

**AUTOMATED SHIPBOARD AEROLOGICAL
PROGRAMME PANEL (ASAPP)**

Twelfth Session

Reading, United Kingdom, 27-29 September 2000

FINAL REPORT

JCOMM Meeting Report No. 6

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NOTE

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1. ORGANIZATION OF THE SESSION

1.1 Opening of the session

1.1.1 The twelfth session of the ASAP Panel (ASAPP) was opened at 0900 hours on 27 September 2000 in the Met. Office College, Reading, United Kingdom, by the chairman of the panel, Dr Klaus Hedegaard. Dr Hedegaard welcomed participants to the meeting, and called on Dr J. Caughey, Technical Director of the Met Office, to address the meeting.

1.1.2 On behalf of the Chief Executive of the Met Office, Mr P. Ewins, Dr Caughey welcomed participants to the United Kingdom and to the Met Office. He reiterated the importance of ASAP, not only to numerical weather prediction and operational meteorology, but also to global climate studies and in the provision of essential ground truth data for satellite soundings. He also noted that there was continual pressure on national budgets, with a need to optimise networks and to demonstrate the cost-effectiveness of observing systems. In this context, international cooperation was essential, with the integration and enhanced coordination of marine observing systems being developed under JCOMM being crucial to this effort. ASAPP certainly had a role to play in this development. Dr Caughey assured the meeting that the United Kingdom would continue to invest in ASAP, most probably directed in the future through EUMETNET and EUCOS. Dr Caughey concluded by wishing participants a very successful meeting and an enjoyable stay in the United Kingdom.

1.1.3 On behalf of the Secretary-General of WMO and the Executive Secretary IOC, the WMO Secretariat representative also welcomed participants to the meeting. In doing so, he expressed his thanks, on behalf of WMO and of the panel, to the Met Office for hosting the meeting and providing such excellent facilities, support and hospitality. He expressed particular thanks to Ms Sarah North for her efforts and efficiency in organizing and supporting the meeting and its participants. The Secretariat representative then also underlined the importance of the meeting, and expressed pleasure at the large number of participants, which in itself was an indication of the growing recognition of the value of the work of the panel. This work included, in particular, efforts to extend ASAP applications worldwide, specifically through the new WRAP project, which had received strong endorsement from the global climate programmes. The Secretariat representative urged the panel to become actively involved in the JCOMM plans to integrate marine observing systems, which could only serve to strengthen the work and recognition of ASAPP.

1.1.4 The chairman of ASAP, Dr Klaus Hedegaard, in turn thanked the Met Office very sincerely for hosting the meeting and providing such excellent support. He noted that the work of the panel had clearly established the cost effectiveness and efficiency of ASAP, and assured everyone that the panel would play its role in the development of JCOMM. He concluded by welcoming new participants in the panel session, including in particular representatives of the Australian Bureau of Meteorology, German Weather Service and of manufacturers (Geolink and Vaisala).

1.1.5 The list of participants in the meeting is given in *Annex I*.

1.2 Adoption of the agenda

1.2.1 The panel adopted its agenda for the session, which is given in *Annex II*. The session documentation was introduced by the Secretariat.

1.3 Working arrangements

1.3.1 The session agreed its hours of work and other necessary working arrangements.

2. REPORT OF THE CHAIRMAN

2.1 The chairman of the panel, Dr Klaus Hedegaard, presented a summary report on activities in support of the panel and its work programme since the last session undertaken by himself, panel members and the Secretariat. Specific action items arising from this report are dealt with under the relevant agenda items.

3. OPERATIONAL PROGRAMME (REPORTS INCLUDING MONITORING)

3.1 National programmes of the ASAP operators

3.1.1 Each participant representing a national organization operating an ASAP or related system gave a presentation on the status of the work, including a report on the performance of their systems during 1999/2000. Such reports were made by Denmark, France, Germany, Iceland/Sweden, United Kingdom and USA. An additional written report from Japan, and verbal report from the chairman on behalf of Spain, were also noted with interest. Points of particular interest relating to national programmes included:

