

WMO Space Programme	WMO SPACE PROGRAMME LONG-TERM STRATEGY	SAT-ST-01 Version 2 May 2003
---------------------	---------------------------------------------------	------------------------------------

(The WMO Space Programme Long-Term Strategy was initially developed by the Third Consultative Meeting on High-Level Policy on Satellite Matters (CM-3) and published as Annex 3 to the CM-3 Final Report. It was then endorsed by the Fourteenth WMO Congress (Cg XIV) and its content was incorporated with minor updates in Section 6.10 of the Sixth WMO Long-Term Plan 2004-2011 (6 LTP). The present version 2 was updated in accordance with 6 LTP).

Background

The fifty third session of the Executive Council agreed to expand the space-based component of the Global Observing System (GOS) of the World Weather Watch to include appropriate Research and Development (R&D) environmental satellite missions. WMO recognized the differences between operational and R&D agencies, and developed a set of guidelines aimed at maximizing the impact of using data from both sources. These guidelines were approved both by the WMO Executive Council and by those R&D agencies which made a commitment to participate in the space-related component of the GOS.

This expansion will result in a tremendous growth in the utilization of environmental satellite data, products and services and the fifty-fourth session of the WMO Executive Council accordingly agreed to establish, as a matter of priority, an appropriate WMO Space Programme (WMOSP). Proposals are thus being included in the Sixth Long-Term Plan and Programme and Budget to be submitted to the WMO Fourteenth Congress in May 2003.

WMOSP is one of five Programmes which complement and enhance the core elements of the World Weather Watch (WWW), as well as providing significant input and support to other WMO and WMO-supported Programmes. It is intended that WMOSP will coordinate space-related activities in WMO-supported programmes, e.g., GCOS and WCRP. In addition, WMOSP coordinates the WMO requirements for environmental satellite data and products, facilitates cooperation between WMO and the satellite operators, and strengthens Members' capabilities to receive and effectively use satellite data. There is an overarching connectivity among the Programmes.

This WMO Space Programme Strategy, nominally covering the period 2004-2011, is intended to complement and elaborate the 6LTP, and in particular to identify the role the satellite operators could play in better implementing the WMO Space Programme. Because of the long lead-time required for initiating new operational satellite services, it is essential for the Strategy also to have regard to an extended period – up to 2015.

WMOSP - Purpose and scope

Like all WMO Programmes, WMOSP is based on the recognition that global weather and climate patterns are interdependent, and that no nation can be entirely self-sufficient in the provision of meteorological, hydrological and related environmental services. The Programmes are thus based

heavily on the sharing of data, analyses, forecasts and warnings; the sharing of skills and methodology; the pooling of resources; collaborative research and development; technical assistance; and cooperation with other international agencies with common objectives.

The main purpose of the WMOSP is to coordinate environmental satellite matters and activities throughout all WMO Programmes and to give guidance to these and other multi-sponsored programmes on the potential of remote sensing techniques in meteorology, hydrology and related disciplines, as well as in their applications.

Through this coordination and guidance, the WMOSP will make an essential contribution to the implementation of the WMO's strategies as stated in the Sixth Long-term Plan, in particular to Strategy 6, with respect to the collection and exchange of satellite observations, and Strategy 8, by ensuring more effective cooperation with those numerous international partners and organizations dealing with satellite systems.

WMOSP - Long-term objectives

It is proposed that the Sixth Long-term Plan (6LTP) define the WMOSP main long-term objectives for the period 2004-2011 as follows:

- (a) To contribute to the development of the GOS, through the full participation of WMO Members, as a composite system comprised of surface and space-based components, with a primary focus on matters related to both operational and R&D environmental satellites;
- (b) To encourage and facilitate the evolution of the GOS by taking advantage of advances and improvements made possible by WMO Members;
- (c) To promote high-quality satellite-related continuing education to keep the knowledge and skill of Members' operational and scientific staff up-to-date with the latest technological innovations, and to provide the competence and skills needed in related fields, such as communications with users.
- (d) To review the space-based components of the various observing systems throughout WMO Programmes and WMO supported Programmes, e.g., WWW's GOS, AREP's GAW, HWR's WHyCOS, JCOMM's implementation of GOOS, etc., with a view towards the development of an integrated WMO global observing system that would encompass all present observing systems.

