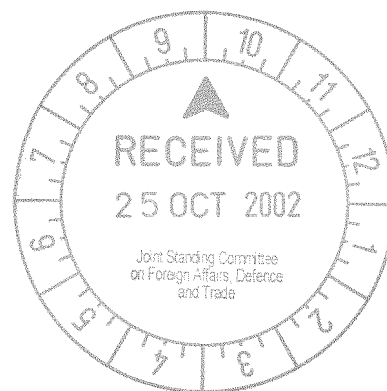


**SUBMISSION
BY THE COMMONWEALTH BUREAU OF METEOROLOGY TO THE
FOREIGN AFFAIRS SUB-COMMITTEE
JOINT STANDING COMMITTEE ON FOREIGN AFFAIRS, DEFENCE AND TRADE**

**PARLIMENTARY INQUIRY ON
“BUILDING AUSTRALIA’S RELATIONS WITH INDONESIA”**

October 2002



CONTENTS

	Paragraph
Summary	
Background	
• The Bureau of Meteorology's relations with Indonesia's Badan Meteorologi dan Geofisika under the authority of the Meteorology Act and the Convention of the World Meteorological Organization	1
• Development assistance programs in meteorology for Indonesia	5
• Projects for BMG undertaken by the Bureau's Special Services Unit	7
• East Timor as an issue in Australia's relations in meteorology with Indonesia	8
Strategic issues in building Australia's relations with Indonesia	
• Importance of meteorological and oceanographic data from Indonesia and neighbouring waters	11
• Benefits of technical assistance programs for Indonesia	12
• Availability of resources	13
• Collaboration in meteorology between Indonesia, East Timor and Australia	15
Recommendations	16
Attachment A - Meteorology Act 1955	
Attachment B - Memorandum of Understanding on cooperation in meteorology with BMG	
Attachment C - Report of the first session of the Joint Working Group (1995)	
Attachment D - Report of the second session of the Joint Working Group (1997)	
Attachment E - Report of the third session of the Joint Working Group (1999)	
Attachment F - Report of the fourth session of the Joint Working Group (2002)	
Attachment G - Joint letter to East Timor dated 15 August 2002	

SUMMARY

Australia (through the Commonwealth Bureau of Meteorology) and Indonesia (through the Badan Meteorologi dan Geofisika) signed a Memorandum of Understanding (MOU) on cooperation in meteorology in 1995. The cooperation that has developed under this MOU has been fruitful and productive, and has brought strategic, economic and social benefits to both countries.

Incorporated into this submission are background information, an identification of strategic issues in building Australia's relations with Indonesia, and four recommendations on future cooperation in meteorology with Indonesia.

BACKGROUND

The Bureau of Meteorology's relations with Indonesia's Badan Meteorologi dan Geofisika under the authority of the Meteorology Act and the Convention of the World Meteorological Organization

The functions of the Bureau of Meteorology (hereafter referred to as the Bureau) are defined in the Meteorology Act 1955 (Attachment A). Section 6(1)(i) specifically empowers the Bureau to cooperate with the authority administering the meteorological service of any other country. This is the basis for the Bureau's bilateral relations with the Badan Meteorologi dan Geofisika (BMG) of Indonesia in the field of meteorology.

2. Both Australia (through the Bureau) and Indonesia (through BMG) are Member countries of the World Meteorological Organization (WMO), a specialised agency of the United Nations. In accordance with Article 2 of the Convention of the WMO on the purposes of the Organization, both countries are committed:

- a) To facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations as well as hydrological and other geophysical observations related to meteorology, and to promote the establishment and maintenance of centres charged with the provision of meteorological and related services;
- b) To promote the establishment and maintenance of systems for the rapid exchange of meteorological and related information;
- c) To promote standardisation of meteorological and related observations and to ensure the uniform publication of observations and statistics;
- d) To further the application of meteorology to aviation, shipping, water problems, agriculture and other human activities;
- e) To promote activities in operational hydrology and to further close cooperation between Meteorological and Hydrological Services; and
- f) To encourage research and training in meteorology and, as appropriate, in related fields and to assist in coordinating the international aspects of such research and training.

3. In line with the authority under the Meteorology Act and the purposes of the Convention of the WMO, the Bureau signed a Memorandum of Understanding (MOU) on cooperation in meteorology with BMG in Jakarta on 1 September 1995. A copy is at Attachment B. The scope for cooperation includes:

- World Weather Watch systems;
- Meteorological research;
- Climate monitoring and seasonal forecasting;
- Meteorological training; and
- Other areas of cooperation in meteorology as may be mutually arranged between the Parties.

4. Since the signing of the MOU, four sessions of the Joint (Meteorological) Working Group (JWG) have been convened. Details are as follows:

- JWG-1, Jakarta, 31 August – 2 September 1995
- JWG-2, Perth, 13-15 August 1997
- JWG-3, Jakarta, 11-13 July 1999
- JWG-4, Melbourne, 12-15 August 2002.

