# EARTH EXPLORER MISSION CFI SOFTWARE

Release Notes - Version 3.7.2

# 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 3.7.2 - 31/07/08
- EXPLORER_DATA_HANDLING -- Version 3.7.2 - 31/07/08
- EXPLORER_LIB -- Version 3.7.2 - 31/07/08
- EXPLORER_ORBIT -- Version 3.7.2 - 31/07/08
- EXPLORER_POINTING -- Version 3.7.2 - 31/07/08
- EXPLORER_VISIBILITY -- Version 3.7.2 - 31/07/08

The following Software User Manuals have been updated accordingly:

- EXPLORER_FILE_HANDLING issue 3.7.2
- EXPLORER_DATA_HANDLING issue 3.7.2
- EXPLORER_LIB issue 3.7.2
- EXPLORER_ORBIT issue 3.7.2
- EXPLORER_POINTING issue 3.7.2
- EXPLORER_VISIBILITY issue 3.7.2
- GENERAL issue 3.7.2

## 2.2 Compilation software and platform

This release of the CFI libraries are provided for SOLARIS, LINUX, MACOS and WINDOWS platforms.

- SOLARIS (32-bits):
  - 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-bits):
  - Solaris 5.9 (or later) Operating System
  - gcc compiler version 3.4.2 (for linking the software to a C application)
  - libxml2 version 2.6.22 or later
- LINUX (32-bits):
  - Linux 2.4.18 (RedHat 8.0) Operating System
  - gcc compiler version 3.3.1 (for linking the software to a C application)
  - 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-bits):
  - Linux 2.6.9 (RedHat Enterprise 4) Operating System
  - gcc compiler version 3.4.5 (for linking the software to a C application)
  - glibc 2.3.4
  - libxml2 version 2.6.22 or later
- PC WINDOWS:
  - 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-bits):
  - 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-bits):
  - Mac OS X version 10.4.9
  - gcc compiler version 4.0.1 (for linking the software to a C application)
  - libxml2 version 2.6.22 or later
- MACOSX on Intel (32-bits):
  - Mac OS X version 10.4.9
  - gcc compiler version 4.0.1 (for linking the software to a C application)
  - libxml2 version 2.6.22 or later
- MACOSX on Intel (64-bits):
  - Mac OS X version 10.4.9
  - gcc compiler version 4.0.1 (for linking the software to a C application)
  - libxml2 version 2.6.22 or later

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

## 2.3 Installation packages

The CFI libraries are provided in different packaging formats depending on the platform:

- Compressed (gzip) tar files are provided for SOLARIS, SOLARIS 64-bit, LINUX and LINUX 64-bit:
  - EXPLORERCFI_3_7_2_SOLARIS.tar.gz
  - EXPLORERCFI_3_7_2_SOLARIS64.tar.gz
  - EXPLORERCFI_3_7_2_LINUX.tar.gz
  - EXPLORERCFI_3_7_2_LINUX64.tar.gz
- WINDOWS installation program: EXPLORERCFI_3_7_2_WINDOWS.exe
- MAC OS X PPC installation program: EXPLORERCFI_3_7_2_MACOS.dmg
- MAC OS X PPC 64-bit installation program: EXPLORERCFI_3_7_2_MACOS64.dmg
- MAC OS X Intel installation program: EXPLORERCFI_3_7_2_MACIN.dmg

- MAC OS X Intel 64-bit installation program: EXPLORERCFI_3_7_2_MACIN64.dmg

# 3 CLOSED SPRS

The following SPR have been solved:

