15th TSMAD Meeting
Record of Discussion
14th to 18th January 2008
IHB, Monaco

Annexes
Annex A - Agenda
Annex B - List of Participants

1.   Opening and Administrative Arrangements

IHB Director responsible for technical activities; Robert Ward, opened the meeting and stressed the importance of completing a draft version of S-100 by the conclusion of the week so that it could be published for evaluation purposes. He proposed that the documents did not have to be perfect, and could be improved in subsequent versions. He noted that this meeting was unique in that there were more "expert contributors" than Member States and suggested that this was an indication of the importance of this standard.

2.   Approval of Agenda

The Chairman Barrie Greenslade proposed that the work could be completed more efficiently if the meeting were to break into the 3 groups with the following tasks;
:
Group 1 - Existing TSMAD issues:
        Review of National Proposals,
        ENC Encoding Bulletin actions,
        Review of hydrographic component for the S-100
        Feature Data Dictionary,
        Development of new Information type and Complex Attributes for S-100,
        Investigating existing "work-around" possibilities in S-57 and considering whether new features or attributes are required, and investigate use cases for S-57 objects and attributes that are not currently utilised in ECDIS.

Group 2 - finalise the following S-100 components;
        Application Schema,
        Feature Catalogue,
        Coordinate Reference System and
        ISO 8211 Encoding components of S-100.

Group 3 – finalise the following components
        Meta Data,
        S-100 Main document,
        Framework component and
        Maintenance component

3.   Minutes of the 14th TSMAD Meeting, Taunton U.K.

There were no proposed changes to the Minutes. Due to the extensive work required to be completed during the meeting it was decided not to review theTSMAD14 actions.

ACTION: TSMAD Secretary and ensure that outstanding Actions from TSMAD14 be added to the Agenda for TSMAD16.

4.   S-100 Focus Group Progress Report

The Minutes from the last S-100 Focus Group meeting were not discussed as it was noted that they would be dealt with by the appropriate breakout group. (Minutes, Hamburg, September 2007*(TSMAD15-4_Minutes.pdf))*

5.   Matters arising

See above.

6.   National papers

The chairman noted that national proposals would be addressed by the Group 1 breakout group. The following issues were discussed:

6.1 **S-57 object classes not symbolized on ECDIS** *(TSMAD15-6.1_ObjClasses.pdf).*

This was first raised at the CSMWG16 meeting. Australia noted that all S-57 features that are permitted to be encoded in the ENC Product Specification should at least be portrayed on ECDIS (at least as a default symbol) so that a mariner can select the feature to find out more information about it. As a result of discussions at CSMWG16, Transas conducted investigations on S-57 object classes (and related primitives) that were not displayed in ECDIS. This was tabled at CSMWG17 (See paper CSMWG17-03.7A). This paper was briefly discussed but no action was taken by the meeting, which resulted in Chris Roberts compiling a paper for TSMAD15 (SeeTSMAD15-6.1A). Comments were also provided by Mike Eaton (CA), (father of the ECDIS Presentation Library), and included in paper TSMAD15-6.1A Rev1. After a long discussion, the meeting decided to address each object class listed in the Transas report separately as listed below:

- **CHKPNT** (point): <u>Symbolise</u>.

- **CURENT** (point, no value for ORIENT): <u>Symbolise</u>. There was some discussion as to the validity of a **CURENT** feature with no value for the attribute ORIENT. Australia gave the example of the South-East Australia Current, for which the direction of flow of the current at a position may change over time, therefore making the population of ORIENT with a single value difficult. The meeting also agreed that the area primitive must be included in S-101.

ACTION AU to add to CR spreadsheet containing these issues.

- **DAMCON** (point): <u>Don't symbolise</u>. The meeting agreed with Eatons comment that a dam, when encoded as point, was not significant to navigation.

- **GRIDRN** (point): <u>No decision could be reached by the meeting</u>. Australia expressed concerned at Eaton's comment that implied that all gridirons on larger scale ENC cells would be encoded as area features.

- **PIPSOL** (point): <u>Don't symbolise</u>. The meeting agreed with Eaton's comment that any pipeline that was navigationally significant would be encoded as a line.

- **PRDARE** (point, CATPRA 1;5;6;8;9): <u>Symbolise</u>. The meeting agreed that the extent of a production area may not be shown on the source; therefore the feature would need to be encoded as a point.

- **RAPIDS** (point): <u>Don't symbolise</u>. Not significant to navigation.

