



Presented to CGMS-46 Plenary, Agenda Item E

Outline

- Objectives/Actions
- WMO Gap Analysis
- IODC Roadmap Implementation
- Contributions to the Space Segment
- Operational and Research Missions
- CGMS Baseline
- CGMS Contingency Plan
- CGMS Baseline – Gap Analysis / Risk Assessment
- Action Required of CGMS

Objectives / Actions

- The objectives for the CGMS-46 WG-III included:
 - Review of the CGMS contribution against the Baseline, including WMO's gap analysis
 - Finalizing the CGMS Baseline and Contingency Plan to be sent to the Plenary for endorsement
 - Review implementation of Indian Ocean Data Coverage
- Open Actions from previous CGMS Meeting that are carried forward:
 - CGMS members to nominate focal points to update OSCAR/Space
 - Propose a way forward for guiding and coordinating socio-economic benefit studies among the CGMS community
 - Agencies to consider contributing resources to the development and maintenance of OSCAR/Space

WMO Gap Analysis

- WG-III considered two documents on this topic:
 - Gap Analysis from WMO
 - ITSC-21 Report from ITWG
- Highlights, actions and recommendations include:
 - WMO identified eight “gaps” (geostationary hyperspectral sounding; radio occultation; altimetry; ocean surface winds; Earth radiation budget; limb soundings; passive microwave imaging; and spectral gaps on future hyperspectral sounders)
 - The WG noted the recommended actions on CGMS members to address the gaps
 - The WG noted the recommendation for WMO and GSICS to continue the interaction on the subject of spectral gaps and GSICS to continue reporting on the instruments used for inter-calibration exercises
 - The WG reviewed the recommendations from the ITWG and noted that the recommendations of relevance to WG-III are sufficiently addressed in on-going work

IODC Roadmap Implementation

- WG-III considered two documents on this topic:
 - IODC Roadmap Implementation from EUMETSAT
 - Update of Indian Ocean Data Coverage from CMA
- Highlights, actions and recommendations include:
 - The WG reviewed current and planned satellites providing coverage for the Indian Ocean area against agreed service requirements
 - The WG noted that all the actions from the Implementation Roadmap had been completed and that Electro-L N2 is now in the operational phase
 - The WG noted that AMV and CSR products were monitored and assimilated in NWP to varying degrees
 - CMA reported that FY-2H will be launched in June 2018 and is planned to provide service, consistent with requirements for IODC, until 2025
 - CMA intends to provide AMVs/CSRs products and users will be able to access the data via a direct broadcast service, CMACAST, or GTS
 - CMA requested support from the NWP community to document the benefits of these data

Contributions to the Space Segment

- WG-III considered four documents on this topic, which spanned two Agenda Items:
 - Importance of GCOM-W data products from NOAA
 - Report on current and future satellites from ISRO; and multi-mission metrological data reception and processing from IMD
 - Development of a single hydro-meteorological and geophysical Russian orbital constellation from ROSCOSMOS
- Highlights, actions and recommendations include:
 - The WG noted that while microwave imagery was provided in three orbital planes, shortfalls in microwave imagery depend on the application area (and the spectral band and resolution required to support the area); and that microwave imagery for all-weather SSTs were at risk and that continuity for AMSR-2 was critical
 - The WG noted ISRO's plans for current and future satellites; especially those in support of weather, climate and oceanography; the ongoing work to improve quality of INSAT 3D / 3DR through GSICS; and that the next generation satellites are in the study phase
 - IMD's development of a Multi-Mission Meteorological Data Receiving & Processing System and ROSC(MMDRPS) project for reception, processing and dissemination of meteorological data of INSAT-3D/3DR/3DS

Maintenance of the WMO OSCAR database / SETT

- WG-III considered the following, additional documents in its deliberations:
 - OSCAR/Space maintenance scheme by WMO
 - Update on the Socio-Economic Tiger Team
 - Status of implementation of the HLPP
- Highlights, actions and recommendations include:
 - The WG noted that OSCAR/Space includes estimates of the geophysical variables potentially retrievable from the various instruments, including rating of the achievable performances and the indication of possible operational limitations
 - WMO, in response to a CGMS action, investigated possible collaboration with CEOS' MIM database but concluded that the OSCAR database far exceeds the level of detail in MIM and CGMS members should continue to use OSCAR/Space as a reference common tool for risk assessments
 - The WG noted that the SETT had made significant progress to date and was undertaking a pilot socioeconomic benefit study to understand and assess the value of satellite data for the users of operational sea ice products and information

