

**WORLD METEOROLOGICAL ORGANIZATION**



**COMPOSITE OBSERVING SYSTEM FOR THE  
NORTH ATLANTIC (COSNA)**

**COORDINATING GROUP FOR COSNA (CGC)**

**THIRTEENTH SESSION**

**REYKJAVIK, 28 - 30 AUGUST 2002**



**FINAL REPORT**

## **Contents**

	<i>Page</i>
<i>General summary of work of the session .....</i>	<i>1-15</i>
<i>Annex I - Agenda</i>	
<i>Annex II - Consolidated Monitoring Report on COSNA Components 2002</i>	
<i>Annex III - Report on North American Atmospheric system (NAOS)</i>	
<i>Annex IV(a) - Statement of Account as at 31 December 2001</i>	
<i>Annex IV(b) - Interim Statement of Account as at 31 July 2002</i>	
<i>Annex V(a) - Proposed Expenditures 1 September 2002 to 31 August 2003</i>	
<i>Annex V(b) - Trust Fund for CGC (Projected Accounts)</i>	
<i>List of Participants</i>	

---

## GENERAL SUMMARY OF THE WORK OF THE SESSION

### 1. ORGANIZATION OF THE WORK OF THE SESSION (agenda item 1)

#### 1.1 Opening of the session (agenda item 1.1)

1.1.1 The meeting was opened at 9.00 a.m on Wednesday, 28 August 2002 in Thjodmenningarhusid (The Culture House), Hverfisgata 15, REYKJAVIK, Iceland by the chairman of CGC, Mr M. Lystad. The list of participants is attached at the end of this report.

1.1.2 The Director of the Icelandic Meteorological Office, Mr Magnus Jonsson welcomed the participants to Iceland and to Reykjavik. He considered it very appropriate that the CGC should meet in Iceland as its weather services obviously depended so much on observations in the North Atlantic and the work of the group had greatly benefitted his country. Noting that COSNA would soon cease to exist as a separate entity, he expressed the hope that the transition to EUCOS would provide new opportunities for observations over the ocean. He felt that the Greenland/Iceland/Faroes region was meteorologically very important for short range forecasting over all of Europe and as such merited high priority for increased observational coverage, including for instance an upper-air station on the NE corner of Iceland. He hoped that the facilities provided for the meeting would be found satisfactory, that the meeting would be successful, and that the participants would enjoy their stay in Iceland.

1.1.3 The Chairman expressed his thanks to the IMO for the invitation to hold the meeting in Reykjavik and for its continuing support and contributions to the work of CGC. He was pleased to note that, in addition to the countries represented at the meeting, most of the groups dealing with the individual observing systems comprising COSNA were also present. He also appreciated the presence of the Programme Manager of EUCOS. Mr Lystad recalled that the CGC had as one of its tasks the periodic review of the need for and the aims of the CGC, and, in the light of previous discussions on the future of SEG and CGC, including in particular the recommendations of the recent meeting of the Management Group, it would be for this session to decide if and when the SEG should be disbanded and when the planned merger of COSNA with EUCOS should take effect.

#### 1.2 Adoption of the agenda (agenda item 1.2)

1.2.1 Arrangements were made for a presentation by Dr Tomas Johannesson of the Icelandic Meteorological Office on "Observations and laboratory experiments for evaluating the effectiveness of avalanche defence structures in Iceland".

1.2.2 The agenda as adopted by the session is given in Appendix I.

### 2. REPORTS OF THE CHAIRMEN OF CGC AND SEG (agenda item 2)

2.1 Mr Lystad presented his report on the main activities of the CGC since its meeting in August 2001. He reported to the session that:

- PRs of contributing countries were notified in September 2001 of the CGC decision not to seek contributions after 2002;

- EUMETNET was informed by letter on the conclusions of CGC-XII regarding the transfer of CGC activities to EUMETNET;

- Arrangements were made for the partial funding of the ASAP Experiment carried out in September-October 2001 as had been agreed by CGC;

- CGC views on the transfer of SEG activities to CBS were incorporated in the

Secretariat document on WWW/GOS to the RA VI session in May 2002;

- A consultant (Mr Hamish McCombie) was again recruited to assist with administrative and other support for CGC;

- Invoices for annual contributions were sent out by the Secretariat as usual (and for the last time) in January 2002;

- The thirteenth Management Group meeting was held in Geneva in March 2002 and the SEG meeting in Reading, UK, in May 2002;

- Arrangements were made with Bernd Richter and DWD regarding his release for the preparation of the COSNA Monitoring report for 2002;

- The Chairman participated in the SEG meeting in Reading in May;

- The Chairman made contact with Météo France to obtain a report on the end-to-end monitoring of ASAP soundings and with the chairman of the ASAP Panel inviting him to take some remedial action to ensure ASAP soundings reached 100hPa.

- Preparations were made for the CGC Session in Reykjavik, August 2002.

2.2 The chairman reported that the meeting of the Management Group in March 2002 had reviewed all recently completed and ongoing activities and made preparations for the thirteenth session of CGC. Much of the meeting had been devoted to the future merger of COSNA and EUCOS, and the consequent transfer of CGC activities to EUMETNET, as well as to the arrangements for the activities of the SEG to be carried out within the WMO/CBS structure. The session discussed this further under item 5 of the agenda.

2.3 He also reported that the EUCOS ASAP experiment, carried out over two months in the Autumn 2001 and partially funded by CGC, had successfully demonstrated the feasibility of a location-dependent operation schedule for the European ASAP units. A recommendation had been made to implement such a schedule from 2002. The experiment had provided a significant increase in E-ASAP data and more than double the amount of data from the Azores (funded by CGC) which had been used in an OSE run by the UK Met Office designed to measure maximum impact from ASAP reports. Two reports on the study had been submitted to the chairman and were available on request.

2.4 The chairman of the SEG, Dr Horst Böttger, reported that at its twelfth session in March the SEG had reviewed the impact studies that had been carried out by its members since the last meeting. Several OSEs from the major European NWP centres, including the HIRLAM consortium, as well as NCEP, had addressed issues raised by the CBS Expert Team on Observational Data Requirements and Redesign of the GOS (ET-ODRRGOS), particularly the impact of hourly SYNOPs and the impact of tropical radiosonde data. Several other studies had addressed the use of high frequency data, in particular from automated systems, such as AMDAR or wind profilers, in 4D-Var data assimilation systems or by using shortened data assimilation time windows.

2.5 In summary, the results of the OSEs were:

- Positive impact was found from the use of high resolution data in 4D-Var or high frequency assimilation cycles.
- Positive impact was found from a range of newly introduced satellite data, i.e. Scat winds, MODIS winds, ozone data, radiances.
- Positive impact was found from surface observations. Data denial studies indicated a strong impact from surface pressure measurements, there is evidence of

additional beneficial impact from high frequency surface pressure data, e.g. hourly observations.

- A clear signal and a significant positive impact were found from aircraft temperature and wind measurements taken during ascent and descent.
- An impact was found from the tropical radiosonde network, a more extensive study would be required to consolidate the results.