- **ROADWY** (point): <u>Don't symbolise</u>. Not significant to navigation.

- **RUNWAY** (point): <u>Don't symbolise</u>. There was some discussion on this, especially in regard to helicopter landing sites. It was considered by the meeting that the principle use for **RUNWAY** was for larger scale ENCs where an HO wished to indicate individual runways within an airport. For smaller scale ENCs, **AIRARE** was considered to be the preferred encoding option (the point symbol for **AIRARE** symbolises in ECDIS.

- **SMCFAC** (point): <u>Symbolise</u>. The principle example of this is a marina (INT1 – U1.1) which, when encoded from a paper chart, is generally encoded as a point feature (the limits of the marina may not be able to be interpreted from the chart).

- **TUNNEL** (point): <u>Don't symbolise</u>. The meeting agreed with Eaton's comment.

- **VEGATN** (point): <u>Symbolise</u>. There was some discussion on this. Some delegates considered that the encoding of a feature that may be destroyed by weather or chopped up for firewood was not good encoding practice, but acceded to Roberts comments.

- **WATFAL** (point): <u>Don't symbolise</u>. Not significant to navigation.

- **SLOGRD** (line): <u>Don't symbolise</u>. It was considered by the meeting that line features should be encoded as **SLOTOP**.

- **All meta features listed**: <u>Don't symbolise</u>. It was agreed that consideration to adding further quality information, possibly through the symbolising of **M_SREL**, should be given for S-100.

It was recommended that TSMAD15-6.1A Rev1 be submitted to the combined TSMAD/CSMWG meeting (May 2008) with the above TSMAD15 recommendations.

6.2 **Report on CSPCWG4 by Australia.** *(TSMAD15-6.2CSPCWG4.pdf)*

Each item within the report was introduced on by Australia (Jeff Wootton).

- Hydro FDD register – registration of new features approved in the review of M-4 or INT1 are to be formally proposed to the IHO Hydro FDD. TSMAD15 information only – no further action required.

- Mangrove areas – The meeting agreed that it was possible to encode mangrove areas (**VEGATN**) within inter tidal areas (**DEPARE**) using S-57 Ed 3.1, and this functionality should be carried through to S-101. The issue of symbolising in ECDIS was addressed in 6.1 above

- Racon wave bands – CSPCWG recommended that these will no longer be portrayed on paper charts but are encoded in ENCs. It was decided that there is no need to remove this from ENCs, as per Roberts recommendation. TSMAD15 information only – no further action required.

- Offshore renewable energy installations – CSPCWG agreed that these features need to be charted, at least on the largest scale charts, as they are already being deployed, at least experimentally, in many seas. The meeting agreed that equivalent encoding guidance was required for ENC.

ACTION: ENC-EB Sub WG co-ordinator to add encoding of offshore renewable energy installations to the ENC Encoding Bulletin Actions List.

- M-4 symbols as IHO paper chart symbol library – For information only – no further action required.

- Procedures for new and revised routeing measures - It is suggested that TSMAD15 should consider this issue (possibly for an ENC Encoding Bulletin) and send a formal response to the Chairman of the CSPCWG. There may also be decisions reached on the new information object which may also be relevant? Australia pointed out that this issue was already the subject of a draft ENC Encoding Bulletin from discussions at JTEWG6 and TSMAD14.

ACTION: ENC EB Sub-WG co-ordinator to complete Encoding Bulletin on promulgation of advice on new or revised routeing measures.

- Recommended tracks term – submitted for information only. Australia noted that they currently portray these as preferred routes on paper charts and recommended that TSMAD may also like to consider safety implications of altering definitions and implications for HOs to review all of their published charts (both paper and ENCs). It was also noted that there was a lot of reliance on M-4 to provide the "why" on encoding in relation to S-57 *(These need to be considered for S-101). Check that an entry has gone into the "Changes for TSMAD consideration for S-100 FDD" spreadsheet for new Category of Track CATTRK (?) of Preferred Route.*

- Letter from Tidal Committee (TC) – TC have made recommendations amending IHO Technical Resolutions which are being approved by Member States. It was suggested that no action be taken by TSMAD until at least the IHO TRs have been approved, however there is a strong possibility that a new feature will be required for S-100 tidal polygon (**TIDPOLY**).

