Space Task Group of the IPY Sub-Committee on Observations

Third session

5-6 May 2008, ESA-ESRIN, Frascati, Italy

Meeting Notes

1. Opening session

The third session of the Space Task Group of the IPY Sub-Committee on Observations (STG 3) was opened by Mark Drinkwater, Co-chair of the STG at 9:30 on Monday, 5 May 2008, at Room E, ESA/ESRIN in Frascati, Italy. He welcomed Dr Masanobu Shimada, representative of JAXA and Dr Fabrizio Battazza, representative of ASI who joined the STG. A list of Participants is given in Annex 1. Meeting participants noted the apologies sent by representatives of NASA, USGS, GEO and WCRP, and absence of information from representatives of BSNC, CMA, INPE, and Roshydromet. The meeting Agenda was approved with some additions as given in Annex 2.

Dr Henri Laur welcomed participants on behalf of ESA/ESRIN and made short introduction on the Agency activities.

2. Review minutes and actions of STG2 and SAR Coordination Workshop

The status of STG 2 Actions and Recommendations was reported by Eduard Sarukhanian. Most actions and recommendations had been implemented, with the remainder considered as ongoing. An updated list of Actions and Recommendations of STG 3, including those stemming from previous STG sessions, teleconferences and coordination meetings is given at the end of the Notes.

3. Status of IPY implementation (David Carlson/Eduard Sarukhanian)

E. Sarukhanian presented the status of IPY implementation (see Presentation 1 and Doc. 2) and distributed publication “The scope of science for the IPY 2007-2008” (WMO/TD – 1364). Meeting noted that the ICSU/WMO Joint Committee (JC) for IPY, its three Sub-Committees, including STG and IPY International Programme Office (IPO) worked actively to facilitate the implementation of IPY projects. International multidisciplinary marine expeditions were successfully conducted in July-September 2007 in the Arctic Ocean within IPY projects related to studies of physical and chemical oceanic processes, sea-ice properties and changes, physical and chemical interaction between atmosphere, sea-ice and ocean, marine geology and biology. One of the main achievements of these activities was the deployment (for the first time in history of Arctic Ocean studies) of 156 current meter moorings and arrays as well as a large number of new underwater and under-ice mobile observing facilities across the Arctic. IPY project “Climate of Antarctica and Southern Ocean (CASO)” (1st phase) was carried out in the Antarctic in January- March 2008.

IPY projects on land are implemented in both Polar Regions, carrying out the studies of atmospheric processes, glaciers and ice sheets, permafrost, hydrological cycle, as well as of the ecosystems, circumpolar human societies, etc. Studies of the polar atmosphere were intensified by the establishment of new Arctic international environmental observatory Tiksi, by modernization of equipment at several observing stations in the Arctic and Antarctica, by establishment of new Belgian manned station and deployment of new AWS in Antarctica.

IPY Sub-Committee on Data Policy identified that insufficient funding is available to sustain the IPY data and metadata collection. Also the present main deficiency is the lack of any formal system that allows quick, easy, and reliable discovery of IPY legacy data. In this connection it was noted that WMO Inter-commission Task Group (ITG) on IPY had meanwhile supported the proposal to

consider the Canadian ArcticNet Portal (http://www.polardata.ca) and its associated searchable metadata as an IPY portal.

ES also pointed out that another important legacy of the IPY will be to convert the burst of observational programmes into sustainable long-term research and monitoring capabilities. A roadmap that provides a way towards a creation of consolidated vision of IPY observing systems legacy is now in preparation by IPY Sub-Committee on Observations. To provide a high-level WMO partnership in the activities aimed to secure the IPY observing system legacy in close communications with operational agencies in the countries and international organizations that have a great interest in Polar Regions, the WMO intends to establish in near future the Executive Council Panel of Experts on Polar Observations, Research and Services.

4. Sustaining Arctic Observing Networks (Don Hinsman)

D. Hinsman discussed the second IPY workshop on Sustaining Arctic Observing Networks (SAON) (see Presentation 2) that was recently held in Edmonton, Canada. The goal of the three SAON workshops is to develop a set of recommendations on how to sustain Arctic-wide observing activities. J. Key noted that SAON will probably make recommendations to the Arctic Council as to where funding should go in support of sustaining the networks.

D.H. showed documented evidence of increased WMO data reporting as part of IPY. He stressed the strong need to implement existing, approved data infrastructures and standards.

DH also noted the approved Global Cryosphere Watch (GCW) initiative (see Agenda item 10), and reported the Canadian commitment to second an expert (B. Goodison) to WMO Secretariat to facilitate of the GCW development.

5. Report on IPY STG SAR Coordination Workshop (Yves Crevier/Ken Jezek)

Y. Crevier showed outcome of recent STG SAR Coordination Workshop (see Presentation 3). In total 13 organisations were represented at the meeting, including 6 space agencies, 3 ground segment operators, and others (incl. Canadian Federal IPY Secretariat). The meeting reviewed existing requirements for SAR acquisition, and Agencies strategic objectives that were in line with IPY Science Priorities. Current acquisition plans were noted at the meeting, which focused specifically on IPY. Specific constraints on capabilities were explained at the meeting by the individual Agencies, including the mission and ground segment capabilities.

The meeting focused the acquisition strategy on solving important scientific foci, filling gaps in coverage, and the need for interagency collaboration (since no single agency can do it all). Though outside the mandate of the STG, in the future context of GEOSS and virtual SAR constellations the meeting participants discussed of the need to plan for interoperability – such as by coordinating the centre frequencies of C-band and X-band missions.