2.6 The SEG had also been informed about the impact studies planned for the coming year and beyond. The studies would address the evaluation and use of new satellite data (in particular ENVISAT, AIRS, Meteosat and GOES WV channels, MODIS AMV etc.), the use of surface based GPS systems for the inference of vertically integrated moisture, and scatterometer wind data. Substantial efforts were to be spent in support of the EUCOS Studies Programme, evaluating the impact of additional data (AMDAR, aerosondes, ASAP) and in particular the impact of observation targeting. Several planned studies would directly address issues raised at the ET-ODRRGOS meetings and the list of proposed studies drawn up by the Team.

2.7 There had also been considerable discussion regarding the continuation of SEG's main activities if and when CGC ceased to exist. These issues had been discussed further at the meeting in July 2002 of the CBS Expert Team on Observational Data Requirements and Redesign of the GOS (ET-ODRRGOS) which had expressed the view that it was important for the work in re-designing the GOS that the SEG activities be continued. It agreed with the SEG that the CBS Expert Team and its rapporteurs on global and regional NWP appeared to be best placed to organize the OSE work and to arrange for future workshops for the exchange of results of OSE studies. It was suggested that such a workshop be held in Europe in the first quarter of 2004. While these proposals would be considered by the CBS in December 2002, the chairman of SEG stated his view that it would still be desirable for there to be annual meetings to maintain momentum in SEG work. This was further discussed under agenda item 5.

### 3. STATUS OF COSNA (agenda item 3)

#### 3.1 Consolidated status report (agenda item 3.1)

3.1.1 The meeting noted with appreciation the consolidated status report on the COSNA prepared by Mr Bernd Richter, which reviewed the functional performance of the various operational components of the system. The report (see Annex II) had been compiled from selected information given in the reports of the monitoring centres of Météo-France, UK Met Office, KNMI QEV Centre and ECMWF, so that deficiencies could be identified, long-term trends detected and appropriate action taken. The CGC expressed its appreciation to these Centres, including the UK Met Office ASDAR Centre, for the continued availability of monitoring information.

3.1.2 It was noted that observational data available from the North Atlantic area continued to be generally of high quality. Data availability is, however, variable because of occasional operational and/or telecommunication problems and the natural variability of mobile platforms such as ships and aircraft actually operating in the region. The most noteworthy results of the review were:

- **GENERAL:** observational data in the COSNA-area continue to be of high quality with respect to availability, quality and timeliness.
- **SYNOP SHIP VOS:** although the number of suspect SYNOP reports from ships shows an increase in 2001, the data quality is still very high with the percentage of

suspect observations less than 1 %.

- **DRIFTING BUOYS:** the number of drifting buoys decreased during 2001 from almost 80 to below 60, but there are again as many buoys north of 50 N as there are south of this parallel.
- **DRIFTING BUOYS:** the data availability of drifting buoys in terms of MSL pressure reports per buoy per day shows a sharp increase in 2001 (probably related to buoy position). Data timeliness had also improved as more than 90 % of all buoys were reporting as "good" or better. However, results for the second quarter of 2002 had shown a recent deterioration in the availability of such data.
- **ASDAR:** another two aircraft (KLM) have been withdrawn from use so that there remain 10 operational units. The data quality is good, but, following the decrease in the number of operational units, the quantity of available reports is decreasing steadily.
- **AMDAR:** the number of AMDAR reports dropped by 1000 reports per day following the events of September 11, 2001 but had now returned to the same number of reports as before with a slight increasing trend.
- **E-AMDAR:** the fleet of E-AMDAR equipped aircraft increased from 100 in the first quarter of 2000, to 200 in 2001Q1 and has reached 250 units in 2002Q1. The data availability also covers vertical profile data during climb and descent in the vicinity of more than 100 airports.
- **E-AMDAR:** the data quality of E-AMDAR reports is very good with no significant anomalies observed.
- **ASAP TEMP:** another EUMETNET ASAP-unit (Sea-Land Achiever WPKD) started operation in 2001 sailing between the English Channel and the Gulf of Mexico.
- **ASAP TEMP:** there are still significant differences in the number of TEMP reports given by the operators as available on GTS and those actually received at ECMWF (771 reports, or 23 %, less available at ECMWF than given by the operators).
- **ASAP TEMP:** the difference in the number of wind reports compared to the number of geopotential reports remains a problem in some cases.
- **ASAP TEMP:** the required top pressure level of 50 hPa was not reached by 50% or more of all soundings of the ships OXTS2 and OVYA2. It appears that the balloons of these units burst between 100 hPa and 50 hPa in 50 % or 30 %, respectively, of all soundings.
- **TEMP LAND:** the land stations around the COSNA area performing radiosoundings are operating at a high level with respect to data availability and data quality. A few problems were, however, identified in a very small number of cases.

3.1.3 Noting that the Ocean Weather Ship Mike continued to operate satisfactorily and provide valuable data, the CGC expressed its appreciation to Norway, the operating country, as well as to Germany and the Netherlands which are providing financial support. The continued operation of Ekofisk, the observing platform in the North Sea, also operated by Norway, with the financial support of the countries bordering the North Sea, was also noted with satisfaction.

### 3.2 Additional reports on system components (agenda item 3.2)

## ASAP

3.2.1 The Chairman of the ASAP Panel, Mr Jean-Louis Gaumet, reported on ASAP activities in the past year. The number of soundings made in the year 2001 was about 5,300 which was around the average for previous years. There had however been a significant increase compared to 2000 due mainly to more soundings made by Japan, Germany and EUMETNET. The 24 ASAP units in 2001 were operated by: Denmark (3 units), EUMETNET (2 units), France (4 units), Germany (3 units), Japan (7 units), Spain (1 unit), Sweden-Iceland (1 unit), United Kingdom (2 units) and WRAP (Worldwide Recurring ASAP Programme) (1 unit).

3.2.2 The chairman reminded the CGC that while the ASAP Panel had now become part of a JCOMM group dealing with observations from ocean areas, it had retained its membership (national operators along with ECMWF and EUMETSAT) and terms of reference. Its annual meeting, ASAPP-XIII, had been held in Goa, India, as a component of the First Session of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) Ship Observations Team, 25 February – 2 March 2002. The session had been attended by ASAP operators from Australia, France, Germany, United Kingdom, United States, Russia and Japan. EUMETSAT participated in the meeting as well as the WRAP project leader. The meeting had also been attended by representatives of manufacturers (Vaisala) and external projects (Seakeepers).