WMOSP - Governance

The Consultative Meetings on High-Level Policy on Satellite Matters (CM) have proved very valuable, and it is considered appropriate to formalize the dialogue between the WMO user community and the environmental satellite agencies, under the auspices of WMO by institutionalizing the meetings. The WMO Congress should be invited to consider authorizing the continuation of the Consultative Meetings on High-Level Policy on Satellite Matters under the Chairmanship of the President of WMO until at least 2007 at which time Congress would have the possibility of considering longer term arrangements. The lead responsibility for the WMOSP should be assigned to the Commission for Basic Systems (CBS), with the Consultative Meetings providing expert advice and guidance and maintaining a high level policy overview of the

Programme.

Projects, financed both through the WMO regular budget, and through extra budgetary resources, are an essential part of WMOSP. The extent to which they can be pursued depends, of course, on the availability of resources, but there is no shortage of topics which can assist significantly in promoting the agreed objectives of the WMOSP. Areas such as the provision of information to WMO Members on the transition schedule for new digital broadcast services, and coordination with space agencies and international mechanisms such as CEOS and IGOS Partnership are prime examples. Enhanced satellite training, and education and training for disaster prevention and mitigation support from R & D satellite data also represent important areas for project activity

Elements of the Strategy

The main thrust of the WMOSP Strategy is encapsulated in the following mission statement:

“To make an increasing contribution to the development of the World Weather Watch GOS, as well as to the other WMO-supported programmes and associated observing systems (such as AREP’s GAW, GCOS, WCRP, HWR’s WHyCOS and JCOMM’s implementation of GOOS) through the provision of continuously improved data, products and services, from both operational and R&D satellites, and to facilitate and promote their wider availability and meaningful utilization around the globe.”

The main elements of the WMOSP Strategy are as follows:

- a) Increased involvement of space agencies contributing, or with the potential to contribute to the space-based component of the GOS;
- b) Promotion of a wider awareness of the availability and utilization of data, products and services, including those from R & D satellites;
- c) Considerably more attention to be paid to the crucial problems connected with the assimilation of R&D and new operational data streams in numerical weather prediction systems;
- d) Closer and more effective cooperation with relevant international bodies;
- e) Additional and continuing emphasis on education and training;
- f) Facilitation of the transition from research to operational systems;
- g) Improved integration of the space component of the various observing system throughout WMO Programmes and WMO supported Programmes;
- h) Increased cooperation amongst WMO Members to develop common basic tools for utilization of research, development and operational remote-sensing systems.*

The strategy for pursuing each of those elements is described in more detail below.

Involvement of space agencies

Space agencies will continue to be encouraged to make their observations available to the Global Observing System (GOS) without restriction. This will include data from R & D satellites which are deemed to be relevant to the GOS.

This close association of the space agencies to the GOS will be of mutual advantage. The

* The last bullet was added in the revised version included in the Sixth Long-Term Plan.

contributions will greatly enrich the GOS, and the space agencies will benefit from participating in an intergovernmental observing system. Moreover, they will receive operational feed-back on the utility of their R & D, and the relevance of their instruments to projected operational systems.

It will be appropriate for space agencies to continue as members of the CM when it is institutionalized. In this way they will have full visibility of the development of the WMOSP as well as the evolving observational and system requirements of the GOS.

The support of space agencies will complement the WMO commitment in establishing the WMOSP, and will provide opportunities to assist the new Space Office with specific projects and initiatives.

By 2011 it is intended that this increased involvement of space agencies will have resulted in a more complete GOS: one which can regularly renew itself as well as take advantage of technological advances.

Wider awareness of availability of data and increased utilization

Continuing attention will be given to describing on appropriate web sites the availability of data, products and services which are being made available by the various contributors. This task takes on mounting importance in view of the near ten-fold increase of data which will become available over the next years, and the significantly increased range of available instruments. Diffusion of the meta-data clearly indicating what is available, and how it can be accessed, will be a continuing priority action.

The aim is to bring about a very significant increase in the availability and utilization of data, products and services, not only in terms of volume and variety, but also in the geographical spread of the users. The increases which are already promised by the upcoming satellite systems in terms, for example, of higher spatial resolution, more frequent observations and the availability of more spectral bands, are not simply minor improvements, but represent in many cases step changes. Making these significantly improved data, products and services available and at the same time aiming to increase the number and geographical spread of the users, will represent the major challenge for the WMOSP in the next decade.

Assimilation

It is essential that significantly more attention be paid to overcoming the present obstacles to assimilating new satellite data streams both operational and R&D. The aim is to work with the various WMO Programmes and supported Programmes (WWRP, WWW's DPS, WCRP, etc.) to increase the impact of satellite data in the assimilation cycles at NWP and climate prediction centres.

