

WORLD METEOROLOGICAL ORGANIZATION

ET-SUP-8/Doc. 10.4
(02.IV.2014)

COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED
OBSERVING SYSTEMS

ITEM: 10

EXPERT TEAM ON SATELLITE UTILIZATION AND PRODUCTS

EIGHTH SESSION

Original: ENGLISH

GENEVA, SWITZERLAND, 14-17 APRIL 2014

**PREPARING USERS FOR NEW SATELLITES:
Preparation for Meteosat Third Generation**

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Summary and Purpose of Document

This document outlines EUMETSAT's plan to develop a user preparation project for Meteosat Third Generation (MTG).

ACTION PROPOSED

The eighth session is invited to take note and to comment on the proposed approach and future plans.

DISCUSSION

1. MTG Programme

The Meteosat Third Generation (MTG) programme should guarantee access to space-acquired meteorological data until at least the late 2030s.

The Meteosat Third Generation series will comprise six satellites, with the first spacecraft likely to be ready for launch from 2018. The in orbit configuration will consist of two parallel positioned satellites, the MTG-I imager (a 3-tonne satellite with 16 nominal channels) and the MTG-S sounder. The sounder will be one of the key innovations in the new programme, allowing Meteosat satellites, for the first time, to not just image weather systems but to analyse the atmosphere layer-by-layer and perform far more detailed chemical composition studies.

2. Goal of MTG User Preparation

The aim of the preparations is to ensure that MTG satellite data are used by the EUMETSAT Member State NMHS within one year from the successful launch of the first MTG Imaging satellite and to have identified applications areas for the Sounder (IRS) prior to launch of the first MTG-S.

To ensure the smooth transition of the user community from Meteosat Second Generation (MSG) operational services to MTG services the EUMETSAT Secretariat will establish a User Preparation Project. It is assumed that the future project will have 3 distinct phases:

Phase I - Clarification of user preparation requirements and preparation process definition

Phase II - Main user preparation phase prior to launch

Phase III - Evolution and transition to routine operations

In advance of the formal project EUMETSAT has developed a draft Pre-Project Concept document. Excerpts from this document are presented here.

User Preparation Pre-Project Concepts

As part of the preparation for the formal project, an initial set of assumptions have been established based upon on-going dialogues with the user community, the programmed team and science experts.

1. MTG User Community Assumptions

EUMETSAT's current user profile for MSG satellite data comprises:

- NWP centres, (ECMWF & Member State NMHS)
- WMO Users – primarily RA I & RA VI
- Commercial users – Service Providers (other than Member State NMHSs), TV & Internet broadcasters, manufacturers of reception equipment & visualisation tools
- Non-operational users – Research & Educational user community, Amateur users

It is assumed that the MTG user community will have a similar profile. For the purpose of user preparation, specific focus will be placed upon ensuring the readiness of EUMETSAT Member State NMHSs and the wider RA VI and RA I WMO user community. Noting a reliance these users have on the services provided by reception equipment manufacturers, manufacturers will also be supported through the preparation process. It is assumed that the commercial and non-operational user community will benefit from the preparatory activities developed for WMO community.

2. Data Usage Assumptions

Existing near real-time MSG satellite image data are primarily used in support of nowcasting applications. Additionally, some products are used as input to NWP assimilations. It is foreseen that the future MTG prime imaging service will provide continuity of this service without significant changes to the data content and usage. To a large extent, MTG Flexible Combined Imager (FCI) data can be applied to existing use cases.

Whilst the lightning imager will provide new data for the users community, the application of these data are already known through the availability of similar data from other missions, e.g. TRMM, or through ground networks like ATDnet. To a large extent, MTG Lightning Imager data can be applied to existing use cases.

The MTG Sounder data will comprise a new service and as a result, a set of new use cases will need to be identified during the pre-launch years. Heritage polar data e.g. AIRS, IASI, can be used to develop use cases.

3. Test Data & Support Tools Assumptions

It is assumed that the user community will require the following:

Synthetic data - simulated or other data used to test data throughput (formats, segmentation, filename conventions, data volume, data rate, etc.). It is assumed that these data will be provided by the Programme from the instrument and ground segment development teams. It is foreseen that data are initially made available offline, but that they could also be disseminated as test data via the operational delivery means e.g. EUMETCast and the Data Centre.

Proxy data - data with valid scientific content based upon Radiative Transfer calculations to be used to test processing and visualisation tools and to support user training. Proxy data is to be developed to support a variety of test beds so users can familiarise themselves with the use of MTG data within their existing application areas. It is foreseen that the user community are actively involved in the identification of relevant use case scenarios and the “validation” of the proxy data. These data will form the basis for user training. These data would be made available from EUMETSAT via the MTG enhanced operational delivery means (Web, EUMETCast, Data Centre) and they would be integrated into the wider training community websites e.g. EUMeTrain e-port service, MetEd.

Support tools - a set of support tools will be required to allow users to utilise the synthetic and proxy data. It is envisaged that such tools are prepared by the external manufacturing community working in coordination with the MTG Programmed development teams and groups of end users.

4. Data Discovery, Delivery & Access Assumptions

The existing multi-mission facilities supporting the current operational services will be enhanced to accommodate the future MTG services. It is important that enhancements are made to these facilities in advance of the launch of the satellite to support user preparation activities. The following services will be enhanced in preparation for MTG:

Product Navigator - The Product Navigator (online service catalogue) will be enhanced to accommodate the MTG data services as they become pre-operational/operational.

User Management - User registration will be mandatory and/or actively encouraged for most of the MTG services to ensure knowledge of the user community and to enforce data policy as needed. Existing multi-mission registration mechanisms, i.e. the EOP will be updated to reflect the new MTG services.