- INT1 K31 (Fouls) – CSPCWG chairman to raise the issue of the definitions of a "foul" in S-57 and S-32 with appropriate WGs. There was some discussion related to "foul" ground not being dangerous to surface navigation, with the meeting generally agreeing with CSPCWG sentiments. This poses a problem in relation to the definition of **OBSTRN** as outlined in the paper. The meeting agreed that there was an inconsistency in the Standards between the definition for **OBSTRN** and including the value CATOBS = *7* (foul ground) as an enumerant. This causes a conflict between S-57 and M-4.

- INT1 Section W (International abbreviations) – Australia highlighted CSPCWG ACTION 31: for IHB to advise MS in next appropriate CL of intention to transfer list of International abbreviations from INT1 to M-4 Section B-100. This was for information only – no further action required.

- New official INT1s - Both Germany and Spain are planning new INT1 publications this year. For information only – no further action required.

- Future development of INT 1 – It was mentioned that the possibility of an "INT1" containing both paper chart and ENC portrayal had been discussed at previous TSMAD meetings, but to date no action had been taken. For information only – no further action required.

- Secondee to IHB - It was decided that the scoping study for INT1 should be added to the list of possible tasks. **ACTION: IHB.**

6.3 **Report to TSMAD15 regarding the review of M-4** *(TSMAD15-6.3_M4_Review.pdf)*

This paper recommends that TSMAD needs to start work on the S-100 Hydrographic Feature Data Dictionary, particularly to reviewing those definitions that relate to hydrographic terms as the IHO is the authority in these matters. There was a minimum of discussion on the body of the paper, and the meeting agreed to address each of the recommendations at the end of the paper:

- Recommendation 1 (All hydrographic terms within the S-57 Object Catalogue for which the IHO reports to be the expert, be reviewed for S-100). This recommendation was identified as a topic

for discussion later in the meeting. It was also decided to consider papers TSMAD15-7.3b and TSMAD15-7.3c at the same time

- Recommendation 2 (New features added to M-4 be examined by the TSMAD Sub-WG as possible ENC Encoding Bulletins or FAQs). It was decided that issues relating to new features in M-4, as discussed in the detailed report, should be investigated out of session with the possibility of ENC Encoding Bulletin action.

ACTION: ENC EB Sub-WG co-ordinator to investigate new features in M-4 as outlined in the "Changes for TSMAD consideration for S-100 FDD" spreadsheet for possible requirements for ENC Encoding Bulletins.

- Recommendation 3. Someone within TSMAD should be made responsible for following the new IHO discussion site. It was noted that very few attendees were aware of the IHO discussion site referred to in the paper.

ACTION: Lee Alexander (UNH) to look into the IHO discussion site for possible implications on TSMAD.

- Recommendation 4. All of the issues raised in the attached detailed report of M-4 be reviewed by a sub-group of TSMAD. It was not possible to achieve this due to the focus on completing S-100

- Recommendation 5. TSMAD ENC Encoding Bulletin Sub-WG be officially made the point of contact for the CSPCWG Letters. It was agreed that the ENC Encoding Bulletin Sub-WG would be responsible for evaluating CSPCWG Letters to assess any possible S-57 and S-100 implications.

ACTION: ENC EB Sub-WG co-ordinator to notify the secretary of CSPCWG and disseminate all future CSPCWG Letters to the Sub-WG for evaluation.

- Recommendation 6. A coordinator role is to be considered within TSMAD to follow up issues between the CSPCWG, TSMAD and CSMWG. This recommendation was discussed at length, with AU pointing out that up until now, Chris Roberts had been acting as a de-facto liaison between TSMAD, CSMWG and CSPCWG, without any formal recognition of this as a required role by the IHB. The TSMAD Chair recognized that this role would be an increasingly demanding one as it could also involve contact with SNPWG, CHD, DQWG and the Tides WG. The Chairs of these WGs only meet once a year (before CHRIS meetings) and this is not often enough to provide any concerted co-ordination role. It was agreed by the meeting that a co-coordinator's role needs to be raised at the CHRIS level, and the IHB should be approached to support such a role.

ACTION: TSMAD Chair to raise this at the next CHRIS meeting.

- Recommendation 6. Once the review of M-4 Part B has been completed, a thorough check should be made of all M-4 and INT1 references in S-100/S-101. The TSMAD Chair recognized that a cross check of all M-4/INT1/S-100 references was required on completion of the M-4 review, and this would be taken up in the normal course of business of TSMAD – no action required at this stage.

