
SAFNWC/MSG Package: an overview

26 April 2010

Madrid

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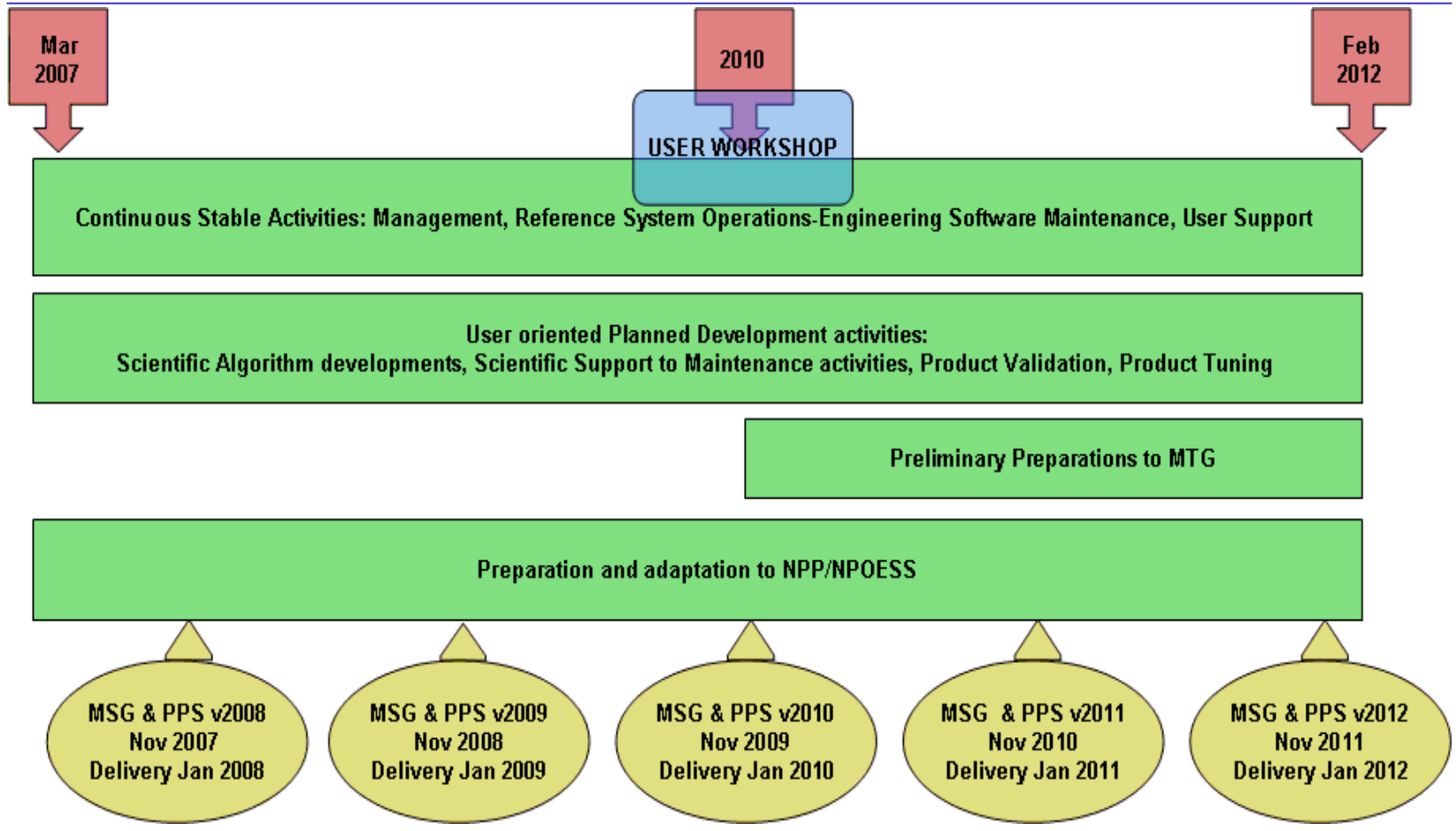
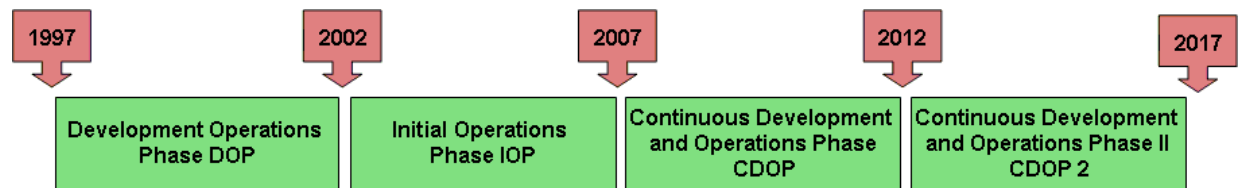
SAFNWC/MSG Package: an overview

