

MINUTES OF THE 13th CEOS STRATEGIC IMPLEMENTATION TEAM MEETING

**3rd February 2004
JAXA EORC, Tokyo**

Participants

BGS:	Stuart Marsh
CNES:	Carole Deniel, Norbert Paluch
CONAE:	Conrado Varotto, Laura Frulla
CSA:	Daniel De Lisle
CSIRO:	Josep Canadell
ESA:	Stephen Briggs
EUMETSAT:	David Williams
JAXA/RESTEC:	Yoji Furuhashi (Chair), Yukio Haruyama, Chu Ishida, Toshihiro Ogawa, Satoko Miura, Kazuo Umezawa, Rio Tanabe, Mariko Kato, Kazuko Misawa, Tomohiro Taguchi, Stephen Ward
MOST/NRSCC:	Li Deren, Shao Liqin, Liu Dingsheng, Li Mengxue, Gao Peiying, Zheng Yu
NASA:	Eric Lindstrom,
NASA/JPL:	Paul DiGiacomo
NOAA:	Marie Colton
UNEP:	R. Norberto Fernandez, Arthur Dahl
USGS:	Jay Feuquay
WCRP:	Rick Lawford
WMO:	Donald Hinsman

1. Welcome and introduction

The Chairman, Yoji Furuhashi, opened the meeting and thanked the participants for joining.

2. Adoption of agenda

The proposed agenda for the meeting was adopted without revision.

3. Minutes of the 12th SIT

The previous minutes were adopted as final and the 4 recorded actions were noted to be complete:

Action Item	Brief Description	Status
12-01	IGCO Theme: SIT Chairman to: inform Drs Moore and Ciaia of the SIT recommendations; and incorporate these recommendations into the SIT report to IGOS-P-10bis.	Completed

12-02	Global Water Cycle Theme: SIT Chairman to present SIT recommendations to IGOS-P-10bis.	Completed
12-03	Geo-hazards Theme: SIT Chairman to present SIT recommendations to IGOS-P-10bis.	Completed
12-04	Next meeting: Chairman of SIT to arrange a SIT meeting in early Spring 2004 after consultation with the relevant Theme Team leaders	Completed

4. Consideration of space requirements for approved Themes

Theme compliance with the IGOS Process Paper

Chu Ishida reviewed the main points of the IGOS Process Paper and reminded participants of the role of SIT in checking the compliance of each of the Themes with the guidelines therein.

4.1 Global Water Cycle Theme

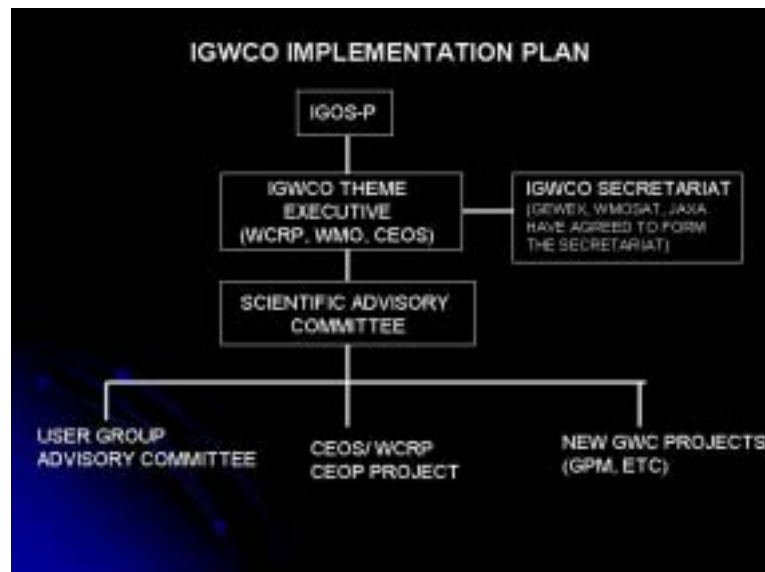
Rick Lawford (WCRP) gave a presentation on the Water Cycle Theme. The discussion and conclusions on each of the main points of interest to SIT (IGOS Process Paper compliance, implementation framework, space segment commitments) are summarised in turn below.

