The EUMETSAT
Network of
Satellite Application
Facilities

NWC SAF
Support to Nowcasting and
Very Short Range Forecasting

SMHI

User Workshop, April 2010, Madrid

PPS Software Development Status and Plans

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Outline

Status

- Statistics
- Satellite data
- Auxiliary data
- Libraries
- News

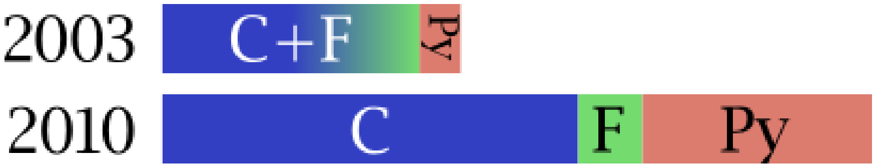
Plans

- Information model common for LEO and GEO
- Satellites and algorithms
- Processing on swath only
- More automated validation
- Installation and configuration
- Portability
- Input and feedback from users needed!

Goal: Raise your interest in the future development of PPS

Status: Statistics

- Code
  - Beta release: C+Fortran: ~75 000 lines, Python: ~12 000 lines
  - C: 121 344 lines
  - Fortran: 18 773 lines
  - Python: 66 993 lines



- Users
  - 6 known to run PPS operationally, 6 more running / setting up
  - How many unknown?

Status: Satellite data

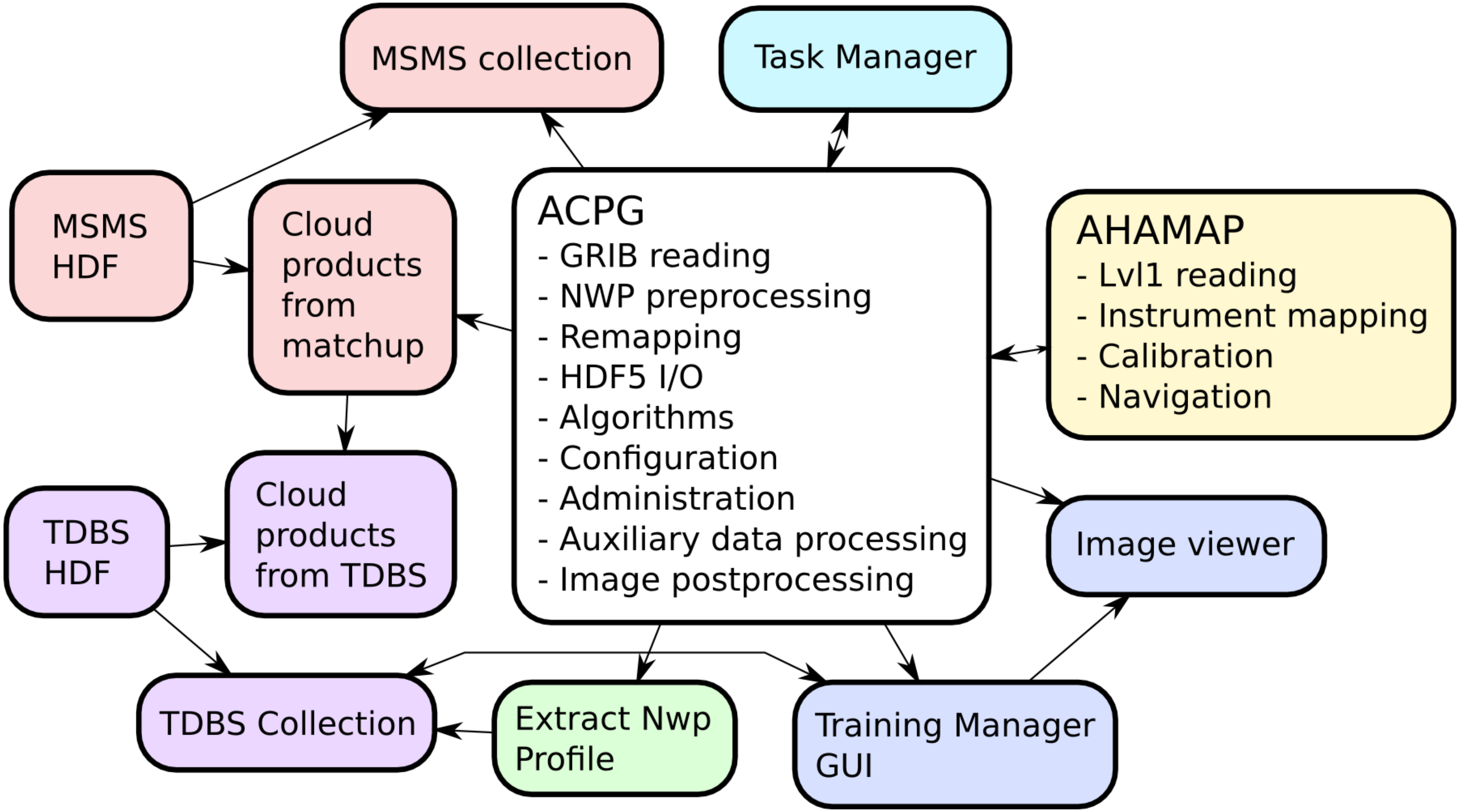
- NOAA (AVHRR, AMSU-A, AMSU-B/MHS)
- Metop (AVHRR, AMSU-A, MHS, IASI)
- Terra, Aqua (MODIS) for prototyping NPP

