



The Nowcasting Satellite Application Facility (NWC SAF)

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During the definition of the Meteosat Second Generation project, EUMETSAT introduced, in 1992, the Satellite Application Facility (SAF) concept. SAFs are dedicated centres of excellence for processing satellite data and form an integral part of the distributed EUMETSAT Application Ground Segment. These SAFs have been developed by a consortium of EUMETSAT Member States and Cooperating States.

There are currently five SAFs providing products and services on an operational basis, trying to obtain the maximum benefit of Meteosat Second Generation (MSG) and Polar Platform Satellites.

The pioneer of these SAFs is the NWC SAF, the SAF to support Nowcasting and Very Short Range Forecasting. The final objective of the NWC SAF is the development and distribution of an integrated Software Package to enable the operational extraction of meteorological products to support these activities.

The NWC SAF is led by the Instituto Nacional de Meteorología (INM-Spain), and it is being developed by a consortium of NMSs including Météo-France (MFFrance), the Sveriges meteorologiska och hydrologiska institut (SMHISweden) and the Zentralanstalt für Meteorologie und Geodynamik (ZAMGAustria), covering the scientific needs of the project. In addition, since early stages of the development, the Spanish company GMV is also involved in the project, being responsible of software engineering aspects as system integration, verification, validation and user support activities.

Once the *Initial Operations Phase* has been successfully completed (March 2007) the NWC SAF project is currently in its *Continuous Development Operations Phase*. This phase intends:

- to provide to users updated software packages with additional developments and evolutions according to the new satellite features.
- to reinforce the use of the NWC SAF software packages among the meteorological community (by means of timely updated software packages deliveries, operations activities and users support service).

The goal of the NWC SAF project is fulfilled by means of the operational generation of 12 Meteorological, high level products: Cloud Mask (CMA); Cloud Type (CT); Cloud Top Temperature and Height (CTTH); Precipitating Clouds (PC); Convective Rainfall Rate (CRR); Total Precipitable Water (TPW); Layer Precipitable Water (LPW); Stability Analysis Imagery (SAI); High Resolution Winds (HRW); Automatic Satellite Image Interpretation (ASII); Rapid Development Thunderstorm (RDT); and Air Mass Analysis (AMA).

Main characteristics of the MSG package (SAFNWC/MSG) can be summarised as follows:

- **Modularity:** All processors (called Product Generator Elements or PGE) are implemented as stand-alone and fully operative applications, minimising the interferences between them. Algorithms and processing can be easily updated and modified assuring no impact in the rest of components.
- **Simplicity:** The identification of common needs for many of the components and the implementation of a common library simplifies the development of the PGEs under responsibility of the scientific teams of the project (INM, MF, SMHI & ZAMG).
- **Flexibility:** All components of the application, specially the processing framework, have been designed in order to allow the user a full configuration according its specific needs.
- **Scalability:** The presented design allows adding or removing Product Generator Elements into the system in a quick and configurable way.

The first fully operational version of the SAFNWC/MSG was released during 2004, and recently (during 2007) it has been upgraded to improve the quality of the generated products.

The SAFNWC/MSG application has been extensively tested, providing its robustness from an operative point of view. This software has demonstrated its capability to run in an automatic way with a minimum human support. The application has been designed to run in four UNIX platforms: Sun/Solaris, Intel/Linux (Red Hat - Fedora), SGI/IRIX and IBM/AIX

The Spanish NMS (INM) is running the SAFNWC/MSG application in an operational environment since 2003. All 12 products are properly and timely generated at full satellite resolution for the European Area within 15 minutes after the reception of the MSG images. These products are automatically transferred and ingested into the operational environment of the INM, allowing their visualization, analysis and exploitation. In addition, products over two different regions (covering Europe and Spain) are sent to the project Help-Desk (<http://nwcsaf.inm.es>), allowing a real-time monitoring of the application. Due to EUMETSAT's data policy, real-time products are located in the private area of this Help-Desk. Instead, 1-day old products are available in the open area of the web site.