- EXPCFI-SPR-115 (AN-309): The file generation functions do not create a correct reference to the schema.
- EXPCFI-SPR-116 (AN-310): Wrong version number for the executables for the file generation functions.
- EXPCFI-SPR-118 (AN-316): Problem with **xv_station_vis_time_no_file** when AOS elevation > LOS elevation and mask=XV_AOS_LOS or mask=XV_COMBINE.
- EXPCFI-SPR-119 (AN-337): **xp_dem_compute**: DEM target not found in some circunstances.
- EXPCFI-SPR-121 (AN-334): Error in **xl_euler_to_matrix** when the input matrix is quasi orthonormal.
- EXPCFI-SPR-122 (AN-298): Memory for DEM initialisation is not free.
- EXPCFI-SPR-123 (AN-336): **xp_dem_compute**: Wrong altitude when longitude is close to 360.0 degrees..
- EXPCFI-SPR-124 (AN-339): The XML validator function only works with the esa-eop URL in the namespace (xmlns). In USER mode, the namespace has to be get from the schema.
- EXPCFI-SPR-125 (AN-115): DORIS Navigator files. Anotation between packets are not generated by **xo_gen_dnf**.
- EXPCFI-SPR-126 (AN-328): When the propagation mode is "DOUBLE" mode, the osculating keplerian elements are not correctly computed.
- EXPCFI-SPR-127 (AN-331): Zone / Station Id does not need to be exactly 8 characters.
- EXPCFI-SPR-128(AN-342):**xp_sat_nominal_att_init_model** for mode XP_MODEL_GENERIC: The first and second axis enumeration values (model_param[1] and model_param[6]) can take the same value for the targets XP_INERTIAL_TARGET_VEC or XP_EF_TARGET_VEC.
- EXPCFI-SPR-129 (AN-344): Problems with swath position when the MLST drift is different from zero.
- EXPCFI-AN-311: The library integrity checking executable available also for Windows
- EXPCFI-AN-317: **xf_tree_read_string_attribute/xf_tree_read_string_node_value**: Error when reading attribute ‘xmlns’. New function created: **xf_tree_get_namespace**
- EXPCFI-AN-324: Doris Navigator: changes in ASCII header of binary file ans associated .HDR file
- EXPCFI-AN-325: **xv_gen_swath / xv_gen_swath_no_file**: The function xd_read sdf is not reading the ASAR parameters
- EXPCFI-AN-343: The field <Creator></Creator> in the Fixed Header shall have the following format <Creator>LIBRARY_NAME:xx_gen_XXX</Creator>

# 4 NEW REQUIREMENTS

The following new features/requirements have been implemented (see section “Known Problems” at the end of each of the SUMs to check limitations of the current release):

- GENERAL:
  - New Satellite definitions: Sentinel2, Sentinel3 and SeoSat
  - Updated orbit parameters for EarthCARE
  - New Generic satellite with loose orbit tolerances

- EXPLORER_FILE_HANDLING:
  - New function to read the namespace: **xf_tree_get_namespace**
- EXPLORER_DATA_HANDLING:
  - Reading and writing functions for TLE files: **xd_read_tle** and **xd_write_tle, xd_free_tle**
  - New fields added to Satellite Configuration file (NORAD data)
  - New file formats supported for the Swath Definition and Swath Template files. The SDF and STF data structures have been modified accordingly.
- EXPLORER_ORBIT:
  - Orbit initialization and propagation with TLE files. New funcitons **xo_osv_to_tle**, and **xo_gen_tle**
- EXPLORER_POINTING:
  - Support misalignment or configuration matrices at Satellite Attitude Frame level: **xp_sat_att_quat_plus_matrix_init** and **xp_sat_att_quat_plus_angle_init**
  - New functions to set the azimuth/elevation definiton at satellite attitude frame level: **xp_set_az_el_definition**
  - New quaternion interpolation algoritihm: spherical linear method (SLERP)
  - Aeolus attitude model aligned with SRB 8.1
- EXPLORER_VISIBILITY:
  - New swath types for **xv_zone_vis_time**: area and curve swaths. This functionality requires that new SDF and STF formats are supported. Note that the previous SDF snd STF formats are still supported by the visibility functions.
  - Swath Control File format updated (compliant with ESOV NG v1.1)

Note the following:

- 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 previuos 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 since V3.5 (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.

# 5 KNOWN PROBLEMS

The current version of the CFI has the sfollowing limitations:

- Visibility computations are not possible if Orbit ID is initialised using TLE files (EXPCFI-AN-359);
- Propagator ID validity in TLE mode is shorter than expected if the TLE file is composed of more than one entry (EXPCFI-AN-360);
- Initialisation of Propagator ID in TLE mode + AUTO mode fails if the TLE file is composed of more than one entry (EXPCFI-AN-361);
- Using the xo_gen_tle when the orbit file contains more than one OSV per orbit, the output is a TLE file including wrongly formatted entries (EXPCFI-AN-362);
- Schema validation of Predicted and Restituted Orbit files generated with xo_gen_xxx functions fail due to incorrect schema version in the file header (EXPCFI-AN-363);

- Swath Definition File format as described in the User Manual is not correct for the ASAR geometry, it should be either:

```
<Narrow_Asar>
  <Slant_Range_Left unit=”10-6s”>+xxx.xxx</Stant_Range_Left>
</Narrow_Asar>
```

or:

```
<Wide_Asar>
  <Slant_Range_Left unit=”10-6s”>+xxx.xxx</Stant_Range_Left>
  <Slant_Range_Right unit=”10-6s”>+xxx.xxx</Stant_Range_Right>
</Wide_Asar>
```

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