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Référence de l'émetteur : SALP-IF-M/IDS-EA15938-CN		

SALP

JASON1&2&3 / DESCRIPTIONS OF THE QUATERNION AND SOLAR PANEL FILES

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30/06/2020

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Document géré en configuration	NON	par :	à dater du :
Statut du document :			

		SERVICE ALTIMETRIE & LOCALISATION PRECISE	Référence : SALP-IF-M/IDS-EA15938-CN
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Titre : Jason1, 2 & 3 / descriptions of the quaternion and solar panel files			

BORDEREAU D'INDEXATION

Confidentialité :	NON	Type :
Mots clé : Jason1&2 & 3 / descriptions of the quaternion and solar panel files		
Logiciels de création	Nombre de pages supplémentaires :	
Résumé d'auteur :		

MODIFICATIONS

Les modifications par rapport à la version précédente sont signalées par un trait vertical en marge gauche.

Version	Date	Objet

RÉFÉRENCE DOCUMENTS

Référence	Titre du document
TP2-JS-IF-600-CNES	DR1. OSTM/JASON GROUND SYSTEM INTERFACE
TP3-JS-IF-200-CNES	DR2. OSTM/JASON2 GROUND SYSTEM INTERFACE
TP4-JS-IF-500-CNES	DR3. JASON2& 3 GROUND SYSTEM INTERFACE

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1. INTRODUCTION

This document describes the filename convention and the format of the quaternion/solar panel files of Jason1 , Jason2 and jason3

It has been written using the ground Interface documents (DR1 and DR2), with additional information relative to these specific attitude files coming from the satellite telemetry (format, conventions, physical content) in order to help users to read these files.

The quaternion files contain the 4 components of the spacecraft attitude in the J2000 frame.

The solar panel files contain the angular positions of the solar arrays.

Both files are daily delivered, covering a period of 28 hours (2 overlapping hours between two consecutive files)

2. FILE NAME CONVENTION

Quaternion file: sssqbodyYYYYMMDDHHMMSS_yyyymmddhhmnss.LLL

Solar panel file: sssqsolpYYYYMMDDHHMMSS_yyyymmddhhmnss.LLL

Where

sss = the satellite three-character abbreviation (ja1 or ja2)

qbody or qsolp = fixed part

qbody for body quaternion files,

qsolp for solar panel files

YYYY = date: year of first data

MM = date: month of the first data

DD = date: day in the month of first data

HH = time: hour of the first data

MN = time: mn of the first data

SS = time: second of the first data

yyyy = date: year of last data

mm = date: month of the last data

dd = date: day in the month of last data

hh = time: hour of the first data

mn = time: mn of the first data

ss = time: second of the first data

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LLL = version number (starting with 001 for the initial version)

Ex: ja2qbody20090201220000_20090203020000.001
 ja2qsolp20090201220000_20090203020000.001

3. JASON1

3.1 JASON1 BODY QUATERNION FILE

This file contains the 4 components of the spacecraft attitude quaternion in the J2000 frame (measured values).

$Q = [Q_0, Q_1, Q_2, Q_3]$ where Q_0 = scalar (real) part , and $[Q_1, Q_2, Q_3]$ = vector (imaginary) part

Format description:

Header:

The lines which begin with the character # are some comment lines

- Comments includes in the file are:
- parameters list
- start and end dates for the consultation (Format YYYY/MM/DD HH:MM:SS)
- parameters units (optional)
- minimum value for the parameters (optional)
- maximum value for the parameters (optional)

Data:

Logical structure of record:

< UTC time > < QIALTEST1> < QIALTEST2> < QIALTEST3> < QIALTEST4>

RECORD DESCRIPTION

Field name	Size (bytes)	Kind	Content description
UTC time	23 F	ASCII	Packet time (Format YYYY/MM/DD HH:MM:SS.MMM)
QIALTEST1	12 F	Real F12.6	Component 1 of the spacecraft attitude quaternion in the J2000 frame Scalar (real) part

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QIALTEST2	12 F	Real F12.6	Component 2 of the spacecraft attitude quaternion in the J2000 frame = first component of the vector (imaginary) part
QIALTEST3	12 F	Real F12.6	Component 3 of the spacecraft attitude quaternion in the J2000 frame = second component of the vector (imaginary) part
QIALTEST4	12 F	Real F12.6	Component 4 of the spacecraft attitude quaternion in the J2000 frame = third component of the vector (imaginary) part

All the fields are separated by a "tabulation character"

Example:

Filename = ja1qbody20020817220000_20020819020000.001

```
# Parameter list : QIALTEST1      QIALTEST2      QIALTEST3      QIALTEST4
# Start date :    2002/08/05 22:00:00
# End date :      2002/08/07 02:00:00
# Parameter Unit :
# Minimum value :   -0.001333      -0.915491      -0.361579      -0.372713
# Maximum value :    0.915243       0.915355       0.372204       0.210897
2002/08/05 22:00:08.994      0.780369      -0.536928      0.275326      -0.164098
2002/08/05 22:00:40.995      0.773380      -0.548179      0.276995      -0.157026
2002/08/05 22:01:12.994      0.766217      -0.559297      0.278642      -0.149860
2002/08/05 22:01:44.994      0.758852      -0.570263      0.280343      -0.142656
2002/08/05 22:02:16.995      0.751305      -0.581075      0.282064      -0.135398
2002/08/05 22:02:48.995      0.743562      -0.591736      0.283819      -0.128102
2002/08/05 22:03:20.995      0.735618      -0.602242      0.285626      -0.120785
2002/08/05 22:03:52.995      0.727502      -0.612594      0.287418      -0.113401
```

3.2 JASON1 SOLAR PANEL FILE

This file contains the Solar Array angular positions (measured values).

