Managing Cluster Data

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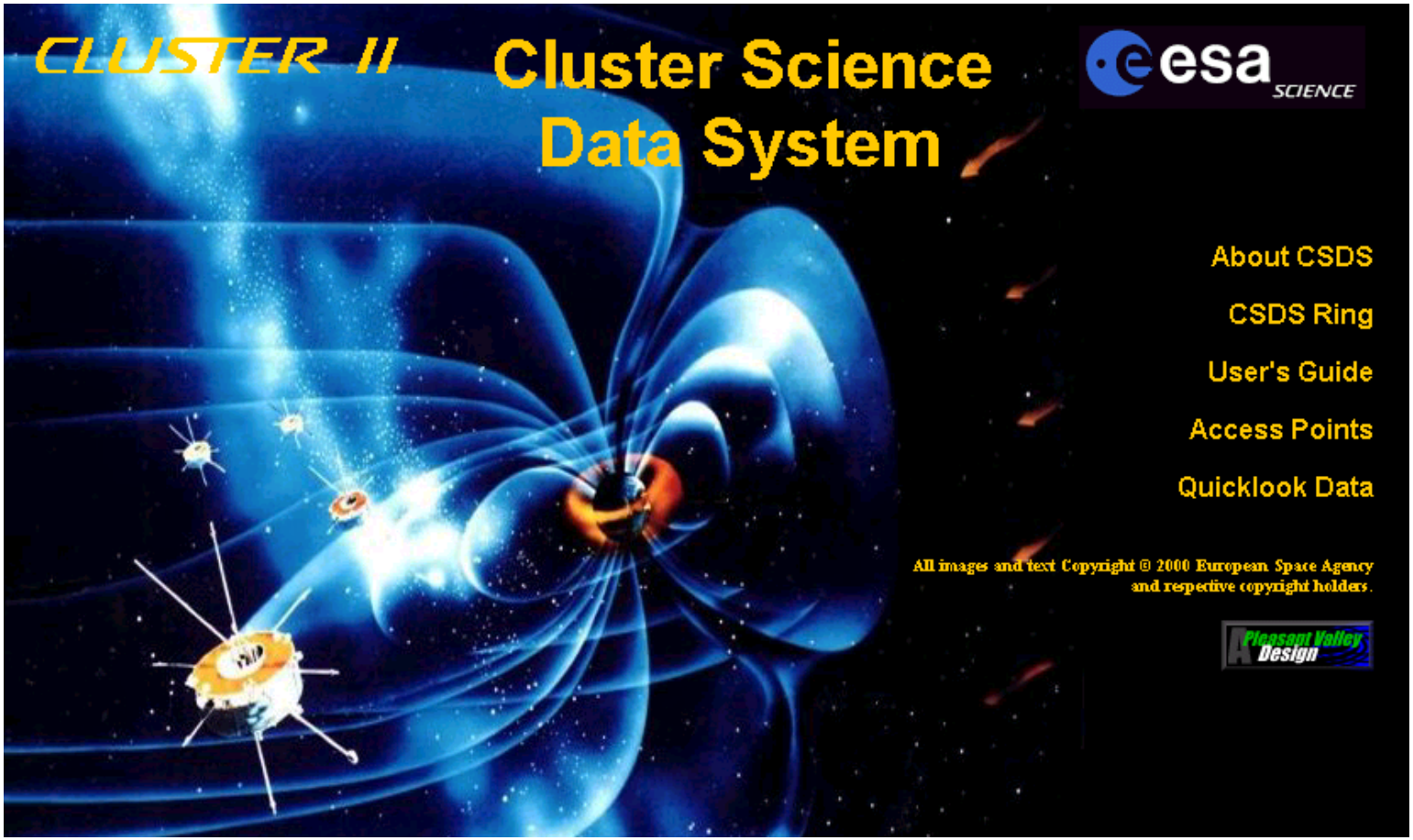
Outline

Cluster Science Data System



Purpose

- To provide relatively quickly a subset of vital Cluster data to the entire Cluster community (The Prime Parameters)
- To provide coarser overview data (1 min) to the entire world (Summary Parameters)
- To provide 6 hour summary plots.

