

EARTH OBSERVATION MISSION CFI SOFTWARE

Release Notes – Version 4.18

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
0767	Added support for TanDEM-X 90m DEM (Digital Elevation Model)
0806	Enabled the use of the orbit number from GEO packets when loading DORIS Navigation files
0810	Added to C++/Java API the existing C API <code>xl_set_tle_sat_data</code> function
0813	Improvements to C++ API: <ul style="list-style-type: none"> - Removed "using namespace std;" from all EOCFI C++ API headers - Modernized exceptions specifications, by replacing <code>throw</code> specifier with <code>noexcept</code> from C++11 - Adhere to <code>const</code> correctness, by passing arguments by <code>const-ref</code>; and declaring methods as <code>const</code> whenever possible - Avoid implicit conversions by declaring constructors <code>explicit</code>
0814	Added support for updated format of IERS bulletin B
0779 0780 0811	Improvements to the Software User Manual: <ul style="list-style-type: none"> - Added documentation for API functions not described in SUM - Corrected multiple typos and added description of multiple missing structs/struct data members - Aligned C++/Java API documentation with C API documentation

3 SOLVED PROBLEMS

Ref./EOCFI-ANR-	Description
0777	Corrected spurious log errors when calling <code>xp_dem_init</code>
0800	Corrected symbol names in C API internal headers
0817	Corrected handling of <code>XV_ORBIT_REL</code> in <code>xv_swathpos_compute</code> function
0818	Corrected misleading error message in <code>xp_get_attitude_data</code>
0819	Corrected internal conversion from Quaternions to Vectors in <code>xl_quaternions_to_vectors</code> function
0820	Corrected handling of Generic DEM with tiles crossing over N/S or E/W quadrants
0821	Corrected use of <code><directory></code> specification for Generic DEM
0825	Corrected memory leaks in <code>xd_read_osf</code> and <code>xd_read_att_def</code> functions
0826	Corrected handling of all <code>DerivEnum</code> values in <code>StateVector::change</code> method

4 RELEASE DESCRIPTION

4.1 Software

Earth Observation Mission CFI Software 4.18 is composed of the following libraries:

Library Name	Version	Issue Date
File Handling	4.18	11/11/2019
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	4.18
	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-584-1.4-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 Clang. 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-4.18-CLIB-LINUX64.zip	cc2038f955217b314f442e1877f42bfa
C	EOCFI-4.18-CLIB-LINUX64_LEGACY.zip	e0c69dd8cd4637e20bea0d95df3ec4ab
C	EOCFI-4.18-CLIB-MACIN64.zip	bfb92f6de9a31caf84255d476cd99d6
C	EOCFI-4.18-CLIB-WINDOWS64.zip	311448de8dd8d053cbb4291197d85f2
C++	EOCFI-4.18-CPPLIB-LINUX64.zip	2e73279bfb7654ceed61ab3c585f0b7e
C++	EOCFI-4.18-CPPLIB-LINUX64_LEGACY.zip	d4bd35eb56fe6066a77ce32666d83eb8
C++	EOCFI-4.18-CPPLIB-MACIN64.zip	48366b53b7c3d726e7cf5d11640de350
C++	EOCFI-4.18-CPPLIB-WINDOWS64_DLL.zip (*)	bc1328add1a6138452d4b7d11461330a
C++	EOCFI-4.18-CPPLIB-WINDOWS64_STA.zip (**)	939a21c164c82b657b3d18e93e601508
JAVA	EOCFI-4.18-JAVALIB-LINUX64.zip	92e22dc3e76006ad569a22d4a0fb794f
JAVA	EOCFI-4.18-JAVALIB-LINUX64_LEGACY.zip	02d7776028f94bc3c057b744d8e58e88
JAVA	EOCFI-4.18-JAVALIB-MACIN64.zip	267fbcfa36e585901c952a5d2472231d
JAVA	EOCFI-4.18-JAVALIB-WINDOWS64.zip	448cd701f3bd41bb0c7417e572538f41

(*) 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 <http://trac.osgeo.org/geotiff/>)
- libtiff (see <http://www.libtiff.org/>)
- libproj (see <http://trac.osgeo.org/proj/>): 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 clang (Mac OS X) and Visual Studio (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>