Header:

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The lines which begin with the character **#** are some comment lines

Comments includes in the file are:

- parameters list
- start and end dates for the consultation (Format YYYY/MM/DD HH:MN:SS)
- parameters units (optional)
- minimum value for the parameters (optional)
- maximum value for the parameters (optional)

Description of data:

Logical structure of record:

< UTC time > <POSSADML> <POSSADMR>

RECORD DESCRIPTION

Field name	Size (bytes)	Kind	Content description
UTC time	23 F	ASCII	Packet time (Format YYYY/MM/DD HH:MN:SS.MMM)
POSSADML	12 F	Real F12.6	Measured angular position of the left Solar Array (rd) : Rotation axis = -Y Angle=0 when solar array's normal direction is oriented along -X satellite's axis. Angle is counted positive for counter clockwise rotation (right hand rule)
POSSADMR	12 F	Real F12.6	Measured angular position of the right Solar Array (rd): Rotation axis = +Y Angle=0 when solar array's normal direction is oriented along -X satellite's axis. Angle is counted positive for counter clockwise rotation (right hand rule)

All the fields are separated by a "tabulation character"

Example:

Filename = ja1qsolp20011219220000_20011221020000.001

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```

# Parameter list      : POSSADML      POSSADMR
# Start date : 2001/12/19 22:00:00
# End date : 2001/12/21 02:00:00
# Parameter Unit :      rd      rd
# Minimum value:      -0.819180      -0.808339
# Maximum value:       0.806566       0.811609
2001/12/19 22:00:21.880      -0.163537      0.161846
2001/12/19 22:00:53.880      -0.185579      0.183179
2001/12/19 22:01:25.881      -0.210824      0.207997
2001/12/19 22:01:57.881      -0.233069      0.230073
2001/12/19 22:02:29.880      -0.255437      0.252307
2001/12/19 22:03:01.881      -0.277805      0.274796
2001/12/19 22:03:33.881      -0.300314      0.296794
2001/12/19 22:04:05.880      -0.322696      0.319013
2001/12/19 22:04:37.881      -0.344959      0.341395
2001/12/19 22:05:09.880      -0.367428      0.363577
2001/12/19 22:05:41.880      -0.389933      0.386063
2001/12/19 22:06:13.881      -0.409577      0.405419
2001/12/19 22:06:45.881      -0.431963      0.428035
2001/12/19 22:07:17.881      -0.454304      0.450465
2001/12/19 22:07:49.881      -0.468388      0.464310
2001/12/19 22:08:21.881      -0.490855      0.486514

```

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4. JASON2 & JASON3

4.1 JASON2 OR JASON3 BODY QUATERNION FILE

This file contains the 4 components of the spacecraft attitude quaternion in the J2000 frame .

$Q = [Q_0, Q_1, Q_2, Q_3]$ where Q_0 = scalar (real) part, and $[Q_1, Q_2, Q_3]$ = vector (imaginary) part

Header:

The lines which begin with the character **#** are some comment lines

Comments includes in the file are :

- parameters list
- start and end dates for the consultation (Format YYYY/MM/DD HH:MM:SS)
- parameters units (optional)
- minimum value for the parameters (optional)
- maximum value for the parameters (optional)

Data:

Note that in the data record, only 5 parameters are useful (time and quaternion components), the 8 others (integers UI<n>) are useless and shall be skipped.

Logical structure of record:

<UT time> <UI1> <QISLEST1> <UI2> <UI3> <QISLEST2> <UI4> <UI5> <QISLEST3> <UI6> <UI7> <QISLEST4>
 <UI8>

RECORD DESCRIPTION

Field name	Size (bytes)	Kind	Content description
UT_time	23 F	ASCII	UTC time of the packet (Format YYYY/MM/DD HH:MM:SS.MMM)
UI1	10 F	I10	Useless parameter: shall be skipped
QISLEST1	12 F	Real F12.9	Component 1 of the spacecraft measured attitude quaternion in the J2000 frame Scalar (real) part.

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UI2	10	F	I4	Useless parameter (fixed to 2007): shall be skipped
UI3	10	F	I10	Useless parameter : shall be skipped
QISLEST2	12	F	Real F12.9	Component 2 of the spacecraft measured attitude quaternion in the J2000 frame = second component of the vector (imaginary) part
UI4	10	F	I4	Useless parameter (fixed to 2007): shall be skipped
UI5	10	F	I10	Useless parameter : shall be skipped
QISLEST3	12	F	Real F12.9	Component 3 of the spacecraft measured attitude quaternion in the J2000 frame = third component of the vector (imaginary) part
UI6	10	F	I4	Useless parameter (fixed to 2007): shall be skipped
UI7	10	F	I10	Useless parameter : shall be skipped
QISLEST4	12	F	Real F12.9	Component 4 of the spacecraft measured attitude quaternion in the J2000 frame = Third component of the vector (imaginary) part
UI8	10	F	I4	Useless parameter (fixed to 2007): shall be skipped

All the fields are separated by a "tabulation character"

Example:

Filename = ja2qbody20090121220000_20090123080000.001