Baseline and Contingency Plan - Background

- CGMS-45 noted that an update was required to the CGMS Baseline and to the CGMS Global Contingency Plan because years had elapsed since the current versions were adopted
- WMO agreed to coordinate this task with WG-III, with a view to presenting the results for endorsement at CGMS-46
- WG-III met at WMO on April 30-May 2, 2018 to update the CGMS Baseline and Contingency Plan
- Representatives from CMA, EUMETSAT, KMA, JMA, JAXA, NOAA, WMO and the CGMS Secretariat participated in the meeting
- This briefing summarizes the deliberations of the workshop and WG-III, the results of which are incorporated into the updated CGMS Baseline and Contingency Plan

CGMS Baseline - Summary of Updates

- The CGMS Baseline constitutes the CGMS response to the WIGOS 2040 Vision to document what missions are currently being, or planned on being flown. The CGMS baseline will be included in the WMO Manual on WIGOS.
- WMO will conduct a **Gap Analysis** between the WIGOS 2040 Vision Tier 1 and the CGMS Baseline to review implementation of WIGOS.
- CGMS will conduct a **Risk Assessment** against the baseline to ensure CGMS is meeting its commitments.
- The CGMS Baseline will be revised every four year to match the update cycle for the Manual on WIGOS.
- The WMO Gap Analysis will occur every four years, serving as an input to the definition of the revised CGMS Baseline
- The CGMS Risk Assessment will be completed every year forming the basis for CGMS actions to ensure continuity.

CGMS Baseline

- The CGMS Baseline enumerates the observations, measurements, and services that form the CGMS contribution to the space-based Global Observing System – includes Space Weather
- The CGMS baseline is responding to end-user requirements expressed in WMO's Rolling Review of Requirements (RRR).
- The CGMS Baseline will strive to support the WMO Integrated Global Observing System (WIGOS) 2040 vision
- Key principles:
 - Commitment: The CGMS Members are providing, or have firm plans to provide, the observations, measurements, and services enumerated in the Baseline
 - Sustained: The observations, measurements, and services are provided on a sustained basis
 - Available: The observations, measurements, and services are available on a free and open basis
 - Operational: The data and products can be utilized in operational applications

CGMS Baseline

- The observations and measurements that constitute the CGMS Baseline are enumerated in a table that describes the Sensor Type, the Orbit, the Observation/M Measurement (or geophysical parameter), and any specific attributes
- The table was designed to facilitate linkage with the OSCAR database and future CGMS risk assessments and WMO gap analysis
- Example entries are observations and measurements are provided below:

Sensor Type	Orbit	Observation/M Measurement	Attributes
Microwave Sounder	LEO	Atmospheric, temperature, and humidity, precipitation	3 sun-synchronous orbits, nominally early morning, mid-morning, and afternoon
Scatterometer	LEO	Ocean surface winds	LEO – 2 sun-synchronous orbits, early morning and mid-morning orbits
Coronagraph	Sun-Earth Line	Coronagraphy	GEO – 1 slot L1

