SWOT Solar Panel Data Format description

CNES SWOT Mission Center, 2024

1. Product Description

SWOT Solar Array Positions are defined into the document “DORIS satellites models implemented in POE processing“, section 18.2, available at
https://ids-doris.org/documents/BC/satellites/DORISSatelliteModels.pdf

Solar Panel angles are extracted on a daily basis from Housekeeping Telemetry (HKTM) by SWOT CNES Mission Center, and made available for POD activities in one daily unique file, covering the day before. In nominal conditions, this extraction is performed daily at 9:00 UTC.

1.1. Format:

These files follow the general HKTM-PARAM Format Description described hereafter, section 2.

SOLAR angles are referenced by the following MNEMOs:
- OBSSD_AM_ZESTSMPOSPX (Solar Panel 1 on side +X)
- OBSSD_AM_ZESTSMPOSMX (Solar Panel 2 on side -X)

Time to use is the <ONBOARD_DATE> (in UTC)

Angle Values are <ENG_VALUE>, integer value to be divided by 120 in order to obtain values in degrees.

Remark: An instrumental correction has to be added to these angles value (add +0.2° to Solar Panel 1 angle, add -0.2° to Solar Panel 2 angle).

1.2. IDS Naming:

swoqsolpYYYYMMDDHHMMSS_yyyymmddhhmnss.LLL.xml
with:
YYYYMMDDHHMMSS= date of first data
yyyymmddhhmnss= date of last data
See https://ids-doris.org/images/documents/Data-Structure-Formats.pdf

2. General HKTM-PARAM Format Description

The General Interface Structure containing a list of HKTM parameters values extracted from the telemetry is the following:

Name	Type	Optional/Required	Description
HEADER	Structure	Required	SWOT tailoring: inlining header, to fix schema name, pass all dates to UTC and remove CONSUMER element.
DATA	Structure	Required	

2.1. STRUCTURE HEADER

Name	Type	Optional/Required	Description
SATELLITE	A_SATELLITE : "SWOT"	Required	Name of the satellite.
INTERFACE_SPECIFICATION	Structure	Required	
PRODUCTION_DATE	AN_UTC_MILLISEC_DATE_TIME : dateTime	Required	Date and Time in UTC format. **Pattern :** \d{4}-\d{2}-\d{2}T\d{2}:\d{2}:\d{2}\.\d{3}Z AN_UTC_MILLISEC_DATE_TIME : Universal Time Coordinate (UTC) accurate to the millisecond. Any valid value shall respect the following format: yyyy-mm-ddThh:mm:ss.sssZ
PRODUCER	AN_ENTITY : "SCC"	Required	Entity that produces the interface. Restricted to only expected producers for this interface in the mission context.
CONFIDENTIALITY	Structure	Required	

2.1.1. Structure INTERFACE_SPECIFICATION

Name	Type	Optional/Required	Description
SCHEMA_NAME	"SWOT_HKTM-PARAM.XSD"	Required	Name of the XML Schema file, including the extension.
SCHEMA_VERSION	Float [1.0 .. 2.0[	Required	XML Schema version (also specified in the version attribute of the schema). **Pattern :** \d+.\d+

2.1.2. Structure CONFIDENTIALITY

Name	Type	Optional/Required	Description
LEVEL	A_CONFIDENTIALITY_LEVEL : "DLP"	Required	
VISIBILITY	A_VISIBILITY : "ALL"	Required	

2.2. Structure DATA

Name	Type	Optional/Required	Description
SUMMARY	Structure	Required	Summary of extracted data.
DATA_LIST	Structure	Required	

2.2.1. Structure SUMMARY

Name	Type	Optional/Required	Description
REQUEST_NAME	String	Required	Request name.
BEGIN_EXTRACT_DATE	AN_UTC_MILLISEC_DATE_TIME	Required	Beginning date of extracted data.

	: dateTime		**Pattern :** \d{4}-\d{2}-\d{2}T\d{2}:\d{2}:\d{2}\.\d{3}Z AN_UTC_MILLISEC_DATE_TIME : Universal Time Coordinate (UTC) accurate to the millisecond. Any valid value shall respect the following format: yyyy-mm-ddThh:mm:ss.sssZ
END_EXTRACT_DATE	AN_UTC_MILLISEC_DATE_TIME : dateTime	Required	Ending date of extracted data. **Pattern :** \d{4}-\d{2}-\d{2}T\d{2}:\d{2}:\d{2}\.\d{3}Z AN_UTC_MILLISEC_DATE_TIME : Universal Time Coordinate (UTC) accurate to the millisecond. Any valid value shall respect the following format: yyyy-mm-ddThh:mm:ss.sssZ
PARAM_LIST	Structure	Required	List of extracted parameters.

2.2.1.1. Structure PARAM_LIST

Name	Type	Optional/Required	Description
PARAM * n	Structure	Optional	Extracted parameter description.

2.2.1.1.1. Structure PARAM

Name	Type	Optional/Required	Description
MNEMO	A_PARAM_MNEMO : String	Required	Parameter mnemonic.
RAW_VALUE_TYPE	String	Optional	Parameter raw value type.
ENG_VALUE_TYPE	String	Required	Parameter engineering value type.
UNIT	String	Required	Parameter unit.

2.2.2. Structure DATA_LIST

Name	Type	Optional/Required	Description
PARAM * n	Structure	Optional	Data of extracted parameters.

