GSAS v3.4.2 Release Notes

Raytheon/Jeff Lee

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Introduction

GSAS 3.4.2 is a minor release which contains fixes for L1A, Waveform, and Elevation processes and products. There was also a small change made in the Atmosphere processing constants.

For L1A, the following changes were made:

- A new check was coded to add the rollover value when the FTLatch has rolled on the previous PDS, but the fire_cmd_time has not yet rolled. This fixes a potential time problem. (This affects time on potentially all products)
- Added the sample EDOS construction record viewer to the distribution (src/prod_util/constr_rec). (No affect on products).
- Fixed GLA04 IST and LRS problems with time_tags which could have caused a time inconsistency. (GLA04 IST and LRS granules)
- Modified the GLA02 product format such that i_et_acqset_tm size is consistent with GLA03. (GLA02)
- Fixed a reported problem with the GLA04 i_bst2_recctr variable. It was not correctly being checked for an unsigned condition. (GLA04 BST)
- Some APID21 variables (i_PDUPMonCal1, and i_PDUPMonCal2) were found to be incorrectly converted when compared with the GLASIST software. The conversion routines were corrected. (GLA03)

For Waveforms and Elevation, the following changes were made:

- Fixed problem where SolAng was not being calculated if PAD is unavailable. (GLA06, GLA12-15)
- Fixed problems with d_reflctUncorr, d_reflCor_atm, d_srf_ruf, and d_srf_slope. (GLA05, GLA06, GLA12-15)
    - d_reflctuncorr – defined
    - d_refltcor – defined for GLA06, GLA12-15 –before only in GLA05
    - d_srf_ruf and d_srf_slope being calculated now –GLA06, GLA12-15
- Fixed an averaging interval problem with GLA06,12-15 QAP files. (No products affected)
- Fixed a problem where solution sigmas might not be handled properly when peaks are combined or removed during the fitting process. (GLA05 and parameters calculated from them on GLA06, GLA12-GLA15)
- Changed the maximum number of peaks to fit (on other-than-land processing) to 2.

- Changed minimum interval between peaks (on other-than-land processing) to 20ns.

For Atmosphere, the following changes were made:

- Changed the default 1064 calibration constant to 5.82d1
- Set a flag indicating that the software use the default 532 calibration constant.
- Set a flag indicating that the software use the default 1064 calibration constant.

Other, more general fixes include:

- Fixed problem where all ANC files did not show up in the product headers. (Affects all product headers)

Product Format Change Summary

On GLA06,, 12-15 : the Prod Units of i_reflCor_atm changed from "N/A" to "Unitless*1E06" and the Alg Units from "N/A" to "Unitless. Also changed the Alg Scale from "1" to "1.0d-06".

On GLA06,12-15, bit 4 of i_corrStatFlg now indicates the method used for calculating roundtrip atmosphere transmission.

On GLA02, i_et_acqset_tm was changed to be an i_spare6. The variable i_spare3 i1b(3) was changed to i_spare3 i1b. The variable i_et_acqset was added after the i_spare3, and was changed to an i2b.

The latest product formats/descriptions will be available at http://glas.wff.nasa.gov/v34_products/.

Release Information

The ClearCase label for this release is RELEASE_3.4.2.

The release date is April 24, 2003.

Version numbers have been updated to “V3.4.2 April 2003" for the following:

- libl1a
- libprod
- libwf
- libelev
- GLAS_L1A
- GLAS_Alt
- anc07_00
- anc07_02
- anc07_04

This should be verified during operation by checking the version information in the appropriate ANC06 files.

SMDS Impact

The distribution tarfile is on glasdev.wff.nasa.gov at the following location:

```
/glasdev1/v3/dist/gsas_V3.4.2.tar.Z.
```

New versions of the ANC07_00, ANC07_02 and ANC07_04 data files are required:

Those processing jobs which failed wih backwards time errors should be reprocessed with this new software.

All libraries and binaries should be recompiled using the top-level Makefile.
IMPORTANT: due to internal changes in the makefiles, SDMS MUST use the command "make runtime" to ensure the software is made without debug flags.

The process for making the libraries and binaries is as follows **(NOTE: SDMS ONLY!!)**

```
cd /install_dir/gsas_v3.4.2
make runtime
make install
```

Note the developers should not use the above procedure. This procedure is for SDMS only!

Detailed Change Notes

CR0000374 : Change Max number of peaks and interval between peaks for other the land

The two changes are as follows:

```
# Max number of peaks to fit - other than land parameters
#
I_MAXFIT2 = 2
#
```

used to be set to 6; forces no more than 2 Gaussians to be fit for the standard parameterization

```
# Min interval between peaks
#
D_INTV_MIN2 = 20.0d0
#
```

used to be 5.0 forces minimum Gaussian spacing to be 20ns (between centers of peaks)

CR0000373 : Change 3 constants in the anc07_001_01_0002.dat file

The constant GD_IR_LMCALCOF was changed to 5.82d1.
The constant GI_USE_GCC_F was changed to 0.
The constant GI_USE_IRCC_F was changed to 0.