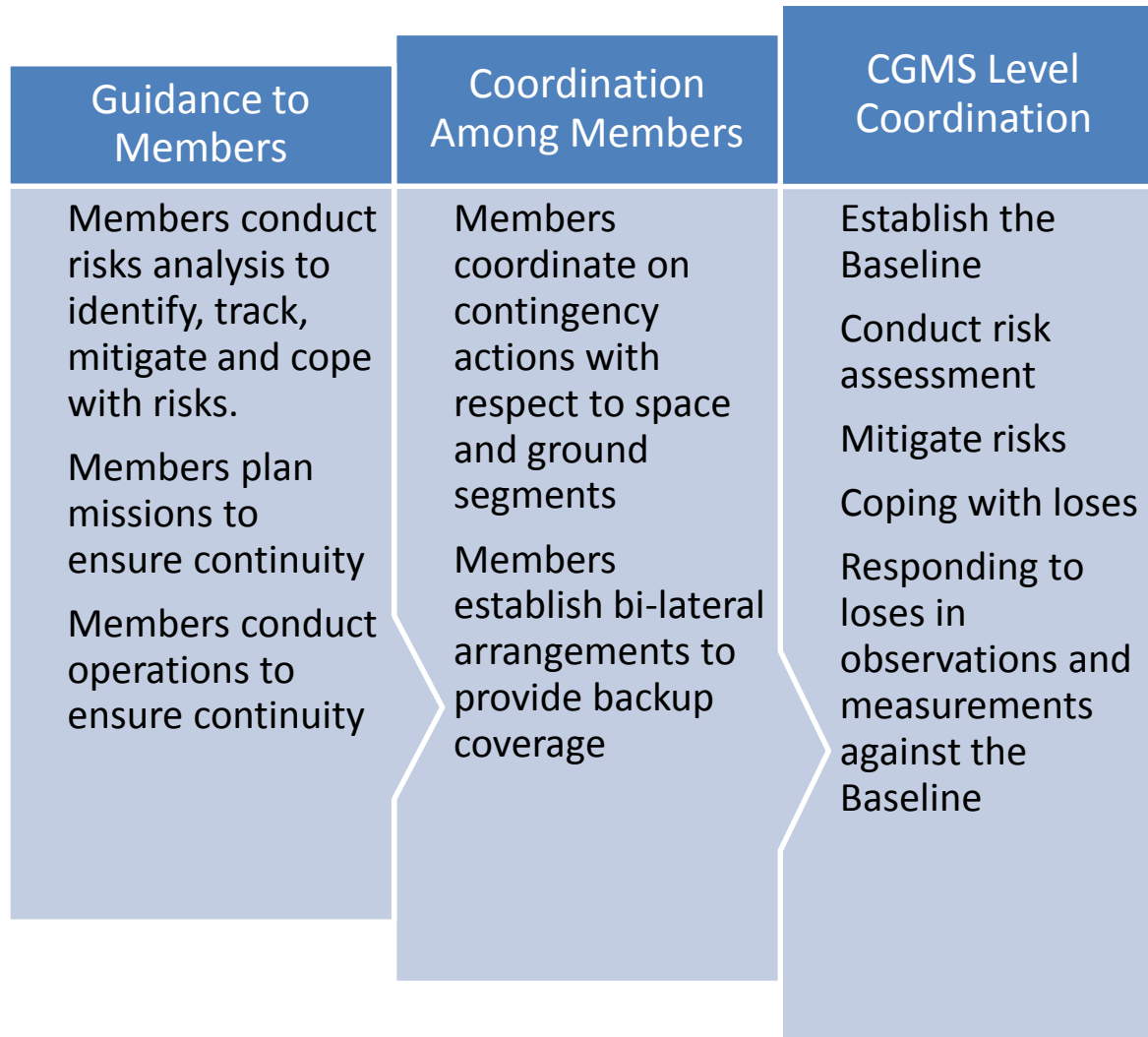
CGMS Baseline

- Services encompass the following areas:
 - Data access (both terrestrial and space-based)
 - Direct broadcast
 - *In-situ* data relay (e.g., data collection systems)
- The CGMS Baseline contains a section on steps CGMS will take to ensure the quality and continuity of data and products:
 - Calibration and validation (including inter-calibration)
 - Monitoring implementation of the baseline (risk assessment)
 - Contingency planning
 - System compatibility and interoperability
 - Use of research/experimental missions to:
 - Supplement the CGMS Baseline
 - Provide a pathway for new sensors and capabilities to be introduced to the CGMS Baseline
 - Support contingency operations

