

HERSCHEL / Planck Project

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subject	Comments to DPU On-Board SW V&V Plan/ Acceptance Test Plan				
reference	<ol style="list-style-type: none"> 1. PACS-CR-PL-012, issue 2.0 2. CNR.IFSI.2001 TR04, issue 1.2 3. Fax SCI-PT-18656, 16-6-2003 				

Dear Otto, dear Patrice,

As agreed during the last Data Management WG meeting (#15) I would like to return comments to the DPU O-B SW V&V Plan/ Acceptance Test Plan, Ref.1. Find my detailed comments in the table attached to this fax.

Together with the I/F Acceptance Test Plan, Ref. 2, which was already commented, Ref. 3, the document Ref. 1 provides a comprehensive insight on the verification approach of the DPU/ICU data bus I/F to the S/C. However, the concerns, which were already expressed in fax Ref. 3, can only be confirmed, with additional worrying issues.

Key points are:

- a) Still many necessary tests seemingly will be skipped.
- b) It is not visible, how and where the requirements from your own I/F test requirements specification (AD 3 in Ref 1) will be fulfilled. No traceability is provided.

ESA would like to recommend, that doc. Ref. 1 becomes modified according to the details of the following table, and the overall verification approach consolidated in line with the recommendations made here and in fax Ref.3.

Best Regards,

Stefan Thürey

Herschel / Planck Project, Avionics and RF Systems Engineer



**ESA COMMENTS to
H-PACS, DPU OBS Val. and Ver. Plan/ Acc. Test Plan
PACS-CR-PL-012, Issue 2.0, 28/07/2003**

No.	Page	Section	Comment
1.		General	<p>a) As the descriptions of chapters 1 and 2 are rather short and unclear (details see below) it becomes apparent only later in the document, that the document tries to cover various SW development and verification activities – from the debugging of individual SW-modules with In-Circuit-Emulator up to testing after delivery to ESA. However, all this is presented without a clear distinction of all these activities. At least this must be done.</p> <p>b) Additionally, the document mainly provides descriptions of SW-configurations and listings of detailed test-steps, which might be suitable for a debugging-test procedure. However, the underlying logic and development approach, etc., which are typical for a Verification Plan, are missing. Therefore, the document in its current state is not acceptable as a Validation and Verification Plan.</p> <p>c) Concerning testing, no detailed references to higher-level requirements are provided. Therefore it remains unclear what exactly is tested with the proposed tests. Although AD 3 already contains a very detailed requirements/test matrix and test descriptions, the link to this matrix seems to be missing. This must be added.</p>
2.	7 ff	2.1	<p>Definitions: The plan introduces Test Items tested on unit, integration, and system level. However, a definition of all these terms is missing. (Which HW is the Test Item? What is the “system”?) Also the term Unit Under Test (UUT) is not used. Para. 2.1 is therefore confusing.</p> <p>In other words: for each XX-level test the test set-up must be described, with test item (DPU plus specific version/configuration of OB-SW), interfaces used, other instrument units, and EGSE equipment used.</p> <p>Later-on, in 2.4 it becomes more obvious, that the Test Items are SW-modules/ -procedures, whereas the test setup is somehow/ insufficiently sketched in 2.4.</p>