- (i) France reported some problems with the reliability of wind measurements with GPS sondes, which required a large operator involvement, though otherwise the systems worked well;
- (ii) Frequent changes of ships and crews were again a problem for Iceland/Sweden, resulting in reduced observations through difficulties in training and maintenance;
- (iii) Staffing problems in Germany had resulted in only two units out of five being operated during recent months, but it was hoped that these problems would soon be rectified;
- (iv) Spain had not been active with ASAP since the demise of Omega, but was planning to restart operations shortly, with some assistance from the panel. The chairman was corresponding with Spain on this issue;
- (v) The United Kingdom reported that although their new ASAP system was now operating satisfactorily, some windfinding problems were being experienced. The location of the launch container adjacent to the ship's funnel had also caused some problems, and consideration was being given to use of a deck launcher;
- (vi) Funding in the USA for ASAP was primarily from research programmes, and for this reason there was no operational maintenance of the programme and no activities in 2000. However, work had continued on system development, and this is reported under agenda item 4.1;
- (vii) The panel agreed on the potential value of having available a training video or CD-ROM (language independent) which could be used to train ship operators, thus helping to reduce a variety of operational errors. (**Action:** chairman and Secretariat to investigate possibilities for development of this aid.)

3.1.2 These reports, updated appropriately, as well as reports from other operators, will be reproduced as usual in the 2000 ASAP Annual Report. (**Action:** Operators, chairman and Secretariat.)

3.2 Report of EUMETSAT

3.2.1 The EUMETSAT representative reported on the status of its monitoring activity and of the geostationary meteorological satellites in general, including in particular a report on the status of Meteosat Second Generation (MSG). This report will be reproduced as usual in the 2000 Annual

Report. The panel expressed its appreciation to EUMETSAT for this report and for its continuing support for ASAP.

3.3 Report of ECMWF

3.3.1 The ECMWF representative reported on their monitoring activities for ASAP. The report indicated that there continued to be some call sign corruption, particularly with Meteosat DCPs, and that the humidity bias in Vaisala sondes also remained. (**Action:** ECMWF to discuss these questions directly with Eumetsat and Vaisala respectively.) The panel was pleased to note that ASAP data quality continued to be comparable with or superior to that of land stations with respect to model fields. The panel expressed its appreciation to ECMWF for this report, which will be updated and reproduced in full in the 2000 Annual Report.

3.4 Report of ASAP monitoring centre

3.4.1 The representative of France reported on the status and operation of and some results from the ASAP monitoring centre, which had been established by Météo France as agreed at ACC-VII. He noted that the monitoring had identified a problem in report duplication, in particular involving Bracknell and Offenbach. There was also some data corruption with reports received via Meteosat. The meeting agreed that these identified problems should be addressed directly by the ASAP Monitoring Centre, the Met Office, the German Weather Service and Eumetsat, as appropriate. (**Action:** Météo France, MO, DWD, Eumetsat.) The panel expressed its appreciation to Meteo France for this comprehensive and very valuable report. The updated report of the ASAP Monitoring Centre will be reproduced in the 2000 Annual Report.

3.5 Report on EUCOS

3.5.1 The panel noted with interest a report from the EUCOS Programme Manager, Mr Francois Gerard, on the proposed EUCOS/COSNA pilot project, which would test, *inter alia*, variable ASAP sounding modes in relation to identified sensitive areas for observational data for NWP in western Europe. Details of this pilot project are given in *Annex III*. Implementation procedures should be discussed directly between EUCOS and the operators concerned. (**Action:** EUCOS and operators.)

3.6 Report on the EUMETNET ASAP project

3.6.1 The ASAPP chairman and EUMETNET ASAP Project (E-ASAP) manager, Dr Klaus Hedegaard reported on the status of the E-ASAP. This report, appropriately updated, will be included in the 2000 Annual Report.

3.7 Worldwide Recurring ASAP Project (WRAP)

3.7.1 The meeting noted with interest a report on the status of planning for WRAP. As a result of a number of actions during the past year on the part of the chairman, the Australian Bureau of Meteorology (ABOM) and the Secretariat, conceptual planning for the project had advanced substantially. A potential line and ships had been identified; the USA (NOAA/OGP) had agreed to provide, on loan, a complete sounder and launcher system for the project; and ABOM was in the process of securing funding for consumables and related items for soundings in the Indian and Southern Oceans and Tasman Sea.

