OPEN NAVIGATION SURFACE WORKING GROUP

MEETING SUMMARY

Second Meeting, 18-22 July 2005
CCOM/JHC, Durham NH

DRAFT VERSION
July 23, 2005

1 Introduction

1.1 Background on the Open Navigation Surface Working Group

The Navigation Surface [1, 2] is a scheme for using grided data as a database for the construction of hydrographic data products which are safe for navigational use. The Open Navigation Surface Working Group (ONSWG) was formed in January 2004 in order to investigate how to implement a file format that would facilitate transfer of data of this type (i.e., bathymetry of the seafloor, and its associated uncertainty) between different vendors. Concerns about meta-data preservation and questions of how to prove veracity of the data (i.e., that the data has not been modified without consent) were also considered. The goals and objectives for the ONSWG are defined through the meeting summary document that was developed during the inaugural meeting [3]. The ONSWG key documents and presentations may be obtained from the Group's web-site, `http://www.opennavsurf.org`.

The primary objective of the ONSWG is to construct a freely distributable source code library that allows the user to read and write grided hydrographic data objects, known as Bathymetric Attributed Grids (BAGs).

1.2 Objectives of the Meeting

Following the inaugural meeting of the group, the primary objectives of the project were clear, and key decisions on structure, definitions, and requirements had been made. These are documented through the BAG File Specification document [4] and the BAG Requirements document [5]. Although key technologies were identified and tested, the bulk of the work required to make the BAG library a reality still needed to be done. This was left as a development exercise for the participants. The second meeting of the group was called in mid-2005 as a way to bring together all of the experience and work of the participants with the primary objective of completing the binary library to read and write BAG files in HDF-V format.

2 Reports on progress to Date

The meeting commenced with reports from the developers about progress on the project. In summary:

1. The components for the Digital Signature Scheme have been tested with an example application, including a DLL wrapper and a VisualBasic interface. Testing showed that the gcrypt library was not sufficiently clean in its build to be used, and development has proceeded with the BeeCrypt library, which builds cleanly on the target platforms.
2. The build system is essentially complete, although it needs some integration of the outlying libraries (BeeCrypt, Xerces, GEOTRANS) to make sure that the whole project builds. The project is now being built with Qmake, which constructs standard `makefile`s for the *nix side of the house, and `*.vcproj` files to Win32; these can then be built without Qmake, so the end-user does not require it. It would however make sense to have a copy of Qmake available with the CVS build archive to ensure that the files can be remade. A `build.bat` file exists in each directory and can be executed to build all.
3. The XML schema has been checked with a parser, but the `libxml2` library is not sufficient to parse and check files of the complexity of the metadata. The Xerces library (from the Apache project, `http://www.apache.org`) can validate the schema as of V2.6.0 and has been adopted for further development. Some early issues with multiple names have now been resolved.
4. The GEOTRANS library is available and builds, and some progress has been made in incorporating the required parameters for the projects that we need into a super-structure to allow for any projection. The project has a requirement for external files that will have to move with any installation of the library, and therefore there will have to be a structure to hold these in the library download. Some work is still required to link up the API for GEOTRANS to the rest of the code.
5. Investigation of the costs of GEOTRANS show that it can be significantly more expensive to initialize than altematives (such as the `proj` library), but that it does agree with the other

libraries in terms of the locations that are predicted. Therefore it is important that the library is only initialized once in the code – a one-off cost.

6. The HDF library builds, but needs to be formed into the code to read/write the appropriate structure for the BAG as defined in the FSD [4]. In addition, the structure of the tracking list element has not been well defined, and may need other work. As a suggestion, there should be an addition of a reference ID in the tag for each node so that a collection of modifications can be referred to by the same number in the metadata lineage. This may need further development.

The participants agreed that there was still significant work to do, but the plan was still sound. The focus for the meeting is to construct a working integrated CVS build with more logical structure than the previous one, which is suitable for building with Qmake. Then, if possible, to build the library along with some example code to demonstrate its use. Work, therefore, commenced.