7.   Group Sessions

7.1 IHO S-100 Main Documents *(TSMAD15-7.1Rev1)*

The S-100 Main document and the associated Framework document – reviewed and completed by Group 3.

7.2 **List of Consolidated Comments** *(TSMAD15-7.2)*

The list of comments was addressed by Groups 2 and 3, and approved through the document review process.

ENC Encoding Bulletins:

The following draft Encoding Bulletins could not be agreed upon by the Sub-WG and required discussion by TSMAD:

- Encoding of AIS information in ENCs: The TSMAD14 decision was that as ENCs is designed for use within an Integrated Bridge System there was no requirement to include AIS information in them. This had been questioned by the TSMAD Chair and Jepperson, particularly where ENCs are used in an ECS. After some discussion, it was decided to publish the draft EB as is, but the issue of the requirement to encode AIS information in ENCs would need to be discussed further for S-101.

- Wrecks: Draft EB. The changes that had been approved for M-4, and whether they were of any benefit to safe navigation, when estimating a safe clearance for wrecks in ENC was discussed. Some members stated that their organisations did not have the resources or the background information to define an estimated safe clearance for all the wrecks within their charting area, and therefore were reluctant to support the release of this EB. There were still some investigations ongoing as to whether the S-52 Presentation Library Conditional Symbology Procedures will support this EB. It was decided to defer the release of this EB and table it for discussion at the joint TSMAD/CSMWG meeting in May 2008.

ACTION: ENC EB Sub-WG co-ordinator to collate all papers and discussions relating to the Wrecks EB and prepare a submission for TSMAD16/CSMWG18.

The following ENC Encoding Bulletins and FAQs were approved for release and published on the IHO Website during the meeting:
- EB15/FAQ14   Linear Maritime Jurisdiction Features
- EB16/FAQ15   Disputed EEZ
- EB17/FAQ16   AIS in ENCs
- EB18/FAQ17   180º Meridian of Longitude
- FAQ18   DGPS Stations
- EB19/FAQ19   IALA Emergency Wreck Buoy
- EB20/FAQ20   Use of Underscore in ENC Cell Names

In addition to the above it was also proposed that, a new encoding bulletin was required to address the issue of character encoding of external text files referenced by the attributes TXTDSC and NTXTDS. For external files referenced by the attribute NTXTDS, some ENC cells had been received by the RENCs that had text files created using local character encoding that were not being interpreted correctly by ECDIS, and therefore could not be read by the user. In S-57 Edition 3.1, there is no specification to cover the character encoding of external text files, which are required to be in the same character encoding as other textual national attributes (NOBJNM, NINFOM). This guidance was provided in Encoding Bulletin number 21 (it was determined that no FAQ was necessary).   The new EB's were posted on the IHO website during the meeting.

7.3 **Group 1** *(TSMAD15-7.3a - e)*

Due to the requirement for the meeting to focus on the preparation of S-100 it was not possible to consider this paper. The paper should be re-submitted at TSMAD16.

<u>Review of the Hydro Content of the FDD:</u> A summary list of items (compiled by 7Cs) included the following FDD issues:

- Items with no definitions;
- References to S-57 structures or to units within definitions or Remarks (e.g. **SOUNDG**, HORLEN – DUNITS was also found later when looking at definitions);
- Candidates for retiring;
- Pseudo graphics in definitions;
- Re-defining structured attributes as either dates, complex attributes or structured text attributes;
- Missing definitions - it appeared that items in the Attribute Catalogue that do not have definitions are restricted to the "Category of" attributes. After brief discussion of how to best create definitions for these attributes, it was suggested that the attribute name be used as the definition in the short term, but more researched and concise definition should be determined as part of any actions arising from the papers submitted to TSMAD15 by CR.

- An attempt to define CATLIT resulted in the group considering this to be too difficult and involved an issue to be resolved in a group discussion.

- Additional investigation of the FDD as it currently stands found that Darkest, Medium and Lightest Blue, and a couple of values for the attribute TOPSHP, were not defined in addition to the "Category of" attributes. It was noted that the search of the FDD was restricted to entries that have "NO VALUE" for Definition, and therefore do not include those entries with inadequate/inaccurate definitions, such as those that have had their definitions derived from the Remarks section of the Object and Attribute catalogues.

- It was suggested that the attribute $CHARS may be a good candidate for re-defining as a complex attribute.

