Installation Guide

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1 Introduction

This documentation provides installation instructions for the data extractors and libraries of the Netherlands Sciamachy Data Center (NL-SCIA-DC). The software is developed to access the official GOME and Sciamachy level 0, 1b and 2 NRT data products as distributed by DLR and ESRIN. Read them carefully, as they tell you what this is all about, explain how to install the software.

2   On what hardware does it run?

The software has been developed under GNU/Linux (Debian and Ubuntu), on Intel/AMD 32/64-bit installations

Old versions (< 1.0) of the software are known to work on HP (hpux-10.20), DEC Alpha (osf4.0d), Sun (SunOS 5.8) and SGI (iris4d).

Support for the PGI compiler is dropped. The speed difference between executables generated with the GNU or Intel compilers is only noticable when calibrating level 1b data (10-20% faster).

3   Installing the software

You need the following software to compile nadc_tools from source:

- GNU make (version $>=$ 3.80)

- GNU gcc (version $>=$ 4.0)

- Python (version $>=$ 2.4)

- HDF5 (version $>=$ 1.8)

- recent distribution of teTeX or texlive to create the documentation

The following software are optional:

- Intel CC compiler (version $>=$ 10.1)

- IDL (version $>=$ 7.0)

- netCDF (version $>=$ 4.0)

- PostgreSQL (version $>=$ 8.3)

Put the NL-SCIA-DC tarball in a directory where you have permissions (e.g. your home directory) and unpack it:

```
tar jxvf nadc_tools-1.xx.x.tar.bz2
```

Make sure you have no stale .o files and dependencies lying around:

```
cd nadc_tools
make realclean
```

To set up all the dependencies correctly do:

```
make dep
```

To compile the software do:

```
    make install
```

This will install the binaries in `PREFIX/bin`, libraries in `PREFIX/lib`, header files (C/C++) in `PREFIX/include`, and IDL programs in `PREFIX/share/nadc_idl`.

Alternative make options are:

```
    make install_libs (libraries, only)
    make install_progs (extractors, only)
    make install_devel (include files (C/C++), only)
    make dist_clean (remove libraries and programs)
```

Recognized command-line options for make are:

`PREFIX`	install NL-SCIA-DC software in PREFIX
`WITH_CC=native/gnu/pgi/intel`	forces the use of the native/GNU/PGI/Intel compilers
`CFLAGS`	C compiler flags
`CXXFLAGS`	C++ compiler flags
`FFLAGS`	Fortran compiler flags
`LDFLAGS`	linker flags, e.g. `-L<lib dir>`
	if you have libraries in a nonstandard directory `<lib dir>`
`WITH_SHARED=0/1`	compile using shared libraries (=1), or static libraries (=0)
`WITH_PSQL=0/1`	compile including PostgreSQL support (=1)
`HDF5_DIR=<dir>`	specify the prefix of the HDF5-directory
	which contains the "include" and "lib" sub-directories
`WITH_IDL=0/1`	compile including IDL support (=1)
`IDL_DIR=<dir>`	prefix where the IDL-software is installed, (e.g. /usr/local/rsi/idl)

For example, to install the required shared libraries for the IDL interface:

```
    make WITH_SHARED=1 install_libs
```

If you are using shared libraries you must install these in a directory searched the dynamic linker. Otherwise, as a user, you can make use of the environment variable `LD_LIBRARY_PATH`, for example (bash):

```
    export LD_LIBRARY_PATH=$HOME/lib
```

If you want to use the IDL programs, you have to have the shared libraries installed and add the directory `PREFIX/share/nadc_idl` to the directory listing of the environment variable `IDL_PATH`, for example (bash):

```
    export IDL_PATH=$IDL_PATH:+PREFIX/share/nadc_idl
```

You can also create a RPM-package from the full sources (on systems which support the rpm package manager). As root, you can simply create the RPM using:

```
rpm -tb nadc_tools-0.xx.x.tar.bz2
```

As a user, you have to configure `$HOME/.rpmmacros`, for example:

```
%_topdir $HOME/rpm-build
```

Make sure that the following directories exists:

```
$HOME/rpm-build/SPEC
$HOME/rpm-build/SOURCES
$HOME/rpm-build/BUILD
$HOME/rpm-build/RPM/i386
```

4 Linking your own programs

Instructions on how to link your own programs with the NL-SCIA-DC libraries are given in the file `How_to_Link.txt`.

