

**11th TSMAD MEETING  
10 – 12 November 2004, IHB, Monaco**

**Hydrographic Interoperability Harmonization Working Group (HIHWG)  
2004 Liaison Report**

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| <b>Submitted by:</b>        | Jennifer Hum-Miller, Chairperson, HIHWG  |
| <b>Executive summary:</b>   | This paper provides an overview of the harmonization and interoperability efforts for vector hydrographic products based on the IHO and DGIWG standards. |
| <b>Actions to be taken:</b> |  |
| <b>Related documents:</b>   | S-57   |
| <b>Related Projects:</b>    | Work Item 2.1 – Proposal S-57 FEATURE OBJECT ATTRIBUTE Review  |

**Mandate of HIHWG**

- To progress the harmonization of standards and/or interoperability of hydrographic vector data by defining a way ahead with a focus on Maritime user requirements and pragmatic database solutions.
- The HIHWG is to review and propose solutions based on the UK-US jointly funded IDON study on 'Interoperability through Hydrographic Harmonization' 2003.
- The aim is to thoroughly examine how interoperability and the harmonization of Electronic Navigation Charts (ENC) and Digital Nautical Charts (DNC) products can be achieved with the maximum amount of product data being conserved, updateable and available for the production to both product specifications. Rule-based solutions and recommendations from this WG are optimized for a common database - a separation of data content from carrier (product specific encoding format)
  - The tenure of the HIHWG is 2 yrs (ending Spring 06)
- Historically, issues that affect the Geospatial Maritime Community are:
  - Separate evolution of standards
  - Overlapping business requirements
  - Production inefficiencies
  - Operational responsiveness
  - Incomplete early harmonization efforts
- The WG is to be formally recognized by the Digital Geographic Information Working Group (IGeoWG) and the International Hydrographic Organization (IHO); and will report to both organizations under a Co-Operative Agreement. The WG is chaired by Canada (DGIWG rep) and considered quorate if UK, US and CA are represented as specified in the HIHWG Terms of Reference. The group is comprised of technical experts representing military operators, DGIWG, IHO, NATO and PfP nations including some contractors in their employ.
- The group will provide liaison reports to both the NATO Geospatial Maritime Working Group (GMWG) and the NATO Interservice Geospatial Working Group (IGeoWG).

- The WG is tasked with investigating, and as far as technically possible, removing the barriers to interoperability across all legacy vector hydrographic information.

### **HIHWG Status**

- The HIHWG has met three times to date with national representatives from CA, US, UK, FR, IT, SE as well as academia and industry contractors
- The first two meetings were held in Ottawa, CA in Jan 04 and Jun 04. The third meeting was held in Victoria, CA Sept 04
- The invited industry members are representative of data producers with experience in both DNC and ENC, ECDIS/WECDIS system providers, and IDON (report authors supported by USL CARIS)
- Perceived benefits as a result of the technical work to be completed by the HIHWG are:
  - Improvements in time/effort required to produce data
  - Efficient database management (e.g. one update suitable for multiple products)
  - Increased operational capability and system functionality (ECDIS/WECDIS user)
  - Greater flexibility towards future enhancements and extensions
  - Lower-cost COTS solutions; more vendor options
  - Ease of maintenance of standards (e.g. S-57, DIGEST)
- Three steps were initially identified in order to achieve harmonization:
  - Data conversion (ENC to DNC / DNC to ENC)
  - Data population (databases, registers)
  - Agree on the alignment to ISO TC211 standards (S-57 Edition 4 and DIGEST The Next Generation)
- The key items being addressed by the HIHWG are:
  - Data content model (S-57 vs. DIGEST)
  - Resolution of the geometry and precision issues
    - e.g. numeric precision differences between DNC & ENC; non-coincidental geometry as a result of collapsing layers on import; positional quality of features
  - Harmonization of the feature data dictionaries/catalogues and Feature Data Model
    - FACC features - S-57 objects
    - Hydrographic definitions
    - ISO TC211 registers (DFDD, IHO, AML)
  - AML, TOD, MSD issues
  - Metadata

