ILRS Data Format & Procedure Standing Committee (DF&P SC) and Software Re-use Study Group (SRSG) 2020 Report

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Executive Summary

- All station site logs have been updated to version 2

- CPF v2 predictions for all satellites are expected by Jan 1, 2021 when v2 will be the official standard. All but a handful are currently available.

- CRD v2 is being produced by only 8 stations, but there will be a push for stations to expedite implementation and complete the conversion by the end of 2021

- The Herstmonceux open source normal point program has been extensively tested and appears to produce normal points as good or better than the official station normal points. Testing of statistical products and exceptions continue and will result in a new version accessible via the ILRS web site.

Site Logs

- All ILRS SLR station site logs have been upgraded to version 2

- The EDC Station Log tool has been updated and works well

CPF v2 Update

1) More and more predictions providers are supplying CPF v2 files in preparation for the conversion to CPF v2 as the official ILRS prediction format on January 1, 2021. It is expected that at least one provider for every satellite will be supplying predictions by the end of the year, and hopefully all the current providers will have v2 CPFs available by then. The only satellites not currently available in v2 are IRNSS, QZS, SARAL, and on eof the restricted satellites.

2) This has not been without issues. Some providers either didn't understand the format or didn't continue providing CPF v1 files after starting to provide CPF v2 files. Those involved were contacted as soon as the issue was detected.

3) Prediction providers are being asked to continue supplying CPF v1 through most of 2021. It would be preferable to end the CPF v1 supply earlier than the end of 2021, so I will be asking the stations periodically next year whether CPF v1 is still needed.

CRD v2 Update

1) There are still only eight stations producing CRD v2 files:Grasse, Graz, Golosiiv, Herstmonceux, Mt. Stromlo, Shanghai, Simiez, and Zimmerwald, with seven of those providing data regularly. Stations will be contacted early next year about expediting the implementation, so that as of early April 2021, the Analysis Standing Committee can start vetting as many stations as possible. The goal is to complete conversion by the end of 2021.

2) While the CRD Configuration Records (C1-C7) are listed as "recommended" in the CRD format document, they should be included unless there is some insurmountable obstacle. They provide valuable information to analysts to help identify the source of station performance changes. Of course, it is critical to keep these records (as well as station change history logs and site logs) up-to-date and to reflect the configuration of the pass.

Sample Code and Webpage

- 1) There are bug-fix versions of the CPF and CRD sample software available on the ILRS web site. The changes are not major, but those who use the sample code should check on their impact. These involve read_crd,c, write_crdf.f, and cpf_chk.c.

- 2) The web pages on the ILRS web site describing the CPF and CRD v2 formats have been updated to make them easier to read, and to remove outdated information.

Testing the Herstmonceux Open Source Normal Point Program

- The Herstmonceux normal point software was created as reference code for those testing or updating existing normal point software.

- By use of a large data set, it was hoped to show that the Herstmonceux normal point software produces demonstrably acceptable results.

- Use the test to quantify the performance of the Hx software vs stations' software

- Use the tests to highlight errors or issues with the Hx software

- Use the software is helping to critique stations' software and procedures

Testing of Herstmonceux Open Source Normal Point Program

- Software was written by Matt Wilkinson in Python and provided on the ILRS web site provided a basis for testing

- Several corrections and modifications were made to the program, including testing of a python version of the ILRS DISTRIB software

- The program was used by Ricklefs at UT to generate normal points for all LAGEOS 1 and LARES passes from all stations for January 2020 using full rate data from the CDDIS.

- Pass by pass comparison showed that ¾ of the LAGEOS 1 and 2/3 of the LARES normal point ranges agreed to 1 mm. The differences for the rest were larger, mainly due to filtering differences.

- Differences seen through orbit fitting and analysis done by J. Ries at UT were small for most stations, and the RMS was generally the same or better with the new software

- Other tests at Herstmonceux explained differences in certain stations' normal points

Testing of Herstmonceux Open Source Normal Point Program - II

- Results have been presented to the ILRS Quality Control Board (ILRS QCB)

- The results prompted discussion and testing of the effect of normal points containing only 1-5 returns

- More testing with the DISTRIB function continue

- Changes are being integrated at Herstmonceux

- A new version of the software will be available through the ILRS website when the testing and integration are complete