The Coordination meeting participants agreed to focus on the following 4 themes:

- C-band coverage (3 day snapshots) for the Arctic Ocean during remainder of IPY;
- Winter pole to coast InSAR coverage of Antarctic at high resolution (3-4 consecutive cycles in ascending and descending orbits);
- Greenland and major ice fields of InSAR acquisition over 3-4 consecutive cycles of high res. in winter;
- Supersites (need identifying) – for overlapping C-, X-, and L-band coverage.

K. Jezek complemented the YC presentation by identifying the SAR acquisition templates and scientific drivers identified by GIIPSY (see Presentation 4). He identified the primary SAR requirements for Antarctica.

KJ noted that there are a number of challenges such as:

- how to assure data continuity between observations north and south of the 'pole hole' (e.g. beam selection),
- how do we propagate Antarctic ground control for orbit refinement,
- how to assemble a consistent set of velocity control points,
- where to allocate highest bandwidth SAR capabilities,
- at what Agency level should these questions be addressed, or is the data portfolio concept sufficient,
- can developments from the SAR Workshop be used to guide thinking on a high-res. optical workshop.

Action STG3-A1 – YC, HL, MG, FB, MS to establish plan (when/where/who) for a follow on meeting for SAR Mission Planners in autumn.

Action STG3-A2 – for KJ and MD to identify GIIPSY supersites (by end May), and transmit to SAR Agencies to focus high bandwidth X-band SAR acquisition plans (e.g. bipolar supersites).

The conclusion is that as a legacy of IPY – it has forced Space Agencies to think about how to coordinate their activities better. This coordinating mechanism should be continued subsequently beyond IPY. The Global Cryosphere Watch would provide a framework for how to continue this activity (see section 10).

YC recalled the response to STG–C1-A4. Radarsat-2 was commissioned at the end of April, 2008, and Radarsat-1 agreement for ASF data reception ceased. This prevents regular synoptic coverage of the Arctic. A letter addressed to Agencies concerned has been drafted and is planned to be send by end of May on behalf of IPY JC.

K. Jezek updated STG on GIIPSY activities since STG-2 (See Presentation 4).

6. Agency Reports on IPY Portfolio Developments

a. ASI COSMO-SkyMed Mission Status and AO Projects (Fabrizio Battazza)

F. Battazza presented the Status of COSMO-SkyMed, identified hereafter as CSK-Skymed (see Presentation 5). Two CSK satellites have now been launched successfully, with a third satellite to be launched this summer, and the fourth in 2009. Currently, ASI is close to completion of commissioning of CSK-1, and hundreds of images have been acquired with which to assess performance. The operation qualification phase now begins. Subsequent launches of 3rd and 4th satellite will allow for at least 3 years (5 years is the goal) of overlapping operations of all four satellites. All CSK technical documents are available at: http://cosmo-skymed-ao.asi.it.

ASI is currently defining the SABRINA EO future programme, conceived for bistatic and interferometric applications. CSK Short average revisit times of less than 2 days at latitudes of 70 deg. (with 1 sat) and with 2 satellites of order of 2-5 hours (max revisit of 37 hours), allows broad applications for dual scenario – including ocean and ice monitoring. Electronic beam steering allows to achieve incidence angles in the range of 20 – 60 deg and left/right looking modes allow to fill the polar hole in each hemisphere. The tandem interferometry campaign is conceived for the interferometric acquisitions, this configuration (two satellites following the same ground track on two slightly different orbit planes) allows acquisition of pairs of images with a time gap of only 20 seconds. In the standard configuration the CSK constellation can realise interferometric acquisitions with a time gap of 4 days (now using two satellites equi-phased at 180 deg. is 8 days).

The temporal performance of the current constellation allows an average revisit time at polar latitudes (>70 deg) of 1-3 hrs (full constellation), max. <12 hrs; and, at the moment is of the order of 2-5 hours (max revisit of 37 hours),

The system has 3 operations modes: very urgent (Response Time (RT) with four satellites <18hrs); crisis (RT< 36 h); and routine (RT< 72 h). The Response Time is the time gap defined by the deposit of the user request until the product delivery. Currently, with two satellites these are reduced to 47h, 64h and 82h respectively. The SAR has multi-mode capabilities (see Presentation 5): Spotlight, Stripmap, Ping-Pong (the polarisation mode), and ScanSAR. Each SAR satellite can acquire up to 450 images per day. With the 4 satellites this translates into 1800 images per day. The dimensioning of the ground segment allows to archive 560 daily images and to generate 200 products per day (up to Level c/d) – based on the current architecture of the ground reception, data processing and archiving. This strong capability can even grow up if the user needs increase. A Data Policy and resource sharing agreement has been defined by ASI and Ministry of Defence allowing the dual exploitation of the CSK data.

The Background mission is being implemented as the lowest level of priority – but includes a number of key primary fields including marine and ice uses. ASI is evaluating the opportunity to establish a background mission using inputs coming from scientists participating to the first CSK AO, and such as inputs coming from IPY users. The AO captured a wide variety of interest in the form of ~200 project proposals. 20 proposals were focused on ice, with 3 specific proposals focused on polar and ice applications – with applications in sea ice, and alpine glaciers. AO Projects expected to start in August 2008 – and last until 2010. This allows the data exploitation of the first 3 satellites. A second CSK AO will be released at the beginning of next year – with an expectation of allowing exploitation of all four satellite missions.

Interoperability, expandability and multi-mission capability is embedded in the CSK System. Due to the IEM capability, ASI is conducting two cooperations: ORFEO with CNES (CSK and the Pleiades optical system – first satellite scheduled for launch in 2009-2010) and SIASGE with CONAE (CSK and SAOCOM Argentinean L-band SAR system - first of two satellites scheduled for launch in 2011-12).

