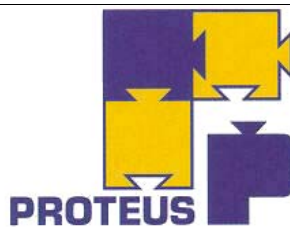


## Chapter 8 : PROTEUS Generic Ground Segment (PGGS)

### CHANGE TRACEABILITY Chapter 8

Here below are listed the changes between issue N-2 and issue N-1:

Here below are listed the changes from the previous issue N-1:



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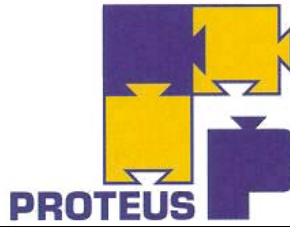
Erreur! Aucune entrée de table d'illustration n'a été trouvée.

## LIST OF TABLES

Erreur! Aucune entrée de table d'illustration n'a été trouvée.

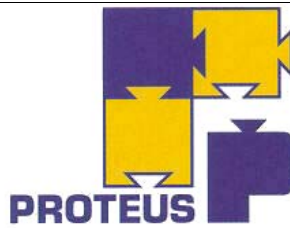
## LIST OF CHANGE TRACEABILITY

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| LIST OF TBDs .....                  | 3 |



## LIST OF TBCs

## LIST OF TBDs



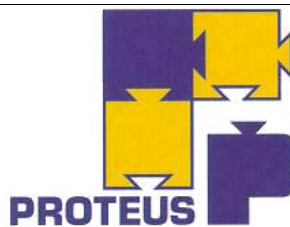
## 8. PROTEUS GENERIC GROUND SEGMENT (PGGS) – MISSION CENTRE INTERFACES

### 8.1 SUBJECT

The purpose of this chapter is to specify, for each exchanged data between the Mission Centre (MC) and PROTEUS Generic Ground Segment (PGGS), all the useful information for their understanding and treatment.

The data are described using several different forms:

- FORM1** general level of interface description.
- FORM2** File general characteristics.
- FORM3** File logical records description giving their size, number and fields.
- FORM5** File example.



## 8.2 INTERFACES NOMENCLATURE

### Generic interface name

XXX\_YYY\_FREE UPPER CASE LETTER TEXT

Separated character: \_ (underscore)

XXX Sender's abbreviation

YYY Receiver's abbreviation with following rules:

CCC

Command Control Centre

MC

Mission Centre

OCC

Orbit Computation Center

TTCET

Telemetry TeleCommand Earth Terminal

Example:

TTCET\_CCC\_HKTMP HKTM-P data provided by TTCET to CCC

### File name

FREE TEXT WITH FOLLOWING RULES:

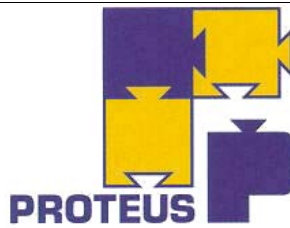
Separated character: \_ (underscore)

SLID is satellite identifier (if needed)

ETID is earth terminal identifier (if needed)

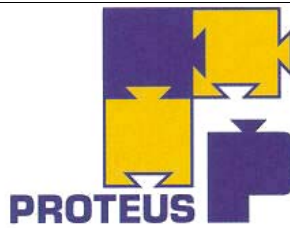
*SLID* is the satellite identifier defined with a character string (maximum 6 characters)  
(example JASON1 or COROT)

*ETID* is a TTCET identifier defined with a character string (maximum 6 characters)  
(example AUS to design a CNES TTCET located at Aussaguel)



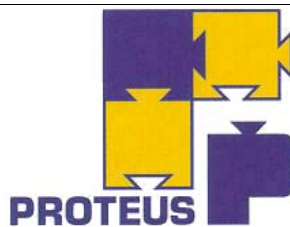
### 8.3 CONVENTIONS APPLIED TO ASCII FILES

- C1** The lines which begin with the character **#** are comment lines
- C2** The first file record is **#BEGIN\_OF\_FILE**
- C3** The last file record is **#END\_OF\_FILE**
- C4** The real numbers are represented in scientific notation with a **decimal point** examples:  
1.2345E3    -1.2345E-3    123.456    -0.123456
- C5** The hexadecimal representation of values are terminated by the character **h**  
examples:    A0F4h    042Ah



#### 8.4 PGGS – MISSION CENTRE INTERFACES DESCRIPTION

| GENERIC NAME              | ROLE   |
|---------------------------|--|
| CCC_MC_ORBIT_EVENTS       | Orbit sequence of events giving in anticipation orbital events, TTCET events (fly-by times) and satellite events (programming AOCS TC times) |
| CCC_MC_PREDICTED_ATTITUDE | Predicted satellite attitude information elaborated by the CCC to the MC   |
| CCC_MC_PREDICTED_ORBIT    | Predicted orbit data of the satellite and time reference (Position, Velocity, Time) elaborated by the CCC after an orbit determination       |
| CCC_MC_TC_LOGBOOK         | Sending acknowledge of TCPL and TCBUS transmitted from CCC to satellite  |
| MC_CCC_TC_PL              | Payload programming commands files provided by MC to CCC   |
| TTCET_MC_PLTM_FRAME       | Files containing PLTM CCSDS standard frames stored in TTCET and transmitted to MC on MC request  |
| TTCET_MC_PLTM_PACKET      | Files containing PLTM CCSDS standard packets stored in TTCET and transmitted to MC on MC request   |



**FORM1**

**INTERFACE DESCRIPTION FILE**

Generic interface name: CCC\_MC\_ORBIT\_EVENTS

Orbit sequence of events giving in anticipation orbital events, TTCET events (fly-by times) and satellite events (programming AOCS TC times)

