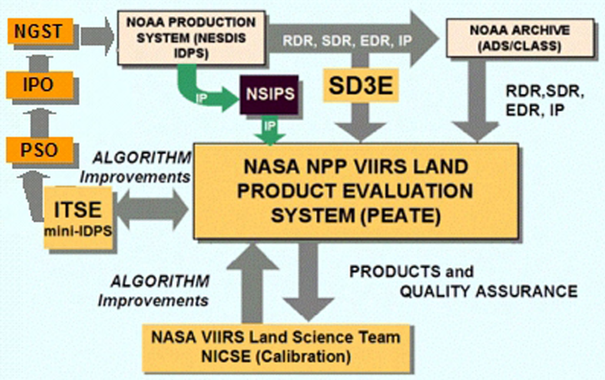
The NPP VIIRS Land PEATE

The NPOESS Preparatory Project (NPP) Science Data Segment (SDS) is based at Goddard Space Flight Center. It is the research arm for evaluation of products and algorithm improvement for NPP instruments. The Land PEATE (Land Product Evaluation and Analysis Test Element) exists to support the NPP VIIRS Land Science Team in the scientific evaluation of land data products of the Visible Infrared Imager/Radiometer Suite (VIIRS) instrument.

THE ALGORITHM EVALUATION PROCESS



The product evaluation and algorithm improvement process begins with the Land PEATE acquiring VIIRS products produced by the NESDIS IDPS from SD3E, CLASS and NSIPS The LPEATE will normally furnish the Land Science Team or NICSE with those data and quality assurance information generated by the LDOPE team. If proposed algorithm improvements are given to the LPEATE, they are integrated into the system and tested. When the Science Team want to submit an algorithm update, which has been evaluated in the Land PEATE, for use in the production system at NESDIS the update is first tested in the mini-IDPS to assess its impact on latency and to verify that product will be correctly produced in the production system. Results of the mini-IDPS testing and the science rationale for making the change are forwarded to the PSO (Project Science Office). If PSO approves the change it is forwarded to the IPO and NGST for further evaluation. An informal path is also present as NGST and IPO staff can view results of Land PEATE testing at the Quality Assessment Team's web site.

LEVEL 2 VIIRS ALGORITHMS IN PRODUCTION

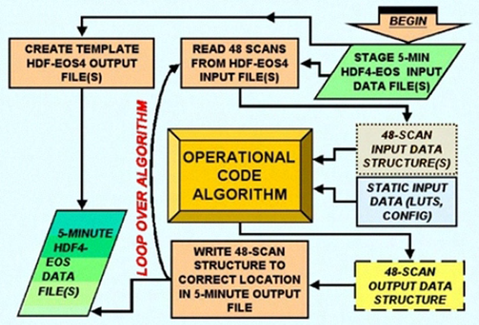
The Land PEATE runs Level 2 (swath-based) software from 3 sources:

- **Science code** (that originally furnished to the contractor)
- **Operational (OPs) code V1.4**, Science code which has been adapted to a production setting, and
- **OPs code V1.5**, which contains many processing and algorithm changes with respect to V1.4.

Plans for the future include

- Integration of the **VIIRS SDR/GEO Level 1 algorithms** – Summer 2008
- Integration of the remaining **Level 2 algorithms** – Summer 2008
- Integration of VIIRs **Level 3 gridding and granulation algorithms** – Fall 2008

OPERATIONAL CODE WRAPPING

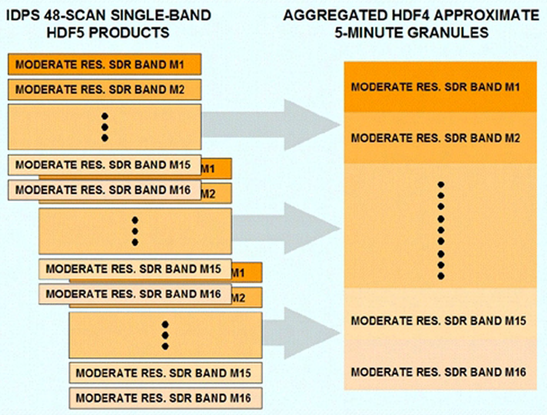


The Land PEATE extracts VIIRS IDPS Operational code algorithms so that they may function on a stand-alone basis, allowing flexibility in algorithm test and evaluation.

Input to the algorithms may be IDPS HDF5 data which are aggregated to approximate 5-minute HDF4 granules or proxy data generated from MODIS data.

Data are staged to the algorithm in 48-scan segments, simulating the actual IDPS process, and written sequentially to an output HDF5-EOS file.

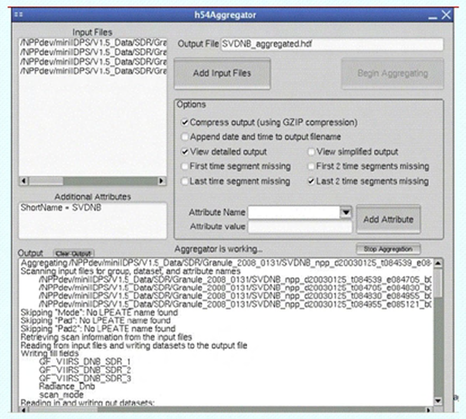
HDF5->4 CONVERSION/ AGGREGATION SOFTWARE



The LPEATE has an aggregation tool which specifically converts NPP/NPOESS HDF5 data files to HDF4 and also aggregates time-contiguous segments together.

