
DORADO AUV INSTALLATION RECOMMENDATIONS

Summary

After discussions with the ship's chief mate and electronics technicians, the Falkor appears quite suitable to integration with the MBARI Mapping AUV flyaway system. There are ample connection points servicing power required for the charging stations contained within the 20FT AUV shipping container. The proposed installation of the van will have to be on the former helicopter deck, now known as the storage deck. Since the ROV will also be onboard for this cruise, the more available deck location and accommodating crane are on the starboard side of the main deck. There is ample power for powering vans on the storage deck.

Deck Placement

As mentioned, the container for the AUV can be placed on the storage deck, as shown in Figure 5. The aft railing of the deck can be removed for full insertion or extraction of the AUV for service if required at sea. There is a major electrical junction box on this deck that could facilitate the connection of power. The main ROV power transformer also exist in a port 20 foot container on the port side, and has wiring pass-throughs to lower decks. The ship has 3-phase 480VAC in 50Hz (direct from generator) and 3-phase 480VAC in 60Hz through a frequency converter. The 50Hz is less clean than the 60Hz power, both are available for the expected loads the van requires.

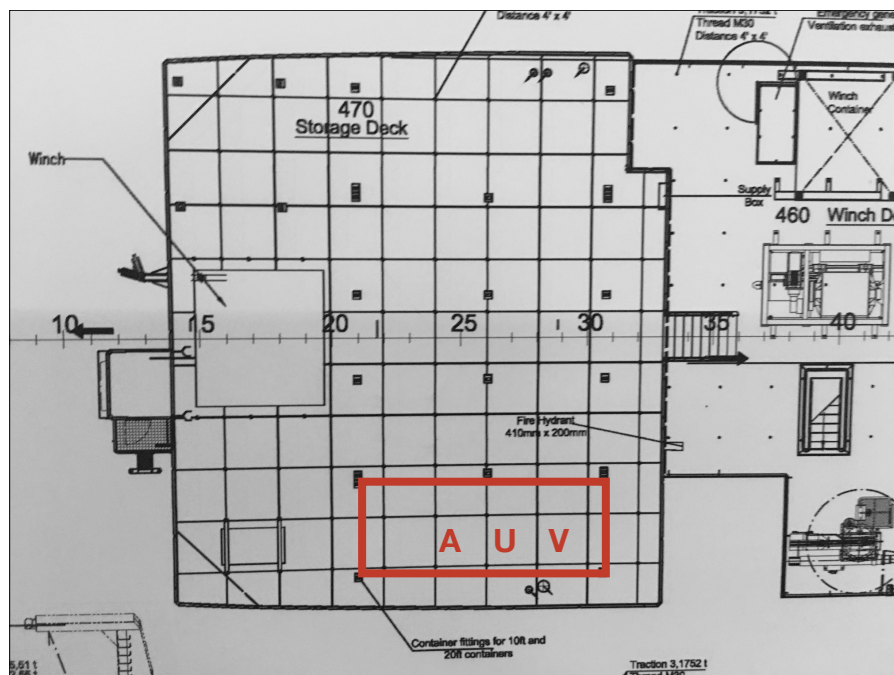


Figure 5: Suggested AUV van placement on the Storage Deck (4).



Figure 6: Panoramic view of the proposed van location taken from the starboard/aft corner of the storage deck.

The AUV itself will have to occupy space on the main deck, starboard side. The port side has a smaller knuckle crane, but it also crowded by a j-frame and soft line winch that will likely remain. The ROV dominates use of the aft a-frame. Starboard will suit fine, but will present some challenge in lifting the AUV and maneuvering overboard. The clearance between the base of the crane and the aft bulkhead of the storage deck is roughly 14-feet. In this configuration I estimate that 60-feet of cable is required to span the distance from the starboard crane bas to the top of the van in its proposed location.

