

FGI-GSRx v2.0.0 Release Notes

New Features in v2.0.0

- (1) Support for two tracking modes: i) Serial Tracking, or ii) Parallel Tracking.
- (2) Support for processing of longer raw I/Q datasets.
- (3) Code optimization for improved performance.
- (4) User manual to support parallel tracking mode.
- (5) Support to run FGI-SpoofRepo datasets (FGI's GNSS spoofing dataset repository).

Changes: v1.0.0 => v2.0.0

Function Name	Remarks	Modification Type
/corr/mulCorrFingerGeneration.m	Multi-correlator finger generation is now separated to a new function for the ease of processing. This function is now called instead of corrFingerGeneration.m when the user enables multi-correlator tracking. The multiorrelator correlation data is currently only used to monitor the channel condition, but not used in actual signal tracking.	New function added
/param/defaultReceiverConfiguration.txt	Few new parameters are added due to the introduction of parallel tracking mode and changes in multi-correlator architecture. Some unnecessary variables are also removed.	Modified
/corr/GNSSCorrelation.m /corr/corrFingerGeneration.m /track/multiFingerTracking.m /track/initTracking.m /track/getCorrelatorFingers.m /plot/plotMultiFingerTracking.m	Changes due to the introduction of a new function 'mulCorrFingerGeneration.m'.	Modified
/frame/gale1bDecodeEphemeris.m	It will store all the decoded navigation subframes for the whole data duration. It will mostly facilitate long data processing, and also processing of OSNMA.	Modified
/sat/gale1bSatpos.m	It checks if there is a need to update ephemeris. Currently, it is based on change of IODnav/IODC. Multiple options are possible, which can be exploited later case by case.	Modified
/sat/getSatelliteInfo.m	Change in eph architecture: it is currently only for Galileo E1 messages, but it can be later considered for other constellations/signals.	Modified
obs/generateCorrectionInputData.m	There was a change in Galileo ephemeris structure. For that reason, we need to change the codes which are affected by the change (i.e., only on Galileo E1 signal).	Modified
acq/acquireSignal.m	The acquisition algorithm now has a fine tuning of doppler: it goes to a second stage for the fine estimation of Doppler frequency for each specific PRN	Modified
/main/gsrx.m	Added functionalities for parallel tracking channel processing.	Modified

/track/doTrackingParallel.m	This function creates a batch script '*.bat' file, that can be then run from the command prompt. The batch file name and path will be provided by the user, in case parallel tracking option is used.	New function added
/track/doTrackingSingleChannel.m	This function is designed to run for each single tracking channel. At the end, it saves the tracking channel results in the *.mat file, that will then later be combined with other tracking channels of the same signal.	Ne function added
/main/runGNSSSingleSatelliteTracking.bat	Example batch script file that is used to run different MATLAB instances to process tracking channels in parallel.	New file added
/track/initializeAndSplitTrackingPerChannel.m	In case of parallel tracking mode, this function is used. It initializes the tracking channels from the acquisition, and then split the channel so that only 1 channel will be processed by one MATLAB instance.	New function added
/track/combineSingleTrackChannelData.m	In case of parallel tracking option, the user can use this function to combine different signals and tracking channels *.mat data files into one	New function added
/track/showTrackStatusSingle.m	Single satellite tracking status is displayed with this function. It is functionally similar to showTrackStatus.m function.	New function added
/bit/gpsl1BitHandling.m	This function was not used in the data processing.	Deleted
/bit/gale1cBitHandling.m	This function was not used in the data processing.	Deleted
/bit/gale1bBitHandling.m	This function was not used in the data processing.	Deleted
/track/power/narrowWidePower.m /track/power/CN0fromNarrowWide.m	Narrow-Wide power ratio-based C/NO estimation is not used anymore.	Deleted
/frame/doFrameDecoding.m	If parity check fails, we should not call ephemeris decoding. This check is now implemented.	Modified
/frame/findPreambles.m	Change in the logic how preamble detection is carried out. it is now based on first segment of navigation messages, and not based on a fix preamble count. If tracking is broken, it needs to be re-estimated.	Modified
/corr/GNSSCorrelation.m /corr/carrierMixing.m /corr/corrFingerGeneration.m /corr/getDataForCorrelation.m /track/dll/codeDiscrim.m /track/dll/codeLoopFilter.m /track/fll/freqLoopFilterWide.m /track/fll/freqLoopFilterVeryNarrow.m /track/fll/freqLoopFilterNarrow.m /track/fll/freqDiscrimAtan2.m /track/fll/freqDiscrimAtan.m /track/pll/phaseDiscrim.m /track/pll/phaseFreqFilter.m /track/pll/phaseLoopFilterNarrow.m /track/pll/phaseLoopFilterVeryNarrow.m /track/pll/phaseLoopFilterWide.m /track/allocateTrackChannel.m /track/allocateTrackChannelHeader.m	<ul style="list-style-type: none"> - Some 'Channel'-level variables are taken one level up to signal-level, since those tracking-related parameters do not usually change from one channel to other... it will make the receiver run faster than before - Some not-so-important tracking variables are not saved for each epoch. It is particularly helpful for long data sets, for example, OSNMA data sets with long data duration (10 - 15 minutes). - Variables are initialized in accordance with the data length. It is not anymore open-ended. 	Modified

/track/initTracking.m /track/power/lockDetect.m /track/power/CN0fromSNR.m /track/doTracking.m /track/GNSSTracking.m /track/bit/beib1BitSync.m /track/bit/bitSync.m /track/bit/beiDouGEOBitSync.m /track/gpsl1UpdateChannelState.m /track/glol1UpdateChannelState.m /track/gale1bUpdateChannelState.m /track/gale1cUpdateChannelState.m /track/beib1UpdateChannelState.m /track/navicl5UpdateChannelState.m /plot/plotMultiFingerTracking.m /plot/plotTracking.m /ui/showTrackStatus.m /obs/generateObservations.m		
/track/gale1bsetTrackingTable.m /track/gale1csetTrackingTable.m /track/gpsl1setTrackingTable.m /track/glol1setTrackingTable.m /track/beib1setTrackingTable.m /track/navicl5setTrackingTable.m	Changes due to removal of CN0fromNarrowWide.m function.	Modified
/obs/getTransmitTime.m	This important fix is associated with the satellite transmit time. The users can expect a slightly better positioning accuracy improvement with this fix.	Modified