3.2.3 The meeting noted with satisfaction that over half of the total number of ASAP units were operating in the COSNA area. Under E-ASAP two new routes had been implemented, one of which was between the English Channel and the south-eastern seaboard of the USA. However, in some cases, there continued to be apparent data losses on the GTS, with the communication efficiency of Germany and Spain remaining low. EUMETSAT had been requested to look into this problem but it was hoped that the new Meteorological Second Generation satellite launched on 28 August 2002 would improve the situation. The monitoring exercise had again highlighted the serious apparent data losses when comparing the reports received at ECMWF with the observations carried out; there were also large discrepancies between the number of reports transmitted by the operators, the number said by the operators to be on the GTS and the numbers actually received at ECMWF<sup>1</sup>. The ASAP Panel was seized of the problem which was among those receiving urgent attention

3.2.4 It was also aware of the deficiency, for a wide variety of reasons, of soundings from a number of ships apparently not reaching the standard level of 100hPa. For some ships, the figure of 80% reaching this level was some 10% less than a decade ago and 10% less than the target set by the Panel. A number of technical and procedural remedial measures to be taken had been drawn up by the Panel, including the change to transmission via Inmarsat in some cases. It had been concluded from the most recent end-to-end monitoring conducted by Météo France, that the switch to Inmarsat by one of the French ships was the probable reason for the better reception of messages and the lower error rate. It was also concluded that the best results were achieved by ships inserting their data in the GTS through only one RTH. It was emphasised that for the monitoring to be useful it was very important for all the original data to be available at the monitoring Centre in Toulouse.

3.2.5 Finally, as regards the future, Mr Gaumet informed the CGC that starting next year all European ASAP activities were to be progressively integrated with E-ASAP, that France planned to transfer operations from Met. personnel to ship's crew and that two of the four French ASAPs were to be transferred by the end of next year from the Caribbean route to a

---

1 Further investigation immediately after the session revealed the reason for the discrepancies in the numbers of ASAP TEMP reports provided by the operators and available at ECMWF. The operators took into account all reports provided over the year while the ECMWF monitoring report is based on 00 and 12 UTC observation times only. During field experiments in 2001 a considerable number of ASAP soundings were taken at 06 and 18UTC. The revised figures for reports available at ECMWF in 2001 for the four observation times 00, 06 12 and 18UTC are shown in the amended Monitoring Report (ANNEX II) and these in fact almost exactly match those given by the operators.

more northern route to Canada.

## **EGOS**

3.2.6 Mr Hreinn Hjartarson (Iceland) introduced the intersessional report of EGOS. He reminded the meeting that EGOS - the European Group on Ocean Stations - was an action group of the Data Buoy Cooperation Panel and that its membership comprised representatives of Denmark, France, Germany, Iceland, Ireland, Netherlands, Norway, Sweden and the United Kingdom. Spain had participated in the two most recent meetings and its membership was under consideration.

3.2.7 The report highlighted the availability and mostly good quality of data from the EGOS network of drifting and moored buoys which accounted for a great majority of surface based observations in the North Atlantic. The number of drifting buoys at the end of each month during the period August 2001 – August 2002 was between 39 (minimum) and 55 (maximum) and on 22 August 2002, immediately before the meeting, 44 drifting buoys were operating. During the period, 46 buoys had ceased to operate and 48 had been deployed (some of those being the redeployment of buoys recovered after drifting ashore). The quality was generally improving and the average operational life-time improved to 353 days (an increase of 19 days in the past year). The reason was a pronounced improvement with the SVP-B drifters, but the loss of drogue was still a problem resulting in lower data quality and the loss of their ability to track surface currents.

3.2.8 It was further noted that there were now 17 moored buoys with extended observing programmes operating in the Eastern Atlantic, the newest being the Irish M3 buoy deployed in July 2002.

3.2.9 During the intersessional period the LUT in Oslo was connected directly to Service ARGOS for improving data handling. In near future the same will be done with the LUT in Sondre Stromfjord.

## **AMDAR/ASDAR**

3.2.10 The Technical Co-ordinator of the AMDAR Panel, Mr Jeff Stickland presented his report on the current status of the WMO AMDAR Panel and its programmes including ASDAR. It was noted that AMDAR as continues to expand globally, the impact of automated aircraft observations is becoming clearer in both operational NWP forecasting and in the number of specialized tools being developed in support of the aviation industry.

3.2.11 It was noted that more countries have joined the AMDAR Panel and new programmes in Canada and Japan were about to commence real time operations. Additionally, the development of new programmes was continuing in Hong Kong China and Saudi Arabia. Positive action was being taken by the ASECNA group of countries in central and West Africa, the Russian Federation, the Republic of Korea and the South America region to develop new programmes. Several more countries had indicated that they intend to either commence or continue planning new programs. Existing programmes in Europe, the US, Australia and South Africa were either expanding or becoming more efficient through the implementation of optimization systems.

3.2.12 The CGC further noted that the development of the appropriate technology to implement specialised targeting programmes anywhere in the world had been completed in Europe and that the development of sensors and observing techniques for humidity, turbulence and icing was continuing in the US.

3.2.13 Following several years of effort, the AMDAR Reference manual had been completed and would be printed later in 2002. Also, the implementation of more comprehensive onboard



AMDAR software by some airlines was under way, and the adoption by the aviation industry of a new standard onboard software specification will enable many airlines to take advantage of sophisticated optimization and targeting tools. The first regional aircraft had begun reporting in Canada and Europe providing profiles at smaller airports and providing en-route data at lower altitudes that are of particular and immediate interest to forecasting. Data quality monitoring continues to be refined and improved globally with better feedback systems to national and regional focal points and airlines. Improvements to BUFR encoding of AMDAR observations have been approved for implementation in November 2003. As the level of communication charges was still of concern, the CGC was pleased to note that efforts were continuing to obtain an acceptable global price with service providers

3.2.14 As has been noted in the comprehensive monitoring report the number of ASDAR units decreased by two units leaving ten still in operation.

### **Satellites**

3.2.15 The representative of EUMETSAT, Mr Sean Burns, informed the meeting of the current status of the operational satellite system. He reported that Meteosat-5 was still at 63°E, supporting the IODC (Indian Ocean Data Coverage) service. Meteosat-6 has been used in support of the Rapid Scanning Service (RSS), which was declared operational on the 18<sup>th</sup> of September 2001. The baseline for the RSS is ten-minute scans covering the approximate latitude range of 10-70°N. These rapid scans are geometrically corrected in near real-time. Each corrected and calibrated scan image is made available to registered users via the Internet within ten minutes of the end of the scan. In addition wind products are derived and are disseminated via the GTS. In preparation for the commissioning of MSG-1 at 10°W, Meteosat-6 will be relocated to 10°E. There will be a short outage of the RSS to accommodate this change.

3.2.16 The ATOVS Retransmission service provides polar orbiting sounder data covering data sparse sea areas around Europe to end users via a low cost satellite reception system. End users can expect to receive data within 30 minutes of the collected instrument measurements. The service is currently in a trial phase with users in six countries and is planned to be operational by the end of 2002

3.2.17 In September 2001, the RDC (Radiance Data from Clouds) product was implemented. The new Clear Sky Radiance (CSR) product became operational. It contains humidity information, radiance for both IR and WV channels, cloud coverage, statistical and quality information.

3.2.18 As regards future geostationary meteorological satellite systems, the CGC was very pleased to learn that the MSG- 1 (Meteosat Second Generation) satellite had been successfully launched on 28 August 2002. The commissioning of the satellite system was currently planned to last until autumn 2003, with image data available to users in December 2002 utilizing the MSG-1 satellite broadcasts and also by retrieval from the EUMETSAT Archive Facility.

