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Definition of the Derived Parameter Language (DPL)

All information is subject to change without notice and does not represent a commitment on the part of **BINARY SPACE**.
Release 1.06 (January 2016)

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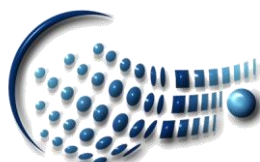
- A. Acceptance

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Document Change Log

Issue	Revision	Date	Affected	Reason for change
1	1	December 1999	All	New document
1	2	September 2001	Chapter 2	Introduction of the ' VOLATILE ' keyword for non-initialized parameters
1	3	August 2004	Chapter 3.1.	Changed parameter status identifiers
1	4	August 2008	Chapter 3.1.	Added support for bandwidth measurement
1	5	May 2011	Chapter 3.1.	Added ' GetPastValueTime ' function
1	6	January 2016	Chapter 3.2.	Added satellite tracking, pass & interlink functions



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1. Introduction

The **Derived Parameter Language** (DPL) is the programming language of SatView™ developed to ease the implementation of derived parameters. It is a macro extension to the common C++ language and comes with a library containing useful telemetry data functions.

2. Syntax

Code written in DPL always consists of one or more procedures, each associated with a derived parameter. The procedures are executed automatically whenever one or more of the parameters P_1, \dots, P_k declared inside are updated.

A procedure complying with the following syntax needs to be implemented for every parameter:

```
DERIVATION PROCEDURE  $P_i$ 
[PARAMETERS  $P_1\{, P_j\};$ ]
[VOLATILE  $P_1\{, P_k\};$ ]
BEGIN
    DPL Code
END
```

Comments:

The above notation is expressed in the *Extended Backus Naur Formalism* (EBNF).

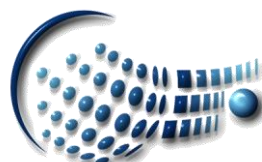
P_i Derived parameter to be calculated.

P_1, \dots, P_j Parameters used for the derivation calculation.

A parameter declaration P_n can be preceded by the **STATIC** keyword which has the effect that the derived parameter is not re-calculated even if the parameter P_n is updated.

P_1, \dots, P_k Parameters eventually used for the derivation calculation.

By using the **VOLATILE** keyword the following enumerated parameters are not checked whether or not they are initialized (i.e. do have a value). Each of the specified parameters must be contained in the list declared with the **PARAMETERS** keyword and may have a random value. By default, the procedure is not executed whenever one of the parameters $P_1 \dots P_j$ has no value. With the **VOLATILE** keyword specified, the calculation in the procedure is performed although one or more of the parameters $P_1 \dots P_k$ have no (or a random) value.



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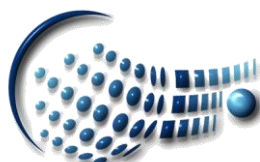
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3. Library

3.1. Telemetry Functions

DPL comes with a set of functions providing full access to the telemetry data. Besides including other (derived) parameters into a calculation it also provides a programmatic interface to raw data.

Function	Description
CString GetTMUnitTag (void)	Returns the identifier of the telemetry unit that is currently processed. <input checked="" type="checkbox"/> Note: When the Packet Telemetry Standard (CCSDS 102.0-B-2) is supported the function returns the name of the telemetry packet. For a telemetry format based standard, it results in a string with the syntax: 'FORMAT: <i>n</i> ' where <i>n</i> is the frame number.
CTimeTag GetTMUnitTime (void)	Returns the time associated with the telemetry unit. <input checked="" type="checkbox"/> Note: The time identifies the moment when the telemetry unit was received on ground including eventual corrections to compensate any delays caused by the ground segment.
UINT GetTMUnitID (void)	Returns the number of the telemetry unit. <input checked="" type="checkbox"/> Note: When the Packet Telemetry Standard (CCSDS 102.0-B-2) is supported the function returns the <i>On Board Reference Time</i> (OBRT) of the telemetry packet. For a telemetry format based standard, it returns the number known as format counter.
BOOL GetTMUnitData (INT <i>nBytePos</i> , BYTE & <i>nValue</i>)	Returns the value of a byte at the specified location <i>nBytePos</i> (≥ 0) in the variable <i>nValue</i> . <input checked="" type="checkbox"/> Note: The function returns TRUE if the specified location is valid, FALSE otherwise.
BOOL GetTMUnitData (INT <i>nBytePos</i> , INT <i>nBitPos</i> , INT <i>nLength</i> , ULONGLONG & <i>nValue</i>)	Returns the value of data at the specified location <i>nBytePos</i> (≥ 0), <i>nBitPos</i> ($0 \leq nBitPos < 8$), <i>nLength</i> ($1 \leq nLength \leq 64$) in the variable <i>nValue</i> . <input checked="" type="checkbox"/> Note: The function returns TRUE if the specified location is valid, FALSE otherwise.



