Community Satellite Processing Package (CSPP) for NPP/JPSS

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What is CSPP?

- CSPP (Community Satellite Processing Package) is the new software system for processing direct broadcast data from Suomi NPP.

- Funded by NOAA via JPSS Project (thanks to Mitch Goldberg).

- Developed and supported by CIMSS/SSEC, UW-Madison.

- For Suomi NPP, we use the Algorithm Development Library (ADL) version of the Suomi NPP operational processing software.

- CSPP will do more than just NPP…

Suomi NPP Launch 2011/10/28
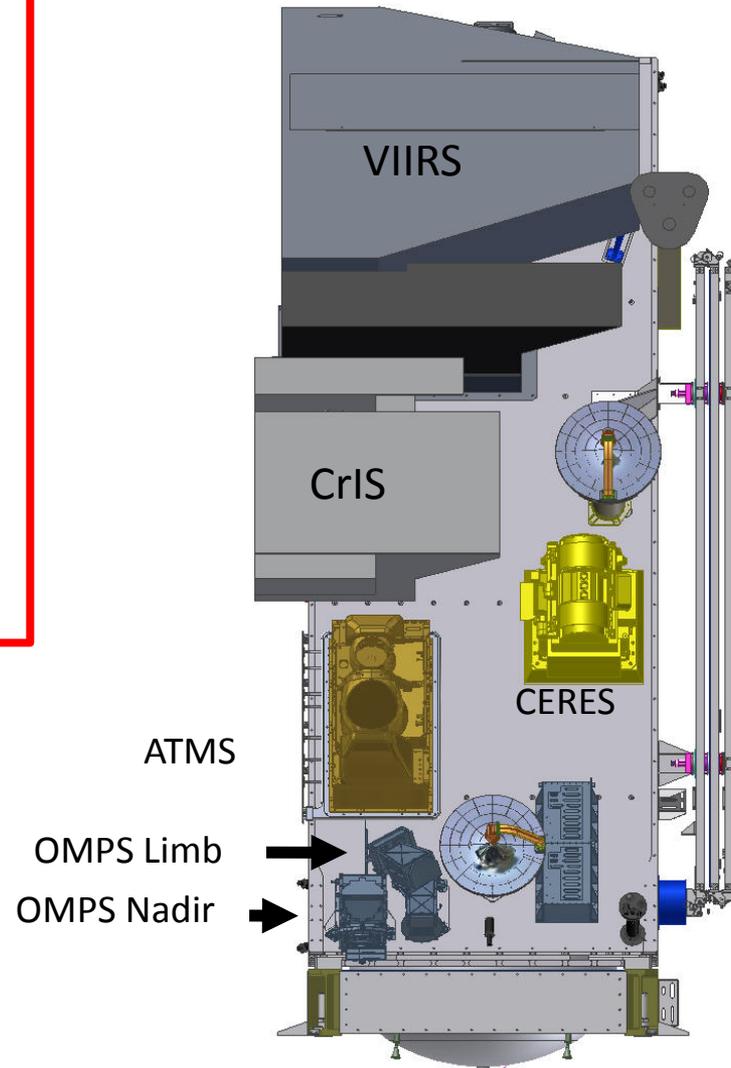
Suomi NPP Sensor Suite

VIIRS – Medium Resolution Visible & Infra-red Imager

CrIS – Fourier Transform Spectrometer for IR Temperature and Moisture sounding

ATMS – Microwave sounding radiometer

OMPS – Total Ozone Mapping and Ozone Profile measurements

CERES - Earth Radiation Budget

VIIRS

CrIS

CERES

ATMS

OMPS Limb

OMPS Nadir

Suomi NPP Direct Broadcast Status

- Started transmitting VIIRS, CrIS, and ATMS science data in real-time via X-band direct broadcast starting on 23 February 2012.

- 7812 MHz, 13 Mbps.

- No encryption, licenses, or fees.