CGMS Contingency Plan

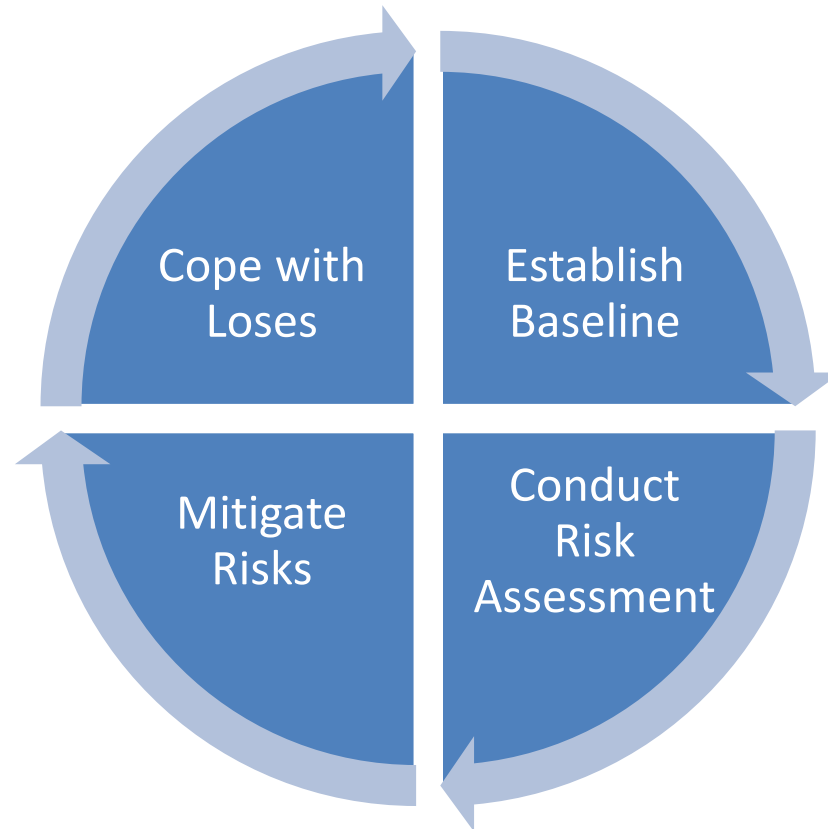
- The CGMS Contingency Plan provides guidance and processes for identifying, mitigating and coping with losses to the CGMS Baseline
- Definitions:
 - Contingency: Within the context of the CGMS, a contingency arises when CGMS is no longer in a position to provide satellite-based observations, measurements, and services corresponding to the CGMS Baseline or when it anticipates such a situation in the near future
 - Contingency Planning: The development of strategy, analysis, planning, development of capabilities, and processes necessary to assure continuity of established baseline observations, measurements, and services in the event of unforeseen circumstances
 - Mitigation: Proactive attempt by a Member or CGMS to ensure continuity of observations, measurements, and services in support of the CGMS Baseline; an effort to anticipate and thereby reduce or eliminate the probability of a risk materializing or risk avoidance
 - Coping: Steps taken by a Member or CGMS to reduce the impact of a materialized risk or capability loss against the CGMS Baseline. For the remainder of this document, these will generally be referred to as “capability losses” or simply “losses.”