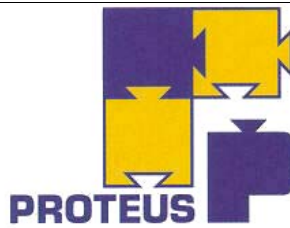
EXCHANGE DESCRIPTION

|                 |                        |                            |     |
|-----------------|------------------------|----------------------------|-----|
| <i>Provider</i> | CCC                    | <i>Consumer</i>            | MC  |
| <i>Client</i>   | CCC                    | <i>Server</i>              | MC  |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | CCC |

|                 |                                   |
|-----------------|-----------------------------------|
| <i>Schedule</i> | Once a week and anytime if needed |
| <i>Comment</i>  |                                   |

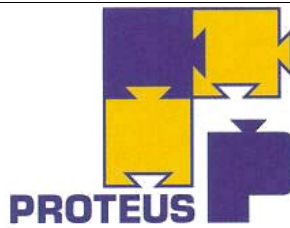
EXCHANGE DATA DESCRIPTION

|                        |                       |                        |    |
|------------------------|-----------------------|------------------------|----|
| <i>Exchange format</i> | ASCII sequential file | <i>Compressed data</i> | NO |
| <i>File name</i>       | SLID_ORBIT_EVENTS     |                        |    |
| <i>Size</i>            | Max 1 Mbytes          |                        |    |



File contains x records

- Chronologically sorted file
- 1 record contains 1 event description
- The first record contains the file creation UT time
- Event description parameters
  - Event time
  - Event class (Navigation, earth terminal, satellite or mission)
  - Event number in the class
  - Event orbital position
  - Event longitude and latitude
  - TTCET ID (only for earth terminal events class)
  - Event comment
- List of events
  - Class of orbital events
    - Ascending and descending pass nodes times
    - Times of transitions (light -> half light -> shadow and reverse)
    - Times of under satellite point transitions (day -> night and reverse)
    - Time of shifting into quadrature position (satellite – sun – earth)
    - Time of shifting into subsolar position
    - Time of sun eclipse by moon
  - Class of Earth terminal events
    - TTCET AOS and LOS (0°, physical angle of elevation, any angle)
    - Maximal angle of elevation pass
    - TM/TC polarization modification
    - Times if TM/TC TTCET antenna glare by sun
    - RF AOS time and LOS time
  - Class of satellite events
    - AOCS TCs due date
  - Class of mission events (Mission dependent)



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FORM2

FILE DESCRIPTION FORM

**FILE NAME: SLID\_ORBIT\_EVENTS**

#### FILE DESCRIPTION

Orbit sequence of events giving in anticipation orbital events, TTCET events (fly-by times) and satellite events (programming AOCS TC times)

#### FILE TYPE

Sequential  [ X ]

Number of record types: 2

Logical structure of records: {«#BEGIN\_OF\_FILE»,  
«1»,n\*{«2»}, (n = number of events descriptions in the file)  
"#END\_OF\_FILE»}

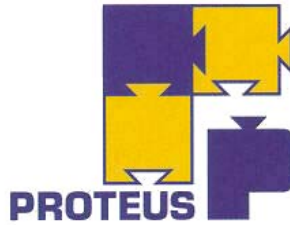
1 < UT file creation time >

2 < Event time > < Class ID > < Event number > < Orbital position >  
< longitude > < latitude > < TTCET ID (optional) > < Comment >

NB: The lines which begin with the character # are comment lines

Direct  [ ]

Record size:



FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_ORBIT\_EVENTS

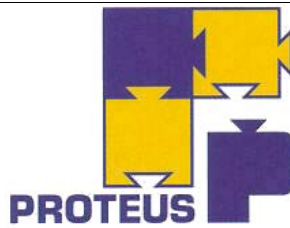
Record number: 1

Record size: 35 bytes

RECORD DESCRIPTION

| Field name | Size (bytes) | Kind  | Content description                                |
|------------|--------------|-------|--|
| Line_Type  | 15 F         | ASCII | <b>Forced to</b> <CREATION_TIME>                   |
| File_Time  | 19 F         | ASCII | File creation time<br>(Format YYYY/MM/DD HH:MN:SS) |

All the fields are separated by a "tabulation character"



FORM3

RECORD DESCRIPTION FORM

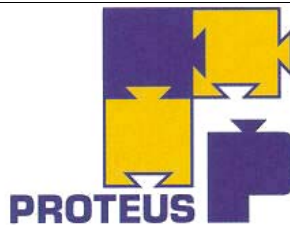
FILE NAME: SLID\_ORBIT\_EVENTS

Record number: 2

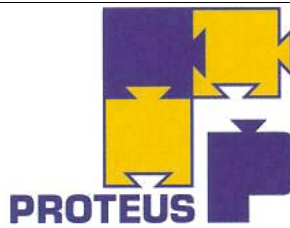
Record size: Max 313 bytes

RECORD DESCRIPTION

| Field name  | Size (bytes) | Kind  | Content description   |
|-------------|--------------|-------|---|
| Event_Time  | 23 F         | ASCII | Event time<br><br>(Format YYYY/MM/DD HH:MN:SS.MMM)  |
| Event_Class | 1 F          | ASCII | Class of Event<br><br><b>O</b> Orbital<br><b>E</b> Earth terminal<br><b>S</b> Satellite<br><b>M</b> Mission<br><br>Class of NON SELECTED Event<br><b>XO</b> Non selected Orbital event<br><b>XE</b> Non selected Earth terminal event<br><b>XS</b> Non selected Satellite event<br><b>XM</b> Non selected Mission event |

