

WMO STRATEGY TO IMPROVE SATELLITE SYSTEM UTILIZATION

(Submitted by the WMO)

Summary and purpose of document

This document informs CGMS of the further development of the Strategy to Improve Satellite System Utilization

ACTION PROPOSED:

CGMS to review the WMO Strategy to Improve Satellite System Utilization, provide comments, and take action as appropriate.

- Appendices:**
- A. Strategy to Improve Satellite System Utilization
 - B. Conclusion and Recommendations of the Expert Team Meeting on Satellite Systems Utilization and Products, Locarno, Switzerland
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DISCUSSION

1. CGMS XXVI was informed of the development of a new Strategy to Improve Satellite System Utilization. Subsequent to CGMS XXVI, CBS Ext. 98 strongly endorsed the Strategy as contained in Appendix A, as well as to a set of recommendations to improve satellite system utilization as follows:

(a) All operational, research and experimental satellite data with potential usefulness for WMO Programmes be made available to the users;

(b) Satellite operators to consider the inclusion of a Data Distribution Service onboard each geostationary meteorological satellite. Users should also be made aware of the possibility of receiving satellite data through alternative means, such as the Internet;

(c) Improve the performance of the MTN and the GTS to accommodate the increasing flows of satellite data and products that are necessary to improve the utilization of satellite systems;

(d) The expansion of DCP usage for agriculture and hydrology be encouraged by the relevant WMO technical commissions;

(e) WMO seek potential funding/sponsors to provide workstations and networks in developing countries.

2. At CBS Ext. 98 and as part of the restructuring of the Commission for basic Systems, an Open Programme Area Group for Integrated Observing Systems (OPAG IOS) was formed. The Chairman for the OPAG IOS is Dr James Purdom and during a meeting of the CBS Advisory Working Group several Expert Teams were identified to address specific issues of importance to CBS. In particular, the Expert Team on Satellite Systems Utilization and Products was asked to further develop the new Strategy.

3. At the Expert Team's Meeting in Locarno, Switzerland, 2-4 June 1999, the Strategy was discussed in light of an analysis of a questionnaire that had been sent to all WMO Members. The meeting was impressed with the depth and breadth of responses as well as the analysis. Due to the comprehensive nature of both, the meeting was able to make recommendations to WMO Members and also for further improvements to the questionnaire process. The meeting also agreed that a further in-depth analysis including the Application of Satellite Technology Progress Reports should be performed after which the results should be published as a WMO Satellite Activities Technical Document.

4. With regard to the questionnaire process, the meeting agreed that a periodic evaluation should be performed (by the Expert Team or a rapporteur) in order to compare the present responses with those provided two years ago. Such a process should also be repeated on a biennial basis and reported in the biennial Applications of Satellite Technology Progress Reports. The meeting also proposed changes to the structure of the Progress Reports in order to describe better WMO Member usage of satellite data which would include essential elements of the questionnaire. Such a combination would eliminate the need to distribute requests for inputs to the Progress Reports and a questionnaire and allow for a more quantitative monitoring of certain key issues. In combining the Progress Report and questionnaire, requests to WMO Members for information would be streamlined and more efficient.

5. The Expert Team noted that the initial analysis concentrated on the status of the use of different satellite data in various application areas and of the requirements and use of several products retrieved from satellite data. Sixty-one responses to the questionnaire were available. This was considered a high rate of responses indicating the high interest of WMO Members in

satellite technology. The performed analysis gave information on the extent to which satellite data and products were used or requested for in several different application areas and on the level of satisfaction on the quality and availability of the satellite data. One important conclusion was that many WMO Members in Regions II, III, IV and V had requested geostationary imagery every 30 minutes. Such a frequency interval was not presently available but stated as the highest priority for the application areas of nowcasting and aeronautical meteorology.

6. The initial analysis also provided information on retrieved products to which highest satisfaction could be assigned, i.e. products that have the highest quality and high priority for the particular application (the priority was stated in four levels). The analysis also provided information on products with the largest deficit (data requested, but not available and priority 1) for different application areas as well as on important requested parameters (not available and priority 1 or 2).