Copies of the summary reports for these sessions are at Attachments C, D, E and F.

Development assistance programs in meteorology for Indonesia

5. Since the signing of the MOU, a total of 19 Bureau and 25 BMG officers have been engaged in scientist exchange activities, the areas of which were:

- Communications and data processing: 8
- Instrumentation for meteorological observations: 2
- Aeronautical meteorology: 1
- Agricultural meteorology: 1
- Marine meteorology including tropical cyclones: 7
- Meteorological research: 8
- Climate matters: 3
- Meteorological training: 11
- Management of meteorological services: 3.

6. Because the state of development in meteorology in Australia is much more advanced than that in Indonesia, most of the above activities were primarily designed to assist the development of BMG through the transfer of technology. Capacity building, in the form of training of meteorological personnel and training on the management of meteorological services, featured highly on the priority list for technical cooperation.

Projects for BMG undertaken by the Bureau's Special Services Unit

7. The Bureau's commercial arm, the Special Services Unit (SSU), has served as sub-contractor for a number of commercial projects with BMG. Examples include projects to refurbish weather radars, and one on the Computer Message Switching System for BMG to overcome the Year 2000 problem.

East Timor as an issue in Australia's relations in meteorology with Indonesia

8. The Bureau has maintained good relations, through WMO, with both Portugal and Indonesia, which have administered East Timor's meteorological network (Portugal prior to 1975; Indonesia 1975-1998).

9. During the period (1998-2002) when East Timor was under the control of the United Nations Transitional Administration in East Timor (UNTAET), the Bureau installed deployable automatic weather stations at three airports: Dili, Baucau and Suai, and provided a weather forecast service in support of military aviation. On 20 May 2002, East Timor became a new independent nation known as the Democratic Republic of East Timor. Subsequently, on 27 September 2002, it joined the United Nations.

10. Because of East Timor's geographic location within the archipelago of Indonesia, trilateral technical cooperation in meteorology between Indonesia, East Timor and Australia is a logical way to bring mutual benefits to the three countries. At

the recent Thirteenth Session of the WMO Regional Association V for the South-West Pacific, Manila, 21-28 May 2002, the Association, conscious of the impact of weather and climate influences on the developing economy of the new nation and the importance of ensuring coordinated international assistance to East Timor in the establishment of its meteorological service capability, expressed its hope that East Timor would become a Member of WMO and thereafter a Member of WMO Regional Association V. It urged East Timor's neighbouring countries and other development partners, with the support of the WMO Secretariat, to take whatever steps they could to assist East Timor in the development of its national meteorological infrastructures and services.

STRATEGIC ISSUES IN BUILDING AUSTRALIA'S RELATIONS WITH INDONESIA

Importance of meteorological and oceanographic data from Indonesia and neighbouring waters

11. Indonesia's location straddling the Equator has special significance in meteorology. The equatorial belt is an important source of heat and energy to drive the world's general circulation. The warm sea in the neighbourhood of Indonesia is also a major factor in driving the El Nino and Southern Oscillation phenomenon, which are responsible for much of the climate variability, in terms of droughts and floods, in the Region. Thus, meteorological and oceanographic data from Indonesia and neighbouring waters are essential for numerical weather prediction and operational weather and climate forecasting in Australia, especially as Melbourne is one of three World Meteorological Centres of WMO.

Benefits of development assistance programs for Indonesia

12. The development assistance programs for BMG provide benefits not only to Indonesia but also to Australia because, inter alia, they:

- Help to bridge the technological gap between the two countries, so that joint activities (eg operational exchange of meteorological data and products, scientific research on the understanding of tropical weather systems and the atmospheric general circulation, regional climate prediction) could be carried out;
- Render mutual support through monitoring and warning of transboundary weather systems such as tropical cyclones and smoke haze;
- Provide geophysical (volcanic activity) data from Indonesia necessary for the warning of volcanic ash clouds that pose a serious threat on the safety of flights from/to Australia overflying Indonesian airspace.

Availability of resources

13. Apart from AusAID financial support (\$68,400) under the Government Sector Linkages Program (GSLP) in 1997-98 for a few minor development projects with BMG,

all funding for technical cooperation in meteorology with BMG since the signing of the MOU has been met from within the Bureau's budget under the authority of the Meteorology Act. This included costs for travel and the provision of equipment including spare parts, estimated at about \$15,000 per annum.

14. Given the limited resources that the Bureau is able to commit to such activities and in view of the substantial strategic, economic and social benefits from strengthened bilateral relations with Indonesia in meteorology, it would be useful if AusAID would be in a position to provide funding support for enhanced Bureau-BMG cooperation.