- Overview of SAFNWC/MSG
- Evolution of SAFNWC/MSG during CDOP project

SAFNWC/MSG Package: an overview

- The general objective of the SAFNWC is to provide operational services to ensure the optimum use of meteorological satellite data in Nowcasting and Very Short Range Forecasting by targeted users.
- To achieve this goal, the SAFNWC is responsible for the development and maintenance of appropriate SW Packages, as well as of all related tasks for user's support.

SAFNWC Phases



SAFNWC/MSG Package: an overview

- SAFNWC CDOP Project: 2007-2012
- Main Objectives:
 - To Consolidate the use of the NWCSAF/MSG software package
 - Promoting the use
 - To Provide user support
 - Mainly through the Help Desk
 - To Update SW and Science
 - according to user oriented development and validation activities



SAFNWC/MSG Package: an overview

- **Specific Objectives:**
 - To Improve the quality of products
 - Through validation and Development of New Algorithms
 - To Ensure the applicability of the products
 - To MSG-N area as priority, but trying to extend to other regions
 - To Maintain the NWCSAF/MSG SW Package
 - Corrective, adaptive and perfective
 - To start preparatory studies for preparing MTG era
 - Both: SW System and Science
 - To Provide User Support
 - Via Help Desk and Training activities
 - To Develop an iterative process to collect User Requirements
 - Guiding further and future activities

SAFNWC/MSG Package: an overview

- Evolution of SAFNWC/MSG during CDOP project
 - 2007-2010
 - 2 new versions of SAFNWC/MSG Package: v2008 and v2009
 - Version 2010 pending Review and Authorization for release to Users
 - 2010: NWC SAF Users Survey
 - 2010: NWC SAF 2010 User Workshop
 - 2008 Users Survey
 - 2005 Users Survey + Product Assessment Review Workshop
 - 2010-2012

SAFNWC/MSG Package: an overview

- Task Manager
- NWCLIB
- Tools
- PGEs:
 - CLOUDS: CMa, CT, CTTH
 - CLEAR AIR – HUMIDITY, STABILITY INDICES: TPW, LPW, SAI
 - WINDS: HRW
 - PRECIPITATION: PC, CRR
 - WEATHER ANALYSIS AND THUNDERSTORMS: RDT, ASII, AMA

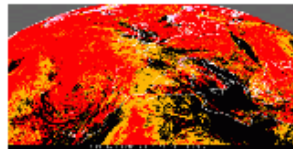
SAFNWC/MSG Package: an overview

MSG

MSG Cloud Products

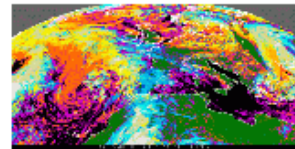
Cloud Mask

[\(Description\)](#)



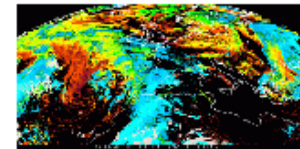
Cloud Type

[\(Description\)](#)



Cloud Top Temperature and Height

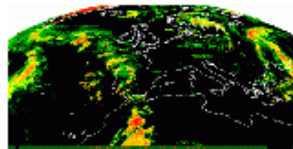
[\(Description\)](#)



MSG Precipitation & Convection Products

Precipitating Clouds

[\(Description\)](#)



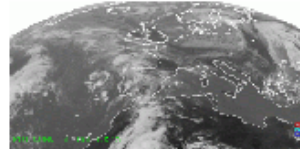
Convective Rainfall Rate

[\(Description\)](#)



Rapid Development Thunderstorms

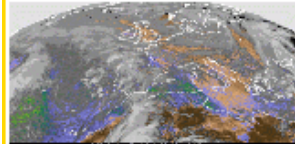
[\(Description\)](#)