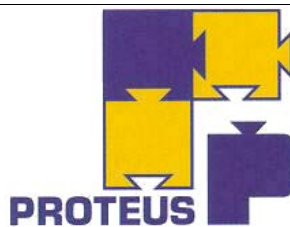


| Field name   | Size (bytes) | Kind  | Content description  |
|--------------|--------------|-------|--|
| Event_Number | 2 V          | Int16 | <p>Event number in the class</p> <ul style="list-style-type: none"><li>• <b>Orbital events class</b><ol style="list-style-type: none"><li>1 Ascending node pass time</li><li>2 Descending node pass time</li><li>3 Light → penombra transition time</li><li>4 Penombra → shadow transition time</li><li>5 Shadow → penombra transition time</li><li>6 Penombra → light transition time</li><li>7 Day → night transition time</li><li>8 Night → day transition time</li><li>9 Time of shifting into quadrature position (satellite – sun – earth)</li><li>10 Time of shifting into subsolar position</li><li>11 Time of sun eclipse by moon</li></ol></li><li>• <b>Earth terminal events class</b><ol style="list-style-type: none"><li>1 0° TTCET AOS time</li><li>2 Physical TTCET AOS time</li><li>3 Another fixed TTCET AOS time (5° for example)</li><li>4 Another fixed TTCET LOS time (5° for example)</li><li>5 Physical TTCET LOS time</li><li>6 0° TTCET AOS time</li><li>7 Maximum angle of elevation pass time</li><li>8 Left → right TM/TC polarization modification</li><li>9 Right → left TM/TC polarization modification</li><li>10 Start of TM/TC TTCET antenna glare by sun</li><li>11 End of TM/TC TTCET antenna glare by sun</li><li>12 RF AOS time</li><li>13 RF LOS time</li></ol></li><li>• <b>Satellite events class</b><ol style="list-style-type: none"><li>1 Orbital position guidance TC</li><li>2 Profile guidance TC</li><li>3 SADM guidance TC</li><li>4 Request STAM1 mode TC</li><li>5 Request STAM2 mode TC</li><li>6 Request OCM2 mode TC</li><li>7 Beginning of thrust in OCM2 mode</li><li>8 End of thrust in OCM2 mode</li><li>9 Request OCM4 mode TC</li><li>10 Beginning of thrust in OCM4 mode</li><li>11 End of thrust in OCM4 mode</li><li>12 Kinetic momentum TC</li><li>13 Enable star tracker TC</li><li>14 Disable star tracker TC</li><li>15 Manoeuvre beginning</li><li>16 Manoeuvre end</li></ol></li><li>• <b>Satellite events class</b><p>Mission dependent</p></li></ul> |



| Field name       | Size (bytes) | Kind      | Content description  |
|------------------|--------------|-----------|--|
| Orbital_Position | 6 F          | Real F6.2 | Orbital position of the event<br>Angle in degree from 0 deg (Equator) to 360 deg in the orbit direction                                |
| Longitude        | 6 F          | Real F6.2 | Terrestrial longitude of the event<br>Angle in degree from 0 deg (Greenwich meridian) to 360 deg in the East direction                 |
| Latitude         | 6 F          | Real F6.2 | Latitude of the event<br>Angle in degree from 0 deg (Equator) to +90 deg (North pole) and from 0 deg (Equator) to -90 deg (South pole) |
| ETID             | 6 V          | ASCII     | Earth terminal identifier (only for the Earth terminal class, nothing otherwise)   |
| Comment          | 256 V        | ASCII     | String of characters describing the event  |

All the fields are separated by a "tabulation character"



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: CCC\_MC\_PREDICTED\_ATTITUDE**

Predicted satellite attitude information elaborated by the SOCC AOCS subsystem to the MOCC

EXCHANGE DESCRIPTION

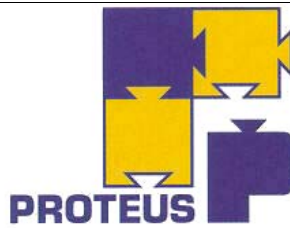
|                 |                        |                            |     |
|-----------------|------------------------|----------------------------|-----|
| <i>Provider</i> | CCC                    | <i>Consumer</i>            | MC  |
| <i>Client</i>   | CCC                    | <i>Server</i>              | MC  |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | CCC |

|                 |  |
|-----------------|--|
| <i>Schedule</i> | Depending mission requirements   |
| <i>Comment</i>  | <ul style="list-style-type: none"> <li>Covered period : depending mission requirements</li> <li>The first point is dated at the end of adjustment period</li> <li>Fixed gap of 60 s between each point</li> <li>If needed, the file takes a maneuver into account</li> </ul> |

EXCHANGED DATA DESCRIPTION

|                        |                         |                        |    |
|------------------------|-------------------------|------------------------|----|
| <i>Exchange format</i> | ASCII sequential file   | <i>Compressed data</i> | NO |
| <i>File name</i>       | SLID_PREDICTED_ATTITUDE |                        |    |
| <i>Size</i>            | Variable                |                        |    |

- File contains x records
- The first record contains the file creation UT time and the type of reference frame (J2000, WGS84 or other)
- Fixed length records
- Record structure
  - UTC time of attitude event
  - Quaternion of the predicted attitude
  - Satellite attitude in ROLL, pitch and yaw (rd)
  - 3 components of the predicted satellite rate (rd/s)
  - Predicted position for the SADM



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FORM2

FILE DESCRIPTION FORM

**FILE NAME: SLID\_PREDICTED\_ATTITUDE**

FILE DESCRIPTION

Predicted satellite attitude information elaborated by the CCC AOCS subsystem to Mission Center

FILE TYPE

Sequential

Number of record types: 2

Logical structure of records: {"#BEGIN\_OF\_FILE",  
"1",n\*{"2"}, (n = number of points in the file)  
#END\_OF\_FILE"}

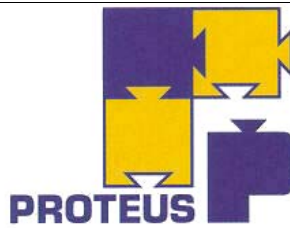
1 <UT file creation time> <Type\_frame>

2 <UTC data time> <QISLPRED1> < QISLPRED2> < QISLPRED3>  
<QISLPRED4> <ROLLPRED> <PITCHPRED> <YAWPRED>  
<SLRATEPREDX> < SLRATEPREDY> < SLRATEPREDZ> <POSPREDL>  
<POSPREDR>