CGMS Contingency Plan



CGMS Contingency Plan

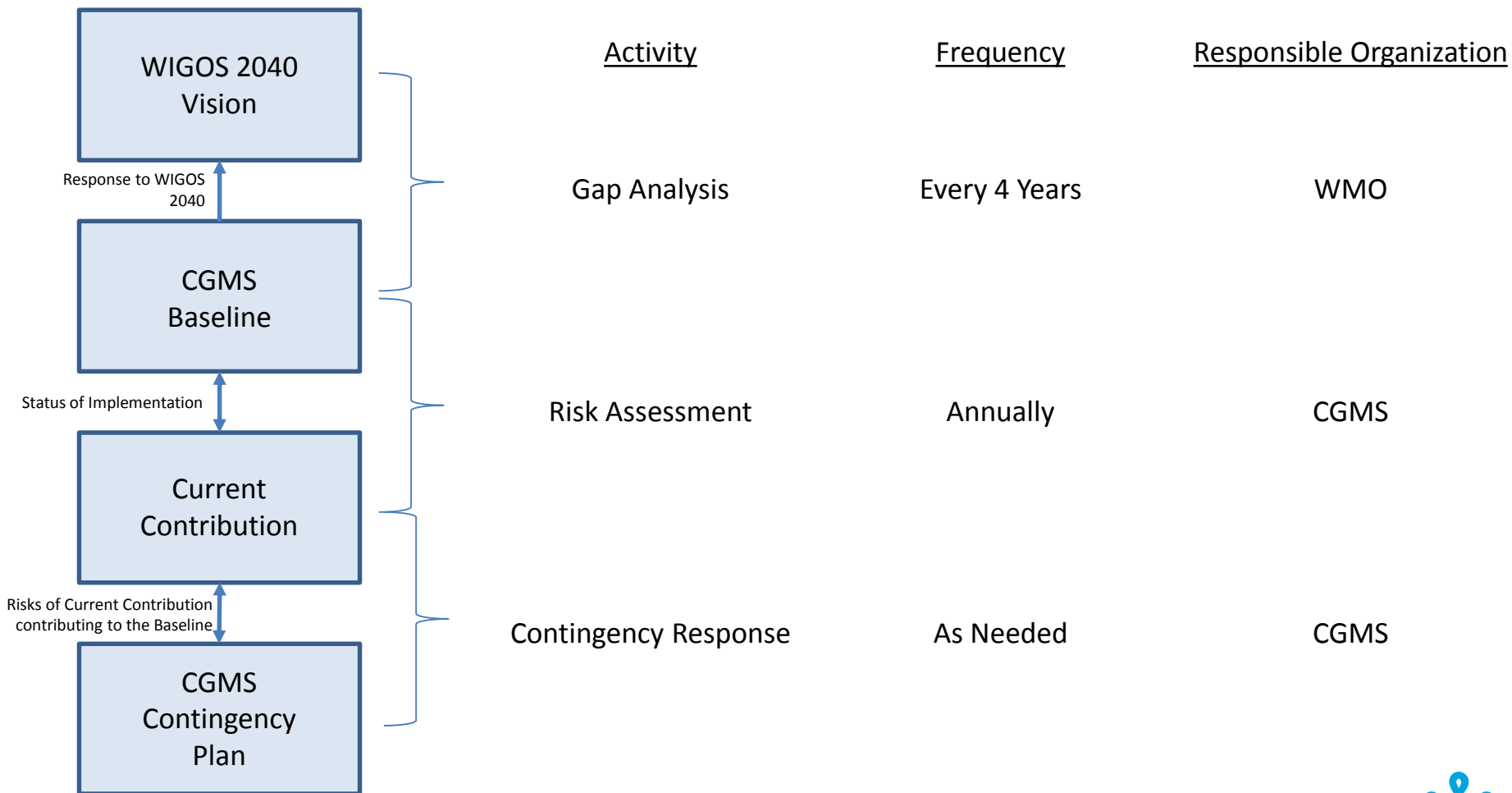
- The CGMS level contingency planning follows a traditional risk management framework in order to avoid risks to service, and to minimize the impacts of any potential losses



CGMS Baseline – Gap Analysis / Risk Assessment

- WG-III and WMO determined that two types of analysis were required to identify gaps:
 - Gap Analysis: Gaps between the WIGOS 2040 vision (when adopted) and the CGMS Baseline
 - Risk Assessment: Identifying risks of current CGMS Member contributions contributing to the CGMS Baseline
- The Gap Analysis will be conducted by WMO against the WIGOS 2040 Vision
- The Risk Assessment will be conducted annually by CGMS
 - CGMS Members will provide current status of their contributions towards the Baseline in a set format – the status will be provided three months prior to the annual CGMS meeting
 - CGMS will document and analyse the current and future status of Member contributions against the Baseline (This will require dedicated effort by CGMS)
 - Based on this analysis, WG-III will assess the current contribution, and in coordination with other WGs, assess the overall risk to the CGMS Baseline
 - WG-III will recommend contingency actions to take to ensure continuity of the CGMS Baseline

CGMS Baseline – Gap Analysis / Risk Assessment



To be considered by CGMS:

- Adopt the Baseline in CGMS-WP-27 and notify WMO of the updated Baseline to be incorporated into the next version of the Manual on WIGOS
- Adopt the Contingency Plan in CGMS-WP-28
- Action the Secretariat to develop a template by December 31, 2018 to capture the current status of CGMS Member contributions on an annual basis
- Action Members to provide the information in the template by February 15, 2019, prior to the annual CGMS risk assessment and CGMS-47
- WG-III will conduct an annual risk assessment of CGMS's current contribution against the baseline consistent with its existing Terms of Reference
- CGMSSEC to investigate the provision of dedicated resource to support the annual risk assessment

