

**PSTG SAR Coordination Working Group  
2<sup>nd</sup> Meeting  
CNES Paris, France  
21 May 2013**

**Meeting Summary**

The second meeting of the Polar Space Task Group (PSTG) Synthetic Aperture Radar (SAR) Coordination Working Group (henceforth: SAR Coordination WG) was held on the premises of CNES Headquarters in Paris, France, preceding PSTG-3 (22-23 May 2013). Annex I has the Agenda, Annex III the list of participants, consisting mainly of Space Agency representatives in charge of SAR missions. Annex II lists all Actions agreed at the meeting.

The SAR Coordination WG is tasked with requests for coordinated acquisition, dissemination, processing and analysis of satellite-based SAR data in response to requests by the user community solicited through PSTG.

**1. Opening and Welcoming remarks**

Y. Crevier opened the meeting and welcomed all participants. He identified the key elements to be addressed by this session: housekeeping issues (agreement on Terms of Reference, discussion of SAR Coordination WG Action status), appraisal of coordinated acquisition of imagery over the ice sheets and discussion on their continuation, and bilateral and multilateral arrangements required for the Group to do its work.

Steven Hosford welcomed all participants on behalf of CNES. He apologized for the inconvenience of not being able to meet at CNES HQ itself due to an unexpected non-availability of the meeting room.

Mark Drinkwater recognized the tremendous efforts involved in the coordinated acquisition of SAR imagery in response to consolidated ice sheet community requirements. He thanked Bernd Scheuchl for his work in bringing together this community which clearly helped driving concerted acquisition planning. This process should serve as an example for the way PSTG and its SAR Coordination WG can respond to consolidated, broadly agreed requirements also from other polar and cryospheric science communities, with tangible results. A set of presentations on such scientific requirements (e.g., on permafrost) is on the agenda of PSTG-3.

The provisional agenda was adopted.

**2. Review of Actions (Secretariat)**

The status of Actions from SAR-CWG-1 was updated. The full list of updated and new Actions is available in Annex I.

Participants stressed that broad availability of datasets acquired on behalf of PSTG was a necessity. Facilitated data access through simple interoperable access points which would reduce multiple registering, licensing and reporting duties by science users vis-à-vis individual agencies should be encouraged, and generic data formats should be used. This is one of the CNES priorities in the CEOS context when assuming the chairmanship of SIT in 2014/2015.

**3. Terms of Reference (Crevier)**

The WG discussed the Terms of Reference proposed by Y. Crevier. P. Potin asked whether the timing of the proposed work plan was correct and whether it was intended to describe all activities laid down in the Terms. Y. Crevier agreed that the language should be corrected in that a three-year work plan for the Group should be developed by June 2013, and that it should be reviewed

annually. It was agreed to circulate the amended Terms of Reference to all invitees of SAR CWG-2, for commenting and subsequent adoption by the end of the month (ACTION SAR CWG-2.5).

**ACTION SAR CWG-2.1: All SAR CWG-2 invitees to review revised Group Terms of Reference for adoption (deadline: 31 May 2013)**

**4. Ice Sheet Monitoring Project**

User perspective (B. Scheuchl)

B. Scheuchl acknowledged the substantial accomplishments of RADARSAT-1 and recalled currently funded large-scale ice sheet monitoring projects; significant user interest in ice sheet-related products has been recorded (such as from MEaSURES). He noted that all but one mission having contributed to the IPY Velocity Map for Antarctica were no longer operational; however there are new contributions made by TerraSAR-X and CSM.

He described the iterative process that had led to a mature requirements document (PSTG-3 doc. 08-02-02) supported by the scientific ice sheet community; preliminary versions were presented to PSTG-2 and SAR CWG-1; doing so is recommended as best practice such that each side (agencies and users) understands what information is needed and what constraints and limitations exist.

