Data Formats, the IGS, and the Future

A. W. Moore

International GPS Service Central Bureau
Jet Propulsion Laboratory MS 238-540
4800 Oak Grove Dr.
Pasadena CA 91109 USA

1 Summary

Given the global nature of the IGS and the wide array of applications for its rich data set, formats for the exchange of data are of the utmost importance to the IGS. The decision to create a new data standard in the IGS should therefore not be taken lightly. The RINEX format has been well documented and very widely used for many years. Further, a number of new data types have been supported by extensions to the general backbone of RINEX, with the positive consequences of instant familiarity to RINEX users, and the opportunity for code re-use in software.

Nonetheless, a number of groups have over the past few years designed and used binary formats for the internal transfer and/or storage of GPS data. Some motivations for this may have included improved compactness for transfer of data rates higher than IGS, inclusion of data types that do not fit easily into RINEX, or improved receiver independence over the native receiver binary formats. Another motivation which may be especially relevant to the IGS in considering a change is the necessity for improved precision over the RINEX data format for L1 and L2 in occultation analysis. The recent call for participation in a Low Earth Orbiter pilot project generated 26 letters of intent, indicating the number of participating agencies will be around one-quarter of the number of IGS member agencies. This community is certainly large enough to warrant a standard exchange format, especially in expectation of later applications requiring the improved precision, or for easier support of GPS modernizations or other GNSS systems.

Several groups proposing binary exchange formats will present detailed poster papers at the IGS Network Workshop; therefore, they will not be described in detail prior to the meeting. Rather, this paper will touch on goals the community should consider in reviewing current formats and developing an IGS format. Community involvement in and usage of any format (such as RINEX has enjoyed) is crucial to the popularity and level of support of a standard.

2 Why Binary?

Given that there is motivation to develop a new data format to support upcoming applications, one may ask why IGS groups have gravitated toward binary formats. Many IGS participants may have found that the ASCII nature of RINEX lends itself to easy visual inspection of a data file. There is probably no reason that a new format *must* be binary, but there are some reasons this would be beneficial. A binary format would have inherent compactness while allowing a large number of data type identifiers to ensure extensibility, and checksums to ensure data integrity.

3 The IGS Community

The IGS has a history of vendor neutrality in its network configuration. One concern in format development has been that in some cases, groups designing internal exchange formats are motivated by the receiver type or types they own and do not have time or reason to extend formats to to other receivers. Although this is certainly understandable, the IGS should maintain its neutral stance wherever possible and avoid the appearance of endorsing any particular manufacturers in adopting a format. This does not mandate, however, that IGS groups developing formats must themselves provide support for every appropriate manufacturer!

As mentioned before, the key to success in a standard format will be widespread community acceptance and involvement. In particular, I believe involvement from the geodetic receiver manufacturing segment would be highly beneficial to the process for the following reasons:

1. Motivation for receiver manufacturers to provide excellent support to the IGS community is clear (potential customers!)

2. Vendors can provide support to IGS users through awareness and open support of IGS formats, for instance, assistance with definitions and ideally subroutine libraries of translator tools from native binary formats to the IGS format.

3. IGS analysts, data centers, and site operators are therefore relieved of the sole responsibility for creating and maintaining compliance with evolving equipment – but of course, involvement by IGS users remains mutually beneficial in identification and resolution of problems or potential improvements.

4 Conclusion

The IGS community representatives in attendance at Oslo should discuss the present format proposals throughout the meeting and a plan for the definition of an open format should be decided upon in one of the break-out working group discussions. Vendor representatives attending the Network Workshop are particularly encouraged to provide input to the format definition process.