

**10<sup>th</sup> Hydrographic Commission on Antarctica (HCA) Meeting  
British Antarctic Survey (BAS), Cambridge,  
United Kingdom, 20-22 September 2010**

**FINAL MINUTES**

- Notes: 1) A list of acronyms used in these Minutes is at Annex A.  
2) A list of all actions from HCA10 is at Annex E.  
3) Names of persons are written in full the first time they appear in the Minutes. Afterwards, only the surname is shown.

**1.- OPENING**

Docs: HCA10-01A rev4            *List of Documents*  
          HCA10-01B rev3        *List of Participants*

The 10<sup>th</sup> Meeting of the Hydrographic Commission on Antarctica (HCA) took place in Cambridge, United Kingdom, from 20 to 22 September 2010. The meeting was hosted by the British Antarctic Survey (BAS) and organized by the United Kingdom Hydrographic Office (UKHO). Sixteen HCA Member States<sup>1</sup>, out of 23, were represented at this meeting, plus observers from COMNAP, IAATO, IALA, GEBCO/IBCSO and the UK Foreign and Commonwealth Office. In total, 31 delegates were in attendance.

Participants were welcomed by Mr. Nicolas Owens, Director of BAS. He mentioned that BAS has developed an Antarctic coastline, based on accurate aerial photography, which could be of interest to HCA. Opening Remarks were provided by Captain Hugo GORZIGLIA, IHB Director and Chairman of HCA. He referred to a series of HCA seminars / presentations successively given to ATCM (Kiev, Ukraine, 2008) at political level, to COMNAP (Punta Arenas, Chile, 2009) at operational level, and to IAATO (Turin, Italy 2010) at user level. He stressed the need for more data in Antarctic waters in support of charting. He expressed the hope that additional data would result from a resolution of the 33<sup>rd</sup> ATCM meeting (2010) inviting National Antarctic Programmes to forward their data collected during the International Polar Year (2007-2008) to HOs. He saw the data collected in Antarctica by academic institutions as another source of information. He thanked BAS and UKHO for the wonderful venue and the hard work in organizing this meeting. He reported that apologies for absence had been received from Japan.

The HCA Secretary, Ing. en chef Michel HUET (IHB), reviewed the documentation available to the meeting, noting that all documents were posted on the IHO website ([www.iho-ohi.net/mtg\\_docs/rhc/HCA/HCA10/HCA10Docs.htm](http://www.iho-ohi.net/mtg_docs/rhc/HCA/HCA10/HCA10Docs.htm)).

Outcome:

- The Commission noted the documents introduced.

**2.- HCA MEMBERSHIP STATUS**

Docs: HCA10-02A            *HCA Membership and Observers List*  
          HCA10-INF1            *Current HCA Statutes*

The Chair indicated that HCA currently comprised 23 IHO Members States. As 16 HCA members were in attendance – one third of the total number is required – decisions could be taken by a simple majority of members present, that is nine, should a vote be necessary.

Outcome:

- The Commission noted the two papers.

---

<sup>1</sup> Argentina, Australia, Brazil, Chile, Ecuador, France, Germany, India, Korea (Rep of), New Zealand, Norway, Peru, South Africa, Spain, UK and USA (NGA).

### 3.- APPROVAL OF THE AGENDA

Docs:	HCA10-03A rev4 HCA10-03B HCA10-03C	Agenda Annotated Agenda Time Table
-------	--	--

The proposed agenda was approved without change.

Outcome:

- The Commission approved the agenda (see Annex D).

### 4.- ELECTION OF VICE-CHAIRMAN

The Chair asked for volunteers, reminding that an HCA Vice-Chair must be elected at each HCA meeting. Comdre Rod NAIRN (Australia) conveyed Australia's offer to host the 2011 HCA meeting in Hobart, Tasmania, and volunteered as HCA Vice-Chair. This was unanimously supported and Comdre NAIRN was elected by acclamations.

Outcome:

- Comdre Rod NAIRN (Australia) was elected unanimously as Vice-Chairman of HCA.

### 5.- STATUS OF LIST OF ACTIONS RESULTING FROM THE 9TH HCA MEETING

Docs:	HCA10-05A rev3 HCA10-INF2	Status of Actions List from the 9 <sup>th</sup> HCA Meeting Minutes of the 9 <sup>th</sup> HCA Meeting, Simon's Town, South Africa, 2009
-------	------------------------------	---

The Chair and the Secretary reviewed all actions arising from the 9<sup>th</sup> HCA meeting. Most of the actions had been completed and the pending ones were being addressed by this meeting under various agenda items. Particular comments were made as follows (Action nos. are those in HCA10-05A):

- **Action 9/1 – Visit of hydrographic surveyors from Argentina, Chile and New Zealand to IAATO ships.**  
Argentina (Cdr Fabian Alejandro VETERE) reported on SHN visit to the *Minerva*. The data collected are generally coherent with the existing charts. However, they are only usable for preliminary plans, for future operations in the concerned area. These data cannot be used for charting. Chile (Capt Patricio CARRASCO) reported that they had not yet received any data following SHOA's visit to the *Star Princess*. New Zealand (Mr Adam GREENLAND) similarly reported that no data had been received yet, following LINZ's visit to the *Spirit of Enderby*. However LINZ considers this is a worthwhile task to continue and that at the very least the rendered information is useful to HOs.

India (Capt Ajay KUMAR JOLLY) felt that, without a Hydrographic team embarked onboard, the data collected cannot be used for cartographic purposes. UK (Mr Andy WILLETT) said that poor data is better than no data. Australia (NAIRN) wanted to know where the IAATO ships go to plan possible coverage.

Noting the above comments, IAATO (Ms Kim CROSBIE) recommended that actions be taken to improve the quality of data measured by IAATO ships and renewed its invitation to take HOs' personnel and equipment onboard its vessels. Further, IAATO holds past measurement information and is willing to provide this data to HOs. IAATO can also provide the programme of its ships for next summer season.

The Chair concluded that the exercise was useful and noted the followings:

- The IHB or UKHO could be the focal point to collect past data held by IAATO;
- Visits to IAATO ships should be widened to include other HCA members;

- IAATO is willing to embark specific equipment, e.g. data loggers.

He suggested that a sub-group be formed to further investigate and expand the ship visit scheme. This was agreed and the team was set up as follows: New Zealand (lead), Argentina, UK and IAATO.

In addition to Argentina, Chile and New Zealand, the following HCA members volunteered to participate in the IAATO ship visit program: Australia, Brazil and UK.

- **Action 9/4 – HCA reporting to ATCM.** The Chair suggested that HCA members liaise with their national delegation to ATCM, inviting them to raise, at ATCM meetings, the importance of hydrography for safety of navigation in Antarctica. This was supported.
- **Action 9/8 – Hydrographic surveyors embarking on IAATO ships.** So far, no HCA member has taken the opportunity of IAATO's offer. As stated above (Action 9/1), IAATO (CROSBIE) confirmed that its offer still stands.
- **Action 9/9 – INT charting contribution by USA.** USA-NGA (Mr Keith ALEXANDER) indicated that USA-NGA have included both charts INT 9062 and 9105 in their chart production plan.
- **Action 9/11 -INT chart producers to be also the producers of the corresponding ENC's – ENC's to be distributed via RENC's.** Australia (NAIRN) reported that negotiations were ongoing between PRIMAR and ICENC to align and harmonize their working practices. South Africa (Capt Abri KAMPFER) felt that the case of those HCA members that are not part of any RENC should be clarified, which was agreed. IAATO (Capt Paul BEGGS) expressed concern that not all ENC's for Antarctica might be available by 2012. UK (RAdm Nick LAMBERT) wondered whether the production of ENC's was adequate to the Antarctic region since GPS position there is so approximate and paper charts from which ENC's are being produced, are not really correlated with the user's needs.
- **Action 9/12 – Provision of bathymetric data to the IBCSO project.** IBCSO (Dr Ralf KROCKER) reported that the project was currently inactive due to lack of AWI personnel to work on it. The Chair mentioned that an *Arctic-Antarctic Seafloor Mapping Meeting* would take place in Stockholm, Sweden, on May 2011, and that he had been invited to attend as Chair HCA. This was supported. The Chair also suggested that GEBCO should liaise with Regional Hydrographic Commissions to improve bathymetry in the respective regions.
- **Action 9/14 – UK providing bathymetric data to Chile.** UK (WILLETT) reported that UKHO had already provided SHOA with bathymetric data for INT 9104.
- **Action 9/15 - Spain's request for change of limits for INT 9121.** The Secretary reported that the changes requested by IHM had been accepted by HCA members and that the IHO Catalogue of INT Charts, S-11, had been amended accordingly. Further, that the proposed new chart INT 9128 on *Base Juan Carlos I* had been accepted for inclusion in S-11.
- **Action 9/18 - Prioritized list of survey requirements.** HSPWG Chair (WILLETT) indicated that this would be reported under section 8.
- **Action 9/19 – HSPWG Membership.** Brazil (Capt Carlos ALBUQUERQUE) asked to be added to the list of members. This was noted by the HSPWG Chair.

Outcome:

- The Committee agreed the Minutes of HCA9 as a true record.
- The Committee noted the list of actions reviewed.
- The Committee approved continuation of the IAATO ship visit scheme.

- **Action 10/1 - HCA Chair** to invite IAATO to provide available past bathymetric data available, with a view to improving decision making process with regard to hydrographic survey priority assignment. Data can be provided to the IHB or directly to the HSPWG Chair.
- **Action 10/2 – Team on IAATO Ship Visit Scheme** (AR, NZ (lead), UK and IAATO) to develop further complementary future actions to implement ship visits and guidelines on the IAATO ship visit process. IHB / HCA Chair to disseminate such procedures to relevant parties.
- **Action 10/3 – HCA Chair** to coordinate the visit to IAATO ships of hydrographic surveyors from Argentina, Australia, Brazil, Chile, New Zealand, and UK through HMS Scott, when calling in ports on her way to Antarctica, or in Antarctica, to advice on the collection and rendering of hydrographic data, and report experience to HCA11.
- **Action 10/4 – HCA Members** to contact and brief their ATCM national delegate(s), with a view for the latter(s) to raising the importance of hydrography for safety of navigation in Antarctica at, and support IHO reports to, ATCM meetings.
- **Action 10/5 – HCA Members** to distribute their ENCs via a RENC. **HCA Chair** to clarify the case of those HCA members that are not members of any RENC.
- **Action 10/6 – HCA Chair** to represent HCA at the *Arctic-Antarctic Seafloor Mapping Meeting 2011*, to take place in Stockholm, Sweden, on 3-5 May 2011, and report to HCA11.
- **Action 10/7 – UK** to provide bathymetric data collected in Gerlache Strait to Chile, for production of chart INT 9103 (Proj. 2013).
- **Action 10/8 – HCA Secretary** to include the newly approved INT 9128, based on Spanish chart no. 7001 *Base Juan Carlos I*, into the INT Chart Scheme, with Spain as producer.