A sample of images (taken by CSK-1 and CSK-2 during the commissioning) focusing on potential ocean and ice applications was presented. FB noted that ASI is extremely pleased to support IPY activity a best effort will be provided on the basis of an understanding of the requirements, and of the needs for background coverage in specific geographic areas together with the specification of the SAR acquisition modes.

b. JAXA - ALOS IPY contributions (Masanobu Shimada)

M. Shimada reported on the status of ALOS (see Presentation 6). At present, 17 cycles of data have been acquired by PALSAR and other instruments. Fine beam single (FBS), Fine beam dual (FBD) and polarimetry (PLR) mode coverage is extensive. MS reported on over 700,000 scenes acquired by ALOS to date – mapping Earth more than 4 times. Typically 1000 to 1500 scenes are acquired by PALSAR each day. ALOS has an exact revisit time of 46 days with a sub-cycle of 2 days. The orbital tube of the satellite is maintained within ~500m – and inclination of orbit will be maintained periodically to ensure good InSAR (with first manoeuvre August 2008 – and subsequently every 3 years). A failure resulted in activation of B side of Data Relay System (DRTS) – with lifetime of 5-7 years. Fuel reserves will allow up to an estimated 10 years further mission activity. JAXA is considering expansion of activities using Data relay satellites. Calibration results summary indicates very good performance of the system (geometric and radiometric stability).

An example of Antarctica Browse Mosaic (Cycle 08, 14, 16) was shown – with comparisons over these 3 cycles. ALOS IPY observations for PALSAR with Target: North Pole and Antarctica: several times coverage (not daily coverage). Polarimetric coverage has also been acquired of the Greenland, whilst FBS, WB1 (SCANSAR) have been acquired over Greenland in two cycles – allowing at least interferometry of West Greenland.

Future plans have been made to acquire Arctic basin coverage: WB1 (SCANSAR) and Fine Beam Coverage (51 deg) in the forthcoming summer to check melting all the way to the North Pole. This will be acquired in an interval from June to October 2008.

Antarctic coverage has been acquired from Cycles 16 and 18 in Scansar (WB1). Cycles 17 and 18 are available in Fine Beam – for InSAR applications and Cycles 15 and 16 in Fine Beam over Antarctica. Examples show good correlation over Pine Island Glacier. Other examples were given also from Lambert Glacier (from E. Rignot).

Currently 100m is the final resolution of the mosaicked Data (coming soon). Until now 500m was a constraint to the resolution. The Kyoto and Carbon initiative is driving the tropical forest inventory.

JAXA doesn't have a background mission – rather have a fixed observation plan. This is viewed by the STG as a considerable advantage over the other Agencies. One key issue is that the plans, however, don't explicitly indicate oceans/sea ice – since the focus of the PALSAR mission is principally terrestrial.

MS presented the PRISM planned global coverage (nadir viewing), together with the results - which showed an impressive proportion of coverage after cloud clearing.

Action STG3-A4 – on ASI and JAXA to formulate contents of their respective IPY Data Portfolios by end June.

7. Status updates from other Agencies

c. CNES (Eric Thouvenot)

E. Thouvenot gave an update on CNES planning of VGT over Antarctica and showed the latest mosaics of VGT coverage at 1km (see Presentation 7). He reported that a FORMOSAT-2 catalogue has been established, in which the F2 results of 2007 campaign have been placed. A summary was provided of 2007-08 Southern Hemisphere and Northern Hemisphere campaigns for exact repeat pairs for F2. For SPOT 5 HRS, the idea is to obtain stereo pairs in ice sheet margins and glaciers. Digital Terrain Models are now provided with two different correlation masks. Results from the SPIRIT project were shown by ET for Jakobshavn Isbrae.

An attempt was made to cover Arctic the remaining areas not successfully completed due to cloud cover in 2007. A few new areas had been requested in Canada and Norway. Antarctic coverage in austral summer 2007-2008 indicates good data (> 1300 cloud free images). HRS products may be obtained by request from the POLARDALI. The system is interfaced with Google to allow viewing via the Google interface.

KJ noted that Cartosat was recently launched by the ISRO - and KOMPSAT by the KARI. ET suggested to organise an Optical Coordination meeting for IPY and to include Republic of Korea, India, NASA, JAXA and USGS.

d. CSA (Yves Crevier)

Y. Crevier updated on the status of CSA IPY activities spanning Arctic Science Archive Processing (ASAP) Project; Polar Science Database (see Presentation 8).

- ASAP – initiation of processing of RSAT1 archive collected over both poles, and to encourage access for scientific activities.
- Antarctic Mapping Mission – MiniMAMM2 completed.
- Polar Snapshots – sea ice min/max.
- Canadian Arctic Land masses InSAR coverage for seasonal Permafrost changes.

CSA future activities are focusing on Snapshots. Requirement is to build a 3-day ScanSAR Wide B coverage, with knowledge of the constraints (e.g. Resource limitations, eclipse/power, and or operational limitations). Strong coordination required with ESA to fill in gaps in Arctic basin wide coverage.

Pole to coast coverage in Antarctica requires a slew manoeuvre to map south of 78 deg. S. Radarsat-2 acquisition plans are required to achieve this.

Highlights are: making use of both RSAT-1 and -2 and archived data. These data will be publicly served using common data distribution infrastructure.

CSA wish to continue to make archival data available, and to try to ensure RADARSAT-1 continuity beyond March 2009. There is also a willingness to try to extend the allocation framework to the international IPY community. CSA are also willing to implement a virtual SAR constellation.

e. DLR (Manfred Gottwald)

M. Gottwald updated on the status of TerraSAR-X and its addition to the DLR IPY portfolio (see Presentation 9). This focused on Pole to coast interferometry STG science objective, and the objective of filling the polar hole.