All three constants reside in anc07_001_01_0002.dat

CR0000362 : Fix shot_time to account for hidden FTLatch rollover

Added detection code to shot_time_mod which compares the first FTLatch against the first shot_time. If the FTLatch is a half-rollover value less than the shot_time, the rollover value is added to the FTLatch in all ANC32 records.

CR0000354 : Add the construction record viewer to GSAS distribution

Added to /glas/vob/src/prod_util/constr_rec. Created makefile and added to distribution script.

PR0000347 : GLA04 IST Problems

1) last_ist_vtcw and last_lrs_vtcw should be global variables in L_Att.

2) The time tag estimation code (where the VTCW does NOT roll within the frame but the time_tag does) was changed to subtract 1 from the time_tags starting a the point of the time_tag roll and continuing backwards to the first time_tag.

The previous algorithm (using deltas) covered up the IST problem with duplicate data.

CR0000341 : Change i_et_acqset_tm on GLA02 from i1b to i2b

Changes were made to GLA02_scal_mod, GLA02_prod_mod, GLA02_alg_mod. The variable i_et_acqset_tm was changed to be an i_spare6. The variable i_spare3 i1b(3) was changed to i_spare3 i1b. The variable i_et_acqset was added after the i_spare3, and was changed to an i2b.

PR0000327 : i_bst2_recctr calculation incorrect in L_Att_Proc

On line 365 or thereabouts in L_Att_MOD.f90,

if (GLA04_bst_alg%i_bst2_recctr(i)) &

was changed to

if (GLA04_bst_alg%i_bst2_recctr(i) < 0)

AI0000324 : Compare GLA03 data to PJ APID output

An error was found in an equation used in APID21. The code in /glas/vob/src/l1a_lib/L_Eng_mod.f90 was modified to correct the inputs to the first equation used in APID21 around line 464 to check for unsigned on i_PDUPMonCal1, and i_PDUPMonCal2.

PR0000302 : All ANC files do not show in product headers

All input ANC files were not showing in the product headers. This is because the files are included by comparing the file start/stop time against the granule start/stop time. In the control file, many ANC files have start/stop times of 0/0. A file whose start/stop times is 0/0 is now considered as an input to the granule.

PR0000321 : Some GLA06, 12-15 Variables Are Incorrect
PR0000319 : QAP06,12-15 incorrect for Release 9.

Added code in ElevMgr to get d_reflctUncorr from gla05, to calculate d_reflCor_atm, and to pass these values to gla12-15. In previous releases, d_reflctUncorr and d_reflCor_atm were undefined on gla06, 12-15.

Added d_T_RTatm to const_elev_mod and anc07_0003 as the default round-trip atmosphere transmission used to compute d_reflCor_atm.

d_reflCor_atm = d_reflctUncorr / d_T_RTatm

(d_T_RTatm = the round-trip atmosphere transmission)

d_T_RTatm = exp(-2(Tc+Ta+Tm)), where

Tc is the cloud (column) integrated optical depth (1/sec),

Ta is the aerosol (column) integrated optical depth (1/4sec),

Tm is the molecular optical depth.

The optical depths are not available until GLA11, so per Steve Palm, the approximation to use for d_T_RTatm is 0.98.

Added pass through in WFMgr for d_beam_coelev, d_beam_azimuth, and d_SolAng. Added code to WFMgr & ElevMgr to calculate d_SolAng if ephemeris is available even if PAD is not available. Checking for first valid lat,lon,elev to use for the calulation. In previous releases, d_beam_coelev, d_beam_azimuth, and d_SolAng were undefined.

Changed initialized value of i_sigmaatt from 0 to gi_invalid_i2b in GLA05_prod_mod & GLA06_prod_mod.

The attitude quality indicator (i_sigmaatt) is obtained from anc09 (PointingSigma). i_sigmaatt was not being scaled from PointingSigma correctly. In previous releases, i_sigmaatt will be 0 because of this error.

Changed code in ElevMgr so that the 100 km averages will be done over the correct time interval. In previous releases, where there were data gaps, all of the averages may not have been computed and written to QAP06.

Changed ElevMgr to use the peak with the maximum amplitude instead of the last (closest-to-the-ground) peak for calculating slope & roughness, and setting i_SurfRufslpQF & GLA15%i_OcRMSqf.

PR0000308 : GLA05 Solution Sigmas For Some Peaks Are Incorrect
PR0000294 : Using DEBUG mode, Waveform developer should be able to run dataset without crashing.
PR0000225 : The transmitted pulse is not being fit when there is no received WF.