3 Work Completed During the Meeting

During the meeting, much progress was completed towards the completion of the library. Particularly:

1. The CVS repository is now essentially complete, with all of the libraries integrated. The build system appears to work as expected. The Xerces library is very difficult to integrate with the build system because of the complexity of the code. Therefore for now, the code will be built using the Xerces system, and then copied into the appropriate place in the ONS build tree using some custom code.
2. The library has been packaged for check-in to the CVS server to replace the previous setup.
3. In order to support the configuration files that are required for GEOTRANS, and to hold the XML schema, an environment variable (`BAG_HOME`) has been incorporated in to the project, and a suitable directory added to the CVS repository. This directory can be moved anywhere, as long as the environment variable is set appropriately.
4. The XML API is now completed with accessor functions to read and write the XML into the BAG file. We expect that there is no requirement to parse all of the XML directly, and that we can work with the XML as files on disc instead, parsing and verifying as a separate process.
5. The XML scheme is complete, and extensions to the ISO 19115 schema has been defined to hold a projected coordinate system coverage value set (i.e., bounds in the projected coordinate scheme).
6. The security scheme example code has been reconfigured to work with the new build system, and is confirmed to work with the new version of the library.
7. The basic BAG API has been defined and integrated with the work of the sub-team coders.
8. The HDF-V code to drive the basic BAG API has been built, and is in the process of being tested with example reader/writer code.
9. Use of an HDF-V attribute for meta-data did not work as expected, probably due to the size of the metadata, and was reconfigured as a sub-object instead; API updated to support this change.
10. The security scheme library has been extended to allow the use of standard XML text files to hold the required certificates and keys to implement the system. (Primarily so that users do not have to have the HASP hardware keys to use the examples.)
11. An example dataset (the Reson 8125 data from the Shallow Survey 2005 conference dataset) has been identified, and supplied to the participants for constructing the example BAG required for the conference demonstration. Due to complications with the test build as detailed above, this could not be done at the time of the meeting (see section 4).

At the end of the meeting, therefore, we have a complete build of the system library, which is known to compile and link with the example code. Significant further testing will be required to thrash out the bugs that are currently causing some difficulties.

4 Work to be Completed Subsequent to the Meeting

The primary completion task is in debugging: to make sure that the example code correctly builds and then read an example BAG. In addition, an example BAG file will be required for the demonstration of the

project at the Fourth International Conference on High-Resolution Surveys in Shallow Water in Plymouth, UK in September 2005.

It has been agreed that the tracking list for the BAG does not need to be completed for the conference, although it will need to be finished before the release process. However, the focus for now was agreed to be getting the library working so that it can be integrated into the participant's respective applications for demonstration there. The goal of the demonstration was agreed to be that the applications should be demonstrated live if possible, and via screen snapshots if not.

There was no specific distribution of modules to the participants over and above their current distribution, since the process of debugging falls to everyone. There are still difficulties with distribution of source code via CVS since the firewall requirements of some of the participants disallow the appropriate connections. Consequently, some of the development may have to be distributed by e-mail, which will take some careful coordination. The CVS repository at CCOM/JHC will still be maintained, and will be updated as e-mail is received. In the meantime, the participants agreed to collectively find a way around the CVS issues if possible.

5 Summary

Significant progress has been made during the process of the second meeting of the ONSWG. The library is now in (hopefully) the final form, builds and links with the example code, and (almost) runs. Some integration issues remain, in particular the role of GEOTRANS and the implementation of the tracking list in the HDF-V structure. However, the library structure is sufficient to allow testing and further development towards the final goal of a full release towards the end of the year.

Once again, the success of the meeting is primarily the result of the enthusiasm and commitment of the participants in the project, as outlined below. And we could not do it without the support of the parent institutions and companies who allow their participation, and support it through time, travel and equipment use. This support, and the efforts of the participants, is gratefully acknowledged.

6 Participants

Shannon Byrne (SAIC Newport)
Brian Calder (CCOM/JHC)
Jim Case (CCOM/JHC)
Dave Fabre (NAVOCEANO)
Bill Lamey (CARIS Ltd)
Webb McDonald (SAIC Newport)
Mark Paton (IVS Ltd)
Jack Riley (NOAA HSTP)

7 References

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[5] Calder, B. R., and the Open Navigation Surface Working Group (ONSWG), "Requirement Documents: The Bathymtric Attributed Grid (BAG)." V1.0 [Draft] (online: `http://www.opennavsurf.org/papers/ons_require.pdf`), 2004.