The stripmap mode of TSAR-X allows acquiring pole to coast coverage – with limitation of polar hole at 81 deg. S in the nominal right looking mode (K.J note that this is likely based on sea-level ice sheet). To fill polar hole one must consider left looking data. This has been planned in a request simulation for 24 hours, equivalent to 15 TerraSAR-X orbits/tracks. Thus 15 conflict free scenes can be acquired in the pole region daily with lengths depending on the region of interest (ROI) extend, e.g. 200 km if ROI is south of 89 deg S and 500 km if ROI is south of 86 deg S. Left looking mode requests have been successfully tested but products may have degraded performance.

The scientific community should give a detailed planning of the acquisitions via an IPY proposal (areas, incidence angle, polarisation, priorities, and period). The main residual question is whether four successive cycles (in 11 day repeat pass) are required, or perhaps a longer interval.

A third theme is the multi-frequency and fully polarimetric data acquisitions over common supersites. Dual retrieving antenna (DRA) configuration (experimental mode of TSAR-X).

Status of six IPY AO proposals was given. There are two new proposals including one from I. Joughin (Greenland and Antarctic glaciers) and D. Floricioiu (Antarctic Peninsula).

Action STG3-A 5 – to MG, KJ and DF to resolve open questions regarding mission planning for LL pole hole, and pole to coast coverage from TSAR-X.

f. ESA (Henri Laur)

H. Laur gave status update on ESA IPY contributions (see Presentation 10). He noted the typical monthly Wide-swath image dataset acquired by WSM (150m res. at HH pol). The March 2008 example is a worst case example since data volumes were halved, due to the ATV use of Artemis data relay satellite. It shows also a problem area receiving less coverage in the Chukchi Sea.

Around 100 ASAR scenes per day are being made available from both Polar Regions. Medium resolution products (75 m pixel spacing) is available in the “rolling archive” free of charge to investigators who go through a “simple” registration procedure.

ESA supporting IPY logistics are undertaken via the GMES PolarView consortium and IPY Ice Logistics portal (www.ipy-ice-portal.org**)**. Examples from Baltic Sea illustrate low ice extent in

winter 2007-08. Examples were shown of near real time data from Antarctica. Wilkins ice shelf example showed that the data are used and monitored in near real time – via PolarView Services.

MERIS mosaics can also in principle be made available from Carsten Brockman (Brockman Consult) at 1km pixel spacing (here: http://www.brockmann-consult.de/ImageOfTheDay/SAE_05-06/index.htm).

Further results were shown indicating that Sciamachy Data are systematically being used to monitor progression of ozone hole. Envisat Altimetry data in the Arctic Ocean indicates a decrease by 3-4 mm/year.

g. Eumetsat (Kenneth Holmlund)

Ken Holmlund focused on EPS MetOp contribution to IPY (Presentation 11) – including a status of Cal/Val and operationalisation of MetOp data streams:

- ATOVS – AVHRR L1 products declared operational (MetOp since Jul 2007),
- IASI –L1 operational since July '07 and data delivered with error covariance matrices for assimilation. Quality monitoring is undertaken by ECMWF, UKMO, MeteoFrance, and Eumetsat,
- ASCAT disseminated since 31 Jan. 2007, and intermediate Cal/Val – with fully operational validated data stream since early 2008.

KH showed examples of GOME time series of SO2 plume following the jet stream to indicate possibilities in tracking trans-continental pollution. Also from ozone hole GRAS now declared operational after extensive Cal/Val and precise orbit determination (POD). It produces temp/humidity profiles.

ATOVS L2 validation from American instruments still progressing. IASI L2 validation is ongoing – with trial dissemination of ozone and trace gases.

In the near future, the plan is for distribution of second generation products such as full-res. Scatterometer winds, and AVHRR polar cap upper level winds, with cooperation with CIMSS/NOAA (J. Key). Also investigations are ongoing for fast track Arctic dumps and Antarctic aata acquisitions. Plans are also being investigated for tandem operations. In tandem operations in same orbital frame – separation of 25-50 minutes.

Reprocessing of products will result in consistent operational calibration of ASCAT, GOME-2, AVHRR, and IASI.

The Eumetsat IPY Portfolio is to be implemented within the new Eumetsat EO portal, and the Eumetsat contribution to IPY is to be highlighted in this web interface. Archiving of EARS AVHRR (full resolution) data is being undertaken for IPY portfolio. An interface with automatic sub-setting to be considered.

Volker Gaertner from Eumetsat made a request for guidelines for a keyword structure for Eumetsat EO portal entry point to IPY portfolio data products. MD suggested that a well-established and tried and tested structure is already employed by IPYDIS and NSIDC (in context of GCMD). Thus it would be best if Eumetsat would consider implementing a similar structure for product classification in the context of relevant Eumetsat cryospheric products, such that users can navigate to products in an identical manner.

h. NOAA NESDIS (Jeff Key)

J. Key informed the meeting that NESDIS is contributing to IPY via a number of experimental products, in addition to the standard NOAA polar products (See Presentation 12). NESDIS is now supporting the implementation of near real-time (NRT) products as well as the reprocessing of others. The real-time product suites Also RT products at Direct Broadcast (DB) sites will be

expanded to include polar winds, atmospheric properties (cloud phase, height, etc.), surface temperature, and albedo, ice extent, concentration, motion and thickness, and snow cover. The real-time products are based on MODIS (Terra and Aqua) and AVHRR (NOAA-15, 16, 17, 18), depending on the site. MODIS DB sites include McMurdo, Antarctic, Tromsø, Norway, Sodankylä, Finland, and Fairbanks, Alaska. To date only one AVHRR direct readout (High Resolution Picture Transmission, HRPT) site is generating higher-level products (Barrow, Alaska), but discussions with site operators in Antarctica (Casey, Davis, Rothera, and Halley) are in progress. The MODIS DB products will be continued at least until end of Terra and Aqua missions. Reprocessed data sets will include the AVHRR Polar Pathfinder extended (APP-x) and the AVHRR polar winds. Both products will cover the period from 1982 - until the present.