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WORD GetTmUnitQuality (void)	Returns the data quality indication of the telemetry unit. It may be a combination of one or more of the following values: TMUNIT_DATAQUALITY_GOOD TMUNIT_DATAQUALITY_BAD TMUNIT_SEQUENCEQUALITY_GOOD TMUNIT_SEQUENCEQUALITY_BAD TMUNIT_TIMECORRELATION_GOOD TMUNIT_TIMECORRELATION_BAD <input checked="" type="checkbox"/> Note: The value TMUNIT_DATAQUALITY_NONE is returned in case of an error.
type-specifier GetValue (Parameter-Id)	Returns the current (calibrated) value of parameter <i>Parameter-Id</i> . <input checked="" type="checkbox"/> Note: If the parameter occurs more than once within a telemetry unit, the function returns the value of the first occurrence.
type-specifier GetValue (Parameter-Id, INT nOccurrence)	Returns the current (calibrated) value of parameter <i>Parameter-Id</i> at the occurrence specified by <i>nOccurrence</i> (≥ 0). <input checked="" type="checkbox"/> Note: If an illegal occurrence number is specified the functions return 0.
type-specifier GetRawValue (Parameter-Id)	Returns the current raw value of parameter <i>Parameter-Id</i> . <input checked="" type="checkbox"/> Note: If the parameter occurs more than once within a telemetry unit, the function returns the value of the first occurrence.
type-specifier GetRawValue (Parameter-Id, INT nOccurrence)	Returns the current raw value of parameter <i>Parameter-Id</i> at the occurrence specified by <i>nOccurrence</i> (≥ 0). <input checked="" type="checkbox"/> Note: If an illegal occurrence number is specified the functions return 0.



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CTimeTag GetValueTime (<i>Parameter-Id</i>)	Returns the time associated with the current value of parameter <i>Parameter-Id</i> . <input checked="" type="checkbox"/> Note: If the parameter occurs more than once within a telemetry unit, the function returns the value of the first occurrence.
CTimeTag GetValueTime (<i>Parameter-Id</i> , INT <i>nOccurrence</i>)	Returns the time associated with the current value of parameter <i>Parameter-Id</i> at the occurrence specified by <i>nOccurrence</i> (≥ 0). <input checked="" type="checkbox"/> Note: If an illegal occurrence number is specified the functions return 0.
<i>type-specifier</i> GetPastValue (<i>Parameter-Id</i> , INT <i>nSample</i>)	Returns a past (calibrated) value of parameter <i>Parameter-Id</i> . The variable <i>nSample</i> specifies how many samples in the past the value should be from. <input checked="" type="checkbox"/> Note: If a parameter occurs more than once within a telemetry unit, each occurrence is counted as a sample.
<i>type-specifier</i> GetPastRawValue (<i>Parameter-Id</i> , INT <i>nSample</i>)	Returns a past raw value of parameter <i>Parameter-Id</i> . The variable <i>nSample</i> specifies how many samples in the past the value should be from. <input checked="" type="checkbox"/> Note: If a parameter occurs more than once within a telemetry unit, each occurrence is counted as a sample.
CTimeTag GetPastValueTime (<i>Parameter-Id</i> , INT <i>nSample</i>)	Returns the time associated with a past value of parameter <i>Parameter-Id</i> . The variable <i>nSample</i> specifies how many samples in the past the value should be from. <input checked="" type="checkbox"/> Note: If a parameter occurs more than once within a telemetry unit, each occurrence is counted as a sample.







