

CGMS BASELINE FOR THE OPERATIONAL CONTRIBUTION TO THE GOS

(adopted by CGMS-39 on 6 October 2011)

FUTURE SATELLITE MISSIONS TO BE PERFORMED ON OPERATIONAL/SUSTAINED BASIS

Introduction

In support of the programmes coordinated or co-sponsored by WMO for weather and climate, CGMS Members plan to maintain the operational capabilities and services described below, that constitute the “CGMS baseline for the operational contribution to the GOS”.

While this particular document focuses on missions that are decided and managed in an operational or sustained framework, with a perspective of long-term follow-on, this in no way precludes the importance of other missions undertaken e.g. on a research or demonstration basis. First of all, because today’s research and development are the foundation of tomorrow’s operational missions. Furthermore, because many missions initiated in an R&D framework for a limited duration are eventually extended well beyond their design life time and provide longstanding support to both scientific and operational activities.

This baseline defines a constellation of geostationary satellites, a core meteorological mission on three sun-synchronous orbits, other missions in sun-synchronous orbits, missions in other Low Earth Orbits, and contains cross-cutting considerations on contingency planning, inter-calibration, data availability and dissemination.

I. Constellation in geostationary orbit

At least six geostationary satellites shall be operated at evenly distributed locations with in orbit redundancy, and perform the following missions:

- (a) Advanced visible and infrared imagery (at least 16 spectral channels, 2km resolution) over the full disc at least every 15 minutes
- (b) Infrared sounding (hyperspectral on some positions)
- (c) Lightning detection
- (d) Data collection
- (e) Space environment monitoring

On selected positions, the following missions shall be performed:

- (f) Earth Radiation Budget monitoring
- (g) High spectral resolution UV sounding
- (h) Solar activity monitoring

II. LEO sun-synchronous missions

Operational sun-synchronous satellites shall be operated around three orbital planes in mid-morning (“am”, nominally 09:30 descending, 21:30 ascending ECT), afternoon (“pm”, nominally 13:30 ascending ECT) and early morning (nominally 05:30 descending, 17:30 ascending ECT) and, as a constellation, shall perform the following missions:

1) Core meteorological mission nominally on 3 orbital planes

- (i) Multispectral visible and infrared imagery
- (j) Infrared hyperspectral sounding (at least am and pm)
- (k) Microwave sounding
- (l) Microwave imagery

2) Other missions on sun-synchronous orbits

- (m) Wind scatterometry over sea surfaces (at least two orbital planes)
- (n) Ocean surface topography by radar altimetry (at least on am and pm orbits, supplemented by a reference mission on a high-precision, inclined orbit)
- (o) Radio-occultation sounding (at least am and pm, supplemented by a constellation in specific orbits)
- (p) Broadband VIS/IR radiometer for Earth Radiation balance (at least am and pm)
- (q) Total Solar Irradiance (at least one)
- (r) Contribution to atmospheric composition observations (at least am and pm)
- (s) Narrow-band Vis/NIR imagers (at least one sun-synchronous, am spacecraft) for ocean colour, vegetation and aerosol monitoring
- (t) High-resolution multi-spectral Vis/IR imagers (constellation of sun-synchronous satellites, preferably in am)
- (u) IR dual-angle view imagery for high-accuracy SST (at least one am spacecraft)
- (v) Particle detection and / or electron density (at least am and pm)
- (w) Magnetic field (at least am and pm)
- (x) Solar activity (at least two)
- (y) Data collection

III. Other LEO missions

The following missions shall be performed on an operational basis by Low Earth Orbit satellites on appropriate orbits:

- (z) Ocean surface topography by radar altimetry (A reference mission on high-precision, inclined orbit, complementing two instruments on sun-synchronous am and pm orbit)
- (aa) Radio-Occultation sounding (dedicated constellation of sensors on appropriate orbits)

IV. Contingency Planning

The CGMS baseline is associated with contingency plans for geostationary and polar-orbiting satellite systems, which are detailed in the CGMS Global Contingency Plan¹.

V. Inter-calibration

Instruments should be inter-calibrated on a routine basis against reference instruments or calibration sites. The routine and operational intercalibration and corrections shall be performed in accordance with standards as agreed by the Global Space-based Inter-calibration System (GSICS).

VI. Data availability and dissemination

VI.1. Data open availability with suitable timeliness

All operational environmental observation satellite systems should be designed to ensure the provision of data with suitable timeliness, as appropriate for their intended applications. Data should be preserved for the long term and documented with metadata allowing their interpretation and utilization. The satellite operators should establish dissemination contents and schedules that take into account the data requirements of users. Re-broadcast via telecommunication satellites should complement and supplement direct broadcast services, which allows cost-efficient access

¹ The Global Contingency Plan (http://www.wmo.int/pages/prog/sat/documents/CGMS_Global-Contingency-Plan_version2_070507.pdf) should be updated accordingly. It should indicate that in case of potential gaps on core sun-synchronous missions, absolute priority should be given to observation from mid-morning and early afternoon orbits, in order to maintain the continuity of these datasets.

to integrated data streams including data from different satellites, non-satellite data and geophysical products. The dissemination systems should utilize all-weather resilient telecommunication means.

VI.2. Direct broadcast for core meteorological missions in LEO

The core meteorological satellite systems in LEO orbits, and other operational observation satellite systems when relevant, should ensure near-real-time data dissemination of imagery, sounding, and other real-time data of interest to Members by direct broadcast. Direct broadcast frequencies, modulations, and formats for polar-orbiting satellites should allow a particular user to acquire data from either satellite by a single antenna and signal processing hardware. Direct Broadcast should use allocations in all-weather resilient frequency bands.

VII. Note

The present update of the CGMS baseline is adopted in the light of satellite mission plans as they are known in October 2011.