<u>Review of the Maintenance component:</u> The TSMAD Chair, highlighted problems caused in the S-57 Maintenance Document by changes to the Standard being classified in many cases as both Clarifications and Corrections. This resulted in much confusion, particularly for production software manufacturers and encoders, as to whether a change was relevant to the current Edition of S-57 or should be included in the next Edition. It was determined by the group that guidance on maintenance should be included in a profile to ensure that changes to the Standard must only be classified into a single category.

Australia suggested that while reviewing the document, the group should also use the S-57 Maintenance Procedures (October 2003) as a reference document. Discussions during the review included:

- Classification of changes to S-100 into Clarifications, Corrections and Amendments: Many in the group felt that there was not enough distinction between the terms "Correction" and "Amendment" and it was agreed that Amendments did not provide a clear enough distinction and was therefore replaced with "Distinctions" (as used in S-57).

- Version control (of S-100): Initial discussions on this issue related to whether iterations of the Standard were to be known as "Versions" or "Editions". It was agreed that the meanings of these terms is very similar, with "versions" being more widely associated with computer software and "editions" with hard copy publications (books, etc). It was eventually decided that the term "Versions" would be used, as the Standard refers to the transfer of digital data.

- Change Request Form: The profile does not currently contain such a form.

Action: Tom Mellor agreed to design such a form, which would be included as an Annex to the profile.

- Removal of Annex A (as in the current draft): This Annex (CHRIS Principles and Procedures for Making Changes to Technical Standards and Specifications) was removed,

- Creation of an S-101 Maintenance Document: It was decided that this should be in the form of a searchable database.

Additional Discussion Items included.

- Information Objects: CARIS (Hugh Astle) provided a presentation on the purpose and construct of Information objects. He explained that Information objects would be of a specific type of identifiable object containing attributes which would be associated to other S-100 features (and possible other Information objects) but having no spatial information. This will mean that an Information object can be associated with one or many features in an S-100 data set, which will reduce data redundancy and excessive duplicate attribute encoding as occurs currently in S-57. Questions that need to be answered are "How Information objects will affected the database approach and how HOs will use Information objects," will needs further discussion.

ACTION: TSMAD Chair to compile a TSMAD Letter to MS inviting ideas for use of the S-100 Information Object.

- Cardinality of Attributes: CARIS (Hugh Astle) provided a brief presentation, and outlined the theory behind allowing cardinality of attributes within S-100. This would allow multiple instances of an attribute on features by definition in the Feature Catalogue (binding). Additionally, when defining multiplicity in the cardinality of an attribute for a feature, it can also be identified whether or not order (of the defining of multiple attribute values) is important. The major implication of introducing cardinality in S-100 will be the elimination of "List" type enumerated attributes.

- Dates: There is no date type in S-57 – all dates are currently formatted as "coded string" type attributes. It was decided that there was no requirement to have a date type in S-100.

- Complex Attributes: An attribute that contains sub-attributes is a "complex attribute". In terms of S-57, the criteria for identifying candidates for complex attributes include attributes that "go with" other attributes e.g. NATQUA and NATSUR for **SBDARE**; and attributes that may require other attributes to fully define the value populated e.g. VERCLR may require a value for VERDAT for a **BRIDGE**. An example of the possible application of a complex attribute could be:

$CHARS	=	Complex attribute
FONT	=	Sub-attribute (E, [1..1]) (text style)
WEIGHT	=	Sub-attribute (E, [1..1]) (text line weight)
FALT	=	Sub-attribute (E, [1..1]) (text justification)
TEXT	=	Sub-attribute (S, [1..1]) (text string)

In the above example, the attribute $CHARS has the sub-attributes FONT (enumerated value that must have a single value, WEIGHT (enumerated value that must have a single value), FALT (enumerated value that must have a single value), and TEXT (free text string value that must have a single value). This example was considered as a good one as the four sub-attributes would not be related to any other attribute populated for a feature containing the $CHARS attribute. Note that the attributes FONT, FALT and TEXT are only 4 letter acronyms. This is potentially an example of a fundamental difference between S-57 and S-100, in that it may no longer be required to have a mandatory 6 figure acronym for features and attributes.

It was suggested that a good starting point for developing complex attributes would be to go through the UOC and identify all attributes that could be considered to be a "sub-component" of other attributes e.g. HORACC applies only to HORCLR (UOC clause 2.2.4.2) and VERACC applies to VERCLR, VERCOP, VERCSA and VERCCL (UOC clause 2.2.4.3). The group agreed to use this as a starting point and began to develop a spreadsheet of possible candidates.