3.	7, 8	2.1.2, 2.1.3	The terms TMTC, CONTROLLER, PRO_EXEC, etc. are used without any further explanation or reference to a document, in which these items are described. Please add something in order to allow an outsider to understand the document.
4.	9	2.4	<p>DPU/ Instrument-SW tests before delivery: Define in detail, how the test setup looks, for unit-, integration- and system-level. Provide the corresponding three detailed block diagrams, showing all units/ boxes and all interconnections (with connector-identifiers).</p> <p>Refer only to instrument- and instrument-EGSE equipment, because all instrument capabilities have to be tested with this equipment only, before delivery (to ESA/ Industry), and documented in the Acceptance Data Package.</p>
5.	9	2.4	<p>Tests with ESA/ Alcatel EGSE, before or after delivery:</p> <ol style="list-style-type: none"> 1. From 2000 onwards ESA has pointed out, that it is not planned to conduct such tests at IFSI. However, it was offered as an option, to do some I/F-testing either at ESTEC or at the Herschel P/L integration site. 2. The PI has made a commitment to support any SW debugging and updating in a way, that there is no negative impact on S/C-level AIV activities whatsoever, incl. travelling of IFSI personnel, if necessary. <p>Conclusion: As testing with ESA/ Alcatel Testbed is optional and will be managed by us, delete everything about it. It is beyond the scope of the document under review, and beyond the responsibilities of IFSI.</p>
5.	12, other s	4.1, also 4.2, and other test modules	<p>Test-step 2: “and compile the OBS.” Step 3: “Load the OBS...”</p> <p>New compilation for each test-run, or “stand-alone-testing of SW-modules” are, in general, not acceptable.</p> <p>The executable code of the OBS must exist a) permanently in DPU EEPROM, and b) as a file with all necessary load/link information on a disk or CD-ROM (, from which an identical copy can be loaded into the DPU EEPROM). This SW must have a specific version number, and must be under configuration control. It belongs to the Deliverable Items.</p>

6.	13	4.1, 4.2, etc.	<p>The tests TP1, TP2, TP3 seem to be more a development/ debugging test than an Acceptance Test on a finished item, which is under configuration control. Although such tests might be useful, they should not show up in a test document for a deliverable item.</p> <p>In general: Modify all test sequences, such that all necessary data about successful SDB-Protocol operation can be checked at the CDMU Simulator or Instrument-EGSE, without ICE-probe, Dedicated Test SW Tools, partial DPU-SW, etc. (unfeasible test for FMs!).</p>
7.	17	No detailed para.- numbers in rest of docum.!	<p>Function Management: Each Function must be stoppable and (re-)startable (only potential exception: global (instrument) modes). Test cannot be considered useful and correct.</p>
8.	19		<p>DPU-Reset: A DPU-SW-Reset seems to be "just" another TC(8,4) without any further protection – very risky approach!</p>
9.	25	4.4.1	<p>According to the introduction to TP4 this test deals with so-called (PACS-) OBCPs. Interpreting test steps 2,3,4 the conclusion is, that the Memory Management Service 6 is used to upload a OBCP.</p> <p>It has been pointed out several times that this is forbidden in conjunction with any nominally foreseen replacements of SW modules! The Service 6 will only be used for repairing detected mistakes in OB-SW, or equiv.</p> <p>The load/exchange of an OBCP (one of the purposes of OBCPs) must be done via Service 18.</p>
10.	26		<p>Test of Memory Management: The test only makes sense if data can be loaded, not only dumped. Also, the instrument EGSE must be able to calculate the CRC over a block of data, which can be compared, in the instrument EGSE, with the CRC calculated on-board (during load , dump, or check).</p> <p>All this seems not to be the case.</p>

11.	27		<p>Test of Sequence Management: As this service is non-standard (in the Herschel/Planck context) it should be deleted from the test set, which is needed to verify proper operation of the data bus I/F. (It may be retained as instrument functional test)</p>
12.	35		<p>Test of Science Data Transfer in Normal and Burst Mode: Although these tests are listed in 2.1.3 as TISL 17 and 18, these mandatory tests are not described in any detail.</p>
13.		General, final	<p>Add the DPU/ICU I/F Acceptance Test Plan as RD in the document under review. The two documents together have the potential (in future) to provide all necessary details for the testing of the data bus I/F at Physical/ electrical Layer and at Data Link and Transfer Layer. The OBSW V&V Plan may additionally cover the testing of (all) other functional characteristics of the DPU/ICU, however all this in clearly separated, identifiable test-modules.</p> <p>Please update both documents in line with this fax and fax SCI-PT-18656.</p>