IGOS Process Paper Compliance

It was agreed that the IGWCO theme satisfied the main criteria defined in the IGOS Process Paper.

Implementation Framework

The envisaged implementation framework is outlined in the figure below – including an Executive, a Secretariat, Scientific Advisory Committee, and various working groups.



Staffing of the Executive is expected to come from WWW programmes of WMO, from the GEWEX programme of WCRP, and from JAXA – representing CEOS. Don Hinsman, Rick Lawford, and Chu Ishida will serve as the contacts for the time being. NRSCC/MOST expressed interest in playing an active role in the Secretariat of the Theme.

The Chair welcomed these first steps to define the implementation plan for IGWCO and asked that the Theme team provide a more detailed plan at the next SIT meeting, including: final details of the institutional arrangements; a timetable and concrete actions planned for Theme implementation.

Space Segment Commitments

Rick Lawford reported the concern of IGWCO regarding the growing uncertainty in satellite coverage for the period 2004-2010 (ie pre-NPOESS) – and the integrity of key information products as a result. Specific concerns include: the status of the sensor package on NOAA N^o 17; the plan to omit CERES from NPP; the lack of follow-on to SORCE; the loss of ADEOS II.

The main recommendations of IGWCO (and the subsequent discussion) regarding specific space segment commitments were as follows:

1. Precipitation measurements and the TRMM-GPM measurement gap: This was recognised as the single most critical issue facing the IGWCO community. Precipitation measurements are the most critical variable for the water cycle community. Whilst TRMM has proved that measurements of sufficient resolution can be made available from space and observation by radar should be continued, the measurement provision gap between TRMM termination and GPM operations will have serious impacts on water cycle science.

The main points of the discussion regarding space agency commitments were as follows:

- NASA and JAXA will undertake a review of the options for the extension of the TRMM mission: the current expectation is that TRMM can be extended safely (ie termination by controlled re-entry) for a further year, or could be extended for 3-4 years if controlled re-entry is not necessary;
- agencies involved in GPM will make best efforts to minimise the measurement gap after TRMM; ESA will report on the status of planning for the EGPM mission;
- David Williams noted that the GPM mission objectives were not yet totally clear and that it should be a primary objective of the Water Theme to influence the conclusion of this process;
- it was pointed out that the possible measurement gap between TRMM and GPM could be mitigated by a number of alternative microwave instruments – including those on the DMSP, NPOESS, and FY-3 series missions;
- Rick Lawford suggested that more efforts will be necessary for ‘buy-in’ of the global water cycle community to the IGWCO requirements as being representative of their needs.

The following actions and deadlines were adopted:

Action	13-1	JAXA and NASA to liaise with IGWCO to develop the discussion on the TRMM-GPM gap and on IGWCO input to GPM requirements definition	SIT-14
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Action	13-2	ESA to provide an update on the status of EGPM	SIT-14
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2. The capabilities and applications of SMOS and HYDROS data needs to be better understood by IGWCO: It was agreed that ESA and NASA would develop a dialogue with IGWCO on these issues.

Action	13-3	ESA and NASA to work with IGWCO to define the expected information products from SMOS and HYDROS and their likely accuracy	SIT-14
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3. IGWCO needs a better understanding of the potential contribution of space measurements for the monitoring of both surface and sub-surface water parameters: It was noted that a number of missions have promising capabilities, including interferometric SAR sensors and altimeters. Water levels of inland lakes/ rivers as small as 100m in dimension may be feasible in future.

4. Cold season variables: it was noted that a new ‘Cryosphere Theme’ proposal was under development by Colin Summerhayes and that the IGWCO Team should provide inputs to this process.