3.2.19 The development of the EUMETSAT Polar System is progressing with the first launch currently planned for mid 2005. Of the Satellite Application Facilities (SAF), the pilot projects for 'Support to Nowcasting and Very Short Range Forecasting' and 'Ocean & Sea Ice' will soon start their Initial Operations Phase.

### **3.3 New Observing Systems (agenda item 3.3)**

3.3.1 Under this item Mr Gerhard Steinhorst informed the meeting of the new EUMETNET windprofiler network programme which had been adopted by the EUMETNET Council in May 2002. The origin of the programme went back to the COST-76 project which had made a number of achievements, including the allocation of windprofiler frequencies, development of the BUFR code for the exchange of data and the establishment of the CWINDE network;

differences in radar hardware and sampling techniques had been harmonised. The data produced by the network are generally of high quality but regular monitoring is necessary. The new programme was initiated in July 2002 with the participation of 10 countries and the DWD, supported by MeteoSuisse and the UK Met Office, being the responsible agency. The objectives of the programme are the routine operation of the network Hub, the evaluation of data quality, the development of software, user education and support and the resolution of frequency allocation issues.

3.3.2 The EUCOS Programme Manager reported that the aerosonde demonstration involving the operation of regular flights of robotic aircraft over a 200 km region off the West coast of Portugal, had taken place during the month of March 2002, with data being exchanged over the GTS. The results had however been disappointing as three of the aerosondes had been lost during the demonstration. However, the quality of the data captured was judged to be good. A second long-duration demonstration flight was expected during September 2002.

3.3.3 Dr Caughey also informed the meeting that discussions were being held with Vaisala regarding the possibility of radiosondes providing some data also on descent with only a small increase in cost. Noting that a demonstration of such a new sonde was being arranged for early next year, the CGC emphasised the need for time and position to be included in the report

3.3.4 Dr Francis informed the meeting of the possibility that the UK Met Office would be cooperating in a project to install and operate a network of coastal HF radar systems within the UK. These systems would be capable of gathering data on surface winds, waves and currents within the adjacent sea areas. The CGC asked to be kept informed of progress and invited other participants to inform the UK of any similar initiatives in other countries. In this connection, the CGC recalled earlier requests which had so far gone unanswered, to have more wave spectral data disseminated on the GTS. The requirement still existed.

3.3.5 It was also noted that Météo France, in cooperation with E-AMDAR, has a project to test a TAMDAR system (for light aviation at small airports).

#### **4. OTHER OBSERVING PROGRAMMES/SYSTEMS (agenda item 4)**

##### **4.1 North American Atmospheric Observing System (NAOS) (agenda item 4.1)**

There being no representative of NAOS present at the meeting, Dr Böttger conveyed to the participants the information on NAOS activities which had gathered at the recent meeting of the SEG where a representative of NCEP was present. The emphasis of NAOS had changed from the development of an integrated observing system over North America to the development and demonstration of meso-scale observing networks aimed at high-impact severe weather situations, followed by OSEs. It being understood that the original aims of NAOS were no longer being pursued, the CGC agreed that it was not necessary to continue to seek information on the development of the programme.<sup>2</sup>

##### **4.2 EUMETNET Composite Observing System (EUCOS) (agenda item 4.2)**

4.2.1 At the invitation of the Chairman, Mr Jim Caughey (UK Met Office), the EUCOS Programme Manager, gave an overview of the purposes, structure and present status of EUCOS. He first summarised the EUCOS design (and evolution) between 2001 and 2006 as endorsed by the EUMETNET Council at the end of the EUCOS Implementation Programme. The design incorporates four main elements Oceanic, Aeronautic, Territorial and Observations Targeting. These elements are expected to evolve through the period of the Operational Programme, out to 2006 based upon results from the EUCOS Studies Programme. The content

---

<sup>2</sup> A report on the status of NAOS was received too late for consideration at the session. It is attached in extenso as Annex III to this report.

and plans for these activities were then considered in some detail.

#### *Ocean Upper Air Segment*

4.2.2 This comprises the EUMETNET ASAP programme (E-ASAP) together with Ocean Weathership Mike and the Ekofisk Platform. The ASAP programme objectives are:

- to reach 18 ASAP units producing 6,300 soundings/year by integrating existing national units and procuring new units
- contribute soundings to the WWW
- optimise the overall system by route/company selection
- reduce the cost of an ASAP profile by economies of scale.

Funding for the ASAP programme, OWS 'M' and Ekofisk, will be from the overall EUCOS budget set by EUMETNET Council on an annual basis. All 18 EUMETNET Member countries will contribute to this integrated programme.

#### *Aeronautical Segment*

4.2.3 This encompasses the EUMETNET-AMDAR (E-AMDAR) programme. Broadly speaking the objectives are to:

- reach 740 profiles/day over European airports by 2006 (to complement the upper air network)
- acquire data over data sparse/sensitive areas
- contribute to the WMO AMDAR initiative.

E-AMDAR has achieved considerable success in recent years. Aircraft numbers have risen by 440% and increasingly the overall system was moving towards full automation. By 2006 the system is expected to handle 13 million messages/year. This programme will also be conducted on an integrated basis funded by all 18 Members.

#### *EUCOS Studies programme*

4.2.4 The Studies Programme is intended to better inform detailed the evolution of the Operational System out to 2006. Highlights of the proposed activities were presented, including,

- selected Observing System Experiments (OSEs) concerning targeted observations, more frequent AMDAR data and the utility of surface marine data in GNWP.
- technology demonstrations considering AMDAR humidity, TAMDAR (tropospheric AMDAR), driftsonde etc.
- investigation of the implications for terrestrial observations from the developing space segment
- further network studies

The output from these studies is expected to inform the development of EUCOS capability out to 2006.

#### *Surface Marine Programme*

4.2.5 The EUCOS-Programme Manager outlined plans for the Surface Marine Programme which is of particular interest to CGC. This will include Voluntary Observing Ships, moored buoys and drifting buoys. Phase 1 would be principally a design study followed by implementation in Phase 2. The activities would include performance monitoring and compilation of detailed quarterly and annual reports as part of overall EUCOS operational

activities.

*The EUCOS Operational System and Web-site*

4.2.6 The adoption of performance standards, monitoring procedures, fault correction procedures and change control procedures, is important for any operational system. Principles have been agreed within EUCOS to cover these aspects which will be progressively implemented and made more demanding from 1 January 2003. The EUCOS Web-site development was also illustrated showing easy access to performance information, EUCOS programmes, meetings, documentation, reports etc.

**4.3 THORPEX** (agenda item 4.3)

4.3.1 The meeting was briefed by Drs Böttger and Caughey on the status of THORPEX (The hemispheric observing, research and predictability experiment), the primary objective of which was to test the hypothesis that the accuracy of Northern Hemisphere cool-season NWP forecasts up to 10 days ahead can be significantly improved by additional observations in critical areas of the extra-tropical oceanic storm tracks and other remote data sparse areas. It has been conceived as a 5 to 10 years programme and would include the development of advanced data assimilation systems, OSEs and OSSEs to evaluate current and future observing systems, predictability studies, adaptive observation strategies and observing system design. No significant financial commitment had as yet been made to the project. WMO Commission for Atmospheric Sciences had expressed an interest and had expectations that it would receive the support of WMO.