Details on the status of RADARSAT-1 acquisition over Greenland in response to PSTG action over the past five months were shown, noting essential support by NSC and KSAT for data acquisition and reception. Over Greenland, interferometric coverage yielded coast-to-coast tracks, with 32 triplets in three consecutive acquisitions, six 24-day pairs, eight 48 day pairs and three strips with no interferometric coverage (total satellite on time: 209 minutes). Some mode conflicts were described in coastal regions of Greenland (overlapping with service requirements). Over Antarctica, RADARSAT-2 acquisitions (right-looking interferometric SAR) have led to good coverage of Antarctica except for the innermost areas, with many three- and two-fold consecutive acquisitions now available. Acquisitions continue in support of the ongoing Pine Island/Thwaites Glacier area campaign.

It was noted that Svalbard covered only by single acquisition lines from RADARSAT-1, however, these may be usefully complemented by acquisitions from RADARSAT-2 (given the end of lifetime of RADARSAT-1 on 29 April 2013).

**ACTION SAR CWG-2.2: Investigate complementing single RADARSAT-1 acquisition dataset for Svalbard with acquisitions from RADARSAT-2 (Lead: B. Scheuchl and Y. Crevier; deadline: 1 October 2013)**

As for the discussion in which format the data have been acquired by KSAT and what formats can be assimilated in the ASF/NASA processor, clarification is needed.

**ACTION SAR CWG-2.3: E. Herland, Y. Crevier and B. Scheuchl to identify the data format KSAT is providing, and confirm subsequent processing with ASF/NASA, CSA. (deadline: 1 November 2013)**

The meeting noted that RADARSAT-1 data acquisition, processing and transmission to ASF/NASA and CSA was under NSC responsibility, and was using the FRED data format. No formal agreements between NSC and NASA were necessary for the exchange of these data. CSA would require an exchange of letters, authorizing ASF/NASA to process data. E. Herland stressed that any datasets resulting of this work should be made freely available. Recently MDA agreed in a letter to disseminate the RADARSAT-1 and RADARSAT-2 acquired over the past five months,

under the auspices of the PSTG SAR CWG for scientific use globally. This move was much appreciated by the Group.

For simplifying the registration, licensing and reporting duties of scientific data users, measures should be put in place e.g., to make data catalogues interoperable, and to agree on commonalities in Announcements of Opportunity.

#### Acquisition plans and activities using TerraSAR-X and TanDEM-X (D. Floricioiu)

D. Floricioiu provided an update on TerraSAR-X and TanDEM-X data acquisition over the ice sheets. Both missions provide key contributions to mapping and monitoring ice sheets. Regarding TerraSAR-X, new acquisition modi are in test with higher resolution and larger swath width that could be used in support of snow monitoring needs. She presented of the status of science projects started at IPY STG SAR initiative using TerraSAR-X:

- monitoring the ice velocity of 24 Greenland outlet glaciers;
- background acquisitions over Antarctic ice shelves and glaciers;
- ice dynamics over the Recovery glacier system and the Transantarctic Mountains.

As for TanDEM-X, in February 2013 first and second global DEM acquisitions were finalized including one coverage of the Antarctic Peninsula. An Antarctica campaign started on 29 April 2013 and foresees the acquisition of first TanDEM-X coverage of the entire continent (including areas South of 81°S in left-looking mode) until 4 July 2013. She showed land coherence maps based on single baseline-processed TanDEM-X acquisitions, with low correlation over complex terrain, sand deserts and in the dry snow zone of Greenland. Data acquisitions were performed over super test sites relevant for glaciology on the Antarctic Peninsula, Greenland and sea ice in the Arctic ocean with more than 50 datatakes per site since 1 June 2011.

#### Sentinel High Level Operations Plan and Sentinel-1 (P. Potin)

P. Potin described the Sentinel High Level Operations Plan (ref. PSTG-3/Doc. 08-04-02) and its status, and provided detail on the Sentinel-1 high-level acquisition concept, described a preliminary Sentinel-1 observation scenario for the first six months of the ramp-up phase, and made a conflict analysis and planned observation campaigns over Greenland and Antarctica during this timeframe. The Sentinel HLOP is a paper to be approved by ESA Member States, which implements in priority the requirements from the GMES services (e.g., MyOcean) and from the ESA and EU member states. Other data acquisitions requirements are implemented on a best efforts basis. The Sentinel operations are pending confirmation of related EU funding.

