OPEN NAVIGATION SURFACE WORKING GROUP

MEETING SUMMARY

2016-05-18
Canadian Hydrographic Conference

DRAFT VERSION
2016-05-30

1 Introduction

This document details the result of the meeting held at 1500AST on 2016-05-18 to continue development for a new release of the library. The meeting was held in conjunction with the Canadian Hydrographic Conference 2016, using facilities kindly arranged by Rob Hare of the Canadian Hydrographic Association. The summary of all meetings and teleconferences of the Open Navigation Surface Working Group (ON-SWG) can be obtained from the project's web-site, http://www.opennavsurf.org. For a list of participants, see section 4.

In the following, names of people with action items are shown in **BOLD SMALL CAPS**; expected deadline release dates are shown in red. Sizes of variables are indicated by 'U' for unsigned, 'S' for signed, 'F' for floating-point, and a size in bits (e.g., U8 is an eight bit unsigned integer, F64 is a 64-bit (double precision) floating-point number). Data sizes are given in bytes (B) with the usual convention that the SI multipliers are taken to mean multiples of 2^{10}B (i.e., 1kB = 2^{10}B = 1024B). The acronym 'CR' means 'Candidate Release' (i.e., a release of the library for comments) and 'FR' means 'Full Release' (i.e., release V1.6.0 of the library).

2 Summary of Discussion

2.1 Adoption of Variable Resolution Development Branch

Calder proposed that the current variable resolution implementation branch ('variableresolution' in the Git repository) be merged with the current development branch, and form the basis of release 1.6.0 of the library. The proposal was agreed *nem con*. [Action: **CALDER**].

2.2 Adoption of BAGViewer into Core Distribution

Calder proposed that a newly developed graphical 3D BAG viewer application developed by **Roland Arsenault** at CCOM/JHC be adopted into the core distribution via a current pull-request as part of release 1.6.0. The proposal was agreed *nem con*. [Action: **CALDER**].

2.3 Addition of BAG Explorer Links to Website

Calder proposed that a link be added to the ONSWG website to provide information on BAG Explorer, a module for HDF Compass developed by **Giuseppe Masetti** at CCOM/JHC. This downloadable application reads and parses general HDF5 data, but is made BAG-aware by the BAG Explorer module, allowing users to verify and inspect the content of BAG files, inspect and export the XML metadata, and construct simple hill-shade visualizations of the layers of the BAG. The proposal was agreed *nem con*. [Action: **CALDER**].

2.4 Proposal for Revised C++ API

Van Duzee had previously proposed implementing a new API for the library to take advantage of a more modern C++ design and to simplify the access pattern for the libraries various layers. The initial implementation draft is provided in the 'v2.0_cpp_api' branch of the Git repository. Previously, some developers in the core community had expressed a need for a C-style API for the library, and a C-language wrapper for the C++ API had been suggested. In discussion, however, it was confirmed that none of the core developer community still had this requirement, and therefore the proposal is for a pure C++ API, and for a re-configuration of the entire library to be compiled as C++ code, rather than as mixed C/C++.

The meeting was in agreement that a new API would significantly assist in simplifying use patterns for the library, and welcomed the proposal for a new API. In discussion, however, it was agreed that further development was required for the current proposal to be sufficiently complete for adoption. The group therefore agreed to revisit the idea at the next round-table meeting at the U.S. Hydrographic Conference in Galveston, TX (2017-03). [Action: **CALDER, VAN DUZEE**].

2.5 Potential for Active Tiling in BAG Files

Due to the storage of 'no data' values in the elevation and uncertainty layers, BAG files for sparse data are always technically dense so far as the HDF5 library is concerned, and can therefore be very verbose, leading to large file sizes and longer transfer times. In a previous iteration of the library, the development group turned on compression in the HDF5 library in order to assist with this problem, and found that even moderate levels of compression could help with file sizes with only minimal computation overhead for compression and decompression.

As part of the implementation of compression, the HDF5 library provides for tiling of the 2D arrays used for the elevation and uncertainty layers. However, since the library does not recognize the 'no data' values as indicating sparsity of data, this does not allow empty tiles to be ignored, which could radically improve the file size. Allowing the BAG library to apply this level of processing before passing the data to the HDF5 library could therefore significant reduce the size of BAG files. **Calder** therefore proposed that the development group consider this for a future release of the library.

In discussion, **van Duzee** indicated that CARIS had attempted to do this previously, and found that the reduction in file size could be significant in practice as well as in theory. Consequently, the group agreed that adding active tiling to the BAG implementation should be pursued in a future release of the library, with a tentative target of release 1.7.0 of the library in early-mid 2017. **Van Duzee** agreed to examine whether any aspect of the previous work could be considered for inclusion. [Action: VAN DUZEE].

