**Orbital events**

**15 January 2018 - AL**

The following is based on the CNES standard « ISIS ».

Four categories of events are listed:

* orbital events -> related to orbit celestial bodies…
* satellite events -> related to satellite bus
* station events -> related to ground station visibility
* mission events -> related to the payload

Also note that the events list has been built with particular space missions in mind, so that the events structure or the events types as described may not be adapted to all cases.

A few elements / definitions:

* An event occurs at a specific time and is instantaneous (lengh is 0).
* An event is defined by a type (=name), a time (when the event occurs) + additional information that depends on the category of event.

* Some names contain bracket (e.g. [X]H\_LOCAL\_TIME).
Where “[X]” should be replaced by a value.

An alternative way could be:

Type of event: LOCAL\_TIME

Associated parameter: local time value in hours.

# List of events

## ORBITAL\_EVENT

ASCENDING\_NODE

Date when the satellite is at the ascending node of the orbit (defined by ascending through ITRF equator)

DESCENDING\_NODE

Date when the satellite is at the descending node of the orbit (defined by descending through ITRF equator)

[X]DEG\_LATITUDE\_ARGUMENT

Date when the argument of latitude (orbital position ie PSO) is equal to [X] in degree. [X] in the range [0;360[ to be mission-tailored (for instance X=90 for point closest to North Pole and 270 for point closest to South Pole)

PERIAPSIS

Date when the satellite is at the periapsis (ANOM=0 deg)

APOAPSIS

Date when the satellite is at the apoapsis (ANOM=180 deg)

[X]DEG\_ANOM

Date when the true orbital anomaly is equal to [X] in degree. [X] in the range [0 ;360[ to be mission-tailored

MIN\_LATITUDE

Date when the satellite reaches its minimal latitude

MAX\_LATITUDE

Date when the satellite reaches its maximal latitude

PLUS\_[X]DEG\_LATITUDE\_UP

Transition above the latitude of [X] in degree. [X] in the range [0 ;90] to be mission-tailored

MINUS\_[X]DEG\_LATITUDE\_UP

Transition above the latitude of -[X] in degree. [X] in the range [0 ;90] to be mission-tailored

PLUS\_[X]DEG\_LATITUDE\_DOWN

Transition below the latitude of [X] in degree. [X] in the range [0 ;90] to be mission-tailored

MINUS\_[X]DEG\_LATITUDE\_DOWN

Transition below the latitude of -[X] degree. [X] in the range [0 ;90] to be mission-tailored

PLUS\_[X]DEG\_LATITUDE

Date when the satellite reaches the latitude of [X] degree. [X] in the range [0 ;90] to be mission-tailored

MINUS\_[X]DEG\_LATITUDE

Date when the satellite reaches the latitude of -[X] degree. [X] in the range [0 ;90] to be mission-tailored

MIN\_LONGITUDE

Date when the satellite reaches its minimal longitude

MAX\_LONGITUDE

Date when the satellite reaches its maximal longitude

[X]\_LONGITUDE\_UP

Transition above the longitude of [X] degree. [X] in the range [0 ;360[ to be mission-tailored

[X]\_LONGITUDE\_DOWN

Transition below the longitude of [X] degree. [X] in the range [0 ;360[ to be mission-tailored

[X]\_LONGITUDE

Date when the satellite reaches the longitude of [X] degree. [X] in the range [0 ;360[ to be mission-tailored

SUBSOLAR\_POSITION

Date when the satellite is at the subsolar position of the orbit (local time=12h)

ANTI\_SUBSOLAR\_POSITION

Date when the satellite is at the antisubsolar position of the orbit (local time=0h)

QUADRATURE\_POSITION

Date of quadrature between satellite; Earth and Sun (local time=6h or 18h)

[X]H\_LOCAL\_TIME

Date when the local hour of the satellite is equal to [X]hour. [X] in the range [0, 24[ to be mission-tailored. The local hour is determined by the Sun and satellite projections on the equatorial plane.

[X]H\_SOLAR\_TIME

Date when the solar hour of the satellite is equal to [X]hour. [X] in the range [0, 24[ to be mission-tailored. The solar hour is determined by the satellite and Sun projection on the osculating orbital plan.

[X]DEG\_SUN\_BETA\_TRANSITION\_DOWN

Date when the elevation of the Sun with regards to the orbital plane (beta angle) becomes lower than the value [X]deg.

