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Agenda Item: 3.2
Person Responsible: A Fox

Report to SCAR EXCOM – July 2011

**SCAR Standing Committee on Antarctic Geographic
Information SC-AGI**

Executive Summary

Title: Report to SCAR EXCOM – July 2011: SCAR Standing Committee on Antarctic Geographic Information (SCAGI)

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Introduction/ Background: All work in Antarctica relies on a consistent geographic framework, and the main function of the Standing Committee on Antarctic Geographic Information (SCAGI) is to manage and improve the geographic framework not only for Antarctic scientific research but also for other activities including operations, environmental management and tourism. SCAGI continues to deliver a range of Geographic Information products through its various projects. These products include the SCAR Composite Gazetteer of Antarctica; Antarctic Digital Database, Map Catalogue and Feature Catalogue. SCAGI integrates topographic and names information received from national Antarctic programs into the ADD and Composite Gazetteer of Antarctica. In keeping with Article III.1.c of the Treaty that Scientific observations and results from Antarctica shall be exchanged and be freely available, SCAGI promotes an open standards approach to support free and unrestricted data access and contributes to developing the specifications for this.

Important Issues or Factors:

Most of the effort in SCAGI comes from a few committed members, this is not sustainable in the long term. It is highlighted by the difficulty in recruiting a new Chief Officer and the lack of engagement by South American countries, despite the 2010 SCAGI meeting being in Buenos Aires.

Recommendations/Actions and Justification:

Delegates should ensure that they are familiar with the work that SCAGI does and encourage their national representatives to become involved with and contribute data to SCAGI products. Delegates should ensure that retiring national representatives are replaced with a successor national representative.

Expected Benefits/Outcomes:

Wider engagement by the Antarctic community would help SCAGI to continue to develop, and deliver effectively, reliable relevant Geographic Information Services to the Antarctic science and operations communities. Maintaining the position of SCAR as the source of geographic Information Services such as the ADD and CGA supports the SCAR Strategic Plan objective of an international leadership role for SCAR.

Partners: SCADM, SCAR member countries, other organizations with an interest in Antarctic geographic Information such as COMNAP, Antarctic Treaty System, IHO, NASA, Google.

Budget Implications:

For the SCAR CGA and SCAR ADD to be improved, either SCAGI members must take on the necessary work or the work is outsourced. Continuation of \$4k a year allocation is requested.

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SCAR Standing Committee on Antarctic Geographic Information SC-AGI

1. Community Projects

The SCAR Standing Committee on Antarctic Geographic Information is responsible for four SCAR Community Projects. These are:

1. SCAR Antarctic Digital Database
2. SCAR Composite Gazetteer of Antarctica
3. SCAR Map Catalogue
4. SCAR Feature Catalogue

In addition to those projects, national institutions develop products that also benefit the wider Antarctic community. The SCAR SCAGI has proved a valuable arena for setting up collaborations between national institutions, for example:

- The Landsat Image Mosaic of Antarctica (LIMA) developed by the United States Geological Survey (USGS), NASA and BAS; this came out of discussions at the SCAGI meeting in Hobart, 2006.
- An initiative led by USGS to scan the archive of Antarctic aerial photography including collections held by BAS and AAD; this resulted from the Amsterdam meeting in 2009.

1.1 SCAR Antarctic Digital Database <http://www.add.scar.org:8080/add/>

Introduction:

The SCAR Antarctic Digital Database (ADD) is a compilation of the best available international topographic mapping for Antarctica. It is merged into a single seamless dataset with fully structured, topologically correct data to conform as far as possible to ISO TC211 for geographic information. It is available for web-download in a variety of formats for use in science and logistics applications and in other web-services.

The ADD has been maintained and developed by BAS on behalf of SCAR since 1993. This is an active project and continues to develop to include new data as it becomes available and to improve access to the information for the international community. BAS remains fully committed to supporting the ADD.

Achievements in the last two years:

It is intended to have a new release of the ADD ready for the SCAGI meeting at Palma de Mallorca, 6-7 September 2011. This will include:

- New coastlines for the ice shelves and glacier tongues compiled by BAS. This is in response to feedback, for example from the sea-ice community, about the need for up-to-date coastlines for the ice shelves, and to respond to changes in features such as the Mertz Glacier tongue. The coastline is derived from interpretation of European Space Agency Envisat satellite radar imagery. It is a shared coastline with the PolarView service

(www.polarview.aq) which provides access to satellite radar imagery about sea-ice density and distribution.

- A new “boundary of contiguous grounded ice” from the NASA Antarctic Surface Accumulation and Ice Discharge (ASAID) project (www.nasa.gov/topics/earth/features/antarctica-outline.html). This is valuable because it provides a consistent product from a single source, but merging this with the existing topographic information and maintaining a topologically correct structure has required substantial effort.
- A new coastline for Antarctic Peninsula resulting from collaborative glaciological work between BAS and University of Swansea, UK.
- Metadata for existing data converted to database format for on-line access, to conform with the SCAR Data and Information Management Strategy (DIMS).
- Web-access to data in the commonly-used ESRI “Shapefile” format.
- Upgrades from new 1:250,000 scale mapping in the Antarctic Peninsula by BAS.

