

Engineering Change Request Form

Change Request No.: 1303-01050	Date: 4/30/2013	WBS:
Control Account Name: None	Configuration Manager: Wickman, Diana	Control Account Manager:

SECTION TO BE COMPLETED BY PERSON REQUESTING CHANGE:

Requestor: Sheri White **Telephone Number:** (508) 289-3740

Request Name (Include document number and revision level):

Station Papa Deployment and GSPP Waivers

Description of Change (Include all related systems):

This ECR requests a waiver on 1) the deployment of the Global Surface Piercing Profiler (GSPP) for the first deployment of the Station Papa Global Hybrid Profiler Mooring (GP02HYPM) and 2) two design requirements on the Rolls Royce SeaCycler Global Surface Piercing Profilers.

1) Deployment waivers

The requirements being temporarily waived are all of the requirements in Section 3.5.1.1 Global Surface-Piercing Profiler of the L3 CG requirements module:

L3-CG-RQ-527, L3-CG-RQ-524, L3-CG-RQ-526, L3-CG-RQ-199, L3-CG-RQ-528, L3-CG-RQ-200, L3-CG-RQ-201, L3-CG-RQ-202, L3-CG-RQ-530, L3-CG-RQ-204, L3-CG-RQ-205, L3-CG-RQ-206.

See attached spreadsheet for DOORS export of requirements to be waived.

The path forward with Contingency was approved by ECR 1303-01006 – Contingency Budget Request Global Surface Piercing Profiler (GSPP). Specifically, the Station Papa Global Hybrid Profiler Mooring will be deployed in 2013 with the refurbished SeaCycler GSPP that was used in AST2. Production GSPP units will be deployed at Station Papa and Irminger Sea in Summer 2014. Baseline date changes in the IMS for procurement were covered by ECR 1303-01006.

Other updates to the IMS associated with the delayed deployment are:

CG50106 “Build, Assemble & Test - Surface Piercing Profiler - Hybrid Profiler Mooring-(Station PAPA)”

- Break link to CG52294 “Ready for Integration - Mooring Platform Subassemblies- (Irminger Sea)”
- Link to new successor created by 1303-01024 “Papa O&M Cruise - MREFC I&T”

2) Rolls Royce SeaCycler GSPP design requirement waivers

L4-CG-PR-RQ-181 All structural and electrical cables on a profiler deployed at depths shallower than 1000 m shall be protected from fish bite.

L4-CG-PR-RQ-353 The Global surface piercing Profiler shall have the capability to reach the surface in conditions of winds up to 13 ms-1 and maximum wave heights of up to 4 meters.

Reason for Change:

1) Due to a delay in bringing the vendor under contract to provide the GSPPs for CGSN, there is not sufficient time to build a production unit to support the initial Global Station Papa Array deployment in Summer 2013. The prototype SeaCycler profiler (used for At Sea Test 2 – AST2) will be used for the initial Station Papa deployment.

2) The selected GSPP -- the SeaCycler from Rolls Royce -- does not meet all of the design requirements.

L4-CG-PR-RQ-181: A waiver is recommended in order to reduce schedule and cost impacts. The schedule impact is due a complete redesign of the system due to the type of the cable that has been implemented for profiling. The change in cable from a non-fish bite protected cable to a steel cable (fish bite protected) would require a change in the communication electronics, there will be a different cable diameter, material, weight and construction. The new communications technology is unproven and would require additional testing. The change in the weight of this cable would affect the buoyancy of the Mechanical Float and require further engineering design work and thorough testing to ensure proper operation. Another factor is that the fish bite risk is greatest at low latitudes, lower latitudes than those of any of the GSPP deployment sites. There is little documentation on the fish bite risk. One study (Berteaux and Prindle, 1987) noted that all historical instances of fish bite occurred between the latitudes of 40°N and 40°S with higher percentages of moorings bit closer to the equator. However, the Berteaux and Prindle (1987) study is limited by the small number of moorings deployed at high latitudes. The latitudes of the GSPP deployments are 42° S (Argentine basin), 55° S (Southern Pacific Ocean west of southern Chile), 60° N (Irminger Sea offshore of southern Greenland) and 50° N (Ocean Weather Station Papa in the Gulf of Alaska). □□

L4-CG-PR-RQ-353: The SeaCycler has functionality to determine if wave heights are excessive through an onboard computer which can abort the profile at an upper safe damage-free depth and store the data for upload on the next

successful surfacing. The "Wave Zone Defined" line is an estimate of SeaCyclers™ ability to surface under different wave heights. Analysis indicates that during complete surfacings (bringing the CTD to zero-meter water depth) it is possible in seas up to 2m. Surfacing under larger wave conditions usually forces the InstFloat (with CTD) to stop before reaching the surface to avoid excessive cable loading. This "Abort Profile" stop-depth is determined automatically by the SeaCycler™ control software based on SeaCyclers™ capabilities and user settings, which can be adjusted from shore. □

Benefit to OOI:

This temporary waiver is needed to allow the initial Global Hybrid Profiler Mooring to be deployed on schedule. The design requirements waivers are need to allow procurement of a commercial GSPP that can meet the program cost and schedule constraints.

Requestor Assessment of Impact to Control Account:

Scope:

There is no change in scope. The deployment of the GSPP on the Global Hybrid Profiler Mooring will be delayed, but all required GSPPs will be deployed before the end of the MREFC period.

Schedule:

The deployment of the first production GSPP will be delayed until Summer 2014.

Cost:

The is no change in cost associated with this waiver. Cost aspects of the GSPP procurement deployments were covered in ECR 1303-01006.

