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**Digital Mapping, Charting, and Geodesy
Analysis Program (DMAP)
Technical Review of Additional Military
Layers Product Specifications, Ed. 4.0**

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14. ABSTRACT Additional Military Layers (AML) is intended to supply supplemental digital cartographic information to standard Electronic Nautical Chart (ENC)/Digital Nautical Chart (DNC) products to increase military applications utility. Six baseline AML draft product specifications were provided: Contour Line Bathymetry (CLB) Environment, Seabed and Beach (ESB) Large Bottom Objects (OBO) Maritime Foundation and Facilities (MFF).					
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1.0 Background

AML is intended to supply supplemental digital cartographic information to standard Electronic Nautical Chart (ENC) / Digital Nautical Chart (DNC) products to increase military applications utility. Six baseline AML draft product specifications were provided:

- Contour Line Bathymetry (CLB)
- Environment, Seabed and Beach (ESB)
- Large Bottom Objects (OBO)
- Maritime Foundation and Facilities (MFF)
- Routes, Areas and Limits (RAL)
- Small Bottom Objects (SBO)

2.0 Discussion

DMAP has reviewed the six baseline AML draft product specifications. The United Kingdom Hydrographic Office development of the AML appears to be adequate for the intended use of this product. However, we would like to reemphasize that continued efforts need to be applied in the support of Vector Product Format (VPF)/Digest inclusion and compatibility.

Additionally, emphasis needs to be placed in the area of symbology as it relates to the use of AML in conjunction with other S-57 or VPF products to ensure compatibility and clarity of communication.

2.1 New FACC (Digest) Codes that will be added by AML

Of the six product specifications submitted for review, only one at present contains information that relates to Feature and Attribute Coding Catalog (FACC), the CLB or Contour Line Bathymetry. The following table indicates the new FACC values as shown in CLB. Existing software currently working with bathymetric contours under FACC will need to address these new attributes in their code.

It should be noted that the code for Name (national language), na2, already exists in FACC, defined as "Second Name". Therefore, this code needs clarification: If the proposed code "na2" in CLB has this definition, rather than the description used in CLB,

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the code “na2” should not be shown in italics meaning proposed as new. Otherwise, if the proposed code is truly new, it should have another FACC acronym, e.g., na7.

CLB Product Specification, Section B.4.5, pg. B-32

Attribute	Description	AML Proposed FACC Acronym
Category of conformance	An area in which data is of a specified conformation to the product specification.	con
Caveat	A component of a security clearance and/or security class used for computing access rights and controlling information flow by authorising a specific group of subjects to have access to the information.	cav
International Defence Organization (IDO) status	The IDO Status (if applicable) that must precede, and be applied to, the Protection Marking thus making it an IDO Marking.	ido
Max distance between survey lines	The maximum spacing of the principal sounding lines of a survey.	su1
Min distance between survey lines	The minimum spacing of the principal sounding lines of a survey.	su2
Name (national language)	The principal name or identifier of an object in national language characters.	na2
Owner authority	The NATO country code denoting the ‘owner’ that is responsible for establishing and setting the protective marking level.	ona
Producing country	The country responsible for the production of the data.	na5
Production agency	The agency responsible for the production of the data.	pag
Sounding accuracy	The best estimate of the accuracy of the sounding data.	sac
Source agency	The agency responsible for the production of the source.	sag
Source country	The country responsible for the production of the source.	na6
Source date	The date of issue of the source information, if applicable.	sod
Source ID	ID of the data source (e.g., chart number).	sid
Source scale	The scale at which the source data	sos

Attribute	Description	AML Proposed FACC Acronym
	has been compiled.	
Source type	The type of data source (e.g., chart, report, etc.	std
Survey authority	The authority which was responsible for the survey.	sau
Largest scale of survey information	The largest scale for the range of survey scale as used in source diagram information.	ss1
Smallest scale of survey information	The smallest scale for the range of survey scale as used in source diagram information.	ss2

DMAP stresses the importance that all AML features and attributes need to be in compliance with Digest. An attempt was made to map the other five product specifications to current FACC features and attributes as well as to look at the proposed S-57 codes. There were a lot of matches within the two standards. However, at this time, it appears to be too soon to make the comparison for review purposes. We look forward to reviewing the other five product specifications against Digest and FACC as they are developed.