4.3.2 Although details of the design and extent of the Euro-THORPEX were still evolving, it was recognized that THORPEX was of interest to CGC and EUCOS in that it could contribute to the testing of relevant new observing systems and provide other tools in network design. EUCOS was therefore participating in a number of "Expressions of Interest" for possible EC funding within Framework 6. The Chairman of SEG was requested to keep himself informed of progress in this experiment.

**5. FUTURE OF CGC AND SEG** (agenda item 5)

5.1 The meeting recalled its earlier decisions that at some time in the near future COSNA should be subsumed in EUCOS and that the activities of CGC should be undertaken by an appropriate mechanism within EUMETNET. It had been agreed that CGC should continue to exist with unchanged terms of reference until such time as:

- (a) EUCOS becomes an operational system;
- (b) satisfactory arrangements are made for the marine component of EUCOS;
- (c) adequate provision is made for the monitoring of the entire system;
- (d) arrangements are made for scientific evaluations to be continued under the aegis of WMO/CBS-CAS and/or EUCOS;
- (e) close contacts and coordination are assured between EUMETNET/EUCOS and other bodies dealing with observing systems and networks.

5.2 At its twelfth session CGC had noted the relevant developments that had taken place and concluded that the earliest date that a final decision could be taken by CGC to bring its affairs to a close would be August 2003. By then it was expected that experience will have been gained with an operational EUCOS taking over the monitoring of all COSNA components as well as in developing the surface marine component. Noting that the EUCOS operational

programme had commenced in January 2002, the Management Group, at its meeting in March 2002, had agreed that the target date was still feasible.

5.3 Following the most recent briefing on the status and activities of EUCOS, the CGC noted with satisfaction that the operational EUCOS included a marine surface component and agreed monitoring principles. Detailed plans for monitoring to begin in January 2003 were being drawn up for submission to the EUMETNET Programme Board for Observations in Autumn 2002. The extent to which surface marine activities would be integrated (i.e. jointly funded) or implemented through cooperative arrangements as at present, would be determined at the forthcoming EUMETNET Council meeting in September 2002. Assurances were given that activities similar to those carried out by the CGC as regards monitoring and liaison with other bodies dealing with observing systems and networks were already underway and could only be amplified as EUCOS activities increased.

5.4 The meeting therefore agreed that the conditions it had set for the transfer of activities to EUMETNET were well on the way to being met and that matters were on course for a final decision on the transfer to be taken at its session in August 2003. Between now and then, the Management Group at its meeting in Spring 2003 should review any further progress by EUCOS in developing an organizational structure for the management of the marine component and in implementing a procedure for monitoring the operation of the entire system, which would, of course depend on the decisions taken by the EUMETNET. Based on this review the Management Group should make a recommendation to CGC-XIV on the decisions to be taken regarding the transfer of activities.

5.5 As regards of arrangements being made for scientific evaluations to be continued after the closure of CGC and, as a consequence, closure of the SEG, the meeting noted that the thirteenth session of the WMO Regional Association for Europe (Geneva, May 2002) had been informed of the situation and had recommended that the activities of the Group be incorporated into the working structure of CBS, if possible. The matter had also been considered by the CBS Expert Team on Observational Data Requirements and the Redesign of the GOS at its meeting in July 2002 which had stressed the importance of the activities of the SEG being continued. It felt that the ET itself, along with its Rapporteurs on global and regional NWP appeared to be best placed to organise future OSE work and arrange future workshops for the exchange of the results of OSE studies and the provision of feedback on performance to system operators and managers of the observing system.

5.6 The CGC fully supported these views and proposals and expressed the expectation that they would be considered favourably by the full session of CBS in December 2002 so that continuation of the scientific evaluation work will be assured within the OPAG-IOS framework with the aim of initiating, coordinating and monitoring global and regional data impact studies.

5.7 The CGC felt, however, that whatever decision was taken by CBS, it would be unlikely to provide the possibility of arranging annual meetings which would be desirable in order to maintain the momentum in data impact studies. It was therefore pleased to learn that EUMETNET/EUCOS was considering the possibility of widening the role of its Scientific Advisory Team, the membership of which is much the same as that of the SEG, to include the regional aspects of impact studies focussing on the Atlantic and Europe. A proposal to this effect was being submitted to a meeting of SAT in October 2002. It was the intention that the SAT work in this regard would provide valuable feedback to the global OSE studies of the CBS OPAG-IOS.

5.8 In the light of these plans, the CGC agreed that if the decisions to be taken by CBS and EUCOS/SAT were favourable the SEG would be disbanded next year; it was therefore decided in principle that there would not be a meeting of the SEG in 2003. The situation would be reviewed by the Management Group in early 2003 and final recommendations made to the next session of CGC.

**6. ADMINISTRATIVE AND FINANCIAL MATTERS** (agenda item 6)

**6.1 Status of the CGC Trust Fund** (agenda item 6.1)

6.1.1 The meeting noted that the following contributions to the Fund had been received in 2002:

Germany		22,651	(SFR equivalent)
Iceland		500	SFR
Netherlands		7,000	SFR
Norway		9,000	SFR
Portugal		1,500	SFR
Sweden		6,800	SFR
Switzerland	10,000		SFR
UK		12,214	(SFR equivalent)

6.1.2 As regards expenditures, the session noted in particular that a total of just over SFR 70,000.- had been used to support the EUCOS/CGC ASAP Study and the associated additional observations in the Azores. The balance of the Fund stood at SFR 278,597. The statement of account of revenue and expenditure as given in Annex IV was accepted by the meeting.

**6.2 Approval of the budget proposal for the year 2002-2003** (agenda item 6.2)

Consideration was given to the prospective expenditures for the year 2002-2003. A sum of SFR 52,000 was set aside for the customary preparation of the monitoring report, administrative and support costs, travel and per diem for CGC officers etc. The meeting adopted the budget as shown in Annex V.

**6.3 WMO support to CGC** (agenda item 6.3)

The meeting was informed that the staffing situation in the WWW Department of the WMO Secretariat was such that it was not in a position to resume full administrative support for the CGC without the assistance of an outside consultant. The meeting agreed therefore to make provision for the services of a consultant and requested the Chairman to make the necessary arrangements with the Secretariat.

**6.4 Closure of the Trust Fund** (agenda item 6.4)

Although a formal decision on the disposal of the remaining funds in the Trust Fund would be taken only at the final meeting of CGC (the amount available would not in any case be known until then), the present session gave preliminary consideration to the various options available. These included, for example, the return of funds to participating countries, the transfer of funds to WMO and/or EUMETNET for use in connection with activities related to observing in the North Atlantic, the allocation of funds to specific projects or programmes implemented by individual Members. Noting that a sum in excess of SFR 220,000 was likely to remain in the Fund in August 2003 the CGC agreed with the recommendation of the Management Group that SFR 50,000 be set aside for a third WMO/CBS Workshop on Impact Studies in 2004. It was further agreed in principle that the remaining funds (approximately SFR 170,000) would be allocated to EUCOS to Support new developments related to COSNA. This decision would be reviewed again at the final session of CGC.