### **National Projects of Interest**

- ENC to DNC Conversion Project (CA) using COTS software/contractor - completed
  - Challenges were identified:
    - Incompatibilities between the two standards - precision and geometry
    - Incompatibilities between the two data dictionaries - feature and attribute mappings
    - Conversion could not be fully automated, required manual data processing
    - Content inconsistencies
  - Recommendation
    - Population of a common hydrographic database to minimize incompatibilities
    - Refinement of automation tools for data conversion
- HIH Pilot Project (CA) - in progress
  - Joint project between Dept of National Defence (DND) and the Dept of Fisheries and Oceans, Canadian Hydrographic Services (CHS)
  - Objective:

- Examine methods for harmonizing the updating of ENC's by CHS, and DNC's by DND.
- The intent of the pilot project is to accomplish ENC and DNC New Edition work, maintain information for two digital chart products (ENC and DNC), and complex Traffic Separation Scheme (TSS) updates.
- Process:
  - Create New Editions of both ENC and DNC products according to specifications through the conversion of ENC to DNC and DNC to ENC
  - Convert and merge an update from one product specification to the other product specification
  - Perform quality assurance
  - Process mapping, capture and analysis of project results

### **Way Forward**

- The HIHWG has developed a harmonization work plan based on a few practicable recommendations from the IDON report:
  - Data conversion (ENC to DNC / DNC to ENC)
    - The pilot project sponsored by Canada confirmed the findings of the IDON report and assesses the impacts of the incompatibilities between the standards and data dictionaries. The HIH pilot project is expected to build on the lessons learned from the initial data conversion project.
    - Issues of resolution, geometry and precision issues were identified
      - The HIHWG is proposing rule-based solutions to correct for geometry issues. Examples and diagrams are being presented.
  - Data population (databases, registers)
    - Harmonization of the feature data dictionaries/catalogues and Feature Data Model
    - Submit/request feature definition modifications
      - IHO S-57 Object Catalogue
      - IHO S-32 Hydrographic Dictionary
      - DGIWG FACC (Feature Attribute Coding Catalogue)
    - Metadata
      - Propose that both a DNC and ENC metadata profile be created following ISO 19115 and 19139 to enable common data content model
      - Collaboration with DGIWG and IHO on profile developments
      - Propose the creation of hydrographic metadata data dictionary register following ISO 19126
  - Agree on the alignment to ISO TC211 standards (S-57 Edition 4 and DIGEST The Next Generation)
    - Both DGIWG and IHO are Class A Liaison members of ISO TC211
    - Both are committed to aligning their standards and profiles to ISO TC211 and to actively participate in respective technical WGs
  - Development a Hydrographic Education/Marketing/Requirements package
    - Focus is Military utility of hydrographic vector information/database
    - Desire is that if operators understand the intelligence associated with the information, they will then be better positioned to define their Statement of Requirements through the use of standards

### **Recommendations to DGIWG**

- Recommend DGIWG develop DNC metadata profile
- Recommend DGIWG review the HIHWG Work Plan against DGIWG Technical Plan priorities

**Recommendation to IHO**

- Recommend IHO formally recognize the HIHWG
- To date, the following recommendations have been identified for consideration at the Nov04 IHO TSMAD meeting:
  - Propose that IHO develop ENC metadata profile
  - Recommend that IHO consider requests for definition edits to both S-57 Object Catalogue and S-32 Hydrographic Data Dictionary from HIHWG

**Recommendations to NATO**

- Recommend GMWG endorse the work of the HIHWG to progress data interoperability issues
- Recommend GMWG review the HIHWG Work Plan for further priority review, considering the technical work being conducted by DGIWG and IHO and HIHWG membership end state.

Respectfully

Jennifer Hum-Miller  
Chairperson  
HIHWG