

<b>SUBJECT:</b>	SWT-37 meeting
<b>PLACE OF MEETING:</b>	ESTEC
<b>DATE OF MEETING</b>	October 2, 2001
Participants	Distribution
See List of participants in Annex 1	participants Cluster documentation usual attendees not present at meeting

<p><b>Welcome, agenda</b></p> <p>P.Escoubet welcomed all participants and presented the agenda, which was unanimously approved.</p> <p><b>AGENDA:</b></p> <ol style="list-style-type: none"> <li>1. Instrument status (PIs)</li> <li>2. ESOC report (S. Matussi)</li> <li>3. JSOC report (D. Neudegg)</li> <li>4. data coverage extension (P.Escoubet)</li> <li>5. CSDS (M.Fehringer)</li> <li>6. US Senior Review (M. Goldstein)</li> <li>7. conferences, workshops &amp; publications (P.Escoubet)</li> <li>8. AOB</li> </ol> <p><b>1 Instrument status (PIs)</b></p> <p><b>1.1 ASPOC: annex 2</b></p> <ul style="list-style-type: none"> <li>- ASPOC is routinely operating on SC 2,3 and 4.</li> <li>- The time sharing agreement with EFW to operate ASPOC only every second orbit is still in place (ASPOC on on even-numbered orbits). Both parties have agreed to continue with this scheme in the near future.</li> <li>- ASPOC supports the data coverage extension (100% scenario).</li> </ul> <p><b>1.2 CIS: annex 3</b></p> <ul style="list-style-type: none"> <li>- CIS continues to operate nominally on SC1, 3 and 4 (HIA switched off on SC4).</li> <li>- MCPs degrade as expected except for the lower quadrant MCP on SC3. This affects the accuracy of the onboard moments. A patch for correction has been uploaded recently. However data till September 27 have to be treated with care. Larger error bars apply and caveats need to be read.</li> <li>- CIS data will be reprocessed at the French data centre starting Nov 1.</li> <li>- CSDSweb data: H<sup>+</sup> data from CODIF are displayed. When CIS is in RPA mode, no data are displayed on CSDSweb. Data are taken from either SC4 (dayside constellation) or SC3 (nightside constellation).</li> <li>- CIS agrees to the telemetry reallocation to PEACE for NM1 and BM1 provided NM2 and NM3 remain unchanged</li> <li>- CIS strongly supports the 100% data coverage scenario</li> <li>- CIS publications are made available online at</li> </ul>	<p><b>ACTIONS</b></p>
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[http://cis.cesr.fr:8000/CIS\\_sw\\_home-en.htm](http://cis.cesr.fr:8000/CIS_sw_home-en.htm)

### 1.3 EDI: annex 4

- The PI software was released on September 27 and data processing was run simultaneously at Garching, Graz and UNH. Prime Parameters will be available up to end June 01 within a few days.
- Major improvements were implemented to the ground software. E.g., distinction between electrons that have gyrated up to 6 times before hitting the detector can now be made using high resolution magnetic field data.
- EDI operates nominally on SC1, 2 and 3. EDI is off on SC4 due to problems with overcurrents triggering the LCL. Further tests into this problem are scheduled for October.
- Small overcurrents that occasionally triggered SC monitoring or the LCL switch off are now detected internally and normal operations are restarted automatically.
- A problem with beam modulation on one gun on SC1 does not prevent proper operations of EDI on that SC.
- Interference on SC2 with WHISPER still occurs due to problems with current calibration.
- On CSDS data both caveats and status byte need to be considered
- EDI supports the data coverage extension (100% scenario).

### 1.4 FGM: annex 5

- all 4 instruments perform nominally
- data processing is nominal
- calibration levels for both high resolution data and between the four instruments are in the 0.1 nT range.
- numerous publications in Ann.Geophys., JGR, GRL, etc.
- FGM supports the data coverage extension (100% scenario).

### 1.5 PEACE: annex 6

- All 4 instruments work well with only two minor anomalies experienced on SC2. There the communication between sensor and DPU was disrupted twice probably due to EMC interference.
- Up to June 13, 2001 improper FGM calibration offsets have been applied to pitch angle data. Has been corrected thereafter. In very weak magnetic fields the pitch angle selection error can be larger than the resolution due to variations in the FGM offset data.
- The evolution of the sensitivity of the MCPs is closely monitored.
- 4 dedicated cross-sensor calibration campaigns have been carried out so far.
- PEACE will provide input to JSOC to update their database in order to improve the relevant PIORs.
- PEACE is considering operations within L= 6.
- PEACE supports the data coverage extension (100% scenario).

