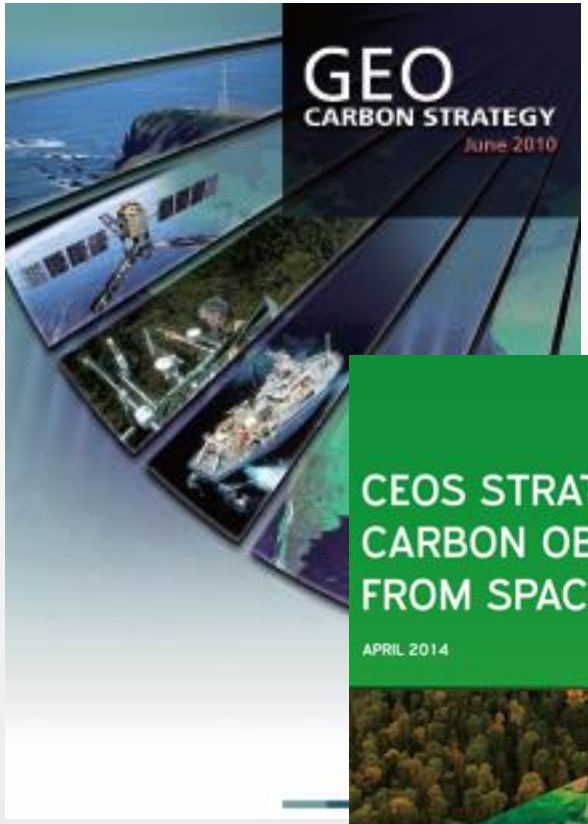
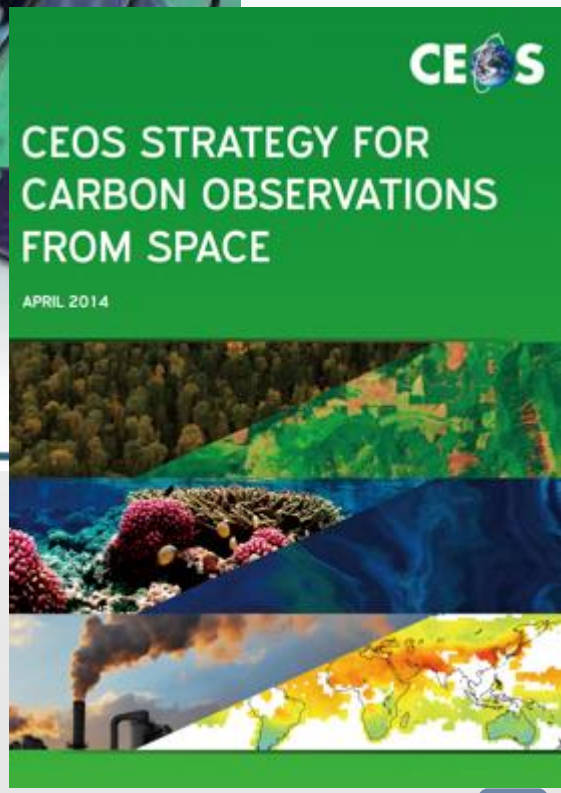
CEOS Carbon activity - history and Background

- GEO Carbon Report developed in June 2010 by team led by Ciais et al. (GCP).
- *CEOS Strategy for Carbon Observations from Space* – written in response to above, completed in March 2014 – *Wickland et al.*
- 42 Actions identified in the report for specific response– first discussed at SIT Technical Workshop in September 2013
- April 2014: Proposed establishment of a study team to take forward the Actions and also identify formal CEOS mechanism to manage Actions.





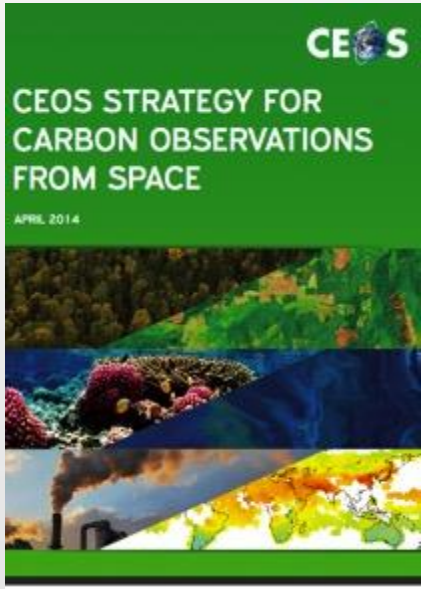
Truly cross-cutting within CEOS

Spreadsheet identified lead CEOS “Entity” as:

- Atmospheric Chemistry-VC: 6 Actions
- Land Surface Imaging-VC: 4 Actions
- Working Group Climate: 7 Actions
- Working Group Calibration/Validation: 11 Actions
- Strategic Implementation Team: 7 Actions
- N/A: 2 Actions
- Many other WGs and VCs named as contributing

CEOS Strategy for Carbon Observations from Space – AIs on Atmosphere

- **AI 16 & 18: CEOS members to organise Workshops to refine the scientific and policy requirements for quantitative data on atmospheric CO2 and CH4 from low Earth and geostationary orbit**
- **AI 17 & 19: ACC to co-ordinate the detailed planning and preparation for a Constellation from low Earth and geostationary orbit**
- **AI 20: ACC and WGCV to provide coordination and support for the Cross Calibration/Validation of all satellite CO2- and CH4-measuring sensors**
- **AI 23: Individual CEOS Agencies with interests in and/or mandates for providing improved information on natural and anthropogenic Emissions of carbon (CO2, CH4, etc.)**