2.2 Possible SBO Additional Attributes

The Naval Oceanographic Office (NAVOCEANO) was contacted for their evaluation of the SBO or Small Bottom Object AML product specification with regards to its compatibility with the COMINWARCOM MEDAL program. The following table was generated by NAVOCEANO to indicate the comparison of the MEDAL attributes and those contained in the AML SBO specification. In this table NAVOCEANO has indicated additional attributes (with asterisks) that should be considered for inclusion.

MEDAL Object Data Fields	NATO (Attribute)
1. Current RSCTC number	Contact Reference Number Mine Reference Number MWDC Reference Number
2. RSCTC number	same as above (↑)
3. Observation DTG	Capture date
4. Last update DTG	Last detection year (?)
5. Image ID	Image file link

6. Latitude	*
7. Longitude	*
8. Error major axis	Error ellipse
9. Error minor axis	Error ellipse
10. Survey type	Survey type
11. Class	*
12. Category	*
13. Shape	Contact shape
14. Size length	Horizontal length
15. Size width	Horizontal width
16. Size height	Vertical Length
17. Size units	Height / length units
18. Depth	Depth of water over feature
19. Depth unit	Depth units
20. Diver MSD burial	Burial percentage
21. Horizontal orientation	Inclination
22. Vertical orientation	Inclination
23. Definition strength	Sonar reflectivity
24. Shadow	*
25. Ringing	*
26. Multiple Aspects	*

* wishlist

Description of attributes that NAVOCEANO would like to see included in AML. Also included are the current formats used in MEDAL Build 7.

1. **Latitude:** Exact latitude of object (as opposed to the position of the ship).
2. **Longitude:** Exact longitude of object (as opposed to the position of the ship).
3. **Class:** What is the contact classified as? 1 char code: Values: 0=NOMBO (Non-mine, mine-like bottom object); 1=Milco (Mine like); 2= Non-mine like; 3=Unexploded.
4. **Category:** What category does the contact fit? 1 char code: Values 0=Coral Head; 1=Fish Equipment/Trap; 2=Pipe Drum; 3=Rock; 4=Scrap Metal; 5=Ship Wreckage; 6=Well Head; 7=Other Man-made; 8=Other Natural.
5. **Shadow:** Does the object have a shadow? 1 char code: Values 0=Yes; 1=No;
6. **Ringing:** Does the object have a ringing? 1 char code: Values 0=Yes; 1=No;
7. **Multiple Aspects:** Does the object have a multiple aspects? 1 char code: Values 0=Yes; 1=No

2.3 Examining the AML Simulator

A general examination of the AML Simulator offers the user a simplistic look at "AML-like" data. It does not provide exact AML data in a manner that might be used in an ECDIS display. However, it does include Map Explorer project definitions that would make it easy to symbolize the data in a manner similar to ECDIS or paper chart format. The Simulator data and its accompanying Map Explorer application provide a good example for the general user. Comments found in the corresponding script file point out that the data set was not intended to support one standard symbol set, but could be used with a user specified standard. The script also notes that the AML project team will be working in this area in the months to come. The following illustrations show an overview of the type of data displays offered in the Simulator.

DMAP recommends that a closer look be given to the most common standards for symbolizing chart data (i.e., S-52 and MIL-PRF-89045 Draft Military Specification, Geospatial Symbols for Digital Displays (GeoSym)) to determine the usability of the AML data with other standard data sets like Digital Nautical Chart (DNC). Although further investigation is recommended, it is noted that the Simulator served a valuable purpose of giving the user an initial glimpse at the type of data that would be offered as an AML.

