

EARTH OBSERVATION MISSION CFI SOFTWARE

Release Notes – Version 4.22

This document describes the changes introduced in this release of the Earth Observation Mission CFI Software.

Visit us at <http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software> for more.

1 USER SUPPORT

For any question related to the usage of the EOCFI or to report a problem, please contact:

EOCFI Software Support Team

e-mail: cfi@eopp.esa.int

2 NEW FEATURES & IMPROVEMENTS

Ref./EOCFI-ANR-	Description
937	Updated the EOCFI C++ RPATH to be based on \$ORIGIN/@rpath (on Linux/macOS)
939	Enabled support for AEM with custom REF_FRAME used by MTG
923	Improvements to DEM-related schemas - Allow up to 6000 rows/columns in Generic Raster DEM configuration - Make Cache_Type and Cache_Max_Size optional in EO_OPER_INT_DEMCFG
927	Added missing DEM models to C++ and Java library enumerations
918/919	Multiple documentation improvements - Specify which DEM-related fields are optional - Include Mean Keplerian elements for supported missions in documentation

3 SOLVED PROBLEMS

Ref./EOCFI-ANR-	Description
920	Corrected function <code>xv_gen_scf</code> to generate files compliant with EOFFS V3
922	Corrected crash during initialization of ASTER GDEM (accessing height information at poles)
924	Corrected crash caused by passing NULL time filter parameters to <code>xp_time_ref_init_file</code> when loading IERS bulletin
925	Corrected crash caused by loading SP3 file with non-existing satellite identifier
926	Corrected intersection with targets above 9000 meters <i>(n.b. necessary because some DEMs consider polar ice caps height, with maximum heights above 12000 meters)</i>
931	Corrected initialization of time based on overlapping orbit files <i>(n.b. as UT1 was always used as reference, under some conditions the initialization incorrectly considered duplicate information)</i>
933	Corrected memory leaks during calculation of zone visibility <i>(i.e. <code>xv_zonevistime_compute</code>)</i>
938	Corrected handling of Line-of-Sight intersection close to North/South pole
941	Removed <code>using namespace</code> directives from C++ header files
943	Corrected <code>xo_osv_rec::ref_frame</code> value after loading orbit from file

4 RELEASE DESCRIPTION

4.1 Software

Earth Observation Mission CFI Software 4.22 is composed of the following libraries:

Library Name	Version	Issue Date
File Handling	4.22	22/12/2021
Data Handling		
Lib		
Orbit		
Pointing		
Visibility		
EECommon (*)		

(*) only C++ and JAVA APIs

The core API of the above libraries is written in C and provides an API for C, C++ and Java.

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

<http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software/branch-4-x/eocfi-v4x-download>

4.2 Documentation

The following documents are available:

Type	Document Name	Version
General	Mission Conventions Document	4.22
	General Software User Manual	
C API	Quick Start Guide	
	File Handling Software User Manual	
	Data Handling Software User Manual	
	Lib Software User Manual	
	Orbit Software User Manual	
	Pointing Software User Manual	
	Visibility Software User Manual	

The documentation is available for download (with C++ and Java APIs also available on-line) at the following URL:

<http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software/branch-4-x/eocfi-v4x-documentation>

The Earth Observation Mission CFI Software file formats are specified in the EO Mission Software File Format Specification document, which is available at the following URL:

http://eop-cfi.esa.int/Repo/PUBLIC/DOCUMENTATION/SYSTEM_SUPPORT_DOCS/PE-ID-ESA-GS-584-1.6-EO_Mission_SW_File_Format_Specs.pdf

Note: In Section 3.2 of EO CFI File Format Specification (Orbit Scenario File), the element <ANX_Longitude_Drift> and its contents are not supported by the latest EOCFI SW version.

4.3 Supported platforms

The following platforms are supported by this release of the CFI (the following are requirements for the **C API**):

Designation	Platform/Architecture	Minimum Platform Requirements	Software Requirements
LINUX64_LEGACY	Linux 64-bit	x86_64 based PC Linux Operating System (Kernel version 2.6.x)	GCC compiler version 4.5.x glibc (C Library) version 2.12 (*)
LINUX64	Linux 64-bit	x86_64 based PC Linux Operating System (Kernel version 4.10.x)	GCC compiler version 6.3.x glibc (C Library) version 2.24
WINDOWS64	Windows 64-bit	x86_64 based PC Microsoft Windows 7	Microsoft Visual C++ Compiler (Visual Studio 2017 Express or Professional edition, 64-bit)
MACIN64	MacOS/Intel 64-bit	x86_64 based Mac Computer Mac OS X version 10.12.x (Sierra)	Xcode 9.2/Clang compiler frontend

(*) According to gcc documentation, forward compatibility is ensured up to gcc/g++ version 4.9.x.

