SNEAK (inStrumeNt sourcE pAcket toolkit)

Description and Usage Examples

14-03-2022

SNEAK

- SNEAK is designed to be a toolkit to extract/manipulate the values of specific ISP fields in L0/RAW files
  - Multiple *command line utilities*
    - Could easily be used for batch processing of L0 files

  - *ISP Tree Maker*
    - lists the fields of the ISP(s) stored in a file
  - *ISP Extractor*
    - extracts specific ISP field(s) into a CSV text file
  - *ISP Transform*
    - updates specific ISP field(s) according to a timeline
  - *ISP Multiplexer*
    - selects/reorders/combines the ISPs from multi-file ISP streams
  - *ISP Sequencer*
    - corrects the SSC of a multi-file ISP stream

SNEAK

- Available for Linux, MacOS and Windows (64bit)

- Documentation included in the installation package – also available online.

- Usage Requirements
  - 25 MB disk space
  - 8 GB RAM
  - Java 8, consider using OpenJDK 8 (LTS) from Adoptium

- Installation
  - Make sure JAVA_HOME environment variable is correctly set
  - Download from https://eop-cfi.esa.int/index.php/applications/tools/sneak
  - Extract anywhere
  - (Optional) Add the installation folder to the PATH environment variable

SNEAK

- Specification of L0 data format based in *DFDL for Space* (DFDL4S)
  - DFDL schema is a generic extension of XSD schema (used to validate XML)
  - DFDL schema is extends XSD with attributes/annotations that specify size/characteristics of binary fields
  - DFDL4S is “our” implementation of DFDL
    - available at https://eop-cfi.esa.int/index.php/applications/dfdl4s
    - Supports interpretation of L0/RAW Space-to-Ground data
    - Support CCSDS format, including Space Packets Protocol for Instrument Source Packets (ISPs)

  - Catalogue of supported mission is available at

    https://eop-cfi.esa.int/Repo/PUBLIC/DOCUMENTATION/MISSION_DATA/TELEMETRY_SCHEMA_FILES/

  - Note: the amount of detail included in the DFDL4S schema is (mostly) guided by the needs of the mission

SNEAK . *Generic*

- How to display version information?

```
$ isp_treemk --version

isp_treemk (sneak v1.3.2)
Developed and distributed by EOP-PE
https://eop-cfi.esa.int/
```

- How to display available options?

```
$ isp_treemk --help

General:
  -h [ --help ]          Display options help
  -v [ --version ]       Display version information
  --verbose              Display progress bar while processing the file
  --schema arg           Schema of the ISP [REQUIRED]
  --isp arg              ISP file to be displayed [REQUIRED]
  --packet arg           Number of an ISP to be displayed [OPTIONAL, MULTIPLE]
```

SNEAK . *ISP Tree Maker*

- The ISP Tree Maker (isp_treemk) lists the fields of ISP(s) stored in a L0 file.

- Useful to collect the ISP field paths used to configure the other utilities.
  - Consider using S2G to do elaborate ISP inspection/reporting
    – available at https://eop-cfi.esa.int/index.php/applications/s2g-data-viewer

- *Options*

```
-h [ --help ]          Display options help
-v [ --version ]       Display version information
--verbose              Display progress bar while processing the file
--schema arg           Schema of the ISP [REQUIRED]
--isp arg              ISP file to be displayed [REQUIRED]
--packet arg           Number of an ISP to be displayed [OPTIONAL, MULTIPLE]
```

SNEAK . *ISP Tree Maker*

- How to display all packets in ISP stream?

```
$ isp_treemk
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
```

- How to display a specific packet in ISP stream?

```
$ isp_treemk
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --packet 0
```

- How to display multiple specific packets in ISP stream?

```
$ isp_treemk
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --packet 5
    --packet 8
```

