

## **Space-based component of WMO Integrated Global Observing Systems (WIGOS) – the Vision in 2040 for meeting the climate requirements**

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The Seventeenth of World Meteorological Congress (2015, Geneva) decided to implement the Pre-Operational Phase WMO Integrated Global Observing System (WIGOS) for the Financial Period (2016-2019), with the purpose and the vision for further developing an integrated, coordinated and comprehensive observing system (including both surface-based and space-based components) to satisfy, in a cost-effective and sustained manner, the evolving observing requirements of Members in delivering their weather, climate, water and related environmental services. WIGOS will provide a framework for enabling the integration and optimized evolution of WMO observing systems, and of WMO's contribution to co-sponsored systems (GCOS, GOOS, GTOS) and GEOSS, resulting in increased knowledge and enhanced services across all WMO Programmes.

For facilitating the long-term planning and development of WIGOS, in September 2014, the Extraordinary Session of the Commission for Basic Systems (CBS-Ext(2014)) encouraged the initiative to develop a new Vision of the WMO Integrated Global Observing System (WIGOS), including component observing systems (i.e. surface-based component and space-based component) in 2040. The new horizon of the vision was set to 2040 in order to be ahead of currently firm satellite plans, since a vision document should serve as guidance in the early planning stage rather than just reflect existing plans. The Vision shall be ambitious but achievable.

The development of a WIGOS Space Vision was approached by three different angles. First of all, the new vision should aim to respond to the Global Societal Needs (GSNs) addressed in the WMO Strategic Plan and with the anticipated evolution of these GSNs in the horizon of 2040, in the context of WIGOS and of the increasing maturity of space applications and the emerging requirements of WMO important application areas which are not fully addressed by current plans (e.g. to Global Framework for Climate Services, air quality, hydrology, and cryosphere monitoring).

Secondly, the vision should consider the opportunities opened or anticipated from advances in satellite and instrument technology, including the advent of a new generation of low earth orbit (LEO) and geostationary meteorological environmental satellites (GEO) launches around the global in the 2015-2030+ timeframe and will provide services till 2040; lessons learnt from demonstration missions that, by 2040, will be mature for transition from R&D or demonstration stage to operational stage (e.g. GPM, GRACE, SMOS, Doppler lidar, etc.), and possible new concepts. Rapid progress in technological capabilities will allow improved performances in terms of spectral, spatial, temporal and radiometric resolution, which also bears on the

amount of data to be exchanged.

Finally, attention should be paid to emerging changes in the provider community considering the increased number of space-faring nations, the range of possible approaches between large and very small satellite programmes, and the balance to be found between an increasing capability of the private sector to contribute to the system and the specific responsibilities of governmental entities. Opportunities and risks should be carefully analysed considering the possible technological evolution, as well as the key strategies for optimal integration of space-based and surface-based observation capabilities.

The presentation will communicate the WMO Strategic Plan, which provides a high-level statement of the future direction and priorities of the WMO. Building on the Global Societal Needs described in the Strategic Plan, the roadmap for developing WIGOS Space vision 2040 will be presented, capturing the vision and anticipation of climate and GCOS services requirements in the 2040 time horizon, taking into consideration the great opportunities and benefits of planned new generation of meteorological and environmental satellites and the potential critical gaps for meeting future climate requirements.