7. Statistics for the initial analysis also indicated which parameters were of significance for a particular application (if at all), which were valuable for an application area (i.e. quality high or medium and high priority), which had problems and which had specific problematic parameters. Finally the statistics indicated which parameters were not used or requested for each of the different application areas.

8. Based on the results of the initial analysis of the questionnaire, the Expert Team developed and agreed upon a list of recommendations as contained in Appendix B.

9. The meeting noted that in anticipation of the advanced next generation of meteorological satellite systems and the expected transition from analogue to digital transmission mode developing countries were now faced with the urgent need to build their capacities to ensure optimal utilization of these new systems. In order to assist WMO Members in building their capacities, the meeting discussed a WMO region-wide strategy aimed at addressing needs and possible technical solutions that would ensure the development and utilization of appropriate satellite application products, coupled with Education and Training (E&T) at minimal costs and tuned to user requirements. With regard to WMO Region I, the meeting discussed the possible establishment and development of Sub-regional African Institutes for Meteorological Satellite Applications (AIMSA) which were expected to focus on providing technical solutions for the emerging needs, e.g. the transition of analogue to digital mode that would require an immediate need to develop new applications and the translation of research activities to operational phase within the NMHSs in Africa. This strategic approach was based on the past positive experiences of the Co-operative Institute of Meteorological Studies (CIMSS) of the United States and the Satellite Application Facilities (SAF) of EUMETSAT. Furthermore, the establishment of the AIMSA would, in essence, be building on the existing infrastructure and be in-line with the overall objectives of WMO. The Expert Meeting agreed that it should serve as a role model for similar structures in all other WMO Regions. The meeting was unanimously in agreement with the establishment of such institutes.

STRATEGY TO IMPROVE SATELLITE SYSTEM UTILIZATION

STRATEGIC GOAL	MAJOR OBJECTIVES	PROJ	PROPOSED ACTION TOPICS
To improve systematically the utilization of the GOS space-based sub-systems capabilities with emphasis on improving utilization of satellite data and services in developing countries	To focus on the needs of developing countries	BEN	<ul style="list-style-type: none"> - Foster improved promotion of systems use at User Forum - Favour multiagency strategy promoting satellite system benefits - Focus on improved warning and monitoring of environmental hazards such as severe weather, volcanic ash, air and ocean pollution etc.
		DPD	<ul style="list-style-type: none"> - Study the concept of specialised centres and networks to assist NMHSs in the use of satellite data, e.g., new applications, NWP products - Promote better transfer from research to operational applications - Focus in high identified priority user requirements for satellite applications - Assure closer operational development links with Pls - Implement operational distributed database system - Study specifications for improved WMC/RSMC satellite products
	E&T	<ul style="list-style-type: none"> - Favour the implementation of specific satellite E&T programmes in RMTC's and organisation of other relevant WMO training activities - Expand US-based virtual lab network in RA III & IV - Focus on better use of polar -orbiting data and products 	
	INF	<ul style="list-style-type: none"> - Evaluate the status of aid projects (Swiss, Italian...) - Seek CGMS help for assuring the continuity of Indian Ocean/RA II satellite coverage - Propose major WMO project on low-cost satellite workstation - Promote the expansion of EUMETSAT MDD system use in RA I & II - Focus on effective use of LRIT in RA II & V (with MTSAT-1) - Focus on a smooth transition from WEFAX/APT to LRIT/LRPT - Focus initial funding on work station and networking - Expand use of DCP/DRS for agriculture and Hydrology - Pursue improved performance of the MTN and GTS to accommodate increasing flows of satellite data - Promote a better use of Internet and systems such as VSAT 	
	To improve the access to satellite data through increased effectiveness in the distribution of satellite system data and products at major hubs- in particular those maintained by satellite operators, WMO WMC's RSMC and other entities as appropriate	RM	<ul style="list-style-type: none"> - Continuously perform critical review process of satellite data availability and use linking monitoring to action plans - Review WMO requirements for new Earth Observation Satellite data

Proposed action items are considered under the following project areas:

- BEN = Improve benefits, mainly through promotion
 DPD = Data processing and development of new methodologies
 E&T = Education and Training;
 INF = Infrastructure, including receiving stations, DCP, MDD equipment etc. and TLC
 RM = Continuous review and monitoring activities

CONCLUSION AND RECOMMENDATIONS OF THE EXPERT TEAM MEETING ON SATELLITE SYSTEMS UTILIZATION AND PRODUCTS, LOCARNO, SWITZERLAND

The Expert Team Meeting:

1. Encouraged the establishment of cooperative institutes for meteorological applications within WMO Regions with the aim of translating the already existing methodologies not fully exploited into operational practices and develop new products tailored to specific needs;
2. Regarding the Questionnaire on the Use of Satellite Data and Products and as a guideline to be reviewed further consistent with Annex V, recommended that:
 - (a) a periodic evaluation of the questionnaire be performed to obtain trends and awareness of the improvements achieved and identify critical areas to be addressed;
 - (b) the Application of Satellite Technology Progress Reports and the Questionnaire on the Use of Satellite Data and Products be combined to be issued biennially;
 - (c) the chapters in sequence for the combined Application of Satellite Technology Progress Reports be:
 - (1) Chapter I Summary of major highlights
 - (2) Chapter II Current operational use (including validation, verification, performance statistics)
 - (3) Chapter III Research and Development
 - (4) Chapter IV Plans for future operational systems
 - (5) Chapter V Other items
 - (6) Chapter VI Questionnaire
 - (d) a shortened version of the questionnaire contain the following:
 - (1) Data and frequency availability: type of satellite, availability, means of availability (Direct reception (HR, WEFAX), INTERNET, GTS etc.);
 - (2) Use of satellite data: image interpretation (qualitative use), extraction of parameters/products (quantitative use);
 - (3) Processing: processing by NMHS or provision of products by others;
 - (4) Method for use of satellite data: nowcasting (not NWP), assimilation in numerical models, etc.;
 - (5) Application areas and needed data frequency: aeronautical meteorology, marine meteorology, agricultural meteorology, climate, hydrology, public weather services, environmental applications including natural hazards, others;
 - (6) Use of satellite parameters for application areas (list of parameters as in the present version of the questionnaire plus some others such as: wind profile, radiances, volcanic ash, salinity, etc. and that there be only three priority levels;
 - (7) Limitation on use of satellite data (as in the present version of the questionnaire);

- (8) Other information: under point 9.2 add a question regarding availability and effectiveness of training in satellite meteorology (method of training, e.g. through RMTTC, CAL etc., duration,...). Question Nos. 9.1 and 9.3 to be retained;
 - (9) Delete questions relating to archiving and DCPs.
3. Regarding the availability of satellite data to users, recommended that:
 - (a) the OPAG IOS Chairman, as a matter of urgency, inform CGMS satellite operators of the requirement (nowcasting) for the dissemination of half hourly data from geostationary satellites;
 - (b) in recognizing and re-confirming the World Weather Watch goal that all NMHSs have at least a geostationary and a polar-orbiting direct readout satellite data receiver, they are also able to receive satellite data through INTERNET and other emerging technologies;
 - (c) half hourly data from geostationary satellites be available on the INTERNET for training purposes;
 - (d) following the dramatic increase of the performances and the continuous decrease of the cost of the telecommunications services, NMHSs should take the necessary actions to be capable of benefiting from this emerging technology.
4. Regarding the retrieval of geophysical parameters from satellites and noting the users' needs which were requested at the highest priority but were not available in a satisfactory way, recommended that further development concentrate on the possibility of having at least the following parameters:
 - (a) Quantitative precipitation estimates;
 - (b) Atmospheric instability.
5. Regarding the non-availability of satellite receiving equipment for some WMO Members and the detrimental impact for inadequate training and poor access to appropriate application software, strongly urged the further development of the "virtual" laboratory concept;
6. Urged WMO Members to utilize home pages and Internet as a means of communication on satellite system status, data dissemination, distribution of training materials, and coordination of science activity;
7. Suggested the Chairman OPAG IOS draw the attention of WMO Members and CGMS satellite operators to the potentially large and positive return on financial and personnel resource investments made by them that allow the early and full use of present and future satellite systems.