- Downlink format is described in CDFCB External Volume VII at http://npp.gsfc.nasa.gov/science/documents.html

- Intermittent issue with short signal strength drop (4 passes in 16 days) at certain overpass positions
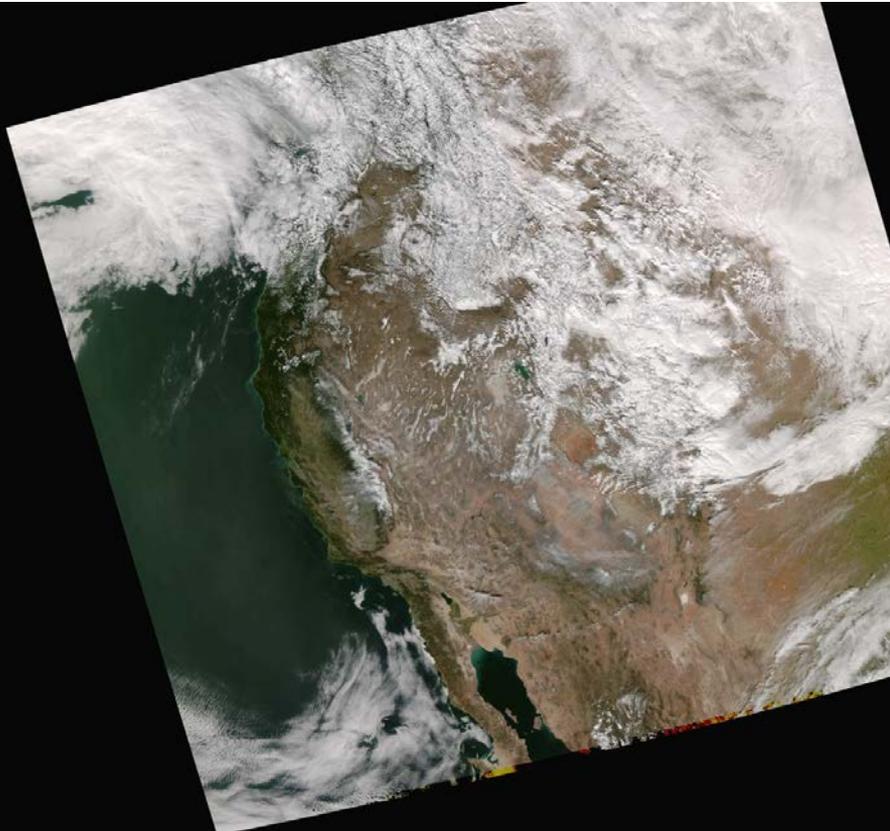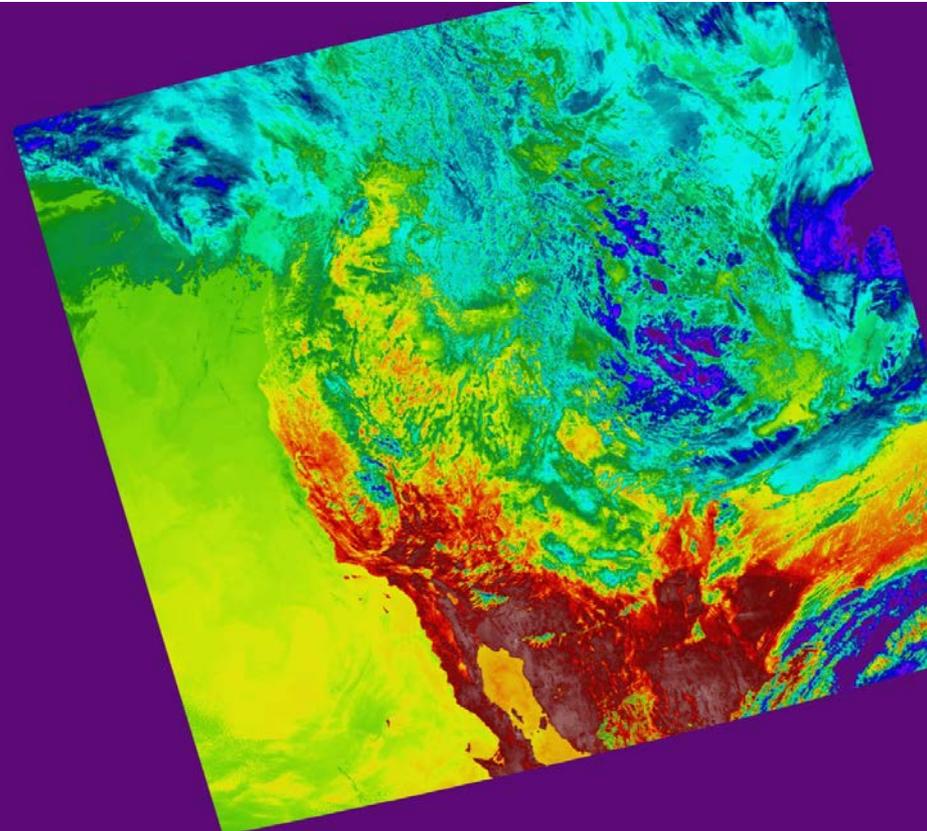
SSEC 2.4 meter X/L-band System
Installed Sep 2011