The solution sigmas were not being handled properly when peaks were combined or removed during the fitting process. They are now being set invalid for invalid peaks, When peaks are removed during the fitting process, the corresponding solution sigmas are also removed. In previous releases, when the amplitude or peak-width became too

large during the fitting process, that shot was marked as a poor fit, and the peak parameters were estimated, but nothing was done to the solution sigmas (which no longer corresponded to i_parm). With this release, when either the amplitude or peak width become too large during the fitting process, the solution sigmas are re-initialized, an estimate for one peak is made, and the fitting process is restarted generating new solution sigmas. Only those solution sigmas that correspond to non-invalid parameters are now stored on the product. The transmitted pulses are now being fit whether there is a received WF or not. The transmitted pulse characteristics are now being initialized, so that if there is no transmitted pulse, a random number does not cause an overflow or underflow when being scaled before writing to the product.

Changed files

```
./Makefile
./data/anc07_001_01_0000.dat
./data/anc07_001_01_0002.dat
./data/anc07_001_01_0003.dat
./data/anc07_001_01_0004.dat
./src/common_libs/anc_lib/anc07_elev_mod.f90
./src/common_libs/exec_lib/com_hdr_update_mod.f90
./src/common_libs/platform_lib/const_elev_mod.f90
./src/common_libs/prod_lib/GLA02_alg_mod.f90
./src/common_libs/prod_lib/GLA02_prod_mod.f90
./src/common_libs/prod_lib/GLA02_scal_mod.f90
./src/common_libs/prod_lib/GLA04_alg_mod.f90
./src/common_libs/prod_lib/GLA05_Pass_mod.f90
./src/common_libs/prod_lib/GLA05_prod_mod.f90
./src/common_libs/prod_lib/GLA05_scal_mod.f90
./src/common_libs/prod_lib/GLA06_Pass_mod.f90
./src/common_libs/prod_lib/GLA06_prod_mod.f90
./src/common_libs/prod_lib/GLA06_scal_mod.f90
./src/common_libs/prod_lib/GLA12_scal_mod.f90
./src/common_libs/prod_lib/GLA13_scal_mod.f90
./src/common_libs/prod_lib/GLA14_scal_mod.f90
./src/common_libs/prod_lib/GLA15_scal_mod.f90
./src/common_libs/prod_lib/vers_prod_mod.f90
./src/elev_lib/vers_elev_mod.f90
./src/glas_alt/ElevMgr_mod.f90
./src/glas_alt/GLAS_Alt.f90
./src/glas_alt/WFMgr_mod.f90
./src/glas_l1a/GLAS_L1A.f90
./src/glas_l1a/L1AMgr_mod.f90
./src/glas_l1a/WriteL1A_mod.f90
./src/l1a_lib/L_Att_mod.f90
./src/l1a_lib/L_Eng_mod.f90
./src/l1a_lib/shot_time_mod.f90
./src/l1a_lib/vers_l1a_mod.f90
./src/prod_util/
./src/prod_util/constr_rec/
./src/prod_util/constr_rec/Makefile
./src/prod_util/constr_rec/crview.c
./src/prod_util/constr_rec/util.c
./src/prod_util/constr_rec/util.h
./src/prod_verify/code
./src/prod_verify/code/Makefile
./src/prod_verify/code/onepass_avg_mod.f90
```

```
./src/prod_verify/code/qapg_elev_mod.f90
./src/prod_verify/code/qapg_generate_mod.f90
./src/prod_verify/code/qapg_gla05_at.f90
./src/prod_verify/code/qapg_gla05_mod.f90
./src/prod_verify/code/qapg_gla05_sum.f90
./src/prod_verify/code/qapg_readgla_mod.f90
./src/prod_verify/code/qapg_specialcases_mod.f90
./src/waveforms/W_FunctionalFt/W_FunctionalFt_mod.f90
./src/wf_lib/vers_wf_mod.f90
```

