CGMS-XXVIII
WMO WP-3
Prepared by WMO
Agenda item: G.1

MATTERS RELATED TO APT AND WEFAX AND CONVERSIONS

(*Submitted by the WMO*)

Summary and purpose of document

This document describes the status of activities related to the conversion of the APT/WEFAX services from analogue to digital scheduled to occur during the decade; a new technical document on the migration of satellite receiving stations and the WWW goals for implementation of satellite ground receiving stations.

ACTION PROPOSED

CGMS Members to update the Status for LRIT/LRPT conversion for satellites in polar and geostationary orbit as contained in the Appendix and comment on the activities related to WWW implementation goals for satellite ground receiving stations, as well as the status of the new technical document on the migration of satellite receiving stations.

Appendix: Status for LRIT/LRPT conversion for satellites in polar and geostationary orbit

DISCUSSION

APT/WEFAX Conversion

1. The Appendix shows the latest status for LRIT/LRPT conversion for satellites in polar and geostationary orbit. The tables were reviewed at the twenty-seventh session (October 1999) of CGMS where the satellite operators discussed the dates when the new digital services would commence for their satellite systems and the duration of a transition period when both analogue and digital services would be available. Information received by WMO since CGMS-XXVII concerning the status for MSG and MTSAT-1R have also been added to the tables. The tables are available on Internet through the WMO Satellite Activities home pages at <http://www.wmo.ch/hinsman/APT_WEFAXstatus.html>.

2. An analysis of the Appendix for LRIT conversion indicates that in WMO Regions I (Africa) and VI (Europe) there will be an eighteen month overlap starting in July 2003. WMO Regions II (Asia) and V (Southwest Pacific) will have a twenty month overlap starting in July 2003. WMO Regions III and IV (South, Central and North America including the Caribbean) will possibly have no overlap starting with the launch of GOES-N. The Indian Ocean area (RA II) appears to have no overlap starting in 2002. The duration of some of the above overlaps may be optimistic. It should be recalled that CGMS Members have already indicated to WMO their intention to provide for a three year overlap. While recognizing satellite development schedules can vary, the greatly reduced transition plan for LRIT will place many WMO Members in a position where the reception of satellite data may not be possible unless further action is taken by the satellite operator.

3. An analysis of the table for LRPT conversion shows that the morning (AM) satellite will start LRPT in 2003 while the afternoon (PM) satellite will start LRPT in 2009. Since there will be no transition period for the AM orbit or PM orbit separately, but rather a six-year period when both APT (PM) and LRPT (AM) will be available, it will be necessary to maintain a dual capability (APT and LRPT) during the period 2003-2009 if it is deemed necessary to have information from AM and PM satellites. Although not formally notified, WMO has been informed that the NPOESS series may use 401 MHz rather than 137 MHz. The use of 401 MHz will require all WMO Members to maintain two separate polar-orbiting receivers, assuming that NPOESS uses LRPT. The only Space to Earth allocation for Meteorological Satellites in the 401 MHz region is 400.15 MHz to 401.00 MHz. Meteorological Aids share the same allocation on a co-primary status.

4. It can also be seen that the inclusive transition period for all regions will cover the period from 2003 until 2009 or more.

Technical document on the Migration of Satellite Receiving Stations

5. The second session of the CBS OPAG IOS Expert Team on Satellite System Utilization and Products occurred 25-29 October 1999 in Melbourne, Australia. The second session recalled that the Expert Team Meeting in Locarno, Switzerland had discussed the migration from analogue to digital services (APT/WEFAX to LRPT/LRIT). The Locarno meeting had recommended the development of a technical document describing how to exploit the new digital services. It agreed upon the outline and schedule for such a technical document. The second session was informed that a consultant had developed a draft technical document based on materials provided by CGMS satellite operators guided by the prescribed outline. The second session reviewed the draft technical document and provided input to allow the completion and publication of the technical document prior to the delivery of the LRIT service from JMA's MTSAT which was then expected in mid-2000. The session also noted that the new technical document would be available in both hard copy and accessible via the WMO web pages.

6. The second session strongly supported the development and publication of the technical document. Whilst recognizing the primary focus of the new technical document, the session was also of the opinion that it should be expanded at its next revision to include similar information for the high resolution services (HRIT (High Rate Information Transmission) and AHRPT (Advanced High Resolution Picture Transmission)). Since these areas were already of value to WMO Members, the

session confirmed that the Table of Contents already included references to the high-resolution services with the expectation that the appropriate materials would be added to the technical document at a future update. The Table of Contents would also list other possible digital services.

7. In view of the delays in the launch of MTSAT-1R and MSG, the technical document is being finalized for distribution in 2000 with the expectation that a new technical document would be issued with updated information, as appropriate.

WWW goals for satellite ground receiving stations

8. The third session of the CBS OPAG IOS Expert Team on Satellite System Utilization and Products also reviewed the present WWW goals for the percentage of implementation for WMO Members equipped with satellite receiving equipment. The goals were 100% for polar-orbiting satellite data receivers (either APT or HRPT) and 100% for geostationary satellite data receivers (either WEFAX or HR). This meant that each WMO Member should be equipped with at least one polar-orbiting satellite data receiver and one geostationary satellite data receiver. The goals have been used since 1992.