JK responded in his presentation to STG2-A2 action (see slides). D.H. noted that the LAC coverage of Antarctica is stored at NOAA. This would allow continuity of a 1km product from historical data through the present day, but the LAC data do not provide complete spatial coverage. JK noted that MODIS are of superior quality and thus Antarctic data at 500m would be better for an Antarctic snapshot during IPY. The STG believed that it is still of value to ensure that the historical HRPT data are recovered, if possible, such as to facilitate an historical reference dataset which allows comparison between contemporary AVHRR and those Antarctic data collected by independent HRPT stations.

Recommendation STG3-R1 – for NESDIS and NASA to consider the feasibility of development and production of cloud-free MODIS bipolar Snapshots at 500m resolution as part of their IPY portfolios.

Recommendation STG3-R2 – for NESDIS to follow up on STG2-A2 to contact Antarctic HRPT stations – to investigate availability of direct broadcast archives for reconstructing historical retrospective composite 1km AVHRR products.

JK also noted that there had been some work to look at quality of geostationary products at high latitude limit of coverage (see Poster handout from JK).

i. NASA and USGS

Due to the time difference, availability and meeting time constraints, it was not possible to have a teleconference with NASA or USGS. The STG encourages participation of NASA and USGS at the next meeting.

8. Input from CGMS & WMO Space Programme (Don Hinsman)

D. Hinsman updated STG on the status of the HEO system “Arktika” (See Presentation 13). IGEOLAB had considered the need for innovative instruments in geostationary orbit – to improve instrument and product performances. They also considered the need to have demonstration missions with cost sharing. CM-7 (Jan. 2007) reaffirmed the value of IGEOLAB and the “Arktika” concept by exploiting highly elliptical geostationary orbits. Three test proposals have been made including placing GIFTS (IR sounder) on the platform.

Partnerships have been investigated via a number of Focus meetings. The concept would include two satellites in HEO producing geostationary coverage 90% of the time. Status reports have been reviewed from NOAA, Finland, Canada, and the importance of the “Arktika” project has been reaffirmed. Roshydromet and Roscosmos have confirmed a reserve for 500kg of payload with 5 years to proposed launch (in 2013 timeframe). Russian Federation is presently analysing a Finnish proposal for an instrument. Meanwhile Canada has entered into bilateral technical meetings for instruments, ground processing and validation.

The STG was extremely pleased to note the progress and recent achievements in engaging partners in the "Arktika" project. The STG takes note of this positive development as a key achievement and contributions to the IPY legacy.

9. Management of IPY Data Legacy (Oystein Godoy)

O. Godoy, co-ordinator of IPY operational geophysical data has updated the status on managing the IPY Data legacy (see Presentation 14). Meanwhile the IPY Data Sub-Committee had defined a Data Policy and IPY Metadata profile. Data coordinators have been established in Canada, UK, and Netherlands; in other countries they are still needed. YC noted that the Canadian co-ordinator for data issues is Dr Ellsworth LeDrew.

OG described metadata, using existing standards and exploiting GCMD keywords. The Open Archiving Initiative (OAI) is low cost and easy to implement – and adopted by ESA. It is also recommended by CEOS WGISS interoperability. An alternative U.S. standard is the ISO23950. However, IPY have chosen not to follow this standard as it is regarded as being heavier and more difficult to implement. Currently OG and Mark Parsons, Co-Chair of IPY Sub-Committee on Data Policy and Management are looking into the suitability of OAI-PMH, using DokIPY as a test project (Norwegian project involving several institutes) together with NSIDC with their efforts to linking to GCMD.

Questions had meanwhile been sent by OG to several space agencies concerning potential support for and adoption of OAI-PMH as a tool for accessing metadata.

OG is currently working on cataloguing WMO essential data, ECMWF and HIRLAM NWP data (via MetNo), THORPEX, and drifters/buoys data, etc.). He is also working on examining metadata for space related data sets (see http://ipycoord.met.no). Recent migration of OpeNDAP to the THREDDS data server allows better support for WMO formats including GRIB, BUFR etc. He is currently participating in drafting of VGISC – and is a European contribution to WMO Information System (WIS).

The following open questions were identified as key residual issues:

- to what extent are the CEOS WGISS interoperability Handbook recommendations implemented by the Agencies?
- to what extent is the catalogue interoperability protocol for EO metadata implemented by the Agencies?

Open Archiving Initiative is critical because it allow linking of information from Google and open commons (for publications etc).

a. WIGOS and WIS (Don Hinsman)

D. Hinsman presented the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) – (see Presentation 15). The WMO Congress-XV established the priority to create a mechanism for integrating the WMO observing systems and to develop an implementation plan for realising this approach. WIGOS (which is WMO contribution to GEOSS) shall be a comprehensive coordinated and sustainable system of systems with four broad objectives:

- Atmosphere, ocean and terrestrial including hydrological and cryosphere domains
- Ensuring inter-agency co-sponsorship of systems
- Increasing interoperability between various systems
- Respect related international initiatives.

Anticipated benefits of WIGOS are improved services and quality of services, etc. The current WIGOS components are foreseen to be: WWW/GOS, GAW; Radiation Observing Networks; Marine observing networks (e.g. VOS); Global Cryosphere Watch; etc.

