

## MINUTES OF MEETING



Ref. : PROBA2-MOM-XXX-VE Iss.:A Rev.:0 6 April, 2005

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Project : PROBA 2  
Subject : LYRA instrument and data manager SW requirements meeting  
Place : Spacebel  
Date start : 5/4/2005  
Date end : 5/4/2005

<b>Participants</b>	<b>Signature</b>	<b>Company</b>
P. Vuilleumier		ESTEC
P. Creten		SBI
J.F.Hochedez		ROB
M. Dominique		ROB
Y. Stockman		CSL
P. Denis		SBI
A. Theissen		ROB
F. Denis		CSL
K. Gantois		Verhaert
D. Bernaerts		Verhaert

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1.			<p>Optimisation of cadence:</p> <p>ROB explained that they prefer to have the onboard determination of the optimal cadence considering the available memory and the time to the next ground contact.</p> <p>ESA/Verhaert argued that this is better performed by operational means and not implemented in the onboard software since:</p> <ul style="list-style-type: none"> <li>- all events onboard, except anomalies, are perfectly predictable</li> <li>- operations are more flexible to change in order to find the optimum scheme for the cadence determination and downloads.</li> </ul> <p>It is concluded that the preferred way is the operations. No automatic cadence adjustment will be implemented onboard.</p>	
2.	State diagram		<p>State diagram:</p> <p>for ROB, it is not really necessary (keeping in mind the new orbit) to have the mode switching automatic onboard based on eclipse events (only TC based transitions could be enough).</p> <p>It is preferred to still keep this functionality in the onboard software.</p>	
3.	State diagram		<p>ROB would prefer to have the possibility to change all the parameters without requiring to switch off the instrument (thus have a state transition from "acquisition" to "acquisition").</p> <p>SBI clarifies that it is possible to send commands to change parameters (including integration time) at any time during acquisition. However, synchronisation with the starting and closing of lumps is not included.</p>	

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4.	ASIC reload	SBI	<p>ROB prefers that the ASIC reload is performed approximately once per orbit and during a large angle rotation.</p> <p>Thus: one ASIC reload every X large angle rotations with X being configurable.</p> <p>SBI to add SW requirement that large angle rotations are detected by the LIM.</p> <p>Before the execution of an ASIC reload, the lump shall be closed.</p>	
5.	RS422 interface	CSL	CSL to confirm that the LYRA baud rate is 38400 for both interfaces.	8/4/2005
6.	Latch up	ROB	ROB to check if it is acceptable to perform the ASIC reload immediately after detection by the LDM.	8/4/2005
7.	LDM	SBI	<p>3 packet types will be foreseen to download the lumps. Subsequent lumps will be downloaded each in a different packet type. The different packet types will be stored in different telemetry stores.</p> <p>Further possibility: have one of these stores circular, the other ones bounded.</p> <p>This mechanism provides robustness in case of temporary link loss.</p>	
8.	LIM FDIR	<p>ROB</p> <p>SBI</p>	<p>ROB to clarify table page 12 of LIM document and to provide limits as raw values and to indicate which shall lead to a switch to idle mode and which to off mode.</p> <p>SBI to split the monitoring between possible actions: idle or off.</p>	20/4/2005

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9.	LIM power on	SBI	To add requirement that upon leaving the off-mode, the door status shall be read before it is changed.	20/4/2005
		ROB	If the door is found open the following procedure shall be performed: <ul style="list-style-type: none"> <li>- close door</li> <li>- raise event</li> <li>- goto Off state</li> <li>- prevent switching on of the instrument before special ground operation (this procedure will be based on page 48 and following of LIM document... ROB to clarify this procedure).</li> </ul>	
		ROB	ROB to clarify how the status of the door can be read without changing this status.	
10.	Housekeeping data synchronisation	SBI	SBI to foresee a "resynch" function to synchronise on the 4 byte housekeeping data (either based on the message checksum or on the utilisation of the synch pulse).	8/4/2005
		ROB	ROB to confirm that the time synch pulse is in phase with the housekeeping generation messages and with the science block generation.	
11.	LDM	SBI	<p>To include a "open lump" command for use by the operator. Data generated between the "close lump" and "open lump" will be rejected. Between close and open, commands to change settings can be sent (in this way it can be guaranteed that lumps have a constant setting).</p> <p>Atomic commands can as well be sent without the open en close commands, but then the change of setting can happen inside a lump.</p> <p>During nominal acquisition, a new lump will be used every TBD bytes without loss of data.</p>	