5. IGWCO needs a better understanding of the capabilities of space segment measurements, algorithms, and assimilation techniques for provision of estimates of areal evapotranspiration – and to discuss the way forward for improvements: Stephen Briggs noted that ESA’s plan for the SPECTRA mission can be expected to provide some valuable results, adding to current capabilities from the likes of MODIS, MERIS and AATSR. Marie Colton suggested that the Joint Satellite Data Assimilation Center of NASA and NOAA may be an appropriate body to support studies of the future prospects for areal evapotranspiration products. The Center considers proposals for new studies on an annual basis and IGWCO could develop a suitable submission.

6. IGWCO has a requirement for more complete and accurate long-term water and energy cycle products: It was noted that this requirement, likely to involve consideration of new data assimilation and reanalysis techniques, is one of the particular domains of expertise of WMO – which has a history of establishing such experiments and identifying the benefits of extra observations. It was proposed that IGWCO/WCRP work with WMO and its supported programmes to develop a solid proposal for a suitable project. Don Hinsman noted that the proposed activity would be relevant for inclusion in the GCOS implementation plan.

Action	13-4	IGWCO, in consultation with WMO, to develop a proposal for the study of new water and energy cycle products	SIT-14
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7. IGWCO needs a better understanding of current and future capabilities of space segment measurements of freshwater quality parameters: IGWCO was encouraged to explore linkages with the Coastal Theme requirements. Considerably more detail is required by the CEOS agencies to understand the precise scope and nature of the Theme requirements.

Action	13-5	IGWCO to distribute the white paper on water quality observation requirements	Feb 2004
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The SIT Chair observed that many of the recommendations presented by IGWCO had the common Theme of needing considerably better definition of their observational requirements and better understanding of the space system capabilities. Further, it is recognised that links to the wider water cycle community need to be better developed so that the Theme may be identified as being truly representative of the community needs – thereby strengthening the case for investment in new observational capabilities. It was therefore proposed that the Theme team explore the organisation of a technical workshop – perhaps in association with one of the major community meetings planned during 2004 (such as the WMO Commission on Hydrology, Monterey, October 2004) – in order to address these issues, including the development of a community position on the need for GPM.

The SIT Chair strongly encouraged the IGWCO Theme to take these next steps, and to begin development of the implementation plan identifying the institutional framework, major data processes and products, and end users. The Geohazards Theme progress on such specifics was cited as a good model to guide the efforts.

Action	13-6	IGWCO to develop plans for a ‘Theme Implementation Workshop’ to: better define the Theme observational requirements; validate those requirements with the wider community; better understand space segment capabilities and opportunities; develop a position on GPM requirements.	SIT-14
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4.2 Global Carbon Theme

Pep Canadell (CSIRO/GCP) gave a presentation on the Global Carbon Theme:

IGOS Process Paper Compliance

It was agreed that the Theme did not yet comply with a number of the criteria required by the IGOS Process Paper – including identification of leadership, resources, and implementation milestones. Further work will be necessary.

Implementation Framework

As yet, there is no implementation plan for the Theme. The SIT Chairman recognised the particular problem during the coming months of continuity of staffing and resourcing for the IGCO Theme team – given the departure of Will Steffen from IGBP and other commitments of Philippe Ciais and Berrien Moore. Resolution of this issue was recognised as essential to maintain momentum of the Theme.

Action	13-7	IGCO to confirm staffing of the Theme team during 2004 (and who is responsible for SIT-14 inputs)	Feb 2004
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GTOS, GOOS, and the Global Carbon Project were identified as the likely lead agencies for the implementation of the Theme – but the framework concept and planning has yet to be developed and considerably more discussion and definition remains to be done. The steps taken and the details provided by the Geo-hazards Theme for the SIT-13 meeting were cited as a good model for the way forward for IGCO.

