

**Minutes of the  
2<sup>nd</sup> Atmospheric Composition Constellation Workshop (ACC-2)  
EUMETSAT, Darmstadt, Germany  
13-14 September 2007**

ACC-2 was held at the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) in Darmstadt, Germany on 13-14 September 2007. The Atmospheric Composition Constellation (ACC) is one of four Constellations proposed by CEOS to support the overall goals of GEO and to provide prototype systems for GEOSS. The meeting was attended by representatives from participating CEOS agencies to the ACC Constellation Study and other supporting organizations. These include JAXA, ECMWF, DLR, KNMI, CSA, CNES, NIVR, EUMETSAT, NOAA, RAL, NASA, ESA and Harvard University. We gratefully acknowledge Eumetsat for hosting the workshop.

The Workshop had three sections: 1) Overview of the CEOS and the Atmospheric Composition Constellation, (2) ACC contributions from the member space agencies, and (3) Status of the ACC Projects. The workshop Agenda and participant list are attached to these minutes. The presentations can be found at: <https://ceos.larc.nasa.gov> (username and password is required). Contact Brian Killough ([Brian.D.Killough@nasa.gov](mailto:Brian.D.Killough@nasa.gov), NASA) for file server access information.

### **1) Overview of CEOS and the Atmospheric Composition Constellation**

Lars Prahms (Director of EUMETSAT) provided a welcome to the group and reviewed the charter of EUMETSAT.

E. Hilsenrath (ACC Lead) reviewed the constellation concept, objectives and goals. The ACC requirements are mature and we should project that conclusion to CEOS as we prepare for future missions and opportunities. The ACC has defined clear near-term, mid-term and long-term goals and projects that will demonstrate ACC capabilities.

Steven Briggs joined the meeting via telecon representing the CEOS leadership. He discussed the importance of the Constellation teams and their relationship to GEO. The study teams have the potential to influence the decisions of international space agencies. In addition, he stressed the need for the study teams to present a status report at the CEOS Plenary.

Folkert Boersma (Harvard University) was a guest speaker on “Concurrent Measurements off Tropospheric NO<sub>2</sub> from OMI and SCIAMACHY”. There are differences between OMI and SCIAMACHY with different sampling times (1:30 vs 10:00, respectively). The research is examining these differences to determine specific drivers for the NO<sub>2</sub> column data.

Heinrich Bovensmann (University of Bremen) was a guest speaker on “Challenges for Atmospheric Composition Measurements from Space”. Topics included trends in NO<sub>2</sub> and SO<sub>2</sub> as well as greenhouse gases (GHG) in the boundary layer. Global long term monitoring of key trace gases is required for the future. An existing gap exists for temporal sampling to support air quality and health (geostationary). Gaps in the future are possible for global GHG monitoring

after SCIAMACHY / GOSAT / OCO and profiling of the upper troposphere and stratosphere  
after ENVISAT / AURA / ACE.

Brian Killough (CEOS Systems Engineering Office) presented a status of the CEOS Constellations “Way Forward” plans, ACC accomplishments and current work, an analysis of the GEO SBA’s, and a status of the CEOS Plenary and Global Observing System (GEO) Summit Visualization Product. The end of the presentation showed a draft version of the short ACC video for the GEO Summit meeting. There was a considerable discussion on ground-based measurements and their use for cal/val as well as assimilation among ground networks to support more general GEO system user products.

## **(2) ACC contributions from the member space agencies**

Eleni Paliouras (DLR, representing Claus Zehner) presented a status of PROMOTE. The user products from PROMOTE are aligned with GMES and also with GEO. There was a discussion on the long term desire to transition the ESA PROMOTE product to a more operational system available to global users which is managed by the EC.

Pepijn Veefkind (KNMI, Netherlands) presented a status of CAMELOT (Composition of the Atmosphere: Mission Concepts and Sentinel Observation Techniques). This project was based on the results of the CAPACITY study which derived a set of user requirements for ozone, air quality and climate and identified observational gaps. It is focused only on nadir Sentinel 4+5 missions.