## 6.- RELEVANT INTERNATIONAL ORGANIZATIONS' REPORT

### 6.1 Antarctic Treaty Secretariat (ATS) ([www.ats.aq](http://www.ats.aq))

Docs: HCA10-INF3 IHO Report submitted to ATCM-33  
 HCA10-INF4 References related to IHO that appear in the ATCM XXXIII Report  
 HCA10-INF5 Forwarding of hydrographic data collected during the IPY

There was no representative of the ATCM Secretariat at the meeting. The Chair briefly referred to the compendium of items in HCA10-INF4, taken from the ATCM33 proceedings and of interest to HCA. In particular, he drew attention to the following items:

- Item 211. Uruguay made a proposal to encourage and facilitate the transfer of hydrographic data collected during the IPY to Hydrographic Offices. This proposal was approved and resulted in the adoption of ATCM Resolution 2 (2010). It is attached as Annex F.
- Item 217. ATCM33 endorsed the following recommendations from the Antarctic Treaty Meeting of Experts (ATME) on Ship-borne Tourism (Wellington, New Zealand, December 2009):
  - Recommendation 4: *that the Treaty Parties should continue to contribute to hydrographic surveying and charting information and consider advising vessels intending to operate in the Antarctic Treaty area that many areas have not been surveyed to modern standards.*
  - Recommendation 17: *The IHO-HCA should continue to be invited to annual ATCMs to report the status of hydrographic survey and nautical chart production in Antarctic waters. Parties also agreed that, as appropriate, the ATCM should be represented at IHO-HCA meetings. Where an IHO-HCA meeting was to be held in a country that was also a Consultative Party, then that Consultative Party should consider attending the HCA meeting.*

Ms Jane RUMBLE (UK Foreign and Commonwealth Office), who has attended all ATCM meetings since 2003, referred to the ATCM resolutions on hydrography agreed in 2008 and 2010. She stressed the importance of the HCA work, as well as the need for training of mariners on Antarctic navigation using electronic means. She suggested that HCA should report to ATCM that it is making good progress

to help legitimate its activity and give clear priority zones to be reported to IHO. India (KUMAR JOLLY) added that the HCA focus should be on quality and accuracy of particular areas rather than broad coverage which may conflict with environmental and safety issues. The Chair acknowledged that there was a need for improvement of how hydrography is addressed at ATCM meetings.

The 34<sup>th</sup> ATCM will take place in Buenos Aires, Argentina, from 20 June to 1 July 2011.

Outcome:

- The commission noted the three information papers.

### 6.2 Council of Managers of National Antarctic Programs (COMNAP) ([www.comnap.aq](http://www.comnap.aq))

Docs: HCA10-06.2A COMNAP Report

COMNAP (Mr David BLAKE, BAS) introduced the report. The main purpose of COMNAP is to develop and promote best practice in managing the support to scientific research in Antarctica. COMNAP provides the Antarctic Treaty System with practical and technical advice drawn from the National Antarctic Programs' pool of expertise. Recent COMNAP activities of interest to HCA included:

- Second Workshop “Towards improved Search and Rescue (SAR) coordination and response in the Antarctic”, Buenos Aires, Argentina, 2-4 November 2009.
- The COMNAP Ship Position Reporting System (SPRS). Latest positions and other practical information of all participating COMNAP vessels are broadcast to each of these vessels and their National Antarctic Program every time they send a position report, and are broadcast every 24h to relevant Antarctic Search and Rescue authorities.

COMNAP Secretariat is now hosted by the University of Canterbury, Christchurch, New Zealand. The 22<sup>nd</sup> COMNAP Annual General Meeting was held on 9-12 August 2010 in Buenos Aires, Argentina. The 23<sup>rd</sup> meeting will take place on 1-5 August 2011 in Stockholm, Sweden.

Outcome:

- The Commission noted the report.

### 6.3 International Maritime Organization (IMO) ([www.imo.org](http://www.imo.org))

There was no IMO representative at, nor IMO report to the meeting.

### 6.4 International Association of Antarctica Tour Operators (IAATO) ([www.iaato.org](http://www.iaato.org))

Docs: HCA10-INF6 HCA Presentations at the IAATO 21st Annual Meeting  
 HCA10-INF7 IAATO Overview of Antarctic Tourism: 2009-2010  
 HCA10-INF8 Report on Technical Visit to MV “Minerva”  
 HCA10-INF9 Report of IAATO 2009-10 to ATCM-33  
 HCA10-INF10 Spatial patterns of tour ship traffic in the Antarctic Peninsula region

IAATO (CROSBIE) introduced IAATO as a global network of tour operators that banded together in 1991 to advocate, promote and practice safe and environmentally responsible private-sector travel to the Antarctic.

She reported that, in total, approximately 21,600 passengers landed in Antarctica from seaborne vessels during the 2009-10 season. This represented some 20% drop in the number of landing passengers from the previous season, about 10% drop in the number of ships visiting Antarctica, and 3% drop in the number of travels to that area, a result of the worldwide economic downturn.

She mentioned that, for the 2010-11 season, all commercial SOLAS passenger ships in the IAATO fleet will participate in a web-based satellite vessel tracking system, with a view to enhancing contingency response. She gave a presentation *Spatial patterns of tour ship travel in the Antarctic Peninsula Region*, showing the changes in tour ship traffic over time, based on ships post visit reports, with 19 years of landing statistics and 5 years of reconstructed itineraries. She noted that vessel tracking will make this exercise simpler in the future.

She reiterated that IAATO was willing to contribute to improving hydrographic surveying in Antarctica via ships of opportunity.

The Chair referred to the set of presentations on the importance of hydrographic activities in Antarctica that were given by him and Andrew Willett (UK) in the frame of the IAATO 21<sup>st</sup> Annual Meeting (Turin, Italy, 21-24 June 2010). He said that the presentations, now available from the IHO website, were very well received and generated many questions and comments from the participants.

It was agreed that the HCA Vice-Chair would represent HCA at the next IAATO Annual Meeting, planned on 9-12 May 2011 in Hobart, Tasmania, Australia.

Outcome:

- The Commission noted the five information papers.
- **Action 10/9 – HCA Vice-Chair** to represent HCA at the IAATO 22<sup>nd</sup> Annual Meeting, to take place in Hobart, Tasmania, Australia, on 9-12 May 2011, and report to HCA11.

#### 6.5 Scientific Committee on Antarctic Research (SCAR) ([www.scar.org](http://www.scar.org))

There was no SCAR representative at, nor SCAR report to the meeting.

#### 6.6 Intergovernmental Oceanographic Commission (IOC) (<http://ioc.unesco.org>)

There was no IOC representative at, nor IOC report to the meeting.

#### 6.7 International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) ([www.iala-aism.org/](http://www.iala-aism.org/))

IALA (Mr Gary PROSSER) briefly presented the activities of this association and its several committees. IALA gathers marine aids to navigation authorities, manufacturers and consultants from all parts of the world. IALA's aim is to harmonize aids to navigation worldwide and to ensure that the movements of vessels are safe, expeditious, cost effective and harmless to the environment.

He referred to an IALA meeting on the marking of polar routes held in February 2010. The meeting focused on Arctic areas and agreed a resolution recommending that, for Arctic waters, IALA support the concerned nations (Canada, Denmark, Norway, Russia and USA) in relation to *inter alia* the importance of improving hydrographic services in the region.

Outcome:

- The Commission noted the presentation.

### 7.- HCA ACTIVITIES IN THE LIGHT OF THE IHO WORK PROGRAM:

**7.1 INT chart scheme: progress made since last meeting and actual charting status; new requirements and modifications proposed to the scheme (S-11).**

Docs: HCA10-07.1A INT Chart Scheme and Production Status for Region 'M'  
 HCA10-07.1B rev1 INT Charts in Progress or Not Produced  
 HCA10-07.1C Layout of INT Production Status for Region 'M'

IHB (HUET) recalled that the proposed chart INT 9128 (Spanish 7001) had been approved by HCA members, following HCA Letter 05/2010, and would therefore be included in S-11 Region M as soon as possible (see above new action 10/8). Ecuador (Cdr Jorge CARDENAS) proposed including a new 1:10,000 scale INT chart *Punta Fort Williams (Isla Greenwich)* in the scheme, covering the northwest part of the existing INT 9122 and with Ecuador as producer. Australia (NAIRN) proposed including two new 1:500,000 scale INT charts in the scheme in order to fill in existing gaps of coverage, i.e. *Kirby Island to Magnet Bay* to fill in the gap between INT 9040 and INT 9035, and *Cape Filchner to Mill Island* to fill in the gap between INT 9025 and INT 9020. UK (WILLETT) proposed including two new large scale INT charts in the scheme, in the areas of *Detaille Island* and *Snow Hill Island*. It was agreed that these proposals should be circulated to all HCA members and observers for comments. Details of the proposed new INT charts by Ecuador, Australia and UK are provided at Annex G.

Referring to HCA10-07.1A, IHB (HUET) reported on progress in INT chart coverage in Region 'M' over the past year. As of August 2010, 64 INT Charts had been produced out of the 102 INT charts of the scheme. Four charts were published since HCA9, i.e. new charts INT 9055 & 9057 by Germany and INT 9046 by Japan, and new edition of INT 9056 by South Africa. Also, 22 INT Charts (New Charts or New Editions) were planned for publication from 2010 to 2013. He mentioned HCA10-07.1C providing a lay-out of the status of INT chart production in Antarctica, as of August 2010.

The Commission then reviewed HCA10-07.1B focusing on INT charts in progress or not produced. The review results are summarized in the table below and will be reflected in S-11 in due course.

INT No.	Producer	Scale 1:	Comments
9062	US	200 000	USA-NGA have included this chart in their chart production programme, with publication planned in 2012.
9142	AR	10 000	Publication planned in 2011
9103	CL	50 000	Will be produced by Chile to 2015.
9104	CL	50 000	Will be produced by Chile to 2013.
9105	US	25 000	USA-NGA have included this chart in their chart production programme, with publication planned in 2011.
9159	GB	150 000	Publication postponed to 2013.
9162	CL	150 000	No date for the time being.
9163	GB	150 000	Publication postponed to 2012.
9164	CL	150 000	No date for the time being.
9113	GB	various	Publication planned after 2015.
9114	GB	various	Publication planned after 2015.
9116	GB	various	Publication planned after 2015.
9125	BR & PE	40 000	Publication postponed to 2011.
9126	BR	40 000	Publication planned in 2011.
9127	BR	40 000	Publication planned in 2011.
9130	GB	75 000	Publication planned after 2015.

