EARTH OBSERVATION MISSION CFI SOFTWARE

Release Notes - Version 4.2

1   INTRODUCTION

This note describes the changes introduced in the new release of the Earth Observation 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:

- EO_FILE_HANDLING -- Version 4.2 - 31/01/11
- EO_DATA_HANDLING -- Version 4.2 - 31/01/11
- EO_LIB -- Version 4.2 - 31/01/11
- EO_ORBIT -- Version 4.2 - 31/01/11
- EO_POINTING -- Version 4.2 - 31/01/11
- EO_VISIBILITY -- Version 4.2 - 31/01/11

The libraries are available for download at the following URL (registration required):

http://eop-cfi.esa.int/eo_cfi_distribution/CURRENT/4.2

More information can be found at: http://eop-cfi.esa.int/eo_cfi_distribution

The following Software User Manuals have been updated accordingly:

- EO_FILE_HANDLING issue 4.2
- EO_DATA_HANDLING issue 4.2
- EO_LIB issue 4.2
- EO_ORBIT issue 4.2
- EO_POINTING issue 4.2
- EO_VISIBILITY issue 4.2
- GENERAL issue 4.2

The documentation is available for download at the following URL:

http://eop-cfi.esa.int/CFI/EO_CFI_DOCS/4.2

2.2 Supported platforms and build environments

The following platforms / building environments are supported by this release of the CFI:

- SOLARIS (64-bits):
    - Solaris 5.9 (or later) Operating System
    - gcc compiler version 4.2.2 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later
- LINUX (32-bits):
    - Linux 2.6.16 Operating System
    - gcc compiler version 4.2.2 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later
- LINUX (64-bits):
    - Linux 2.6.16 Operating System
    - gcc compiler version 4.2.2 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later
- PC WINDOWS (32-bit):
    - Microsoft Windows 2000 or XP Operating Systems.
    - Microsoft Visual C++ 8.0 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 on PPC (32-bits):
    - Mac OS X version 10.4.6
    - gcc compiler version 4.2.1 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later
- MACOSX on Intel (32-bits):
    - Mac OS X version 10.4.11
    - gcc compiler version 4.2.1 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later
- MACOSX on Intel (64-bits):
    - Mac OS X version 10.4.11
    - gcc compiler version 4.2.1 (for linking the software to a C application)
    - libxml2 version 2.6.22 or later

2.3 Installation packages

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

- WINDOWS 32-bit installation program: EOCFI_4_2_WINDOWS.exe
- MAC OS X PPC 32-bit installation program: EOCFI_4_2_MACOS32.dmg
- MAC OS X Intel 32-bit installation program: EOCFI_4_2_MACIN32.dmg
- MAC OS X Intel 64-bit installation program: EOCFI_4_2_MACIN64.dmg
- SOLARIS 64-bit Compressed (gzip) tar file: EOCFI_4_2_SOLARIS64.tar.gz
- LINUX 32-bit Compressed (gzip) tar file: EOCFI_4_2_LINUX32.tar.gz
- LINUX 64-bit Compressed (gzip) tar file: EOCFI_4_2_LINUX64.tar.gz

DEM datasets are distributed separately and are available for download at the following URL:

http://eop-cfi.esa.int/eo_cfi_distribution/DEM

3 NEW FEATURES

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

- GENERAL:
    - o NORAD TLE Satellite number designators for GOCE, SMOS and CRYOSAT2.
    - o New satellite identifiers: SENTINEL_1C, SENTINEL_2A, SENTINEL_2B, SENTINEL_2C, SENTINEL_3A, SENTINEL_3B, SENTINEL_3C.
    - o Check normalization of input vectors, matrices and quaternions.
    - o Orbit Id initialisation: the state vector/orbital changes time stamps from the orbit files are recomputed to be compatible with the input time correlations (time_id).
    - o Compliance to file format standard v2.0 for Sentinel Missions.
- EO_DATA_HANDLING:
    - o New DEM configuration file.
    - o New OSF format to support curved Mean Local Solar Time and OSV time reference.
    - o New STF format to support curved Mean Local Solar Time.
- EO_ORBIT:
    - o Support for curved Mean Local Solar Time. New functions:
        - ▪ xo_orbit_init_def_2
        - ▪ xo_gen_osf_create_2
        - ▪ xo_gen_osf_append_orbit_change_2

- ▪ xo_gen_osf_change_repeat_cycle_2.
- EO_POINTING:
  - o Support for new DEM model: ACE2 9" resolution (available for download at http://eop-cfi.esa.int/eo_cfi_distribution/DEM/ACE2_9SEC/.
  - o New function xp_dem_get_info to extract DEM data source flag.
  - o Possibility of using regional (partial) DEM.
- EO_VISIBILITY:
  - o Support in visibility functions for TLE files and precise propagation.
  - o Support in visibility functions for new STF format.

4 CLOSED ANOMALIES

4.1 Software Problems

The following Software Problems have been fixed:

ANR Nr.	Description
418	The CFI algorithm for SAR modes produces wrong results when pointing to the left of the boresight direction (i.e. when target azimuth = 270.0 deg). In particular the left and right points are incorrectly geo-located.
419	DEM target computation fails when using ray tracing model
432	wrong error message in xl_time_ref_init_file when the time_id is initialized with XL_SEL_TIME and a time interval outside the validity time of the input orbit file.
434	Empty list of station visibility segments when using OSF
435	Error in xp_change_frame when attitude frame contains offsets
436	xo_osv_compute_extra does not compute osculating elements when used in combination with the precise orbit propagator
437	OEF format is obsolete, however is still described in the SUMS (e.g. Data Handling)
440	instrument offsets not taken into account in target computation functions
441	Yaw Steering Attitude Mode: Earth Fixed velocity should be computed at the spacecraft instead of nadir
442	Failure in thread safety: in xl_common_id.c, distinct mutexes cannot prevent simultaneous access to Id lists

443	xo_orbit_init_file fails with ROF (ANX not found)
444	for some missions, files are generated without Mission ID in the name
446	memory leak in xp_change_frame
451	Nodal period and seconds since ANX are computed incorrectly when using TLE
458	Typo in nominal eccentricity for Sentinel1B

4.2 New Features

The following new features have been implemented:

ANR Nr.	Description
220	Check on normalization of input vectors, matrices and quaternions.
347	MLST non linear drift supported (Linear, Quadratic and Harmonics terms)
383	New DEM dataset (ACE2 9SECS resolution) supported
384	DEM Data source extraction supported
402	Visibility computations supported with TLE and precise propagators
406	Partial (regional) DEM datasets supported
414	CryoSat-2, GOCE, SMOS supported with TLE propagator.
416	xo_orbit_init_file: Re-computation of OSV times in case of discrepancy with time correlations defined in time_id
459	Support for File Format Standard version 2.0.

5 KNOWN PROBLEMS

1) Slow execution of visibility computations in combination with precise propagator;

2) Small inaccuracies in altitudes computations using the DEM ACE2 9SECS resolution due to geoid approximated by 30 harmonics.