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<p><i>type-specifier</i> CalculateValueAverage(<i>Parameter-Id</i>,INT <i>nSamples</i>)</p>	<p>Returns the raw average value of the last <i>nSamples</i> samples of parameter <i>Parameter-Id</i>.</p> <p> Note: If less than <i>nSamples</i> samples have been collected, the function returns a floating average of the samples already encountered.</p>
<p>UINT GetStatus(<i>Parameter-Id</i>)</p>	<p>Returns the status of the parameter <i>Parameter-Id</i> which may be a combination of the following values:</p> <p>TMPARAMETER_STATUS_GOOD TMPARAMETER_STATUS_BAD TMPARAMETER_STATUS_NOLIMIT TMPARAMETER_STATUS_SOFTLIMIT TMPARAMETER_STATUS_HARDLIMIT TMPARAMETER_STATUS_DELTALIMIT TMPARAMETER_STATUS_VALID TMPARAMETER_STATUS_INVALID</p> <p> Note: The value TMPARAMETER_STATUS_NONE is returned if the parameter has no value.</p>
<p>UINT GetStatus(<i>Parameter-Id</i>, INT <i>nOccurrence</i>)</p>	<p>Returns the status of the parameter <i>Parameter-Id</i> for the specified occurrence <i>nOccurrence</i>.</p> <p>See above for possible values returned by this function.</p> <p> Note: The value TMPARAMETER_STATUS_NONE is returned if the parameter has no value or an illegal occurrence number was specified.</p>
<p>double GetTotalTMBandwidth()</p>	<p>Returns the total amount of bits per second available for the telemetry data (including the protocol overhead for the telemetry unit).</p> <p> Note: A value of 'NAN' is returned when no bandwidth information is available. Use the macro isnan (double <i>f</i>) to check for that result.</p>



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double GetAvailableTMBandwidth()	Returns the currently unused bandwidth as a number between 0 and 1. <input checked="" type="checkbox"/> Note: A value of 'NAN' is returned when no bandwidth information or measurement is available. Use the macro isnan (double <i>f</i>) to check for that result.
double GetMaxDiagnosticTMBandwidth()	Returns the maximum of bits per second currently available for diagnostic purposes, dumps or reports. <input checked="" type="checkbox"/> Note: A value of 'NAN' is returned when no bandwidth information is available. Use the macro isnan (double <i>f</i>) to check for that result.
double GetAvailableDiagnosticTMBandwidth()	Returns the bandwidth currently available for diagnostic purposes, dumps or reports as a number between 0 and 1. <input checked="" type="checkbox"/> Note: A value of 'NAN' is returned when no bandwidth information or measurement is available. Use the macro isnan (double <i>f</i>) to check for that result.
CTimeTag GetLastTMBandwidthMeasurementTime()	Returns the time of the last bandwidth measurement. <input checked="" type="checkbox"/> Note: A time equal to 0 is returned when no bandwidth information or measurement is available.





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3.2. Satellite Tracking, Pass & Interlink Functions



An extensive interface is provided by the DPL to support satellite tracking, location pass predictions as well as satellite interlink calculations.

Function	Description								
double CalculateSpacecraftOrbitLongitude (LPCTSTR <i>pszSpacecraft</i> , UINT <i>nNORADID</i> , CONST CTimeKey & <i>tTime</i>)	Returns the longitude of the specified spacecraft < <i>pszSpacecraft</i> , <i>nNORADID</i> > at the time <i>tTime</i> .  Note: <ul style="list-style-type: none"> • This function is available for Earth-centric spacecraft only • The parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned longitude will be between 0...360 degrees <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the longitude should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the longitude should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the longitude should be calculated.								
double CalculateSpacecraftOrbitLatitude (LPCTSTR <i>pszSpacecraft</i> , UINT <i>nNORADID</i> , CONST CTimeKey & <i>tTime</i>)	Returns the latitude of the specified spacecraft < <i>pszSpacecraft</i> , <i>nNORADID</i> > at the time <i>tTime</i> .  Note: <ul style="list-style-type: none"> • This function is available for Earth-centric spacecraft only • The parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned latitude will be between -90...90 degrees <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the latitude should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the latitude should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the latitude should be calculated.								