- Local
- Global Metop
- GAC (Global Area Coverage, NOAA)
    - State-of-the-art intercalibration (v2010)
    - NOAA7 – NOAA19

Status: Auxiliary Data

- NWP
  - GRIB
  - ECMWF, HIRLAM, any NWP model in regular lon/lat grid (pressure levels)
- Variable land emissivity (v2010)
- Land use (USGS)
  - Fraction of land (coasts)
- Topography (USGS)
- Sea ice (OSISAF)

Status: Different parts of PPS



MSMS collection

Task Manager

MSMS HDF

Cloud products from matchup

ACPG
- GRIB reading
- NWP preprocessing
- Remapping
- HDF5 I/O
- Algorithms
- Configuration
- Administration
- Auxiliary data processing
- Image postprocessing

AHAMAP
- Lvl1 reading
- Instrument mapping
- Calibration
- Navigation

TDBS HDF

Cloud products from TDBS

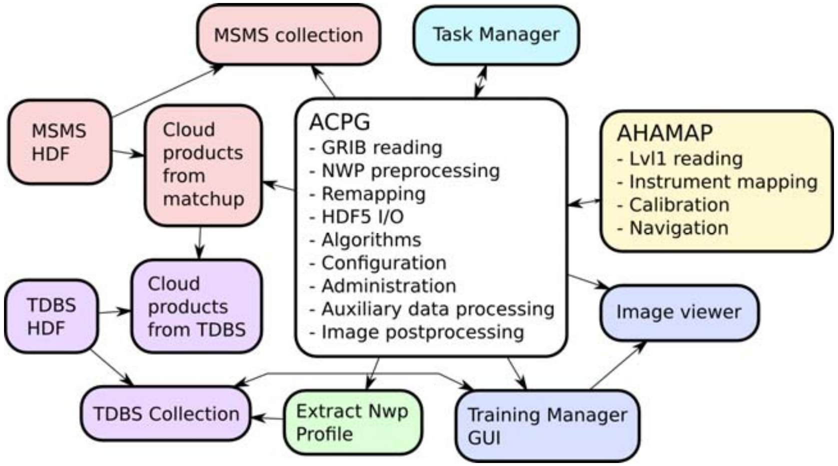
Image viewer

TDBS Collection

Extract Nwp Profile

Training Manager GUI

Status: Internal Libraries



- Common functions
    - HDF5 files
        - Read/write PPS information model
        - HDF5 1.8 (v2010)
    - Read auxilliary data
- GRIB files
    - Read any field
    - PPS uses: Temperature, Column integrated water vapour, OSISAF sea ice
    - NWP postprocessing: model levels to pressure levels, integrate water vapour, tropopause, …
    - GRIB API (v2010) replaces EMOS => seamless use of GRIB edition 2 files
        - Need test data (TIGGE data works)
- Remapping / projection

Use externally? Some insight needed…

We want to make this easier!

OSISAF
MESAN
CM-SAF

LandSAF?
Others?

News 2010

- Variable land emissivity
- Numeric replaced by NumPy, ScientificPython removed
- HDF5 1.8, HLHDF 0.79
- RTTOV9 (CTTH, dynamic feature thresholds)
- GAC processing better
- GRIB API (read both GRIB 1 and GRIB 2)
- CTTH threading configurable
- Bugs smashed
  - Wrong threshold table for t37t12 was used (SPR:376/SMR:354)
  - Memory leaks
  - …
- source_me, .profile_pps now automagically set up during configure

Plans

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Plans: Satellites and algorithms

- Additional satellites
  - NPP/JPSS
  - FY-3
  - PCW
  - Post-EPS

- Additions to / improvements of algorithms
  - E.g. probabilistic cloud masking, improved aerosol detection