### 1.6 RAPID: annex 7

- A moment of silence was held in memory of Berend Wilken who had died

on September 4, 2001. Pat Daly announced that in honour of Berend a special technical session on "Time of Flight Technique in Space Missions" would be held at the next EGS.

- RAPID is working nominally on SC1, 3 and 4. On SC2 the central sensor head (one out of three heads) is inactive.
- RAPID data have been included in the CSDSweb Quicklook plots on page "particles #2".
- MCPs on the central sensor head which faces the sun deteriorate much faster than expected (donut effect). Increasing the relevant voltage levels on SC 1, 3 and 4 could revive the MCPs. On SC2, the Phoenix model, the MCP could not be recovered by this procedure. The higher voltage levels have been applied permanently since August 18, 2001. New calibration factors will be applied from then on.
- JSOC has issued an automatic startup sequence to put RAPID into proper operation after a spontaneous reset. Previously, resets did not reactivate patches and left high voltage power supply off.
- At a LCL switch-off parts of the memory are sometimes overwritten and patches can be found corrupted at the next turn on and are deactivated. This is a hardware problem. At each switch-on the patches must be checked and uploaded if necessary. Next occurrence is the attitude manoeuvre on Oct. 22.
- All RAPID data will be reprocessed with new calibration factors.
- RAPID supports the data coverage extension (100% scenario).

### **1.7 DWP: annex 8**

- DWP and the particle correlator are working well on all 4 SC.
- The problems with SEU that previously led to disruptions of WEC operations are well under control now. There has been no significant loss of WEC data since last SWT.
- A major update of the WEC commanding database at JSOC has been performed. WEC generally meets JSOC deadlines, JSOC has been very co-operative in case of requests for late changes.
- DWP supports the data coverage to 100% but prefers mission extension to data coverage extension.

### **1.8 EFW: annex 9**

- all four instruments perform nominally
- one minor hardware problem on SC2: the 10 Hz filter on probe 3 failed and is not operational since late July 2001. The 180 Hz filter is used instead. EFW will mostly keep the 10 Hz filter on the other 3 SC but operations using the 180 Hz filters on all 4 SC are also being performed. Details can be found at <http://cluster.irfu.se>.
- A list of standard and non-standard EFW operations can also be found at the same web page.
- The data coverage extension is supported by EFW (100% scenario).

### **1.9 STAFF: annex 10**

- all 4 instruments are performing nominally
- no interference seen from other instruments

- Cols have access now to search coil 3-hours spectrograms on a new CEPT server with a link to STAFF SA plots at Meudon.
- STAFF is not yet ready for reprocessing their data.
- STAFF supports the data coverage extension (100% scenario).

### 1.10 WBD: annex 11

- All four instruments operate nominally and provide very high quality data
- The counter reset problem that was detected on SC2 just before launch did not degrade further. The problem is cured by software on ground. Also on SC2, a data bit in a major frame gets corrupted sometimes. Detection by software and smoothing the time series data solves the problem.
- Level 1 data CD distribution is expected to start soon when a problem with Reed – Solomon decoding will be fixed by DSN.
- 467 hours of data with a success rate of 98.0 % have been retrieved between May 1 and August 9.
- WBD want to convert their single spacecraft operations SSO to multi SC operations MSO by simply having SSOs at the same time. NASA HQ has tentatively agreed but no special time calibrations as they are being done for the MSOs will be carried out.
- WBD supports the data coverage extension (100% scenario).
- The address of the WBD web page is <http://www-pw.physics.uiowa.edu/plasma-wave/istp/cluster/>

### 1.11 WHISPER: annex 12

- All four instruments operate nominally.
- Operations planning are very time consuming because sounder and analyser tuning are strongly dependent on the regions.
- interference due to EDI: an arrangement that EDI operates in three different current regimes (low, medium and high) is in place. Within three consecutive orbits each regime is applied once during one entire orbit. WHISPER is still affected during the high current mode and on SC-2 also when EDI is running the other modes.
- Densities given in CSDS parameter need to be improved. A “Ne quality parameter” will be introduced in the next PI software release. The wave parameters are of good quality.
- WHISPER supports the data coverage extension (100% scenario).

## 2 ESOC report: annex 13

- SC and payload status:  
All 4 SC and their payloads (except ASPOC/SC1, CIS/SC2 and EDI/SC4) are in nominal condition and working well. No problems were encountered during the long eclipses in early September.
- Data return:  
ESOC has investigated the amount of scientific data they release compared to the mission goal of 95% of simultaneous 4 SC data. This goal was met so far except for the two months of April and May when problems with the OBDH during manoeuvre preparations reduced the return to about 83%.
- Anomaly reports:

Currently there are 12 open anomaly reports, one of them is payload related (EDI on SC4). 25 ARs have been raised so far, most of them concern the OBDH.