2.6 Development of a Regression/Unit Testing Suite

In response to problems with interoperability with different implementations of the BAG library within commercial software, **Calder** proposed that the development group consider the construction of a test suite that would allow for validation of the BAG files being generated by particular implementations. In discussion, the group considered two alternatives: a unit-testing framework that would build and run regression tests as part of the construction of the library, and a validation application that would run through the contents of any particular BAG and would report, verbosely, the contents of the file, and any problems encountered in the process of reading it. Both options were considered viable. A suggestion was made that the cppunit framework would be a possible approach to building the unit tests.

The group agreed that including a new test suite in the next release of the library would be difficult, and therefore that the task should be considered again at the next round-table meeting at the U.S. Hydrographic Conference in Galveston, TX (2017-03). [Action: CALDER].

2.7 Requirement for Nominal Depth in Elevation Layer

In the current release of the library, it is possible to have Nominal Depth stored in the elevation layer of the BAG file instead of real depths; a metadata record is used to indicate to the user which type of data is present. As part of the Canadian Hydrographic Conference technical program, representatives of the Naval Oceanographic Office indicated that this requirement is no longer essential for their operations, and in fact had disadvantages in that software that does not correctly parse the metadata might mistake Nominal Depth for true depths, which can cause significant differences in depth reported with safety of navigation consequences.

The group discussed the potential for removing the ability to have Nominal Depth in the elevation layer, and agreed in principle that it would be the right approach. However, **Ladner** indicated that a grace period would be beneficial in realigning the production process at NAVO to allow for this. Consequently, the group agreed to tentatively schedule this for release 1.7.0 of the library in early-mid 2017, subject to NAVO requirements. [Action: LADNER].

2.8 Synchronization of BAG Development with S-102

The International Hydrographic Organisation Standard S-102 for gridded bathymetric data is based on the BAG implementation supported by the development group; in practice an S-102 file encoded in HDF5 format with XML metadata is binary compatible with a BAG file. As part of the standard, S-102 is committed to following updates and changes to the BAG implementation; due to the delay in modifying and then ratifying international standards, however, the S-102 specification typically lags one or more major releases behind the BAG library implementation. In this context, **Cove** brought up a concern that vendors may have to support more than one version of the BAG library if they are to be able to support S-102 output as well as the latest innovations and extensions in the BAG library's latest release.

While acknowledging the validity of this concern, the group also agreed that being constrained to the update cycle of the S-102 standards group would not be in the best interests of the overall path of the development group. Notwithstanding, the group also agreed that if it is possible to synchronize the development work with the S-102 standardization process without delaying the BAG development cycle, it should be done.

In practice, it appears that this would mean that any proposal for a new feature in BAG files that would necessitate a significant change to S-102 would have to have a formal definition, and preferably an implementation, prior to November of each year. This would allow for time to convert the BAG specification to S-102 structure, get it to the S-100 sub-committee in time for their meeting in the first quarter of the following year, and therefore to the IHO for their meeting in the third quarter of the year. The development group noted these requirements.

3   Summary of Action Items and Dates

The following actions and dates were agreed:

Person	Actions(s)	Section	Date
Calder	Blend 'variableresolution' development branch into the main branch ready for release 1.6.0 of the library	2.1	2016-06-03
Calder	Blend BAGViewer pull-request from Arsenault into the main branch ready for release 1.6.0 of the library	2.2	2016-06-03
Calder	Add links to BAG Explorer to the project website	2.3	2016-06-17
Calder, van Duzee	Develop proposal for C++ API for BAG library as part of V2.0 release of the library	2.4	2017-03-01
van Duzee	Investigate potential for active tiling in BAG files to reduce file size	2.5	2017-03-01
Calder	Schedule discussion of unit/regression testing for the library at next round-table meeting.	2.6	2017-03-01
Ladner	Confirm the requirement for Nominal Depth in elevation can be dropped for version 1.7.0 of the library.	2.7	2017-03-01

Dates above in red are those which would result in a significant impact on other activities were they to slip, and are therefore critical. The release dates for 1.6.0 agreed were:
- Candidate: 2016-06-03
- Full: 2016-06-17

4   Participants

Jonathan Beaudoin (QPS)
Brian Calder (CCOM/JHC)
Karen Cove (CARIS)
Mike van Duzee (CARIS)
Brett Goldenbloome (Leidos)
Stacy Johnson (NAVO)
Wade Ladner (NAVO)
Danny Neville (QPS)
Jack Riley (NOAA)