**7. FUTURE WORK PLAN OF CGC** (agenda item 7)

In the light of the discussions on the preceding agenda items, the meeting agreed on the following action items for the next intersessional period:

- (a) The Chairman to send a letter to EUMETNET conveying the conclusions of CGC on the transfer of activities to EUMETNET (paragraphs 5.1 to 5.8 above); (September 2002);
- (b) The Secretary to send the Final Report of the meeting to all participants and to other interested or formerly participating countries, including Canada, Denmark, Finland, Ireland, Italy, Poland, Spain, Sweden, Switzerland, and USA;
- (c) ASAP Panel to address the problem of the apparent data losses on GTS (para. 3.2.3 above);
- (d) UK Met Office and ECMWF to compare ASAP data availability in their operational data bases and inform chairman of the ASAP Panel (para. 3.2.3 above);
- (e) UK Met Office to investigate and report on the recent downward trend in the availability of data from drifting buoys (para. 3.1.2 above);
- (f) Recruitment of consultant to assist with administrative and other support for CGC (February 2003);
- (g) Management Group meeting (April 2003);
- (h) Preparation of the COSNA Monitoring report with focus on conclusions, trends and problems; (to be decided by CGC/MG);
- (i) ECMWF to continue to prepare special section on COSNA monitoring in monthly reports with comprehensive statistics on data availability;
- (j) Chairman of CGC to maintain liaison with EUMETNET/EUCOS;
- (k) Chairman of SEG to maintain liaison with EUCOS/SAT;
- (l) Chairman of CGC and SEG to maintain contacts with bodies and programmes (e.g. THORPEX) with activities relevant to the work of CGC;

**8. ELECTION OF CHAIRMAN AND VICE-CHAIRMAN** (agenda item 8)

The meeting re-elected by acclamation Mr M. Lystad (Norway) and Dr. G. Steinhorst (Germany) as chairman and vice-chairman, respectively, of CGC. Dr. Böttger was invited and agreed to continue as chairman of the SEG.

**9. OTHER BUSINESS** (agenda item 9)

***Date and place of next meeting***

The CGC accepted with appreciation the invitation of the representative of Portugal to hold its 14<sup>th</sup> session in that country from 27 to 29 August 2003. The exact place would be agreed upon by the chairman in consultation with the Portuguese authorities.

**10. CLOSURE OF THE MEETING** (agenda item 10)

The chairman thanked the participants for their contributions to what he felt had been a very interesting and successful meeting conducted in an excellent spirit of cooperation. He thanked the Icelandic Meteorological Office for having provided excellent facilities for the meeting.

The meeting closed at 12.00 hours on Friday, 30 August 2002.

CGC XIII  
(Reykjavik, 28-30 August 2003)

**AGENDA**

1. ORGANIZATION OF THE MEETING
    - 1.1 Opening
    - 1.2 Adoption of the agenda
  2. REPORTS BY THE CHAIRMEN OF CGC AND SEG
  3. STATUS OF COSNA
    - 3.1 Consolidated status report
    - 3.2 Additional reports on system components
    - 3.3 New Observing Systems
  4. OTHER OBSERVING PROGRAMMES/SYSTEMS
    - 4.1 North American Atmospheric Observing System (NAOS)
    - 4.2 EUMETNET Composite Observing System (EUCOS)
    - 4.3 THORPEX
  5. FUTURE OF CGC AND SEG
  6. ADMINISTRATIVE AND FINANCIAL MATTERS
    - 6.1 Status of the CGC Fund
    - 6.2 Approval of the budget proposal
    - 6.3 WMO support to CGC
    - 6.4 Closure of the Trust Fund
  7. INTERSESSIONAL WORK PLAN OF CGC
  8. ELECTION OF THE CHAIRMAN AND VICE-CHAIRMAN
  9. ANY OTHER BUSINESS
  10. CLOSURE OF THE MEETING
-



**Consolidated Monitoring Report**  
**on COSNA - Components**  
**2002**

This report may be found at: <http://www.wmo.ch/web/www/reports.html>

**Report on North Atlantic Atmospheric Observing System (NAOS)  
Coordinating Group for COSNA  
28-30 August 2002**

21 August 2002 (19:47)

#### **4 Observing System Programs**

##### **4.1 North Atlantic Atmospheric Observing System (NAOS)**

###### **4.1.1 Background**

NAOS began in 1996 with the goal of "providing scientific, technical, and administrative bases for governmental decision processes on how to meet the evolving needs for atmospheric observations over the region of North America and adjacent ocean areas in support of the prediction and assessment of weather and of associated climate services." Participating are governmental organizations and universities in Canada, Mexico and the United States. Two basic strategies were adopted: (1) use both Observing Systems Experiments (OSE) and Observing System Simulation Experiments (OSSE) to demonstrate the value of various observing systems to NWP, and (2) conduct field evaluations and pilot studies to examine both the value of observing systems to field forecasters and the operational suitability of specific systems.

Semi-annual reports have been issued on the overall NAOS activities, and special reports have been published both through NAOS and in proceedings of the American Meteorological Society. Specific systems investigated have been the rawinsonde program over the continental United States, wind profilers and automated aircraft reporting. NAOS participated with the WMO in the evaluation of the loss of the Russian radiosonde data during the 1990s. The Test and Evaluation Work Group of NAOS in 2000 and 2001 conducted an in-depth analysis of the special needs for observations in support of mesoscale forecasting. The key parameter identified that was grossly under observed was moisture in the boundary layer. Obtaining boundary layer moisture information has been put as high priority in the design of mesoscale observing networks over North America.

###### **4.1.2 Status and Current Activities**

During the past year, major efforts have been mounted in both Canada and the United States to rationalize the observing programs. In the United States, the requirements for observations has been given a high priority. The National Oceanic and Atmospheric Administration has begun an effort to look at the need for environmental observations across the spectrum of NOAA activities. In particular, the National Weather Service is in the midst of an evaluation of its organizational goals, and the technology infusion required to meet those goals. A Science and Technology Infusion Plan (STIP) is being prepared that identifies the NWS needs by service area (e.g., public weather, aviation and marine). These needs are being evaluated in a cross-cutting analysis that will determine the capabilities required to meet those needs. The capabilities are being examined in five areas: (1) observations, (2) data assimilation and numerical weather prediction, (3) forecast techniques and product generation, (4) dissemination, and (5) system architecture. NAOS people have been participating in the National Weather Service STIP activities relating to the observing programs.