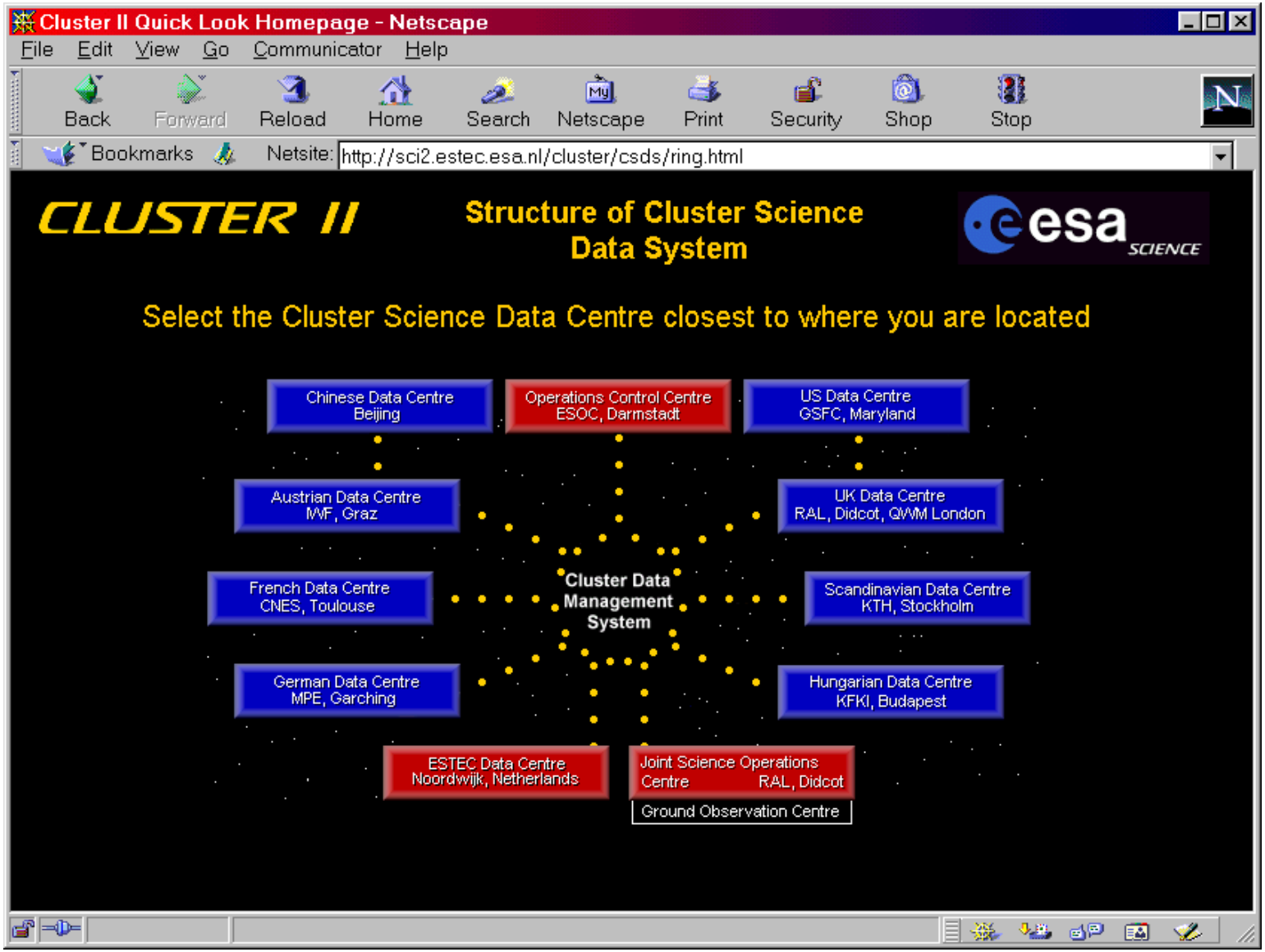
Method

- A set of national Cluster Data Centres, each generating the data sets for the PIs in that country.
- Validation by those PIs.
- Distribution among the Centres to produce a full set at each one.