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<p>double CalculateSpacecraftOrbitAltitude(LPCTSTR <i>pszSpacecraft</i>,UINT <i>nNORADID</i>, CONST CTimeKey &<i>tTime</i>)</p>	<p>Returns the altitude of the specified spacecraft <<i>pszSpacecraft</i>,<i>nNORADID</i>> at the time <i>tTime</i>.</p> <p> Note:</p> <ul style="list-style-type: none"> • This function is available for Earth-centric spacecraft only • The parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned altitude will be > 0 km <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the altitude should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the altitude should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the altitude should be calculated.								
<p>double CalculateSpacecraftOrbitVelocity(LPCTSTR <i>pszSpacecraft</i>,UINT <i>nNORADID</i>, CONST CTimeKey &<i>tTime</i>)</p>	<p>Returns the velocity of the specified spacecraft <<i>pszSpacecraft</i>,<i>nNORADID</i>> at the time <i>tTime</i>.</p> <p> Note:</p> <ul style="list-style-type: none"> • This function is available for Earth-centric spacecraft only • The parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned velocity will be > 0 km/s <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the velocity should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the velocity should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the velocity should be calculated.								





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<p>CSpacecraftPosition CalculateSpacecraftPosition(LPCTSTR <i>pszSpacecraft</i>,UINT <i>nNORADID</i>, CONST CTimeKey &<i>tTime</i>)</p>	<p>Returns the position (relative to the Sun) of the specified spacecraft <<i>pszSpacecraft</i>, <i>nNORADID</i>> at the time <i>tTime</i>.</p> <p> Note:</p> <ul style="list-style-type: none"> • For Earth-centric spacecraft (<i>nNORADID</i> <> 0) the parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned position will be returned in form of the class 'CSpacecraftPosition'; its members <i>m_x</i>, <i>m_y</i>, <i>m_z</i> contain the position coordinates in km <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the position (relative to the Sun) should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the position (relative to the Sun) should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the position (relative to the Sun) should be calculated.								
<p>CSpacecraftVelocity CalculateSpacecraftVelocity(LPCTSTR <i>pszSpacecraft</i>,UINT <i>nNORADID</i>, CONST CTimeKey &<i>tTime</i>)</p>	<p>Returns the velocity (relative to the Sun) of the specified spacecraft <<i>pszSpacecraft</i>, <i>nNORADID</i>> at the time <i>tTime</i>.</p> <p> Note:</p> <ul style="list-style-type: none"> • For Earth-centric spacecraft (<i>nNORADID</i> <> 0) the parameter <i>tTime</i> must be within an interval of a few days from current real-time in order to guarantee a precise result • The returned velocity will be returned in form of the class 'CSpacecraftVelocity'; its members <i>m_x</i>, <i>m_y</i>, <i>m_z</i> contain the velocity coordinates in km/s <table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>pszSpacecraft</i></td> <td>The name of spacecraft.</td> </tr> <tr> <td><i>nNORADID</i></td> <td>The NORAD identifier of the specified spacecraft.</td> </tr> <tr> <td><i>tTime</i></td> <td>The time for which the velocity (relative to the Sun) should be calculated.</td> </tr> </tbody> </table>	Argument	Description	<i>pszSpacecraft</i>	The name of spacecraft.	<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.	<i>tTime</i>	The time for which the velocity (relative to the Sun) should be calculated.
Argument	Description								
<i>pszSpacecraft</i>	The name of spacecraft.								
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.								
<i>tTime</i>	The time for which the velocity (relative to the Sun) should be calculated.								



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TIMETAG CalculateSpacecraftPassStartTime(

LPCTSTR *pszSpacecraft*, UINT *nNORADID*,
 LPCTSTR *pszLocation*,
 double *fLocationLongitude*,
 double *fLocationLatitude*,
 double *fLocationAltitude*,
 CONST CTimeKey &*tStartTime*,
 CONST CTimeSpan &*tInterval*)

Returns the begin of the next pass over the location $\langle pszLocation, fLocationLongitude, fLocationLatitude, fLocationAltitude \rangle$ of the specified spacecraft $\langle pszSpacecraft, nNORADID \rangle$ after the time *tStartTime* and within the subsequent *tInterval* interval.

📌 Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraft</i>	The name of spacecraft.
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.
<i>pszLocation</i>	The name of pass-over location.
<i>fLocationLongitude</i>	The longitude (deg) of the pass-over location.
<i>fLocationLatitude</i>	The latitude (deg) of the pass-over location.
<i>fLocationAltitude</i>	The altitude (km) of the pass-over location.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next pass over the specified location.
<i>tInterval</i>	Specifies the interval to be used to calculate the next pass over the specified location.