They have also participated in the planning and organization of the NOAA New England Forecasting Pilot Program for High Resolution Temperature and Air Quality. This program was mandated by the United States Congress for CY 2002 with the objective of providing improved surface temperature and air quality forecasts to assist in the generation of power in New England. One of the issues that has to be addressed by the power generators is what process is to be used (e.g., oil or natural gas) to create

power. Air quality standards limit the amount of certain pollutants that can be created. The weather situation influences the amount of gasses and particulate matter that can be put into the atmosphere. The temperature affects both the air quality and the demand for power. The impact of both augmented observations and NWP model products will be evaluated. A key aspect of the effort is that the operators of power generating facilities will participate in the evaluation of the impact the forecasts have in their decision process.

The field phase began 15 July and runs to the end of August 2002. One of the important observing systems that was augmented was the automated reporting from commercial aircraft. Canada made a special effort to bring into service meteorological reporting on a number of aircraft servicing both Canadian and US airports in the region of Eastern Canada and North East United States. The results of the experiment will be reported in the scientific literature. There is the possibility that the program will be extended for an additional period, but that decision has not yet been made.

A sub-group of NAOS interacts twice yearly with the commercial airline industry to encourage the expansion of the Meteorological Data Collection and Reporting System (MDCRS). MDCRS is the US contribution to the international Aircraft Meteorological Data and Reporting (AMDAR) program supported by the World Meteorological Organization. One of the important items from the June 2002 meeting concerned the measurement of moisture. Thirty Water Vapor Sensing Systems, Version I (WVSS-I) currently are deployed on B-757 aircraft of United Parcel Service (UPS). The WVSS-I will no longer be supported by UPS. The estimate is that the last system will fail and be removed sometime in May 2003. UPS is still planning for the installation of the WVSS-II, which has a combined temperature and moisture probe in the same housing. Final testing and funding arrangements for the operational deployment of the WVSS-II have yet to be completed. Beginning in about May 2003, then, moisture information will not be available on MDCRS until the WVSS-II becomes operational at some future date.

#### 4.1.3 Relationship with US Weather Research Program

The US Weather Research Program involves some 19 government agencies, universities and the private sector. The activities have four major foci: (1) hurricanes at landfall, (2) quantitative precipitation forecasts, (3) optimal mix of observations, and (4) air quality. Air quality was just recently added and has yet to be fully defined within the USWRP. NAOS, from the beginning, adopted the first three foci as central themes for its activities. Questions of optimal mix have been given emphasis within the NAOS.

For both land falling hurricanes and QPF, substantial work has been ongoing for a number of years. In addition, the USWRP has been a sponsor of a range of field programs, such as the International H<sub>2</sub>O Project (IHOP) and the Pacific Jet (PACJET) experiment. Each of these field programs has a strong observing component. NAOS has made a proposal to the USWRP that there be an observing system focal point within the USWRP to (1) bring together the observing system information from these activities, and (2) assess the information in the context of the optimal mix. The focal point would also be in a position to review the results of various OSEs and OSSEs for the same purpose. The decision on the focal point and the NAOS relationship will be made in October 2002.

#### 4.1.4 Future Activities and Relationship with Coordinating Group for COSNA (CGC) and European Composite Observing System (EUCOS)

THORpex will be discussed in detail under another agenda item. NAOS people have been actively involved with the planning for the US participation in THORpex. One of the proposals that has been made within the US planning for THORpex is that there be a North American regional component. The documentation for that proposal is being considered within both Canada and the US. A key part of that would be the interface between CGC, EUCOS, NAOS, and the USWRP observing system focal point. NAOS, of course, already has a North American structure that has been active in promoting observing system studies. While the final form of the interaction with the CGC and EUCOS is not yet defined, the NAOS and the USWRP will be developing solid connections, especially considering the importance of THORpex for observing system planning.

World Meteorological Organization  
Coordination Group on COSNA  
Account as at 31 December 2001

	<u>SFR</u>	<u>SFR</u>
Balance of Fund at 1 January 2000	301,743	
Contributions	148,166	
Interest earned	20,867	
Credit from Prior Years' Expenditures	<u>576</u>	
<b>Total revenue</b>		<b>471,352</b>
<b>Obligations incurred</b>		
Symposium on Observing System Impact Studies	35,549	
Coordination Group on COSNA 11th Session of the CGC Mgt Group	6,516	
Coordination Group for COSNA 11th Session	9,842	
Coordination Group for COSNA 12th Session of the CGC Mgt Group	6,332	
Coordination Group for COSNA 12th Session	12,684	
Consultancy	88,784	
EUCOS/ASAP Study -Portugal	55,993	
Mission Travel - - ticket, per diem, other (WMO staff)	2,679	
Mission Travel - - ticket, per diem, other (non WMO staff)	14,326	
Printing Services	1,225	
Public Information	<u>17,619</u>	
		251,549
<b>Balance of Fund at 31 December 2001</b>	<b>SFR</b>	<b><u><u>219,803</u></u></b>
<b>Represented by:</b>		
Cash at Bank		329,966
Less:		
Unliquidated Obligations	51,398	
Accounts Payable	<u>58,765</u>	110,163
	<b>SFR</b>	<b><u><u>219,803</u></u></b>

<b>Contributions received (in SFR)</b>	<u>2000</u>	<u>2001</u>	<u>Total</u>
Denmark	5,000		5,000
Germany	24,413	23,620	48,033
Iceland	500	500	1,000
Netherlands	7,000	7,000	14,000
Portugal	1,500	1,500	3,000
Norway	9,000	9,000	18,000
Sweden	6,800	6,805	13,605

Switzerland	10,000	10,000	20,000
United Kingdom	<u>13,571</u>	<u>11,957</u>	<u>25,528</u>
Total	<u>77,784</u>	<u>70,382</u>	<u>148,166</u>

**World Meteorological Organization**  
**Coordination Group on COSNA**  
**Interim Statement of Account as at 31 July 2002**

	<u>SFR</u>	<u>SFR</u>
Balance of Fund at 1 January 2002	219,803	
Contributions	<u>69,665</u>	
Total revenue		289,468
Obligations incurred		
Coordination Group for COSNA 12th Session	11	
Coordination Management COSNA Mar 2002	12,822	
Coordination Group for COSNA 13th Session	20,550	
Consultants	18,323	
Consultants - Credit from Prior Years' (Obligation cancelled)	(46,192)	
Mission Travel - - ticket, per diem, other (non WMO staff)	5,180	
Exchange Difference	<u>177</u>	<u>10,871</u>
Balance of Fund at 30 June 2002	<u>SFR 278,597</u>	
Represented by:		
Cash at Bank		330,061
Less: Prior Year Obligations	3,476	
Current Year Unliquidated Obligations	44,179	
Accounts Payable	1,853	
Exchange Adjustments	<u>1,956</u>	<u>51,464</u>
	<u>SFR 278,597</u>	

***Contributions received (in SFR)***

	<u>Total</u>
Germany	22,651
Iceland	500
Netherlands	7,000
Norway	9,000
Portugal	1,500
Sweden	6,800
Switzerland	10,000
United Kingdom	<u>12,214</u>
Total	<u><u>69,665</u></u>