The default SAR modes used by Sentinel-1 are the interferometric wide swath mode and the extra wide swath mode (plus the Wave mode over the open oceans). The stripmap mode is not planned to be extensively used; the (C-band) data acquired is aimed to serve a wide range of applications. He described the process for collecting and implementing the Sentinel-1 observation requirements which are under development, sourcing from service and government requirements, as well as from scientific users and international initiatives. PSTG is recognized as a mechanism to support international cooperation for the implementation of these cryosphere observation requirements.

In support of ice sheet monitoring, P. Potin outlined some initial, preliminary acquisition scenarios over Europe and outside (e.g. Southern Ocean, Arctic and Canada), with the objective to best reconcile service requirements for the oceans (e.g., sea-ice monitoring from MyOcean), and scientific requirements from the ice sheet community: there are some areas of conflicting requirements especially for coverage of the coastal areas, for which different acquisition modes are needed and switching from one mode to the other leads to 2.4s interruption, equivalent to 17km along track. Over land, it is planned to systematically use the same polarization scheme for a given area, to guarantee data in the same conditions for routine operational services and allow frequent InSAR. The default mode over land would be interferometric wide swath (IW). He concluded that

based on the preliminary analysis one, possibly two ice sheet monitoring campaigns in IW could be undertaken in the first six months of Sentinel-1 lifetime, covering the whole of Greenland and some priority areas over Antarctica. The need for further discussions of these issues was stressed, and contributions by other SAR missions were considered mandatory to ensure full ice sheet coverage.

The results achieved by the RADARSAT campaign should be well documented and advertised, rendering follow-up support to PSTG by other missions easier.

**ACTION SAR CWG-2.4: Describe concisely what has been achieved in support of RADARSAT-2 ice sheet monitoring between Jan and May 2013 as a result of PSTG SARCWG coordination, and highlight the remaining gaps. (Lead: B Scheuchl; deadline: August 2013)**

**ACTION SAR CWG-2.5: Create a template for describing the various datasets that could be made available through an AO by agencies. (Lead: Y. Crevier; deadline: 1 November 2013)**

## 5. Bi- and Multilateral Agreements

Yves stated that such agreements were needed on a case-by-case basis and would need to be discussed in more detail at the next meeting if deemed necessary.

## 6. AOB

Y. Crevier introduced the planned ASAR Workshop 2013 hosted by CSA in Montreal 15-18 October 2013. A special session on the work of PSTG and SARCWG could be arranged for, provided sufficient interest by the Group. Participants were encouraged to indicate their interest to Yves by the end of the month. Current limitations on mission travel were noted, possibly limiting attendance.

**ACTION SAR CWG-2.6: Group to respond to Yves regarding interest for special session at ASAR Workshop, by 31 May.**

He further raised the possibility for the Group to respond to other sets of user requirements. M. Drinkwater stressed the need for a balanced approach that the Group address ice sheet as well as sea ice and other requirements that may arise in PSTG. Sea ice requirements would need further development capturing both scientific and operational perspectives, and John Falkingham, Secretariat of IICWG, would be a possibility for assisting in this process.

B. Scheuchl thanked the Group for paying substantial attention to ice sheet community requirements. The Chair commended the Group for its achievements within a short period of time, and stressed that the Group be open also other requirements.

The following additional Actions were identified:

**ACTION SAR CWG-2.7: Develop a distributed observation strategy among all SAR agencies in PSTG covering the cold spot list provided in doc. [PSTG-3 Doc 08-02-02](#) ("SAR Science Requirements for Ice Sheets") (Lead: A. Roth and F. Battazza; deadline: next PSTG SARCWG meeting)**

**ACTION SAR CWG-2.8: Draft a compendium paper describing collective datasets available (such an activity is ongoing within the Geohazard supersites concept, which then could be duplicated for a Polar Ice Sheet exploitation portal) (Lead: Y. Crevier and H. Laur); CNES (S. Hosford) to contribute concepts related to common access and licensing (deadline: 31 December 2013)**

**ACTION SAR CWG-2.9: Y. Crevier to draft a 3-year work plan for the Group (deadline: next PSTG SAR CWG meeting)**

**7. Meeting Wrap-Up**

The preliminary list of Action was agreed.