Collaboration in meteorology between Indonesia, East Timor and Australia

15. With East Timor having joined the United Nations, it is hoped that East Timor will become a Member of WMO soon, and thereafter of the WMO Regional Association V for the South-West Pacific. On 15 August 2002, during the 4th session of the Joint Working Group, the two Heads of the Services jointly wrote a letter to the Director of Meteorology of East Timor, offering to identify joint assistance in the development of the East Timor meteorological infrastructure, subject to the approval by the governments of Australia and Indonesia. A copy of this letter is at Attachment G.

RECOMMENDATIONS

16. The Bureau recommendations for the future building of Australia's relations with Indonesia are:

Recommendation 1: That the Bureau of Meteorology be encouraged to continue to cooperate strongly with BMG under the terms of the MOU signed in 1995.

Recommendation 2: That, in view of the importance of meteorological and oceanographic data from Indonesia and neighbouring waters for weather and climate forecasting purposes in Australia, technical assistance (especially in the areas of World Weather Watch systems and training) should continue to be made through the Bureau to BMG to ensure that the Indonesian observational programs are maintained and further enhanced, in terms of the coverage in the observational network, and the frequency, timeliness and accuracy of the observations.

Recommendation 3: That, in view of the mutual benefits of development assistance programs for Indonesia, AusAID and the Bureau of Meteorology should explore ways to increase the commitment of resources to bilateral cooperation in meteorology.

Recommendation 4: That Australia should join with Indonesia and other interested countries and/or development partners in the development of the East Timor meteorological infrastructure.

ATTACHMENT A

METEOROLOGY ACT 1955

METEOROLOGY

No. 6 of 1955.¹

An Act relating to the Commonwealth Bureau of Meteorology.

[Assented to 23rd May, 1955]

[Date of Commencement, 20th June, 1955]

Be it enacted by the Queen's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, as follows:

- | | | |
|-----------------|---|--|
| 1. | This Act may be cited as the <i>Meteorology Act 1955</i> . | Short Title |
| 2. | The <i>Meteorology Act 1906</i> is repealed. | Repeal |
| 3. | In this Act, unless the contrary intention appears-
"the Bureau" means the Commonwealth Bureau of Meteorology established by this Act;
"the Director" means the Director of Meteorology. | Definitions |
| 4. ¹ | This Act extends to all Territories of the Commonwealth. | Extension to Territories |
| 5. | (1) For the purposes of this Act, there shall be a Commonwealth Bureau of Meteorology and a Director of Meteorology.
(2) The Bureau shall be under the charge of the Director, who shall, subject to the directions of the Minister, have the general administration of this Act. | The Commonwealth Bureau of Meteorology |
| 6. | (1) The functions of the Bureau are-
(a) the taking and recording of meteorological observations and other observations required for the purposes of meteorology;
(b) the forecasting of weather and of the state of the atmosphere;
(c) the issue of warnings of gales, storms and other weather conditions likely to endanger life or property, including weather conditions likely to give rise to floods or bush fires;
(d) the supply of meteorological information;
(e) the publication of meteorological reports and bulletins;
(f) the promotion of the use of meteorological information;
(g) the promotion of the advancement of meteorological science, by means of | Functions of the Bureau |

¹ Amended by No. 123 of 1973

- meteorological research and investigation or otherwise;
- (h) the furnishing of advice on meteorological matters; and
 - (i)¹ co-operation with the authority administering the meteorological service of any other country in relation to any of the matters specified in the preceding paragraphs of this sub-section.
- (2) The Bureau shall perform its functions under this Act in the public interest generally and in particular-
- (a) for the purposes of the Defence Force;
 - (b) for the purposes of navigation and shipping and of civil aviation; and
 - (c) for the purpose of assisting persons and authorities engaged in primary production, industry, trade and commerce.
7. (1) The Director has such powers as are necessary to enable the Bureau to perform its functions under the last preceding section, and, in particular, may-
- (a) establish meteorological offices and observing stations;
 - (b) arrange with any Department, authority or person to take and record meteorological observations and transmit meteorological reports and information;
 - (c) arrange means of communication for the transmission and reception of meteorological reports and information; and
 - (d) arrange for the training of persons in meteorology.
- (2)¹ The Departments and authorities with which, and the persons with whom, arrangements may be made under the last preceding sub-section include Departments and authorities of a State or Territory of the Commonwealth and persons in the service of such a State or Territory or of such a Department or authority.
8. The Director may, subject to any directions of the Minister, make charges for forecasts, information, advice, publications and other matter supplied in pursuance of this Act.
9. The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters which by this Act are required or permitted to be prescribed, or which are necessary or convenient to be prescribed for carrying out or giving effect to this Act.

