Surface Water and Ocean Topography (SWOT) Mission

Science Definition Team Meeting
Toulouse, July 7, 2015

NASA / CNES Program Status

Eric Lindstrom, NASA Headquarters
Selma Cherchali, CNES Headquarters
CNES Mission Status

- SMOS (soil moisture and ocean salinity) extent to 2017
  ♦ Excellent results

- Altika-SARAL (launched in February 2013)
  ♦ Very good science results thanks to the improvements provided by Ka band radar instrument (better signal to noise ratio, greater along track resolution)
    - First results presented in a Marine Geodesy specific edition gathering 46 papers addressing ocean, hydrology and ice results
  ♦ Anomaly encountered on a platform reaction wheel, potential impact on ground track maintenance capacity, workaround under analysis

- Jason-3 launch set for 8/8/15 at Vandenburg AFB has been postponed while the recent fault with Falcon-9 rocket is studied.

- CFOSAT : new instrument concept dedicated to wave spectrum and direction measurement (SWIM) combined with a scatterometer (SCAT)
  ♦ Cooperation between France and China
  ♦ On track for a 2018 launch
  ♦ Data policy under discussion between partners
NASA Physical Oceanography Mission Status

- Aquarius/SAC-D had a mission-ending hardware failure on 8 June. The mission has entered an ~18 month phase to complete data processing. (Version 4 this summer and Version 5 next year)

- Surface salinity processing continues with data from the SMAP mission (launched January 2015) as an Aquarius team project (SMAP itself has no ocean requirements).

- Jason-3 launch set for 8/8/15 at Vandenburg AFB has been postponed while the recent fault with Falcon-9 rocket is studied.

- Rapidscat is encountering some engineering challenges with increased torques in the antenna spin mechanism (same issue that brought the end of Quikscat antenna rotation in 2009).

- Ku-band Cross-calibration of Quikscat with Rapidscat has been completed and Quikscat mission will be terminated in October 2015.
SWOT at Le Bourget

J.Y Le Gall & J.J Dordain
## MAJOR CNES program achievements

<table>
<thead>
<tr>
<th>EVENT</th>
<th>Date</th>
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<tbody>
<tr>
<td>Phase B Authorization to proceed (FEP de Phase B)</td>
<td>Dec. 2014</td>
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<tr>
<td>SWOT S/L signature with Minister Geneviève FIORAZO</td>
<td>January 2015</td>
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<td>TOSCA/ ROSES Call</td>
<td>May 2015</td>
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<td>Extension of the call to South American Partners Program Telecon</td>
<td>Mid June 2015</td>
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## SWOT CNES PHASE B RESOURCES

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<tr>
<th>SWOT Phase B Budget (w/o CNES H.R)</th>
<th>CNES ONLY HUMAN RESOURCES (Total)</th>
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<tr>
<td>69 M€</td>
<td>70 FTE</td>
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<tr>
<th>GLOBAL INDUSTRY SUPPORT FTE’s for Phase B</th>
<th>RFU ONLY FTE’s for Phase B</th>
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<td>&gt; 170</td>
<td>&gt; 60</td>
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(Phase C/D budget preparation discussed in the frame of the Program Preparation for the Board Of Administrators)
NASA/ CNES PHASING/ SYNCHRONIZATION

NASA SCHEDULE

- 2012 - 2012 NASA Pre Phase A
- 2012 - 2014 NASA Phase A
- 2014 - 2016 NASA Phase B
- 2016 - 2016 NASA Phase C/D

01/01/2012
- NASA MCR septembre 12
- NASA SRR octobre 13
- NASA MDR mai 14
- NASA PDR janvier 16

2013
- mars 13 Phase A review
- janv. 15 Kick Off Satellite
- 2015 System Interface Review

2014
- mai 2014 Signature IA
- juin 14 KdP B

2015
- mai 16 KdP C Implementation Authorization

31/12/2016

CNES SCHEDULE

- 2012 - 2013 Phase A Study
- 2013 - 2014 Phase B1 Study
- 2014 - 2016 Phase B2
- 2016 - 2016 CNES Phase C/D

01/01/2012
- BoA CNES IA Approval mars 2014
- BoA CNES Program Authorization avril 16

31/12/2016

SWOT SDT Meeting July 2015
NASA Overall Budget Status

- Obama Administration FY16 budget provides new mandate to NASA Earth Science for all civilian remote sensing except for weather and space weather (which remain at NOAA).