3.7.2 The meeting expressed its appreciation for these developments, and reiterated the importance of this project for ASAP globally, for operational meteorology and for global climate

studies. It therefore agreed that WRAP should have the highest priority among the activities of the panel in the immediate future. The meeting recognized that a number of major issues remained to be addressed in the implementation of WRAP, including in particular the recruitment of the ship, the initial installation of the sounder system, crew training, etc. It was agreed that this process could best be initiated through a feasibility study, to be undertaken by an expert contracted to the panel. The meeting proposed that Captain Gordon Mackie should be contracted by WMO to undertake this work, with funds to be provided from the ASAP Trust Fund (see also agenda item 7.4). The terms of reference for this consultancy are given in *Annex IV*. The report should be delivered to the ASAPP chairman by April 2001, at which time a decision on and timetable for WRAP implementation could be established. (**Action:** Secretariat, Capt. Mackie, chairman, ABOM, NOAA/OGP.)

4. TECHNICAL ASPECTS

4.1 Development of new systems

4.1.1 The meeting noted with interest the following developments or proposals related to new or improved ASAP systems:

- (i) The USA had completed development of a portable deck launcher system, which would form part of the sounder system to be provided for WRAP. Details of this launcher are given in *Annex V*.
- (ii) LORAN-C was to be used for wind finding for E-ASAP in the Mediterranean.
- (iii) It was suggested that Inmarsat Mini-M might prove a viable, fast, low-cost alternative to Inmarsat-C for ASAP communications. Some complications were, however, noted in this proposal, including the need for a stable antenna platform and directional antenna, and the lack of code 41 facility.

4.2 Information from manufacturers

4.2.1 As before, manufacturers were invited to inform the panel of new equipment developments relevant to use with ASAP. In this context, the meeting noted with interest the following reports:

- (i) From Geolink, on a new GPS radiosonde system, which was to take part shortly in a WMO radiosonde intercomparison experiment.
- (ii) From Vaisala, on wind finding methods in the Vaisala Sounding System, covering a GPS performance improvement project; DigiCORA III; LORAN-C wind finding; and the RS90 sonde family.

The meeting expressed its appreciation to both Geolink and Vaisala for their participation and reports, which it regarded as being of considerable value. Details of these reports are given in *Annexes VI and VII* respectively.

4.3 Communicating ASAP data to the GTS

4.3.1 The meeting agreed that Inmarsat-C remained a proven, reliable and widely available communications system for ASAP data, and was the preferred choice of many operators. As noted above, Inmarsat Mini-M provided a possible low-cost alternative, but there were several inherent difficulties in its application in practice.

4.3.2 The meeting recognized that there remained problems in the use of Meteosat DCPs, where up to 20% data losses were noted. Eumetsat agreed to address these problems once more, but

suggested that they may be solved with the introduction of Meteosat Second Generation (MSG).
(**Action:** Eumetsat and operators.)

4.4 Channels for data transmission via meteorological satellites

4.4.1 The panel reviewed the status and operational use of channels allocated for data transmission via meteorological satellites, with which no major problems were noted. There was a possible interference problem identified with International Channel 12, involving France and Germany. (**Action:** Eumetsat to investigate with operators concerned, together with the ASAP Monitoring Centre.)

4.5 Data and information dissemination

4.5.1 The panel reviewed the status of information on ASAP included in relevant WMO catalogues and operational publications, and ASAP information dissemination in other ways such as the WWW Operational Newsletter. In this context, it noted that the list of operational ASAP ships and national contact points for ASAP operations had not been updated for some time. The Secretariat was therefore requested to circulate the existing list to operators for updating, with the new list to be disseminated in a forthcoming Operational Newsletter and in the 2000 Annual Report. (**Action:** Secretariat and operators.)

4.5.2 In addition, the Secretariat was requested to investigate the possibility to establish a separate supplement to the WMO ship catalogue (WMO-No. 47), to be available on-line through the WMO web page, giving complete metadata of ASAP ships, including ASAP unit IDs and IMO numbers. (**Action:** Secretariat.)