- TSMAD Deferred Actions List: Review of the Deferred Actions List (last updated October 2003). It was decided that all Deferred Actions should be re evaluated by the original submitting organisation, and if considered relevant for S-100, the original items should be re-submitted for consideration.

ACTION: TSMAD Chair to compile a TSMAD Letter to MS requesting a review of any papers submitted by them and placed on the TSMAD Deferred Actions List for possible proposals for S-100.

- S-57 Extensions List: Australia coordinated a review of the TSMAD Internal Extensions List (last updated from TSMAD8), and after a brief discussion on each item, it was decided that all Extensions should be considered for S-100.

8.   Election of TSMAD officers

No nominations were received for any of the TSMAD Executive positions. It was determined by the meeting that the Executive would remain as it is at least until TSMAD17 (September 2008), when it would probably be necessary to elect a new Vice Chair. Barrie Greenslade noted that he would be prepared to continue as Chairman until November 2009. This was unanimously supported.

9.   Any Other Business

No other business was raised.

10.   Date and Place of meetings for 2008

The next meeting will be hosted by the South Africa HO in Cape Town, SA on 5-9 May 2008. This meeting would be a joint TSMAD/CSMWG meeting focussing mainly on S-101.

The final TSMAD meeting for 2008 will be hosted by NOAA, with the probability that the meeting will be in Seattle, USA. Proposed date is mid-September 2008.

Provisional Agenda

Meeting opens **0830** Monday 14th January

1. Opening and Administrative Arrangements
   a. List of Documents *(TSMAD15-1A_Docs.pdf)*
   b. List of Participants *(TSMAD15-1B_Participants.pdf)*

2. Approval of Agenda
   a. Agenda *(TSMAD15-2_Agenda.pdf)*

3. Minutes of the 14th TSMAD Meeting, Taunton U.K.
   a. Minutes *(TSMAD15-3.pdf)*

4. S-100 Focus Group Progress Report
   a. Minutes, Hamburg, September 2007*(TSMAD15-4_Minutes.pdf)*

5. Matters arising

6. National papers
   1. Australia *(TSMAD15-6.1_ObjClasses.pdf)*
   2. Australia *(TSMAD15-6.2CSPCWG4.pdf)*
   3. Australia *(TSMAD15-6.3_M4_Review.pdf (See also TSMAD15-7.1d))*

7. Group Sessions
   7.1 IHO S-100 Main Documents *(TSMAD15-7.1Rev1)*
   7.2 List of Consolidated Comments *(TSMAD15-7.2)*
   7.3 Group 1
       a. New FDD Issues *(TSMAD15-7.3a_FDDIssues.pdf)*
       b. S-57 Authoritative Hydrographic Features (*TSMAD15-7.3b_AuthFea.pdf)*
       c. S-57 Authoritative Hydrographic Attributes (*TSMAD15-7.3c_AuthAtt.pdf)*
       d. Review of M-4 Changes (.xls) (*TSMAD15-7.3d_M4Changes.xls)*
       e. IMO Definitions *(TSMAD15-7.3e_IMODefinitions.pdf)*
   7.4 Group 2
   7.5 Group 3

8. Election of TSMAD officers

9. Any Other Business

10. Date and Place of meetings for 2008

LIST OF PARTICIPANTS

MS / Organisation	Name
Australia	Jeff WOOTTON
Canada (CHS)	Lynn PATTERSON
Canada (CARIS)	Hugh Astel
Canada (Jepperson)	Eivind Mong
Denmark	Carsten RIISE-JENSEN
Finland	Hovi MIKKO
Finland (T-Kartor)	Agita Tarasova
France	Guy UGUEN
Germany (7Cs)	Holger Bothien Eva Christina Deutschmann
Germany (IEHG)	Bernd BIRKLHUBER
Italy (Jepperson)	David D'Aquino
Norway (NHS)	Odd Aage FØRE
Norway (ECC)	Stig Osaland
Sweden	Hans ENGBERG
UK	Barrie GREENSLADE (Chair) Peter PARSLOW Thomas MELLOR Paul BURTON James RAPPAPORT
USA/NOAA	Julia POWELL
USA/Navy	Rodney LADNER
USA (ESRI)	Rafael PONCE
UNH	Lee ALEXANDER
USA (Jepperson)	Angel TERRY
IHB	Tony Pharaoh