MSG Clear Air Products

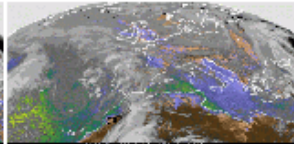
Total Precipitable Water

[\(Description\)](#)



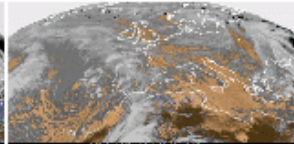
Layer Precipitable Water

[\(Description\)](#)



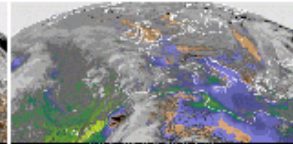
Stability Analysis Imagery

[\(Description\)](#)



SEVIRI Physical Retrieval

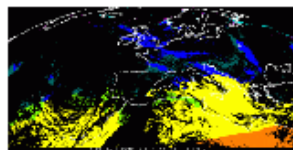
[\(Description\)](#)



MSG Conceptual Model and Winds Products

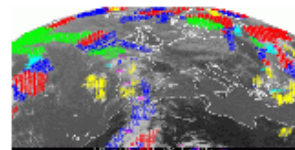
Air Mass Analysis

[\(Description\)](#)



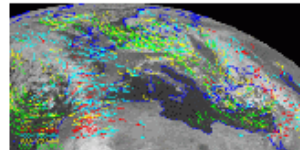
Automatic Satellite Image Interpretation

[\(Description\)](#)



High Resolution Winds

[\(Description\)](#)



SAFNWC/MSG Package: an overview

- SAFNWC/MSG not only implements the 13 PGEs, that is the core of the application, but also implements a Task Manager intended to execute, with minimum human assistance, all necessary tasks for the generation of SAF NWC Products in a real-time operational mode.
- In addition, all common functions are included in the common library NWCLIB.
- The application uses as input the SEVIRI image and other required data, mainly NWP products. Some PGEs need also other PGEs outputs to be executed correctly.
- The Task Manager manages the correct execution of the sequence of task needed to process correctly the application according the timely generation of real-time products.

SAFNWC/MSG Package: an overview

- Tools
 - A set of tools are provided within the \$SAFNWC/src/tools directory. These tools are compiled during the installation of the product and are described below:
 - NWP remapping tools
 - Swap tool for binary data in little-endian environms.
 - *Parallax correction tool*
 - *BUFR to HDF5 conversion tool*
 - *Satellite switch tool*

SAFNWC/MSG Package: an overview

- Evolution/Convergence
 - Scientific documentation
 - ATBD, VR, PUM
 - Commitments
 - Service Specification
 - Product Requirements Document (PRD) and
 - Product Requirements Table (PRT)
 - Products Status (Maturity)
 - Development; Demonstrational; Pre-Operational; Operational

SAFNWC/MSG Package: an overview

- Evolution of SAFNWC/MSG during CDOP project
 - v2008, v2009, v2010

Evolution of SAFNWC/MSG during CDOP project

- SAFNWC/MSG v2008

SAFNWC/MSG v2008

- SYSTEM
 - NWCSAF/MSG System Adaptation to Rapid Scan
 - NWCLIB, Task-Manager and bufr2hdf updated
 - TOPO for 0° (MSG Prime) and for 9.5° (MSG Rapid Scan)
 - NWCSAF/MSG System Adaptation for spectral/effective radiances
 - NWCLIB updated
 - Polinomial FIT

SAFNWC/MSG v2008

- SYSTEM
 - Tested for
 - Solaris 8
 - IRIX 6.5
 - Fedora Core 6, Red Hat Enterprise 3, Red Hat 7.3
 - AIX 5.1

SAFNWC/MSG v2008

- Products & Algorithms
 - CLOUDS Products: Stable
 - Just Minor adaptations
 - Skin Temperature field used as input. (Cold Surfaces)
 - CMa, CT and CTTH were already OPERATIONAL in previous version

SAFNWC/MSG v2008

- Products & Algorithms
 - PRECIPITATION Products:
 - CRR change in flag parameter:
Bit mask describing the processing status (holes from parallax)
 - PC and CRR Pre-OPERATIONAL STATUS