Powers of the Director

Charges

Regulations

MEMORANDUM OF UNDERSTANDING
BETWEEN
BADAN METEOROLOGI DAN GEOFISIKA, INDONESIA
AND
THE AUSTRALIAN BUREAU OF METEOROLOGY
ON CO-OPERATION IN METEOROLOGY

Badan Meteorologi dan Geofisika, Indonesia and the Australian Bureau of Meteorology, hereinafter referred to as the Parties,

PROMPTED by their determination to promote co-operation in meteorology consistent with the objectives of the World Meteorological Organization,

BEARING IN MIND that both Indonesia and Australia are Members of the World Meteorological Organization,

HAVE REACHED THE FOLLOWING UNDERSTANDING:

Article 1

BASIS OF CO-OPERATION

Both Parties shall co-operate in meteorology on the basis of equality, mutual benefit and reciprocity, and in accordance with the laws and regulations of their respective countries.

Article 2

SCOPE OF CO-OPERATION

1. The areas for co-operation shall be:
 - (a) World Weather Watch systems;
 - (b) Meteorological research;
 - (c) Climate monitoring and seasonal forecasting;

- (d) Meteorological training; and
 - (e) Other areas of co-operation in meteorology as may be mutually arranged between the Parties.
2. Co-operation in the areas outlined in paragraph 1 may include the following:
- (a) Exchange of scientists, experts and other personnel, including visits of delegations or teams of specialists to the scientific establishments and institutes of the other Party;
 - (b) Exchange of meteorological, scientific and technical information including publications and research report;
 - (c) Collaboration on significant research projects of mutual interest and joint organization of seminars, workshop, symposia and technical conferences; and
 - (d) Other forms of co-operation in meteorology, as mutually arranged between the Parties.

Article 3

ADMINISTRATION

1. The Parties shall meet at least once every two years to review activities under this MOU and to determine plans for future activities. Such meetings shall be held alternatively in Indonesia and Australia. The date and agenda of each meeting shall be jointly decided following consultation between the Parties.
2. Expenses connected with the implementation of visits referred to in Article 2 point 2 (a) and Article 3 point 1, shall be borne by the sending Party unless some other joint arrangement is made.
3. Each Party shall bear expenses relating to the implementation of the co-operative activities within its own country.
4. Subject to consultation between and mutual consent by the Parties, scientific information obtained as a result of joint scientific research carried out within the framework of this MOU shall be made available to the world's meteorological community.
5. All use and exchange of material shall observe the intellectual property rights attaching to that material according to the relevant laws, regulations and practice of the country of each Party.

6. The two Parties shall consult with each other on any problem that may arise from or in connection with co-operation under this MOU.

Article 4

MODIFICATION OF THE MOU

This MOU may be amended or supplemented as mutually arranged in writing between the two Parties.

Article 5

SETTLEMENT OF DISPUTE

All differences arising from the interpretation or application of this MOU shall be settled amicably through consultation between the two Parties.

Article 6

TERMS

This MOU shall come into effect on the date of signature and remain in effect for a period of five years. There after it shall remain in effect until either Party notifies the other in writing of its intention to terminate the MOU, in which case this MOU would cease to have effect one year after the receipt of such notification. The termination of this MOU shall not prejudice the implementation of any activities or on-going projects made under this MOU.

DONE at Jakarta on 1 September 1995 in duplicate in the Bahasa Indonesia and the English language, each of which being equally authentic.

FOR BADAN METEOROLOGI
DAN GEOFISIKA, INDONESIA

FOR THE AUSTRALIAN
BUREAU OF METEOROLOGY



(KARJOTO SONTOKUSUMO)
DIRECTOR-GENERAL



(JOHN W. ZILLMAN)
DIRECTOR OF METEOROLOGY

REPORT ON

THE FIRST JOINT WORKING GROUP MEETING

BETWEEN

BADAN METEOROLOGI DAN GEOFISIKA, INDONESIA

AND

THE AUSTRALIAN BUREAU OF METEOROLOGY

ON CO-OPERATION IN METEOROLOGY

Jakarta, 31 August - 2 September 1995

INTRODUCTION

1. The first meeting of the Joint Working Group was convened in Jakarta on 31 August up to 2 September 1995 in conjunction with the signing of the Memorandum of Understanding (MoU) on co-operation in meteorology between Mr. Karjoto Sontokusumo of the Indonesian Badan Meteorologi dan Geofisika (BMG) and Dr. John W. Zillman of the Australian Bureau of Meteorology (BoM).
2. Mr. Karjoto Sontokusumo and Dr. John W. Zillman served as co-chairmen for the meeting. A list of the participants is given in **Attachment A**.
3. Mr. Karjoto Sontokusumo outlined the developments leading to the historic signing of the MoU between the two Services in conjunction with the celebrations for the 50th Anniversary of Independence of Indonesia. He gave a warm welcome to Dr. John W. Zillman, not only in his capacity as the Director of Meteorology of Australia but also as the President of the World Meteorological Organization (WMO).
4. Dr. John W. Zillman remarked that he was privileged to be able to sign—on his first visit to Jakarta—an MoU between BoM and BMG. He said that Indonesia is Australia's closest neighbor and as such, the two countries have many common interests and problems. He looked forward to a long period of close collaboration between the two Services. He suggested that a report of the Working Group meeting should be prepared and signed before the departure of the Australian delegation. The report should contain a Category 'A' list consisting of high priority activities which both sides had agreed be implemented during the next two years and a Category 'B' list comprising desirable but less precisely formulated and/or less urgent proposals which would require further elaboration before implementation. He also proposed that in all future Working Group meetings, as well as the review of progress on the specific projects of the bilateral programs, one of the agenda item should be an overview of recent developments and future plans of the two Services.