Usage statistics from 1 June 2009:

New Registrations for download	682
Country of origin (user supplied data, not verified)	78

Planned future developments:

Data from the international project BEDMAP 2, which is refining the known bed topography of Antarctica from new geophysical data, will be ingested in due course.

Other topographic data will be incorporated if it becomes available.

Issues:

Almost no new topographic mapping has been received from other SCAGI members in the last two years. The ADD is currently in contact with the Czech geological survey for their new topographic map of northern James Ross Island.

The ADD can only be as good as its source data. It is not the role of the ADD to do new mapping itself – its remit is to be a compilation of published mapping from nations active in Antarctica.

1.2 SCAR Composite Gazetteer of Antarctica <http://data.aad.gov.au/aadc/gaz/scar/>

Introduction:

The SCAR composite gazetteer of Antarctica (CGA) is a compilation of the national Antarctic gazetteers of countries active in Antarctica. For historical reasons names in many areas have evolved with multiple naming and different geographic coordinates for the same feature in separate gazetteers. In 1992 SCAR started the CGA, as an effort to put in order this complex field comprising a huge amount of data. A relevant, practical aspect of this effort has been to identify

which place names were applicable to the same feature and to group those names under a unique identifier (UID).

The purpose of the CGA is to allow features to be unambiguously identified for scientific and operational uses, and to identify which features have already been named to discourage further duplicate naming.

Italy (ENEA/PNRA, Roberto Cervellati and Chiara Ramorino) are responsible for capturing and including new names/features or amendments to existing names in the CGA. The Australian Antarctic Data Center (Henk Broksma and Dave Watts) runs the web-site that provides access to the CGA database and has implemented improved search tools. Cooperation between Italy and Australia is excellent.

Today the SCAR CGA is based on a database which includes **18,715** features and contains **36,722** names. It collects the geographical information received from **23** countries plus GEBCO (general bathymetric Chart of the Oceans). It is an active project and continues to evolve:

- While all major features in Antarctica have already received a name and are stored in the database, minor features continue to be named by the Geographical Boards as a consequence of the activities of the national expeditions in Antarctica. These new features have to be added to the database.
- Many of the major features are still lacking of a comprehensive description, such as the size or the position relative to other features.

Achievements in the last two years:

Addition of 525 new names for 435 new features. The most active naming countries are Bulgaria, China, UK, USA and Australia.

Harmonisation of names for undersea features between the CGA and the General Bathymetric Chart of the Oceans (GEBCO)

Usage statistics from 1 June 2009:

Hits from all users	1,550,959
Hits from AAD only	25,344
Robot hits (*)	1,150,897
Approximate hits from external users	374,718

Planned future developments:

New names and amendments to existing names and coordinates will continue to be included in the CGA.

Issues:

The quality of the maps available when many features were first named has impacted on the accuracy of many of the coordinates in the CGA. Many of the names lack coherence with the current available continent-wide web products such as Lima or Google Earth which is a disincentive to use the names.

It was recommended at the July 2010 SCAGI meeting in Buenos Aires to check the national

gazetteers against LIMA or other satellite imagery sources and revise the coordinates. Some SCAGI members have begun this task: Italy have completed the process (55 names); Norway and Belgium are collaborating to check names in Dronning Maud Land; In progress for USA (about 1000 new coordinates supplied to CGA); Australia has checked about 1200 names and attached photos to them, and is in progress for the UK (750 of 4900 names checked).

Correspondence about getting place-names into Google Earth is ongoing and active. Australia has a downloadable KML file to display their gazetteer names in Google Earth.

1.3 SCAR Map Catalogue <http://data.aad.gov.au/aadc/mapcat/>

This is compiled and maintained by the Australian Antarctic Division Data Centre. It contains entries for **5155** hard copy maps from **26** countries and **947** digital maps from five countries; up from 3640 hard copy maps and 698 digital maps on 1 June 2009.

Downloads of maps since 1 June 2009 are **9,856**.

1.4 SCAR feature catalogue:

This is not adopted by all SCAGI members for their topographic mapping activities, due, for example, to working within established protocols of their National Mapping Authorities. It is used by Australian Antarctic Division and they have attached feature type to all place-names in the SCAR CGA. ADD also added a field to the SCAR CGA that allows referencing of non-English feature types to the English equivalent.

1.5 Liaison with International Standards Organisation:

SCAR is a Class A Liaison member of ISO TC211, the technical committee creating international standards for GIS. These standards are mandatory in many parts of the world; they are best practice where they are not mandatory, and cover many areas of data management beyond the special case of geographic data.

Paul Cooper, manager of the ADD (1.1 above) represents SCAR at ISO TC211 ensuring that the unique difficulties posed by Antarctica are covered in the ISO standards. Several standards covering these areas are currently in revision. Paul Cooper has attended working groups covering feature catalogues and place-names at an ISO meeting in Delft in May 2011, and has contributed to a technical report, in response to concerns that some proposed changes to standards would be difficult for SCAR to adopt. The existing standard for place-names (ISO 19112) is not useable in the special environment of Antarctica, and Mr Cooper is seeking to have changes made to the standard to allow its adoption by the SCAR Composite Gazetteer of Antarctica (1.2 above).