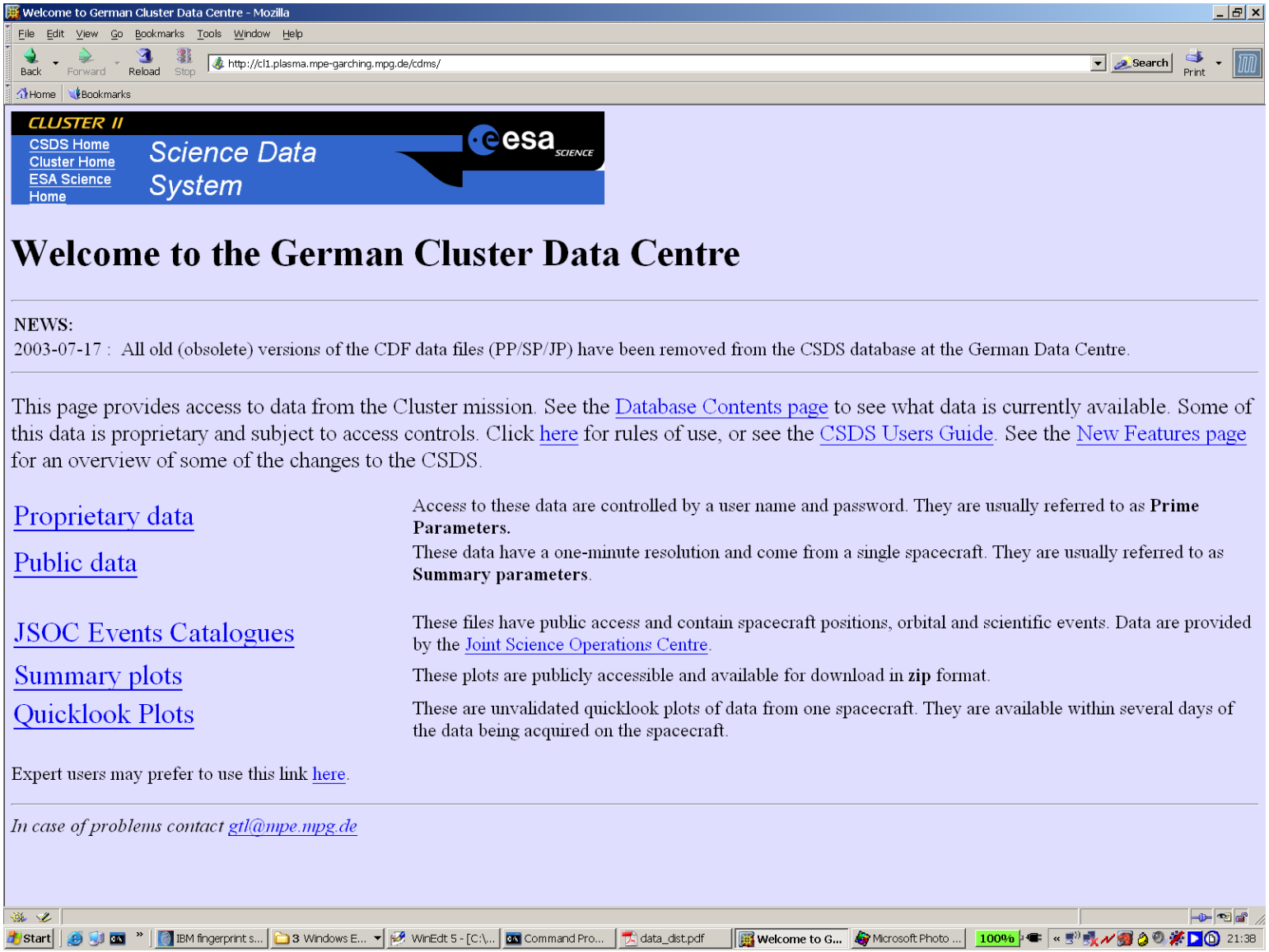
Interaction between PI and Data Centres

- Data centre receives raw data on CDs, same as PI
- DC generates raw data files with software from PI
- . . . and then CSDS products, also with PI software and calibrations.
- PI checks resulting prime parameter files, and validates them, with possible caveats and corrections, for public release.
- PI updates software and calibrations regularly.