Carole Daniel (CNES) presented a status of the CNES programs and projects related to ACC. There were a variety of current and planned space missions, balloon and aircraft missions, user community efforts and data centers that directly relate to ACC efforts.

Elini Paliouras (DLR) presented a status of “DLR Activities related to Atmospheric Composition”. DLR plans to support ACC through space missions, validation campaigns, operational data management and geophysical raw data processing.

Stella Melo (CSA) presented a status of the CSA Atmospheric Composition Program. This included current missions such as MOPITT on Terra, OSIRIS on ODIN, ACE on SCISAT, and Cloudsat. There was also a discussion of new mission developments such as Chinook, and a new small mission RFP for Climate Change in September 2007.

Cathy Clerbaux (EUMETSAT) presented a report on Tropospheric Chemistry and the IASI instrument. Data has been available since May 2007 for science review. Total columns of CO and O<sub>3</sub> have been retrieved with continuing work on CH<sub>4</sub>.

Richard Engelen (ECMWF) presented a report on “Monitoring Atmospheric Composition with GMES”. GMES involves 31 partners and 6 projects to develop forecasts and data products for air quality, aerosols, greenhouse gases, and reactive gases. Prototype products are currently available and the system will be pre-operational by 2009 under the current project. A future proposal is pending to develop a fully operational GMES system.

Rosemary Munro (EUMETSAT) presented a report on “Atmospheric Composition Measurements from EUMETSAT’s Current and Future Missions”.

Yoshihiro Seki (JAXA) presented a report on the GOSAT mission.

Joost Carpay (NIVR) reported on the status of the TROPOMI instrument. The instrument is a follow-on to OMI / SCIAMACHY / GOME with advanced technology. There is a 2.3um channel for CH<sub>4</sub> and CO. It is currently under a Phase-A feasibility study proposed to the NL government.

Larry Flynn (NOAA) presented a report on the NOAA mission plans. The plans for demanifested instruments was presented as well as long term mission planning. A recommendation for ACC to provide global data sets in an “operational” sense was presented. This could be accommodated within the CEOS framework for GEOSS.

Bojan Bojkov (NASA) presented a report on the CEOS Working Group for Calibration and Validation (WGCV). There are currently 6 sub-groups, including atmospheric composition. This group is fostering ongoing interagency validation coordination, synchronization of requirements, and facilitated data access and sharing. All of these efforts directly contribute to ACC.

Jolyon Reburn (RAL) presented a status of the study “CEOS ACC Requirements and Gap Analysis”. There was a discussion of potential missing data from GMES and NOAA. The study is currently finalizing the requirements inputs and extracting the ACC product requirements.

### **(3) Status of the ACC Projects**

Claus Zehner (ESA) presented a status of the project called “Global Aircraft Hazard Support”. Ash clouds have caused significant impacts to airplanes. In addition, they are not visible at night and not detectable by radar. This project can provide improved satellite data and forecasting capabilities for the 9 Volcanic Ash Advisory Centers (VAAC). Plan to use SCIAMACHY, OMI, GOME-2, SEVERI, and AIRS instruments which demonstrates the use of constellations to support the user community. George Serafino (NOAA) presented a status of the project called “NOAA/NASA Satellite Data for Volcanic Ash Advisories”. This presentation provided a detailed summary of the current operational VAAC system. Currently looking at a method to determine ash height and a plan to verify the results with CALIPSO. The overall goal is to provide near-real-time products (within 3 hours of overpass) of SO<sub>2</sub> indices and ash AOD versus height. There are several pending proposals and funding opportunities that could support this project in the future.

Larry Flynn (NOAA) reported on the “Global NO<sub>2</sub> Air Quality” project for Shobha Kondragunta (NOAA). NESDIS plans to provide users a GOME-2 NO<sub>2</sub> product that is consistent with OMI. In addition, SCIMACHY data will be used to address long term trends. Air quality forecasting products are desired for the future.

