## Consolidation of GNSS High-Rate Data Files

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### Introduction

The IGS Global Data Centers (GDCs) have archive high-rate (1-second sampled) GNSS data since 2001. These data are archived by site in files spanning 15 minutes. Therefore, each site ideally submits 4 observation files/hour or 96 observation files/day. Many sites also submit broadcast ephemeris files (for multi-GNSS sites) and some provide meteorological data. Today, 280 or more sites provide these data to CDDIS each day, requiring approximately 11GB/day or 4TB/year in storage.

At CDDIS, these high-rate files, submitted in both RINEX V2 and V3 formats, are archived using the directory structure: `/gnss/data/highrate/YYYY/DDD/HH/YYT` with definitions as follows in Figure 1.

**Directory:** `/gnss/data/highrate/YYYY/DDD/YYT`

| Code | Definition |
|---|---|
| `YYYY` | Year |
| `DDD` | Day of year |
| `HH` | Hour |
| `YY` | Year |
| `T` | File type |

| Type | Definition |
|---|---|
| `d` | Compact observation |
| `f` | BeiDou navigation |
| `g` | GLONASS navigation |
| `h` | SBAS navigation |
| `i` | IRNSS navigation |
| `l` | Galileo navigation |
| `m` | Meteorological |
| `n` | GPS navigation |
| `o` | Observation |
| `q` | QZSS navigation |

*Figure 1. Directory structure for GNSS high-rate data*

### Proposal

The CDDIS proposes to merge the sub-hourly high-rate data files into a single tar archive file by site and by data type. This consolidation will simplify the directory structure and the download process for the users. Each data type (e.g., observation, navigation, etc.) will be contained in a separate tar archive. However, an option to consider for multi-GNSS sites is to consolidate all distinct GNSS navigation files into a single tar archive by site.

The creation of these tar files will start with the oldest data (2001) and move forward, e.g., through 2018. Current data for a TBD (e.g., six month) period will remain archived using the present structure (i.e., by day of year, hour, and file type). Automated procedures can be established at the data centers to create tar archive files as they are older than 6 months. Once individual 15-minute files are merged into a site/type/day tar file, the individual 15 minute files will be removed and archived off-line for a TBD time period.

The tar files will then be archived in the corresponding main day of year subdirectory, i.e., at CDDIS: `/gnss/data/highrate/YYYY/DDD`.

## Filenaming

At this time, high-rate data are archived in both RINEX V3 (using the long filename convention) and V2 formats (using the 8.3 filename format). Therefore tar archives must use filenames that reflect the format version of the content, as shown in Figure 2.

**Format:** RINEX V3

**Filename:** **MMMMMMMMM_YYYYDDD**0000_01D_01S_**CC.TYP**.tar.gz

**Directory:** /gnss/data/highrate/**YYYY**/**DDD**

| Code | Definition |
|---|---|
| **MMMMMMMMM** | Monument name |
| **S** | Source (R/S) |
| **YYYY** | Year |
| **DDD** | Day of year |
| **CC** | Content type |
| **TYP** | File format (rnx, crx) |

| Type | Definition |
|---|---|
| **CN** | BeiDou navigation |
| **EN** | Galileo navigation |
| **GN** | GPS navigation |
| **IN** | IRNSS navigation |
| **JN** | QZSS navigation |
| **MM** | Meteorological |
| **MO** | Compact observation |
| **RN** | GLONASS navigation |
| **SN** | SBAS navigation |

**Format:** RINEX V2

**Filename:** **MMMMDDD**0.**YYT**.tar.gz

**Directory:** /gnss/data/highrate/**YYYY**/**DDD**

| Code | Definition |
|---|---|
| **MMMM** | Monument name |
| **DDD** | Day of year |
| **YY** | Year |
| **T** | Content type |

| Type | Definition |
|---|---|
| **d** | Compact observation |
| **f** | BeiDou navigation |
| **g** | GLONASS navigation |
| **h** | SBAS navigation |
| **i** | IRNSS navigation |
| **l** | Galileo navigation |
| **m** | Meteorological |
| **n** | GPS navigation |
| **o** | Observation |
| **q** | QZSS navigation |

*Figure 2. Filenaming convention and directory structure for RINEX V3 and RINEX V2 tar files*

## Examples

- GODR00USA_R_20182550000_01D_01S_MO.crx.tar.gz: One day of high-rate (1 second sampled) mixed observation data in compact RINEX V3 format from GODR00USA receiver for day 2018255.
- GODR00USA_R_20182550000_01D_01S_GN.rnx.tar.gz: One day of high-rate (1 second sampled) GPS navigation data in RINEX V3 format from GODR00USA receiver for day 2018255.
- GODE2550.18d.tar.gz: One day of high-rate (1 second sampled) observation data in compact RINEX V2 format from GODE for day 2018255.

## Timeline

| Activity | Date |
|---|---|
| IC/DC review | 15-Oct-2019 |
| AC review | 15-Nov-2019 |
| Implementation | 01-Jan-2020 |