Data Licensing - It is assumed that there will be an MTG data policy and that this policy (in particular for the FCI data) will follow closely the current policy for MSG, i.e. data will be licensed based upon data delivery frequency and data usage. Access control will be used to support the MTG Data Policy requirements.

Archive Data - Existing Archive Facility will be upgraded to ingest MTG data. The online retrieval interface will be enhanced accordingly to allow for the ordering of MTG data.

Near Real-time Data - EUMETCast will be the prime mechanism used to deliver MTG data to the user community. Existing developments in DVB-S2 will allow the European user community to prepare their reception stations well in advance of the launch of the first MTG satellite. It is envisaged that some data sets may be made available via alternate mechanisms e.g. terrestrial networks or via the Internet. Noting the high volume of data expected from the start of MTG operations, it may not be feasible to disseminate the full data set on the EUMETCast Africa service without additional sources of funding. Requirements for a reduced service may have to be established in coordination with the African user community, in particular WMO RA I. Through international cooperation agreements, other satellite operators serving the RA II/III/IV/V communities may carry a subset of MTG data via their own dissemination systems.

Web Imagery - EUMETSAT will provide a Web based image service based upon MTG data. The operational MTG web imagery service will provide continuity to the existing MSG web imagery service. Prior to launch, MTG proxy data could be used as input to a pre-operational web imagery service. This service could be used for user training/demonstration/test tool.

User Notification Service - The existing User Notification Service (UNS) will be enhanced to include MTG service outage/change/enhancement information.

5. User Information Assumptions

In addition to the proxy data, users will require supporting information on the MTG system and MTG data. It is envisaged that EUMETSAT develops a MTG web area to deliver information covering:

- Satellite instrument descriptions
- Data processing facility information
- Data access information (formats, data volumes, delivery mechanisms)
- Training material
- Product algorithm definitions and user guides
- Launch schedules and commissioning plans
- User workshops/conferences.

EUMETSAT will support WMO's SATURN portal and will provide relevant content as required.

6. Potential Partnership Assumptions

The following external groups could prove useful partners during the User Preparation Project:

- Member States in particular through STG-OPSWG & STG-SWG
- Satellite Application Facilities (SAFs)
- WMO RA I Dissemination Expert Group
- Expert community groups (e.g. ESSL, Convection Working Group)
- Training partners (e.g. WMO-CGMS Virtual Laboratory, EUMeTrain, EUMETCal, COMET, MetEd)
- WMO - ET-SUP / SATURN
- International coordination groups (e.g. CGMS, CEOS, WMO)
- Reception station manufacturers

Engagement with the above communities will be vital to ensure:

- Correct identification of preparation needs
- Development of proxy data sets
- Preparation of training material and delivery of training courses
- Coordination of user preparation with other satellite operators/product providers and the global user community
- Coordination of data processing software tools

Engagement with these communities could be in the form of questionnaires (to establish high-level information), workshops/conferences and dedicated one-to-one sessions.

Coordination with SAFs will be vital to ensure the correct level of preparation of the user community. The execution of certain tasks related to user preparation would benefit from joint coordination between the EUMETSAT HQ and SAFs. SAF activities for MTG will be addressed within the scope of CDOP3.

7. Way Forward and Current Planning

Phase I

During **Phase I**, the main activities foreseen are:

- gathering relevant information with which to prepare a project plan;
- establishing an internal project team and associated external partners.

Phase I Task	Due Date
Make available through the website all available information on the MTG satellites, services and Programme planning	On-going
Begin interaction with selective user groups on MTG user applications and initial training events. *	On-going
Interview selective NMHSs to discuss their preparation plans	Q4-2014
Establish an internal team to work on the initial user preparation activities	Q4-2014
Initiate discussion with SAF Managers regarding user preparation activities and CDOP3	Q3-2014
Establish a OPS lead Project with required budget	Q4-2014
Present Project Plans to STG-OPSWG and STG-SWG	Q2-2015

* Current User Engagement

EUMETSAT has been engaged in several meetings with representatives from the user community

discussing instrument capabilities, product definitions and user applications. For example;

- In July 2013 EUMETSAT hosted a MTG-IRS NWC workshop to discuss the potential value IRS sounding data could bring to NWC applications. Several participants were invited to perform, for specific weather situations, an initial analysis of level 2 products derived from MTG-IRS proxy data. These generated by using a prototype retrieval algorithm configured in line with up-to-date baseline requirements for the MTG operational processor. The workshop concluded with a set of recommendations some of which the User Preparation Project will address.
- In November 2014 EUMeTrain project is preparing an event week on MTG Imagers (FCI & LI).

Phase II

The outcome of Phase I will provide the input for Phase II. Phase II will comprise the core user preparation activities which may be split into Imager and Sounder service preparation.

The current assumptions of this phase are:

Phase II Task assumptions	Due Date
Internal resources will be utilised according to the project breakdown and work packages	2015 onwards
Test data to be developed, packaged according to user needs and made available	Launch -3 years
User training material to be developed and training performed as per the agreed Training Plan	Launch -2 years
Dedicated user information to be generated and made available through the Website / Portals / Apps	2015 onwards

Phase III

Phase III will cover the early operations phase (commissioning plus 18-months) when continued user training and general user preparation activities may still be required, e.g. preparation for the introduction of Day 2 products, data for the RA I user community etc.

Conclusion

EUMETSAT is committed to establishing a MTG User Preparation Project. Current pre-project activities will form the basis for a formal project. EUMETSAT invites feedback from ET-SUP on the current approach to user preparation.