System supplied by Orbital Systems, Dallas Texas.
Receives data from Suomi NPP, Terra, Aqua, POES, Metop, FY-3, FY-1.

First Suomi NPP DB pass from SSEC
2.4 meter X/L System, 20:30 UTC, 2012/02/23
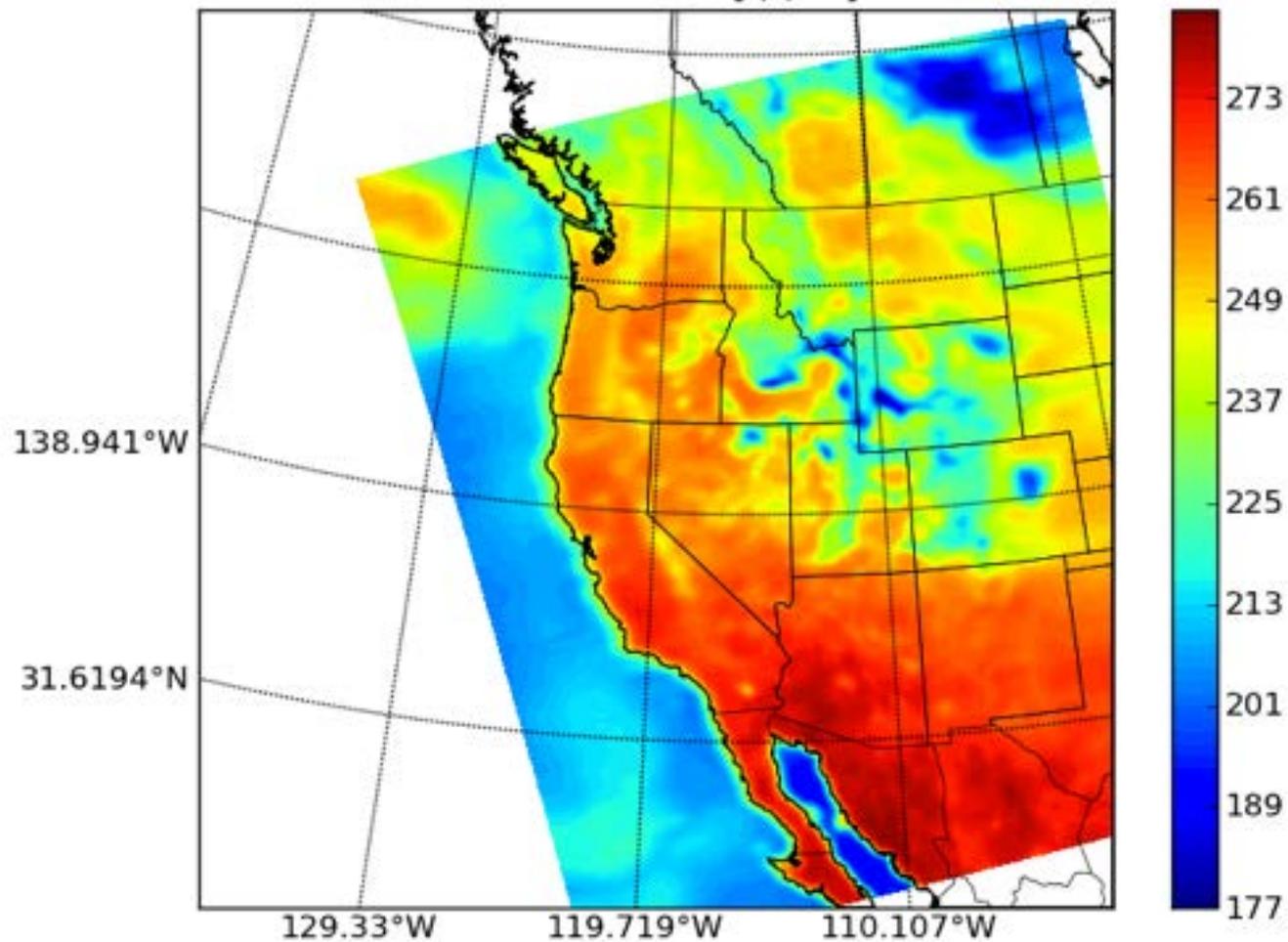
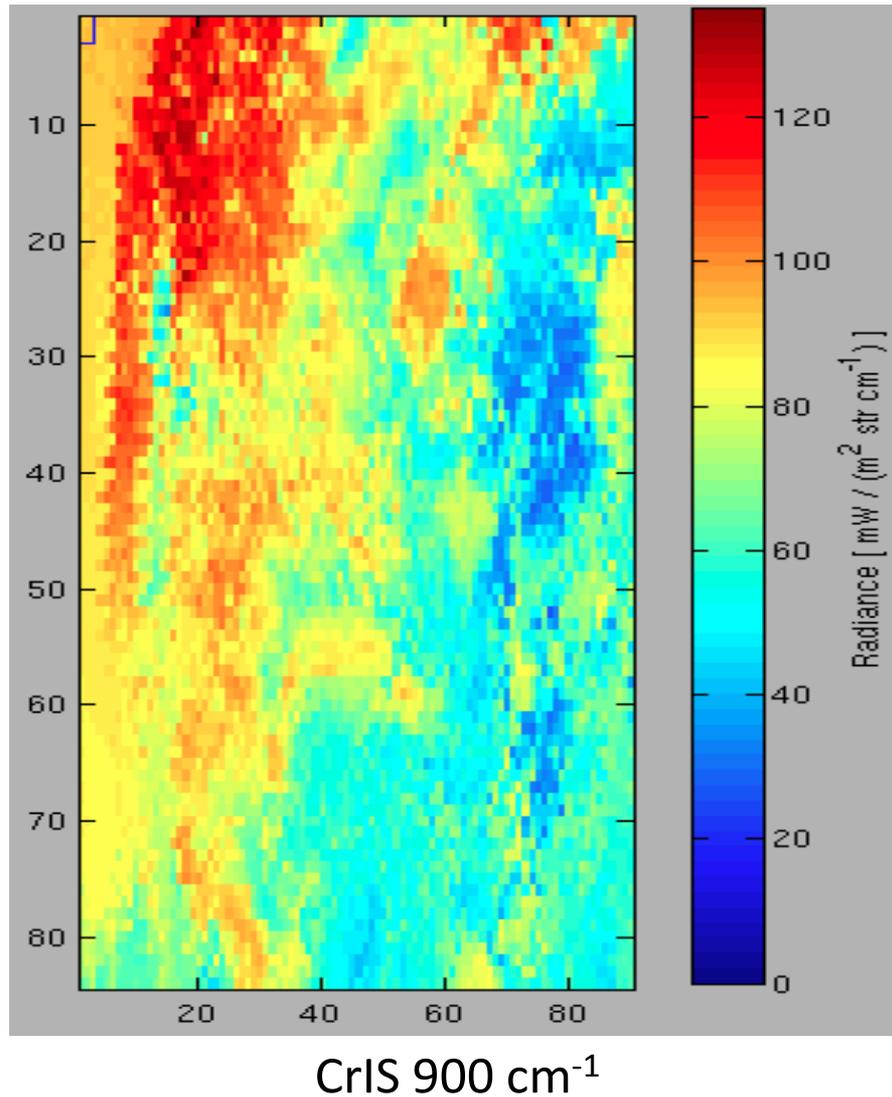

VIIRS True Color (M5/M4/M3)

VIIRS Infrared (M15)