REVIEW OF PRIORITIES

5. The meeting considered **Attachment B** which was a draft list of proposals made by the Indonesian side. It also took into consideration the supplementary remarks made by members of the Australian delegation regarding the areas of co-operation and the promotion of free exchange of meteorological data and products.

COOPERATIVE ACTIVITIES FOR 1995 - 1997

6. After taking into consideration the priorities of both Parties and the availability of resources, the Joint Working Group drew up **Attachment C** containing a list of Category 'A' activities and **Attachment D** containing a list of Category 'B' activities.
7. Dr. John W. Zillman indicated that in order to facilitate the early start of the activities, the Bureau of Meteorology would be pleased to cover the per diem expenses of all Indonesian officers while in Australia on exchange visits under the co-operation program Category 'A' for the first two years. The Working Group agreed that detailed financial arrangements would be worked out between Ms. Rosliany of BMG and Dr. Tsui of BoM who will become the focal points on co-operation under the MoU.
8. To encourage more contacts at the working level, the Working Group agreed to establish contact points to oversee implementation of the projects under the following five areas:
 - World Weather Watch systems
 - Meteorological Research
 - Seasonal / Interannual Forecasting
 - Meteorological Training
 - Transboundary Air Pollution ProblemsNominations for these contact points will be agreed between the two co-chairmen by correspondence.

NEXT MEETING

9. In accordance with Article 3.1 of the MoU, the next meeting of the Working Group would be held in Australia in 1997. Dr. John W. Zillman proposed that the date and venue within Australia be agreed by correspondence before the end of 1996.

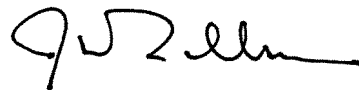
CLOSURE OF THE MEETING

10. On behalf of Dr. D. J. Gauntlett, Dr. V. K. Tsui and himself, Dr. John W. Zillman thanked Mr. Karjoto Sontokusumo and his staff for the warm hospitality extended by BMG during their visit.

Jakarta, 2 September 1995

A handwritten signature in black ink, consisting of a stylized initial 'K' followed by a long horizontal stroke that tapers to the right.

(KARJOTO SONTOKUSUMO)
Director-General, BMG

A handwritten signature in black ink, featuring a large, stylized 'J' followed by 'W. Zillman' in a cursive script.

(JOHN W. ZILLMAN)
Director of Meteorology, BoM

**LIST OF PARTICIPANTS OF
THE FIRST JOINT WORKING GROUP MEETING BOM-BMG
JAKARTA, 31 AUGUST - 2 SEPTEMBER 1995**

AUSTRALIA - BOM

1. Dr. John W. Zillman, Director of Meteorology
2. Dr. D. J. Gauntlett, Deputy Director (Research and Systems).
3. Dr. V. K. Tsui, Superintendent International and Public Affairs.

INDONESIA - BMG

1. Mr. Karjoto Sontokusumo, Director General.
2. Dr. Gunawan Ibrahim, Secretary of the Agency.
3. Mr. J. Sutijanto, Director of Center for Operation Management.
4. Mr. Sawito, Chief of Telecommunication and Instrumentation Division.
5. Mr. Sukarna, Chief of Personnel Division.
6. Mr. Hery Harjanto, Chief of Analysis Division.
7. Mr. T. Muljono, Chief of Meteorological Division.
8. Mr. Suroso Hadijanto, Chief of Climatological Division.
9. Dr. P. A. Winarso, Acting Chief of Forecast and Service Division.
10. Dr. P. J. Prih Harjadi, Chief of Processing Division.
11. Mr. Wasito Hadi, Chief of Planning Division
12. Ms. Rosliany, Chief of Legal Matters and Co-operation Section
13. Mr. Ibnu Purwana, Minute Writer of the Meeting

MATERIAL TO BE CONSIDERED

AT THE FIRST JOINT WORKING GROUP MEETING

1. INTRODUCTION

The Memorandum of Understanding (MoU) records the mutual understandings reached by the Indonesian Badan Meteorologi dan Geofisika (BMG) and the Australian Bureau of Meteorology (BoM) on co-operation in meteorology.

2. SCOPE

2.1. The purpose of the MoU is to promote co-operation in meteorology consistent with the objectives of the World Meteorological Organization (WMO), of which Indonesia and Australia are members.

2.2. Indonesia and Australia will co-operate in meteorology on the basis of equality, mutual benefit, and reciprocity, and in accordance with the laws and regulations of both respective countries.