WIGOS observations and products will be moved via WIS, using WIS data and metadata formats. It will adhere to standards and best practices, and will use WIGOS compatible hardware and software. Data will be formatted in WIGOS approved formats and resolutions.

The WMO Information System (WIS) will facilitate the routine collection and dissemination for time-critical and operation-critical data and products. It should also allow data discovery.

Five pilot projects currently exist and are active. IPY should be considered a WIGOS pilot project. These are demonstration projects with support of WMO regions.

Action STG3-A6 – on DH, OG, and MD to formulate pilot project concept (including WIS data focus) and partnerships to exploit IPY observing system data as part of the IPY legacy and in consideration of SAON.

Pilot project should try to learn how to search metadata from interagency perspective (using different GIIPSY datasets).

b. Interoperability issues and metadata exchange

This item was covered under OG and DH presentations above.

c. Strategy for Data Processing/Products

It is clear that not all that is acquired by SAR is processed or accessed by scientists yet. KJ asked whether we have thoroughly answered the question about who is doing what with the IPY data. YC noted that it is still necessary to process SAR data. In CSA the funding aspect of processing data requires a science plan which justifies the needs.

In the context of ESA, teams of IPY Project PI's have been established under IPY projects hosted by the International Space Science Institute (ISSI) for collaborative research projects to be furthered. Examples in the context of the STG goals include Southern Ocean sea-ice drift (see: http://www.issibern.ch/teams/Antarctic/).

It was suggested that further efforts can be made to survey the IPY users and/or to engage scientists in projects to deliver higher level products from processed SAR data.

Recommendation STG3-R3 – for Space Agencies to report on progress regarding use of IPY portfolio data to address high level science goals, and to report at STG4.

10. Global Cryosphere Watch (Barry Goodison/Vladimir Ryabinin)

E.Sarukhanian gave update on GCW on behalf of B. Goodison (CliC) and V. Ryabinin (WCRP) - (see Presentation 16 – and hand out Document 4). WCRP's Climate and Cryosphere project (CliC) led the development of the conceptual framework for the GCW, a sustained, robust observing system for the cryosphere and a crucial element of the future multidisciplinary observing system. Considering an IPY legacy issue, Congress XV welcomed the proposal to establish a GCW to ensure a legacy for cryosphere observing and monitoring, not only in polar regions, but also globally. GCW was born out of the IGOS Cryosphere Theme development activity, and need for a coordinating framework for Cryosphere observations. GCW will be used as a vehicle for implementing IGOS Cryo Theme recommendations, as well as contributing to WIGOS. SAON is also embedded as a unique opportunity for sustaining the observing network.

GCW importantly provides an intergovernmental mechanism for supporting key cryosphere in-situ and remote sensing observations. It will also help set up a one-stop shop for cryosphere products (employing WIS).
A GCW ad-hoc group was established (under chairmanship of Dr B. Goodison) by IPY ITG in January 2008. The Group will consist of representatives of Data Centres, and countries with cryosphere responsibilities. A scoping document is expected from this Group by early 2009 to define the feasibility of developing and implementing a GCW within WMO.

MD pointed out that WMO support did not prevent long-term degradation in observing infrastructure in the past. Why shall an explicit WMO GCW prevent this in the future? T. Mohr noted that this was the only established intra-governmental mechanism for ensuring that the cryosphere gets the desired attention for implementation of IGOS Theme recommendations. GCW will give clear set of user-driven WMO requirements to formulate new missions and to guide decisions regarding new missions.

Recommendation STG3-R4 – co-Chairs to nominate potential representatives to GCW Ad hoc group

11. IPY Objectives Progress Review

The following items are a subset of all goals discussed at STG1. The STG discussion centred on:

a. Pole to coast InSAR multi-frequency SAR - for ice sheet dynamics

Several Agencies are in the process of planning acquisitions with which to deliver on this scientific goal. Sufficient energy has been expended in meeting and elaborating on the plans required to do this. CSA have tried to convince MDA to fill Antarctic polar hole. Meanwhile, DLR has been contributing to the existing plans of ESA, CSA, and JAXA in respect to filing the hole with TSAR-X data.

The STG SAR coordination workshop highlighted the benefits of the inter-Agency coordination meeting environment, but also raised key challenges with respect to ensuring that the respective mission planning of each Agency successfully interlock.

Recommendation STG3-R5 – for SAR agencies consideration to have informal follow up meetings to build on the success of the first SAR Coordination meeting.

Action STG3-A7 – on YC to circulate abstract for oral presentation at SCAR/IPY workshop by end May and to request information from Agencies for inclusion in presentation.

Action STG3-A8 – on KJ to send SAR requirements to JAXA and ASI for InSAR and other issues by end May.

JAXA has established a plan for acquisitions but which ends in 2009. JAXA would consider STG requirements for further data acquisitions beyond IPY interval – i.e. for 2009-2011.

b. Fine-resolution SAR mapping of the entire Southern Ocean sea-ice cover - for sea ice motion

ESA and CSA are currently obtaining Arctic-basin wide and Southern Ocean wide SAR coverage for the purpose of sea-ice dynamics mapping. The combination of GMM and WSM allows observing the entire cover at 1km and 150m resolution.

Action STG3-A9 – on ESA to report on status of progress in sea ice drift processing from the Arctic and Antarctic.

CSA highlighted the issue in connection with Radarsat-1 regarding the termination of downlink at ASF. This has prompted a letter from IPY JC to try to resolve the issue in the context of R1 (see also section 5).