[X]DEG\_SUN\_BETA\_TRANSITION\_UP

Date when the elevation of the Sun with regards to the orbital plane (beta angle) becomes higher than the value [X]deg.

[X]DEG\_SUBSAT\_SUN\_INCIDENCE\_DOWN

Date when the Sun incidence with regards to the subsatellite point on the Earth surface (angle between Sun direction and vertical local) becomes lower than the value [X]deg.

[X]DEG\_SUBSAT\_SUN\_INCIDENCE\_UP

Date when the Sun incidence with regards to the subsatellite point on the Earth surface (angle between Sun direction and vertical local) becomes higher than the value [X]deg.

[EXT]\_MIN\_DISTANCE

Time of the closest approach of the satellite towards another object [EXT] (minimal distance)

[EXT]\_MAX\_DISTANCE

Time of the furthest approach of the satellite towards another object [EXT] (maximal distance)

[EXT]\_[X]M\_DISTANCE

Time when the distance between the satellite and the other object [EXT] is equal to [X] meters

[EXT]\_[X]M\_DISTANCE\_UP

Transition time when the distance between the satellite and the other object [EXT] passes above [X] meters

[EXT]\_[X]M\_DISTANCE\_DOWN

Transition time when the distance between the satellite and the other object [EXT] passes below [X] meters

[X]KM\_ALTITUDE

Time when the satellite is at the altitude of [X] kilometers

[X]KM\_ALTITUDE\_UP

Transition above the altitude of [X] kilometers

[X]KM\_ALTITUDE\_DOWN

Transition below the altitude of [X] kilometers

NIGHT\_DAY

Transition Night - Day of the subsatellite point

DAY\_NIGHT

Transition Day - Night of the subsatellite point

MOON\_ECLIPSE\_BY\_EARTH\_START

Entry of the satellite in the area where the Moon is occulted by the Earth

MOON\_ECLIPSE\_BY\_EARTH\_END

Exit of the satellite in the area where the Moon is occulted by the Earth

PENUMBRA\_LIGHT

Date when the satellite exits the penumbra of the Earth and enters the sunlight

LIGHT\_PENUMBRA

Date when the satellite exits the sunlight and enters the penumbra of the Earth

PENUMBRA\_SHADOW

Date when the satellite exits the penumbra of the Earth and enters the shadow of the Earth

SHADOW\_PENUMBRA

Date when the satellite exits the shadow of the Earth and enters the penumbra of the Earth

LIGHT\_SHADOW

Date when the satellite exits the sunlight and enters the shadow of the Earth (applicable for missions for which penumbra phase is ignored)

SHADOW\_LIGHT

Date when the satellite exits the shadow and enters the light of the Earth (applicable for missions for which penumbra phase is ignored)

PENUMBRA\_LIGHT\_BY\_MOON

Date when the satellite exits the penumbra of the Moon and enters the sunlight

LIGHT\_PENUMBRA\_BY\_MOON

Date when the satellite exits the sunlight and enters the penumbra of the Moon

PENUMBRA\_SHADOW\_BY\_MOON

Date when the satellite exits the penumbra of the Moon and enters the shadow of the Moon

SHADOW\_PENUMBRA\_BY\_MOON

Date when the satellite exits the shadow of the Moon and enters the penumbra of the Moon

LIGHT\_SHADOW\_BY\_MOON

Date when the satellite exits the sunlight and enters the shadow of the Earth (applicable for missions for which penumbra phase is ignored)

SHADOW\_LIGHT\_BY\_MOON

Date when the satellite exits the shadow and enters the light of the Earth (applicable for missions for which penumbra phase is ignored)

[X]%\_SUN\_ECLIPSE\_START

Date when the satellite enters the shadow of the Earth for a light threshold below [X]%

[X]%\_SUN\_ECLIPSE\_END

Date when the satellite exits the shadow of the Earth for a light threshold below [X]%

[X]%\_SUN\_ECLIPSE\_BY\_MOON\_START

Date when the satellite enters the shadow of the Moon for a light threshold below [X]%

[X]%\_SUN\_ECLIPSE\_BY\_MOON\_END

Date when the satellite exits the shadow of the Moon for a light threshold below [X]%

[X]DEG\_COLIN\_START

Start of the phase when the angle "Satellite-Sun/Satellite-Earth" is included in ([X]deg;-[X]deg) or in (180-[X]deg;180+[X]deg) (colinearity condition)