9156	AR	150 000	Was published in 2010.
------	----	---------	------------------------

Noting that chart production in Antarctica is being delayed year after year, UK (LAMBERT) felt that it might be useful to warn ATCM delegates of this delay and the consequent danger for tourism navigation in that area, further suggesting to reduce shipping to surveyed routes with the expectation that ATCM delegates would then exert pressure on their respective governments, resulting in HOs being urged to produce the charts and, hopefully, appropriate resources being allocated. The Chair believed such action would have no impact on ATCM delegates. IAATO (CROSBIE) suggested it might be counter-productive to refer to tourism in support of chart production. For Australia (NAIRN), a number of INT charts are not produced either because there is no data available and no resources to undertake surveys in the relevant area, or the data are there but there is no cartographic resource available to produce the chart.

Outcome:

- The Commission noted the two reports and the paper.
- **Action 10/10 – HCA Secretary** to circulate to HCA members for comments:
  1. Ecuador's proposal for a new INT chart at 1:10,000 *Fort Williams Point*;
  2. Australia's proposal for two new INT charts at 1:500,000, i.e. *Kirby Island to Magnet Bay* (AUS 448) and *Cape Filchner to Mill Island* (AUS 453).
  3. UK's proposal for two new large scale INT charts in the areas of *Detaille Island* and *Snow Hill Island*.
- See also Action 10/8.

## 7.2 ENC scheme and production status

Doc: HCA10-07.2A rev1 ENC Schemes and Production Status in Antarctica

IHB (HUET) presented the ENC production status for Region 'M', as described in HCA10-07.2A. He recalled that an ENC scheme for bands 1 "overview" and 2 "general" was agreed in 2007 and an ENC scheme for band 3 was agreed in 2009. They are available from the IHO website and annexed to the above meeting document. From the information available at the IHB, status of ENC production in Antarctica, as of August 2010, was as follows:

HCA Member	ENC published	ENC planned (2011-12)
Chile	- 2 coastal ENCs (CL3MA850 and CL3MA800) - 3 harbour ENCs (CL5MA860, CL5MA890 and CL5MA870).	No charts planned for 2011 and 2012.
UK	- 12 overview ENCs (GB104024A, GB104024B, GB104064A, GB104064B, GB104075, GB14065W, GB14065E, GB104063, GB104074, GB104907, GB104213 and GB103200). - 1 general ENC (GB203596) - 4 coastal ENCs (GB372110, GB372220, GB372210 and GB372010). - 4 approaches ENCs (GB47211A, GB47201A, GB43593A and GB43593B). - 2 harbour ENCs (GB57211A and GB57211B).	- 1 coastal ENC (GB368506).

<b>France</b>	<ul style="list-style-type: none"> <li>- 1 approach ENC (FR475940).</li> <li>- 1 harbour ENC (FR575930).</li> <li>- 1 berthing ENC (FR67593A).</li> </ul>	<ul style="list-style-type: none"> <li>- 1 overview ENC based on INT 901 (FR175910).</li> <li>- several coastal ENC's based on FR charts 6741, 6498 and 7171.</li> </ul>
<b>Norway</b>	<ul style="list-style-type: none"> <li>- 1 overview ENC (NO1A5500).</li> </ul>	<ul style="list-style-type: none"> <li>- 1 overview ENC based on INT 909.</li> </ul>
<b>Australia</b>	<ul style="list-style-type: none"> <li>- 2 approaches ENC's (AU468062 and AU468063).</li> <li>- 1 harbour ENC (AU5600P1).</li> </ul>	<ul style="list-style-type: none"> <li>- 4 overview ENC's based on INT 74 (AU190060, AU190090, AU190120 and AU190150).</li> <li>- 13 general ENC's based on INT 9035 (AU270050), INT 9035 &amp; 9033 (AU270060), INT 9033 &amp; 9030 (AU270070), INT 9030 &amp; 9031 (AU270080), INT 9031 (AU270090), AUS 454 (AU270100 and AU270110), and AUS 597 (AU260060, AU260070, AU260080, AU250060, AU250070 and AU250080).</li> <li>- 1 coastal ENC (AU367142).</li> <li>- 5 approaches ENC's based on INT 9021 (AU466110 and AU467110), on INT 9032 (AU468077 and AU469077), and on INT 9014 (AU468142).</li> <li>- 2 harbour ENC's based on INT 9014 (AU5603P1) and INT 9021 (AU601P1).</li> </ul>
<b>Italy</b>	<ul style="list-style-type: none"> <li>- 2 coastal ENC's (IT300884 and IT300881)</li> <li>- 1 harbour ENC (IT400881).</li> </ul>	
<b>Germany</b>	<ul style="list-style-type: none"> <li>- 1 general ENC (DE260001)</li> <li>- 1 coastal ENC (DE3600010).</li> </ul>	<ul style="list-style-type: none"> <li>- 1 overview ENC based on INT 905</li> </ul>
<b>Brazil</b>	<ul style="list-style-type: none"> <li>- 1 coastal ENC (BR325110)</li> <li>- 1 approaches ENC (BR425121)</li> <li>- 1 harbour ENC (BR525121)</li> </ul>	
<b>New Zealand</b>		<ul style="list-style-type: none"> <li>- 1 overview ENC based on INT 65.</li> <li>- 1 general ENC based on INT 900.</li> <li>- 4 coastal ENC's based on INT 9008, INT 9009 and INT 9012.</li> <li>- 5 approaches ENC's based on INT 9001, INT 9003, INT 9006 and INT 9007.</li> <li>- 4 harbour ENC's based on INT 9002, INT 9003 and INT 9006.</li> </ul>
<b>South Africa</b>	<ul style="list-style-type: none"> <li>- 1 coastal ENC (ZA300300)</li> </ul>	

France (Ms Céline ROUX) drew attention to an ENC overlapping issue involving small scale ENC's to be produced in 2011-12 by France, Australia and New Zealand in the area from Davies Sea to Ross Sea. It was accepted that the existing small scale ENC scheme, agreed in 2007 and where priority was given to the most recently published corresponding INT chart, may need revision or adjustment based on actual ENC production plans. It was agreed that France, Australia and New Zealand would liaise to find a solution with no overlap between their respective ENC's, and report any ENC scheme changes to the IHB.

It was agreed that the Chair would report on the current status of ENC production in Antarctica, as part of the future HCA reports to ATCM meetings, in addition to reporting on progress in INT chart production.

Outcome:

- The Commission noted the report.
- **Action 10/11 – France, Australia and New Zealand** to coordinate no overlap between the ENCs to be produced by France (based on INT 901 – not before 2012), Australia (based on INT 74 – planned in 2011) and New Zealand (based on INT 900 – planned in 2011) on the basis that priority is given to the first ENC available for production. **France** to report to IHB any consequent changes to the existing small scale ENC scheme. **IHB** to amend this scheme as appropriate.
- **Action 10/12 - HCA Chair** to report on ENC production in Region M, as part of the HCA report to ATCM-34.

### 7.3 Interaction with IOC

#### A. The IOC-IHO GEBCO Project

*Docs: HCA10-07.3A Undersea Feature Naming in Antarctica*

There was no GEBCO report to the meeting. The Chair briefly reported on the GEBCO meetings held in Peru on the previous week. Of particular note, Google Ocean is keen to use GEBCO data and flag features with their names.

IHB (HUET - Secretary of SCUFN) reported on undersea feature naming matters in Antarctica. To date, 196 names have been approved in the HCA area by the IHO-IOC GEBCO Guiding Committee, following recommendation by its Sub-Committee on Undersea Feature Names (SCUFN). They are part of the GEBCO Gazetteer of Undersea Feature Names, which is available from [www.gebco.net/data\\_and\\_products/undersea\\_feature\\_names/documents/gebco\\_gazetteer\\_aug\\_2010.xls](http://www.gebco.net/data_and_products/undersea_feature_names/documents/gebco_gazetteer_aug_2010.xls). Since HCA9, no new name has been accepted in the HCA area for inclusion in the GEBCO Gazetteer.

He invited HCA members and observers to submit name proposals to the IHB, as SCUFN Secretariat, by filling in the form available, in English, French and Spanish, from [www.gebco.net/data\\_and\\_products/undersea\\_feature\\_names/#features\\_link3](http://www.gebco.net/data_and_products/undersea_feature_names/#features_link3), in accordance with the recommendations in IHO-IOC publication B-6 *Standardization of Undersea Feature Names* (See [www.gebco.net/data\\_and\\_products/undersea\\_feature\\_names/#features\\_link2](http://www.gebco.net/data_and_products/undersea_feature_names/#features_link2)).

Outcome:

- The Commission noted the report.

#### B. The IBCSO Project, an IOC-IHO-SCAR Project

There was no IBCSO report to the meeting. As already said above by Germany (KROCKER), the IBCSO project is stopped for the time being as the person at AWI who was in charge of this project has left and not been replaced.

### 7.4 Hydrographic surveying, nautical charting, nautical publications and information status.

#### A. Presentation of National Reports. Experiences with new techniques and equipment. Project proposals to speed-up compilation and production.

Docs: HCA10-07.4A *National Reports, from France, Norway, Japan, Chile, UK, Argentina, Australia, South Africa, Spain, Brazil, New Zealand, USA and Germany*

HCA members briefly presented their national reports. As a general note, the Chair stated that the HCA is the regional charting organisation that requires the more coordination because all countries are volunteers and cannot be pressed by the SOLAS convention like on their national area. The following particulars were noted (see national reports for more details):

**Argentina** – Cooperation on surveys with Uruguay and Venezuela has been fruitful. The icebreaker *Almirante Irizar* should be back to service for summer cruise 2011-12. INT chart 9156 was being published on 20 September 2010. SHN continues supporting the 2-week Antarctic navigation course which is held annually in Buenos Aires and open to foreign officers.

**Australia** – Multibeam surveys were conducted during the 2009-10 season in the area of Davis Station, in conjunction with Geoscience Australia (GA) and the Australian Antarctic Division (AAD). Chart production plan includes three new editions (INT 9037, 9036 and 9032) and two new charts (AUS 448 and AUS 453) that AHS has proposed to raise to INT status (see para. 7.1 and new action 10/10). ENC coverage under Australia's responsibility will be completed in 2011. Data needed to update INT 9030 is still awaited from India.

**Brazil** – A recognition team visited Maxwell Bay, Admiralty Bay and Elephant Island in order to install tidal stations.

