



Software R2CGGTTSV7

The use of the R2CGGTTSV7 Software is restricted to the following conditions:

1. The Royal Observatory of Belgium (ROB) is the owner of the Software and all rights therein.
2. The use of the R2CGGTTSV7 Software is restricted to non-commercial purposes, except if a formal written agreement is asked and received from the ROB.
3. The ROB is not responsible for the proper functioning of the R2CGGTTSV7 Software on the user computer.
4. The ROB is not responsible for the correctness of the results obtained by the user with the R2CGGTTSV7 Software.
5. Any liability of ROB is strictly limited to damage as a result of gross negligence or misconduct of ROB's employees. ROB excludes to the extent permitted by law any liability in case of indirect damage such as missed income, loss of data, interruption of equipment/business etc.
6. The integration of algorithms or modules of the R2CGGTTSV7 Software into third party software is not allowed.
7. The user may modify the source of the R2CGGTTSV7 Software for his own purpose.
8. Unless the ROB otherwise requires, all publications resulting from use of the R2CGGTTSV7 Software shall include reference to the Software and the fact that it is owned by the ROB. A copy of the publication shall be provided to the ROB

May 2017.

Technical guidelines for using R2CGGTTS V7.1b

“R2CGGTTS.f.V71b” code is supposed to be used and compiled on your own system with an appropriate Fortran 77 compiler (“gfortran” for example).

What's new in R2CGGTTS 7.x:

The reading is based on RINEX 3.02

GPS, GLONASS and Galileo are supported.

The output is aligned on the CGGTTS V2E standard (see *Metrologia* 2015 **52** G1).

In particular, if during the calibration, the antenna cable delay was included in the Receiver delay, “ANT CAB DELAY” can be either set to 0 or not reported in the paramCGGTTS.dat; a SYSDLY will be reported in the CGGTTS files. If furthermore the “CLOCK CAB DELAY XP+XO” is not mentioned or set to zero in the paramCGGTTS.dat, then a TOTDLY will be reported in the CGGTTS files.

Before starting:

Compile the Fortran 77 code on your own system with appropriate compiler (e.g. “gfortran”).

Input files: (All the files have to be placed in the same directory)

In RINEX 3.02 format:

- rinex_obs : *rinex observation file*
- rinex_obs_p : *rinex observation file of the next day*
- rinex_nav_gps : *GPS navigation file*
- rinex_nav_p_gps : *GPS navigation file of the next day*
- rinex_nav_glo : *GLONASS navigation file*
- rinex_nav_p_glo : *GLONASS navigation file of the next day*



OBSERVATOIRE ROYAL DE BELGIQUE • KONINKLIJKE STERRENWACHT VAN BELGIE
Avenue Circulaire, 3 - 1180 Bruxelles • Ringlaan 3, 1180 Brussel

- rinex_nav_gal : *Galileo navigation file*
- rinex_nav_p_gal : *Galileo navigation file of the next day*

Others:

- biasC1P1.dat : *Needed if GPS P1 code is missing in Rinex observation file*
- paramCGGTTS.dat : *!! New format*
Contains all parameters related to the receiver
(created by user, see Annex 1)
- inputFile.dat (optional) : *To fit names of input files according to the need*
(created by user, see Annex 2)

Output files:

- CGGTTS.GPS : *CGGTTS GPS only file*
- CGGTTS.GLO : *CGGTTS GLONASS only file*
- CGGTTS.GAL : *CGGTTS Galileo only file*
- CGGTTS.log : *Log of execution*

Execution:

Ensure that all required data are available in the same directory as the binary file.

Start the binary file.

If there is no inputFile.dat or no MJD specified in the inputFile.dat, you will be asked to enter it.

Then the SW will process the data and output files will be created.

If you encounter any trouble processing your data, please report to pascale.defraigne@oma.be



Annex 1: *paramCGGTTS.dat*

It contains all useful information that will appear in the header and parameters that will be used for CGGTTS file creation. The description of the file format is the following:

REV DATE YYYY-MM-DD	A 30	Date of last modification of the parameters
RCVR _____	A30	Type of receiver and serial number
CH _____	integer	Number of channels
LAB NAME _____	A30	Name of the laboratory
X COORDINATE _____._____	F16.4	X coordinate of antenna phase center (m)
Y COORDINATE _____._____	F16.4	Y coordinate of antenna phase center (m)
Z COORDINATE _____._____	F16.4	Z coordinate of antenna phase center (m)
COMMENTS _____	A30	All kind of comments
REF _____	A30	Laboratory reference
CALIBRATION REFERENCE _____	A9	Calibration ID provided by the BIPM
INT DELAY P1 GPS _____._____	F16.X	Receiver + antenna internal delay (GPS P1) (ns)
INT DELAY P1 GLO _____._____	F16.X	Receiver + antenna internal delay (GLONASS P1) (ns)
INT DELAY P2 GPS _____._____	F16.X	Receiver + antenna internal delay (GPS P2) (ns)
INT DELAY P2 GLO _____._____	F16.X	Receiver + antenna internal delay (GLONASS P2) (ns)
INT DELAY E1 GAL _____._____	F16.X	Receiver + antenna internal delay (Galileo E1) (ns)
INT DELAY E5a GAL _____._____	F16.X	Receiver + antenna internal delay (Galileo E5a) (ns)
ANT CAB DELAY _____._____	F16.X	Antenna cable delay (ns)
CLOCK CAB DELAY XP+XO _____._____	F16.X	Delay to receiver reference (ns)
LEAP SECOND _____	Integer	Number of leap seconds

An example of *paramCGGTTS.dat* file is given in parallel to the SW.



Annex 2: inputFile.dat (optional)

This file is useful for an automatic generation of filenames fitted to the required day, but is not mandatory. If it is absent, input files must be named as indicated in the section “Input/Output files” above and the MJD will be entered interactively.

The description of the file format is the following: (example taken for day of year 65 of year 2016, for “ssss” receiver). **MJD must be the last entry.**

```
FILE_RINEX_NAV_GPS  
brdc0640.16N  
FILE_RINEX_NAV_P_GPS  
brdc0650.16N  
FILE_RINEX_NAV_GLO  
brdc0640.16G  
FILE_RINEX_NAV_P_GLO  
brdc0650.16G  
FILE_RINEX_NAV_GAL  
brdc0640.16L  
FILE_RINEX_NAV_P_GAL  
brdc0650.16L  
FILE_RINEX_OBS  
ssss0640.16O  
FILE_RINEX_OBS_P  
ssss0650.16O  
FILE_CGGTTS_LOG  
file_cggts_log  
FILE_CGGTTS_GPS  
GZXX1Z57.452  
FILE_CGGTTS_GLO  
RZXX1Z57.452  
FILE_CGGTTS_GAL  
EZXX1Z57.452  
MODIFIED_JULIAN_DAY  
57452
```