2.3. The co-operation may include the following:

- a. Exchange of scientists, experts, and other personnel, including visits of delegations or teams of specialists to the scientific establishments and institutes of the other Party;
- b. Exchange of meteorological, scientific, and technical information including publications and research report;
- c. Collaboration of significant research projects of mutual interest and joint organization of seminars, workshops, symposia and technical conferences;
- d. Other forms of co-operation in meteorology, as mutually arranged between the Parties.

2.4. The area of co-operation comprises:

a. World Weather Watch (WWW) Systems.

BoM and BMG will improve co-operation in meteorological observation, telecommunications and data processing. This includes the following points:

- BMG—in accordance with the WMO standard procedure—will improve the punctuality in meteorological data collection and transmission over its 63 basic meteorological stations and will improve its upper air observation according to the WMO standard of twice observation per day from a sufficient number of the existing 13 stations. BoM will assist BMG to improve the quality of those observational data.
- BMG—in accordance with the WMO standard procedure—will improve the punctuality of switching time of the data exchange at Jakarta AMSC and to improve the efficiency of Jakarta-Melbourne communication link. This will facilitate the transmission of raw data from Jakarta to Melbourne and finished products (which include the grib, satellite, and radar data) from Melbourne to Jakarta. An alternative to do this is by improving the existing analog transmission into the digital system.
- More finished product of BoM regarding the Indonesian area is needed by BMG. For this purpose, an increase number of meteorological observation stations other than the 63 basic meteorological stations will be provided to BoM.

b. Meteorological Research

The co-operation in meteorological research will involve:

- Preparation of models for the short-range, long-range / seasonal / interannual predictions.
- Joint research on interaction of the Indonesian-Australian weather.
- Twinning of the Indonesian Bukit Koto Tabang and the Australian Cape Grime Global Atmospheric Watch (GAW) stations.

c. Climate Monitoring and Seasonal / Interannual Forecasting.

The co-operation in climate monitoring and seasonal / interannual forecasting will include:

- Joint study on climate monitoring and climate change.
- Joint preparation on Seasonal / Interannual forecasting for Indo-Australian region.
- The improvement of climatological data base system

d. Meteorological Training

The co-operation in meteorological training will involve training for meteorological, climatological, telecommunication and instrumentation personnel. This can be implemented in the following forms:

- Sending BMG personnel for formal training courses or on the job training at BoM.
- Sharing expertise and scientist exchange program in the field of meteorology, climatology, and the relevant instrumentation.
- Organizing joint seminars, workshops, or symposia, either in Indonesia or in Australia.
- Sending BoM experts to assist BMG to improve its capacity building and training Unit.

e. Other Forms of Co-operations.

Other forms of co-operations may include the following items:

- Meteorological services for off-shore exploration activities and marine transportation.
- Assessment of transboundary air pollution of smoke and haze through detection and monitoring.
- Mesoscale forecasting for the purpose of flood warning.
- Application of meteorology to agriculture.

3. COUNTERPART TEAM OF INDONESIA

To facilitate the first Meeting of the co-operation in meteorology between BMG and BoM, the BMG has set up a team consisting of:

- a. Mr. K. Sontokusumo, the Director General of BMG, as Supervisor
- b. Mr. Sujadi Hardjawanata, the Director of Analysis and Processing, as Team Leader.

- c. Mr. Sawito, Chief of Telecommunication and Instrumentation Division, as Vice Team Leader and Member / WWW Systems.
- d. Mr. Hery Harjanto, Chief of Analysis Division, as Member / Meteorological Research.
- e. Mr. T. Muljono, Chief of Meteorological Division, as Member / WWW System.
- f. Mr. Suroso Hadijanto, Chief Climatological Division, as Member / Climatological Monitoring and Seasonal Forecasting.
- g. Dr. P. A. Winarso, Chief of Forecast and Services, as Member / Meteorological Research.
- h. Dr. Prih Harjadi, Chief of Processing Division, as Member / Climatological Monitoring and Seasonal Forecasting.
- i. Mr. Wasito Hadi, Chief of Planning Division, as Member / Meteorological Training.
- j. Mr. Sukarna, Chief of Personnel Division, as Member / Meteorological Training.

4. ADMINISTRATION

- 4.1. Both Parties will meet at least once every two years to review activities under the MoU and to determine plans for future activities. The meeting will be held alternately in Indonesia and Australia.
- 4.2. Subject to consultation to both Parties, scientific information obtained as a result of the joint research can be made available to the world meteorological community.
- 4.3. All use and exchange of material under the MoU will consider the intellectual property rights attached to the material in accordance with the relevant laws, regulations and practice of both countries.

5. PRELIMINARY IMPLEMENTATION

The first Joint Working Group meeting will be held in Jakarta in relation with the signing of the MoU which was scheduled at the Department of Communications, Jakarta, September 1, 1995.

