
EARTH EXPLORER MISSION CFI SOFTWARE

Release Notes - Version 3.5

1 INTRODUCTION

This note describes the changes introduced in the new release of the Earth Explorer CFI software libraries.

2 NEW RELEASE DESCRIPTION

2.1 CFI Software and Documentation Delivery

The new versions of the CFI software libraries are the following:

- EXPLORER_FILE_HANDLING -- Version 3.5 - 26/05/06
- EXPLORER_DATA_HANDLING -- Version 3.5 - 26/05/06
- EXPLORER_LIB -- Version 3.5 - 26/05/06
- EXPLORER_ORBIT -- Version 3.5 - 26/05/06
- EXPLORER_POINTING -- Version 3.5 - 26/05/06
- EXPLORER_VISIBILITY -- Version 3.5 - 26/05/06

The following Software User Manuals have been updated accordingly:

- EXPLORER_FILE_HANDLING issue 3.5
- EXPLORER_DATA_HANDLING issue 3.5
- EXPLORER_LIB issue 3.5
- EXPLORER_ORBIT issue 3.5
- EXPLORER_POINTING issue 3.5
- EXPLORER_VISIBILITY issue 3.5
- GENERAL issue 3.5

2.2 Compilation software and platform

This Earth Explorer CFI libraries are provided for SOLARIS, LINUX, MACOS and WINDOWS platforms.

- SOLARIS (32-bit):
 - Solaris 5.7 (or later) Operating System
 - gcc compiler version 3.3.2 (for linking the software to a C application)
 - libxml2 version 2.6.22 or later
- SOLARIS (64-bit):
 - Solaris 5.9 (or later) Operating System
 - gcc compiler version 3.4.2 (for linking the software to a C application)
 - libxml2 version 2.4.23 or later
- LINUX (32-bit):
 - Linux 2.4.18 (RedHat 8.0) Operating System
 - gcc compiler version 3.3.1 (for linking the software to a C application)

- glibc version 2.3.2
- libxml2 version 2.6.22 or later

Note that there is an incompatibility between gcc compiler version 3.3 and the RedHat 7.x Operating System. The standard C library (libc.a) is not fully compatible with gcc V3.x.

- LINUX (64-bit):
 - Linux 2.6.9 (RedHat Enterprise 4) Operating System
 - gcc compiler version 3.4.5 (for linking the software to a C application)
 - glibc version 2.3.4
 - libxml2 version 2.6.16 or later
- PC WINDOWS (32-bit):
 - Microsoft Windows 2000 or XP Operating Systems.
 - Microsoft Visual C++ 6.0 Compiler (for linking the software to a C application)
 - libxml2 version 2.6.20 or later (including iconv-1.9.1 and zlib-1.2.3)
- MACOSX (32-bit):
 - Mac OS X version 10.3.9
 - gcc compiler version 3.3 (for linking the software to a C application)
 - libxml2 version 2.6.22 or later

The Earth Explorer CFI software is compatible with Mac OS X 10.4 Xcode release (using gcc 4.0)

- MACOSX (64-bit):
 - Mac OS X version 10.4.6
 - gcc compiler version 4.0.1 (for linking the software to a C application)
 - libxml2 version 2.6.22 or later

The Earth Explorer CFI software is compatible with Mac OS X 10.4 Xcode release (using gcc 4.0)

Note that the distributed binaries have been generated with no debug flag.

2.3 Installation executables.

New installation programs are provided for:

- WINDOWS 32-bit
 - EXPLORERCFI_3_5_WINDOWS.exe” -- Version 3.5 - 26/05/06
- MACOS 64-bit
 - EXPLORERCFI_3_5_MACOS.dmg -- Version 3.5 - 26/05/06
- MACOS 64-bit
 - EXPLORERCFI_3_5_MACOS64.dmg -- Version 3.5 - 26/05/06

3 CLOSED SPRS

The following SPR have been solved:

- EXPCFI-SPR-074 (AN-209, explorer_orbit): Orbit initialization with OSF does not fill the inclination nor the drift_mode
- EXPCFI-SPR-075 (AN-210, explorer_lib): xl_time_ref_init_file fails with XL_TIMEMOD_DORIS_PRECISE
- EXPCFI-SPR-077 (AN-200,explorer_file_handling): Segmentation fault when calling xo_gen_rof (caused by function xf_tree_traverse_and_format)