**Chile** – In February 2010, SHOA carried out hydrographic surveys on Gerlache Strait. The resulting data will be used to update INT 9104 and two national charts of this area. No new INT chart or ENC has been published since HCA9.

**France** – No surveys were conducted in the HCA area and no new INT chart or ENC has been published since HCA9. SHOM deplores that they sometimes happen to know by accident of surveys performed by private companies, or even other HOs, in France areas of charting responsibility, and have to insist to obtain communication of IHO-compliant data relevant to INT charts and nautical information. The result of such surveys should be systematically communicated to the IHO recognized charting authority.

The Chair explained that IHB Circular Letter 50/2010 aimed at clarifying the issue above, by improving the text in INT Chart Regulation A-402.1 of S-4. The proposed revised text also addresses the case of bathymetric data collected by national scientific institutions, which should be made available to the national HO, then to the recognized charting authority, as appropriate.

In this connection, it was agreed that HOs should liaise with their relevant national scientific institutions and set up agreements for the collection of bathymetric information.

**Germany** – Germany's main area of interest is the Weddell Sea. INT 905 which covers its central part is being jointly produced by AWI and BSH, and is planned for publication in 2011, together with the corresponding ENC. Multibeam bathymetry was collected in early 2010 by RV *Polarstern* in the Amundsen and Bellingshausen Seas.

**India** – A hydrographic survey team was embarked on an icebreaker to survey the area of INT 9051 (India Bay). India (KUMAR JOLLY) was willing to assist in the transfer of survey data held by India to Australia in view of updating INT 9030 under Australia's responsibility.

**Korea (Rep. of)** – The multibeam equipped new Korean ice breaker *Araon* was commissioned in November 2009 and will be operated by the Korean Polar Research Institute (KOPRI). In addition to the existing King Sejong scientific base in the Antarctic Peninsula, KOPRI plans to establish another

base on the Ross Sea coast, to be named Jangbogo Station. Multibeam surveys were conducted in 1992 in Bransfield Strait.

The Chair suggested, and this was agreed, that the resulting bathymetric data could be useful to the charting authorities of the concerned area. Consequently, Rep of Korea (Dr Jong Kuk HONG and Mr Jae Young ROH) was invited to review and examine the past bathymetric data held by KOPRI and/or KHOA in Antarctic waters, with the intention that KOPRI/KHOA would consider making this data available to the relevant charting authorities.

**New Zealand** – No surveys were conducted in the Ross Sea, i.e. the area of interest of NZ, and no new INT chart or ENC has been published since HCA9. LINZ plans to start the production of those ENCs under NZ responsibility from 2011.

**Norway** - No surveys or charting activities in Antarctica took place since HCA9. INT 909 and the corresponding ENC are planned for publication in 2011. The building of an icebreaker is planned, to be operational from 2013 at the earliest.

**Peru** – The commission of RV *Humbolt*, planned in 2012, should foster Peru's activities in Antarctica.

**South Africa** – The ENC based on INT 9056 was published on 1 September 2010.

**Spain** – Two large scale surveys were conducted in February 2010 at Byers Peninsula, Livingston Island, and at Fumarole Bay, Deception Island. IHM's proposed amendments to INT 9121 have been accepted, as well as the proposal to include a new chart INT 9128 (Spanish 7001) in the scheme. Publication of an ENC corresponding to INT 9121 is planned on the occasion of the next edition of that INT chart. Spain (Capt Guillermo MOREU MUNAIZ) offered to make available to Argentina the survey data collected at Deception Island, in view of updating INT 9120 under Argentina's responsibility.

**UK** – HMS Scott conducted surveys in Bransfield Strait during the 2009-10 season, including the area of Deception Island. UK (LAMBERT) offered to make available to Argentina and Spain, the data collected in the areas of INT 9120 and INT 9121, respectively. In total, 22 ENCs have been published to date by UKHO in Antarctica.

There followed a discussion on how to progress / improve chart coverage in Antarctica. UK (LAMBERT) felt that a key issue is how to make pressure on, and get resource from Governments to produce Antarctic charts. The Chair suggested an appropriate forum for that could be IRCC, where all RHCs are gathered to discuss matters of common interest. Australia (NAIRN) however noted that HOs have responsibility for their own national waters in all other RHCs, as opposed to HCA. He suggested that ENCs be fully documented with metadata, for their appropriate use in ECDIS. In particular, the attribute CATZOC should be systematically populated. Also, that a large scale ENC scheme (usage bands 4 and 5) be developed, at least in the Antarctic Peninsula; this was agreed. UK (WILLETT) expressed that ENCs in Antarctica should be available by 2012, with the level and quality of data existing on paper chart at that time.

UK (LAMBERT) suggested warning IMO that a number of charts are inadequate for navigation. Australia (NAIRN) stressed that situation is likely to be worst with ENCs since a paper chart cannot be converted into an ENC if its datum is unknown. New Zealand (Greenland) cautioned not to send the wrong message to IMO. It was agreed that a sub-group would prepare a paper on this topic, for submission to IMO MSC/NAV. The team was set up as follows: UK (lead), Australia, New Zealand, South Africa and IAATO.

**USA** – The report addressed activities in Antarctica of both NGA and NOAA. No surveys were being conducted in the HCA area. Bathymetric data collected by US institutions, including academic, are available from the NGDC and MGDS websites. NGA stands ready to supply multibeam data for the area of INT 9000, under Italy's responsibility. DNCs have been produced on CDs for the entire world ocean;

CD 29 covers the HCA area. As reported above, INT 9105 and 9062 are planned for publication in 2011 and 2012, respectively. Consideration is being given to the production of the corresponding ENC's. A new edition of NGA Sailing Directions Publication 200 (Antarctica) was issued in 2009.

The Chair mentioned that a national report was also received from Japan.

Outcome:

- The Commission noted all national reports.
- **Action 10/13 – HCA Members** to establish links /arrangements with their relevant national scientific institutions for the collection of bathymetric information, and report on the outcome to HCA11.
- **Action 10/14 – India** to consider providing Australia with the bathymetric data collected in the Larsman Hills area during the 2009-10 season, when it has been processed, in view of updating INT 9030 under Australia's responsibility.
- **Action 10/15 – Rep. of Korea** to consider providing collected bathymetric data of Antarctic waters (HCA area) to the IHB, for further distribution to IHO INT Chart producers.
- **Action 10/16 – Spain and UK** to provide Argentina with bathymetric data recently collected in the area of Deception Island, in view of updating chart INT 9120 under Argentina's responsibility.
- **Action 10/17 – UK** to provide Spain with bathymetric data recently collected in the area of Livingston Island, in view of updating chart INT 9121 under Spain's responsibility.
- **Action 10/18 – Team on ENC Coverage** (UK (lead), AU, NZ, SA and IAATO) to prepare a paper to be submitted to IMO (MSC/NAV) to report on the real ENC coverage of Antarctic waters by 2012 due to poor bathymetric data availability, datum mis-adjustment problem, and other relevant factors.
- **Action 10/19 – HCA Chair** to inform Italy that the requested bathymetric data in support of INT 9000, under Italy's responsibility, is available and can be obtained from US-NGA.
- **Action 10/20 – HCA Members** to provide the IHB, as ENC coordinator for Region M, with a list of their large scale national charts that they intend to convert into ENC's – not duplicating existing INT charts, in order for the IHB to develop a large scale ENC scheme (navigational purposes 4 and 5). **IHB** to develop such scheme and submit it to HCA for comment / approval.
- **Action 10/21 – HCA Chair** to include in the HCA report to IRCC3 the main subjects discussed, in particular those that might have an impact on other RHCs, especially ArHC.

**B. C-55 Status: Hydrographic surveying, nautical charting and provision of MSI**  
*Docs: HCA10-07.4B C-55 Status and GIS for Antarctica – Progress Report*

IHB (HUET) reported on this matter. It was agreed that C-55 should be updated from the information contained in national reports.

IHB (HUET) reported that a "GIS for Antarctica" was being developed at the IHB. It comprises various layers of meta-information pertaining to Hydrography, e.g. surveys, INT charts or ENC's. It includes metadata and geographical coordinates. At present, the GIS addresses the following information:

- Coastline;
- Hydrographic Surveys;
- INT Charts;
- ENC's;
- Tide Gauges;
- Scientific Stations.

Additional information will include background bathymetry, geographical names and RNC's.

A prototype of the Antarctic GIS can be seen at <http://mail.ihb.mc:8880/HCA/>. User = monaco and password = applepolice. HCA members and observers were invited to have a look and provide their comments to the IHB.

Outcome:

- The Commission noted the report.
- **Action 10/22 – HCA Secretary** to update C-55, based on national reports.
- **Action 10/23 – HCA Members & Observers** to review the draft Antarctic GIS and provide comments and updating information, as appropriate.

### 7.5 Nautical Publications and Information. IHO/HCA web page.

IHB (HUET) briefly described the list of nautical publications on Antarctica, which appears on the IHO website (HCA page). It currently includes information provided by Argentina, Australia, Chile, France, South Africa and UK. HCA members were encouraged to continue populating this list.

Outcome:

- The Commission noted the verbal report.
- **Action 10/24 – HCA Members** to provide the IHB with updates to the list of nautical publications which is on the IHO website ([http://www.iho-ohi.net/mtg\\_docs/rhc/HCA/HCA\\_Misc/Nautical\\_Publications.htm](http://www.iho-ohi.net/mtg_docs/rhc/HCA/HCA_Misc/Nautical_Publications.htm)).

### 7.6 Capacity Building Issues

The Chair mentioned that, to date, no capacity building initiative relating to Antarctica had been reported to CBSC. He invited HCA members to suggest such initiatives for inclusion in the next 5-year IHO work programme. He further stressed that any capacity building submissions should be made before 1 April 2011, for them to be considered by CBSC at its next meeting in May 2011. South Africa (KAMPFER) suggested, as an example, funding of a survey team to embark on an IAATO ship. It was agreed that a sub-group formed of Australia, Argentina and South Africa (lead) would prepare a paper on potential capacity building initiatives pertaining to Antarctica.

Outcome:

- **Action 10/25 – HCA Chair** to prepare a draft Work Programme 2012-2017, including capacity building matters, and circulate it for comments to HCA members, with a view to have this document approved at HCA11.
- **Action 10/26 – Capacity Building Team** (AU, AR, ZA (lead)) to identify any HCA-related capacity building initiatives, to be submitted to the CBSC before 1 April 2011.

### 7.7 International Charting Coordination Working Groups (ICCWG)

*Docs: HCA10-07.7A ToR and RoP for ICCWG*

Referring to HCA Letter 02/2010, which followed-up IHB Circular Letter 23/2010, the Chair mentioned that the IHB is de facto acting as INT chart and ENC coordinator for the HCA area (INT Region M). He suggested continuing under this arrangement and that there was no need to formally establish an ICCWG for the HCA area. This was agreed.