First Suomi NPP DB pass from SSEC
2.4 meter X/L System, 20:30 UTC, 2012/02/23

ATMS Channel 16

First Suomi NPP DB pass from SSEC
## 2.4 meter X/L System, 20:30 UTC, 2012/02/23

CrIS 900 cm^{-1}

Vendors with Suomi NPP-ready systems

- Orbital Systems (www.orbitalsystems.com)

- SeaSpace (www.seaspace.com)

- Kongsberg Spacetec (www.spacetec.no)

- VCS (www.vcs.de)

- ScanEx (www.scanex.ru)

Agencies able to receive Suomi NPP include:

- NASA, EUMETSAT, Meteo France, UK Met Office, SMHI, FMI, INPE, CMA

Suomi NPP acquired and processed by Finnish Meteorological Institute, 2012/03/05

VIIRS M7, Courtesy of Timo Ryyppö, FMI Sodankylä
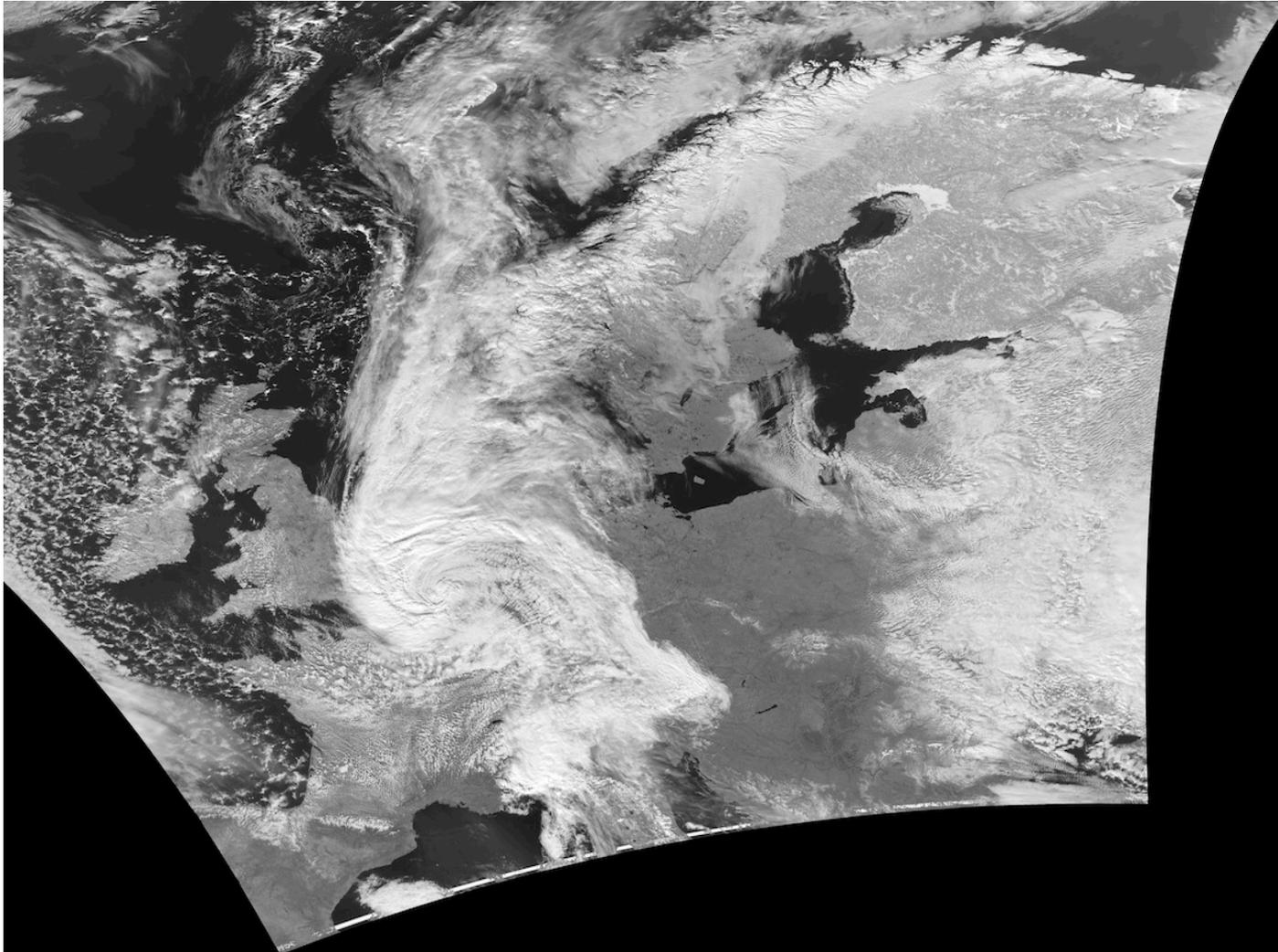
Community Satellite Processing Package