- Mission extension:  
There is 57 kg of fuel left on each SC and sufficient power to run the mission for about 3-4 years from now. A strategy for constellation manoeuvres for an extended mission will be discussed at the next SOWG.
- Future activities: |  
Attitude manoeuvres will be performed on Oct.22, 2001.  
TM re-allocation from CIS to PEACE on SC2 will be tested onboard the satellite by end October.

### **3 JSOC report: annex 14**

- The Science Operations Group at RAL has hired two new staff members to support its expanding activities. Parts of these resources will be devoted to JSOC. In particular, the mission monitoring tasks, which have not been carried out so far, will be supported.
- JSOC supported the study on the data coverage extension by estimating the impact of the different scenarios on their resources. The 100% scenario would roughly be impact neutral, the 75% option would severely increase their activities.
- A short report on the status of scheduling TLIS and PIOR releases was given.
- A detailed discussion of the Master science Plan was deferred to the SOWG meeting on Oct 18, at which Mike Hapgood will be available.

### **4 Data coverage extension: annex 15**

- Andre Balogh has drafted a document arguing the scientific case for the extension of data coverage. It is being finalised with input from the PIs. A presentation given to D. Southwood by Philippe on the data extension is attached in annex 15.
- ESOC has conducted a study on the feasibility and cost impact of extending the data coverage to 75% and 100% respectively. The report can be downloaded from:  
[ftp://ftp.estec.esa.nl/pub/csds/ps/Cluster\\_II/docs/data\\_coverage\\_extension/cluster\\_data\\_return\\_extension\\_i12final.pdf](ftp://ftp.estec.esa.nl/pub/csds/ps/Cluster_II/docs/data_coverage_extension/cluster_data_return_extension_i12final.pdf)
- JSOC expects no major impact on their activities for the 100% case. The additional commanding due to total orbit coverage is expected to be offset by less on/off switching of the instruments. For the 75% case JSOC expects their workload to increase by 50% compared to now. The JSOC presentation on this topic is also given in annex 15.
- A poll among the PIs resulted in unanimous and very strong support of the 100% scenario. The 75% option was strongly rejected. Keeping the data return at 50% as it is now is even being preferred to the 75% option with no dedicated second ground station.
- After the meeting the PIs formulated a common recommendation in respect to the data coverage extension. A clear preference for the 100% scenario is expressed there. The document is attached to annex 15.

## 5 CSDS report: annex 16

- all instrument except EDI have made data available to CSDS till end June 01. About half of the teams have validated up till mid August.
- EDI has released its PI software on Sept 27 and is expecting to catch up with validation within a few days.
- Summary plots are available till end of June.
- Chris Perry has introduced additional features to the CSDSweb quicklook plots:
  - RAPID data have been added on a new panel "particles #2"
  - two constellation plots covering 6 hours and one complete orbit have been added
  - interactive selection of Quicklook plots by clicking on a desired period on a Bryant plot

## 6 US senior review: annex 17

- Mel Goldstein and George Parks presented the Cluster proposal to the Senior Review in July. It contained a "minimal" and an "optimal" budget scenario. Minimum meaning a level below which the US Investigators would be unwilling to continue participating in Cluster. Before the Review the expected funding for CLUSTER was at \$1M for FY 02 and zero thereafter.
- The Senior Review rated Cluster as compelling and ranked it first together with IMAGE among seven "geospace missions". SOHO and ACE came first among the "Solar-Heliospheric missions" with basically the same grading.
- \$6.5M, 7.5M, 6.5M and 6.0M were approved for the fiscal years 02 through to FY05. This is about 1M below minimum in FY02 and slightly above minimum in FY03. Mel says the US teams can cope with that during the two years. FY04 and FY05 are below minimum requests.
- **Caveat:** all costs related to the US Cluster Data Centre have to come from this budget now. So far the CDHF operated at no cost to Cluster. Additional costs will come from DSN and for the education and Outreach program.

## 7 Conferences, workshops and publications: annex 18

- The special Cluster edition of the Annales Geophysicae is now in print. 37 papers will appear in the October 2001 edition.
- V. Krasnoselskikh proposed to have a workshop in Orleans in 2003. The SWT supports this initiative.
- Peter Wenzel suggested to have a joint SOHO – CLUSTER conference in the frame of an ESLAB symposium.

## 8 AOB

- Harri Laakso presented the logistics for the first Cluster workshop that was held on the three days following the SWT.
- DONM:  
March 18/19, 2002 was set for the next combined SOWG/SWT meetings.



However, at the end of the workshop the participants decided to have a second Cluster workshop from March 5 –8, 2002 leaving March 4 as a convenient date for SWT-38. SWT-38 will therefore take place on March 4, 2002 at ESTEC starting at 13:00.