SAFNWC/MSG v2008

- Products & Algorithms
 - CLEAR AIR Products: Major Changes
 - Neural Network Approach
 - Inclusion of Bias Correction Matrices (global and local)
 - TPW and LPW declared as OPERATIONAL Status
 - SAI Pre-OPERATIONAL Status
 - Move to Physical Retrieval Approach
 - New PGE 13 SPhR

SAFNWC/MSG v2008

- Products & Algorithms
 - WINDS Product: Minor Changes
 - Improvement in Height Assignment for High Level Winds
 - HRW was already OPERATIONAL in previous version

SAFNWC/MSG v2008

- Products & Algorithms
 - WEATHER ANALYSIS AND THUNDERSTORMS Products:
 - ASII, AMA: identification of cold cloud-free land via temporal evolution
 - AMA: inclusion of a new parameter AMA_GZ and removal of T-Gradient output. Change in Input dependencies. Flexibility in geographical region selection,
 - ASII was already OPERATIONAL in previous version
 - AMA and RDT Pre-OPERATIONAL Status

Evolution of SAFNWC/MSG during CDOP project

- SAFNWC/MSG v2009

SAFNWC/MSG v2009

- SYSTEM
 - SAFNWC/MSG System Adaptation to run in Linux 32 bit and 64 bit architectures
 - NWCSAF/MSG Automatic System Reconfiguring after a MSG satellite change: check_sat.ksh tool

SAFNWC/MSG v2009

- SYSTEM
 - Parallax correction tool has been integrated in the application
 - Same approach as the one used by CRR
- EMOS library replaced by GRIBEX and BUFRDC

SAFNWC/MSG v2009

- SYSTEM
 - Tested for
 - Solaris 8
 - Fedora Core 6, Red Hat Enterprise 3 (32 bits)
 - Red Hat Enterprise 5 (64 bits)
 - NOT tested for IRIX nor AIX

SAFNWC/MSG v2009

- Products & Algorithms
 - CLOUDS Products: Major Improvements
 - CMA: Better detection of low clouds in twilight conditions (using temporal analysis and growing region technique), a better low cloud detection at night-time over sea (through a more strict thermal threshold applied to sst), a better detection of fast moving clouds (through a temporal analysis) and finally a better dust detection over sea (including a dust detection over sea at night).
 - CTTH: Better tuning (especially through a wider use of the radiance ratioing technique and a better handling of thermal inversion in case low clouds) and a decrease of the box aspect through the implementation of a user-defined segment size (previously having a fixed value of 32 IR pixels).
 - CMA, CT and CTTH were already OPERATIONAL in previous version

SAFNWC/MSG v2009

- Products & Algorithms
 - PRECIPITATION Products: Major changes in CRR
 - CRR: Provides Hourly Accumulation.
 - Hourly accumulations provides estimations at pixel level about the accumulated precipitation in mm during the last hour and it is available every slot.
 - Associated modifications in CRR_DATAFLAG
 - Modified methodology for computing Calibration Matrices: reaching higher rates
 - Update of the parallax correction algorithm
 - PC Pre-OPERATIONAL Status
 - CRR recommended to OPERATIONAL Status BUT conditioned to a more extensive Validation

SAFNWC/MSG v2009

- Products & Algorithms
 - CLEAR AIR Products NN Approach: No Changes
 - TPW and LPW were already OPERATIONAL in previous version
 - SAI Pre-OPERATIONAL Status
 - Pending Conclusion of work in Physical Retrieval Approach
 - New PGE 13 SPhR

SAFNWC/MSG v2009

- Products & Algorithms
 - WINDS Product: Major Changes
 - Use of CT as input for:
 - rejecting tracers that usually perform badly
 - selecting which of the different height levels defined for each tracer (cloud top, cloud medium and cloud base) is best for the height assignment of the wind
 - A new final AMV control check has been included.
 - HRW was already OPERATIONAL in previous version

SAFNWC/MSG v2009

- Products & Algorithms
 - WEATHER ANALYSIS AND THUNDERSTORMS Products:
 - ASII, AMA:
 - ASII: augmentations in dusk/dawn handling. Still based on a fixed grid (but a new one that brings Turkey into the analysis area!).
 - ASII was already OPERATIONAL in previous version
 - AMA Pro-OPERATIONAL Status