Meanwhile, JAXA has put in place a plan to ensure summer 2008 coverage of the Arctic Basin – including filling the central Arctic hole.

c. One complete high resolution visible and thermal IR (Vis/IR) snapshot - for circumpolar permafrost

MD summarised some of the progress in obtaining continental scale coverage (see Presentation 17) using medium resolution optical (MERIS and MODIS) data sets for snow, land cover applications. Meanwhile, the presentation by JAXA indicates extensive ALOS coverage of PRISM instrument over terrestrial cryosphere, with 2.5 m res panchromatic, while AVNIR is operated simultaneously at 10m resolution. The cloud-free proportion of coverage is reported in JAXA presentation.

d. Pan-Arctic high and moderate resolution Vis/IR snapshots - for lake and river freeze-up and break-up)

The STG believed that sufficient data are being acquired with which to address these two high level scientific goals (see also Presentation 17). However, it would nonetheless be useful to get together the optical Agencies to collectively discuss these issues, and whether gaps can be filled by specific tasking of the very high resolution optical systems. This will require engaging other agencies such as KARI. M. Shimada asked whether ASTER data had already been considered. MD responded that ASTER data are already extensively used in high latitude glacier and ice cap coverage in support of the ongoing World Glacier Monitoring Service. Recently ESA had engaged WGMS in a new project GlobGlacier (http://dup.esrin.esa.it/projects/summaryp98.asp) for the purpose of complementing existing ASTER coverage with SPOT, such as to be able to further extend the satellite contribution to the World Glacier Inventory exercise.

MS noted that IPY-related PIs already approved via the ALOS AO may access the relevant JAXA data. HL complemented this by reminding that PIs may alternatively access data acquired through the ALOS Data Nodes operated in North America by ASF and in Europe via ESA.

Action STG3-A10 – for ET, MS, HL and USGS to consider organising a meeting of optical satellite agencies for purpose of showcasing existing IPY results and to evaluate extent to which some of key science objectives (e.g. permafrost) can be met.

e. Atmospheric Dynamics and Composition

HL noted that ozone and other trace gas products are routinely and freely available from Envisat and Aura. A number of experimental products such as BrO, and CH4 are such examples.

Action STG3-A11 – for MG (DLR), KH (Eumetsat), JK (NOAA), HL (ESA), and CD (NASA) to present status of data and higher level products for polar Atmospheric Composition (including clouds and aerosols) at next STG4 meeting.

12. Effectiveness of Data acquisition Strategies

The drawbacks of acquisitions to date had been reviewed in the context of Agenda item 11 and no further discussion was regarded as being necessary.

13. Review future Planning and Coordination needs

In view of the earlier discussion under Agenda item 11, a High Resolution optical data acquisition workshop was regarded as needed for further coordination of those satellites (see Action STG3-A10 above).

14. STG Schedule & Planning of next STG Meeting

An event planned to be organised on 25 February 2009 in Geneva by IPY JC and IPO at which JC will release a Statement on the status of polar research stemming from IPY. It was discussed that this drives the need for a session of STG4 at the end of January timeframe 2009. The proposed date for the STG4 is on 3-4 February, 2009, starting at 10:00hrs – at WMO Headquarters, Geneva, Switzerland.

Action STG3-A12 – WMO Secretariat to complete interaction with ISRO and KARI to establish nominees to STG.

STG 3 Action Items – Overview

STG3-A1 – for YC, HL, MG, FB, MS to establish plan (when/where/who) for a follow on meeting for SAR Mission Planners in early July timeframe.

STG3-A2 – for KJ and MD to identify GIIPSY supersites (by end May), and transmit to SAR Agencies to focus high bandwidth X-band SAR acquisition plans (e.g. bipolar supersites).

STG3-A3 – on KJ to send FB information (by mid-May) about science requirements and planning files.

STG3-A4 – ASI and JAXA to formulate contents of their respective IPY Data Portfolios by end June.

STG3-A5 – to MG, KJ and DF to resolve open questions regarding mission planning for LL pole hole, and pole to coast coverage from TSAR-X.

STG3-A6 – on DH, OG, and MD to formulate pilot project concept (including WIS data focus) and partnerships to exploit IPY observing system data as part of the IPY legacy and in consideration of SAON.

STG3-A7 – on YC to circulate abstract for oral presentation at SCAR/IPY workshop by end May and to request information from Agencies for inclusion in presentation.

STG3-A8 – on KJ to send SAR requirements to JAXA and ASI for InSAR and other issues by end May.

STG3-A9 – on ESA to report on status of progress in sea ice drift processing from Arctic and Antarctic.

STG3-A10 – for E T, MS, H L and USGS to consider organizing, a meeting of optical satellite agencies for purpose of showcasing existing IPY results and to evaluate extent to which some of key science objectives (e.g. permafrost) can be met.

STG3-A11 – for MG (DLR), KH (Eumetsat), JK (NOAA), HL (ESA), and CD (NASA) to present status of data and higher level products for polar Atmospheric Composition (including clouds and aerosols) at next STG meeting.

STG3-A12 – on WMO Secretariat to complete interaction with ISRO and KARI to establish nominees to STG.

STG 3 Recommendations – Overview

STG3-R1 – for NESDIS and NASA to consider feasibility of development and production of cloud-free MODIS bipolar Snapshots at 500m res. as part of IPY portfolio.

STG3-R2 – for NESDIS to follow up on STG2-A2 to contact Antarctic HRPT stations – to investigate availability of direct broadcast archives for reconstructing historical retrospective composite 1km AVHRR products

STG3-R3 – for Space Agencies to report on progress regarding use of IPY portfolio data to address high level science goals, and to report at STG4.