Jakarta, 31 August 1995

Indonesian Badan Meteorologi dan Geofisika.

Attachment C

CATEGORY 'A' ACTIVITIES

1. Visit of Dr. Winarso to attend the Workshop on volcanic ash detection and to assess the potential of greater use of Darwin RSMC products by BMG, one week in September 1995.
2. Visit by one BoM officer to explore opportunity for co-operation in training in BMG, one week in 1996/1997.
3. Visit by one BMG officer to BoM to assess availability and exchange of data and products from RSMC and WMC Melbourne, one-two weeks in 1995-1996.
4. Visit by one BoM officer to explore the opportunity of optimizing the utilization of the existing GTS link, one week in 1996/1997.
5. Exchange of scientist to formulate joint activities for seasonal / interannual forecasting. (Initial visit by one BoM officer to BMG one-two weeks before March 1996, followed by a visit of BMG officer to BoM two weeks in 1996/1997.
6. Visit by one BoM officer to advise on installation of GAW instrumentation, one-two weeks in 1995/1996.
7. On going exchange visits by BoM and BMG officers to advise on calibration and quality control procedure for both surface and upper-air observations, first visit of one-two weeks duration in 1995/1996.
8. Visit by one BMG officer to participate in conference on agrometeorology in Australia in July 1996.
9. Visit by one BoM officer (Mr. P. Spehr) on management matters, 21-22 September 1995.

Note:

The financial year indicated in the list refers to that of the sending Party.

Attachment D

CATEGORY 'B' ACTIVITIES

1. Joint study on quantitative precipitation forecasting in support to improve flood forecasting.
2. Visit by one Australian scientist to establish trace gases measurement in Bukit Koto Tabang GAW station under twinning basis.
3. Develop of proposal for joint research activities regarding transboundary air pollution problems of smoke and haze (following initial assessment under Category 'A' project 3), 1996/1997.
4. Assist BMG in capacity building in particular the integration of existing and planned systems. (Initial assessment to commence via item 2 Category 'A').
5. Assist BMG in the introduction and use of modern data base technologies for forecasting and climate application purposes.
6. BoM scientist to visit BMG on marine meteorology services, following initial discussion in Melbourne during October 1995 on Marine meteorology course.

SUMMARY REPORT OF
THE SECOND SESSION OF THE JOINT WORKING GROUP
BETWEEN
BADAN METEOROLOGI DAN GEOFISIKA, INDONESIA
AND
THE AUSTRALIAN BUREAU OF METEOROLOGY
ON COOPERATION IN METEOROLOGY

Perth, 13 - 15 March 1997

1. On 1 September 1995, a Memorandum of Understanding (MOU) on cooperation in meteorology was signed between the Australian Bureau of Meteorology (BoM) and the Badan Meteorologi dan Geofisika (BMG), Indonesia. A Joint Working Group (JWG) was established for the coordination and implementation of cooperative activities and other related matters undertaken under the MOU. The first session was held in Jakarta from 31 August to 2 September 1995. This report summaries the outcome of the second session of the JWG held in Perth, Australia, 13 - 15 March 1997.

OPENING OF THE SESSION (Agenda Item 1)

2. Dr D J Gauntlett, Deputy Director (Research and Systems), BoM, opened the Second Session of the JWG at 9.30 AM on behalf of the Australian Co-chairperson, Dr J W Zillman, Director of Meteorology. He extended a warm welcome to Mr Sri Diharto, Director-General of BMG and Co-chairperson from Indonesia, and his delegation. He recalled that Mr Sri Diharto had visited Melbourne Head Office last September, and so Perth had been chosen as the venue for the second session to allow familiarisation with a Bureau Regional Office. He remarked that the timing of the current session was important in view of the active and encouraging cooperation initiatives that were taking place at the government to government level. He stated that BoM would provide help, and share with BMG the significant changes that were taking place in BoM, in technical direction and new initiatives. Mr L Broadbridge, Regional Director, Western Australia Regional Office (WARO), joined Dr Gauntlett in welcoming Mr Sri Diharto and the Indonesian delegation and gave information on the provisional program for the duration of the session.

3. Mr Sri Diharto thanked Dr Gauntlett for the warm reception and for the opportunity to visit the WARO. He observed that there had been very good progress in cooperative activities since the first session, and that most of the Category A activities planned during the first session had been completed. He said that Mr Damsyik, Head of Regional Centre III, Denpasar, and Mr Putu Pudja, Head of Regional Centre V, Jayapura, had been included in the delegation because these regions were adjacent to Australia, and there was need for close cooperation between them and Australian Regional Offices.

4. In accordance with the convention whereby the host country chairs sessions, Dr Gauntlett served as the chairperson on behalf of Dr Zillman on 13 March, and Dr Zillman chaired the rest of the session after his arrival in Perth on the morning of 14 March.