NB: The lines which begins with the character # are comment lines

Direct

Record size:



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_PREDICTED\_ATTITUDE

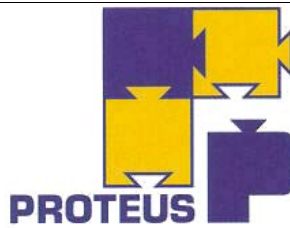
Record number: 1

Record size: 23 bytes

RECORD DESCRIPTION

| Field name | Size (bytes) |   | Kind    | Content description   |
|------------|--------------|---|---------|---|
| Line_Type  | 1            | F | ASCII   | <b>Forced to 1</b>  |
| File_Time  | 19           | F | ASCII   | File creation time<br>(Format YYYY/MM/DD HH:MN:SS)                              |
| Type_frame | 1            | F | Integer | Type of reference frame in the file<br><br><b>1</b> = J2000<br><b>2</b> = WGS84 |

All the fields are separated by a "tabulation character"



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_PREDICTED\_ATTITUDE

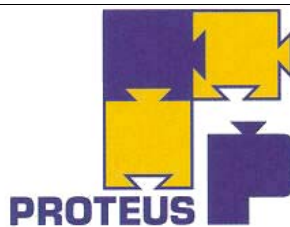
Record number: 2

Record size: Variable

### RECORD DESCRIPTION

| Field name | Size (bytes) | Kind      | Content description   |
|------------|--------------|-----------|---|
| Line_Type  | 1            | F ASCII   | <b>Forced to 2</b>  |
| UTC_time   | 23           | F ASCII   | UTC time of the attitude data<br>(Format YYYY/MM/DD HH:MN:SS.MMM) |
| QISLPRED1  |              | V Float32 | Component 1 of the predicted satellite attitude                   |
| QISLPRED2  |              | V Float32 | Component 2 of the predicted satellite attitude                   |
| QISLPRED3  |              | V Float32 | Component 3 of the predicted satellite attitude                   |
| QISLPRED4  |              | V Float32 | Component 4 of the predicted satellite attitude                   |
| ROLLPRED   |              | V Float32 | Predicted roll <i>unit: rd</i>                                    |
| PITCHPRED  |              | V Float32 | Predicted pitch <i>unit: rd</i>                                   |
| YAWPRED    |              | V Float32 | Predicted yaw <i>unit: rd</i>                                     |
| SLRATEX    |              | V Float32 | Component Xs of the predicted satellite rate <i>unit: rd/s</i>    |
| SLRATEY    |              | V Float32 | Component Ys of the predicted satellite rate <i>unit: rd/s</i>    |
| SLRATEZ    |              | V Float32 | Component Zs of the predicted satellite rate <i>unit: rd/s</i>    |
| POSPREDL   |              | V Float32 | Predicted position for the left SADM <i>unit: rd</i>              |
| POSPREDR   |              | V Float32 | Predicted position for the left SADM <i>unit: rd</i>              |

All the fields are separated by a "tabulation character"



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: CCC\_MC\_PREDICTED\_ORBIT**

Predicted orbit data of the satellite and time (Position, Velocity, Time) elaborated by the CCC after an orbit determination

EXCHANGE DESCRIPTION

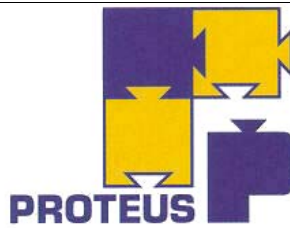
|                 |                        |                            |     |
|-----------------|------------------------|----------------------------|-----|
| <i>Provider</i> | CCC                    | <i>Consumer</i>            | MC  |
| <i>Client</i>   | MC                     | <i>Server</i>              | CCC |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | CCC |

|                 |                                |
|-----------------|--------------------------------|
| <i>Schedule</i> | Depending mission requirements |
| <i>Comment</i>  |                                |

EXCHANGED DATA DESCRIPTION

|                        |                       |                        |    |
|------------------------|-----------------------|------------------------|----|
| <i>Exchange format</i> | ASCII sequential file | <i>Compressed data</i> | NO |
| <i>Files name</i>      | PREDICTED_ORBIT_SLID  |                        |    |
| <i>Size</i>            | Variable              |                        |    |

- File contains x records
- The first record contains the file creation UT time and the type of reference frame (J2000, WGS84 or other)
- Fixed length records
- Record structure
  - UTC time of orbit data (Position, Velocity)
  - Position (x, y, z) (m)
  - Velocity (vx, vy, vz) (m/s)



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FORM2

FILE DESCRIPTION FORM

**FILE NAME:** PREDICTED\_ORBIT\_SLID

#### FILE DESCRIPTION

Predicted orbit data of the satellite and time (Position, Velocity, Time) elaborated by the CCC after an orbit determination

#### FILE TYPE

Sequential  [ X ]

Number of record types: 2

Logical structure of records: {"#BEGIN\_OF\_FILE",  
"1",n\*{"2"}, (n = number of points in the file)  
#END\_OF\_FILE"}

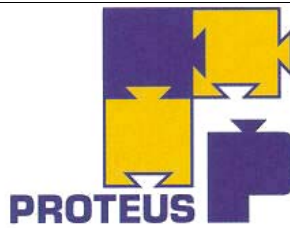
1 <UT file creation time> <Type\_frame>

2 <UTC orbit data time> <X> <Y> <Z> <VX> <VY> <VZ>

NB: The lines which begins with the character # are comment lines

Direct  [ ]

Record size:



