



Glosten

PROJECT MEMORANDUM

Status Update - Jumbo Piston Coring

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TO: Chris Chuhran, Leidos
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JOB/FILE NO. 19136.01

References

1. *Sea Change: 2015-2025 Decadal Survey of Ocean Sciences*, The National Research Council of the National Academies, 2015.
2. Caron, C. (memo) [Glosten], “3 September 2020 Meeting Minutes,” 3 September 2020.
3. Caron, C. (memo) [Glosten], “10 September 2020 Meeting Minutes,” 10 September 2020.

Background

The goal of this effort is to establish a process and requirements list for supporting piston cores 40 to 50 meters in length, colloquially known as Jumbo Piston Coring (JPC), onboard the Antarctic Research Vessel (ARV) under design.

Reference 1 details broad scientific research goals defined by the National Academies of Science. JPC operations are required to meet most of the science goals, revealing the importance of this capability to the science community. A group of scientists including past and present leaders of the marine sediment science community were convened on two occasions to share their practical input on how to best integrate JPC capability into the ARV vessel design.

Process and Requirements Definition

The directions and ideas culled from a series of interviews with Coring Science Representatives from the University-National Oceanographic Laboratory System (UNOLS), References 1 and 3, are used as the basis for the following requirements listed in Table 1. The requirements are broken into broad subject areas, numbered for reference, and sequenced within each subject area in order of importance to the science team. The subject areas are defined as follows:

GA – General Arrangement – applicable to the broader vessel design and layout

Winch – applicable to winch system capabilities

JPC – Jumbo Piston Coring – applicable to the JPC system in particular

Table 1 Requirements for JPC on ARV

Category	ID	Importance	Requirement
GA	1	High	Straight side rail very important for coring operations
GA	2	High	Ability to route cable astern and to starboard
GA	3	High	Dynamic positioning important, ABS DP-1 minimum
GA	4	High	12' empty space required from forward of weight stand forward
GA	5	High	6' empty space required aft of distal end (cutter end) aft once fully onboarded
GA	6	Medium	Deck space for five to six lab / refrigerated storage vans
GA	7	Medium	Minimum crane lift requirement should be loaded reefer on crane (67,200 lbs)
Winch	1	High	Winch internal to ship
Winch	2	High	Traction winch with storage drums required
Winch	3	High	Cable breaking strength 100kip
Winch	4	High	7,000m cable min, 10,000m target
Winch	5	Medium	Winch spec'd out with 1" cable
JPC	1	High	50m length is important, 40m hard minimum
JPC	2	High	Core barrel heaters likely necessary: electric blankets or hot water system to keep core from freezing once out of the water
JPC	3	High	Keep it as simple as possible, to minimize maintenance costs
JPC	4	Medium	Minimum distance over rail for a-frame/boom - ~1m
JPC	5	Medium	Decoupled weight stand
JPC	6	Medium	Pipe flexibility when moving from vertical to horizontal is most dangerous part. Need to be able to handle that movement well
JPC	7	Medium	Slings and synchronized motors for core pivot
JPC	8	Medium	Hydraulic rollers on railing
JPC	9	Low	Protection at iceline for cable

Next Steps

Glosten will approach the USCG to investigate options for relief on onerous wet-handling gear requirements that supersede Class Regulations that are used by most of the rest of the world's research fleet. The USCG has not been amenable to this path in the past, but we are hopeful that, given the published importance of JPC capability to government agencies, the existing international standards available, and the ability to address USCG concerns at this early design stage, this will be successful.

After clarity is received from the USCG on the regulatory regime, the study will be completed with the development of the specification for the JPC. The preferred strategy indicated by the science group is to lay out the requirements in the specification and provide examples in a separate appendix of several JPC handling systems in use. This provides options for the selected shipyard to address the specification requirements in a manner that best suits the design and the yard's strengths.