1.6 Other initiatives:

Antarctic Aerial photography:

There is an archive of several 100,000s of aerial photographs of Antarctica dating back to the 1940s. Most photography was acquired by the US-Navy but there are also substantial collections held by other countries such as UK and Australia. Much of this is more than 40 years old and is deteriorating due to chemical changes in the film. There is much environmental change information locked up in these images, and it is critical that the images are scanned both to make them safe from future deterioration and to promote easier access by scientists.

The USGS has led an initiative to scan the archive of historic aerial photography for Antarctica. The US has already scanned its collection of 330,000 images at 400 dpi and is in progress with scanning them all at 1200 dpi. The USGS has generously agreed to scan the images of UK and Australia as part of this campaign.

The US-NSF Polar Geographic Information Centre (PGIC) at the University of Minnesota has made the flight lines and metadata downloadable and viewable in Google Earth. Australia has Google-compatible flight lines. The UK has a web-browser close to completion for its own photography (and other geographic information) holdings.

2. Future plans for SCAGI

An intersessional meeting will be held in Palma de Mallorca, Spain on 6-7 September 2011 in association with the 8th Symposium on Polar Studies, where SCAGI projects will be reported on in detail. SCAGI will attempt to appoint a new Chief Officer.

SCADM will be meeting at the same time allowing contact between the two groups.

3. Important Issues or Factors:

3.1 Limited engagement by SCAR nations: Most of the effort in SCAGI comes from a few committed members. This is manifested in the recent difficulty in recruiting a new Chief Officer. There has been a lack of engagement by South American countries. While it is recognized that to be physically present at a meeting can be expensive and sometimes is not possible for the Members, it should be possible however to work by e-mail or, as a minimum, to reply to e-mail.

Whilst the recent achievements listed above show that progress can be achieved by the efforts of a few enthusiastic members, in the long term, limited engagement and cooperation will restrict what can be achieved by the group.

The SCAGI meeting in Palma de Mallorca in September will develop a work-plan that is achievable by the members prepared to contribute and that have the backing of their agencies to do so.

3.2 Possible merger with SCADM: Discussion at the Buenos Aires meeting showed that there is no appetite in SCAGI for a merger with SCADM.

Dissemination of geographic information is only one function of SCAGI, the group felt that much of the value of SCAGI is as an arena for arranging collaborations and plans to generate new data.

Continued progress with the ADD and CGA requires specialists of a kind that are not generally found in the field of information management. In many SCAR nations responsibility for Antarctic geographic information, and the authority to agree and contribute to projects, is located in a National Mapping Agency or military survey setting. This is often completely separate from, and has limited communication with, scientific data management.

Merging with SCADM would risk the re-emergence of one of the problems that led to the separation of SCAGI from the SCAR Geosciences group. Many nations send only one delegate to meetings, which means that the delegate has to cover an area that is not their specialism and in which they have no organizational authority to contribute to projects.

3.3 Closer working with COMNAP: This should be an objective for SCAGI as they are a key user of Antarctic Geographic Information for operational planning. Previous attempts at closer working by

SCAGI and its predecessor SCAR-WGGI met with little success. SCAGI should try again to create a dialogue with COMNAP to ensure that SCAR geographic information products meet the needs of the Operations community. There is some progress at a local level - The Australian Antarctic Data Centre is producing 1:1M scale maps for aviation purposes. One pilot project was completed last year, four are proposed for the period July 2011 to June 2012.

4. Recommendations/Actions and Justification.

4.1 Delegates should ensure that they are familiar with the work that SCAGI does and encourage their national representatives to become involved with and contribute data to SCAGI products.

4.2 Delegates should seek to ensure that where a national representative retires or leaves their post a successor is appointed and supported to be involved with SCAGI to avoid loss of contact momentum.

5. Expected Benefits/Outcomes.

More engagement by a wider range of SCAR members would help to ensure the continued development and value of the SCAGI Geographic Information Services and promote their wider usage. Effective provision of reliable, accurate and relevant geographic information services through SCAGI is highly beneficial for science and operations in Antarctica and contributes to the international leadership of SCAR, in line with the Strategic Plan 2011-16.

6. Partners.

Partners for SCAGI include:

- The SCAR member nations and other SCAR-related groups such as SCADM and GIANT.
- The Antarctic Treaty System and COMNAP.
- Other international organizations that are involved with, or are users of Antarctic Geographic Information, including: the International Hydrographic Organization; national Hydrographic Organizations; national place-naming organizations; NASA; Google.

7. Budget Implications.

For the SCAR CGA and SCAR ADD to be improved, either SCAGI members take on the necessary work or the work is outsourced. Continuation of \$4k a year allocation is requested.

Adrian Fox and Roberto Cervellati

SCAR SCAGI Deputy Chief officers, June 2011.