SAFNWC/MSG v2009

- Products & Algorithms
 - WEATHER ANALYSIS AND THUNDERSTORMS Products:
 - RDT:
 - The algorithm of discrimination has been refined. The discrimination is processed on three MSG channels (WV62, WV73 and IR108).
 - The cell definition and tracking is processed on IR 10.8 channel. The discrimination is based on IR 10.8 and vapour channels WV6.2 and WV7.3. The discrimination skill shows a great improvement and the convective classification is stable in time.
- RDT Status Promotion pending delta Validation for a longer period

Evolution of SAFNWC/MSG during CDOP project

- SAFNWC/MSG v2010
- Pending Review DRI-2010 (This Week)

SAFNWC/MSG v2010

- SYSTEM
 - SPR-SAF-NWC-IOP-384
 - GRIBEX library replaced by GRIB-API to support GRIB2
 - NWCSAF/MSG System adaptation to GRIB-API
 - All PGEs supported also in 64-bit Linux
 - Use of RTTOV-9 (in previous versions RTTOV-7)

SAFNWC/MSG v2010

- SYSTEM
 - Tested for
 - Solaris 8
 - Fedora 12, Red Hat Enterprise 3 (32 bits)
 - Red Hat Enterprise 5 (64 bits)

SAFNWC/MSG v2010

- Products & Algorithms
 - CLOUDS Products: Major Improvements
 - CMa: Use of HRV as input
 - CT: Computation of Cloud phase flag. The confusion of low clouds as mid-level clouds in case thermal inversion has been reduced.
 - Suppressed auxiliary data installation step for Cloud products (PGE01-02-03)
 - CMa, CT and CTTH were already OPERATIONAL in previous version

SAFNWC/MSG v2010

- Products & Algorithms
 - PRECIPITATION Products: Major changes in CRR
 - PC: No changes
 - CRR: Includes optional CRR computation derived from lightning data. Link to Lightning Imager instrument on-board MTG.
 - Extensive Delta Validation.
 - PC Pre-OPERATIONAL Status
 - CRR promotion to OPERATIONAL Status pending DRI-2010 (This Week)

SAFNWC/MSG v2010

- Products & Algorithms
 - CLEAR AIR Products NN Approach: No Changes
 - TPW and LPW were already OPERATIONAL in previous version
 - SAI Pre-OPERATIONAL Status
 - New SPhR PGe13 (Physical Retrieval Approach)
 - Ready for NWCSAF/MSG v2010
 - Retrieval of vertical profiles of T, q and Tskin
 - Computation of Humidity and Stability parameters and their differences w.r.t. NWP fields used as input
 - SPhR Status pending DRI-2010 (This Week)

SAFNWC/MSG v2010

- Products & Algorithms
 - WINDS Product: Major Changes
 - Adaptation to calculate winds also from MSG/IR108 channel
 - Optimization of the algorithm permitting to calculate winds in both channels (HRVIS and IR108) in the same running time used by PGE09 v2.2 to calculate only HRVIS winds
 - Adaptation to calculate winds in 'Rapid scan mode' in both MSG/HRVIS and MSG/IR108 channels. (Rec. "national areas", every 5 minutes slot)
 - HRW was already OPERATIONAL in previous version

SAFNWC/MSG v2010

- Products & Algorithms
 - WEATHER ANALYSIS AND THUNDERSTORMS Products:
 - ASII, AMA:
 - ASII: Provides the user with full flexibility on the geographical analysis area. Thus, demanding requirements on e.g. NWP data coverage have now been overcome.
 - AMA: No changes
 - ASII was already OPERATIONAL in previous version
 - AMA Pre-OPERATIONAL Status

SAFNWC/MSG v2010

- Products & Algorithms
 - WEATHER ANALYSIS AND THUNDERSTORMS Products:
 - RDT:
 - The algorithm of the cloud object definition has been completely redesigned in order to improve cpu time performance. This new algorithm used a recursive method. Two new arguments has been added into configuration file in order to adapt the computer capacity to the recursive process.
 - The channels IR12 and IR8.7 has been added to the discrimination algorithm.
 - A trajectory file has been added like new output. This file gather all trajectories ended during the time step.
- RDT Status Promotion pending DRI-2010 (This Week)