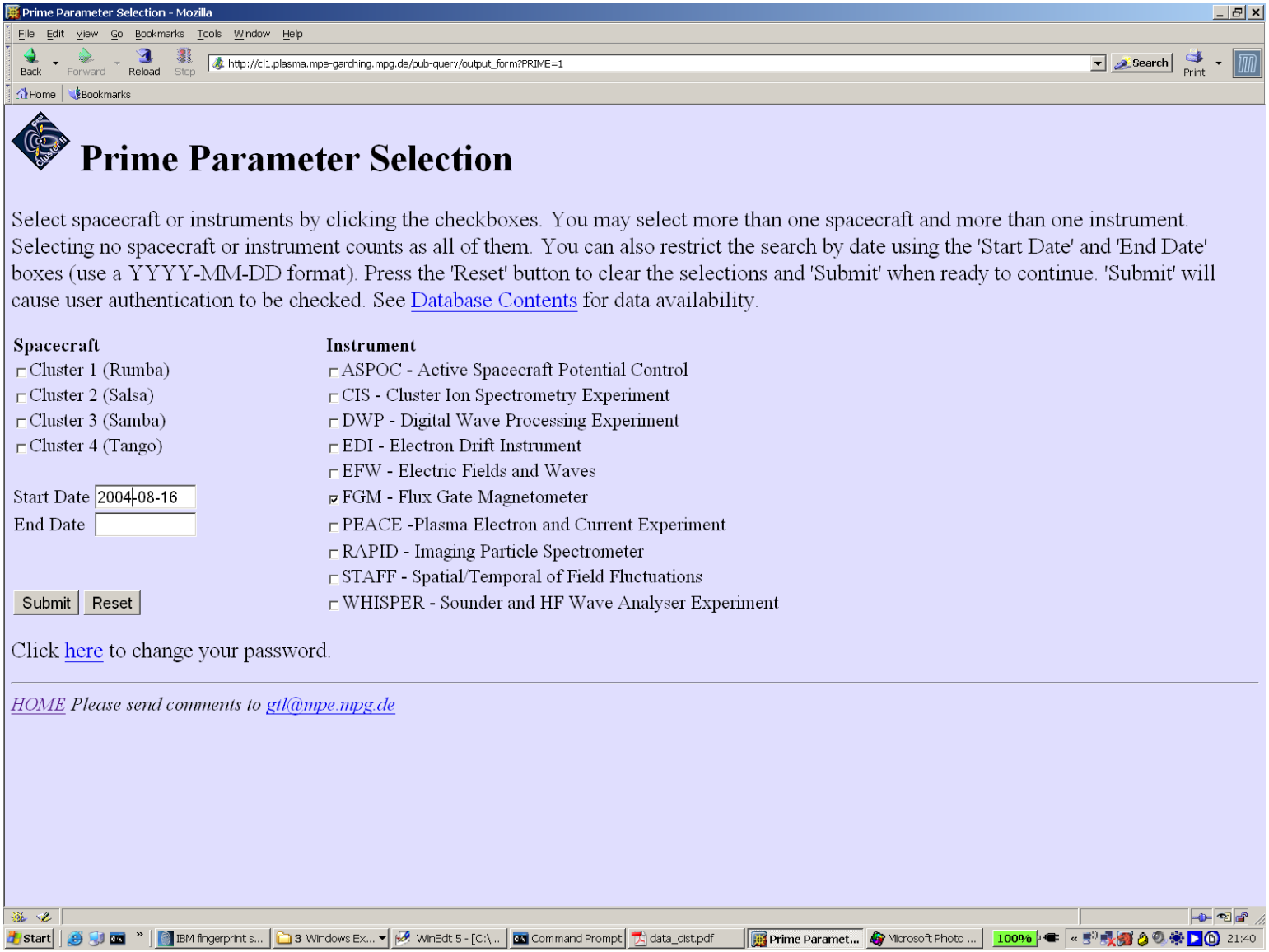
CSDS Web Pages



CSDS Web Pages

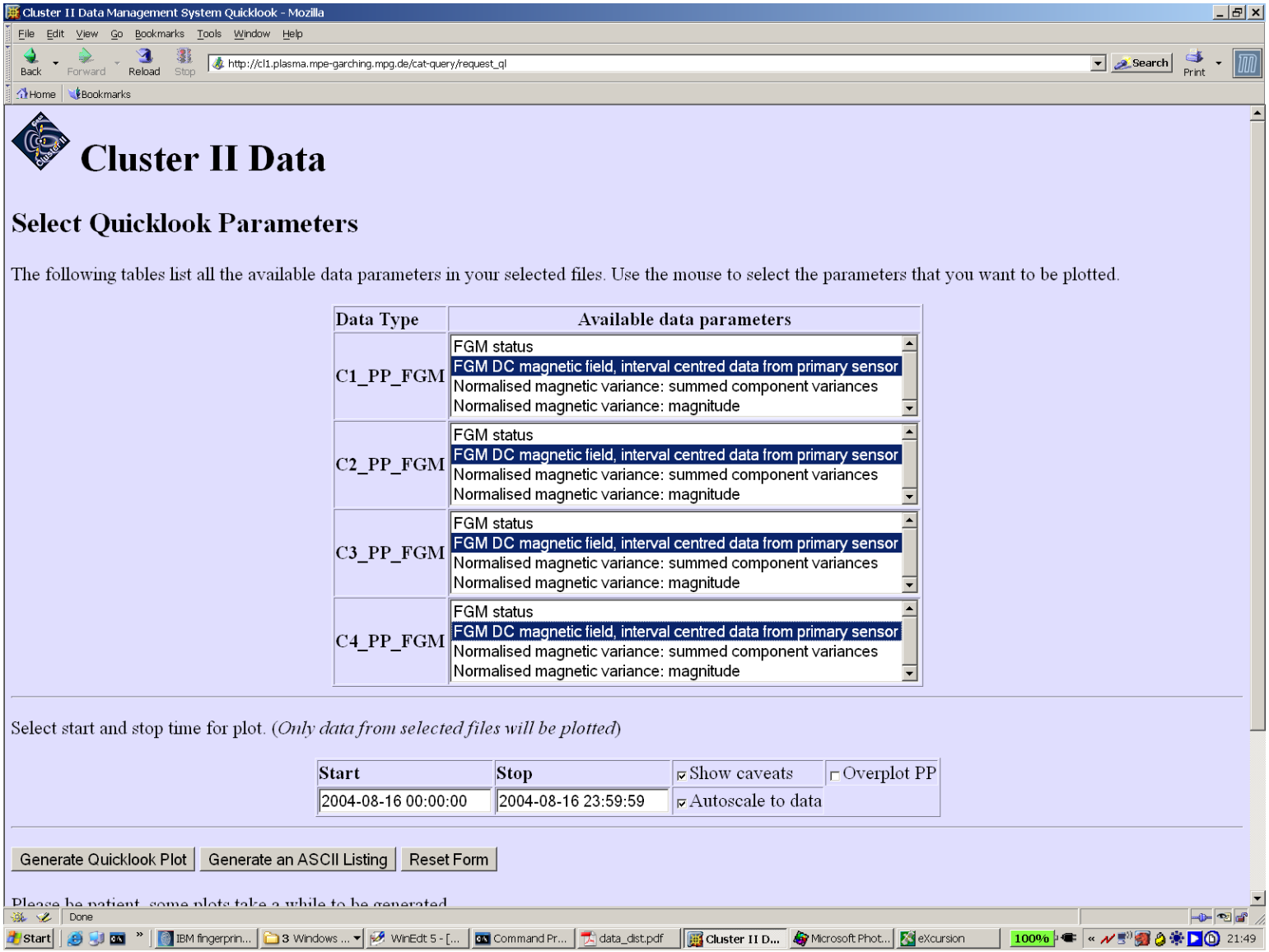


CSDS Web Pages

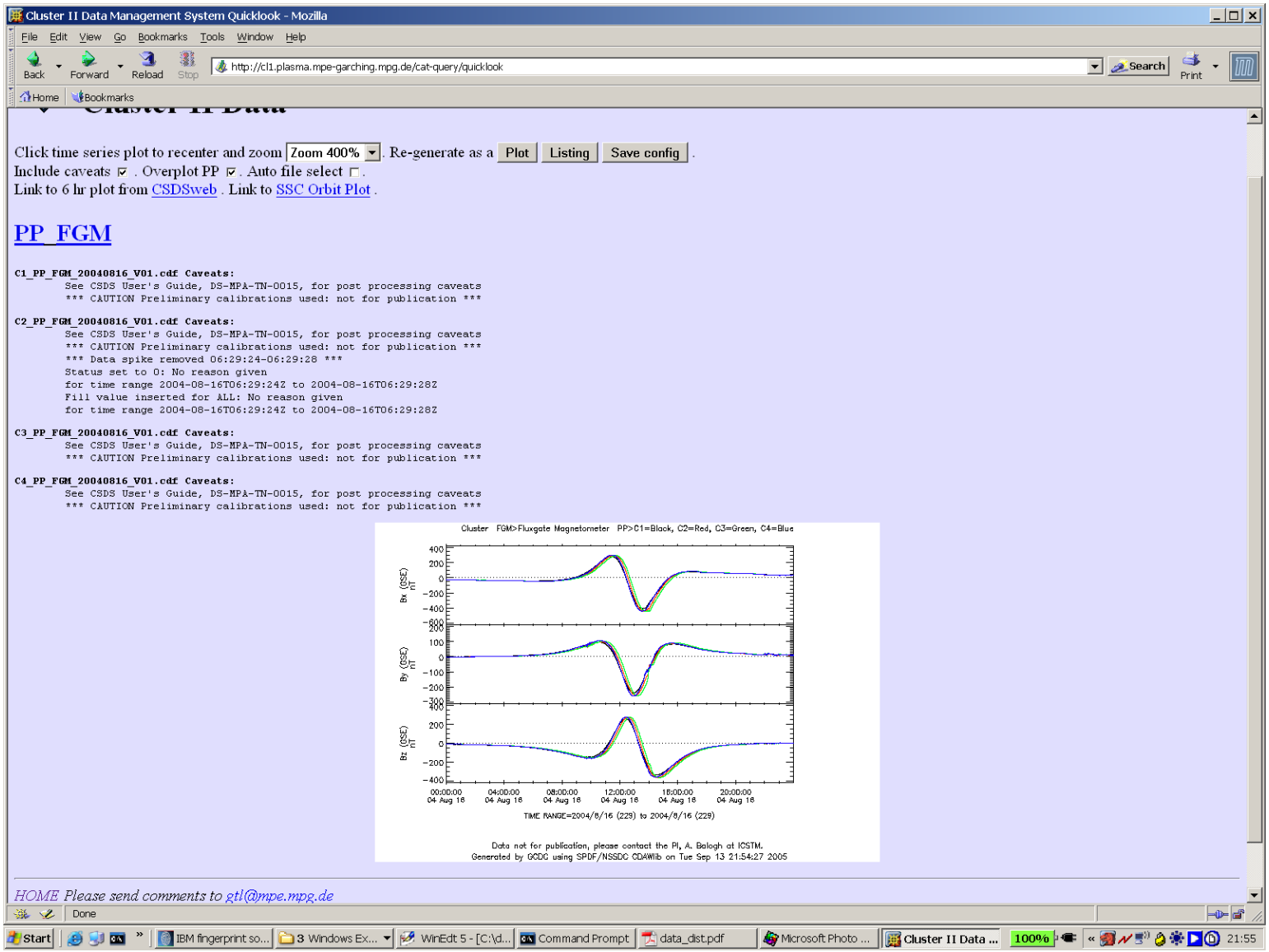


CSDS Web Pages

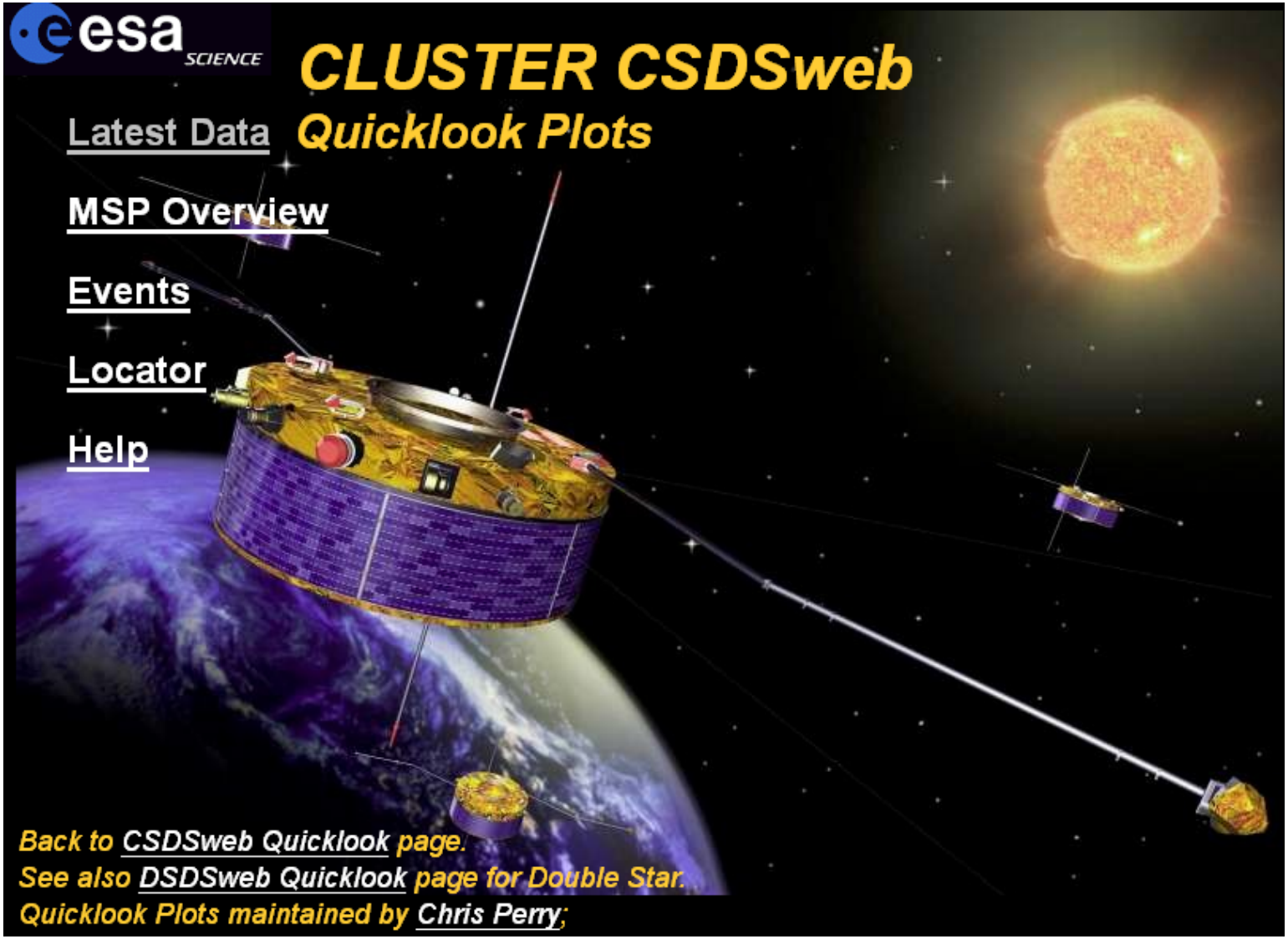
CSDS Web Pages



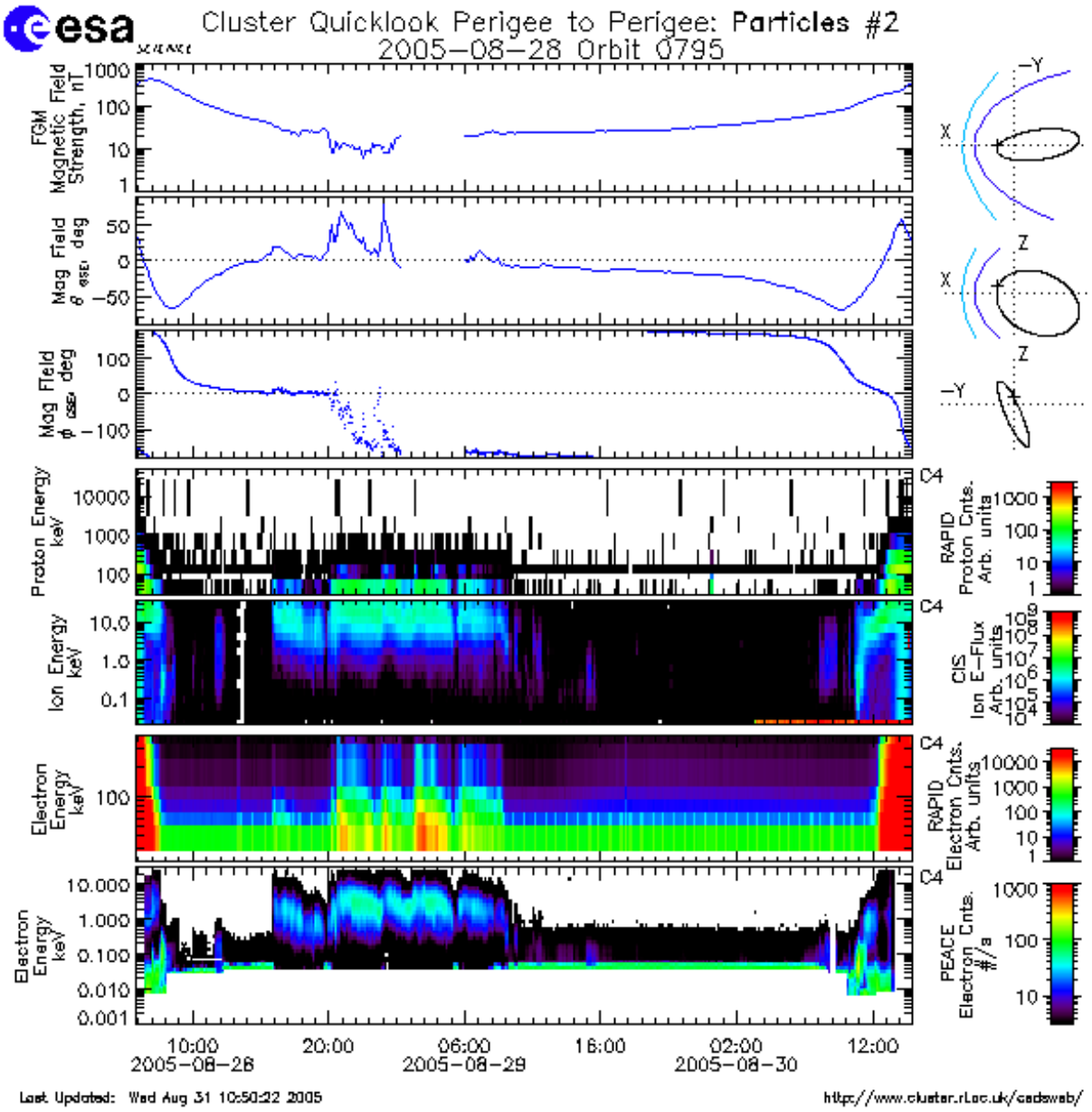
CSDS Web Pages



CSDSWeb


esa SCIENCE
CLUSTER CSDSweb
Quicklook Plots
Latest Data
MSP Overview
Events
Locator
Help
Back to CSDSweb Quicklook page.
See also DSDSweb Quicklook page for Double Star.
Quicklook Plots maintained by Chris Perry;

CSDSWeb


esa
Cluster Quicklook Perigee to Perigee: Particles #2
2005-08-28 Orbit 0795
FGM Magnetic Field Strength, nT
Mag Field θ gse, deg
Mag Field φ gse, deg
Proton Energy keV
Ion Energy keV
Electron Energy keV