For date and place of the next SAR CWG meeting, several options were raised:

- Attached to PSTG-4 [with the caveat the the Group consider meeting in a staggered mode with respect to PSTG, to be able to more effectively respond to needs raised at PSTG]
- Attached to ASAR Montreal workshop in Oct 2013
- Find an occasion to engage JAXA, ASI
- NASA hosting in March 2014

Yves thanked all participants for contributing, and the Secretariat for assisting in the preparation of the meeting. He adjourned the meeting at 18.30.

**AGENDA of 2<sup>nd</sup> PSTG SAR Coordination Working Group Meeting**

**21 May 2013  
CNES HQ, Paris, France**

**Start: 21 May 2013, 13:30**

**End: 21 May 2013, 18:00**

	Item No	Item
13:30		Opening and Welcoming Remarks  CNES Mark Drinkwater Yves Crevier
13:35	1	Meeting Objectives and Approval of Agenda (Yves Crevier)
13:45	2	Review of Actions (Secretariat)\
14:00	3	Terms of Reference (Discussion and Approval) (Yves Crevier, All)
14:15	4	Ice Sheet Monitoring Project  Status and Consolidation of Imaging Activities (B. Scheuchl) Needs and Plans for Up-Coming Imaging Activities (B. Scheuchl, All) Discussion on Potential Contribution for Up-Coming Imaging (All)
15:30		<i>Break</i>
16:00	5	Bi- and Multi-Lateral Agreements (All)
17:00	6	AOB
17:30	7	Meeting Wrap-up (Actions and Next Meeting) (Secretariat)
18:00		<i>Adjourn</i>

**ACTIONS**

<u>ACTION SAR CWG-2.1:</u> All SAR CWG-2 invitees to review revised Group Terms of Reference for adoption (deadline: 31 May 2013)	OPEN
<u>ACTION SAR CWG-2.2:</u> Investigate complementing single RADARSAT-1 acquisition dataset for Svalbard with acquisitions from RADARSAT-2 (Lead: B. Scheuchl and Y. Crevier; deadline: 1 October 2013)	OPEN
<u>ACTION SAR CWG-2.3:</u> E. Herland, Y. Crevier and B. Scheuchl to identify the data format KSAT is providing, and confirm subsequent processing with ASF/NASA, CSA; deadline: 1 November 2013)	OPEN
<u>ACTION SAR CWG-2.4:</u> Describe concisely what has been achieved in support of RADARSAT-2 ice sheet monitoring between Jan and May 2013 as a result of PSTG SAR CWG coordination, and highlight the remaining gaps. (Lead: B Scheuchl; deadline: August 2013)	CLOSED; B Scheuchl reported to CSA and is working with Yves on a post-RADARSAT-2 eclipse campaign in Antarctica for the remainder of the year; consider closed as of 14 August 2013
<u>ACTION SAR CWG-2.5:</u> Create a template for describing the various datasets that could be made available through an AO by agencies. (Lead: Y. Crevier; deadline: 1 November 2013)	OPEN
<u>ACTION SAR CWG-2.6:</u> Group to respond to Yves regarding interest for special session at ASAR Workshop (deadline: 31 May 2013).	OPEN
<u>ACTION SAR CWG-2.7:</u> Develop a distributed observation strategy among all SAR agencies in PSTG covering the cold spot list provided in doc. PSTG-3_Doc_08-02-02 ("SAR Science Requirements for Ice Sheets") (Lead: A. Roth and F. Battazza; deadline: next PSTG SAR CWG meeting)	OPEN
<u>ACTION SAR CWG-2.8:</u> Draft a compendium paper describing collective datasets available (such an activity is ongoing within the Geohazard supersites concept, which then could be duplicated for a Polar Ice Sheet exploitation portal) (Lead: Y. Crevier and H. Laur); CNES (S. Hosford) to contribute concepts related to common access and licensing (deadline: 31 December 2013)	OPEN
<u>ACTION SAR CWG-2.9:</u> Y. Crevier to draft a 3-year work plan for the Group (deadline: next PSTG SAR CWG meeting)	OPEN
<u>ACTION SAR CWG-1.10:</u> Development and adoption by Agencies of a joint preamble to Announcements of Opportunity (including thematic science components to be addressed collectively) (Lead: Roth and Battazza, with Crevier contributing; Deadline: October 2013)	OPEN;