- CSPP will include support for Suomi NPP and JPSS, POES, Metop, and FY-3.
- For Suomi NPP, supported sensors will include VIIRS, CrIS, ATMS (SDRs and a subset of EDRs)
- For POES and Metop, supported sensors will include AVHRR and IASI (Level 2 products only; Level 1 processing provided by AAPP).
- For FY-3, supported sensors will include VIIR and MERSI (Level 2 products only; Level 1 processing provided by NSMC).
- 64-bit Intel Linux is the host platform for all CSPP software.

CSPP for Suomi NPP

- SSEC is preparing algorithms for
  - VIIRS, CrIS, and ATMS RDR to SDR processing,
  - VIIRS Cloud Mask, Active Fires, Cloud Properties, and Aerosol Properties EDRs,
  - CrIS single FOV temperature and moisture retrievals.
- Primary distribution format is compiled code (ready to run).
- Source code will be available if desired (in ADL).
- Supported host platform is Red Hat Enterprise Linux 5 (64-bit), minimum of 16 GB of RAM is required.
- Nigel Atkinson recommends dual Intel hex-core 3.06 GHz CPUs and 64 GB RAM (10 min. VIIRS pass processed in 10 min).

About CSPP for Suomi NPP

- The CSPP software for NPP is based on the Algorithm Development Library (ADL) Version 3.1 developed by Raytheon and the JPSS project *(the same software that runs in the operational processing facility at NOAA/NESDIS)*.

- SSEC has packaged the ADL software to run from the Linux command line in real-time direct broadcast mode. *We have not changed the underlying processing source code, algorithms, or data formats.*

- The output files from the CSPP NPP SDR processing software *are identical in naming, format, and structure to the corresponding files from NOAA/NESDIS.*

- The first release of CSPP will support Suomi NPP VIIRS, CrIS, and ATMS RDR to SDR processing.

Value added features for Suomi NPP

- Ancillary data are ingested and processed automatically.

- Compiler flags are selected to provide optimized execution speed.

- Build environment is the standard ADL 3.1 environment.

- Details of run-time configuration (e.g., XML files) are transparent.

- Command line scripts require the name of the directory containing the input files, and nothing else.

CSPP for POES and Metop

- SSEC is planning to release the CLAVR-X AVHRR Level 2 software package for POES and Metop (from Andy Heidinger, NOAA) using Level 1 data from AAPP.

- Cloud Mask, Cloud Top Properties, Cloud Optical Thickness, NDVI, SST.

- Output format is HDF4.

- Mapped image products will also be available.

- CIMSS/SSEC (Weisz/Smith) have developed a dual-regression single FOV retrieval algorithm for IASI and CrIS (temperature and moisture profiles, cloud properties), which will be released as part of CSPP.

CSPP for FY-3

- SSEC is planning to adapt the CLAVR-X AVHRR Level 2 software package for FY-3 VIRR.

- Level 1 processing is already provided by NSMC http://www.nsmc.cma.gov.cn/newsite/NSMC_EN/Home/Index.html

- Cloud Mask, Cloud Top Properties, Cloud Optical Thickness, NDVI, SST for VIRR.

- SSEC will work with NSMC to release the MERSI Image Processing System (MIPS) to the DB community. MIPS provides true and false color images from MERSI in JPEG, GeoTIFF, and KML formats.

Near-term CSPP Milestones

- Beta1 release of CSPP for VIIRS, CrIS, and ATMS RDR to SDR Dec 21, 2011. Successfully tested by all invited agencies (abut 20).

- Beta2 release of VIIRS SDR on Mar 1, 2012 (first DB capable version).

