**CP4O – Cryosat Plus 4 Oceans**

**Mid Term Review – Guidance Note for Review from Expert Group – Version 2**

# Introduction to CP4O

Cryosat Plus for Oceans is a 24-month project, initiated by ESA[[1]](#footnote-2), supported by CNES, which will generate and evaluate new methods and products to support applications of Cryoat-2 data over the oceans, taking advantage of the new capabilities of the SIRAL SAR/SARin mode altimeter carried by Cryosat-2.

The CP4O project is now approaching its Mid-Term Review at which the progress will be assessed, and the plans for the second period re-evaluated and revised as necessary. This is an appropriate stage to invite experts to review key material and provide advice and recommendations on how to take this work forward.

# Project Status and Requested Expert Group Input

A Group of Experts has been constituted by invitation and comprises:

Walter Smith - NOAA, USA  
Natalia Galin - NOAA/UCL, USA/UK   
Katharine Giles – UCL, UK (in memory, invited before her tragic accident)   
Keith Raney - 2kR-LLC, USA  
Laurent Phalippou –Thales Alenia Space, France  
Rob Cullen – ESA   
Xiaoli Deng -Newcastle Univ, AUS

We are asking the Expert Group to review two of the CP4O Work Packages:

**Work Package 2000 – “Preliminary Analysis of the State of the Art”**

This Work Package provides a review of the state of the art for SAR altimetry and Cryosat -2 products and an overview of plans for developing and validating new products in WP4000 of the project. WP2000 is now almost completed, pending the final compilation of some material and the provision, review and acceptance of the two deliverables, the “Preliminary Analysis Report” (D2.1), and the “Development and Validation Plan” (D2.2).

**Work Package 4000 – “Product Development and Validation”**

Within this activity the CP4O team is developing and validating test products under the following themes:

* Low Rate Mode, Open Ocean
* SAR mode and “RDSAR” mode – Open Ocean
* SAR mode – Coastal Ocean
* SARIN mode – Coastal Ocean
* SAR mode – Polar Ocean
* SAR mode – Sea Floor Topography.

This work package started early in 2013 and is due to complete in November 2013. For each products, two documents will be produced: An “Algorithm and Theoretical Basis Document”, and a “Product Validation Report”. At this stage draft documents for some of the themes will be available. For some themes the work is not yet at a sufficiently mature stage for review.

*Please note that the intended approach for this Work Package is for separate organisations to develop, evaluate and iterate their own processing schemes independently. At the end of this Work Package each organisation will then produce a validation data set, produced according to some agreed specifications, which will be used as input to the next stage. These validation data sets will then be inter-compared and assessed for their capability to provide improved oceanographic measurements.*

**Material for Review**

To support the review we will provide the complete deliverables for WP2000: D2.1 and D2.2, and draft deliverables for selected activities within WP4000. In addition some of the presentations in the SAR Altimetry Expert Workshop will include results from this work.

Table 1 lists the WP2000 and WP4000 activities and deliverables. We will only be asking for a review for which draft documents are available, marked with an ‘X’. Where there will be a relevant presentation in the SAR Altimetry Expert Workshop, this is indicated in the last column.

These presentations will be made available for download in pdf format at:

<http://www.satoc.eu/projects/CP4O/MidTermReview.html>

*Table 1 CP4O deliverables / reports to be reviewed by the Expert Group*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Who** | **Documents to be Reviewed** | | **Relevant Presentation at MTR** |
| **WP2000** |  | **Preliminary Analysis Review** | **Development & Validation Plan** |  |
| Preliminary Analysis of the State of the Art | TU Delft | X | X |  |
| **WP4000 – Product Development and Validation** |  | **Draft ATBD** | **Draft PVR** |  |
| LRM for Open Ocean (RADS) | TU Delft |  |  | Naeije |
| SAR for Open Ocean / SAMOSA retracker | Starlab/NOC |  |  | Gommenginger et al. |
| SAR for Open Ocean / CLS,CNES re-tracker | CLS | X | X | Moreau |
| RDSAR for Open Ocean CNES/CLS SAR reduction algorithm | CLS | X | X | Moreau |
| SAR for Coastal Ocean | NOC |  |  | Gommenginger et al. |
| SAR for Sea Floor Mapping | DTU Space |  |  | Andersen |
| SAR for Polar Ocean | DTU Space |  |  | Andersen & Stenseng |
| SARIN for Coastal Ocean | isardSAT |  |  | Garcia |
| Wet tropo Corrections | U Porto | X (provided as a single document) | | Fernandes |
| Ionospheric Corrections | Noveltis | X | X | Cancet |
| Regional Tides | Noveltis | X | X | Cancet |
| Other Geophys corrections | TU Delft |  |  | Naeije |

**Requested Expert Group Input**

We are requesting an expert scientific review on the approach taken, and for recommendations on how best to take the work in CP4O forward. We are not asking the experts to contribute to the formal process of accepting or rejecting the deliverables. To support these aims we suggest that the experts could consider the following questions:

**WP2000**

* Does the “Preliminary Analysis Report” (D2.1) provide a complete analysis of the state of the art for SAR altimetry as it was on the reference date of October 2012?
* Are there any clear gaps or inaccuracies?
* Does the Development and Validation Plan (D2.2) provide a clear definition of the products to be developed and the approach to be taken?

**WP4000**

For each of the activities / products listed in the table above

* Is the theoretical basis sound?
* Is the source data set and processing approach sensible?
* Is the time period and geographical extent of the demonstration data set appropriate?
* Are the validation technique and data sets suitable?

**General Questions**

   - Do you have any changes to suggest in the products being developed and the validation approach being applied (bearing in mind finite resources of project)?

 - Are there any potentially important products / applications not being covered?

Please note that we will welcome any expressions of interest in collaborating more closely with the project, for example in confronting output data and discussions on theoretical and empirical approaches.

*David Cotton, SatOC: CP4O Project Manager*

*Jérôme Benveniste, ESRIN: ESA Scientific Officer for CP4O*

1. Under the Support To Science Element (STSE) of the Envelope Programme [↑](#footnote-ref-2)