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TIMETAG CalculateSpacecraftPassStopTime(

LPCTSTR *pszSpacecraft*, UINT *nNORADID*,
 LPCTSTR *pszLocation*,
 double *fLocationLongitude*,
 double *fLocationLatitude*,
 double *fLocationAltitude*,
 CONST CTimeKey &*tStartTime*,
 CONST CTimeSpan &*tInterval*)

Returns the end of the next pass over the location $\langle pszLocation, fLocationLongitude, fLocationLatitude, fLocationAltitude \rangle$ of the specified spacecraft $\langle pszSpacecraft, nNORADID \rangle$ after the time *tStartTime* and within the subsequent *tInterval* interval.

📌 Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraft</i>	The name of spacecraft.
<i>nNORADID</i>	The NORAD identifier of the specified spacecraft.
<i>pszLocation</i>	The name of pass-over location.
<i>fLocationLongitude</i>	The longitude (deg) of the pass-over location.
<i>fLocationLatitude</i>	The latitude (deg) of the pass-over location.
<i>fLocationAltitude</i>	The altitude (km) of the pass-over location.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next pass over the specified location.
<i>tInterval</i>	Specifies the interval to be used to calculate the next pass over the specified location.



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TIMETAG

CalculateSpacecraftInterlinkStartTime

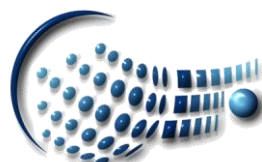
LPCTSTR *pszSpacecraftA*, UINT *nNORADIDA*,
LPCTSTR *pszSpacecraftB*, UINT *nNORADIDB*,
CONST CTimeKey &*tStartTime*,
CONST CTimeSpan &*tInterval*)

Returns the begin of the next interlink session between the spacecraft <*pszSpacecraftA*, *nNORADIDA*> and <*pszSpacecraftB*, *nNORADIDB*> after the time *tStartTime* and within the subsequent *tInterval* interval.

Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraftA</i> <i>nNORADIDA</i>	The name of first spacecraft. The NORAD identifier of the first spacecraft.
<i>pszSpacecraftB</i> <i>nNORADIDB</i>	The name of second spacecraft. The NORAD identifier of the second spacecraft.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next interlink session.
<i>tInterval</i>	Specifies the interval to be used to calculate the next interlink session.



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TIMETAG

CalculateSpacecraftInterlinkStopTime(

LPCTSTR *pszSpacecraftA*,UINT *nNORADIDA*,
LPCTSTR *pszSpacecraftB*,UINT *nNORADIDB*,
CONST CTimeKey &*tStartTime*,
CONST CTimeSpan &*tInterval*)

Returns the end of the next interlink session between the spacecraft <*pszSpacecraftA*, *nNORADIDA*> and <*pszSpacecraftB*, *nNORADIDB*> after the time *tStartTime* and within the subsequent *tInterval* interval.

📌 Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraftA</i> <i>nNORADIDA</i>	The name of first spacecraft. The NORAD identifier of the first spacecraft.
<i>pszSpacecraftB</i> <i>nNORADIDB</i>	The name of second spacecraft. The NORAD identifier of the second spacecraft.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next interlink session.
<i>tInterval</i>	Specifies the interval to be used to calculate the next interlink session.



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TIMETAG

CalculateSpacecraftRelaidInterlinkStartTime(
LPCTSTR *pszSpacecraftA*,UINT *nNORADIDA*,
LPCTSTR *pszSpacecraftVia*,UINT *nNORADIDVia*,
LPCTSTR *pszSpacecraftB*,UINT *nNORADIDB*,
CONST CTimeKey &*tStartTime*,
CONST CTimeSpan &*tInterval*)

Returns the begin of the next interlink session between the spacecraft *<pszSpacecraftA,nNORADIDA>* and *<pszSpacecraftB,nNORADIDB>* via the relais *<pszSpacecraftVia,nNORADIDVia>* after the time *tStartTime* and within the subsequent *tInterval* interval.

Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraftA</i> <i>nNORADIDA</i>	The name of first spacecraft. The NORAD identifier of the first spacecraft.
<i>pszSpacecraftVia</i> <i>nNORADIDVia</i>	The name of relais spacecraft. The NORAD identifier of the relais spacecraft.
<i>pszSpacecraftB</i> <i>nNORADIDB</i>	The name of second spacecraft. The NORAD identifier of the second spacecraft.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next interlink session.
<i>tInterval</i>	Specifies the interval to be used to calculate the next interlink session.



