CGMS-XXX
WMO WP-15
Prepared by WMO
Agenda item: H.3
Plenary

WMO EXECUTIVE COUNCIL CONSULTATIVE MEETINGS ON HIGH-LEVEL POLICY ON SATELLITE MATTERS

(Submitted by WMO)

Summary and purpose of document

To inform CGMS Members of the results from the second session of the WMO Executive Council Consultative Meetings on High-Level Policy on Satellite Matters.

ACTION PROPOSED

CGMS Members to note the deliberations and results of the second session of the WMO Executive Council Consultative Meetings on High-Level Policy on Satellite Matters and comment as appropriate.

DISCUSSION

1. This document contains items of relevance to CGMS arising from the second session of the Consultative Meetings on High-Level Policy on Satellite Matters (CM-2) held in February 2002. Items discussed in CM-2 but covered in other WMO working papers, i.e., WMO WP-6 – WMO Space Programme, WMO WP-23 – CGMS Membership and WMO WP-24 – GCOS Principles for Climate, are only briefly referred to in this document for completeness.

Expansion of the GOS

2. CM-2 noted that the fifty-third session of the WMO Executive Council (June 2001) had endorsed the *Guidelines for requirements for observational data from operational and R&D satellite missions* developed at CM-1 (January 2001). After CM-1, the *Guidelines* had been forwarded to the space agencies and several Research and Development (R&D) space agencies had responded positively.

3. The fifty-fourth session of the WMO Executive Council (EC-LIV) held in June 2002 was pleased to learn that at CM-2 several R&D space agencies responded positively. The National Aeronautics and Space Administration (NASA) of the USA confirmed its commitment to WMO and to the world community to make observations available without restriction. It further indicated that this policy would apply to all relevant missions. Therefore, since data from NASA's Earth observation missions were readily available, its satellites can be considered *de facto* as part of the space-based component of the Global Observing System (GOS). The European Space Agency (ESA) confirmed that it was establishing a dialogue towards the development of information for WMO Members concerning the availability of specific data and products from ESA's EO satellite missions, and in particular from the ENVISAT mission launched in March 2002. ESA further indicated that it would propose to its Programme Board for Earth Observation (PB-EO), to organize jointly a dedicated, specific Announcement of Opportunity (AO) to foster the use of ESA Earth Observation data by the WMO community. The National Space Development Agency of Japan (NASDA) indicated that its future satellite missions including ADEOS II and the GCOM series were candidate systems to contribute to the new R&D constellation for the space-based component of the GOS. Finally, the Russian Aviation and Space Agency (Rosaviakosmos) confirmed that experimental and R&D instruments on board its operational METEOR 3M N1 satellite as well as on its future Ocean series and other missions could be considered as a potential contribution to the space-based component of the GOS.

4. Therefore, the space-based component of the GOS is now comprised of three constellations, operational geostationary, operational polar-orbiting and R&D satellites as shown in Figure 1.

Synopsis of the utility of R&D satellite data and products for WMO Members

CM-2 reviewed a report that was a synthesis of input from the operational user communities on the utility of existing R&D data including persuasive arguments related to their impacts from R&D satellite missions. CM-2 recalled that EC-LIII was of the opinion that R&D satellite data and products were greatly contributing to WMO Programmes and had requested that such a report be prepared.

CM-2 noted that the responses on the utility of R&D satellite data and products covered the full spectrum of WMO Regions as well as a good cross-section of developed and developing countries. Countries from both the Northern and Southern Hemispheres, tropical, mid- and high-latitude as well as those with coastlines and those landlocked had responded. Most disciplines and application areas including NWP, hydrology, climate, oceanography, agrometeorology, environmental monitoring and detection and monitoring of natural disasters were included. Thus CM-2 was confident that most potential user communities had an input.