**PROPOSED EXPENDITURES  
CO-ORDINATING GROUP FOR THE COSNA**

**1 September 2002 to 31 August 2003**

	<b>Seconded experts:</b>	7,000 SFR
Production of the consolidated monitoring report		
	<b>Travel/CGC and SEG:</b>	16,000 SFR
Travel and per diem of chairman and vice-chairman of CGC, chairman of the SEG, and invited experts as may be agreed,		
	<b>Staff costs/Consultant services</b>	19,000 SFR
To assist in preparation and support for CGC/MG session in Spring 2003 and for CGC-XIV in August 2003		
	<b>WMO Administration:</b>	5,000 SFR
The cost of administrative support to the CGC such as personnel and travel unit staff time, mailing and communications.		
	<b>Contingency:</b>	5,000 SFR
September 2002 to August 2003 (12 Months)		
	<b>Total Expenses:</b>	52,000 SFR
	<b>Total cost to Trust Fund</b>	<b>52,000.SFR</b>

---



**World Meteorological Organization**

**Trust Fund for the Coordination Group on the COSNA  
(In Swiss Francs)**

**PROJECTED ACCOUNTS**                      **September 2002 to August 2003  
(12 Months)**

**Beginning Balance**                      **278,597**

**Deposits Expected**

Contributions	nil
Interest	8,000

**Subtotal**                                      **8,000**

**Budget Obligations**

Seconded experts	7,000
Travel	16,000
Staff costs	19,000
WMO Administration	5,000
Contingency	5,000

**Subtotal**                                      **52,000**

**Projected balance August 2003**                      **234,597 SFR**

## LIST OF PARTICIPANTS

Chairman, CGC

**Mr LYSTAD, Magne**  
The Norwegian Meteorological Institute  
P.O. Box 43, Blindern  
0313 Oslo 3  
Norway  
Tel.: 4722- 96 33 23  
Fax: 4722- 96.30.50  
Email: [magne.lystad@met.no](mailto:magne.lystad@met.no)

Vice-chairman, CGC

**Dr STEINHORST, Gerhard**  
Deutscher Wetterdienst  
Kaiserleistrasse 42  
D-63067 Offenbach  
Germany  
Tel.: 4969-8062 2688  
Fax: 4969-8062 3687  
Email: [gerhard.steinhorst@dwd.de](mailto:gerhard.steinhorst@dwd.de)

FRANCE

**Dr GAUMET, Jean-Louis**  
Météo-France,  
7 rue Teisserenc de Bort  
78195 Trappes Cedex  
Tel: (33 1) 30 13 64 70  
Fax: (33 1) 30 13 60 68  
Email: [jean-louis.gaumet@meteo.fr](mailto:jean-louis.gaumet@meteo.fr)

GERMANY

**Gerhard Steinhorst**  
(see above)

**Mr RICHTER Bernd**  
Deutscher Wetterdienst  
Kaiserleistrasse 42  
D-63067 Offenbach  
Germany  
Tel.: 4969-8062 2559  
Fax: 4969-8062 3557  
Email: [bernd.richter@dwd.de](mailto:bernd.richter@dwd.de)

ICELAND

**Mr HJARTARSON Hreinn**  
Icelandic Meteorological Office  
Bustadavegur 9  
15-150 Reykjavik  
Iceland  
Tel.: 354 522 6000  
Fax: 354 522 6004  
Email: [hreinn@vedur.is](mailto:hreinn@vedur.is)

**Dr ARASON, Pordur**  
Icelandic Meteorological Office  
Bustadavegur 9  
15-150 Reykjavik  
Iceland  
Tel.: 354 522 6000  
Fax: 354 522 6004  
Email: [arason@vedur.is](mailto:arason@vedur.is)

NETHERLANDS

**Mr BOUWS Evert**  
Royal Netherlands Meteorological Institute  
P.O. Box 201  
3730 AE De Bilt  
The Netherlands  
Tel.: 3130 2206 888  
Fax: 3130 2210 407  
Email: [evert.bouws@knmi.nl](mailto:evert.bouws@knmi.nl)

PORTUGAL

**Mr CARVALHO Renato**  
Instituto de Meteorologia  
Rua C Aeroporto  
1700 Lisboa  
Portugal  
Tel.: 35 12 18 48 39 61  
Fax: 35 12 18 46 47 44  
Email: [Renato.carvalho@meteo.pt](mailto:Renato.carvalho@meteo.pt)

UNITED KINGDOM

**Dr FRANCIS, Peter Edward**  
The Met. Office  
London Road  
Bracknell  
Berkshire RG12 2SZ  
United Kingdom  
Tel.: 44 1344 85 66 25  
Fax: 44 1344 85 64 12  
Email: [peter.francis@metoffice.com](mailto:peter.francis@metoffice.com)

AMDAR Panel

**Mr GROOTERS, Frank**  
Chairman, WMO AMDAR Panel  
Royal Netherlands Meteorological Institute  
P.O. Box 201  
3730 AE De Bilt  
The Netherlands  
Tel.: 3130 2206 888  
Fax: 3130 2210 691  
Email: [frank.grooters@knmi.nl](mailto:frank.grooters@knmi.nl)

**Mr STICKLAND, Jeff**  
Technical Coordinator, WMO AMDAR Panel  
The Met Office  
Beaufort Park  
South Road Easthampstead  
Wokingham, Berkshire RG40 3DN  
United Kingdom  
Tel.: 44- 1344 855 018  
Fax: 44- 1344 855 897  
Email: [jeff.stickland@metoffice.com](mailto:jeff.stickland@metoffice.com)

ASAP Panel

**Jean-Louis Gaumet**  
Chairman ASAP Panel  
(see above)

European Centre for Medium-range  
Weather Forecasts (ECMWF)

**Dr BÖTTGER, Horst**  
ECMWF  
Shinfield Park  
Reading, Berkshire RG2 9AX  
United Kingdom  
Tel.: 44-118 949 90 60  
Fax: 44-118 986 94 50  
Email: [horst.boettger@ecmwf.int](mailto:horst.boettger@ecmwf.int)

European Composite Observing System  
(EUCOS)

**Dr CAUGHEY, Jim**  
Programme Manager, EUCOS  
The Met. Office  
London Road  
Bracknell  
Berkshire RG12 2SZ  
United Kingdom  
Tel.: 44 1344 85 66 25  
Fax: 44 1344 85 64 12  
Email: [Jim.caughey@metoffice.com](mailto:Jim.caughey@metoffice.com)

European Organization for the Exploitation  
Of Meteorological Satellites (EUMETSAT)

**Mr BURNS Sean**  
EUMETSAT  
AM Kavalleriesand 31  
D-64295 Darmstadt  
Germany  
Tel.: 49 6151 807 571  
Fax: 49 6151 807 304  
Email: [Burns@eumetsat.de](mailto:Burns@eumetsat.de)

Consultant/Secretary

**Mr McCOMBIE Hamish**  
C/o WMO  
7, bis avenue de la Paix  
1211 Genève 2  
Tel.: 41 22 730 80 06  
Fax: 41 22 730 80 21  
Email: [hmccombie@aol.com](mailto:hmccombie@aol.com)