Space Segment Commitments

The analysis of commitments required for presentation to SIT has focused to date on the primary atmospheric parameters of CO₂, CO, aerosols etc. Each of the main points is discussed below:

- **Column-integrated atmospheric CO₂:** this is a key parameter for the various stakeholders in providing the monitoring information they will be expected to supply regularly – at various resolutions (1-50km); JAXA confirmed that they are committed to the launch of GOSAT which will provide supporting measurements; NASA confirmed that they will launch the OCO mission; it was noted that neither mission was listed in the latest edition of the CEOS Handbook;

Action	13-8	JAXA and NASA to provide details of GOSAT and OCO to WMO for inclusion in the CEOS Handbook	Feb 2004
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- **Development of ground-based solar observatories for CO₂:** this is required to characterize the ultimate accuracy of the near IR absorption technique; JAXA noted that they were currently in discussions with Japan's NIES to plan such ground-based cal/val facilities for GOSAT; IGCO is invited to provide inputs to the planning process to ensure that the community requirements will be met;
- **The prospect of an active mission for measurements of column CO₂ without diurnal, seasonal, latitudinal, or surface restrictions:** ESA confirmed that they are looking at active lidar techniques for future implementation;
- **in-situ eddy covariance fluxes and atmospheric CO₂ networks required for cal/val activities:** it was noted that, currently, all such networks are in research mode; NASA supports FLUXNET for example; Pep Canadell noted that all available measurements and support welcome – whether ongoing or one-off; it was reported that JAXA will develop a validation system for GOSAT in cooperation with NIES and will be willing to share results in support of IGCO;
- **integration of the operational observations with process study results via model-data fusion to give a holistic picture of the dynamics of the carbon cycle:** Marie Colton noted that it was a challenge for IGCO (and other Themes) Challenge of themes to overcome the obstacle of data assimilation being beyond the purview of any single agency; Stephen Briggs noted that, given a suitable proposal, the different agencies involved (including from CEOS) would likely be willing to investigate a more sophisticated approach to utilisation – difficult to transfer into a specific initiative. Eric Lindstrom proposed, and several CEOS members agreed, that IGCO should define such a proposal – focusing on a specific product that IGCO have in mind – as a way to focus actions of all concerned; such mechanisms should be the type of content found in the IGCO Implementation Plan;

Action	13-9	IGCO to further develop their implementation plan, clarifying the implementation framework, responsibilities, timetable, data providers, products, and users	SIT-14
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4.3 Geo-hazards Theme

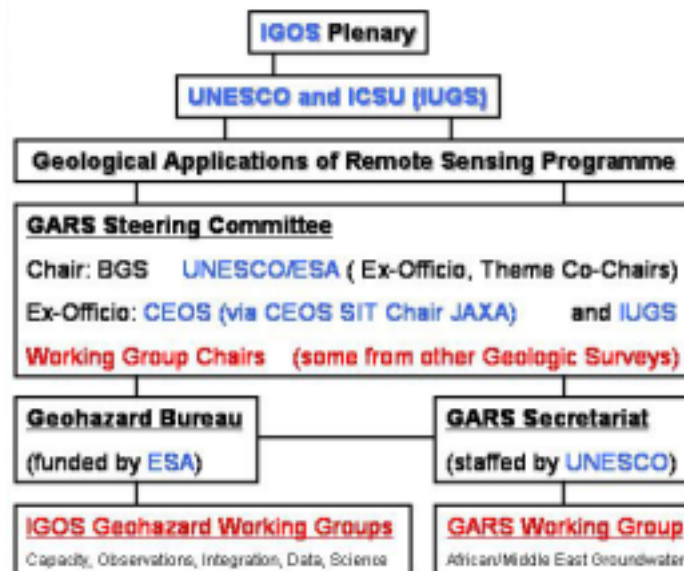
Stuart Marsh (BGS) gave a presentation on the Geo-hazards Theme:

IGOS Process Paper Compliance

It was agreed that the Theme satisfied the main criteria defined in the IGOS Process Paper.