Brian Killough (NASA) presented for Jack Fishman (NASA) on the status of the project “Demonstration of a Global Fire / Aerosol Operational Product”. The project is currently using MODIS and CALIPSO data for smoke trajectory forecasting. The long term desire is to expand the project to many international users and utilize more satellites as a virtual constellation. It was suggested that emphasis should be placed on the end user products and availability of data in near-real-time. The CEOS WGISS group and the UIC should be contacted for relevant discussions on data availability. In addition, contact information will be provided by ESA and ECMWF for similar fire detection and smoke trajectory forecast efforts.

### Attendees

Name	Organization	Email Address
Ernie Hilsenrath	NASA	ernest.hilsenrath@nasa.gov
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Jolyon Reburn	RAL	J.Reburn@rl.ac.uk

## Agenda

Eumetsat- Darmstadt, Germany  
13 September 2007

9:00	Welcome from Eumetsat	L. Prahms
9:10	Agenda Overview and Meeting objectives Status of Atmospheric Composition Constellation	E. Hilsenrath
9:30	Guest Speaker – NO <sub>2</sub> Retrieval from Multiple Instruments	F. Boersma
10:00	Guest Speaker – Challenges for AC Measurements from Space	H. Bovensmann
10:45	CEOS Constellation Systems Engineering Office and preparations for the CEOS Plenary and GEO Summit Meeting	B. Killough
11:00	Agency Report Updates	
	ESA/DLR - PROMOTE	E. Paliouras
	ESA/KNMI - CAMELOT	P. Veefkind
	CNES – Atmospheric Composition Program	C. Daniel
	DLR – Atmospheric Composition Program	E. Paliouras
	CSA - Atmospheric Composition Program	S. Melo
	EC/ECMWF – Monitoring AC and Climate with the GMES Framework	R. Engelen
	Eumetsat - AC Measurements: Current and Future EUMETSAT Satellites	R. Munro
	JAXA – Atmospheric Composition and GEO	Y. Seki
	NIVR - New developments and collaborations	J. Carpay
	NOAA – Operations and Constellations	L. Flynn
15:00	Requirements and Gap Analysis	J. Reburn
15:40	CEOS Working Group Cal/Val Report	B. Bojkov
16:35	Guest Speaker – Tropospheric Chemistry Multiple Instruments	C. Clerbaux
17:00	Review and Action Items	

14 September 2007

9:00	Discussion of ACC Projects	
	- Introduction	E. Hilsenrath
	- GOME-2 and OMI NO <sub>2</sub> Retrievals for Regional and Global Air Quality Modeling Applications (NOAA-led)	S. Kondragunta/L.Flynn
	- Operational Fire Detection and Smoke Prediction	J. Fishman/B.Killough
	- Volcanic Ash Advisories for Global Application	G. Serafino/C. Zehner
	- Further implementation of Projects	All
	- New long term projects	All
14:00	Adjourn	



## **Action Items**

- (1) ACC will write a one-page recommendation to CEOS concerning long term needs for Greenhouse Gases. This will be led by Stella Melo (CSA).
- (2) ACC will write a recommendation to CEOS concerning the need for ground-based measurements to support calibration/validation as well as data assimilation for user products to support GEO initiatives. This will be led by Bojan Bokov (NASA).
- (3) Larry Flynn (NOAA) will provide the latest NOAA requirements documents to Jolyon Reburn for use in his ACC requirements study.
- (4) Claus Zehner (ESA) and Richard Engelen (ECMWF) will provide contact information to Jack Fishman (NASA) concerning the fire/aerosol project. ESA and ECMWF have active programs for fire detection and smoke propagation that are relevant to the ACC project.
- (5) Projects leads will provide a schedule including milestones for the short-term and long-term.