9. While the present goals recognized the importance of the different constellations of the space-based Global Observing System (GOS), i.e., the polar-orbiting and geostationary constellations, they did not take into consideration the varying size, in terms of geographical surface area, of WMO Members. For example, the goal that both a small and large country, regardless of size, have a polar and a geostationary receiver could be viewed as unbalanced especially knowing that some large WMO Members span several time zones which implies many different polar-orbiting passes or the ability to view several different geostationary satellites.

10. In specifying that each WMO Member should have at least one high or low resolution station for both geostationary and polar-orbiting satellites, the WWW goal assumed that satellites would have a direct broadcast capability with two data flows (high and low rate information transmission), and that all the information needed could be met by these broadcast facilities in addition to the GTS, which was used to disseminate data and products.

11. The third session was of the opinion that this assumption was consistent with the basic design of most satellite programmes that had been approved so far, and would be valid to a large extent for the next 10 to 15 years. However, considerations on possible changes in the concept for the direct broadcast service (see WMO WP-18) from meteorological satellites and in the long-term development of data dissemination would have to take into account the development of users' information needs as well as rapidly emerging telecommunication technologies.

12. The session discussed the need for more appropriate implementation goals for ground receiving stations by WMO Members. It noted that while the present goals were based on the configuration of the required reception equipment, i.e., the antenna and front-end electronics, the session considered that it was more appropriate to state the goals in terms of real-time data access and processing capability.

13. Concerning data access, the session considered that there was a need to prioritize goals as follows:

- first priority should be access to both LEO and GEO satellite imagery and sounding data from the space-based component of the Global Observing System;

- second priority should be access to additional data from relevant earth observation and research satellites.

14. Concerning data processing, the goals should reflect the needs in appropriate application areas such as Hydrology, Agricultural Meteorology, Nowcasting and Very Short-Range Forecasting

(VSRF), Aeronautical Meteorology, Public Weather Service and Global and Regional NWP.

STATUS FOR LRIT CONVERSION, SATELLITES IN GEOSTATIONARY ORBIT
(updated 23 August 2000)

Operator	Satellite	Launch (M/Y)	Service	Start	Stop
EUMETSAT	Meteosat 5	03/1991	WEFAX	03/91	
	Meteosat 6	11/1993	WEFAX	11/93	
	Meteosat 7	09/1997	WEFAX	07/97	12/2003
	MSG 1	1/2002	LRIT	7/02	2007
	MSG 2	2002	LRIT	2003	2008
	MSG 3	2007	LRIT	2008	2013
India	INSAT I-d	06/1990	None		
	INSAT II-a	07/1992	None		
	INSAT II-b	07/1993	None		
	INSAT II-e	---	None		
Japan	GMS-5	03/1995	WEFAX	06/95	07/2004
	MTSAT-1R	01/2003	WEFAX LRIT	07/03 07/03	03/2005 07/2008
	MTSAT-2	07/2004	LRIT	07/08	07/2013
USA	GOES - 8	04/1994	WEFAX	11/94	
	GOES - 9	05/1995	WEFAX	01/96	
	GOES - 10	04/1997	WEFAX	06/97	
	GOES - 11	05/2000	WEFAX	09/00	
	GOES - M	08/2002	WEFAX	10/02	
	GOES - N	2002	WEFAX/LRIT		
	GOES - O	2005	WEFAX/LRIT		
Russian Federation	Elektro-1	11/94	WEFAX		
	Elektro-2	---	WEFAX		
	Elektro-3	2002	LRIT	2002	
China	FY-2	---	WEFAX		

STATUS FOR LRPT CONVERSION, SATELLITES IN POLAR ORBIT
(updated 23 August 2000)

Operator	Satellite	Launch (M/Y)	Service	Start	Stop
EUMETSAT	Metop-1	2003	LRPT	2003	
	Metop-2	2006	LRPT	2006	
	Metop-3	2010	LRPT	2010	
USA	NOAA-9	12/1984	APT	12/84	08/95
	NOAA-12	05/1991	APT	05/91	
	NOAA-14	12/1994	APT	12/94	
	NOAA-15	08/1997	APT	08/97	
	NOAA-L	09/2000	APT	09/00	
	NOAA-M	04/2001	APT	04/01	
	NOAA-N	12/2003	APT	12/03	
	NOAA-N'	07/2007	APT	07/07	
	NPOESS-1	07/2009	LRPT	07/09	
	NPOESS-2	10/2010	LRPT	10/10	
China	FY-1C	05/1999	None		
	FY-1D	12/2001	None		
Russian Federation	Meteor 2-21	08/1993	APT	08/93	
	Meteor 3-5	08/1991	APT	08/91	
	Resourse-01-N4	----	APT		
	Meteor 3M-1	----	APT		
	Meteor 3M-2	2002	LRPT	2002	