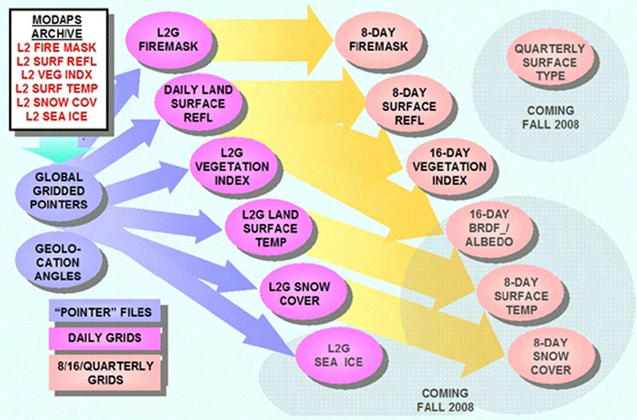
The tool currently works on Level 1 SDR/GEO data and will be expanded to work on Level 2 and gridded data as well.

... will be available for use by the Science Team



The Aggregation tool will include a GUI to make using the software fast and easy.

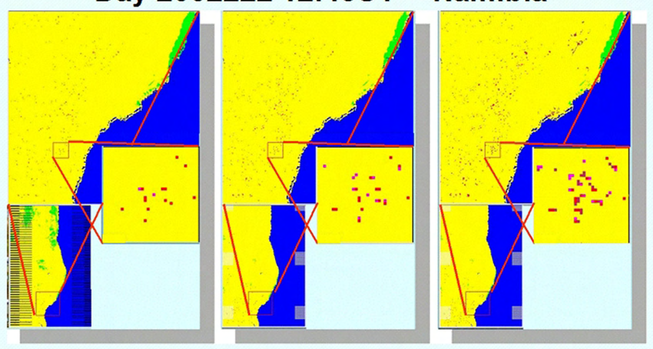
DATA GRIDDING ALGORITHMS FOR DIRECT COMPARISON OF VIIRS TO MODIS DATA



The Land PEATE also produces gridded daily and multi-day data products in MODIS Level 3 format to facilitate comparison with Land Products from the Aqua MODIS instrument.

EXAMPLE ALGORITHM COMPARISON

Fire Mask Algorithm Comparison
Day 2002222 12:45UT -- Namibia

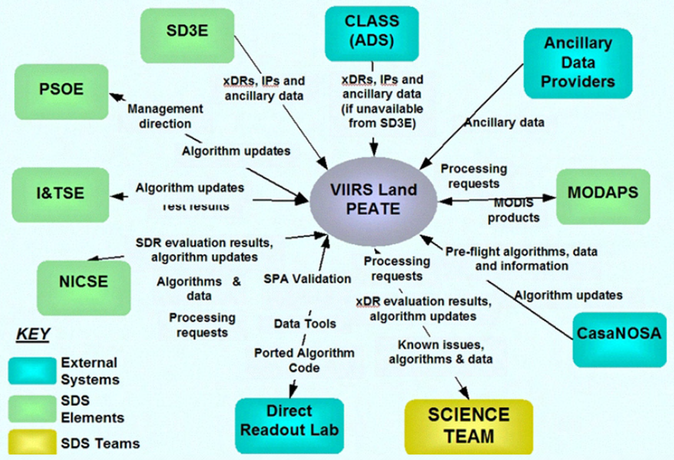


Science Code Algorithm | **OPs V1.4 Code Algorithm** | **OPs V1.5 Code Algorithm**

Comparison of one scene between Fire Mask generated by the original Science Code algorithm and masks generated by OPs code V1.4 (Oct. 2006) and V1.5 (December 2007) versions of the algorithm. Data were generated using proxy data from MODIS Aqua. The Science code algorithm produces no fires, whereas the V1.5 code produces more fire pixels than credible.

Color	Interpretation	Science Code	OPs code V1.4	OPs code V1.5	Coincident Pixels		
					Science-OPs 1.4	Science-OPs 1.5	OPs 1.4-1.5
Blue	Water	972887	1127979	1127979	946049	946049	1127979
Green	Cloud	94831	6309	6309	6008	6008	6309
Yellow	Non-Fire	1281598	1526398	1523655	1252219	1254516	1523655
Maroon	Fire/Low Confidence	0	11	2442	0	0	11
Magenta	Fire/Nominal Confidence	288	1486	1740	253	253	1486
Red	Fire/High Confidence	1542	1935	1993	1408	1408	1935
Black/ White	Missing/Fill	397474	84502	84502	84502	84502	84502

LAND PEATE CONTEXT DIAGRAM



The Land PEATE operates within the larger context of the NPP/NPOESS project. In order to carry out NPP VIIRS Land Science Team support, we interact with many different entities.

- The PSOE (Project Science Office Element) gives management direction and is the final arbiter of algorithm updates.
- The SD3E (SDS Data Depository and Distributory Element) furnishes the LPEATE with data manufactured by the IDPS (Interface Data Processing Segment).
- CLASS (NOAA's Comprehensive Large Array-data Stewardship System) is a backup source of data for the LPEATE.
- Ancillary data providers such as NOAA (GDAS data) or the U.S.Naval Observatory (ephemeris files) are an important source of data needed to produce VIIRS data.
- The MODAPS data processing system supplies MODIS products and also forms the basis for the LPEATE data processing system.
- NICSE (NPP Instrument Calibration Support Element) performs VIIRS instrument calibration
- CasaNOSA is the web-based server at the IPO (NOAA Integrated Program Office) which supplies software and test data.
- The NASA Direct Readout Lab and the LPEATE exchange, use, and modify the other entity's software as appropriate.

LAND PEATE POINTS OF CONTACT

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