4.6 Operator and system ID in FM 36-XI TEMP SHIP

4.6.1 The meeting agreed that there was a problem in the monitoring of ASAP activities in that only the ship's call sign identified the unit. This caused identification problems either in case of ships hosting different units, or when systems were transferred to other ships. The meeting therefore discussed different possibilities to provide owner and system ID in a convenient way. The following possibilities and conclusions were arrived at:

- (i) Modify the TEMP SHIP code to include this information. This solution was not possible since CBS no longer accepted character code modifications.
- (ii) Replace the ship call sign with an ASAP unit indicator. While feasible, it was recognized that this solution would serve to dissociate the TEMP message from the normal SHIP reports and ship metadata, which could provide difficulties for many operational and climate users.
- (iii) Migrate all ASAP reports to BUFR, where it would be simple to include the additional information. Operators were recommended to implement this option as a long term solution, in particular once system upgrades to DigiCORA 3 were implemented, since this would include an option for BUFR encoding. (**Action:** Operators.)
- (iv) Implement a ship catalogue supplement for ASAP ships as noted above, to include the additional information. Operators should update the information in this catalogue as often as necessary and monitoring centres should check the catalogue regularly for changes. The following unit ID scheme was agreed: D/ASAP1,2,3 etc.; F/ASAP1,2,3 etc.; GB/ASAP1,2 etc.; DK/ASAP1,2 etc.; IS/ASAP1,2 etc.; EU/ASAP1,2,3 etc.; WRAP/ASAP1,2 etc. (**Action:** Secretariat and operators.)

4.7 ASAP costs

4.7.1 The panel reviewed both the capital cost and the operating cost of ASAP units. It agreed that the document originally developed on this topic remained essentially valid, with the removal of references to ECUs. The revised ASAP cost document is given in *Annex VIII* and will also be reproduced in the 2000 Annual Report. (**Action:** Secretariat.)

4.8 Other technical aspects

4.8.1 No other technical questions relating to ASAP were noted.

5. SCIENTIFIC ACTIVITIES RELATED TO ASAP

5.1 Report of the COSNA Scientific Evaluation Group (SEG)

5.1.1 The COSNA SEG held its tenth session in March 2000 in Toulouse, in conjunction with the Second CGC/WMO Workshop on the Impact of Various Observing Systems on NWP. Papers given at this workshop had clearly indicated the positive impact of radiosonde data over the oceans, as well as the need for such data to calibrate satellite soundings. A further published paper had established that ASAP soundings were of a sufficient quality to impact significantly on analyses and NWP. In addition, ECMWF stressed that the lack of profile data from the Pacific Ocean on occasions had a significant negative impact on their D+5 and D+6 prognoses for Europe.

5.1.2 A further study by Dr M. Bader (Met Office), on the impact of lack of observational data (especially profile data) from the area south west of United Kingdom and France, had demonstrated that there was a manifest lack of data over the Atlantic, in particular with vertical information. Such data could, at present, only be derived from dropsondes or sondes launched from ASAPs.

5.1.3 The meeting noted these results with interest, and agreed that they demonstrated the critical role which ASAP would play in NWP for at least the next decade.

5.2 Other scientific aspects

5.2.1 No other relevant scientific matters were noted at the present time.

6. RELATIONS TO OTHER BODIES

6.1 Co-ordinating Group on COSNA (CGC)

6.1.1 The meeting noted that ASAP operations remained an important component of COSNA, even though the CGC was in the process of being incorporated into EUMETNET, in a way yet to be clearly defined. The chairman reported briefly on the eleventh session of the CGC (August 2000), at which he had made a presentation on behalf of the panel, and at which the importance of ASAP had again been underlined. The meeting noted that the EUCOS Pilot Project presented under item 3.5 above was also sponsored by the CGC.

6.2 CBS, CIMO, GCOS

6.2.1 The meeting noted with appreciation that a presentation on ASAP (including WRAP) had been given to the sixth session of the GCOS/AOPC (Geneva, April 2000). The AOPC had

expressed its strong support for the work of the ASAPP, and noted the value to global climate studies of ASAP soundings, including in particular those proposed in the Southern Hemisphere under WRAP. A concrete example of the effects of this support was the success in obtaining additional funding to support WRAP in Australia. The meeting agreed to maintain close liaison with AOPC and GCOS in the future, in view of the obvious mutual benefits of such liaison. (**Action:** chairman and Secretariat.)

6.2.2 The meeting further noted with appreciation that the Secretariat had made presentations on ASAP to two recent CBS expert team meetings relating to the Global Observing System (Geneva, June and September 2000). Both meetings had emphasised the importance of ASAP to the WWW, and expressed appreciation for the work of the ASAPP in maintaining and expanding ASAP. The meetings had also noted with appreciation the work of JCOMM towards the integration of marine observing systems, the JCOMMOPS proposal, and the agreement of JCOMM to participate in the CBS Rolling Requirements Review process. This latter process would eventually encompass ASAP data. The meeting agreed to fully support this interaction of JCOMM and CBS.