Outcome:

- The Commission decided not to set up an ICCWG for the HCA area and that the IHB will continue to act as INT chart and ENC coordinator for the HCA area.

**8.- HCA SURVEY PRIORITIZATION WORKING GROUP**

Docs: HCA10-08A HCA Long Term Survey Plan  
 HCA10-08B HCA Survey Short List  
 HCA10-INF11 IAATO request for accessing national charts of Antarctica

HSPWG Chair (WILLETT) presented an updated HCA long term survey plan (HCA10-08A). The main additions related to new graphics on Maritime Safety Routes (MSR) covering mainland Antarctica, following Australia's request. Those additional MSRs have been based on ships usage rates, e.g. IAATO statistics, as well as the INT chart scheme and production status for Region M. It was agreed that HCA members wishing to include additional MSRs / survey requirements in the long term survey plan would inform the HSPWG Chair accordingly.

HSPWG Chair (WILLETT) presented an updated HCA survey short list, focusing on the survey status in some MSRs in the most visited zones of the Antarctic Peninsula and showing which areas have been surveyed and which areas remain to be surveyed. He suggested there was a need for additional surveys and INT charts in some areas, e.g. Dettelle Island and Snow Hill Island (see Action 10/10). IAATO (CROSBIE) agreed to review the HCA survey plans – long term and short list – and provide comments to the HSPWG Chair.

HSPWG Chair (WILLETT) conveyed to the meeting a request expressed at the IAATO 21<sup>st</sup> Annual Meeting (Turin, Italy, June 2010) for a simple access to all national charts of Antarctica. He suggested that a catalogue of those charts be developed, based on the former S-59 *Status of Hydrographic Surveying and Nautical Charting in Antarctica*, the chart catalogues of producer nations and/or the HCA members' websites. It was agreed that the IHB / HCA Secretary would compile such a catalogue, in liaison with HCA members. The HCA Secretary noted that all national charts should eventually appear in the HCA Antarctic GIS.

Outcome:

- The Commission noted the three papers.
- **Action 10/27 – HCA Members** to provide the HSPWG Chair with information on Maritime Shipping Routes (MSR) and survey requirements, to be reflected in the HCA survey plans (re: HCA10-08A and 08B).
- **Action 10/28 – IAATO** to review the HCA survey plans (re: HCA10-08A and 08B) and provide the HSPWG Chair with any comments and update information.
- **Action 10/29 – HCA Secretary** to post a list of Antarctic national charts on the IHO website by the end of October 2010. Circulate to HCA Members a draft list of Antarctic national charts including coordinates, for review and completion.

**9.- ANY OTHER BUSINESS****9.1 Overlapping of national cartography with INT charts**

The Chair recalled that this subject was already discussed at HCA9 and resulted in Action 9/17. HCA Members were invited to avoid the production of different national charts covering the same area and to ensure the provision of the most reliable and updated INT Chart of such area, with a view to not confusing the mariner and avoiding duplication of charting efforts. In this connection, the IHB had

prepared a graphic showing an example of chart overlapping in the area of Deception Island, which was presented.

South Africa (KAMPFER), Spain (MOREU MUNAIZ) and Australia (NAIRN) advocated that HCA should attempt to have one single and INT chart for a given area, and that all data available for that area should be passed to the HO responsible for the relevant INT chart. UK (WILLETT) suggested that INT chart co-production can be an option to reduce chart overlapping.

IAATO (BEGGS) said that mariners want to use updated charts. They wish that a new edition of a chart be produced when new data is available for that chart. Having several charts on a given area is not perceived as a problem.

The Chair noted that the ENC(s) derived from an INT chart will be unique, i.e. no duplication will occur.

Outcome:

- The Commission agreed that overlapping of national charts with existing INT charts should be avoided as far as possible.
- See also Action 10/29.

## 9.2 Use of Olex Data to improve charting in Antarctica

The Chair gave a presentation and mentioned that, at the IAATO 21st Annual Meeting (Turin, Italy, June 2010), particular interest was expressed by Mr Stephen WILKINS (Xplore Expeditions) and Capt Leif SKOG (Lindblad Expeditions) with regard to a bathymetric data collection system connected to an echosounder (single beam or multibeam) and known as Olex System ([www.olex.no](http://www.olex.no)). Tide adjustments are made from predicted values. Olex systems are essentially used by fishing vessels. Data is made available in ASCII format. He suggested that data collected by IAATO vessels fitted with such systems could significantly contribute to HCA, providing this data is collected following appropriate standards. Mr WILKINS had indicated that he would submit a set of data collected by Olex systems for HCA assessment.

Australia (NAIRN) felt that any data available is potentially useful and supported that Olex data be assessed by HCA members.

It was agreed that the Chair would continue investigating this matter.

Outcome:

- The Commission noted the presentation.
- **Action 10/30 – HCA Chair** to continue research to obtain bathymetric data in the HCA area, via Olex or other sources.

## 10 IMO charting issues in the Polar Regions

Australia (NAIRN) drew attention to a paper submitted by Denmark to IMO NAV55 (NAV 55/INF.6 - copy attached at Annex H) about polar areas where the inadequacy of nautical charts may impact on the use of ECDIS. It is planned that Denmark will prepare an initial draft circular to seek comments and support for co-sponsorship to NAV 57 (June 2011). He suggested that there would be benefit in HCA members contributing to the development of this IMO safety of navigation circular and invited those interested to register their interest with Mr Carsten Jensen, Danish Maritime Administration ([cqi@dma.dk](mailto:cqi@dma.dk)).

Outcome:

- The Commission supported that HCA members contribute to the planned IMO circular on safety of navigation in polar waters.
- See also Action 10/18.

**10.- TIME AND PLACE OF NEXT MEETING**

Australia (NAIRN) formally offered to host the 11th HCA meeting in Hobart, Tasmania. This proposal was gratefully accepted by the meeting and, after discussion, it was agreed that HCA10 would be held on 5-7 October 2011.

Outcome:

- **Action 10/31 – HCA Chair and Australia** to coordinate the organization of the 11th HCA Meeting, to take place in Hobart, Tasmania, Australia on 5-7 October 2011.

**11.- APPROVAL OF ACTION LIST**

The meeting reviewed the list of actions arising from HCA10. The agreed list is at Annex E.

**12.- CLOSURE**

On behalf of the meeting, the Chair warmly thanked the BAS and UKHO hosts for the excellent arrangements for HCA10. He also thanked all participants and observers for their valuable contribution to the meeting. He concluded that, in his view, the meeting was very successful.

The meeting closed at 13:00 on 22 September 2010.

---

## LIST OF ACRONYMS

AT	Antarctic Treaty
ATCM	Antarctic Treaty Consultative Meeting
AEM	Antarctic Treaty Experts Meeting
ATS	Antarctic Treaty System
AWI	Alfred Wegener Institute (Germany)
BAS	British Antarctic Survey (UK)
BSH	Bundesamt für Seeschifffahrt und Hydrographie (Germany)
C-55	Publication "Status of Hydrographic Surveying and Nautical Charting" (IHO)
CATZOC	Category of Zones of Confidence (IHO)
CB	Capacity Building
CBSC	Capacity Building Sub-Committee (IHO)
COMNAP	Council of Managers of National Antarctic Programmes
DNC	Digital Nautical Chart (USA-NGA)
ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigational Chart
GEBCO	General Bathymetric Chart of the Oceans (IHO-IOC)
GGC	GEBCO Guiding Committee
GIS	Geographic Information System
HCA	Hydrographic Committee on Antarctica (IHO)
HO	Hydrographic Office
HSPWG	HCA Survey Prioritisation Working Group
IAATO	International Association of Antarctic Tour Operators
IBCSO	International Bathymetric Chart of the Southern Ocean (IOC-IHO-SCAR)
ICCWG	International Charting Coordination Working Group (IHO)
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization

IMO	International Maritime Organization
INT	International (Charts) (IHO)
IOC	Intergovernmental Oceanographic Commission (UNESCO)
KHOA	Korean Hydrographic and Oceanographic Administration
KOPRI	Korean Polar Research Institute
LINZ	Land Information New Zealand
MGDS	Marine Geoscience Data System (USA)
MS	Member State
MSI	Maritime Safety Information
MSR	Maritime Safety Route
NAV	Sub-Committee on Safety of Navigation (IMO)
NGA	National Geospatial-intelligence Agency (USA)
NOAA	National Oceanographic and Atmospheric Administration (USA)
RENC	Regional ENC Coordinating Centre
RHC	Regional Hydrographic Commission (IHO)
SANHO	South African Navy Hydrographic Office
SAR	Search and Rescue
SCAR	Scientific Committee on Antarctic Research
SCUFN	Sub-Committee on Undersea Feature Names (GEBCO)
SDI	Spatial Data Infrastructure
SOLAS	Safety Of Life At Sea convention (IMO)
SOO	Ship Of Opportunity
SPRS	Ship Position Reporting System (COMNAP)
ToR	Terms of Reference
UKHO	United Kingdom Hydrographic Office
WG	Working Group