2.2.2.1. Structure PARAM

Name	Type	Optional/Required	Description
MNEMO	A_PARAM_MNEMO : String	Required	Parameter mnemonic.
ONBOARD_DATE	AN_UTC_MILLISEC_DATE_TIME : dateTime	Required	Parameter on-board date. **Pattern :** \d{4}-\d{2}-\d{2}T\d{2}:\d{2}:\d{2}\.\d{3}Z AN_UTC_MILLISEC_DATE_TIME : Universal Time Coordinate (UTC) accurate to the millisecond. Any valid value shall respect the following format: yyyy-mm-ddThh:mm:ss.sssZ
GROUND_DATE	AN_UTC_MILLISEC_DATE_TIME : dateTime	Required	Parameter ground date.

			Pattern : \d{4}-\d{2}-\d{2}T\d{2}:\d{2}:\d{2}\.\d{3}Z AN_UTC_MILLISEC_DATE_TIME : Universal Time Coordinate (UTC) accurate to the millisecond. Any valid value shall respect the following format: yyyy-mm-ddThh:mm:ss.sssZ
ENCODED_VALUE	AN_HEXA_STRING : String	Optional	Encoded value. **Pattern :** [0-9,A-F,a-f]* AN_HEXA_STRING : An hexadecimal number.
RAW_VALUE	String	Optional	Raw value.
ENG_VALUE	String	Required	Engeeniring value.
MONITORING_STATUS	Enumeration ["NORMAL" "OUT_OF_RANGE" "WARNING" "DANGER" "CRITICAL"]	Required	Monitoring status.
SIGNIFICATIVITY_STATUS	Enumeration ["OK" "NOK"]	Required	Significativity status.

3. Example of content

```
<?xml version="1.0" encoding="UTF-8"?>
<HKTM_PARAM>
  <HEADER>
    <SATELLITE>SWOT</SATELLITE>
    <INTERFACE_SPECIFICATION>
      <SCHEMA_NAME>SWOT_HKTM-PARAM.XSD</SCHEMA_NAME>
      <SCHEMA_VERSION>1.0</SCHEMA_VERSION>
    </INTERFACE_SPECIFICATION>
    <PRODUCTION_DATE>2023-07-31T08:59:32.370Z</PRODUCTION_DATE>
    <PRODUCER>SCC</PRODUCER>
    <CONFIDENTIALITY>
      <LEVEL>DLP</LEVEL>
      <VISIBILITY>ALL</VISIBILITY>
    </CONFIDENTIALITY>
  </HEADER>
  <DATA>
    <SUMMARY>
      <REQUEST_NAME>request_hktmParam</REQUEST_NAME>
      <BEGIN_EXTRACT_DATE>2023-07-29T23:59:23.000Z</BEGIN_EXTRACT_DATE>
      <END_EXTRACT_DATE>2023-07-30T23:59:23.000Z</END_EXTRACT_DATE>
      <PARAM_LIST>
        <PARAM>
          <MNEMO>OBSSD_AM_ZESTSMPOSPX</MNEMO>
          <ENG_VALUE_TYPE>LongInteger</ENG_VALUE_TYPE>
          <UNIT/>
        </PARAM>
        <PARAM>
          <MNEMO>OBSSD_AM_ZESTSMPOSMX</MNEMO>
          <ENG_VALUE_TYPE>LongInteger</ENG_VALUE_TYPE>
          <UNIT/>
```

```
      </PARAM>
      <PARAM>
        <MNEMO>OBSPD_GC_PTOTSAIN</MNEMO>
        <ENG_VALUE_TYPE>LongReal</ENG_VALUE_TYPE>
        <UNIT>W</UNIT>
      </PARAM>
    </PARAM_LIST>
  </SUMMARY>
  <DATA_LIST>
    <PARAM>
      <MNEMO>OBSSD_AM_ZESTSMPOSPX</MNEMO>
      <ONBOARD_DATE>2023-07-29T23:59:41.163Z</ONBOARD_DATE>
      <GROUND_DATE>2023-07-30T06:29:12.460Z</GROUND_DATE>
      <ENG_VALUE>-3600</ENG_VALUE>
      <MONITORING_STATUS>NORMAL</MONITORING_STATUS>
      <SIGNIFICATIVITY_STATUS>OK</SIGNIFICATIVITY_STATUS>
    </PARAM>
    <PARAM>
      <MNEMO>OBSSD_AM_ZESTSMPOSMX</MNEMO>
      <ONBOARD_DATE>2023-07-29T23:59:41.163Z</ONBOARD_DATE>
      <GROUND_DATE>2023-07-30T06:29:12.460Z</GROUND_DATE>
      <ENG_VALUE>3600</ENG_VALUE>
      <MONITORING_STATUS>NORMAL</MONITORING_STATUS>
      <SIGNIFICATIVITY_STATUS>OK</SIGNIFICATIVITY_STATUS>
    </PARAM>
    <PARAM>
      <MNEMO>OBSSD_AM_ZESTSMPOSPX</MNEMO>
      <ONBOARD_DATE>2023-07-30T00:00:13.165Z</ONBOARD_DATE>
      <GROUND_DATE>2023-07-30T06:29:27.990Z</GROUND_DATE>
      <ENG_VALUE>-3600</ENG_VALUE>
      <MONITORING_STATUS>NORMAL</MONITORING_STATUS>
      <SIGNIFICATIVITY_STATUS>OK</SIGNIFICATIVITY_STATUS>
    </PARAM>
    <PARAM>
      <MNEMO>OBSSD_AM_ZESTSMPOSMX</MNEMO>
      <ONBOARD_DATE>2023-07-30T00:00:13.165Z</ONBOARD_DATE>
      <GROUND_DATE>2023-07-30T06:29:27.990Z</GROUND_DATE>
      <ENG_VALUE>3600</ENG_VALUE>
      <MONITORING_STATUS>NORMAL</MONITORING_STATUS>
      <SIGNIFICATIVITY_STATUS>OK</SIGNIFICATIVITY_STATUS>
    </PARAM>
```

…