[X]DEG\_COLIN\_END

End of the phase when the angle "Satellite-Sun/Satellite-Earth" is included in ([X]deg;-[X]deg) or in (180-[X]deg;180+[X]deg) (colinearity condition)

MIN\_COLIN

Date when the angle "Satellite-Sun/Satellite-Earth" is minimal

MAX\_COLIN

Date when the angle "Satellite-Sun/Satellite-Earth" is maximal

SUBSAT\_[AREA]\_ENTER

Date when the subsatellite position enters the terrestrial surface [AREA] to be mission-tailored (for example [AREA]=landmass)

SUBSAT\_[AREA]\_EXIT

Date when the subsatellite position exits the terrestrial surface [AREA] to be mission-tailored (for example [AREA]=landmass)

IN\_[ZONE]\_ENTER

Date when the satellite enters the volume [ZONE] to be mission-tailored (for instance [ZONE]=SAA)

IN\_[ZONE]\_EXIT

Date when the satellite exits the volume [ZONE] to be mission-tailored (for instance [ZONE]=SAA)

MIN\_TARGET\_[POINT]

Date when the satellite line of sight is the closest to the terrestrial target point [POINT] taking into account the attitude of the satellite and the line of sight (minimal distance)

[EXT]\_[X]DEG\_AOS

Start of geometric visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), with an elevation angle higher than [X] deg in current satellite antenna frame

[EXT]\_[X]DEG\_LOS

End of geometric visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), with an elevation angle higher than [X] deg in current satellite antenna frame

[EXT]\_PHYSICAL\_AOS

Start of physical visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), in current satellite antenna frame, taking into account the antenna mask

[EXT]\_PHYSICAL\_LOS

End of physical visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), in current satellite antenna frame, taking into account the antenna mask

[EXT]\_RF\_AOS

Start of radiofrequency visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), in current satellite antenna frame, taking into account the link budget

[EXT]\_RF\_LOS

End of radiofrequency visibility of the external satellite [EXT] (for instance [EXT] : one GPS satellite), in current satellite antenna frame, taking into account the link budget

## SATELLITE\_EVENTS

MANEUVER\_THRUST[i]\_START

Beginning of the thrust number [i] of a maneuver (calculation performed by FDS). ([i] integer from 1 to M, reinitialised for each new OEF file)

MANEUVER\_THRUST[i]\_END

End of the thrust number [i] of a maneuver (calculation performed by FDS). ([i] integer from 1 to M, reinitialised for each new OEF file)

EARTH\_GLARE\_[SENSOR]\_START

Date of beginning of the glare of the sensor [SENS], when the angle of the sensor with regards to Earth is under the guard angle

EARTH\_GLARE\_[SENSOR]\_END

Date of end of the glare of the sensor [SENS], when the angle of the sensor with regards to Earth is under the guard angle

SUN\_GLARE\_[SENSOR]\_START

Date of beginning of the glare of the sensor [SENS], when the angle of the sensor with regards to Sun is under the guard angle

SUN\_GLARE\_[SENSOR]\_END

Date of end of the glare of the sensor [SENS], when the angle of the sensor with regards to Sun is under the guard angle

MOON\_GLARE\_[SENSOR]\_START

Date of beginning of the glare of the sensor [SENS], when the angle of the sensor with regards to Moon is under the guard angle

MOON\_GLARE\_[SENSOR]\_END

Date of end of the glare of the sensor [SENS], when the angle of the sensor with regards to Moon is under the guard angle

EARTH\_IN\_[SENSOR]\_START

Date when the Earth enters in the field of view of the sensor [SENS]

EARTH\_IN\_[SENSOR]\_END

Date when the Earth exits the field of view of the sensor [SENS]

SUN\_IN\_[SENSOR]\_START

Date when the Sun enters in the field of view of the sensor [SENS]

SUN\_IN\_[SENSOR]\_END

Date when the Sun exits the field of view of the sensor [SENS]

MOON\_IN\_[SENSOR]\_START

Date when the Moon enters in the field of view of the sensor [SENS]

MOON\_IN\_[SENSOR]\_END

Date when the Moon exits the field of view of the sensor [SENS]

SAFE2NOM\_[MODE]\_START

Start of the transition between converged AOCS SAFE mode to AOCS NOMINAL mode, in the targeted attitude, ready to begin mission programming. [MODE] to be mission-tailored with the following list: AUTO (automatic), GEO (geocentric), INERT (inertial), SUN (solar), PFYS (PF yaw steering)