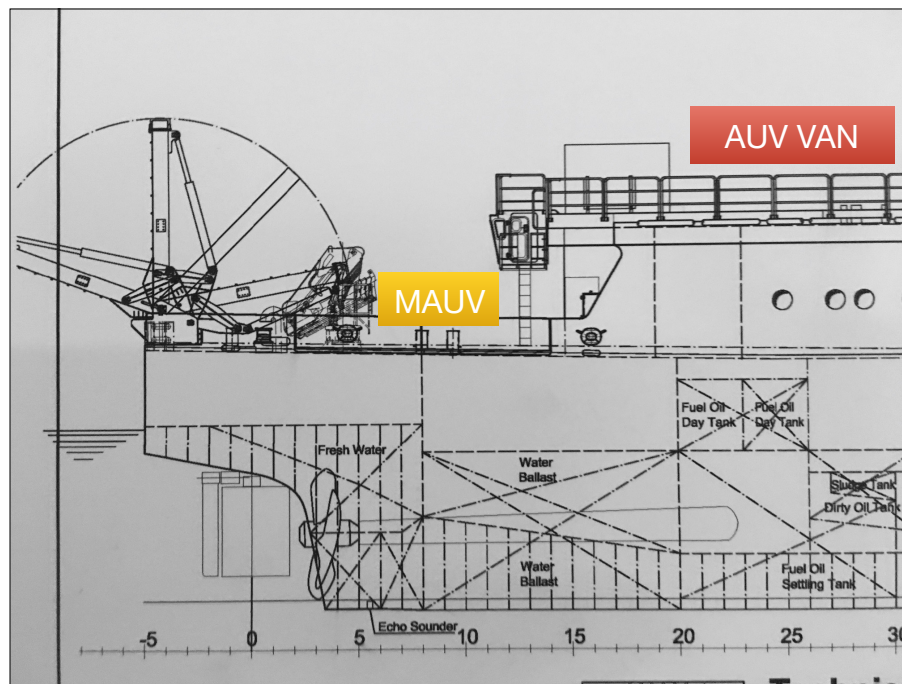


Figure 7: Suggested Placement of AUV system assets on the Storage Deck (4) and Main Deck (3).



Figure 8: Panoramic photo of the main deck, facing starboard.

Launch & Recovery

At present the chief's mate has identified that they no longer have and capture heads for the knuckle cranes aboard the ship. They do have a frame used for Sentry and Nereus deck operations, and it is designed to hand from the a-frame. The ROV's presence on the deck prevents use of this apparatus. It is likely that MBARI will have to arrange for a capture head of its own to adapt to the starboard crane for safe launch and recovery. Discussion with the ship's mates left open options to use small boats for recovery and launch. They are willing to attempt recovery in the style of the Rachel Carson, as well.

The crane has a 250 kNm lifting capacity, the outreach lifting capacity is listed in the table below:

Extension	Capacity
5.0 m	4.26 metric tons
6.7 m	3.11 metric tons
10.0 m	2.03 metric tons
11.8 m	1.74 metric tons



Figure 9: Starboard crane head.

Ship Support Systems

USBL Tracking

The R/V Falkor is operating 6G USBL tracking using Ranger2v4.04.01. Tracking of the ROV during the dive was not very consistent, but acceptable for a 4300-m dive. They have a 1-PPS and ZDA input to the NSH, separate from the 1-PPS system used for the Sprint+DVL. Further inspection of the NSH shows many available ports: 3x RS-232, 1x RS-485. Hopefully, these can be used for SMS commands to Dorado AvTrak beacons, and AMT releases.

Vessel GPS & Gyro

Both are available on the network as UDP broadcast from centralized Moxa terminal servers.

Radio Direction Finder

The bridge operates a RDF unit using a Simrad Taiyo ADDF TD-L1630. A unit similar if not identical to those on MBARI vessel.



Unused Transducers

I was not able to obtain details about the excess transducers that are hull mounted. There are two that were installed to support acoustic communications for Nereus and Sentry, so we should contact Woods Hole for more information.

Summary

The R/V Falkor seems well equipped for AUV operations. Major follow up tasks include: determination of a capture head solution for the starboard crane if possible, power cable purchase for the van, and identification and compatibility of the hull mounted transducers.

BUDGET

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Description	Quantity	Unit Price	Cost
Item 1	55	\$ 100	\$ 5,500
Item 2	13	\$ 90	\$ 1,170
Item 3	25	\$ 50	\$ 1,250
Total			\$ 7,920
