

CGMS-XXIX EUM-WP-21  
Prepared by EUMETSAT  
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Discussed in WG III

## **UPDATE ON RAPID SCAN SCHEDULES AND APPLICATIONS**

This document reports on the status, schedules and use of Meteosat Rapid Scan Imagery and responds to CGMS Action 28.33.

CGMS Members are invited to take note.

## **UPDATE ON RAPID SCAN SCHEDULES AND APPLICATIONS**

### **1 INTRODUCTION**

Following the success of the rapid scanning support provided to the Mesoscale Alpine Programme in Autumn 1999, and after extensive discussions with potential users, a proposal for an operational Rapid Scanning Service (RSS) has been developed. Rapid Scanning trials began in August 2000 and will continue until the start of the operational RSS, currently foreseen for mid September 2001.

### **2 RSS PREPARATIONS**

The preparations for the RSS can be divided into four main areas:

- Rapid scan image taking and processing
- Fast dissemination of rapid scan images via the Internet
- Extraction of meteorological products from rapid scan images
- Operational and administrative aspects of the RSS

#### **2.1 Image Taking and Image Processing**

The baseline for the RSS involves continuous rapid scan imaging operations for periods of up to three days, with no loss of geometric accuracy in the rectified images, when compared to that normally achieved for full Earth scan images. In addition, the rapid scan images are calibrated and, for Meteosat-6, this also requires a correction for the effects of the Meteosat-6 radiometer anomaly.

The image processing function has been modified to send the rectified, anomaly corrected and calibrated rapid scan images to a new Extended File Transfer System (EFTS) at the end of each rapid scan image taking cycle for sub-area extraction, formatting and dissemination.

Furthermore, minor changes to the automatic image taking procedures have been made in order to allow a 30 second standby period at the end of each rapid scan, rather than the normal 2.5 minute standby used for full Earth scan images. This latter change makes it possible to increase the number of image lines that can be scanned in each rapid scan image taking cycle.

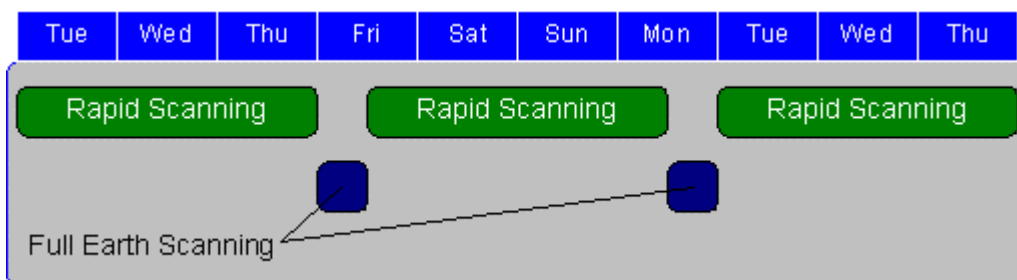
#### **2.2 Rapid Scan Schedule**

Rapid scanning is performed 7 days a week with a 12-hour interruption every 3 days to perform full Earth scanning, needed to derive navigation information for the image processing system. In addition, there is a 3-day break for spacecraft orbit determination rangings, which are needed approximately every month. However, should the equipment used to support the RSS be needed to support either the Meteosat 0° or 63°E Services, this will also lead to interruptions in the RSS.

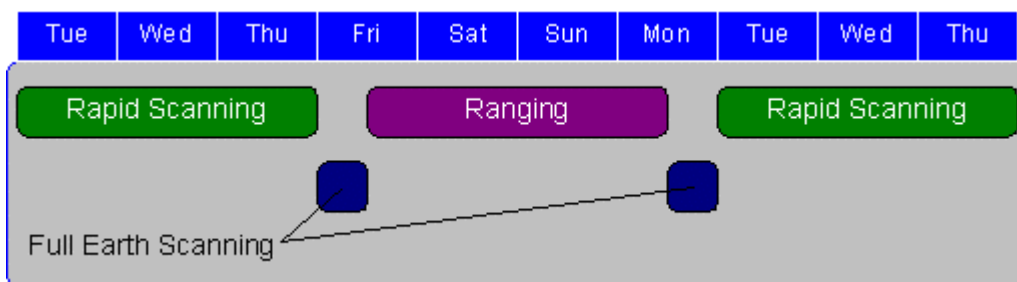
The planned rapid scan schedule repeats on a weekly basis and comprises:

- 12 hours full Earth scanning, starting at 12:00 on a Monday followed by,
- 3 days rapid scanning starting at 00:00 on a Tuesday followed by,
- 12 hours full Earth scanning starting at 00:00 on a Friday followed by,
- 3 days rapid scanning starting at 12:00 on a Friday.