SAFE2NOM\_[MODE]\_END

Same as above but for the end of transition

[MODE]2MAN\_SEQ

Date of the switch between a converged AOCS NOMINAL mode to a maneuver sequence. [MODE] to be mission-tailored with the following list : AUTO (automatic), GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

MAN\_SEQ2[MODE]

Date of the switch between a maneuver sequence to a converged AOCS NOMINAL mode. [MODE] to be mission-tailored with the following list: AUTO (automatic), GEO (geocentric), INERT (inertial), SUN (solar), PFYS (PF yaw steering)

[MODE1]2[MODE2]\_START

Start of the transition between the nominal mode [MODE1] and the nominal mode [MODE2]. [MODE1] and [MODE2]to be mission-tailored with the following list: GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

[MODE1]2[MODE2]\_END

Same as above but for the end of transition

GUID\_POLY2[MODE]\_START

Start of the transition between the specific polynomial guidance with no rallying phase and [MODE]. [MODE]to be mission-tailored with the following list: GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

GUID\_POLY2[MODE]\_END

Same as above but for the end of transition

GUID\_RALLPOLY2[MODE]\_START

Start of the transition between the specific polynomial guidance with rallying phase and [MODE]. [MODE]to be mission-tailored with the following list: GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

GUID\_RALLPOLY2[MODE]\_END

Same as above but for the end of transition

GUID\_HARM2[MODE]\_START

Start of the transition between the specific harmonic guidance and [MODE]. [MODE]to be mission-tailored with the following list: GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

GUID\_HARM2[MODE]\_END

Same as above but for the end of transition

ENTERING\_NOM\_AUTO

Date of enter in the nominal automatic guidance mode NOM\_AUTO

ENTERING\_NOM\_GRND

Date of enter in the nominal ground commanded mode NOM\_GRND

[MODE]2GUID\_POLY\_START

Start of the transition between the nominal standard mode [MODE] and the specific polynomial guidance mode with no rallying phase. [MODE] to be mission-tailored with the following list : GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

[MODE]2GUID\_POLY\_END

Same as above but for the end of transition

[MODE]2GUID\_RALLPOLY\_START

Start of the transition between the nominal standard mode [MODE] and the specific polynomial guidance mode with rallying phase. [MODE] to be mission-tailored with the following list : GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignement), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

[MODE]2GUID\_RALLPOLY\_END

Same as above but for the end of transition

GUID\_RALLPOLY\_POLY\_BEGIN

During the GUID\_RALLPOLY mode, date when the rallying phase ends and the polynomial profile begins

[MODE]2GUID\_HARM\_START

Start of the transition between the nominal standard mode [MODE] and the specific harmonic guidance mode. [MODE] to be mission-tailored with the following list : GEO (geocentric), LN (geocentric+local nadir), TC (geocentric+track compensation), LNTC (geocentric+local nadir+track compensation), GEOVEL (geocentric+velocity vector alignment), INERT (inertial), SUN (solar), PFYS (PF yaw steering), PFYSLN (PF yaw steering+local nadir)

[MODE]2GUID\_HARM\_END

Same as above but for the end of transition

NAV\_START\_GNSS\_TC

Request for navigation function with GNSS data sent through a TC

NAV\_START\_GROUND\_TC

Request for navigation function with an orbit sent by the ground sent through a TC

NAV\_GNSS\_TC

Request for navigation function with selection of GNSS to be used sent through a TC

NAV\_UPDATE\_TC

Request for updating the onboard orbit sent through a TC

SADM\_HOLD\_TC

Request for holding SADM mode (keeping SADM in current position), sent through a TC

SADM\_CRUISE\_TC

Request for cruise SADM mode (given the targeted SADM position), sent through a TC

SADM\_AUTO\_TC

Request for autonomous SADM mode (optimizing sun enlightment), sent through a TC

TSHIFT\_TC

Request for compensating long track ground computation error due to imprecise knowledge of the onboard orbit

[SURFACE]\_[X]PC\_ILLUMINATION

Date of a given percentage [X]% of illumination of the surface [SURFACE] of the satellite. [X] and [SURFACE] to be defined by the mission.