- EXPCFI-SPR-078 (AN-205, explorer_pointing): Wrong results are obtained when the departing attitude frame of the computed attitude matrix is J2000 (function xp_change_frame)
- EXPCFI-SPR-079 (AN-208, explorer_orbit): Wrong mean inclination from xo_orbit_info.
- EXPCFI-SPR-080 (AN-211, explorer_pointing): Wrong results when the departing coordinate frame is not the same for all the attitude matrices involved.
- EXPCFI-SPR-081 (AN-216, explorer_pointing): Initialization with Star Tracker file: DCM matrix has to be transposed before storing in the attitude_id data.
- EXPCFI-SPR-082 (AN-221, explorer_pointing): Discontinuities in the satellite to target elevation angle.
- EXPCFI-SPR-083 (AN-229, explorer_visibility): xv_station_vis_time: Start/stop times in visibility segments shifted approximately 30 seconds.
- EXPCFI-SPR-084 (AN-230, explorer_pointing): Frequency and atmospheric model not initialized in structure target_id
- EXPCFI-AN-231 (explorer_lib): After initializing the time_id, the function xl_time_get_leap_second_info reports a warning (“Time Reference not initialized”)
- EXPCFI-AN-233 (explorer_lib): In function xl_time_get_leap_second_info, the output utc leap times (before and after) are not set to empty strings when no leap second introduced.

4 NEW REQUIREMENTS

The following new features/requirements have been implemented:

- GENERAL:
 - The libraries have been compiled with optimization flags:
 - “-O3 -funroll-loops” for SOLARIS, LINUX and MAC OS.
 - “/Ot /Ob2 /Og /Op” for WINDOWS
 - The libraries have been made thread-safe (code review, removal of global and static variables)
 - Libraries compiled in 64-bits are provided for SOLARIS, LINUX and MAC OS X platforms
 - Support for new Earth Explorer missions: EARTHCARE and SWARM.
- EXPLORER_DATA_HANDLING
 - New routine **xd_xml_validate** to validate an XML file using its schema and check schema versioning (only the interface has been defined).
- EXPLORER_LIB:
 - New executable **time_conv** for time conversions between different formats/references.
 - New enumeration values for B1950 and Galactic Coordinate systems (the transformations are not yet implemented)
 - New routines for conversions between unitary direction and right ascension/declination: **xl_radec_to_cart** and **xl_cart_to_radec**. (only the interfaces have been defined)
 - New routine to convert right ascension/declination between different star catalogues: **xl_star_catalog** (only the interface has been defined).
 - New routines for routines to transform between Earth Fixed coordinates to topocentric angles: **xl_ef_to_topocentric** and **xl_topocentric_to_ef** (only the interfaces have been defined).
 - New inputs allowed for **xl_time_ref_init_file**:
 - * automatic detection of input file types (XL_TIMEMOD_AUTO)
 - * use of DORIS Navigation files is allowed
 - * selection of file validity interval (XL_SEL_FILE)

- EXPLORER_ORBIT:
 - New executables **time_to_orbit** and **orbit_to_time**.
- EXPLORER_POINTING:
 - Implementation of aberration correction for the Cryosat attitude determination (Star Tracker files). As a consequence, a new element has been added to the structures `xd_tracker_conf_file` and `xp_star_tracker_aux`
 - DEM algorithm: GETASSE altitudes are given for the center of the pixel rather than one of its corners. Two new elements (`offset_x` and `offset_y`) have been defined in structure `xd_dem_ace`.

Note the following:

- The Fortran interfaces as specified in the SUMs are obsolete (CFI interfaces not supported by Fortran 77). However, successful tests have been performed using Fortran 90/95.
- Envisat ASCII file format is not supported. Envisat DORIS Navigator files are not supported either.
- As a consequence of the correction of EXPCFI-SPR-059 (V3.4), POFs and ROFs generated using the CFI file generation routines previous to V3.3 will not be accepted by the current CFI SW.
- The `explorer_file_handling` function `xf_error_msg` has been removed from the SW (it was not thread-safe, it made use of global variables). The existing routine `xf_basic_error_msg` shall be used to retrieve the error messages.
- To link correctly the applications with the EE CFI SW, the `pthread` library has to be added to the list of libraries to link with.
- The runtime performances given in the SUMs have not been updated with the values corresponding to the current delivery (the figures were computed with V2.X)

5 KNOWN PROBLEMS

See section “Known Problems” at the end of each of the SUMs to check limitations of the current release