## MINUTES OF MEETING

**VERHAERT**



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12.	Atomic commands verification	SBI  ROB  SBI	<p>ROB states that it is important that the TC verification reports (completion reports) for the close cover are only issued after explicit onboard verification of the door status.</p> <p>ROB to specify the delays to respect between issuing the command and reading back the status.</p> <p>Note: a good way to ensure that the correct status after execution of a command is received is the following procedure:</p> <ul style="list-style-type: none"> <li>- send command word</li> <li>- neglect status word</li> <li>- wait tbd</li> <li>- resend command word</li> <li>- assess status word</li> </ul> <p>This is mainly important for open/close cover commands.</p>	20/4/2005
13.	LYRA ICD	ROB/CSL	ICD to be corrected: use head instead detector (one head contains 4 detectors).	
14.	TBD's	ROB	<p>ROB to fill in the TBD's in point 17 of the LYRA instrument manager software requirements.</p> <p>Replace "Read all HK signals (once) and verify their values by TBD" by "wait 4 minutes". (this ensures that all HK is read in).</p> <p>The lines "check channel TBD" can be replaced by "wait TBD (10 sec) time".</p>	20/4/2005
15.	LIM software requirements	SBI	Add "open lumps" before each check channel and "close lumps" after each check channel in sequence 17.	

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16.	LED pulsing		<p>ROB clarifies the following scheme for led pulsing:</p> <ul style="list-style-type: none"> <li>- a LED pulse sequence has to be commanded every day to every week</li> <li>- the duration of such pulse sequence is typically 1 minute to 1 hour</li> <li>- the frequency of the LED pulses is 5 Hz until continuously on.</li> </ul> <p>SBI to define special values for the LED_PULSE_PERIOD:</p> <ul style="list-style-type: none"> <li>- always on</li> <li>- always off</li> </ul> <p>The onboard software will manage the LED pulsing. The periods during which pulses shall be on and off will be managed by ground.</p>	
17.	LDM data buffer	SBI	Having now three data stores, ROB would prefer to have 2 bounded stores and one cyclic	
18.	LDM Number of science blocks	SBI	ROB confirms that 999 is ok.	
19.	Data compression and data re-arrangement	ROB	<p>ROB explains that they have 2 objectives:</p> <ul style="list-style-type: none"> <li>- having access to the raw data (acceptable if this is not optimised)</li> <li>- having the capability to download the maximum of data</li> </ul> <p>It is discussed during the meeting that re-arranging the data by removing the trailing 0's might make the compression algorithm less efficient.</p> <p>Note: the processor is a 32-bit processor. Therefore algorithms that are bite-aligned are preferred.</p> <p>ROB to assess this and send the new specifications.</p>	20/4/2005
20.	Invalid science blocks (FDIR 2)	SBI	<p>Instead of using the invalid science blocks part of the lump, it is acceptable as well to implement the following simplification:</p> <ul style="list-style-type: none"> <li>- include the bad data inside the good data on the condition that:</li> <li>- an event is generated and downlinked to the ground indicating bytes 28 – 25, which indicates which data is corrupt.</li> </ul>	

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21.	FDIR 5	SBI	To change: an event shall be generated, but the instrument will not be switched to idle mode in case of buffer full (the cyclic store will still be updated with data).	
22.	Functional 5 – 6 and 8	SBI  ROB	5. Will be applicable always. 6. Can be removed. 8. To be confirmed.  ROB to confirm that this is acceptable (in view of action 19 above).	20/4/2005
23.	Functional 9	SBI	Add: when integration time is changed.	
24.	Functional 11	SBI	Point 4 can be removed.	
25.	Functional 12	SBI	TBC (see action 19 above)	
26.	Functional 14	SBI	PUS service will be changed into 3 other (user defined) services. 3,25 will not be used.	
27.	Observability 1	SBI	Can be removed.	
28.				