5 Feedback

If you encounter any problems while trying to build, install or run one or more components of the nadc_tools package you can send e-mail to: *R.M.van.Hees@sron.nl*

Apart from problems, we would also appreciate to hear from you if you have any ideas, suggestions, or comments that may help us to improve the quality or functionality of nadc_tools

6 Software layout

The source code is organized as follows:

Docs contains the LaTeX documentation of the NL-SCIA-DC software

FRESCO contains the NL-SCIA-DC Fresco GOME/SCIA extractors

GOME contains the NL-SCIA-DC GOME level 1 and 2 extractors

IDL_NADC NL-SCIA-DC IDL-API to read, select and calibration Sciamachy data

IMAP contains the NL-SCIA-DC IMAP extractors

IMLM contains the NL-SCIA-DC IMLM extractors

MCFS contains the NL-SCIA-DC MCFS extractors

MERIS contains the NL-SCIA-DC Meris level 2 extractors

SCIA contains the NL-SCIA-DC Sciamachy level 0, 1 and 2 extractors

SDMF constains processors for the Sciamachy Data Monitoring Facility

TOGOMI contains the NL-SCIA-DC TOGOMI extractors

TOSOMI contains the NL-SCIA-DC TOSOMI extractors

config contains the configuration files of the NADC software

include contains header files for the C code, including function prototypes, and annotations for Splint.

libGOME contains modules to read, select, calibrate and write GOME data

libIDL_NADC NADC C-to-IDL API to the read and calibration modules in `libGOME and libSCIA`

libMERIS contains modules to read, select, calibrate and write Meris data

libNADC contains low level functions used by the NADC software

libSCIA contains modules to read, select, calibrate and write Sciamachy data

libSDMF_NADC contains modules to read, select and write SDMF data

libSQL_NADC contains modules to ingest, select and remove data from the NL-SCIA-DC meta databases

scripts contains scripts, programs and templates to maintain the source code

The name of the modules should describe the purpose of the functions it contains.

A About NADC tools

A.1 Purpose and Limitations

The probably most important part of the NL-SCIA-DC software (nadc_tools) are the C-libraries, which contain functions to read Sciamachy data products into memory, dump the data as ASCII output or write the data in PDS or HDF5 format. The software is written in ANSI-C (and even assembler), and coded in such a way that you (an experienced (C-) programmer) can easily understand the code. The data extractors, included in this software package, are developed for the NL-SCIA-DC and give a good example of how to use the libraries.

The software distributed in this package contains libraries, written in ANSI-C (mostly POSIX compliant except for some ISO C99 extensions) and an IDL wrapper library (using `CALL_EXTERNAL`) with IDL functions to read GOME and Sciamachy data. The IDL interface requires sharable object libraries. Building shared libraries is easy on the supported platforms, however, do not forget to set the environment variable `LD_LIBRARY_PATH`.

This software package is written and maintained by Richard van Hees (SRON), and distributed under the GNU General Public License.

A.2 Acknowledgement

In case (part of) this dataset is used for a publication and essential to the work and the results, an offer of co-authorship to Richard van Hees (SRON) and /or Ralph Snel (SRON) is highly appreciated. Please do not hesitate to contact us in an early stage for necessary support.

In all other cases SRON should be properly acknowledged. Such an acknowledgement could state: "We acknowledge SRON for providing the nadc_tools and/or patched Sciamachy level 1b data products".

A.3 DISCLAIMER

We at SRON have developed nadc_tools as part of our commitment towards the verification and further improvement of the calibration of Sciamachy data. This software is developed for in-house usage, and generously shared with you WITHOUT ANY WARRANTY. We will try to help you with any problems, but only on a "best effort" basis. In order to continuously improve this facility, feedback from users is highly appreciated.

Note that this software package is also not supported in any way by ESA or DLR, although the nadc_tools extractors and libraries mimic some of the functionality of the gdp and EnviView toolbox.

The software package is in no way intended to replace the official data processor and should not be treated as such. Especially it is not meant to (and cannot) produce official data products. These have to be derived with ESA approved tools such as EnviView that can be downloaded for free from ESA.

It is your own responsibility to verify the results you produce with this package against official data products. If you find discrepancies, please inform SRON (not ESA or DLR) at once. Any information you give will help us to improve our software. We will relay to ESA all information to improve the official data processor.

A.4 COPYRIGHT