Electron Energy keV
RAPID Proton Cnts. Arb. units
CIS Ion E-Flux Arb. units
RAPID Electron Cnts. Arb. units
PEACE Electron Cnts. #/a
10:00 2005-08-28
20:00
06:00 2005-08-29
16:00
02:00 2005-08-30
12:00
Last Updated: Wed Aug 31 10:50:22 2005
http://www.cluster.rl.ac.uk/csdsweb/

Deliverables

CSDS Formats

- Simple line plots
- Ascii listings
- Common Data Format (CDF) delivered as zip file
- Summary plots as zipped PostScript files

There is a CSDS Users Guide explaining all the Cluster instruments (sufficiently for CSDS use) and the variables available.

JSOC

(Cluster) Joint Science Operations Centre

- Coordinates scientific planning between PIs and ESOC
- Provides predicted event catalogues, orbit data, etc

History

- CSDS was envisaged in mid-1980's as revolutionary new idea to deliver scientific data quickly and efficiently.
- This was before the WWW and Internet browsers existed. The Internet provided FTP, Telnet, emails (without attachments).
- Originally to be run by ESIS, European Space Information System, for which Cluster was the first demo customer.
- But ESIS was a pilot project, and soon it became clear that Cluster would be its only customer. And so should pay for it!!
- ESIS died, and JSOC took over its software.
- With Cluster II, a new Web-based interface was created from scratch by JSOC, now called CDMS (Cluster Data Management System).

Cluster Active Archive

As useful and vital CSDS is, it does remain in many ways a compromise (e.g. distributed data centre) and old fashioned.

A new ESA project, the *Cluster Active Archive* is a more modern, centrally run solution.

CAA Goals

- To begin archiving *complete* data sets while the mission is still operational;
- such that they can be obtained, inspected, manipulated, interactively online (the active part);
- and to provide a long-term (decades) home for Cluster data after all the instrument teams and expertise have dispersed.

CAA Data Rights

- Data in CAA will be available to the world.
- Two years' data to be ingested per year. Data will not be the latest, but is to be the best.
- Complete sets of processed data (physical parameters) plus raw data for future generations to reproduce processing, if desired.