6.3 JCOMM

6.3.1 The meeting recognized that the merger of CMM and IGOSS into the new Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), approved by Congress in May 1999, had some significance for ASAPP. In particular, JCOMM was now the primary reporting mechanism for all operational ocean-related activities of WMO and IOC, and had the responsibility, *inter alia*, to coordinate the implementation and operation of ocean observing systems in support of WWW, GOOS and GCOS. JCOMM was thus also the primary reporting mechanism for the ASAPP. This fact had been recognized at the previous panel session, where the terms of reference had been modified accordingly.

6.3.2 In this context, the meeting noted with interest an update on the status of JCOMM. A second meeting of the interim JCOMM Management Committee had been held in Paris in June 2000. This meeting, in particular, had agreed a detailed proposal for the new substructure for JCOMM, including full terms of reference for the different components, to be eventually submitted to JCOMM-I (Iceland, June 2001) for approval. *Annex IX* gives a schematic of this substructure. The substructure includes, within the Observations Programme Area, a Ship Observations Team (SOT), encompassing the VOS, SOOP and ASAP as previously proposed. The proposed integrated terms of reference for the SOT are given in *Annex X*. The meeting noted that the SOT was designed to integrate ship-based operations to the extent possible, particularly in areas such as logistics and communications, while preserving the identity of the individual component groups and their capabilities to address specific technical problems. The meeting supported the reasons for and concept of SOT, and agreed to participate fully in its development, including the planned first combined SOT meeting in early 2002.

6.3.3 The meeting further noted with interest the proposal for a JCOMM Observing Systems Operations Support Centre (JCOMMOPS), to be based on the existing DBCP/SOOP and Argo coordinators (see *Annex XI*). It recognized that this was a natural development under JCOMM, which would undoubtedly provide operational support of considerable value to VOS as well as DBCP, SOOP and Argo, and supported the concept in principle. At the same time, however, it agreed that ASAP was presently a relatively small operation, with adequate support being provided by operators and organizations such as EUMETNET. In addition, the development of WRAP was the current main priority for the panel, which would take all its human and financial resources over the next year or so. The meeting therefore agreed to review the development of JCOMMOPS at the first SOT meeting, and also to reassess the possibilities for the direct involvement of ASAPP at that time. (**Action:** Secretariat.)

7. ORGANIZATIONAL MATTERS

7.1 Future status of the ASAPP

7.1.1 ACC-IX agreed to maintain the committee (now panel) in its present form for the immediate future, on the basis of perceived requirements and benefits, but to review its status at each session, in particular in the light of ongoing support from operators. In this context, the meeting noted the ongoing importance of the work of the panel, the expansion of its operations worldwide through WRAP, and the increased interest by operators in this work. It therefore agreed to maintain the panel in its present form, within the context of the JCOMM Ship Observations Team as agreed above under item 6.3.

7.2 Terms of reference

7.2.1 The meeting recalled its agreement regarding the participation of the panel in SOT, as well as the proposed SOT terms of reference (*Annex X*). These integrated terms of reference will be presented to JCOMM-I for approval. In this context, the meeting agreed to maintain the existing ASAPP terms of reference (see Annex V of the final report of ACC-XI) unchanged, at least until the first session of the SOT.

7.3 Membership

7.3.1 The meeting welcomed the reintegration of Germany into the work of the panel at the present session, as well as the participation of Australia for the first time. It noted that the participation of many more ship-operating countries in the SOT would provide an ideal opportunity to introduce ASAP to them, and also possibly recruit more ASAP participants.

7.4 Status of ASAP Trust Fund

7.4.1 The meeting reviewed and approved a finalized statement of account for the ASAP Trust Fund for the biennium 1998/99, as well as an interim statement for the present biennium to July 2000. These statements are given in *Annex XII*. It recognized that substantial expenditures would be required during 2001, in particular to support the development and implementation of WRAP, including the engagement of a consultant as agreed under item 3.7. It therefore agreed a draft budget for 2001, including a table of possible contributions, which is given in *Annex XIII*. The Secretariat was requested to invoice contributors as usual during December 2000. The budget includes a sum set aside as a forward commitment towards the reprinting of the brochure after the establishment of WRAP. (**Action:** Secretariat.)