<p><u>ACTION SAR CWG-1.1:</u> Yves Crevier to circulate a revised SAR Coordination WG Terms of Reference to all participants. (Deadline: 15 Dec 2012)</p>	<p>CLOSED; done.</p>
<p><u>ACTION SAR CWG-1.2:</u> SAR Coordination WG to designate a Chair among its participants. (Lead: Crevier, Battazza; Co-Lead: Drinkwater; Deadline: 15 Dec 2012)</p>	<p>CLOSED; the Group and the PSTG Chair suggested Yves Crevier as Chair, who accepted.</p>
<p><u>ACTION SAR CWG-1.3:</u> Collect planning information to enable a decision by Norwegian Space Centre (NSC) on whether a direct downlink to RADARSAT-1 and potentially other contributions can be provided (Lead: Scheuchl, MDA; Deadline: 28 Nov 2012)</p>	<p>CLOSED; completed, planning information compiled, leading to R-1 campaign.</p>
<p><u>ACTION SAR CWG-1.4:</u> Explore options for resourcing data reception and processing, either within existing NSC-KSAT agreement, or by NASA (Lead: Crevier; Co-Leads: Herland, Rigby, Webb; Deadline: 3 Dec 2012)</p>	<p>CLOSED; initial progress made. Superseded by new Action SAR CWG-2.3.</p>
<p><u>ACTION SAR CWG-1.5:</u> Identify and confirm the list of “cold spots” to be monitored through a dense time series approach (Lead: Scheuchl; Deadline: 1 Dec 2012)</p>	<p>CLOSED; done through doc PSTG-3_Doc_08-02-02 ( “SAR Science Requirements for Ice Sheets” )</p>
<p><u>ACTION SAR CWG-1.6:</u> X-Band SAR missions to communicate their list of existing sites they are already covering through their current imaging activities (Lead: Roth, Floricioiu and Battazza; Deadline: 3 Dec 2012)</p>	<p>CLOSED; general list of sites provided by DLR through doc. PSTG-3_Doc_08-02-03 (“Time series of TerraSAR-X over selected polar sites”); ASI maintains a general interest in targeted acquisitions</p>
<p><u>ACTION SAR CWG-1.7:</u> Send consolidated list of “cold spots” to X-Band mission managers and request planning for dense time series image collection (Lead: Crevier; Co-Lead: Battazza, Roth, and Floricioiu; Deadline: 10 Dec 2012)</p>	<p>CLOSED; new Action SAR CWG-2.7.</p>
<p><u>ACTION SAR-WG-1.8:</u> Develop three detailed acquisition scenarios in response to the ice sheet community requirement for monitoring Antarctica, including (i) level of effort (e.g., number of scenes; data distribution and processing), (ii) downlinking options, (iii) delineation of scope (e.g., sea ice, coastal regions, ice sheet), (iv) timing options (immediate vs mid-term response). Lead: Rigby; Deadline: February 2013)</p>	<p>CLOSED; covered at PSTG-3.</p>
<p><u>ACTION SAR CWG-1.9:</u> – Prepare “white paper” on facilitated access to SAR data archives, to be submitted in advance of the next PSTG meeting (Lead: Laur; Deadline: 28 Feb 2013)</p>	<p>CLOSED; superseded by new Action SAR CWG-2.8.</p>



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