- NASA will now be primary USA partner on two Jason-CS/Sentinel-6/Altimetry Follow-on missions (LRD ~2020 and ~2025). NASA recently expressed full support for these missions in a letter ahead of the EUMETSAT Council.

- FY16 Appropriations actions in the US Congress have caused a great deal of community concern. House appropriations made a major cut to NASA Earth Science. Senate mark is just short of the President’s request. We expect the Senate mark to prevail.

- Appropriations may not be passed by end of September so we must consider the idea of another government shutdown in October.
NASA / CNES SWOT Science Team Plans

- Science Definition Team continues through end of CY2015. This meeting in Toulouse is the fifth and final meeting of this team.

- A SWOT Science Team (details next slide) will be put in place by January 2016 and run through the end of CY19 (9 months prior to launch). Funding for this team in USA is double that of the SDT.
  - ($1.5M/yr → $3M/yr)

- In 2019 another competition is planned for ROSES / TOSCA to refresh the SWOT Science Team. Another doubling of funding is planned (and approved by NASA) for that team to run CY20-CY23.
  - ($3M/yr → $6M/yr)
NASA / CNES Science Team Status

- Current SWOT Science Definition Team (SDT) : First meeting 28-30 January 2013 with all 38 PI teams. Now last meeting in July 2015 with work continuing through the end of the year.
- Now we have proposals for next phase – SWOT Science Team
- 110+ proposals to NASA and CNES and review processes underway. (CNES receives proposals from international partners India, Japan, Brazil, Peru, Colombia, Paraguay, ..)
- ROSES Review through end of September. Coordination on selection during October. **Start date of projects 1/1/16** (budget allowing)
- At NASA 67 proposals received covering hydrology (~20), oceanography (~39), and remote sensing science (of ice, vegetation, estuaries, etc ~8).
- NASA selection of 15-20 likely.
- At CNES 36 proposals received covering hydrology (14), oceanography (17), and transverse projects (5)
Rio SWOT-South American Hydro Meeting
May 12th and 13th

- To allow the involvement of the South American partners - TOSCA-SWOT call extent to mid June
  - 6 projects received

- IRD, CNES and AEB with partners (CPRM, INPE, ANA, UEA – université de l’Etat de l’Amazonas, UnB – université fédérale de Brasilia -, …) will organize a seminar by November 2015 in Brasilia
AirSWOT – A NASA HQ perspective

• NASA took the decision to fund AirSWOT through the SWOT Project at JPL. As such its primary mission is to support the development of the mission as opposed to servicing “independent” science campaigns.

• Once there is a proven and well-understood AirSWOT capability there is likely to be demand for AirSWOT that outstrips the capacity of the SWOT Project to deliver AirSWOT for scientific inquiry.

• NASA HQ needs a plan for AirSWOT utilization and governance to justify the expansion of resources and capacity for the science campaigns that exceed the basic level of support built into the mission budget.

• Can the SDT and SWOT Project deliver such a plan this year?
The Science Definition Team is a select group of US/France/Canada scientists assembled to work with the SWOT Project to integrate science into the final spacecraft and mission design – *designs that will be rolled-out and confirmed in early 2016*.

The SDT formalizes the interaction between scientists and program/project team:
- To take into account the science requirements in the mission design
- To analyze the evolution of those requirements
- To make trade-off according to the maximum science needs and requirements in a constrained technical and budget framework
- To take key decisions for the success of the mission jointly

*NASA and CNES need the full attention and cooperation of the SDT members as we head to PDR!*
CNES Outreach activities

- A specific CNES Mag dedicated to Climate with a focus to SWOT mission (some examples available)

- For Le Bourget, SWOT brochure was made (some examples available in French)

- During this last SDT meeting, our partner Thierry Gentet from MIRA production will make some interviews, so please be cooperative and enthusiastic!!

- Its for the promotion of SWOT mission and its measurements!