```
# Parameters :      QISLEST1      QISLEST2      QISLEST3      QISLEST4
# Start date : 2009/01/21 22:00:00
# End date : 2009/01/23 08:00:00
# Parameter unit :   none      none      none      none
# Minimum value :    0.000289 -0.388675      -0.895033      -0.250234
# Maximum value :    0.602124 0.601936 0.894719 0.896272
2009/01/21 22:00:03.467 1767744511 0.411585 2007 2845464061 -0.084372 2007 1693100798 0.197103 2007 1902226432 0.885793 2007
2009/01/21 22:00:35.468 1796954111 0.418386 2007 2616098557 -0.097723 2007 1607477502 0.187135 2007 1897073152 0.883394 2007
2009/01/21 22:01:07.468 1826441727 0.425252 2007 2388816381 -0.110953 2007 1519345150 0.176875 2007 1891207680 0.880662 2007
2009/01/21 22:01:39.467 1856260607 0.432194 2007 2165996541 -0.123922 2007 1428287742 0.166275 2007 1884658944 0.877613 2007
2009/01/21 22:02:11.468 1886344447 0.439199 2007 3121649662 -0.136592 2007 1334107390 0.155311 2007 1877453056 0.874257 2007
```

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4.2 JASON2 & JASON 3 SOLAR PANEL FILE

This file contains the Solar Array angular positions (commanded positions).

Note1: As the control of the solar arrays position of JASON2 is performed in open loop (closed loop for Jason1), there is an ambiguity of sign of the measured positions, that is why the commanded positions are given in the solar panel file (instead of measured ones). Note also that both types of position are very close (accuracy less than 1deg).

Note2: as for the quaternion file, the solar panel file contains useless parameters (integer) that should be skipped.

Header:

The lines which begin with the character # are some comment lines.

Comments includes in the file are :

- parameters list
- start and end dates for the consultation (Format YYYY/MM/DD HH:MN:SS)
- parameters units (optional)
- minimum value for the parameters (optional)
- maximum value for the parameters (optional)

Data:

Logical structure of record:

< UT Time > <UI1> <POSTARGL> <UI2> <POSTARGR> <UI3>

RECORD DESCRIPTION

Field name	Size (bytes)	Kind	Content description
UT time	23 F	ASCII	Packet time (Format YYYY/MM/DD HH:MN:SS.MMM)
UI1	10 F	Integer I10	Useless parameter (shall be skipped)
POSTARGL	12 F	Real F12.6	Commanded angular position of the left Solar Array (rd) : Rotation axis = -Y

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			Angle=0 when solar array's normal direction is oriented along -X satellite's axis. Angle is counted positive for counter clockwise rotation (right hand rule)
UI2	10 F	Integer I10	Useless parameter (shall be skipped)
POSTARGR	12 F	Real F12.6	Commanded angular position of the right Solar Array (rd): Rotation axis = +Y Angle=0 when solar array's normal direction is oriented along -X satellite's axis. Angle is counted positive for counter clockwise rotation (right hand rule)
UI3	10 F	Integer I4	Useless parameter (shall be skipped) Fixed value: 2007

All the fields are separated by a "tabulation character"

Example :

Filename= ja2qsolp20090527220000_20090529080000.001

```
# Parameters :      POSTARGL POSTARGR
# Start date :      2008/12/30 22:00:00
# End date :        2009/01/01 08:00:00
# Parameter unit :  rd      rd
# Minimum value :   -1.196634 -1.189110
# Maximum value :   1.189109 1.196633
2008/12/30 22:00:30.009      2807840256      -0.692497 2007      1487126272      0.692497 2007
2008/12/30 22:01:02.009      2746163968      -0.721218 2007      1548802560      0.721217 2007
2008/12/30 22:01:34.009      2685857024      -0.749300 2007      1609109504      0.749300 2007
2008/12/30 22:02:06.009      2626971648      -0.776721 2007      1667994880      0.776721 2007
2008/12/30 22:02:38.009      2569561856      -0.803455 2007      1725404672      0.803454 2007
2008/12/30 22:03:10.009      2513677568      -0.829478 2007      1781288960      0.829477 2007
2008/12/30 22:03:42.009      2459368192      -0.854767 2007      1835598336      0.854767 2007
2008/12/30 22:04:14.010      2406681856      -0.879301 2007      1888284672      0.879301 2007
2008/12/30 22:04:46.010      2355666432      -0.903057 2007      1939300096      0.903057 2007
2008/12/30 22:05:18.010      2306367232      -0.926014 2007      1988599296      0.926014 2007
```

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