SNEAK . *ISP Extractor*

- The ISP Extractor (isp_extractor) extracts the values of ISP field(s) into a CSV text file
- List of fields to extract is provided in text file (one field per line):

```
/Packet_Primary_Header/Packet_Identification/APID int
/Packet_Primary_Header/Packet_Sequence_Ctrl/SSC
/Packet_Data_Field/NAVATT_Packet_Secondary_Header/Time_Code_Field/Time_Code
/Packet_Data_Field/NAVATT_Packet_Secondary_Header/Time_Code_Field/Time_Code/Coarse_Time
/Packet_Data_Field/NAVATT_Packet_Secondary_Header/Time_Code_Field/Time_Code/Fine_Time
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Position/X
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Position/Y
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Position/Z
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Velocity/X
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Velocity/Y
/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Navigation_and_Attitude_Data/Satellite_Velocity/Z
```

- *Options*

```
    -h [ –help ] : Displays options help
    -v [ –version ] : Displays version information
    --verbose : Display progress bar while processing the file
    --schema arg : Schema of the ISP [REQUIRED]
    --isp arg : ISP file [REQUIRED]
    --fields arg : Text file containing the list of fields (one per line) to be extracted [REQUIRED]
    -o arg ` [ `-output arg ] : Output file to store the CSV fields [REQUIRED]
    --separator arg : The separator to be used in the output; if not provided ‘,’ is used by default [OPTIONAL]
    --unavailable arg : The [integer] value to be used when a field does not exist; if not provided ‘0’ is used by default [OPTIONAL]
```

SNEAK . *ISP Extractor*

- How to extract ISP field values into CSV?

```
$ isp_extractor
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --fields cfg/flex_fields.txt
    --output flex_fields.csv
   [--verbose]
```

- How to extract ISP field values with custom separator?

```
$ isp_extractor
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --fields cfg/flex_fields.txt
    --output flex_fields.csv
    --separator “;”
```

- How to extract ISP field values with custom “unavailable field marker”?
  - *This is typically useful in case of processing ISP streams mixing multiple ISP types, where some types might not have all selected fields*

```
$ isp_extractor
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --fields cfg/flex_fields.txt
    --output flex_fields.csv
    --separator “;”
    --unavailable 42
```

SNEAK . *ISP Transform*

- The ISP Transform (isp_transform) updates specific ISP field(s) according to a timeline specification
- Traverses all ISPs in the provided ISP stream, and updates the fields based on the ISP packet time information

```
{
  "time_segments": [
    {
      "time_selection": {
        "path": "/Packet_Data_Field/NAVATT_Packet_Secondary_Header/Time_Code_Field/Time_Code/Coarse_Time",
        "gps_time_start": "2019-09-14T10:36:33.000",
        "gps_time_stop": "2019-09-14T10:36:38.000",
      },
      "updates": [
        {
          "path": [
            "/Packet_Data_Field/NAVATT_User_Data_Field/ISP_Data/Pointing_Guidance/Guidance_Mode"
          ],
          "type": "uint32_t",
          "value": "2"
        },
      ]
    }
  ]
}
```

Warning: The changes are applied to the ISP stream ”in-situ”!!! The ISP file will be changed!

- *Options:*

```
   -h [ --help ] : Displays options help
   -v [ --version ] : Displays version information
   --verbose : Display progress bar while processing the file
   --schema arg : Schema of the ISP [REQUIRED]
   --isp arg : ISP file [REQUIRED]
   --timeline arg : Timeline file that defines the ISP fields to be updated [REQUIRED]
```

SNEAK . *ISP Transform*

- How to transform ISP stream according to timeline?

```
$ isp_transform
    --schema schema/FLEXX-bandTMISP.xsd
    --isp L0/FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL
    --timeline cfg/flex_timeline.json
   [--verbose]
```

SNEAK . *ISP Multiplexer*

- The ISP Multiplexed (isp_mux) select/reorder/combine the ISPs from multi-file ISP streams

```
{
  "order": [
    {
      "schema_path": "schema/FLEXX-bandTMISP.xsd",
      "isp_path": "FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL",
      "isp_indexes": [
        2,
        0
      ]
    },
    {
      "schema_path": "schema/FLEXX-bandTMISP.xsd",
      "isp_path": "FLX_GPP__L0__NAVATT_20190914T103613_20190914T103728_20220201T153727.DBL",
      "isp_indexes": [
        1,
        3
      ]
    }
  ]
}
```