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TIMETAG

CalculateSpacecraftRelaidInterlinkStopTime(

LPCTSTR *pszSpacecraftA*,UINT *nNORADIDA*,
 LPCTSTR *pszSpacecraftVia*,UINT *nNORADIDVia*,
 LPCTSTR *pszSpacecraftB*,UINT *nNORADIDB*,
 CONST CTimeKey &*tStartTime*,
 CONST CTimeSpan &*tInterval*)

Returns the end of the next interlink session between the spacecraft *<pszSpacecraftA,nNORADIDA>* and *<pszSpacecraftB,nNORADIDB>* via the relais *<pszSpacecraftVia,nNORADIDVia>* after the time *tStartTime* and within the subsequent *tInterval* interval.

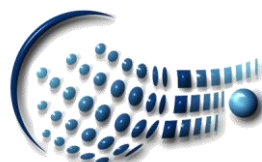
Note:

- This function is available for Earth-centric spacecraft only
- The parameter *tStartTime* must be within an interval of a few days from current real-time in order to guarantee a precise result

Argument	Description
<i>pszSpacecraftA</i> <i>nNORADIDA</i>	The name of first spacecraft. The NORAD identifier of the first spacecraft.
<i>pszSpacecraftVia</i> <i>nNORADIDVia</i>	The name of relais spacecraft. The NORAD identifier of the relais spacecraft.
<i>pszSpacecraftB</i> <i>nNORADIDB</i>	The name of second spacecraft. The NORAD identifier of the second spacecraft.
<i>tStartTime</i>	Specifies the start time to be used to calculate the next interlink session.
<i>tInterval</i>	Specifies the interval to be used to calculate the next interlink session.

Note:

All satellite tracking, pass & interlink functions cannot be tested within the SatView™ Editor; they all return 'NAN' (for 'double' data types) and '0' (for 'TIMETAG' data types). When executed within the SatView™ Desktop, the satellite tracking sub-system must be enabled for these functions to return valid results. Furthermore, it must be ensured that access to the Internet is guaranteed.



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Data Types:

Identifier	Description
<i>type-specifier</i>	Depending on the data type of the telemetry parameter P_i , it is either an UINT, INT, double or CString.
<i>parameter-tag</i>	Tag of the telemetry parameter P_i .
CSpacecraftPosition	A class representing the position of a spacecraft (relative to the Sun for all non Earth-centric ones). The following member properties are available: double m_x double m_y double m_z
CSpacecraftVelocity	A class representing the velocity of a spacecraft (relative to the Sun for all non Earth-centric ones). The following member properties are available: double m_x double m_y double m_z
CString	A class representing a string. Consult the <i>Microsoft® Foundation Class (MFC)</i> documentation.
CTimeTag TIMETAG	A class representing an absolute time in microseconds since January 1, 1970. Consult the <i>Microsoft® Foundation Class (MFC)</i> documentation (see the 'CTime' class).
CTimeKey TIMEKEY	A class representing an absolute time in seconds since January 1, 1970. Consult the <i>Microsoft® Foundation Class (MFC)</i> documentation (see the 'CTime' class).
CTimeSpan	A class representing a time interval in seconds. Consult the <i>Microsoft® Foundation Class (MFC)</i> documentation.



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4. Samples

DERIVATION PROCEDURE E015

PARAMETERS R301;

BEGIN

```
E015 = (R301 == TEXT("PEAM")) ? TRUE:FALSE;
```

END

DERIVATION PROCEDURE E730

PARAMETERS E722P,O372,R372;

BEGIN

```
E730 = (R372-E722P)/O372;
```

END

DERIVATION PROCEDURE E735

PARAMETERS E864,E865,E866;

BEGIN

```
E735 = -0.02163*E864+0.02163*E865+0.052*E866;
```

END

DERIVATION PROCEDURE PV407

PARAMETERS F116;

BEGIN

```
PV407 = (F116 == 0x73) ? TRUE:FALSE;
```

END

DERIVATION PROCEDURE A015

BEGIN

```
A015 = (CalculateSpacecraftOrbitAltitude(TEXT("ISS (ZAYRA)"),25544,  
GetTMUnitTime().GetTimeInSeconds()) < 250.0) ? TRUE:FALSE;
```

END

A. Acceptance

This document has been read and accepted by ESA.



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