Implementation Framework

It was noted that an implementation mechanism was needed for the Theme which represents both the in-situ and space-based geo-hazard communities. The proposed mechanism is GARS: The “Geological Applications of Remote Sensing” Programme funded by UNESCO & ICSU (via IUGS). GARS has been operating for 20 years - steered by scientists from geological surveys, research institutes and universities, and is now chaired by IGOS Geo-hazards Theme Team Chairman. UNESCO and ICSU have agreed the necessary modifications and GARS will focus on IGOS Geo-hazard Theme Implementation during 2004-6. Increased space agency participation in the GARS Steering Committee will be necessary.



The proposed framework is shown above. The framework will be ‘populated’ by the summer of 2004. The Theme Leaders have developed a personnel and resources plan for the coming year, including:

BGS, and now BNSC, support Theme implementation with the Chair’s time

- BGS and BNSC support for the Chair’s time;
- UNESCO recruitment of a new staff member as GARS Secretariat;
- ESA have offered to fund and staff a Bureau for the Theme for 3 years; the location of the bureau is yet to be decided, but will likely be in Europe;
- active participation continues from the Theme Team members

The GARS Programme Budget for 2004 IGOS activity is US\$15k. UNESCO/IUGS seed-corn funds will support 2004 scientific/technical meetings.

The Theme's plans for 2004 include:

- Q1: publish Report, update website;
- Q2: establish IGOS Geo-hazards Bureau; hold Theme Launch Workshop;
- Complete the modification of GARS Programme;
- Establish Steering Committee and Working Groups (on Capacity Building; Observations and Key Systems; Integration and Modelling; Databases and Infrastructure; Underpinning Science)

Space Segment Commitments

Stuart Marsh listed 4 priority action areas for consideration by SIT:

- baseline global topography: this data is required for all types of geo-hazards and is used in mapping, modelling and visualization; a global, consistent, high-resolution dataset is required;
- baseline geo-science mapping: ASTER & Landsat continuity are key issues;
- ground displacement: the need for future continuity in C-band and L-band sensors for use in INSAR was explained; C-Band INSAR was noted as being near "operational" in urban/arid settings – thanks to the continuity provided by the ERS/ENVISAT series;
- L-band: continuity is still vital
- Data Access: The Theme will need space agency involvement in addressing issues related to standards and interoperability, distribution networks etc.

Stephen Briggs reported that, for C-band SAR continuity, ERS and ENVISAT may fly in tandem until 2007. He also suggested that GMES missions may provide further C-band continuity. Daniel de Lisle reported that Radarsat-2 will be launched in November 2005.

For L-band SAR continuity, Chu Ishida reported that JAXA will launch ALOS late in 2004, and Conrado Varotto informed that CONAE will launch the L-band Skymed mission in 2006.

For baseline global topography data, Chu Ishida reported that ALOS will provide a 10 metre topographic dataset. Jay Feuquay noted that SRTM global 8 metre DEM data will be made public later this year.

Eric Lindstrom reported that NASA has funding for continuity of Landsat's mission beyond Landsat-7.

The SIT Chairman emphasised the importance of the connection with existing in-situ operational systems and international frameworks. Stuart Marsh confirmed that this would be addressed by the Theme, and noted that the Theme is more about 'preparedness' rather than 'response'. Preparedness is a global endeavour but response is undertaken locally. One challenge for the Theme is to identify how existing frameworks can be used to best effect.

Action	13-10	JAXA to confirm the Japanese operational agency appropriate for participation in the Geo-hazards Theme	Feb 2004
Action	13-11	NASA to provide SIT with information on the proposed 'international altimetry service'	Feb 2004
Action	13-12	JAXA to update SIT on the status of ASTER follow-on mission	Feb 2004

5. Consideration of Themes still in development

5.1 Atmospheric Chemistry Theme

Don Hinsman (WMO) gave an update of the IGACO team progress in preparing the Theme report. It was noted that the report is expected to focus on 4 key issues:

- air pollution/air quality;
- climate-chemistry interaction;
- stratospheric ozone depletion;
- atmospheric self-cleaning capability.