## STATION\_EVENTS

 [X]DEG\_AOS

Start of geometric visibility of the satellite with a station, with an elevation angle higher than [X] deg. [X] to be mission-tailored (typical values : 0, 5, 10 deg) - (Nota : AoS = acquisition of signal)

[X]DEG\_LOS

End of geometric visibility of the satellite with a station, with an elevation angle higher than [X] deg. [X] to be mission-tailored (typical values : 0, 5, 10 deg) - (Nota : LoS = loss of signal)

PHYSICAL\_AOS

Start of physical visibility of the satellite with a station, taking into account the station mask - (Nota : AoS = acquisition of signal)

PHYSICAL\_LOS

End of physical visibility of the satellite with a station, taking into account the station mask - (Nota : AoS = acquisition of signal)

TMTC\_AOS

Date of start for TM/TC link (defined by the maximum between X\_DEG\_AOS (X=5 deg minimum authorized to send TM/TC) and the PHYSICAL\_AOS

TMTC\_LOS

Date of end for TM/TC link (defined by the minimum between X\_DEG\_LOS (X=5 deg minimum authorized to send TM/TC) and the PHYSICAL\_LOS

RF\_AOS

Start of radioelectrical visibility of the satellite with a station taking into account the link budget - (Nota : AoS = acquisition of signal). This event is defined by a station, an antenna of the satellite and the type of radioelectrical visibility (continuous (CONT) or intermittent (INT) depending on the atttitude of the satellite)

RF\_LOS

End of radioelectrical visibility of the satellite with a station taking into account the link budget - (Nota : AoS = acquisition of signal). This event is defined by a station, an antenna of the satellite and the type of radioelectrical visibility (continuous (CONT) or intermittent (INT) depending on the atttitude of the satellite)

MAX\_ELEVATION\_PASS

Date when the satellite is at its maximal elevation during the visibility by the station

POLAR\_CHANGE\_[ANT1]\_TO\_[ANT2]\_IN\_NOMINAL\_MODE

In nominal mode, change of the polarization of the signal between the antenna [ANT1] and the antenna [ANT2]. The antenna [ANT2] is now visible from the station. [ANT1] and [ANT2] to be mission-tailored (for instance: [ANT1]=L, [ANT2]=R). The change of polarization is calculated considering the transition exactly in the middle of both antennas

POLAR\_CHANGE\_[ANT1]\_TO\_[ANT2]\_IN\_SAFE\_MODE

Idem as above but in safe mode

SUN\_GLARE\_START

Start of TM/TC antenna glare by Sun

SUN\_GLARE\_END

End of TM/TC antenna glare by Sun

[EXT]\_INTERFERENCE\_START

Start of interference between the satellite and an external satellite [EXT] during a visibility of a station. [EXT] to be mission-tailored

[EXT]\_INTERFERENCE\_END

End of interference between the satellite and an external satellite [EXT] during a visibility of a station. [EXT] to be mission-tailored

[ANT]\_MASKING\_BY\_[PART]\_START

Beginning of the antenna [ANT] masking by the satellite [PART] (for example SOLAR\_ARRAY); during RF visibility

[ANT]\_MASKING\_BY\_[PART]\_END

End of the antenna [ANT] masking by the satellite [PART] (for example SOLAR\_ARRAY); during RF visibility

## MISSION\_EVENTS

MANEUVER\_SLOT[i]\_START

Start of the slot planned for the maneuver number [i] ([i] integer from 1 to N, reinitialised for each new OEF file). Nota : the number of maneuver slots N can be equal or lower than the number of maneuver thrusts M. For instance N=1 if the maneuver slot covers all the maneuver thrusts : N=M if we want to liberate the maneuver slot between 2 maneuvers thrusts

MANEUVER\_SLOT[i]\_END

End of the slot planned for the maneuver number [i] ([i] integer from 1 to N, reinitialised for each new OEF file). Nota : the number of maneuver slots N can be equal or lower than the number of maneuver thrusts M. For instance N=1 if the maneuver slot covers all the maneuver thrusts : N=M if we want to liberate the maneuver slot between 2 maneuvers thrusts

EARTH\_GLARE\_[INSTR]\_START

Date of beginning of the glare of the instrument [INSTR], when the angle of the sensor with regards to Earth is under the guard angle,

EARTH\_GLARE\_[INSTR]\_END

Date of end of the glare of the of the instrument [INSTR], when the angle of the sensor with regards to Earth is under the guard angle

SUN\_GLARE\_[INSTR]\_START

Date of beginning of the glare of the instrument [INSTR] when the angle of the sensor with regards to Sun is under the guard angle