External Cooperation

The common factor in all these external activities is the need to exploit more fully both that which is available through the WMO, together with the specialized capabilities of the international organisations, for the benefit of both. Additionally, the WMO intends to explain to its partners the objectives and priorities of its Space Programme, and to use its influence in these bodies to arrive at compatible and mutually acceptable courses of action.

In addition to the need for coordination between WMO user communities and R&D space agencies, WMO will also encourage closer coordination between operational and R&D space agencies in such areas as radio frequency coordination, orbit coordination, standardization of data formats and standardization of user stations. The same need for coordination will exist in the area of research, both related to future instruments as well as to reception facilities on the ground.

WMO will continue its membership of the Coordination Group for Meteorological Satellites (CGMS), and to sponsor appropriate projects with CGMS such as has been done with the Virtual Laboratory (VL) Focus Group formed to ensure efficient and effective operation of the VL.

Similarly, WMO, as an Associate of the Committee on Earth Observation Satellites (CEOS), will make the maximum use of relevant CEOS activities, such as the Working Group on Calibration and Validation and the Working Group on Information Systems and Services. WMO will continue to contribute to CEOS activities by making available relevant services already established by WMO.

As agreed by Congress* and the Executive Council, WMO will continue to be an active partner in the IGOS Partnership. Its role, and that of its sponsored and co-sponsored observing systems and programmes will be through the development of IGOS Themes and ultimately in the establishment of a coherent synthesis of these Themes with existing programmes and activities.

In order to influence decisions important to meteorological satellite systems, WMO has either joined or facilitated the establishment of several interest groups including the Space Frequency Coordination Group, the International Winds Workshops, the International TOVS Working Group and the new International Precipitation Working Group. Participation in these bodies will be continued, within the limits of available resources, for as long as their work remains relevant to the WMOSP.

During the coming decade, WMO intends to be one of the motors for developing an integrated global observing system, and to this end will use its influence in the various international bodies in order to encourage close and meaningful cooperation, as well as discouraging unnecessary duplication.

Education and training

In conformity with the recommendation of the Executive Council, additional emphasis will be placed on education and training in satellite matters, especially for data and products from R&D satellites. The aim will be to assist capacity building such as to become an important element in achieving sustainable development.

Building on the WMO Strategy for Education and Training in Satellite Matters, and the success of the more recent Strategy to Improve Satellite System Utilization, it is intended to intensify efforts in this field. Increasing the ability of members to exploit the new data streams, products and services is a keystone of the WMOSP Strategy. To this end, and initially focussing on the six specialized “centres of excellence”, close links will be maintained with the various national and international education and training initiatives.

Transitioning from research to operational systems

* The reference to Congress was added in the revised version included in the Sixth Long Term Plan

The closer cooperation with space agencies having launched R&D satellites will promote a more consistent dialogue aimed at identifying the elements of R&D satellites whose availability would be most welcomed on an operational basis.

This continued renewal and extension of operational space observations is of the utmost importance to the GOS, and will also assist in the quest for the flexibility to respond to new observational requirements. WMOSP will act as a catalyst for the development of international data and product dissemination and for improved processing systems. Development in these areas must go hand in hand with the already predictable increase in data availability.

Improved observing system integration

Closer integration of the space-based component of the various observing systems throughout WMO Programmes and WMO supported Programmes will increase the availability of data, products and services required by WMO Members. The aim will be to review the space components of the various observing systems in order to optimize the effectiveness of each, with the goal towards the development of an integrated WMO global observing system that would encompass all present observing systems.

Publications

The availability of satellite related materials to WMO Members in official languages is pivotal in order to maximize the exploitation of satellite data and products. Efforts in the WMOSP will focus on increasing the availability of materials through an expanded publication's programme using hard copy, CD ROM and Internet as well as translating the materials into the various WMO languages as appropriate.

Summary of WMOSP Strategy

Consistently pursuing the WMOSP is intended to lead to a situation by 2011 and beyond where the GOS fully benefits from the satellite observations of both its members and the world's space agencies. R&D satellites will not only be regularly contributing to the GOS, but will supplement the expected improved operational data streams. This will result in a better service to WMO Members and provide a valuable feedback to the space agencies.

At the same time the renewed emphasis on education and training will ensure that data, products and services are being used more effectively and more widely, with special benefit accruing to developing countries. WMOSP is designed to contribute to capacity building and to fostering sustainable development.

WMO, through its active participation with other international bodies, will during this decade come to be recognized as one of the leaders in the drive towards an integrated global observing system.

Looking beyond the 2011 time frame, it is clear that WMO Space Programme activities will be invaluable in leading to an even wider exploitation of satellite observations in an integrated global context.