APRGP GNSS RINEX OBSERVATION FILE STANDARDISATION SPECIFICATION

This specification is drafted for the purpose of ensuring input parameters are correctly entered during creation of GPS RINEX observation files which will facilitate easy post processing of the campaign data set.

Observation *file name*

Since some statistic information in data pre-processing is obtained from the RINEX *file name*, the file name must be given correctly.

According to the specification for the RINEX format, the observation *file name* (o-file) is defined as following:

xxxxddds.yyo (use lower case characters for RINEX *file name*)

where:

xxxx is the four character *site name* (also known as the four character station identifier or SINEX site code),

ddd is the *day of year* (DOY),

s is the *session number*, use s=0 (zero) for files containing all existing data at a site for a single day.

yy is the last two digits of year.

e.g. alic1910.14o for the *site name* ALIC, which is station mark number AU012 at Alice Springs in Australia, on day 191 of 2014 (10 July 2014).

Header of RINEX file

Input items in RINEX header records such as site name, receiver information, antenna information and the start time must be given correctly. The first 28 lines of the RINEX observation file alic1910.14o are listed below as a sample RINEX file with correctly entered header record information.

```
....^...1|0...^...2|0...^...3|0...^...4|0...^...5|0...^...6|0...^...7|0...^...8|

     2.11           OBSERVATION DATA    M (MIXED)           RINEX VERSION / TYPE
teqc  2013Mar15                         20140711 00:23:37UTCPGM / RUN BY / DATE
Solaris x86 5.10|AMD64|cc SC5.8 -xarch=amd64|=+|=+          COMMENT
BIT 2 OF LLI FLAGS DATA COLLECTED UNDER A/S CONDITION       COMMENT
ALIC                                                        MARKER NAME
50137M001                                                   MARKER NUMBER
geodesy@ga.gov.au   GEOSCIENCE AUSTRALIA                    OBSERVER / AGENCY
355318              LEICA GRX1200GGPRO  8.71/3.822          REC # / TYPE / VERS
09370001            LEIAR25.R3      NONE                    ANT # / TYPE
 -4052051.7670  4212836.2150 -2545106.0270                  APPROX POSITION XYZ
        0.0015        0.0000        0.0000                  ANTENNA: DELTA H/E/N
     1     1                                                WAVELENGTH FACT L1/2
     6    L1    L2    C1    P2    S1    S2                  # / TYPES OF OBSERV
    30.0000                                                 INTERVAL
Forced Modulo Decimation to 30 seconds                      COMMENT
Default                                                     COMMENT
Project creator:                                            COMMENT
 SNR is mapped to RINEX snr flag value [0-9]                COMMENT
  L1 & L2: min(max(int(snr_dBHz/6), 0), 9)                  COMMENT
  2014     7    10     0     0    0.0000000     GPS         TIME OF FIRST OBS
    16                                                      LEAP SECONDS
                                                            END OF HEADER
 14  7 10  0  0  0.0000000  0 15G22G27G03G21G14G29G18G15G16R04R05R06
                               R20R18R19
 106396369.891 8  82906234.02948  20246557.180    20246553.440          51.000
        49.000
 117718830.138 8  91728958.81147  22401153.340    22401154.500          50.250
        47.000
 129888847.194 7 101212083.63845  24717028.020    24717027.820          47.500
        34.500
 114210795.506 8  88995391.14247  21733599.200    21733597.440          50.500
        45.000
 118657088.935 8  92460069.38646  22579679.260    22579679.620          49.250
```

```
       41.500
122144019.203 8  95177141.85347  23243247.580    23243248.920          48.750
       43.000
108354662.424 8  84432172.91547  20619213.120    20619210.800          51.500
       46.750
128971870.752 8 100497532.73446  24542540.500    24542542.980          48.750
       41.000
117215207.384 8  91336504.51147  22305318.000    22305316.700          50.000
       43.500
113915662.252 8  88601071.890 7  21272951.080    21272953.760          50.500
       47.000
102683253.538 8  79864767.459 8  19209020.880    19209025.360          50.750
       48.250
116312933.985 8  90465651.730 7  21796983.900    21796990.120          49.500
       43.500
114505029.885 7  89059486.255 7  21413021.640    21413027.160          45.750
       46.250
121442516.872 7  94455298.380 7  22750287.640    22750296.480          47.250
       45.000
105833605.853 8  82315037.272 8  19784480.860    19784483.580          51.250
       48.250
....^...1|0...^...2|0...^...3|0...^...4|0...^...5|0...^...6|0...^...7|0...^...8|
```

Columns 61 to 80 of the RINEX header records contain the header record labels. The header records section of the RINEX file is terminated with the "END OF HEADER" labelled record.

It is critical that the following information entered in the RINEX header records is correct to minimise the problems encountered by the processing/analysis centres.

- "MARKER NAME" labelled header record.
  Four character *site name*, same as used for *file name.* (e.g. ALIC in above sample)
- "MARKER NUMBER" labelled header record.
  Station name/number used to uniquely identify the station mark. (e.g. 50137M001 in above sample)
- "REC # / TYPE / VERS" labelled header record.
  Receiver serial number. (e.g. `355318` in above sample)
  The receiver type should comply with the receiver naming conventions in Reference Document 2 below. (e.g. AOA ICS-4000Z in above sample)
- "ANT # / TYPE" labelled header record.
  Antenna serial number. (e.g. `09370001` in above sample)
  The antenna type should comply with the antenna naming conventions in Reference Document 2 below. (e.g. `LEIAR25.R3 NONE` in above sample)
- "ANTENNA: DELTA H/E/N" labelled header record.
  The antenna height should be the vertical height of the GPS antenna reference point (ARP) above the station mark in metres. .(e.g. `0.0015` in above sample) Reference Document 3 below shows the location of the ARP for most geodetic GPS antenna types.
- "APPROX POSITION XYZ" labelled header record.
  The approximate position of the observation site should be contained in the RINEX file.
  (e.g. `-4052051.7670 4212836.2150 -2545106.0270` in above sample)
  Coordinates from the receiver solution are precise enough as the initial coordinate values.
- "TIME OF FIRST OBS" labelled header record.
  Same time as the first observation epoch. (e.g. `2014 7 10 0 0 0.0000000` in above sample)
- "TIME OF LAST OBS" labelled header record.
  Same time as the last observation epoch. This header record is optional and may not exist in all RINEX files.

Reference documents

1. The RINEX format (versions 2, 2.10, 2.11 & 3.x) specification is available at URL:
   ftp://igscb.jpl.nasa.gov/igscb/data/format/

2. The receiver and antenna naming conventions used by IGS are available at URL:
   ftp://igscb.jpl.nasa.gov/igscb/station/general/rcvr_ant.tab

3. The Antenna Reference Point (ARP), the bottom surface of the antenna to which antenna heights refer in RINEX files is shown in the antenna diagrams for most antenna types at URL:
   http://www.ngs.noaa.gov/ANTCAL/