- We want to make
  - adding new instruments, and
  - testing/adding/replacing algorithms or parts of algorithms

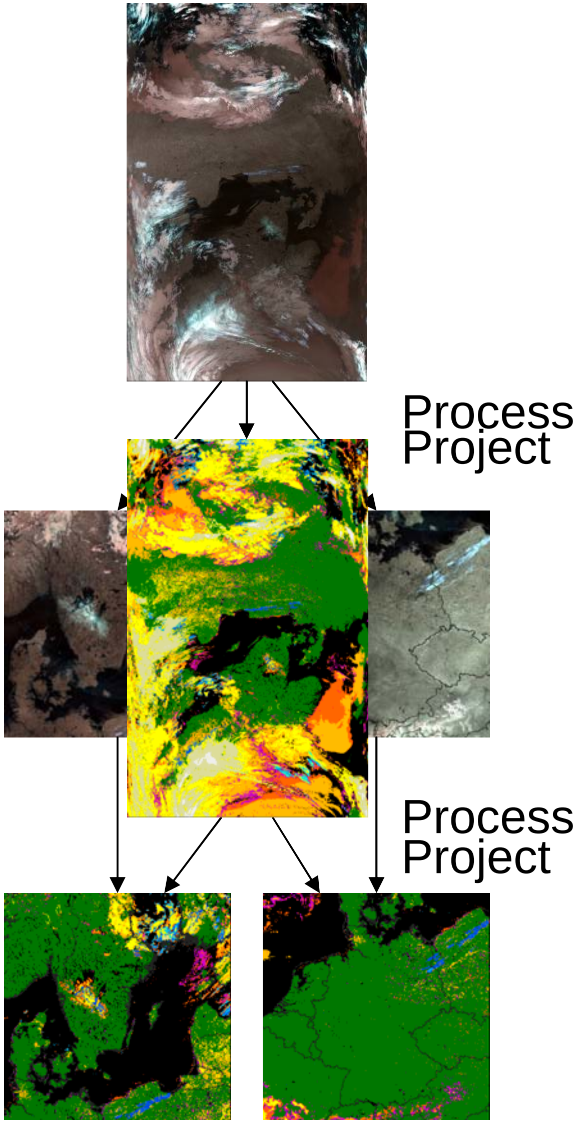
  easy for users and developers alike

Plans: Process on swath only

- Currently two pathways
  - Region: 1) project satellite data, 2) process
  - Swath: 1) process, 2) project result

  => Duplication of code, bugs
- Performance:
  - Region faster for < ~6 1024×1024 areas
  - Swath faster for more processing

How would this affect your processing?



Plans: More automated validation

- PPS currently includes some tools for validation
- Push-a-button validation
- Automatic, periodic, regular validation

Plans: Metadata standards, file formats

- Common information model and metadata standard for LEO and GEO
- Conform to community standards / conventions, such as
  - CF conventions
  - OPeNDAP
- File formats, e.g.
  - HDF5
  - netCDF 4
  - GeoTIFF
- Easier for users to use either LEO or GEO data
- Web services integration

Plans: Simplify Installation, Configuration

- Distribution
  - One complete distribution, including 3rd party dependencies
  - Possibly through script to download needed packages from Aemet servers
- Installation, one of the following candidates
  - Pure GNU build tools, more standardised
    - Umbrella package / installation script
  - Python Distutils
- Configuration
  - Uniform configuration files
  - Even more automated setup
  - Remove multiple definitions

Plans: Portability

- Currently testing only on Intel GNU/Linux
- Solaris user, portability reference

Plans: Technical solutions

- Modularise
- Clean, well defined, persistent interfaces
  - Easier to add functionality without affecting rest of system
  - Users can use whole system or parts
    - I/O, create own products, test/add/replace algorithms
    - **We want to know what you need**
  - Easier to locate bugs
  - Easier to use/replace 3rd party modules, e.g. for projection

- Python as far as possible, C for number crunching
  - Object oriented, cost effective development, easier to build

or

- C core (similar to current system)
  - Users can interface from C programs

Which parts would you like to see in C / Python?

Summary

- More flexible system – for users and developers
  - Easily add satellites/instruments, algorithms
  - Use parts of the PPS software package
  - Modularisation is key, good interfaces

Questions to users

- *Which parts of PPS do you currently use/interface?*
- *Which parts would you like to be able to interface? How would that interface ideally look for you?*
- *What additions/changes to PPS would you like to see in the future?*
- *Do you need support/validation for platforms other than Intel GNU/Linux?*
- *Do you use the Task Manager? Would you like to? On Global Metop?*

- Write down ideas at our poster
- Come talk with us!