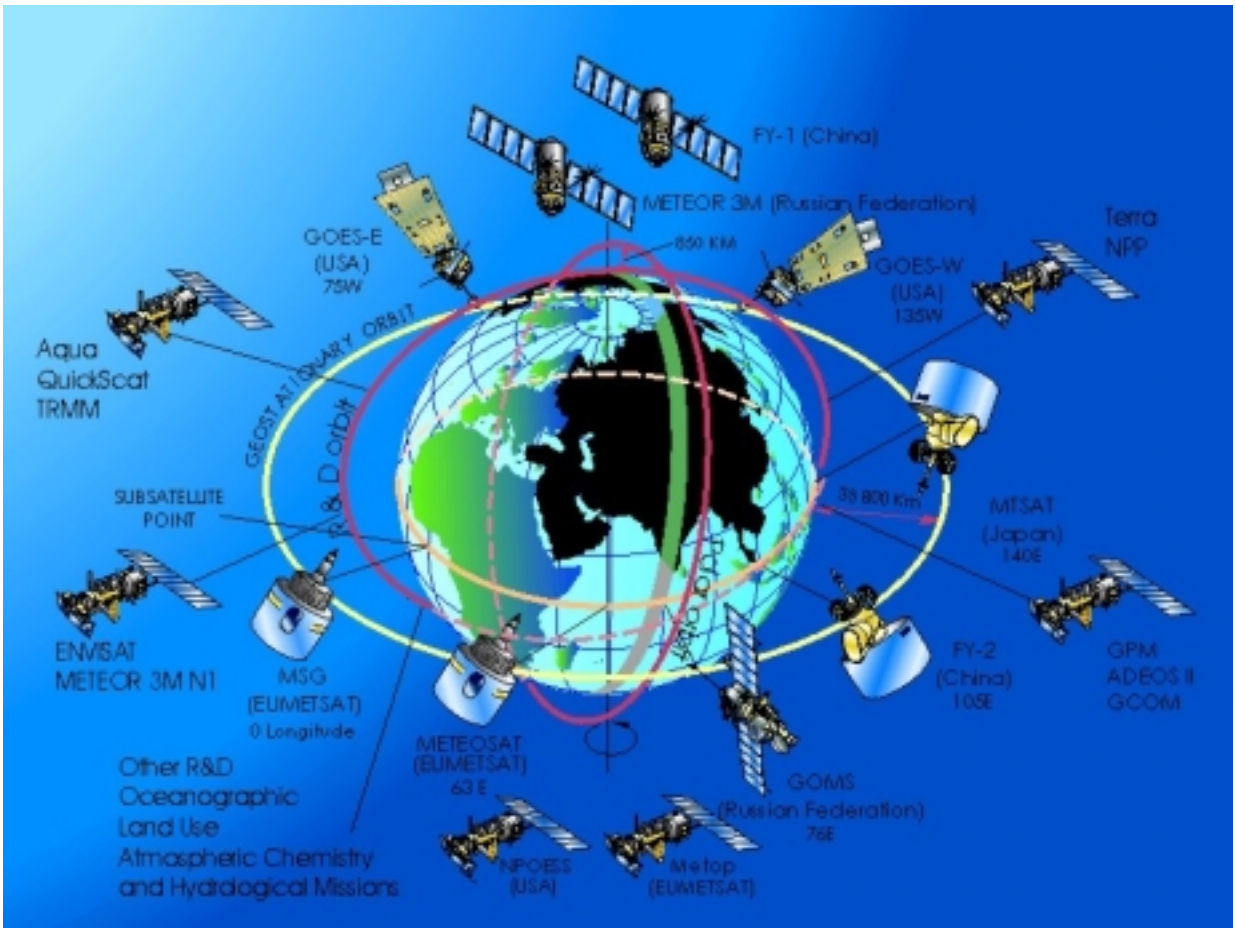

Figure 1 – New space-based component of the Global Observing System

CM-2 also recalled that the use of operational satellite data and products by WMO Members had, in the past, been well-documented in the Application of Satellite Technology Progress Report series (WMO TD/No. 995, WMO TD/No. 863, WMO TD/No. 716, WMO TD/No. 628, WMO TD/No. 569, WMO TD/No. 431, etc.). It also noted that the series would continue on a biennial basis. Such reports were available through the WMO Satellite Activities web site and Office.

An indicator of the utility of R&D satellite data and products was the list of specific satellite missions mentioned in the country reports as follows: ADEOS-II, Aqua, ERS-1, ERS-2, ENVISAT, DMSP, GCOM, GIFTS, Jason-1, Okean, QuikScat, Resource-O, Terra, Topex/Poseidon, TRMM, SPOT and more. While CM-2 recognized that DMSP was not an R&D satellite, it was also not considered part of the present space-based Global Observing System but was mentioned continually in the country reports. The data from all of the above satellites were being used operationally.