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** PREDICTED\_ORBIT\_SLID

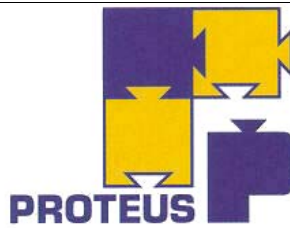
Record number: 1

Record size: 23 bytes

### RECORD DESCRIPTION

| Field name | Size (bytes) | Kind    | Content description   |
|------------|--------------|---------|---|
| Line_Type  | 1 F          | ASCII   | <b>Forced to 1</b>  |
| File_Time  | 19 F         | ASCII   | File creation time<br>(Format YYYY/MM/DD HH:MN:SS)                |
| Type_frame | 1 F          | Integer | Type of reference frame in the file<br><br>1 = J2000<br>2 = WGS84 |

All the fields are separated by a "tabulation character"



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** PREDICTED\_ORBIT\_SLID

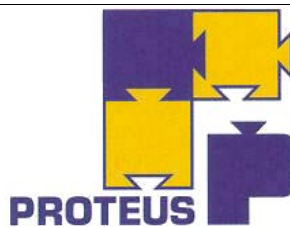
Record number: 2

Record size: 151 bytes

### RECORD DESCRIPTION

| Field name | Size (bytes) | Kind       | Content description  |
|------------|--------------|------------|--|
| Line_Type  | 1 F          | ASCII      | Forced to 2  |
| UTC_time   | 23 F         | ASCII      | UTC time of the orbit data<br>(Format YYYY/MM/DD HH:MN:SS.MMM) |
| X_Position | 20 F         | Real F20.5 | X position (m)   |
| Y_Position | 20 F         | Real F20.5 | Y position (m)   |
| Z_Position | 20 F         | Real F20.5 | Z position (m)   |
| X_Velocity | 20 F         | Real F20.5 | X velocity position (m/s)                                      |
| Y_Velocity | 20 F         | Real F20.5 | Y velocity position (m/s)                                      |
| Z_Velocity | 20 F         | Real F20.5 | Z velocity position (m/s)                                      |

All the fields are separated by a "tabulation character"



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: CCC\_MC\_TC\_LOGBOOK**

Sending acknowledge of TCPL and TCBUS transmitted from CCC to satellite

EXCHANGE DESCRIPTION

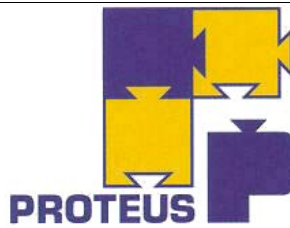
|                 |                        |                            |     |
|-----------------|------------------------|----------------------------|-----|
| <i>Provider</i> | CCC                    | <i>Consumer</i>            | MC  |
| <i>Client</i>   | CCC                    | <i>Server</i>              | MC  |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | CCC |

|                 |                                   |
|-----------------|-----------------------------------|
| <i>Schedule</i> | Depending on mission requirements |
| <i>Comment</i>  |                                   |

EXCHANGED DATA DESCRIPTION

|                        |  |                        |    |
|------------------------|--|------------------------|----|
| <i>Exchange format</i> | ASCII sequential file  | <i>Compressed data</i> | NO |
| <i>File name</i>       | R_TCLOG_SLID_(YYYY_MM_DD_HH_MM_SS) <sub>begin</sub> _(YYYY_MM_DD_HH_MM_SS) <sub>end</sub><br>(extraction period UT date) |                        |    |
| <i>Size</i>            | Depending on number of sending TC during the period  |                        |    |

- The first record contains the sending time of the first TC described in the file
- The second record contains the sending time of the last TC described in the file
- The following blocks describe the TCs
- Block description
  - TC description (mnemo, destination, nature, operational description, APID, family, TC ID, MAP number, VC number)
  - TC sending time
  - Due date for time-tagged TC
  - TC sending acknowledge result
  - TC binary profile



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FORM2

FILE DESCRIPTION FORM

FILE NAME: R\_TCLOG\_SLID\_YYYY\_MM\_DD\_HH\_MM\_SS

FILE DESCRIPTION

Sending acknowledge of TCPL and TCBUS transmitted from CCC to satellite

FILE TYPE

Sequential  [ X ]

Number of record types: 1

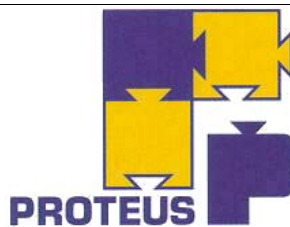
Logical structure of records: {«#BEGIN\_OF\_FILE»,  
«1»,»2»,n\*{3}, (n = number of TC logbook messages)  
#END\_OF\_FILE»}

1 <First TC sending time>  
2 <Last TC sending time>  
3 <TC mnemo> <TC destination> <TC nature> <TC operational description> <TC APID> <TC\_Family> <TC ID> <MAP number> <VC number> <TC sending time> <Due date> <TC Acknowledge> <TC binary profile>

NB: The lines which begins with the character # are comment lines

Direct  [ ]

Record size:



FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_LOGBOOK

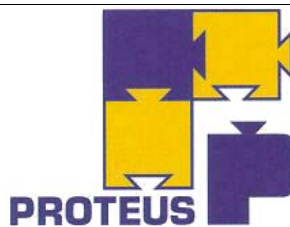
Record number: 3

Record size: Variable

## RECORD DESCRIPTION

| Field name   | Size (bytes) |   | Kind  | Content description   |
|--------------|--------------|---|-------|---|
| Line_Type    | 1            | F | ASCII | <b>Forced to 1</b>  |
| TC_Mnemo     | 8            | V | ASCII | TC mnemo  |
| TC_Dest      | 4            | V | ASCII | TC destination  |
| TC_Nature    | 2            | F | ASCII | TC nature   |
| TC_OpDesc    | 80           | V | ASCII | TC operational description  |
| TC_APID      |              |   | Int16 | TC packet APID number   |
| TC_Family    |              |   | Int16 | TC family number (0 for TCD)  |
| TC_ID        |              |   | Int16 | TC number (0 for TCD)   |
| MAP          |              |   | Int16 | Multiplexed access point number   |
| VC_ID        |              |   | Int16 | Virtual channel number  |
| Sending_Time | 19           | F | ASCII | Sending time of the TC<br>(Format YYYY/MM/DD HH:MN:SS)  |
| Due_Date     | 23           | F | ASCII | Due date for time tagged TC<br>(Format YYYY/MM/DD HH:MN:SS.MMM)   |
| TC_ACK       | 3            | V | ASCII | TC acknowledge by satellite through the CLCW<br><br><b>OK</b> TC sent by CCC and acknowledged by the satellite<br><b>NOK</b> TC sent by CCC and non acknowledged by the satellite |
| TC_Binary    |              |   | HEXA  | Binary TC profile in hexadecimal  |