Data Formats

- Data are delivered to CAA in a specially developed *Cluster Exchange Format*, CEF, an ascii format;
- Users will download selected data in variety of formats, including CEF, CDF, ascii listing.
- Survey, overview plots in various formats.

RAPID contribution

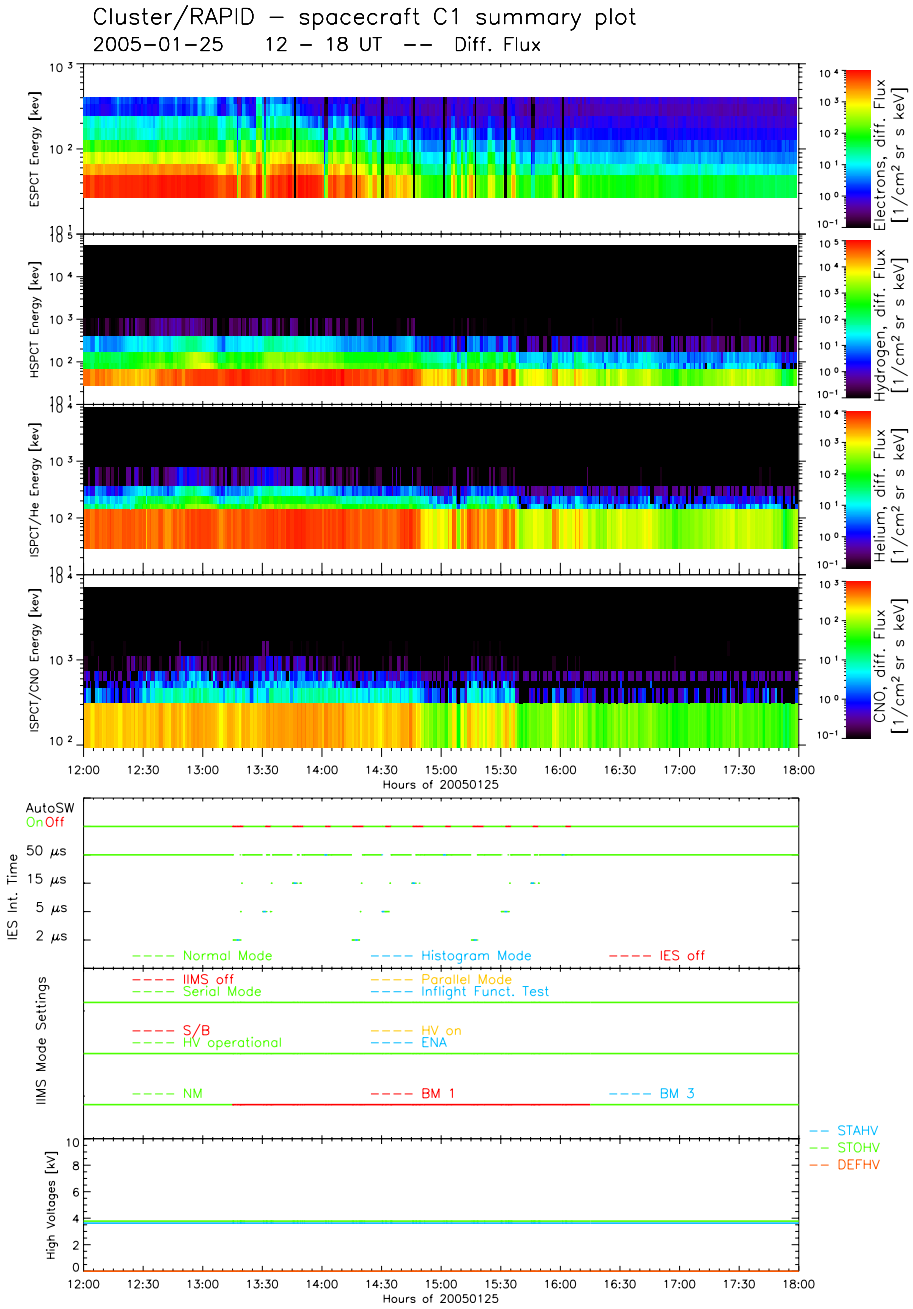
Main Data Products

- Omnidirectional fluxes for electrons and ions
- 3-D particle fluxes for electrons and ions
- Standard deviations of all the above (for subsequent error analyses)
- Raw count rates for the above, plus their standard deviations

Derived Products

- GSE flow directions for all electron and ion detectors/sectors, once per hour
- Pitch angles for all electron and ion detectors/sectors, for each spin, based on on-board magnetic data

RAPID Summary Plots



Delivery Method

- Raw RAPID data files (MSF) transferred to CAA.
- Software to convert MSF to RAPID science (SCI) files, with calibration, delivered to CAA.
- Sofware and template files to convert SCI to CEF files also delivered to CAA.
- CAA generates CEF files following OK from Lindau.
- Lindau checks selected CEF files with its own to verify proper processing.