SUN\_GLARE\_[INSTR]\_END

Date of end of the glare of the instrument [INSTR] when the angle of the sensor with regards to Sun is under the guard angle

MOON\_GLARE\_[INSTR]\_START

Date of beginning of the glare of the instrument [INSTR], when the angle of the sensor with regards to Moon is under the guard angle

MOON\_GLARE\_[INSTR]\_END

Date of end of the glare of the instrument [INSTR] when the angle of the sensor with regards to Moon is under the guard angle

EARTH\_IN\_[INSTR]\_START

Date when the Earyh enters in the field of view of the instrument [INSTR]

EARTH\_IN\_[INSTR]\_END

Date when the Earth exits the field of view of the instrument [INSTR]

SUN\_IN\_[INSTR]\_START

Date when the Sun enters in the field of view of the instrument [INSTR]

SUN\_IN\_[INSTR]\_END

Date when the Sun exits the field of view of the instrument [INSTR]

MOON\_IN\_[INSTR]\_START

Date when the Moon enters in the field of view of the instrument [INSTR]

MOON\_IN\_[INSTR]\_END

Date when the Moon exits the field of view of the instrument [INSTR]

# Events / events set description

--- for information only ---

**DATA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| METADATA  | Structure  | Required  | Define the method to compute and provide orbital events |
| EVENT \* n  | Structure  | Optional  | Event. |

**METADATA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| COMMENT \* n  | String  | Optional  |  |
| ORBIT\_BEGINNING\_AOL  | AN\_ANGLE\_INTEGER\_IN\_DEG : Integer [0 .. 360[  | Optional  | Argument of latitude (=pso) of the beginning of the orbits (deg). It is a true pso in ITRF. This parameter is an integer between [0; 360[. Example : 0 deg if the orbits begin at ascending node. The orbit number changes at this pso. The first orbit of the cycle has the number 1**Attribute : unit** - "deg" - RequiredAN\_ANGLE\_INTEGER\_IN\_DEG : an angle that is an integer between 0 and 360 degrees  |
| REF\_FRAME  | A\_RESTRICTED\_REF\_FRAME : Enumeration [ "GCRF" "ITRF" "CIRF" "TIRF" "ITRF\_GCRF" ]  | Required  | Name of the reference frame in which the data are computed. ITRF/GCRF means : components in ITRF, velocity relative to GCRF (position expressed in ITRF, inertial velocity expressed in ITRF).A\_RESTRICTED\_REF\_FRAME : Restricted ref frame for the oem, omm and opm structures  |
| ALT\_DEF  | Enumeration [ "geodesic" "geocentric" "spherical" ]  | Required  | Definition of the altitude. Either Geodesic (local vertical, above Earth ellipsoid), geocentric (Earth center direction, above Earth ellipsoid) or spherical (above circular Earth with equatorial radius).  |
| PARAM\_NATURE  | "true"  | Required  | Definition of the nature of orbital parameters such as AoL. |

**Structure EVENT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| EVENT\_CLASS  | Choice  | Required  | Event class. |
| TIME  | AN\_EPOCH : String  | Required  | Date with CCSDS format.**Pattern :** \d{4}-((\d{2}\-\d{2})|\d{3})T\d{2}:\d{2}:\d{2}(\.\d\*)?Z? |
| DURATION  | A\_DURATION\_IN\_SEC : Float [0.0 .. ]  | Optional  | Duration of the event, only for the events whose suffix is START or AoS.**Attribute : unit** - "s" - RequiredA\_DURATION\_IN\_SEC : A duration in seconds.  |
| LOCATION  | Structure  | Required  |  |
| COMMENT  | String  | Optional  | Text describing the event and providing the characteristics of the event parameters. |

**Choice EVENT\_CLASS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| ORBITAL  | AN\_ORBITAL\_EVENT : String  | Required  | Orbital event.***Configurable item using ORBITAL\_EVENT\_CONFIG.XML***  |
| STATION  | Structure  | Required  | Station event (these events are related to S-band, X-band or S+X-band stations). |
| SATELLITE  | A\_SATELLITE\_EVENT : String  | Required  | Satellite event.***Configurable item using SATELLITE\_EVENT\_CONFIG.XML***  |
| MISSION  | A\_MISSION\_EVENT : String  | Required  | Mission event.***Configurable item using MISSION\_EVENT\_CONFIG.XML***  |