All the fields are separated by a "tabulation character"



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: MC\_CCC\_TC\_PL**

Payload programming commands files provided by MC to CCC

EXCHANGE DESCRIPTION

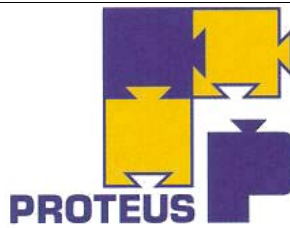
|                 |                        |                              |     |
|-----------------|------------------------|------------------------------|-----|
| <i>Provider</i> | MC                     | <i>Consumer</i>              | CCC |
| <i>Client</i>   | CCC                    | <i>Server</i>                | MC  |
| <i>Protocol</i> | FTP authenticated mode | <i>Connection initiative</i> | CCC |

|                 |                                   |
|-----------------|-----------------------------------|
| <i>Schedule</i> | Depending on mission requirements |
| <i>Comment</i>  |                                   |

EXCHANGED DATA DESCRIPTION

|                        |   |                        |    |
|------------------------|---|------------------------|----|
| <i>Exchange format</i> | ASCII sequential file   | <i>Compressed data</i> | NO |
| <i>File name</i>       | SLID_TC_specific-name_YYYY_MM_DD_HH_MM_SS (File creation UT time) |                        |    |
| <i>Size</i>            | Max: 500 Kbytes   |                        |    |

- 1 file contains ASCII description and binary profile TC
- The first record contains the file creation UT time
- The second record contains the provider of the file
- 1 file contains one or more blocks of TC description
- Each TC is described in a block which contains
  - TC mnemo and operational description
  - Due date if TC time-tagged
  - Delay before the TC sending
  - ASCII TC parameters description
  - Binary TC packet profile
- For a time tagged TC, it shall not specify a delay before the TC sending



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FORM2

FILE DESCRIPTION FORM

FILE NAME: SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

FILE DESCRIPTION

Payload programming commands files provided by MC to CCC

FILE TYPE

Sequential [ X ]

Number of record types: 7

Logical structure of records: {"#BEGIN\_OF\_FILE", "1", "2", n\*{"3", ["4"], ["5"], [ m\*{"6"}], "7"}, "#END\_OF\_FILE"}

(n = number of TC description in the file)

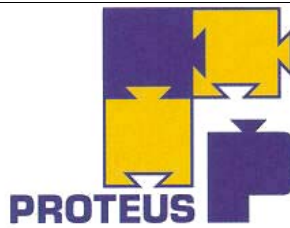
(m = number of ASCII TC description record)

- 1 <File creation time>
2 <Provider>
3 <TC Mnemo> <TC Operational description>
4 <Due Date for time-tagged> (optional record)
5 <Delay before TC sending> (optional record)
6 <TC data description> (optional record)
7 <Length of TC packet> <TC packet binary profile>

NB: The lines which begins with the character # are comment lines

Direct [ ]

Record size:



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

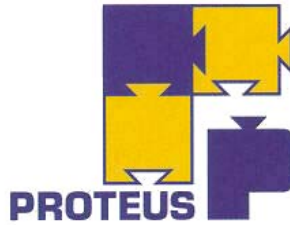
Record number: 1

Record size: 35 bytes

RECORD DESCRIPTIO

| Field name    | Size (bytes) |   | Kind  | Content description                                |
|---------------|--------------|---|-------|--|
| Line_type     | 15           | F | ASCII | <b>Forced to</b> <CREATION_TIME>                   |
| Creation_Time | 19           | F | ASCII | File creation UT time (Format YYYY/MM/DD HH:MN:SS) |

All the fields are separated by a "tabulation character"



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

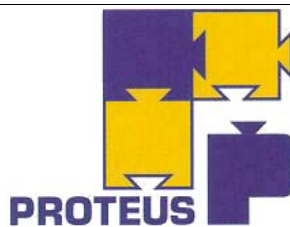
Record number: 2

Record size: 15 bytes

### RECORD DESCRIPTION

| Field name | Size (bytes) |   | Kind  | Content description                  |
|------------|--------------|---|-------|--------------------------------------|
| Line_type  | 10           | F | ASCII | <b>Forced to</b> < <b>PROVIDER</b> > |
| Provider   | 4            | F | ASCII | TC group provider acronym            |

All the fields are separated by a "tabulation character"



FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

Record number: 3

Record size: Max 101 bytes

RECORD DESCRIPTION

| Field name | Size (bytes) |   | Kind  | Content description                            |
|------------|--------------|---|-------|--|
| Line_type  | 10           | F | ASCII | <b>Forced to</b> <TC_MNEMO>                    |
| TC_Mnemo   | 11           | V | ASCII | Satellite Data Base TC mnemo                   |
| TC_OpDesc  | 80           | V | ASCII | Satellite Data Base TC operational description |

All the fields are separated by a "tabulation character"

FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

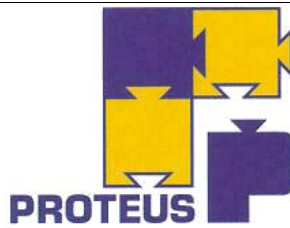
Record number: 4 **Optional record**

Record size: 34 bytes

RECORD DESCRIPTION

| Field name | Size (bytes) |   | Kind  | Content description   |
|------------|--------------|---|-------|---|
| Line_type  | 10           | F | ASCII | <b>Forced to</b> <DUE_DATE>                                     |
| Due_Date   | 23           | F | ASCII | Due time for TC time-tagged<br>(Format YYYY/MM/DD HH:MN:SS.MMM) |

All the fields are separated by a "tabulation character"



FORM3

RECORD DESCRIPTION FORM

FILE NAME: SLID \_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

Record number: 5 **Optional record**

Record size: Variable

RECORD DESCRIPTION

| Field name | Size (bytes) | Kind | Content description  |
|------------|--------------|------|--|
| Line_type  | 7            | F    | <b>Forced to</b> <DELAY>   |
| Delay      |              | V    | Delay to respect before the TC sending in milliseconds<br>This field is authorized only if the TC is not a time_tagged command |

All the fields are separated by a "tabulation character"  
RECORD DESCRIPTION FORM

FORM3

FILE NAME: SLID \_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

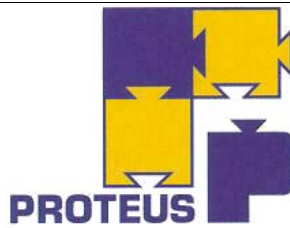
Record number: 6 **Optional record**

Record size: Max 90 bytes

RECORD DESCRIPTION

| Field name | Size (bytes) | Kind | Content description              |
|------------|--------------|------|----------------------------------|
| Line_type  | 9            | F    | <b>Forced to</b> <TC_DATA>       |
| TC_Desc    | 80           | V    | Free text describing the TC data |

All the fields are separated by a "tabulation character"



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FORM3

RECORD DESCRIPTION FORM

**FILE NAME:** SLID\_TC\_specific-name\_YYYY\_MM\_DD\_HH\_MM\_SS

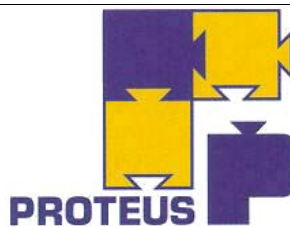
Record number: 7

Record size: Max 265 bytes

### RECORD DESCRIPTION

| Field name | Size (bytes) | Kind | Content description  |
|------------|--------------|------|--|
| Line_type  | 12           | F    | ASCII<br><b>Forced to &lt; TC_PROFILE &gt;</b>   |
| Length     |              | V    | Int16<br>TC packet length in bytes (max 248 bytes)   |
| TC_Binary  |              | V    | Hexa<br>Binary TC packet profile in hexadecimal<br>See packet structure in [RD2] <ul style="list-style-type: none"><li>• Packet header (6 bytes) with APID and data length</li><li>• Packet data (max 242 bytes)</li></ul> |

All the fields are separated by a "tabulation character"



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: TT CET\_MC\_PLTM\_FRAME**

Files containing PLTM CCSDS standard frames stored in TT CET and transmitted to MC on MC request

## EXCHANGE DESCRIPTION

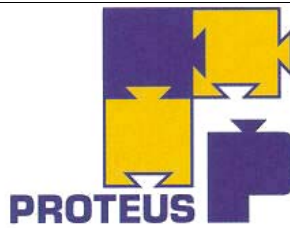
|                 |                        |                            |        |
|-----------------|------------------------|----------------------------|--------|
| <i>Provider</i> | TT CET                 | <i>Consumer</i>            | MC     |
| <i>Client</i>   | MC                     | <i>Server</i>              | TT CET |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | MC     |

|                 |  |
|-----------------|--|
| <i>Schedule</i> | Files creation after each programmed fly-by  |
| <i>Comment</i>  | <ul style="list-style-type: none"> <li>Data are provided by TT CET to MC after fly-by LOS + 3 min</li> <li>Storage time at TT CET level: 72 hours</li> <li>1 file contains an integer number of PLTM CCSDS frames</li> <li>The PLTM file can be removed in TT CET by the MC after recovery and processing</li> </ul> |

## EXCHANGED DATA DESCRIPTION

|                        |   |                        |    |
|------------------------|---|------------------------|----|
| <i>Exchange format</i> | Binary sequential file  | <i>Compressed data</i> | NO |
| <i>File name</i>       | SLID_PLTM1_F_YYYY_MM_DD_HH_MM_SS (If VC for PLTM1)<br>SLID_PLTM2_F_YYYY_MM_DD_HH_MM_SS (If VC for PLTM2)<br>(File creation UT time) |                        |    |
| <i>Size</i>            | Max 10 Mbytes   |                        |    |

- 1 file contains maximum 8900 frames of PLTM1 or maximum 8900 frames of PLTM2
- Fixed-length records
- 1 record contains 1 PLTM1 frames:
  - Frame synchronization marker (4 bytes)
  - CCSDS main header of the frame (6 bytes)
  - Data zone of the frame (1105 bytes) with:
    - Count of the virtual channel frame extension
    - PLTM1 or PLTM2 packet(s)
  - Operational control zone (4 bytes)



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FORM2

FILE DESCRIPTION FORM

**FILE NAME:** SLID\_PLTMi\_F\_YYYY\_MM\_DD\_HH\_MM\_SS

#### FILE DESCRIPTION

Files containing PLTM CCSDS standard frames stored in TTCET and transmitted to MC on MC request

#### FILE TYPE

Sequential

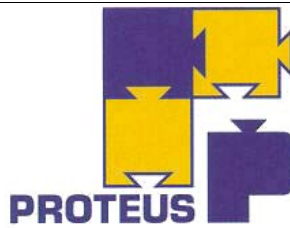
Number of record types: 1

Logical structure of records: {n\*{«1»}} (n = number of PLTM frames in the file)