The weekly RSS schedule (without orbit determination rangings) is shown below:



The weekly RSS schedule (with orbit determination rangings) is:



The EUMETSAT Operations Internet Server (OIS) stores copies of the last seven days worth of rapid scan images, for all sub-areas and in all file formats and users will be able to download rapid scan data from this server (see Section 6). In addition, it is possible to FTP “push” specified files to certain Users. Data older than 7 days will only be available from the MARF.

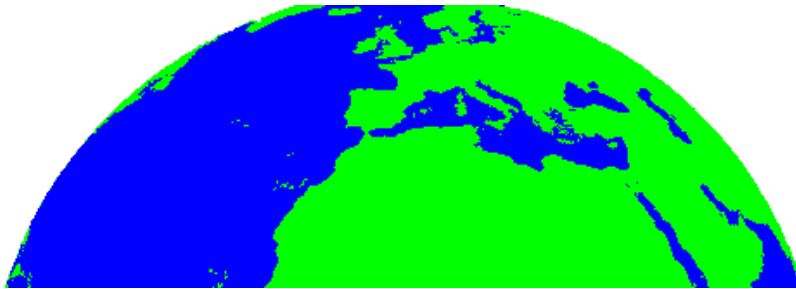
### 2.3 Correction of Meteosat-6 Imagery

As mentioned above, the Meteosat-6 Radiometric Anomaly Correction software has been modified so that it can derive anomaly corrections for rapid scan images. The rapid scan anomaly corrections are based on a cross-calibration with Meteosat-7 images. The anomaly correction, which essentially adjusts the IR and WV radiometric levels so that they correspond to a user-specified calibration, was introduced into the Rapid Scanning trials for validation from 1<sup>st</sup> May 2001. The anomaly correction leads to images that are generally radiometrically stable, however, a final validation of the accuracy of the calibration awaits a validation with the Meteosat Meteorological Product Extraction Facility (MPEF).

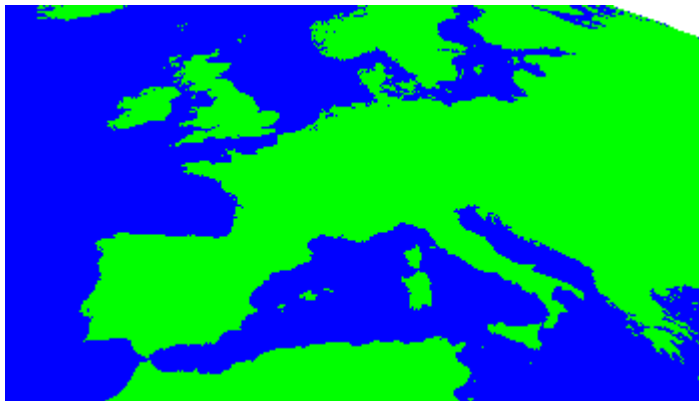
## 2.4 Fast Dissemination Scheme

A “fast delivery” data dissemination mechanism has been introduced for the RSS. In this scheme, each rapid scan image is sent to the Extended File Transfer System (EFTS) at the end of the corresponding rapid scan image taking cycle. Instructions on which sub-areas are to be extracted from the image, which file formats are to be created (e.g. OpenMTP, GIF and JPEG) and where the data is to be sent, also accompany each rapid scan image. Sub-areas supported are the Full Rapid Scan area and a European sector and whilst the area to be scanned is selectable, the baseline scan area for the Rapid Scanning Service covers a latitude range from approximately 10°N to 70°N, as shown below:

A subset of the Full Rapid Scan Region that covers the European sector (see below) is also distributed to



RSS users:



## 3 EXTRACTION OF METEOROLOGICAL PRODUCTS

The rapid scan images generated during the RSS are sent to the Meteorological Product Extraction Facility (MPEF), which then extracts a set of wind products for dissemination via the GTS. Products extracted are:

- Cloud Motion Winds (CMW);
- High Resolution Visible Winds (HRV);
- High Resolution Water Vapour Winds (HWW);
- Clear Sky Water Vapour Winds (WWV).

These products are generated every half-hour and make use of the Rapid Scan data acquired during the half-hour.