STG3-R4 – co-Chairs to nominate potential representatives to GCW Ad hoc group

STG3-R5 – for SAR agencies to consider informal follow up meetings to build on the success of the first SAR Coordination meeting.

Annex 1

Space Task Group (STG) of the IPY Sub-Committee on Observations - Third Session

(5-6 May 2008, ESA-ESRIN, Frascati, Italy)

List of participants

STG members

1. Drinkwater Mark, Co-chair	ESA	Mark.Drinkwater@esa.int
2. Battazza Fabrizio	ASI	Fabrizio.Battazza@asi.it
3. Thouvenot Eric	CNES	Eric.Thouvenot@cnes.fr
4. Crevier Yves	CSA	Yves.Crevier@space.gc.ca
5. Gottwald Manfred	DLR	Manfred.Gottwald@dlr.de
6. Laur Henri	ESA	Henri.Laur@esa.int
7. Holmlund, Kenneth	EUMETSAT	Kenneth.Holmlund@eumetsat.int
8. Shimada Masanobu	JAXA	Shimada.Masanobu@jaxa.jp
9. Key Jeff	NOAA	jkey@ssec.wisc.edu

Invited participants

1. Mohr Tillmann	IPY JC	Tillmann.Mohr@t-online.de
2. Sarukhanian Eduard	IPY JC	esarukhanian@wmo.int
3. Jezek Ken	IPY GIIPSY	jezek.1@osu.edu
4. Godoy Oystein	IPY SCDPM	o.godoy@met.no
5. Hinsman Don	WMO	DHinsman@wmo.int

Annex 2

Space Task Group (STG)
of the IPY Sub-Committee on Observations
Third Session

(5-6 May 2008, Room E, ESA-ESRIN, Frascati, Italy)

STG-3 Agenda

1. Opening (Introduction by Co-chair, approval of agenda)

2. Review minutes and actions of STG2 and SAR Coordination Workshop

3. Status of IPY implementation (DC/ES)

4. Sustaining Arctic Observing Networks – perspectives (DH)

5. Report on IPY STG SAR Coordination Workshop (YC/KJ)

6. Agency Reports on IPY Portfolio Developments
    a. JAXA - ALOS IPY contributions (MS)
    b. ASI Cosmo-Skymed Status (FB)

7. Status updates from other Agencies
    c. CNES
    d. CSA
    e. DLR
    f. ESA
    g. Eumetsat
    h. NOAA NESDIS
    i. NASA and USGS

8. Input from CGMS & WMO Space Programme (DH)
    HEO system Arctika (DH)

9. Management of IPY Data Legacy (OG)
    a. WIGOS and WIS (DH)
    b. Interoperability issues and metadata exchange
    c. Strategy for Data Processing/Products

10. Global Cryosphere Watch (BG/VR)

11. IPY Objectives Progress Review
    a. Pole to coast InSAR multi-frequency SAR - for ice sheet dynamics (All)
    b. Fine-resolution SAR mapping of the entire Southern Ocean sea-ice cover - for sea ice motion (All)
    c. One complete high resolution visible and thermal IR (Vis/IR) snapshot - for circumpolar permafrost (All)
    d. Pan-Arctic high and moderate resolution Vis/IR snapshots - for lake and river freeze-up and break-up (All)
    e. Atmospheric Dynamics and Composition

12. Effectiveness of Data acquisition Strategies (All)

13. Review future Planning and Coordination needs (All)
    - HighRes. optical data acquisition workshop

14. STG Schedule & Planning of next STG Meeting

Annex 3

Presentation Material

Presentation 1.	Status of IPY implementation (E. Sarukhanian)
Presentation 2.	Sustained Arctic Observing Network (D.Hinsman)
Presentation 3.	Report on SAR Workshop (Y. Crevier)
Presentation 4.	GIIPSY activities since STG2 (K. Jezek)
Presentation 5.	ASI - Cosmo-Skymed Status (F. Battazza)
Presentation 6.	JAXA - ALOS IPY contributions (M. Shimada)
Presentation 7.	CNES Portfolio status update (E. Thouvenot)
Presentation 8.	CSA Portfolio status update (Y. Crevier)
Presentation 9.	DLR Portfolio status update (M. Gottwald)
Presentation 10.	ESA Portfolio status update (H. Laur)
Presentation 11.	Eumetsat Portfolio status update (K. Holmlund)
Presentation 12	NOAA Portfolio status update (J. Key)
Presentation 13.	Input from CGMS & WMO Space Programme (D. Hinsman)
Presentation 14.	Management of the IPY Data Legacy (O. Godoy)
Presentation 15	WIGOS and WIS (D. Hinsman)
Presentation 16	Global Cryosphere Watch (E. Sarukhanian)
Presentation 17	Progress in obtaining Vis/IR at high latitudes (M. Drinkwater)

Annex 4

ICSU/WMO JOINT COMMITTEE FOR IPY

SUB-COMMITTEE ON OBSERVATIONS
SPACE TASK GROUP
THIRD SESSION

FRASCATI, ITALY, 5-6 MAY2008 Original: ENGLISH

List of documents

Document No	Title	Submitted
Doc 1	Provisional agenda	M. Drinkwater
Doc 2	Status of implementation of the IPY 2007-2008	D. Carlson E. Sarukhanian
Doc 3	IPY Space Task Group Synthetic Aperture Radar (SAR) Workshop	Y. Crevier
Doc 4	Global Cryoshere Watch (GCW)	B. Goodison, V. Ryabinin
Doc 5	ISRO AO Oceansat-2	ISRO/K. Jezek
Inf 1	List of documents	
Inf 2	STG 2 Minutes, Actions, Recommendations	M. Drinkwater
Inf 3	Preliminary list of participants	