The following IDL QA code was also updated:

```
./idl/qa_browse/browse
./idl/qa_browse/compare/0README
./idl/qa_browse/compare/qapc_alongtrack.pro
./idl/qa_browse/compare/qapc_format.pro
./idl/qa_browse/compare/qapc_inprod_alongtrack.pro
./idl/qa_browse/compare/qapc_inprod_alongtrack_V3.pro
./idl/qa_browse/compare/qapc_inprod_summary.pro
./idl/qa_browse/compare/qapc_inprod_summary_V3.pro
./idl/qa_browse/compare/qapc_outputfilenames.pro
./idl/qa_browse/compare/qapc_product.pro
./idl/qa_browse/compare/qapc_readcntlfile.pro
./idl/qa_browse/compare/qapc_reformqap01.pro
./idl/qa_browse/compare/qapc_reformqap02.pro
./idl/qa_browse/compare/qapc_reformqap05.pro
./idl/qa_browse/compare/qapc_scalardata.pro
./idl/qa_browse/compare/qapc_statistics.pro
./idl/qa_browse/compare/qapc_summary.pro
./idl/qa_browse/compare/qapc_updatebdflag.pro
./idl/qa_browse/compare/qapc_vectordata.pro
./idl/qa_browse/compare/qapcompare.pro
./idl/qa_browse/compare/runqapc
./idl/qa_browse/compare/sample.txt
./idl/qa_browse/description-files/qap_description.pro
./idl/qa_browse/description-files/qap_description.txt
./idl/qa_browse/read/qapr_readfile.pro
./idl/qa_browse/read/qapr_readheader.pro
./idl/qa_browse/read/qapr_readpastheader.pro
./idl/qa_browse/read/qapr_readqap06.pro
./idl/qa_browse/read/qapr_readqap13.pro
./idl/qa_browse/read/qapr_readqap15.pro
./idl/qa_browse/read/qapread.pro
./idl/qa_browse/util/bar_plot.pro
./idl/qa_browse/util/circdist.pro
./idl/qa_browse/util/colorbar__define.pro
./idl/qa_browse/util/error_message.pro
./idl/qa_browse/util/extract_filename.pro
./idl/qa_browse/util/genglafile.pro
./idl/qa_browse/util/getcolor.pro
./idl/qa_browse/util/imdisp.pro
./idl/qa_browse/util/isreal.pro
./idl/qa_browse/util/j2000sec2string.pro
./idl/qa_browse/util/j2000sectoymdhms.pro
./idl/qa_browse/util/makebackgroundwhite.pro
./idl/qa_browse/util/makepoly.pro
./idl/qa_browse/util/minmax.pro
./idl/qa_browse/util/nearestint.pro
```

./idl/qa_browse/util/notbdv.pro
./idl/qa_browse/util/qa_colors.pro
./idl/qa_browse/util/qa_consts.pro
./idl/qa_browse/util/qab01_consts.pro
./idl/qa_browse/util/qab02_consts.pro
./idl/qa_browse/util/qab04_consts.pro
./idl/qa_browse/util/qab05_consts.pro
./idl/qa_browse/util/qab06_consts.pro
./idl/qa_browse/util/qab07_consts.pro
./idl/qa_browse/util/qab13and15_consts.pro
./idl/qa_browse/util/qab_bar_consts.pro
./idl/qa_browse/util/qab_consts.pro
./idl/qa_browse/util/qab_translatecomponentstatus.pro
./idl/qa_browse/util/qap01_datastruct.pro
./idl/qa_browse/util/qap02_datastruct.pro
./idl/qa_browse/util/qap03_datastruct.pro
./idl/qa_browse/util/qap04_datastruct.pro
./idl/qa_browse/util/qap05_datastruct.pro
./idl/qa_browse/util/qap06V2_datastruct.pro
./idl/qa_browse/util/qap06V3_datastruct.pro
./idl/qa_browse/util/qap06V4_datastruct.pro
./idl/qa_browse/util/qap06_datastruct.pro
./idl/qa_browse/util/qap07V2_datastruct.pro
./idl/qa_browse/util/qap07_datastruct.pro
./idl/qa_browse/util/qap08V2_datastruct.pro
./idl/qa_browse/util/qap08_datastruct.pro
./idl/qa_browse/util/qap09V2_datastruct.pro
./idl/qa_browse/util/qap09_datastruct.pro
./idl/qa_browse/util/qap10V2_datastruct.pro
./idl/qa_browse/util/qap10_datastruct.pro
./idl/qa_browse/util/qap11V2_datastruct.pro
./idl/qa_browse/util/qap11_datastruct.pro
./idl/qa_browse/util/qap13V2_datastruct.pro
./idl/qa_browse/util/qap13V3_datastruct.pro
./idl/qa_browse/util/qap13V4_datastruct.pro
./idl/qa_browse/util/qap13_datastruct.pro
./idl/qa_browse/util/qap15V2_datastruct.pro
./idl/qa_browse/util/qap15V3_datastruct.pro
./idl/qa_browse/util/qap15V4_datastruct.pro
./idl/qa_browse/util/qap15_datastruct.pro
./idl/qa_browse/util/qapprint.pro
./idl/qa_browse/util/removetrailingzeros.pro
./idl/qa_browse/util/restoreplotparms.pro
./idl/qa_browse/util/saveplotparms.pro
./idl/qa_browse/util/sign.pro
./idl/qa_browse/util/strprint.pro
./idl/qa_browse/util/tag_exists.pro
./idl/qa_browse/util/tvread2.pro
./idl/qa_browse/util/where2d.pro
./idl/qa_browse/util/write_struct.pro
./idl/qa_browse/util/ymdhms2j2000sec.pro