- Options:

```
Options:
  -h [ --help ]          Display options help
  -v [ --version ]       Display version information
  --verbose              Display progress bar while processing the file
  -o [ --output ] arg    Output file to store the selected ISPs [REQUIRED]
  --order arg            Path to configuration describing order of ISP [REQUIRED]
```

SNEAK . *ISP Multiplexer*

- How to create ISP file by combining multiple ISP streams?

```
$ isp_mux
    --order cfg/flex_order.json
    --output flex_merged_isp.bin
```

SNEAK . *ISP Sequencer*

- The ISP Sequencer (isp_sequencer) corrects the SSC of a multi-file ISP stream

- Traverses all ISPs from the multiple provided ISP streams, making the SSC sequential
  - SSC sequence is independent per APID
    - i.e. it can be used on a ISP stream containing multiple types of packets
  - CRC is updated to ensure that ISP is fully valid after SSC adjustment

-
  ```
  Options:
   -h [ --help ]          Display options help
    -v [ --version ]       Display version information
    --verbose              Display progress bar while processing the file
    --schema arg           Schema of the ISP [REQUIRED]
    --isp arg              ISP(s) file to be displayed [REQUIRED]
    --ssc arg              Pair(s) of <APID>:<SCC> (e.g 1343:42); if not provided initial SSC defaults to 0
  ```

SNEAK . *ISP Sequencer*

- How to make a correct SSC sequence in ISP stream?

```
$ isp_sequencer
    --schema schema/FLEXX-bandTMISP.xsd
    --isp flex_isp.bin
   [--verbose]
```

- How to make a correct SSC sequence in a multiple file ISP stream?

```
$ isp_sequencer
    --schema schema/FLEXX-bandTMISP.xsd
    --isp flex_isp_1.bin
    --isp flex_isp_2.bin
```

- How to make a correct SSC sequence in ISP stream with custom starting SSC?