A second indicator was the breadth of WMO Programmes and associated application areas supported by data and products from the R&D satellites. While not complete, the list included specific applications within the disciplines of agrometeorology, weather forecasting, hydrology, climate and oceanography including: monitoring of ecology, sea-ice, snow cover, urban heat island, crop yield, vegetation, flood, volcanic ash and other natural disasters; tropical cyclone forecasting; fire areas; oceanic chlorophyll content; NWP; sea height; and CO_2 exchange between the atmosphere and ocean.

Another indicator was the impact that R&D satellite data and products had when used for operational purposes. Here, WMO Members' comments provided both an overview as well as

specific insights. CM-2 noted that the positive remarks from WMO Members covered almost the full gamut of applications as well the various R&D missions.

Comments with an overall viewpoint included the following statements. While most NMHS operations depend critically on data and products from operational satellite missions, R&D systems have now become an integral part of some NMHSs' operations. One Member noted that the initiative of WMO to include data of R&D systems as early and as extensively as possible into operational use was strongly supported. Satellite data were an indispensable element for development of the Sahel countries. Altimeter data with orbital corrections have a large impact on high-resolution, eddy-resolving ocean models and have provided a major quasi-operational contribution. The extension of a major NWP centre's forecasting system to an integrated Earth system (encompassing atmosphere, ocean, ocean surface waves and land) able to monitor the environment and natural hazards would only be possible with a synergistic exploitation of future satellite systems provided by the R&D and operational space agencies.

Comments related to specific R&D missions included the following statements. The Total Ozone Mapping Spectrometer (TOMS) provided critical image data that confirmed the existence of the Antarctic ozone hole and TOMS equivalent capability will be continued with the flight Ozone Mapping Instrument (OMI) on NASA's Chemistry mission in 2003 and subsequently the Ozone Mapping and Profiler Suite (OMPS) on NPOESS, being developed for flight on afternoon (1330 ascending) NPOESS platforms as well as GOME-2 on the Metop series, the follow-on to the GOME on ERS-2. Positive impact results from the use of SPOT's HRV data for sea-ice and flood monitoring. All-weather observations from Okean's RLS BO were of great importance to make sea-ice observations for sea routes. QuikScat data enabled WMO Members with oceanic forecasting responsibilities to rapidly detect incorrect ship observations and was often the only source of verification over coastal areas apart from land based METARS which usually do not show the true wind speed at sea. ERS scatterometer data provided unprecedented spatially detailed and accurate wind vector fields near the ocean surface. TRMM data allowed better identification of the centre positions and the wind radii of tropical cyclones. An Observing System Experiment (OSE) with QuikScat (SeaWinds) data showed remarkable positive impact over the Southern Hemisphere and its derived wind vectors were equivalent to that observed by ships and buoys. In another NWP OSE using total precipitable water from TRMM's TMI, remarkable positive impact was achieved on forecasted wind fields for 850 hPa and height fields for 250 hPa over the tropics. Additionally, SST analysis could be obtained even over cloud-covered areas with TRMM's TMI and some ocean data assimilation systems totally depended on the sea surface height observed by TOPEX/POSEIDON. Experience gained in the last few years has demonstrated that data from R&D satellites can be used operationally; a striking example is the use of ERS/SAR (Synthetic Aperture Radar) for the monitoring of sea ice. Information difficult to detect with operational meteorological satellites, such as monitoring in the large water basin is detected using Aqua's MODIS.

EC-LIV recalled that it had requested a report that would be a synthesis of input from the operational user communities on the utility of existing R&D data including persuasive arguments related to their impacts from R&D satellite missions. It noted that CM-2 had reviewed the report and agreed with it.

EC-LIV was convinced that the short synopsis demonstrated that many R&D satellite missions were already being used operationally by WMO Members in support of many applications and the impacts had been impressive. The expansion of the space-based Global Observing Systems to formally include appropriate R&D to complement the existing operational meteorological satellites should provide global observations to assist WMO Members in meeting their ever increasing challenges.

EC-LIV felt strongly that the report, including the synopsis, would be very beneficial to WMO Members and thus it was important that there be wide distribution amongst WMO Members. Furthermore, it felt that similar reports should be prepared on a regular basis. The reports on the

utilization of R&D data and products by the operational user communities should be prepared on a biennial basis to be phased with the Application of Satellite Technology Progress Report series. This would provide for a report on the operational use of R&D satellite data and products every second year, with reports from the Application of Satellite Technology Progress Report series in the intervening years.