A two-phased approach is envisaged for implementation:

- 2004-2014, led by WMO in co-operation with CEOS agencies: implement IGACO system for all group 1 species; develop retrieval algorithms, quality control system, models; upgrade ground-networks and routine aircraft observations; plan and initiate the long term observational system including the space component;
- beyond 2014: establish an operational IGACO system for all group 1 and group 2 species, including relevant satellites; maintain ground networks for all group 1 and group 2 species; maintain routine aircraft programme for group 1 and group 2 species with improved global coverage; refine models and data assimilation.

David Williams cautioned that there should be no expectation of a near future capability for geostationary atmospheric chemistry operational measurements – since this domain remains strictly a scientific endeavour at present. The 10-year objective of IGACO for 4 GEO and 2 LEO missions providing a range of atmospheric chemistry missions might therefore be regarded as too ambitious. He proposed that the Theme consider defining short term requirements for a demonstration project for GEO measurements – to help build the case and requirements for the future system. France and Germany both have concept studies underway.

Don Hinsman confirmed that the existing GAW was principally an in-situ system, and that IGACO would bring a major space segment to the system.

Chu Ishida hoped that the report to IGOS-P-11 would provide an understanding of precisely who will participate in IGACO and what their responsibilities are.

The IGACO Theme Team will continue to develop the report for submission to IGOS-P-11 and will reflect SIT comments where appropriate.

5.2 Coastal Theme

Paul DiGiacamo (NASA JPL) gave an update of the Coastal Theme team progress in preparing the Theme report:

- a workshop was held in New Zealand in November 2003 which identified the priority issues for the Theme report:
 - coastal hazards & public safety;
 - coastal urbanization & public health;
 - coastal ecosystem health & productivity;
 - coastal hydrological and biogeochemical cycles;
- a number of observational needs in these domains were explained;
- some of the key challenges for the Coastal Theme were highlighted: improved data access; model and algorithm development; data integration & assimilation; improved resolution (eg geo-stationary platforms & hyperspectral); ocean sensors (including cal/val); synchronous multi-sensor platforms; continuity (eg visible/IR, microwave) and knowledge (eg salinity);
- the Theme team plan milestones are as follows:
 - **Feb 2004:** Coastal Theme Workshop #3, at IOC in Paris on 23-25 February;
 - **Apr 2004:** Submission of Coastal Theme Report to IGOS Partners and Coastal Theme Space Requirements to CEOS-SIT;
 - **May 2004:** Review of Coastal Theme Report during IGOS-P-11;
 - **Q3 2004+:** Anticipated publication of Coastal Theme Report (commitment of support from IOC); initiation of implementation phase (C-GOOS/GTOS etc).

6. Status of Themes in implementation

Ocean Theme

Eric Lindstrom reported that Colin Summerhayes would retire from his GOOS role in March. The next steps for the Ocean Theme are: to undertake the 'rolling review' in 2004; to co-ordinate where necessary with the Carbon and Coastal Themes; to address observation continuity challenges; and to publish an updated Theme report. It was noted that the Theme's success may have been due in part to capturing in its definition the spirit of existing directions of observation providers.

The SIT Chair noted that Ghassem Asrar of NASA had advised him that he hoped to see a full assessment of the success of implementation of the Theme before the Theme paper is updated.

Action	13-13	Ocean Theme Team to advise SIT Chair on their plans for assessment of the Theme implementation	SIT-14
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Commonalities across Themes

There was a brief discussion regarding commonalities in requirements across the different IGOS Themes (eg the Geo-hazards Theme has a similar requirement to the Coastal Theme for a 30m topographic dataset). It was suggested that it may be valuable to have a discussion or side meeting at a future Partners meeting to discuss such commonalities in requirements and to identify datasets of particular value for different communities.

Chu Ishida suggested that SIT-14 consider such common requirements across Themes.