NOTE for MACIN64 distribution:

As of version 5 of Xcode the default compiler is Clang (see <http://clang.llvm.org/>). Clang is a compiler front end for C and C++ and can build an application linking against the EOCFI C/C++ libraries. The gcc and g++ program provided within Xcode are aliases for clang. OpenMP is not supported in AppleClang. Therefore, the `-fopenmp` compiler option cannot not be used. Functions using parallelized computations, e.g. `xp_target_list...` functions will operate in single-threading mode.

The following are additional requirements for the **C++ API** (a C++ compiler is required):

- g++ compiler version 4.5.x for LINUX64_LEGACY (*) (in MACIN64, g++ is an alias for clang) and g++ compiler version 6.3.x for LINUX64 (*)
- Microsoft Visual C++ Compiler (Visual Studio 2017 Express or Professional edition) for WINDOWS

The following are additional requirements for the **JAVA API** (a JAVA SDK is required):

- Java Standard Edition (SE) version 8 for all platforms

4.4 Distribution Packages

The Earth Observation Mission CFI Software libraries are provided as Zip archives:

API	Package Name	MD5 Checksum
C	EOCFI-4.22-CLIB-LINUX64.zip	800766e9b6b2c0a824edaaf7c94a3fa3
C	EOCFI-4.22-CLIB-LINUX64_LEGACY.zip	5f9322c3e90eaa1288d5238793d39221
C	EOCFI-4.22-CLIB-MACIN64.zip	b841c0378a1d8d791303d2e3e65658b2
C	EOCFI-4.22-CLIB-WINDOWS64.zip	a514a92709d427c0333b57a623687629
C++	EOCFI-4.22-CPPLIB-LINUX64.zip	b5f5dbe97eca9628842e4798f7be5382
C++	EOCFI-4.22-CPPLIB-LINUX64_LEGACY.zip	134fe228b47e606612fcc18144f9a051
C++	EOCFI-4.22-CPPLIB-MACIN64.zip	fb9018239505767a795f8bb1f47f5805
C++	EOCFI-4.22-CPPLIB-WINDOWS64_DLL.zip (*)	1a6913f1b53dfee55987e2d4127e01ca
C++	EOCFI-4.22-CPPLIB-WINDOWS64_STA.zip (**)	cb9067723d3a2346bcabfe917c18c21b
JAVA	EOCFI-4.22-JAVALIB-LINUX64.zip	07aec6c6e72ebb7bed3743bfd67a8c75
JAVA	EOCFI-4.22-JAVALIB-LINUX64_LEGACY.zip	1e16c6a7c37c76a47a57c4051a40c51
JAVA	EOCFI-4.22-JAVALIB-MACIN64.zip	286b5e10bf8baf2973803d413f2f9ad5
JAVA	EOCFI-4.22-JAVALIB-WINDOWS64.zip	506a38878b586a0f99c9c2cfd49464b9

(*) Dynamic libraries (DLLs) / (**) Static libraries

Information on how to get and use the supported DEM datasets can be found at the following URL:

<http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software/support-files>

4.5 Installation Hints

To install Earth Observation Mission CFI Software libraries, simply extract the contents of the distribution package in the desired installation directory. More information on how to install and use the libraries can be found on:

- Section 6 “CFI LIBRARIES INSTALLATION” of the General SUM;
- Section 6 “LIBRARY USAGE” of each Library User Manual.

The Earth Observation Mission CFI Software makes use of the following third-party libraries:

- pthreads (POSIX threads): this library is normally pre-installed in Linux and Mac OS X systems. For Windows, the library is provided in the `cfi_tools` directory within the distribution package. Pthreads is covered by the GNU Lesser General Public License. (see <https://www.sourceware.org/pthreads-win32/copying.html>).
- libxml2 (see <http://xmlsoft.org/>): for reading and writing XML files.
- libgeotiff (see <https://trac.osgeo.org/geotiff/>)
- libtiff (see <http://www.libtiff.org/>)
- libproj (see <https://proj.org/>): for reading ASTER GDEM files.

Terms and conditions for usage of such libraries are detailed in the text file (included in the distribution package) `TERMS_AND_CONDITIONS.TXT`.

The libraries libxml2, libgeotiff, libtiff and libproj are provided:

- in the C API distribution packages: as separated static libraries (see Section 6 of each User Manual for instruction on how to link them to the application program).
- in the C++ / Java APIs distribution packages: as separated dynamic libraries (see Section 6 of each User Manual for instruction on how to link them to the application program). In the Java API for MAC OS X platform, due to incompatibilities with system libraries, they are instead embedded in the EOCFI libraries.

User applications using the Pointing library need to be built with OpenMP support (adding `-fopenmp` switch in gcc, see Section 6 of the Pointing User Manual).

OpenMP is not supported in AppleClang (Mac OS X) and Visual C++ (Windows), therefore no additional switch is required. In these platforms the library will operate in single-threading mode.

The XML validation function and tool in the Data Handling library uses the libxml2 library. For Windows platforms, it is required to link the user application with the `ws2_32.lib`.

5 KNOWN PROBLEMS

The updated list of known issues that will be resolved in a future release can be found at the following URL:

<http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software/branch-4-x/known-issues-branch-4>