#### **4 MONITORING AND REPORTING**

Tools have been put in place to enable the performance of the RSS to be monitored. This enables the derivation of accurate performance figures and reports, in a manner consistent with those in use for the Meteosat 0° and 63°E Services. The following features of the system are monitored:

- The number of scheduled and actual rapid scan images per day, and their geometric and radiometric quality,
- The transfer of rapid scan images from the image processing function to the EFTS,
- EFTS performance, including the transfer of rapid scan images to the specified users and the detection of EFTS hardware and software problems,
- OIS performance, including statistics on user download activity and the detection of OIS hardware and software problems.

#### **5 USER CATEGORIES**

Two categories of users have been defined: users of near real-time data and users of data older than 24 hours.

##### **5.1 Users of near real-time RSS data**

To gain access to near real-time RSS data, a user has to be in possession of a half-hourly High Resolution Image (HRI) licence and, additionally, has to sign an amendment to it. In the situation where a user has not yet concluded an HRI licence with EUMETSAT, a half-hourly HRI licence has to be acquired, however, a Meteosat Key Unit (used to decrypt regular Meteosat HRI data) is not required if the user only requires access to RSS data. Users of near real-time RSS data are also granted access to RSS data older than 24 hours.

EUMETSAT Member States and Co-operating States are exempt from signing any licence when requesting image data for official duty use.

##### **5.2 Users of RSS data older than 24 hours**

These users have the same access conditions as those accessing archive data from the Meteorological Archive and Retrieval Facility (MARF). In this case, the user only has to sign a MARF licence to gain access to RSS data older than 24 hours.

#### **6 ACCESS METHODS**

Access to rapid scan data is given via the EUMETSAT Operations Internet Server (OIS) and data can be accessed using either FTP pull or push.

## 6.1 FTP Pull Service

It is expected that these users will be the majority of users. This group can be subdivided into the following two sub-groups:

- i) User accessing near real-time data (images less than 24 hours). These users are provided with an individual FTP User Name and Password,
- ii) Users accessing image data older than 24 hours. These users are requested to provide the IP address of their server to allow system monitoring. Users will be provided with an FTP account, User Name and Password.

## 6.2 FTP Push Service

The FTP push service is only available for near real-time data and is restricted to NMHS of EUMETSAT Member and Co-operating States for official duty use only.

Users of the FTP 'push' service are also given access to the 'pull' service.

## 7 COMMUNICATION WITH THE RSS USER COMMUNITY

Communication with the RSS user community is carried out via two media:

- **EUMETSAT Web pages.** An RSS news web page has been added to the EUMETSAT web site. This page is updated daily and contains the schedule of rapid scan operations for the following weeks, details of rapid scanning problems during the previous 7 days, plus additional information, as appropriate;
- An **RSS list-server**, which contains the e-mail addresses of all registered RSS users. The RSS list-server will be used to send information to RSS users about planned and unplanned service interruptions and administrative messages;

Communication with RSS users concerning, e.g. registration or other more general correspondence will make use of the e-mail account [ops@eumetsat.de](mailto:ops@eumetsat.de) and will be carried out by the EUMETSAT User Service Helpdesk team.

## 8 SOME APPLICATIONS OF RAPID SCAN IMAGERY

To date, the half-hourly image products from Meteosat have been used for many meteorological applications. They allow detailed monitoring of the state of the atmosphere and through the use of animation show the movement of clouds and the circulation of major weather systems.

Rapid scan imagery, comprising images of selected sectors of the earth every 10 minutes, provides a much better insight into the dynamics of meteorological phenomena, the prediction and evolution of severe weather events, the impact of geographical features on airflow and the derivation of more numerous and more accurate atmospheric motion vectors.

It will be recalled that EUMETSAT first carried out limited trials of rapid scanning using Meteosat-6 in 1999 when it provided detailed image sets for the international Mesoscale Alpine Programme (MAP). Limited scans of the Alpine region were carried out during the Special Observation Period in autumn 1999.

MAP was an international project conceived to coordinate and integrate top quality basic research on mountain meteorology with direct practical applications for numerical weather prediction. The programme aimed at obtaining further insight on the physical and dynamic processes that rule precipitation mechanisms over major or complex orography, and determining three-dimensional circulation patterns in the proximity of large mountain ranges.

Further information about the MAP experiment can be found on the EUMETSAT Web site at <http://www.eumetsat.de> and <http://www.map.ethz.ch>.

## **9 CONCLUSION**

CGMS Members are invited to take note of the status, schedules and some applications of the EUMTSAT Rapid Scan Service.