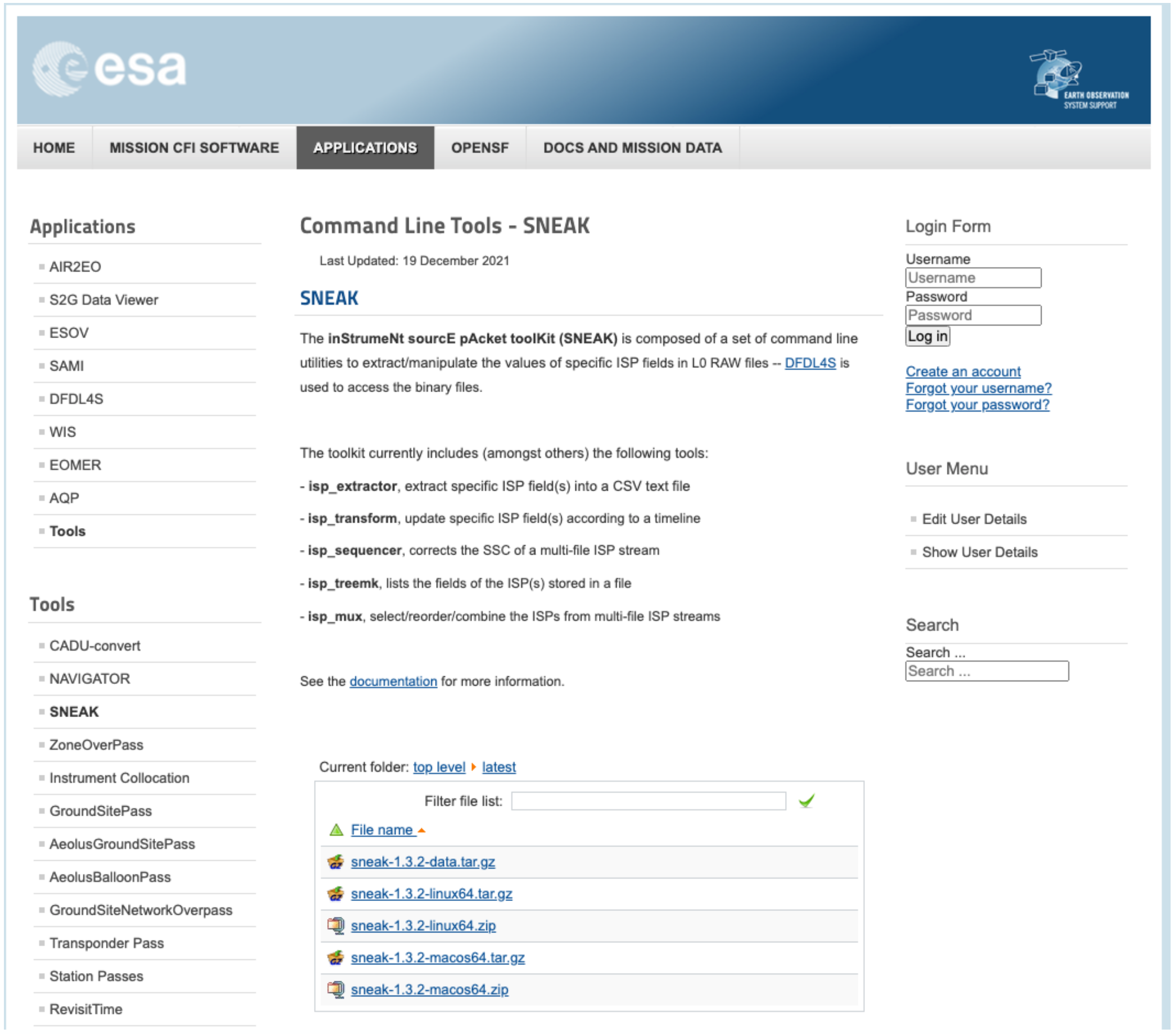
```
$ isp_sequencer
    --schema schema/FLEXX-bandTMISP.xsd
    --isp flex_isp_1.bin
    --isp flex_isp_2.bin
    --ssc 361:16382
```

Support

- In-house development
  - Quick feedback
  - Quick releases
- Active Maintenance/Support

- Suggestions of new features, improvements or bug reports are welcome!

- Support:
  cfi@eopp.esa.int or dfdl4s@eopp.esa.int



Applications

- AIR2EO
- S2G Data Viewer
- ESOV
- SAMI
- DFDL4S
- WIS
- EOMER
- AQP
- **Tools**

Tools

- CADU-convert
- NAVIGATOR
- **SNEAK**
- ZoneOverPass
- Instrument Collocation
- GroundSitePass
- AeolusGroundSitePass
- AeolusBalloonPass
- GroundSiteNetworkOverpass
- Transponder Pass
- Station Passes
- RevisitTime

Command Line Tools - SNEAK

Last Updated: 19 December 2021

SNEAK

The **inStrumeNt sourcE pAcket toolKit (SNEAK)** is composed of a set of command line utilities to extract/manipulate the values of specific ISP fields in L0 RAW files -- DFDL4S is used to access the binary files.

The toolkit currently includes (amongst others) the following tools:

- **isp_extractor**, extract specific ISP field(s) into a CSV text file
- **isp_transform**, update specific ISP field(s) according to a timeline
- **isp_sequencer**, corrects the SSC of a multi-file ISP stream
- **isp_treemk**, lists the fields of the ISP(s) stored in a file
- **isp_mux**, select/reorder/combine the ISPs from multi-file ISP streams

See the documentation for more information.

Current folder: top level ▸ latest

Filter file list: ✓

File name ▴
sneak-1.3.2-data.tar.gz
sneak-1.3.2-linux64.tar.gz
sneak-1.3.2-linux64.zip
sneak-1.3.2-macos64.tar.gz
sneak-1.3.2-macos64.zip

Login Form

Username	Username
Password	Password

Log in

Create an account
Forgot your username?
Forgot your password?

User Menu

- Edit User Details
- Show User Details

Search

Search ...
Search ...