USBL acoustic release, replaces old LBL transponders.
- New Alvin elevator with syntactic foam floatation