## LIST OF PARTICIPANTS

I. Members	Name	E-mail
Argentina	Cdr Fabian Alejandro VETERE	<a href="mailto:fveter@hidro.gov.ar">fveter@hidro.gov.ar</a>
Australia	Comdre Rod NAIRN ( <b>Vice-Chairman</b> )	<a href="mailto:Rod.Nairn@defence.gov.au">Rod.Nairn@defence.gov.au</a> <a href="mailto:international.relations@hydro.gov.au">international.relations@hydro.gov.au</a>
Brazil	Capt Carlos ALBUQUERQUE Cdr Edson MAGNO	<a href="mailto:int.rel@dhn.mar.mil.br">int.rel@dhn.mar.mil.br</a>
Chile	Capt Patricio CARRASCO LCdr Miguel E. VASQUEZ	<a href="mailto:director@shoa.cl">director@shoa.cl</a> <a href="mailto:mvasquez@shoa.cl">mvasquez@shoa.cl</a>
Ecuador	Cdr Jorge CARDENAS	<a href="mailto:direccion@inocar.mil.ec">direccion@inocar.mil.ec</a>
France	Ms Céline ROUX	<a href="mailto:dspre-rex@shom.fr">dspre-rex@shom.fr</a>
Germany	Dr Ralf KROCKER	<a href="mailto:Ralf.Krocker@awi.de">Ralf.Krocker@awi.de</a>
India	Capt Ajay KUMAR JOLLY	<a href="mailto:incho@dataone.in">incho@dataone.in</a> <a href="mailto:ia-incho-navy@nic.in">ia-incho-navy@nic.in</a>
Korea (Rep. Of)	Mr Jae Young ROH Dr Jong Kuk HONG	<a href="mailto:nohgy@korea.kr">nohgy@korea.kr</a> <a href="mailto:jkhong@kopri.re.kr">jkhong@kopri.re.kr</a>
New Zealand	Mr Adam GREENLAND	<a href="mailto:agreenland@linz.govt.nz">agreenland@linz.govt.nz</a>
Norway	Mr Kjetil WIRAK	<a href="mailto:Kjetil.Wirak@statkart.no">Kjetil.Wirak@statkart.no</a>
Peru	Cdr Walter FLORES SERVAT	<a href="mailto:wflores@dhn.mil.pe">wflores@dhn.mil.pe</a>
South Africa	Capt Abri KAMPFER	<a href="mailto:hydrosan@iafrica.com">hydrosan@iafrica.com</a>
Spain	Capt Guillermo MOREU MUNAIZ LCdr José María BUSTAMANTE CALABUIG	<a href="mailto:ihmesp@fn.mde.es">ihmesp@fn.mde.es</a>
United Kingdom	Radm Nick LAMBERT Mr Andy WILLETT	<a href="mailto:Nicolas.Lambert@ukho.gov.uk">Nicolas.Lambert@ukho.gov.uk</a> <a href="mailto:andy.willet@ukho.gov.uk">andy.willet@ukho.gov.uk</a>
USA (NGA)	Mr Keith ALEXANDER	<a href="mailto:Keith.E.Alexander@nga.mil">Keith.E.Alexander@nga.mil</a>
II. IHB	Name	E-mail
	Capt Hugo M. GORZIGLIA ( <b>Chairman</b> ) Ing en Chef Michel HUET ( <b>Secretary</b> )	<a href="mailto:hgorziglia@ihb.mc">hgorziglia@ihb.mc</a> <a href="mailto:mhuet@ihb.mc">mhuet@ihb.mc</a>
III. Observers	Name	E-mail
COMNAP/SCALOP	Mr David BLAKE	<a href="mailto:dmb@bas.ac.uk">dmb@bas.ac.uk</a>
IAATO	Mr Steve WELLMEIER Ms Kim CROSBIE Capt Paul BEGGS Capt Leif SKOG	<a href="mailto:Swellmeier@iaato.org">Swellmeier@iaato.org</a> <a href="mailto:kimcrosbie@iaato.org">kimcrosbie@iaato.org</a> <a href="mailto:pbeggs@princesscruises.com">pbeggs@princesscruises.com</a> <a href="mailto:leifs@expeditions.com">leifs@expeditions.com</a>
IALA	Mr Gary PROSSER	<a href="mailto:secgen.iala@wanadoo.fr">secgen.iala@wanadoo.fr</a>
GEBCO/ IBCSO	Dr Ralf KROCKER	<a href="mailto:Ralf.Krocker@awi.de">Ralf.Krocker@awi.de</a>
UK Foreign and Commonwealth Office	Ms Jane RUMBLE	<a href="mailto:Jane.Rumble@fco.gov.uk">Jane.Rumble@fco.gov.uk</a>

## LIST OF DOCUMENTS

Document	Content	Responsible
HCA10-01A rev4	List of Documents	Secretary
HCA10-01B rev3	List of Participants	Secretary
HCA10-02A	HCA Membership and Observers List	Secretary
HCA10-03A rev4	Agenda	Chairman
HCA10-03B	Annotated Agenda	Chairman
HCA10-03C	Time Table	Chairman
HCA10-05A rev3	Status of Actions List from the 9 <sup>th</sup> HCA Meeting	Secretary
HCA10-06.2A	COMNAP Report	COMNAP
HCA10-07.1A	INT Chart Scheme and Production Status for Region 'M'	Secretary
HCA10-07.1B rev1	INT Charts in Progress or Not Produced	Secretary
HCA10-07.1C	Layout of INT Production Status for Region 'M'	Secretary
HCA10-07.2A rev1	ENC Schemes and Production Status in Antarctica	Secretary
HCA10-07.3A	Undersea Feature Naming Status for Region 'M'	Secretary
HCA10-07.4A	National Reports	HCA Member States
HCA10-07.4B	C-55 Status and GIS for Antarctica – Progress Report	Secretary
HCA10-07.7A	ToR and RoP for ICCWG	Secretary
HCA10-08A	HCA Long Term Survey Plan	HSPWG Chair
HCA10-08B	HCA Survey Short List	HSPWG Chair
	<b>INFORMATION DOCUMENTS</b>	
HCA10-INF1	Current HCA Statutes	Secretary
HCA10-INF2	Minutes of the 9 <sup>th</sup> HCA Meeting, Simon's Town near Cape Town, South Africa, 2009	Secretary
HCA10-INF3	IHO Report submitted to the ATCM-33	Chairman
HCA10-INF4	References related to IHO that appear in the ATCM XXXIII Report	Chairman
HCA10-INF5	Forwarding of hydrographic data collected during the IPY	Chairman
HCA10-INF6	HCA Presentations at the IAATO 21 <sup>st</sup> Annual Meeting	Chairman
HCA10-INF7	IAATO Overview of Antarctic Tourism: 2009-2010	IAATO
HCA10-INF8	Report on Technical Visit to MV "Minerva"	Argentina
HCA10-INF9	Report of the International Association of Antarctica Tour Operators 2009-10 to ATCM-33	IAATO
HCA10-INF10	Spatial patterns of tour ship traffic in the Antarctic Peninsula region	IAATO & U. of Maryland, USA
HCA10-INF11	IAATO request for accessing national charts of Antarctica	HSPWG Chair

**AGENDA**

- 1.- **Opening**
  - Docs: HCA10-01A *List of Documents*
  - HCA10-01B *List of Participants*
  
- 2.- **HCA Membership Status**
  - Docs: HCA10-02A *HCA Membership and Observers List*
  - HCA10-INF1 *Current HCA Statutes*
  
- 3.- **Approval of Agenda**
  - Docs: HCA10-03A *Agenda*
  - HCA10-03B *Annotated Agenda*
  - HCA10-03C *Time Table*
  
- 4.- **Election of Vice-Chairman**
  
- 5.- **Status of List of Actions resulting from HCA9**
  - Docs: HCA10-05A *Status of Actions List from the 9<sup>th</sup> HCA Meeting*
  - HCA10-INF2 *Minutes of the 9<sup>th</sup> HCA Meeting, Simon's Town, South Africa, 2009*
  
- 6.- **Relevant International Organizations' Report**
  - 6.1 ATCM
    - Docs: HCA10-INF3 *IHO Report submitted to ATCM-33*
    - HCA10-INF4 *References related to IHO that appear in the ATCM XXXIII Report*
    - HCA10-INF5 *Forwarding of ydrographic data collected during the IPY*
  
  - 6.2 COMNAP
    - Docs: HCA10-06.2A *COMNAP Report*
  
  - 6.3 IMO
  
  - 6.4 IAATO
    - Docs: HCA10-INF6 *HCA Presentations at the IAATO 21<sup>st</sup> Annual Meeting*
    - HCA10-INF7 *IAATO Overview of Antarctic Tourism: 2009-2010*
    - HCA10-INF8 *Report on Technical Visit to MV "Minerva"*
    - HCA10-INF9 *Report of IAATO 2009-10 to ATCM-33*
    - HCA10-INF10 *Spatial patterns of tour ship traffic in the Antarctic Peninsula region*
  
  - 6.5 SCAR
  
  - 6.6 IOC
  
  - 6.7 IALA
  
- 7.- **HCA Activities in the light of the IHO Work Program**
  - 7.1 INT chart scheme: progress made since last meeting and actual charting status; new requirements and modifications proposed to the scheme (S-11).
    - Docs: HCA10-07.1A *INT Chart Scheme and Production Status for Region 'M'*
    - HCA10-07.1B *INT Charts in Progress or Not Produced*
    - HCA10-07.1C *Layout of INT Production Status for Region 'M'*
  
  - 7.2 ENC scheme and production status

Doc: HCA10-07.2A *ENC Schemes and Production Status in Antarctica*

7.3 Interaction with IOC:

- The IOC/IHO GEBCO Project

Docs: HCA10-07.3A *Undersea Feature Naming in Antarctica*

- The IBCSO Project, an IOC/IHO/SCAR Project.

7.4 Hydrographic surveying, nautical charting, nautical publications and information status.

- Presentation of National Reports. Experiences with new techniques and equipment. Project proposals to speed-up compilation and production.