SECTION TO BE COMPLETED BY IO/SL CCB CHAIRPERSON:

Assessment of Impact to IO Project:

Master Schedule:

CG CCB: The first production GSPP will be deployed in Summer 2014.

Project Cost:

CG CCB: No change to cost.

Deliverables:

CG CCB: No change to deliverables.

Potential Impact to Science and Design / As-built Capability: CG CCB: No science impact. The full production GSPP will be deployed before the end of MREFC. The GSPP may not always reach the surface given the limitations of the technology and the requirement to avoid surfacing in hazardous conditions (L4-CG-PR-RQ-198). It should be noted that the L2 and L3 requirements related to reaching the surface in various conditions are objectives due to the immaturity of the technology; therefore the limitations on surfacing will not detract from meeting the high-level science requirements.

Percent Impact on WBS elements(s) selected: 0%		Percent Impact on OOI: 0%	
Contingency \$0		Contingency Schedule (weeks): 0	
Signature of CG CCB Chairperson: Sheri White (swhite@whoi.edu)		Date: 5/8/2013 1:30:00 PM	Board Determination: Approved
Signature of System CCB Chairperson: Ed Chapman (echapman@oceanleadership.org)		Date: 6/4/2013 2:00:00 PM	Board Determination: Approved
CERTIFICATION OF TECHNICAL DATA PACKAGE AND CONTROL SYSTEM UPDATE			
Signature of Configuration Manager: Diana Wickman (dwickman@whoi.edu)		Date: 6/14/2013 1:23:06 PM	Systems and Documentation Updated: Confirmed Complete

Attach supporting technical documentation and or additional comments as needed.

Change Request No.: 1303-01050**Request Name:** Station Papa Deployment and GSPP Waivers**ECR Comments**

#	Reviewer	Date Added	General Comment	Requestor Response	CCB Decision	Lien
1	Ed Chapman	5/1/2013	These questions relate to L4-CG-PR-RQ-353-- 1) Are waivers required for either the L3 or L2 parents of L4-CG-PR-RQ-353? 2) I don't know how frequently the waves at the the global locations are between 2 and 4 meters, but since we are not sampling all the way to the surface during those conditions there is at least some science impact. That impact should be described in the ECR. 3) Given the frequency with which the waves exceed 2ms, will the GSPP be able to store enough data such that nothing is lost prior to it finally being able to surface and transmit data?	Accept		
2	Steve Holford	5/7/2013	No comments.			
3	Ed Dever	5/8/2013	comment/question sent directly to requester	Accept		
4	Susan Banahan	6/4/2013	Agree with comment #1 regarding documenting the science impact.	Accept		

Change Request No.: 1303-01050**Request Name:** Station Papa Deployment and GSPP Waivers**ECR Vote (Highest Level Board: System)**

Title	Member Name	Delegate Name	Vote	Comment
Cyberinfrastructure (CI) COTR	Phil Ardunay		Approve	
Project Scientist	Jack Barth		Approve	
Field Operations Coordinator	Liz Caporelli		Approve	
Chief Systems Engineer	Ed Chapman		Approve	
Former teammate	Alan Chave		Approve	
Deputy PM	Bob Collier		Approve	
OOI Program Director/PI	Tim Cowles		Approve	
Project Manager	Mike Crowley		Approve	
Program Director/PI	John Delaney		Approve	
Systems Engineer (PNW)	Ed Dever		Approve	
Principal Investigator	Scott Glenn		Approve	
COTR - Associate Project Manager RSN	Paul Hagstrom		Approve	
Project Management	Brian Ittig		Approve	
OOI Endurance Operations Manager	Tom Kearney		Approve	
Project Scientist	Deb Kelley		Approve	
Sr Project Manager	Mike Kelly		Approve	
Business Operations Manager	Ben Korin		Approve	
Program Manager and Chief Engineer	Paul Matthias	Sheri White	Approve	
COTR - Associate Project Manager EPE	Andrea McCurdy		Approve	
Senior Systems Engineer	Chuck McGuire		Approve	
Associate Director	Michael Mulvihill		Approve	
Principal Investigator for CI	John Orcutt		Approve	
Project Scientist	Al Plueddemann		Approve	
CGSN and EA COTR	Greg Settle		Approve	
Observatory Director	Julie Thomas		Approve	
Co-Principal Investigator	John Trowbridge		Approve	

Deputy Principal Investigator	Frank Vernon		Approve	
Program Director/PI	Bob Weller		Approve	
Lead System Engineer	Sheri White		Approve	
System Engineer	Joe Wieclawek		Approve	
Quality & Safety Manager	Michael Zernick		Approve	

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ECR Liens/Action Items

Lien	Due Date	Complete	Completion Date
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Action Item	Due Date	Complete	Cancel	Completion Date
Mark the Verification Status for the L3/L4 requirements as "Waived" in DOORS and add a description in the verification details column. (S. White, K. Carr, E. Dever)	5/27/2013	Yes	No	6/14/2013
Update "Approved Waiver-CM" attribute for affected L3/L4 requirement(s) in DOORS with the ECR number of the approved Waiver. (S. White, K. Carr, E. Dever)	5/27/2013	Yes	No	6/14/2013
Baseline L3 CG System Requirements module	6/28/2013	No	Yes	
Baseline L4 CG module	6/28/2013	Yes	No	6/14/2013

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ECR Meeting Results and Notes

Board Level	Meeting Date	Meeting Name	Meeting Result	Meeting Notes
CG	5/8/2013	CG CCB 2013-05-08	Approved	
System	6/4/2013	2013-06-04 System Level CCB	Approved	Jun 14, 2013: Due to NSF directed changes to the commissioning process, the deployment waiver portion of this ECR is no longer applicable. The ECR is effectively only for the L4 requirements waivers and not the deployment waiver.