1 <Synchronization marker> <Frame main header> <frame data>  
<Operational control zone>

Direct

Record size:



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FORM3

RECORD DESCRIPTION FORM

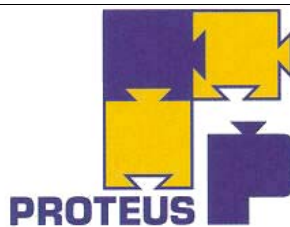
**FILE NAME:** SLID\_PLTMi\_F\_YYYY\_MM\_DD\_HH\_MM\_SS

Record number: 1

Record size: 1119 bytes

### RECORD DESCRIPTION

| Field name   | Size (bytes) | Kind | Content description  |
|--------------|--------------|------|--|
| Synchro      | 4 F          |      | Frame synchronization marker<br><b>Forced to value 1ACFFC1D hexa</b> |
| Frame_Header | 6 F          |      | Main header of the frame<br>See frame structure in [RD2]             |
| Frame_Data   | 1105 F       |      | Data zone of the frame<br>See frame structure in [RD2]               |
| Control_Zone | 4 F          |      | Operational control zone<br>See frame structure in [RD2]             |



FORM1

INTERFACE DESCRIPTION FORM

**Generic interface name: TT CET\_MC\_PLTM\_PACKET**

Files containing PLTM CCSDS standard packets stored in TT CET and transmitted to MC on MC request

## EXCHANGE DESCRIPTION

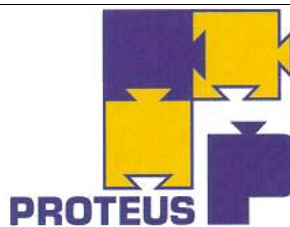
|                 |                        |                            |        |
|-----------------|------------------------|----------------------------|--------|
| <i>Provider</i> | TT CET                 | <i>Consumer</i>            | MC     |
| <i>Client</i>   | MC                     | <i>Server</i>              | TT CET |
| <i>Protocol</i> | FTP authenticated mode | <i>Exchange initiative</i> | MC     |

|                 |   |
|-----------------|---|
| <i>Schedule</i> | Files creation after each programmed fly-by   |
| <i>Comment</i>  | <ul style="list-style-type: none"> <li>- Data are provided by TT CET to MC after fly-by LOS + 5 MN</li> <li>- Storage time are TT CET level: 72 hours</li> <li>- 1 file contains an integer number of PLTM CCSDS packets</li> <li>- The PLTM file can be removed in TT CET by the MC after recovery and processing</li> </ul> |

## EXCHANGED DATA DESCRIPTION

|                        |   |                 |
|------------------------|---|-----------------|
| <i>Exchange format</i> | Binary sequential file  | Compressed data |
| <i>File name</i>       | SLID_PLTM1_P_YYYY_MM_DD_HH_MM_SS (If VC for PLTM1)<br>SLID_PLTM2_P_YYYY_MM_DD_HH_MM_SS (If VC for PLTM2)<br>(File creation UT time) |                 |
| <i>Size</i>            | Max 10 Mbytes   |                 |

- 1 file contains x MN of PLTM1 or x MN of PLTM2
- Variable-length records
- 1 record contains 1 PLTM packet:
  - CCSDS packet header with in particular:
    - TM APID number
    - Data length (fixed length for each APID)
  - PLTM packet data (max 1018 bytes) with:
    - UT time except on-board computer time during safe mode
    - APID data (see Satellite Data Base)



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FORM2

FILE DESCRIPTION FORM

**FILE NAME:** SLID\_PLTMi\_P\_YYYY\_MM\_DD\_HH\_MM\_SS

#### FILE DESCRIPTION

Files containing PLTM CCSDS standard packets stored in TTCET and transmitted to MC on MC request

#### FILE TYPE

Sequential

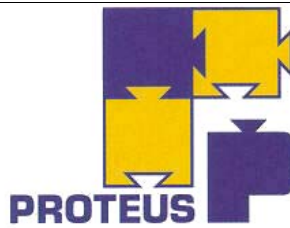
Number of record types: 1

Logical structure of records: {n\*{«1»}} (n = number of PLTM packets in the file)

1 <TM packet header> <TM packet data>

Direct

Record size:



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FORM3

RECORD DESCRIPTION FORM

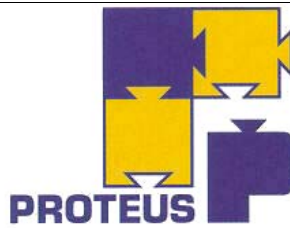
**FILE NAME:** SLID\_PLTMi\_P\_YYYY\_MM\_DD\_HH\_MM\_SS

Record number: 1

Record size: Max 1 kbytes

### RECORD DESCRIPTION

| Field name    | Size (bytes) | Kind | Content description   |
|---------------|--------------|------|---|
| Packet_Header | 6            | F    | Packet header including APID number and data length<br>See TM packet structure in [RD2]   |
| Packet_Data   |              | V    | TM packet data with: <ul style="list-style-type: none"><li>• Datation information (10 bytes)</li><li>• PLTM TM data (max 1008 bytes)</li></ul> See TM packet structure in [RD2] |



## 8.5 NETWORK IF – FTP CONNECTIONS SPÉCIFICATIONS

### 8.5.1 TRANSFER SCENARIO

CCC always initiates the FTP connections with TTCET, MC or OCC (i.e. CCC host is always client).  
MC always initiates the FTP connections with TTCET.

### 8.5.2 CONNECTION REQUIREMENTS

- R1** The FTP connection must be authenticated.
- R2** Login/password are included in system file "passwd".
- R3** A password is not in plain text.
- R4** The password must be changed at least every ninety days.
- R5** Files must be stored in a dedicated data directory.
- R6** The FTP server must provide a logfile. The server administrator only manages this logfile.

END OF CHAPTER