**Structure STATION**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| EVENT\_TYPE  | A\_STATION\_EVENT : String  | Required  | ***Configurable item using STATION\_EVENT\_CONFIG.XML***  |
| PARAMETERS  | A\_POINTING  | Required  | A\_POINTING : Station event characteristics  |

**Type A\_POINTING**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| STATION  | A\_STATION\_MNEMO : String  | Required  | Station mnemonic.***Configurable item using STATION\_MNEMO\_CONFIG.XML***  |
| EARTH\_ANTENNA \* n  | AN\_EARTH\_ANTENNA\_MNEMO : String  | Required  | Mnemonic of the Earth antenna(s).***Configurable item using EARTH\_ANTENNA\_MNEMO\_CONFIG.XML***  |
| SAT\_ANTENNA  | A\_SAT\_ANTENNA\_MNEMO : String  | Optional  | Mnemonic of the stellite antenna.***Configurable item using SAT\_ANTENNA\_MNEMO\_CONFIG.XML***  |
| ELEVATION  | AN\_ELEVATION : Float [-10.0 .. 90.0]  | Required  | Elevation angle (degree).**Attribute : unit** - "deg" - RequiredAN\_ELEVATION : A [-10 ; 90] angle in degree used for an elevation  |
| AZIMUT  | AN\_ANGLE\_IN\_DEG\_0\_360 : Float [0.0 .. 360.0]  | Required  | Azimut angle (degree).**Attribute : unit** - "deg" - RequiredAN\_ANGLE\_IN\_DEG\_0\_360 : A [0 ; 360] angle (can be used for azimut)  |
| TYPE  | Enumeration [ "CONT" "INTERM" ]  | Optional  | State = continuous or intermittent. |

**Structure LOCATION**

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| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| ARGUMENT\_OF\_LATITUDE  | AN\_ANGLE\_IN\_DEG\_0\_360 : Float [0.0 .. 360.0]  | Required  | Argument of Latitude of the satellite (degree) in the orbit direction : sum of the argument of perigee and anomaly. Computed using definitions of METADATA**Attribute : unit** - "deg" - RequiredAN\_ANGLE\_IN\_DEG\_0\_360 : A [0 ; 360] angle (can be used for azimut)  |
| SUBSATELLITE\_POSITION  | Structure  | Required  |  |
| DAY\_IN\_CYCLE  | Integer [1 .. 127]  | Optional  | Number of the day in the cycle (phased orbit) (integer). |
| ORBIT\_NUMBER  | AN\_ORBIT\_NUMBER : Integer [1 .. 32767]  | Optional  | Orbit number (phased orbit). The orbit number changes at the date of the orbit change event defined for the mission (the same than the one specified in REF-ORB if this interface is used). For all events whose date is higher or equal to the date of the orbit change event, and until the next orbit change, ORBIT\_NUMBER will be equal to the one of the orbit change event.AN\_ORBIT\_NUMBER : Orbit number in the cycle.  |
| ABS\_ORBIT\_NUMBER  | Integer [1 .. 9223372036854775807]  | Optional  | Absolute Orbit number since beginning of life. The orbit number changes at the date of the orbit change event defined for the mission (the same than the one specified in REF-ORB if this interface is used). For all events whose date is higher or equal to the date of the orbit change event, and until the next orbit change, ABS\_ORBIT\_NUMBER will be equal to the one of the orbit change event. |

**Structure SUBSATELLITE\_POSITION**

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| **Name**  | **Type**  | **Optional/Required**  | **Description**  |
| LONGITUDE  | AN\_ANGLE\_IN\_DEG\_M180\_180 : Float [-180.0 .. 180.0]  | Required  | Geodetic Longitude of the subsatellite point (degree) in ITRF.**Attribute : unit** - "deg" - RequiredAN\_ANGLE\_IN\_DEG\_M180\_180 : A [-180 ; 180] angle (can be used for longitude)  |
| LATITUDE  | AN\_ANGLE\_IN\_DEG\_M90\_90 : Float [-90.0 .. 90.0]  | Required  | Geodetic Latitude of the subsatellite point (degree) in ITRF.**Attribute : unit** - "deg" - RequiredAN\_ANGLE\_IN\_DEG\_M90\_90 : A [-90 ; 90] angle (can be used for latitude)  |
| ALTITUDE  | A\_DISTANCE\_IN\_KM : Float  | Required  | Altitude of the satellite (km). Computed using definitions of METADATA**Attribute : unit** - "km" - Required |