- Beta3 release for VIIRS and ATMS SDR on Mar 16, 2012 (first optimized version).

- Public version 1.0 release for VIIRS, CrIS, and ATMS SDR by Apr 15.

CSPP Website
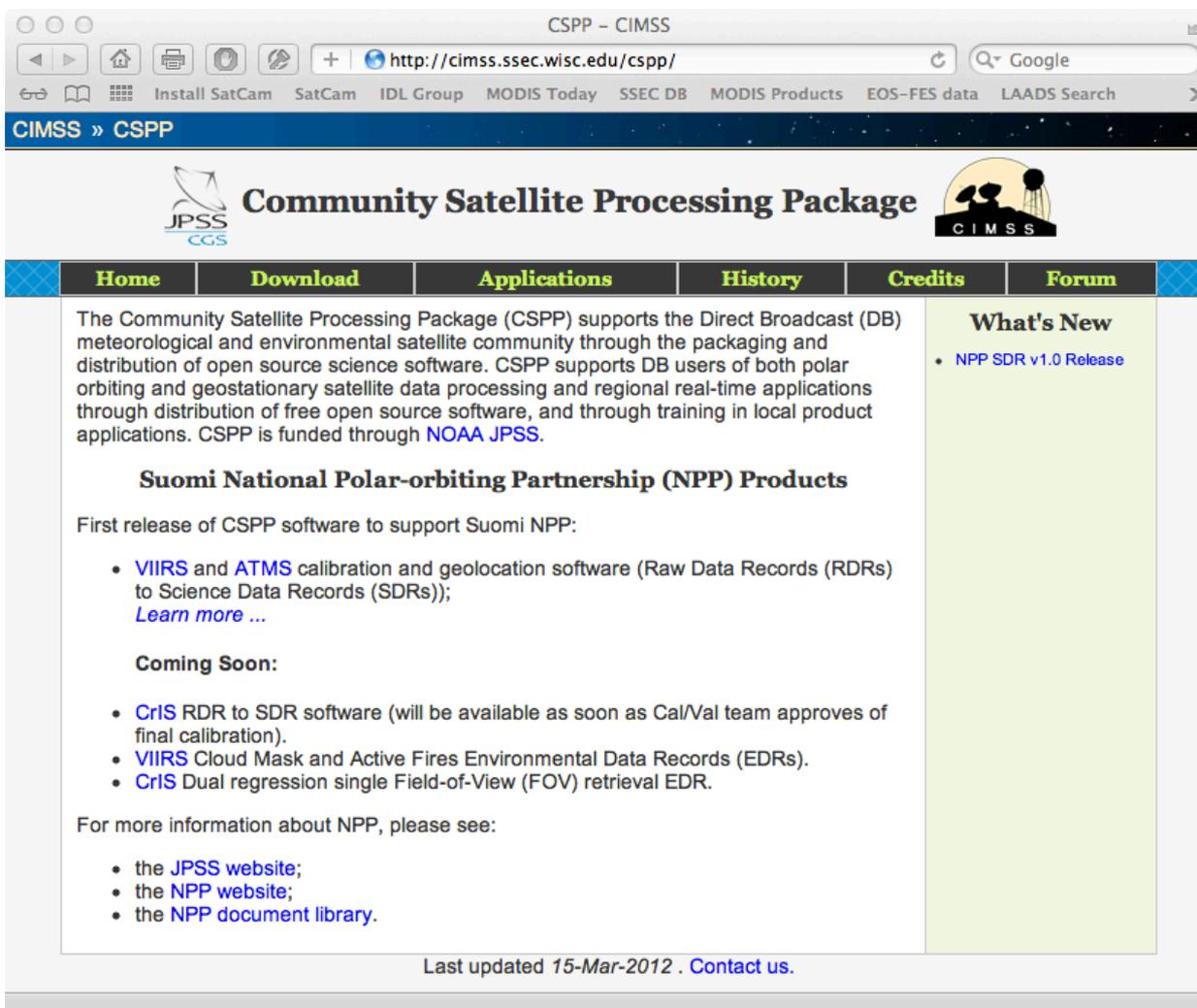
http://cimss.ssec.wisc.edu/cspp/