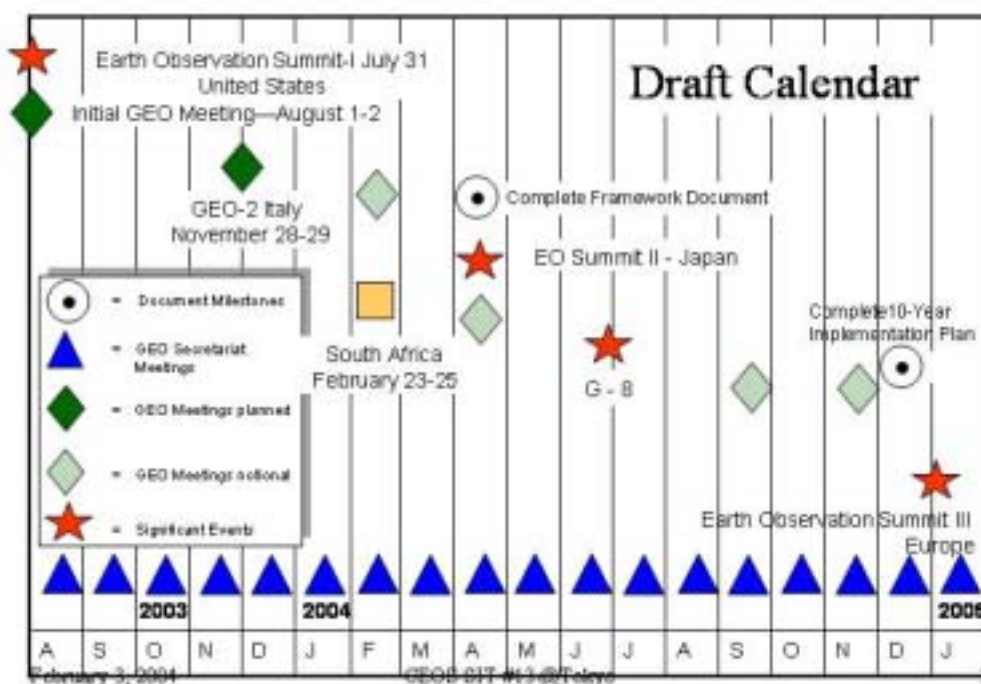
7. Current issues related to IGOS-P Themes

7.1 GEO

Yukio Haruyama presented a brief update on the status and activities of GEO, including details of the main documents under development:

- GEO report (GEO-4, April 22&23, Tokyo);
- Framework Document (EO Summit II, April 25, Tokyo);
- 10-year Implementation Plan (EO Summit III, February 16 2005, Europe).

The timetable for 2004 was outlined as follows:



GEO-5 is expected to be held in the Netherlands in October.

SIT participants gave a number of comments to the Chair in response to his question asking how SIT could best support and interface to the GEO process:

- Don Hinsman suggested that SIT had been instrumental in the IGOS process of identifying and developing the Themes; these Themes should be cited as examples to GEO and encourage to continue as the baseline for future GEO efforts;
- David Williams agreed and suggested that GEO would have to use IGOS progress as the basis for the GEO implementation plan.
- Stephen Briggs further suggested that progressing IGOS Theme implementation was the best way to influence the GEO process.

7.2 IGOS-P evolution

Arthur Dahl gave a brief presentation which summarised the main points of the paper he had written with Jeff Tschirley: “The IGOS partnership and emerging themes: A review of strategic choices and areas of concentration”. The SIT Chairman congratulated the authors on the value of the paper and noted that the messages had been much appreciated by many of the IGOS Partners, including CEOS. The SIT recommended that the paper be discussed in detail at the next IGOS Partners meeting in May.

8. SIT TOR and other strategic issues

No issues were raised.

9. Next meeting

It was agreed that SIT-14 would be held on May 25th (and 26th morning if necessary) in Rome before IGOS-P11.

It was requested that FAO provide a venue for the SIT-14 meeting.