7.5 Election of officers

7.5.1 The meeting re-elected Dr Klaus Hedegaard as panel chairman and elected Mr Jean-Louis Gaumet as vice-chairman, to hold office until the end of the next panel session. In doing so, it noted with regret that Margaret Bushby was unable to continue as vice-chairman of the panel, and thanked her for her valuable work in support of ASAP over the past year.

8. FUTURE WORK PROGRAMME OF THE ASAPP

8.1 Programme implementation

8.1.1 The meeting reiterated that the top priority in programme implementation for the panel over the next year and more would be the implementation of WRAP. Other implementation activities would include:

- (i) Continuation and enhancement of the ASAP monitoring by Météo France. (**Action:** Météo France.)
- (ii) Liaison with monitoring and NWP centres regarding ASAP impacts and quality. (**Action:** Operators.)
- (iii) Updating ASAP information in the Operational Newsletter and implementation of the Ship Catalogue supplement for ASAP. (**Action:** Secretariat and operators.)
- (iv) Seeking support from EUMETNET for WRAP while in the EUCOS area and also for activities outside the EUCOS area as a contribution to WWW. (**Action:** chairman and EUCOS Programme Manager.)

8.2 Promotional activities

8.2.1 The meeting expressed its appreciation to the Met Office for the excellent article on ASAP recently published in the Marine Observer. It noted with appreciation that an article on ASAP was to appear shortly in the next edition of Ocean Views, published by ABOM, and suggested that a similar article might also be published in the Mariners Weather Log (NOAA/NWS). (**Action:** USA). Furthermore, the meeting suggested that an ASAP article based on that in the Marine Observer might be prepared and proposed for publication in the Inmarsat journal Ocean Voice. (**Action:** MO, Capt. G. Mackie and the Secretariat.) The Secretariat was also requested to post the ASAP Annual Report in future on the WMO web site, so that it was available for wider use and distribution by operators.

8.2.2 The meeting recognized that the ASAP brochure required some revision, but agreed that publication of the revised version should be delayed until after the implementation of WRAP and E-ASAP. The Met Office agreed to prepare a first revised draft for review by panel members before the first SOT meeting, with the new brochure to be published during 2002. (**Action:** MO.)

8.3 Annual report and other publications

8.3.1 The panel reviewed and endorsed existing procedures for the preparation of the annual report, as well as the overall structure for the 2000 report. These are given in *Annex XIV*. The Annual National Report Format was also reviewed, and a number of modifications proposed, as follows:

- (i) Addition of a column to Table 1 to include information on launch method, together with a footnote as follows:

Launch method examples: deck launcher (portable); deck launcher (fixed); container (manual); container (semi-automatic); other.

- (ii) Addition of a column in Table 2 to give balloon size (grams).

The revised report format is given in *Annex XV*.

8.3.2 Finally on this item, operators were requested to include in the “comments” section on the second page of the report information on system operators, e.g. ships crews, meteorological service personnel, etc.

9. CLOSURE

9.1 Date and place of ASAPP-XIII

9.1.2 The meeting noted with interest that the National Institute of Oceanography (NIO), India, which was a member of the SOOP Implementation Panel, had tentatively offered to host the first session of the SOT in the first quarter of 2002. The meeting further noted with interest the offer of Météo France to also host this meeting, should the offer of NIO not come to fruition. The chairman and Secretariat were requested to finalize the date and place of this meeting as soon as possible, and inform panel members accordingly.

9.2 Adoption of the final report

9.2.1 The meeting reviewed and adopted the final report of ASAPP-XII.

9.3 Closure

9.3.1 In closing the meeting the chairman, Klaus Hedegaard once more expressed his sincere thanks, on behalf of all participants, to the Met. Office, and particularly to Margaret Bushby and Sarah North, for hosting the meeting and for supporting it so well and hospitably, which had contributed both to the success of the meeting and the enjoyment of the participants. He noted that the WRAP project was an excellent example of the value of the panel in coordinating and strengthening ASAP globally, which was very important for many international programmes. The present meeting had succeeded in significantly advancing the planning for WRAP, as well as other aspects of the work of the panel, and he thanked all participants for their valuable contributions to this success.

9.3.2 Speaking on behalf of all participants, Gordon Mackie expressed his thanks to the chairman, both for his very able conduct of the meeting, and also for his wise and energetic leadership of the panel during the intersessional period.

9.3.3 The twelfth session of the ASAP Panel closed at 1130 hours on Friday, 29 September 2000.

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