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METEOSAT THIRD GENERATION (MTG) DATA DISSEMINATION
In response to CGMS action/recommendation A37.03

EUMETSAT is operating a multi-mission dissemination system consisting of EUMETCast, RMDCN and Internet. The baseline for MTG is to use this multi-mission dissemination system to provide data to the end users in near real time.

This paper presents to CGMS in more detail the planned evolution of the EUMETSAT multi-mission dissemination system to accommodate the high data volume demand of MTG. The upgrade of EUMETCast Europe to the DVB-S2 standard will provide the flexibility to add the MTG near real time data in a cost efficient way to the satellite dissemination. This will make MTG data available to all users in the EUMETCast Europe footprint. A subset of these products will be available to users in the EUMETCast Africa footprint. RMDCN is still the appropriate network for operational dissemination of WMO coordinated data for global exchange. EUMETSAT's dissemination system will continue to be able to use a variety of dissemination means and be flexible to adapt to changing needs.

Meteosat Third Generation (MTG) Data dissemination

1 INTRODUCTION

The current EUMETSAT dissemination system comprises near-real-time dissemination using DVB-S broadcast via EUMETCast, point-to-point file based dissemination to other organisations via RMDCN, point-to-point file based dissemination to Internet users and also downloads initiated from Internet users.

The baseline dissemination system is EUMETCast and is currently operated on EUROIRD-9A with a bandwidth of 16.5 Mbps (Mbit/sec) which includes all polar and geostationary EUMETSAT missions, foreign satellite data and a range of other data sets and products.

2 DISSEMINATION EVOLUTION

The dissemination data rate will increase significantly with upcoming systems such as Metop B/C, MSG3/4, GMES S-3 and MTG, where GMES S-3 and MTG are the main data volume contributors. For the S-3 mission the expected data rate is, after compression, in the order of 60 Mbps. For MTG, the current sizing assumption for a 3 satellite configuration represents between 100-120 Mbps (after compression), with the deployment staged over several years. This is resulting in an estimate of 180-200 Mbps dissemination for the fully configured S-3 and MTG systems.

Several studies have been conducted and more will be performed in future in order to converge on the best evolution path for the EUMETSAT integrated dissemination system. The studies addressed satellite dissemination, managed terrestrial networks (RMDCN) and the research based network of DANTE (GEANT3 in Europe).

2.1 SATELLITE DISSEMINATION

The results from the studies suggest:

- It is technically possible to accommodate 300 Mbps or even more on a number of transponders by scaling up EUMETCast;
- The DVB-S2 standard is the key to achieve those data rates. More advanced coding and modulation standards allow a huge increase of the throughput on existing transponders;
- In DVB-S2 the data throughput can be dynamically shaped for different services even on the same transponder. For instance it would be possible to supply common data at data rates with 36 Mbps and optimised to small 80cm dishes (like the current user base), at the same time as a second service operates at 60 Mbps optimised to higher data throughput volume and requiring 2.40m dishes to supply such very high volume data to a limited number of high-rate end users;

- The possibility to change the throughput of a single 36MHz transponder between 72-120 Mbps at only the cost of larger reception antennas is a very cost effective way for staged bandwidth increase scenarios like the one anticipated;

2.2 TERRESTRIAL DISSEMINATION

RMDCN is the existing data communication network in RA-VI expanding also to Asia and US.

Overall it can be said that RMDCN would, in future, be able to cater for unicast and also multicast connections with hundreds of Mbps bandwidth to a limited number of high-rate endpoint Member States as long as they are part of the main MPLS cloud.

RMDCN is still the appropriate network for operational dissemination of WMO coordinated data for global exchange.

The assessment of the suitability of the research based network of DANTE for dissemination and associated tests are presently ongoing.

In summary it can be said that:

- It is technically possible to disseminate very high volumes but only to a limited number of end-points;
- Terrestrial dissemination is not suitable to serve many geographically diverse end-points with such volumes operationally because the required very high, reliable bandwidth is still not commonly available;
- A main issue with disseminating high volumes to many users via terrestrial links is the implicit data replication and resulting exponential resource demands on the sender side. This data replication applies also if multicast is used on terrestrial networks because then the routers need to replicate each data set on network level for each different physical link. Furthermore on reliable multicast, which is due to the SLA end-user requirements compulsory, the entire multicast network will only be as fast as the slowest participant due to the ack/nack feedback and resulting resends.

2.3 Summary of the trade off analysis

The analysis indicates that satellite broadcast on several transponders using the DVB-S2 standard offers the most effective and scalable way to supply common high timeliness data to an unlimited number of users (within the satellite footprint) and also to supply high volume data to specialised users. If more centres emerge which want to have access to the high volume data only an installation of an appropriately sized reception dish would be required and therefore this dissemination concept is very scalable with respect to a growing number of users and also staged increases in bandwidth demands.

Each dissemination method has its strengths and weaknesses:

- Satellite broadcast is the most appropriate solution for operational dissemination from 7 users onwards;
- The result suggests that there is an affordable evolution path for a satellite broadcast solution;
- RMDCN remains to be applicable for dissemination of WMO coordinated data for global exchange;
- DANTE based solutions at this point in time are potentially more appropriate for bi-lateral data exchange or special cases with a very limited number of users;
- EUMETSATs ground segment dissemination system will continue to be able to use a variety of dissemination means and be flexible to adapt to changing needs.

3 MTG DISSEMINATION

The baseline for MTG dissemination is to use the integrated EUMETSAT dissemination system. This will consist of an upgraded DVB-S2 based EUMETCast Europe, EUMETCast Africa, RMDCN and Internet. Also DANTE based solutions are taken into consideration for special cases or bi-lateral data exchange.

The MTG near real time dissemination will use EUMETCast and will be split into two services: a medium rate service for small inexpensive end user equipment, and a high rate service requiring large antennas and more professional DVB reception equipment. A subset of the MTG products will be available on EUMETCast Africa. The details are still being analysed.

RMDCN remains to be applicable for dissemination of WMO coordinated data for global exchange.

4 CONCLUSIONS

CGMS is invited to take note of the current status and evolution of the EUMETSAT multi-mission dissemination system, and the evolution of the EUMETCast Services with regards to MTG.