Docs: HCA10-07.4A *National Reports*

- C-55 Status: hydrographic surveying, nautical charting and provision of MSI

Docs: HCA10-07.4B *C-55 Status and GIS for Antarctica – Progress Report*

7.5 Nautical Publications and Information. IHO/HCA web page.

7.6 Capacity Building Issues

7.7 International Charting Coordination Working Groups (ICCWG)

Docs: HCA10-07.7A *ToR and RoP for ICCWG*

## 8.- **HCA Survey Prioritisation Working Group**

Docs: HCA10-08A *HCA Long Term Survey Plan*

HCA10-08B *HCA Survey Short List*

HCA10-INF11 *IAATO request for accessing national charts of Antarctica*

## 9.- **Any other business**

9.1 Overlapping of national cartography with INT charts

9.2 Use of Olex Data to improve charting in Antarctica

9.3 IMO charting issues in the Polar Regions

## 10.- **Time and Place of next Meeting**

## 11.- **Approval of Action List**

## 12.- **Closure**

ACTIONS RESULTING FROM THE 10<sup>th</sup> HCA MEETING

Agenda Item	Action	Details	Responsible
5	10/1	Invite IAATO to provide available past bathymetric data available, with a view to improving decision making process with regard to hydrographic survey priority assignment. Data can be provided to the IHB or directly to the HSPWG Chair.	HCA Chair
5	10/2	Develop further complementary future actions to implement ship visits and guidelines on the IAATO ship visit process. IHB to disseminate such procedures to relevant parties.	AR, NZ(lead), UK and IAATO HCA Chair
5	10/3	Coordinate the visit of hydrographic surveyors from Argentina, Australia, Brazil, Chile, New Zealand and UK through HMS Scott to IAATO ships, when calling in ports on her way to Antarctica, or in Antarctica, to advice on the collection and rendering of hydrographic data, and report experience to HCA11.	AR, AU, BR, CH, NZ UK, and IAATO
5	10/4	Contact and brief their ATCM national delegate(s), with a view for the latter(s) to raising the importance of hydrography for safety of navigation in Antarctica at, and support IHO reports to ATCM meetings.	HCA Members
5	10/5	Distribute their ENCs via a RENC. Chair to clarify the case of those HCA members that are not members of any RENC.	HCA Members HCA Chair
5	10/6	Represent HCA at the <i>Arctic-Antarctic Seafloor Mapping Meeting 2011</i> , to take place in Stockholm, Sweden, on 3-5 May 2011, and report to HCA11.	HCA Chair
5	10/7	Provide bathymetric data collected in Gerlache Strait to Chile, for production of chart INT 9103 (Proj. 2013).	UK
5	10/8	Include the newly approved INT 9128, based on Spanish chart no. 7001 <i>Base Juan Carlos I</i> , into the INT Chart Scheme, with Spain as producer.	HCA Secretary
6.4	10/9	Represent HCA at the IAATO 22 <sup>nd</sup> Annual Meeting, to take place in Hobart, Tasmania, Australia, on 9-12 May 2011, and report to HCA11.	HCA Vice Chair
7.1	10/10	Circulate to HCA members for comments: <ul style="list-style-type: none"> <li>a) Ecuador's proposal for a new INT chart at 1:10,000 <i>Fort Williams Point</i>;</li> <li>b) Australia's proposal for two new INT charts at 1:500,000, i.e. <i>Kirby Island to Magnet Bay</i> (AUS 448) and <i>Cape Filchner to Mill Island</i> (AUS 453).</li> <li>c) UK proposal for two new large scale INT charts in the areas of <i>Detaille Island</i> and <i>Snow Hill Island</i>.</li> </ul>	HCA Secretary
7.2	10/11	Coordinate no overlap between ENCs to be produced by France (based on INT 901 – not before 2012), Australia (based on INT 74 – planned in 2011) and New Zealand (based on INT 900 – planned in 2011) on the basis that priority is given to the first ENC available for production. Report to IHB any changes to the small scale ENC scheme. IHB to amend this scheme as appropriate.	FR, AU, NZ IHB

Agenda Item	Action	Details	Responsible
7.2	10/12	Report on ENC production in Region M, as part of the HCA report to ATCM-34.	HCA Chair
7.4	10/13	Establish links /arrangements with their relevant national scientific institutions for the collection of bathymetric information, and report on the outcome to HCA11.	HCA Members
7.4	10/14	Consider providing Australia with the bathymetric data collected in the Larsman Hills area during the 2009-10 season, when it has been processed, in view of updating INT 9030 under Australia's responsibility.	India
7.4	10/15	Consider providing collected bathymetric data of Antarctic waters (HCA area) to the IHB, for further distribution to IHO INT Chart producers.	Korea (Rep of) IHB
7.4	10/16	Provide Argentina with bathymetric data recently collected in the area of Deception Island, in view of updating chart INT 9120 under Argentina's responsibility.	Spain and UK
	10/17	Provide Spain with bathymetric data recently collected in the area of Livingston Island, in view of updating chart INT 9121 under Spain's responsibility.	UK
7.4	10/18	Prepare a paper to be submitted to IMO (MSC/NAV) to report on the real ENC coverage of Antarctic waters by 2012 due to poor bathymetric data availability, datum mis-adjustment problem, and other relevant factors.	UK (lead), AU, NZ, SA, and IAATO
7.4	10/19	Inform Italy that the requested bathymetric data in support of INT 9000, under Italy's responsibility, is available and can be obtained from US-NGA.	HCA Chair
7.4	10/20	Provide the IHB, as ENC coordinator for Region M, with a list of their large scale national charts that they intend to convert into ENCs – not duplicating existing INT charts, in order for the IHB to develop a large scale ENC scheme (navigational purposes 4 and 5). IHB to develop such scheme and submit it to HCA for comment / approval.	HCA Members IHB
7.4	10/21	Include in the HCA report to IRCC3 the main subjects discussed, in particular those that might have an impact on other RHCs, specially ArHC.	HCA Chair
7.4	10/22	Update C-55, based on national reports.	HCA Secretary
7.4	10/23	Review the draft Antarctic GIS and provide comments and updating information, as appropriate	HCA Members & Observers
7.5	10/24	Provide the IHB with updates to the list of nautical publications which is on the IHO website ( <a href="http://www.iho-ohi.net/mtg_docs/rhc/HCA/HCA_Misc/Nautical_Publications.htm">http://www.iho-ohi.net/mtg_docs/rhc/HCA/HCA_Misc/Nautical_Publications.htm</a> ).	HCA Members
7.6	10/25	Prepare a draft Work Programme 2012-2017, including capacity building matters, and circulate it for comments to HCA members, with a view to have this document approved at HCA11.	Chair HCA Members
7.6	10/26	Identify any HCA-related capacity building initiatives, to be submitted to the CBSC before 1 April 2011.	AU, AR, ZA (lead)
8	10/27	Provide the HSPWG Chair with information on Maritime Shipping Routes (MSR) and survey requirements, to be reflected in the HCA survey plans (re: HCA10-08A and 08B).	HCA Members

Agenda Item	Action	Details	Responsible
8	10/28	Review the HCA survey plans (re: HCA10-08A and 08B) and provide the HSPWG Chair with any comments and update information.	IAATO
9.1	10/29	Post a list of Antarctic national charts on the IHO website by the end of October 2010. Circulate to HCA Members a draft list of Antarctic national charts including coordinates, for review and completion.	HCA Secretary and HCA Members
9.2	10/30	Continue research to obtain bathymetric data in the HCA area, via Olex or other sources.	HCA Chair
10	10/31	Coordinate the organization of the 11 <sup>th</sup> HCA Meeting, to take place in Hobart, Tasmania, Australia on 5-7 October 2011.	HCA Chair and Australia

ANTARCTIC TREATY CONSULTATIVE MEETING (ATCM)  
ATCM33, Punta del Este, Uruguay, June 2010

**Resolution 2 (2010)**  
**The contribution of the IPY to hydrographic knowledge of Antarctic waters**

The Representatives,

*Considering* the appeal made by the Hydrographic Commission on Antarctica (HCA) of the International Hydrographic Organization with respect to improving collection of hydrographic data and charting in the Antarctic region;

*Noting* the increase in scientific expeditions in the Southern Ocean as part of the International Polar Year (IPY) 2007 – 2008;

*Considering* that vessels of the national programs and others linked to the IPY are being urged to compile, whenever possible, hydrographic and bathymetric data on all Antarctic voyages;

*Acknowledging* that access to and management of observations and data collected during the IPY is fundamental to ensuring the legacy of the IPY;

*Taking into account* the fact that new forms of data forwarding have been developed since the publication of Resolution 5 (2008);

**Recommend** that governments and the ATCM:

- 1) Support and promote contacts and liaisons between national IPY committees and national hydrographic offices.
- 2) Endeavour to ensure that hydrographic and bathymetric data collected during the IPY be forwarded by the national IPY committees to the national hydrographic services using the formats developed to this end, and to instruct those responsible to give the HCA access to the full inventory of data so that they can be considered for use in the production of international nautical charts under the international charting scheme coordinated by the HCA.
- 3) Promote liaison and cooperation between national hydrographic offices and the HCA to ensure the legacy of the IPY in the field of hydrography, thereby contributing to the improvement of nautical charts and the safety of navigation in Antarctic Treaty waters.

## PROPOSED NEW INT CHARTS BY ECUADOR, AUSTRALIA AND UK

<b>INT Number</b>	Not yet assigned		Not yet assigned		Not yet assigned		Not yet assigned		Not yet assigned	
<b>National Number</b>	Not known		Aus 448		Aus 453		Not known		Not known	
<b>Producer</b>	Ecuador		Australia		Australia		UK		UK	
<b>Datum</b>	WGS 84		WGS84		WGS84		WGS84		WGS84	
<b>Projection</b>	Mercator		Mercator		Mercator		Mercator		Mercator	
<b>Format</b>	A1 (514.7 x 887.9 mm)		A0		A0		Not known		Not known	
<b>Chart Title</b>	Punta Fort Williams, Isla Greenwich		Kirby Island to Magnet Bay		Cape Filchner to Mill Island		Detaille Island		Snow Hill Island (Main Sheet)	
<b>Chart Scale</b>	1:10,000 at 62°26'S		1:500,000 at 68°S		1:500,000 at 68°S		1:10,000 at 66°30'S		1:75,000 at 66°30'S	
<b>Chart Limits (NE)</b>	62°24.15'S	59°42.84'W	64°35'S	57°25'E	63°45'S	102°23'E	66°51.0'S	66°46.0'W	64°07.5'S	56°20.0'W
<b>Chart Limits (SW)</b>	62°27.85'S	59°48.83'W	67°47'S	45°00'E	67°00'S	90°00'E	66°52.5'S	66°49.5'W	64°36.5'S	57°55.0'W
<b>Plan Title</b>										Snow Hill Island (Inset Plan)
<b>Plan Scale</b>										1:30,000 at 66°30'S
<b>Plan Limits (NE)</b>										64°31.0'S 57°22.0'W
<b>Plan Limits (SW)</b>										64°36.0'S 57°33.0'W



IMO

SUB-COMMITTEE ON SAFETY  
OF NAVIGATION  
55th session  
Agenda item 20

NAV 55/INF.6  
21 May 2009  
ENGLISH ONLY

### ANY OTHER BUSINESS

#### Precautions in using navigational charts in Greenland waters Submitted by Denmark

##### SUMMARY

<b>Executive summary:</b>	This document provides information regarding precautions in use of navigational charts in Greenland waters in terms of inaccuracies in paper charts due to incorrect positioning of the coastline, geographical datum and hydrographic survey. Further, this document informs of precautions regarding the use of electronic navigation in Greenland coastal waters.	
<b>Strategic direction:</b>	5.2	
<b>High-level action:</b>	5.2.4	
<b>Planned output:</b>	-	
<b>Action to be taken:</b>	Paragraph 35	
<b>Related documents:</b>	MSC 86/3; SN.1/Circ.276, SN.1/Circ.255, SN.1/Circ.207/Rev.1 and MSC/Circ.1056	SN/Circ.213,

##### Introduction

1 At its eighty-sixth session, the Maritime Safety Committee is expected to adopt a carriage requirement for an Electronic Chart Display and Information System (ECDIS) for SOLAS vessels with an implementation period from 2012 to 2018. In this context, Denmark has found it essential to provide guidance on navigation in Greenland waters in the light of the still limited coverage of Electronic Navigational Charts (ENC) in these waters in 2012 and ahead.

2 Greenland covers a large Arctic area (2,127,600 km<sup>2</sup>) and is navigationally considered a remote area. The distances between the settlements in Greenland are large, and the consequences of an accident may be greater in Greenland compared to more densely navigated waters, where

search and rescue facilities are seldom far away. In addition to this, an accident could have a serious impact on the vulnerable Arctic environment.