ACC Summary Response (from AC-VC-11, 2015)

- **Several countries and space agencies have and are currently planning to launch satellites in the 2016-2025 time frame to obtain GHG measurements from space.**

- **A single satellite (or national constellation) can not fulfill established GHG user requirements (e.g. GCOS – 4 hourly measurements).**

- **The need for a GHG Constellation is clearly outlined in the CEOS Strategy for Carbon Measurements from Space.**

ACC Summary Response Details (from AC-VC-11, 2015)

- Foster efforts to deploy future GHG satellites that overlap with existing GHG missions by at least one year to establish a GHG Constellation. Emphasize improved accuracy, spatial resolution and temporal coverage to enable a space based capability to distinguish natural from anthropogenic GHG emissions. ACC will write a white paper on a GHG Constellation during the next 2 years.
- ACC (Space Agencies) will support the organisation of the yearly IWGGMS Meetings (June 2016 in Japan, 2017 planned in Finland)
- Agree on an open data policy for GHG data from space and ground based validation sites
  - Japan (GOSAT/GOSAT-2), U.S. (OCO-2, OCO—3), Europe (S5P), and China (TanSat)
- Share/agree on mission requirements.
- Support the establishment of a common product format (share specifications, meta data definition etc.)
- Improve interaction/co-operation among space agencies on GHGs.
- Ensure close interaction between GHG and AQ scientific data exploitation.
- Support the establishment of common Cal/Val standards (pre-launch and on-orbit calibration standards, perform algorithm intercomparisons, provide traceability information, use the same spectroscopic databases adopt internationally recognized validation standards, etc.).
- Support the continuation/possible extension of the TCCON network.
- Link into overarching and in-situ activities (e.g. an Integrated Global Greenhouse Gas Information System)

Proposed CEOS Process Now
(CEOS SIT to request Plenary endorsement 10/2016)

- Forego the “traffic light” approach to monitoring and reviewing Carbon Actions for some time [Although we will internally keep an overview of overall progress]
- Instead of the 42 overall Carbon “Actions”, focus on a number (5-7) of WG and VC proposed initiatives
- These will also act as “prototypes” for number of crosscutting aspects related to the Carbon Action implementation i.e.:
  - Initiatives addressing multiple Actions
  - Initiatives across multiple CEOS entities VCs & WGs
  - Initiatives addressing multiple thematic examples from the same Carbon Action
- In parallel we would continue several supporting activities: GEO Carbon Flagship engagement, mapping Agency level projects onto Carbon Actions, 2 yr CEOS Carbon Workshop

ACC Initiatives Align with this approach

Deliveries:

- Merged CARB AI 16+18: ACC to support the organisation of yearly IWGGMS (International Workshop on Greenhouse Gas Measurements from Space): next planned at FMI (Helsinki, Finland) on 6-8 June 2017
- Merged CARB AI 17+19+23: ACC will prepare a white paper within 2 years
- CARB AI 20: ACC will write a Technical Note within 2 years

People involved:

ACC GHG lead: D. Crisp (NASA)

M. Nakajima, K. Shiomi (JAXA) – GOSAT, GOSAT2; D. Crisp (NASA) – OCO2, OCO3; Y. Liu (CAS) – TanSat; C. Zehner, Y. Meijer (ESA) – S5P, future GHG Sentinel; A. Friker (DLR) – MERLIN; C. Deniel (CNES) - MERLIN, MicroCarb, IASI; D. Edwards (NCAR) – GEO CH4; A. Butz - (DLR) GEO CO2; etc. – to be updated during upcoming ACC-12 meeting, Seoul, 13-14 Oct 2016 ☺

Backup

Plenary 2015 (November)
Way Forward

1. **VCs and WGs were reassured that Principals understand that 'finishing' many of the actions is a long-term effort and that an 'agile' approach is appropriate.**
2. **Noting the need to build momentum the SIT Vice Chair suggested that:**
   - VCs and WGs focus specific near-term (1 year) steps that are achievable and will show progress.
   - Principals be engaged to determine their support for these proposed 'next steps'; with this helping give VCs and WGs confidence in their direction.

Stock take September 2016

- 3 hour session organised during WG-VC day
- Headline outcome was that an improved process for carbon action management within CEOS was agreed
- It was agreed that for the ACC effort, this had begun to cover some of the issues raised at CGMS in June 2016. Additional CGMS agencies, beyond those already involved, work would therefore be invited to join this as a shared initiative satisfying the action placed on CEOS at the CGMS Plenary. Possible, in due course the scope will be broader than ACC.
- The timing remains to be clarified for outputs; Other action may be progressed in addition to the above. All CEOS WG/VCs should review the table of actions in the context of these new initiatives and their ongoing work in development since 2014 and provide an update of their real or potential involvement with each ahead of Plenary.
- A workshop (CEOS working meeting) is envisioned ahead of Q3 2017 to take stock and prepare a full report of progress for CEOS Plenary 2017

Initial Proposed Initiatives (TBC)

1. ACC: aiming for a white paper on a GHG constellation;
2. WGClimate: focusing their gap analysis work on carbon-specific ECVs;
3. WGISS: on a carbon data portal to facilitate the discoverability and accessibility of ECV products and space-borne CDRs relevant for the carbon actions.;
4. WGCV: reported on their internal management and reporting on relevant actions;
5. NASA: on cal/val and production of biomass products from CEOS missions – based on previous bi-lateral initiative from ;
6. JAXA: on the opportunity to engage with IPCC Inventories and promote satellite EO.
7. …

These address a good cross-section of Actions across the Carbon Strategy