3 Navigation in Greenland waters differs significantly from navigation in other (non-Arctic) waters. In general, it is difficult for mariners who are not familiar with the conditions to navigate around Greenland. It is, to a high degree, due to the climate and the influence of the weather. Furthermore, instruments such as magnetic compasses may be unusable and gyrocompasses may be unreliable.

4 In waters with more frequent maritime traffic, markings and other navigational systems have normally been established to assist mariners. Due to the remote Arctic location and the historically low density of maritime traffic, the assistance offered to mariners in the form of charts within the scope of relevant IHO standards and other facilities has not reached the same level in Greenland. Furthermore, floating markings are not an option due to ice conditions and great depths.

5 In addition, systematic and completely covering hydrographic surveys have not been carried out in many areas along the coasts of Greenland due to the wide extent of the sea area and the Greenland archipelago. In other words, depth conditions will be unknown or depth data will be of poor quality in large areas. For mariners it is essential to understand the limitations in the source material providing the basis for the production of paper charts and, consequently, the information given in the paper charts must be interpreted with caution.

6 Modern navigation is based on Global Navigational Satellite Systems (GNSS) as, e.g., GPS. The continuous marking of the ship's position on an ENC in the ECDIS system is made by means of GNSS. Positions obtained from satellite navigation systems refer to World Geodetic System 1984 (WGS 84) datum.

7 The use of ECDIS in Greenland waters requires the availability of ENCs which refer to WGS 84 datum and are produced with a correct positioning of topography, including coastline, and hydrography in the geographic net. At present, ENCs are not available for Greenland coastal navigation, except for a very few exceptions.

8 In Greenland coastal waters, the inaccuracies in the present paper charts could endanger safety of navigation if the navigator relies on satellite based electronic navigation instead of the use of terrestrial navigation.

### **Navigation in Greenland waters in terms of inaccuracies in paper charts**

9 At present, the paper charts available for Greenland waters are not compatible with GNSS navigation, as, e.g., GPS, for several reasons.

10 Incorrect positioning of topography and hydrography in the geographic net. A major difficulty with the paper charts available for Greenland waters is the incorrect positioning of the coastline in the geographic net in the charts. At the northern and eastern coastlines where the uncertainty is most distinct, the coastline may be positioned several nautical miles incorrect. In other parts of Greenland, the uncertainty may be less, but still at a substantive level when comparing with the accurate position achievable from a GNSS receiver. In general, charts of the northern and eastern Greenland coastlines are misplaced by 0-5,000 metres, and in some areas of the extreme northeast Greenland even more. Charts of the west Greenland coastlines are

misplaced by 0-1,000 metres.

11 Due to this fact a note has been inserted in the paper charts covering the Greenland west coast, stating, e.g., *Due to age, quality and some of the source material, it must be expected that positions obtained from satellite navigation system are more accurate than those on this chart.*

12 In the paper charts covering the Greenland east coast, the following note is found: *The difference between satellite-derived positions and positions on this chart cannot be determined; mariners are warned that these differences MAY BE SIGNIFICANT TO NAVIGATION and are therefore advised to use alternative sources of positional information, particularly when closing the shore or navigating in the vicinity of dangers.*

13 Conclusion: In the paper charts available for Greenland waters, the positioning of the information in the charts (i.e. topography, including coastline, and hydrography, etc.) is inaccurate, which means that ships cannot navigate safely by means of satellite navigation on the basis of the present paper charts.

14 It is important to emphasize that, despite the inaccuracies of the paper charts; it is possible for ships to navigate in coastal areas if they use their radar equipment as the primary positioning instrument and rely on terrestrial navigation methods when navigating in Greenland waters.

15 Chart datum. The paper charts available for west Greenland waters are produced in the geographical datum “Qornoq 1927”. On each paper chart a note has been inserted giving the correction to be used if positions are obtained from a satellite navigation system, such as GPS, which refers to WGS 84 datum. This could state, e.g., *Positions obtained from satellite navigation systems refer to WGS 84 datum; they should be moved 0.08’ northward and 0.25’ westward to agree with the chart.*

16 For paper charts covering northern and eastern Greenland waters, the source material for chart datum may be unknown.

17 It is important to notice that the correction may vary from one chart to another and the correction is only to be used if the GNSS receiver has not been pre-selected to the “Qornoq 1927” datum.

18 The use of the geodetic datum “Qornoq 1927” instead of the WGS 84 may have the following effect for Automatic Identification System (AIS) which relays the ship’s position signal from a GNSS receiver. It can get this information in two ways: From an external or a built-in receiver. AIS with an internal receiver transmits the ship’s position in WGS 84 coordinates. AIS with an external receiver can transmit the ship’s position in WGS 84 or in Qornoq 1927. This can give rise to misunderstandings and misinterpretations when AIS is used for anti-collision purposes.

19 Conclusion: GNSS should be used only as a secondary positioning instrument, and if used as such, mariners must be aware of the necessary correction between the reference chart datum in the paper charts and the information received from GNSS.

20 Hydrographic survey. IHO Special Publication No. 55 Third Edition (2004) on status of hydrographic surveying and nautical charting worldwide, latest update of 8 May 2009, states the following for Greenland: *“The coastline of Greenland is very complex and the total sea area of*

*the EEZ is ca. 2,000,000 square kilometres. Due to permanent ice cover, the limit for navigable waters has been set to 75 degrees northern latitude. The east coast is sparsely populated and only surveyed near populated areas. A prioritised programme is in force to resurvey navigable routes to and between populated areas on the west coast of Greenland, to modern standards”.*

21 The lack of survey data or its poor quality is reflected in the charts by, e.g., waters where depths are given only by passages of reconnaissance lines or even as white unsurveyed areas in the chart. Attention is also drawn to the fact that source diagrams are lacking in many of the paper charts available for Greenland waters. The basic lack of IHO compatible survey data for chart production should make ships keep an additional safety distance when passing underwater rocks and obstructions.

22 Unfortunately, it will be many years before all areas have been surveyed or re-surveyed and all paper charts revised accordingly. Until then, mariners should remain cautious to the dangers mentioned in this document.

### **Caution to be taken before navigating in Greenland coastal waters**

23 In summary, at present caution must be taken in consideration that:

- official ENC's are not available for coastal navigation;
- only paper charts are available for coastal navigation, but these are not compatible with GNSS navigation;
- paper charts have incorrect positioning of coastlines in the geographic net;
- chart datum “Qornoq 1927” is used for some areas, mostly at west Greenland, instead of WGS 84 datum;
- for other areas, mostly north and east Greenland, the source material for chart datum may be unknown and the accuracy may be affected by the age and quality; and
- hydrographic surveys may be sporadic and areas may be considered as unexplored. In some areas, depths are only given by sounding tracks from passages of a reconnaissance nature.

24 Since official ENC's are not available for coastal navigation, voyages conducted primarily by means of GNSS navigation should not be chosen as a solution at present.

25 Furthermore, it must be noted that digital raster navigational charts (RNC-charts) used in an approved ECDIS or an Electronic Chart System (ECS) are not considered an acceptable method for safe navigation. In the case of Greenland waters, raster charts will have been produced by means of digitalization of paper charts and will, consequently, have inherited the topographic and hydrographic inaccuracies of paper charts.

26 Even if a position obtained from a GNSS receiver is corrected to the datum of the paper chart, where available, the navigator cannot trust the inserted GNSS-position in the paper chart due to the inaccurate positioning of the coastline in the geographic net.

27 It is important to be aware that terrestrial navigation, including the use of radar navigation, gyro, log, echo sounder and visual input, is the best method for conducting safe navigation when satellite navigation becomes uncertain. Paper charts and nautical publications become primary sources when planning and conducting a safe voyage. Terrestrial navigation will be relative to the surrounding coastline when using radar and visual observation methods.

### **Present status and future developments of nautical charts for Greenland waters**

28 Guidance to mariners on navigation in Greenland is generally given by publishing official nautical charts, nautical publications and Notices to Mariners.

29 The nautical charts available for Greenland waters include paper charts, port plans and, in very few cases, electronic navigation charts (ENC). Today, Greenland waters are covered by 94 paper charts of various scales, while only 4 ENCs have been produced by early 2009. ENC coverage is, consequently, a long-term process, which has only just begun.

30 In 2006, the Danish Hydrographic Office launched a project with the purpose of producing improved paper charts in terms of the geometric precision of the paper charts (i.e. topography, including coastline, and hydrography, etc.). In addition to this improvement, the paper charts will also be transformed into WGS 84 datum. In the improved paper charts, the coastline will be provided with a degree of precision that makes the use of satellite navigation sound and secure.

31 It is expected that ENCs corresponding to the improved paper charts will be produced and published as an ongoing process ahead. Among the ENCs published, ENCs in usage band overview (corresponding to scale 1:3500000 for sea passage) are expected to be published before 2012. Navigational and hydrographic information will be much simplified or completely left out in areas close to land. Consequently, it will only be possible to use these ENCs in usage band overview for navigation in open waters.

32 Conclusion: At present ENCs are not available for Greenland coastal navigation, except for a very few exceptions. It is expected that the ENC coverage will be continuously improved, but complete ENC coverage in coastal areas cannot be expected in 2012. In coastal areas, ships will therefore as a general rule have to use paper charts for navigation.

### **Recommendations on charts, ECDIS and voyage planning**

33 Before planning a voyage to Greenland, the following IMO guidelines and resolutions should be consulted further in addition to the ordinary use of paper charts and nautical information:

- SN.1/Circ.207/Rev.1 on Differences between RCDS and ECDIS;
- SN/Circ.213 on Guidance on chart datums and the accuracy of positions on charts;
- SN.1/Circ.255 on Additional guidance on chart datums and the accuracy of positions on charts;
- SN.1/Circ.276 on Transitioning from paper chart to ECDIS navigation;
- Resolution A.893(21) on Guidelines for voyage planning;
- Resolution A.999(25) on Guidelines on voyage planning for passenger ships operating in remote areas; and
- MSC/Circ.1056 on Guidelines for ships operating in Arctic ice-covered waters.

These guidelines and resolutions and other IMO guidance material can be downloaded from the

IMO website, [www.imo.org](http://www.imo.org).

**Planned Safety of Navigation (SN) circular**

34 Denmark will, before the implementation date of the new carriage requirement for ECDIS, forward a Safety of Navigation circular to the Organization providing the latest information on chart availability and quality for Greenland waters.

**Action requested of the Sub-Committee**

35 The Sub-Committee is invited to note the information provided.