5. A list of participants is at Appendix 1.

ADOPTION OF THE AGENDA (Agenda Item 2)

6. The provisional agenda adopted is at Appendix 2.

OVERVIEW OF RECENT DEVELOPMENTS AND FUTURE PLANS OF BMG AND BOM (Agenda Item 3)

7. Dr Gauntlett provided an overview of BoM organization, its structure and resources and highlighted some of the major technical trends which were shaping the BoM under the technical and resources constraints it was facing. He remarked that a review of the Bureau completed recently had suggested that there was room to lift the revenue being derived from Bureau through cost recovery. He said that cost recovery was causing other problems, in particular it had raised questions regarding the consistency of charging policies with Australian trade practices legislation.

8. Dr Gauntlett stated that the Bureau was facing continued reduction in staff levels, a challenge it was trying to meet with new initiatives to increase productivity, for example through automation of the observational network through robotic devices. An example of this was the development of the autosonde for upper air observations. He stated that the upper air network would be partially automated, beginning with Cocos Island in about six months time. He remarked that while the autosonde would save human resources, it would result in increased cost of consumables. On computing capacity BoM had so far lagged behind other major Meteorological Services e.g. USA, UK, and Canada. However, a recent agreement reached between the Bureau and CSIRO to combine computing resources was expected to lift available computer capacity dramatically, enabling BMRC to run climate simulation and seasonal prediction models more efficiently. Dr Gauntlett gave a brief overview of the Australian Integrated Forecasting System (AIFS) and described some of the ways in which it would enhance forecasting operations. It was a completely integrated facility that would replace the Australian Regional Operations System. It had already been installed in the BoM's Victorian Regional Office, and was being installed at Fiji's Regional Specialized Tropical Cyclone Warning Centre.

9. Mr Sri Diharto elaborated on some of the future plans of BMG. He stated that BMG planned to upgrade all its EEC radars through funding provided under the national budget. He gave high priority to improving BMG's seasonal prediction capability. On numerical weather prediction modelling he said he believed in first building up the technical and scientific expertise of staff gradually through training consolidation and experience building rather than embarking on high technology rapidly. He stated that BMG would work with local institutions such as universities, Institute for National Aeronautics and Aviation (LAPAN), and the Agency for Application and Assessment of Technology (BPPT) and would like to carry out joint research activities with BoM and CSIRO. He remarked that while BMG had no operational numerical models for Indonesia at this stage, it hoped to implement a workstation based model with the help of BoM. BMG gave high priority to the establishment of an Oracle based Relational Data Base Management System (DBMS) using an IBM RISC 6000 computer, and hoped to work closely with BoM in this area. He

attached high importance to the development of improved marine meteorological services in Indonesia because of the many commercial activities in the Timor Gap and the importance of marine forecasts to numerous small vessels operating in Indonesian waters. Mr Sri Dihartha proposed the establishment of a BMG/BoM joint technical committee to oversee all joint technical cooperative activities. Other plans of importance were the upgrading of hardware facilities which had been carried out under FMT-6, improved calibration arrangements for BMG instrumentation, enhanced use of the Internet for operational purposes, and strengthening of BMG Regional Offices, particularly Indonesian Regions III and V, in particular through enhanced cooperation and operational coordination with BoM Regional Offices in Western Australia and Northern Territory, and improved operation of the Global Atmosphere Watch (GAW) station.

REVIEW OF ACTIVITIES SINCE JWG-1 (Agenda Item 4)

10. The activities undertaken since the first session were reviewed.

11. The meeting noted with satisfaction that the majority of the Category A activities agreed at the first session had been completed. It agreed that the program of cooperation since the first session had been highly successful. The range of areas covered was within those agreed at the first session ie, World Weather Watch (WWW) Systems, Meteorological Research, Seasonal/Interannual Forecasting, Meteorological Training, and Transboundary Air Pollution. Details of the objectives and achievements of each of the joint projects are at Appendix 3.

12. The JWG reviewed in detail the uncompleted Category A and Category B activities. Those activities which were no longer applicable were deleted.

FUTURE COOPERATIVE ACTIVITIES (Agenda Item 5)

13. The JWG noted the availability of potential external funding sources to partially support BoM/BMG bilateral activities, such as AusAID (for Government Sector Linkages Program and ACIAR-sponsored projects), BAPPENAS and BPPT (for national development and joint research programs) and WMO (for CLIPS pilot/demonstration projects). It agreed that in the event that such sources are insufficient, the special funding arrangement whereby BoM would cover the per diem expenses of all BMG officers while in Australia on exchange visits under the MOU, would be extended for a further period of two years from 1997 to 1999.

14. The meeting arrived at a list of category A and B activities for future implementation under each of the areas of cooperation, following consideration by each of the meeting of the follow up initiatives to the activities already completed, uncompleted Category A and Category B activities, and a number of new initiatives. Category A and Category B activities agreed for future implementation are summarised in Appendix 4

and Appendix 5 respectively.

WORLD WEATHER WATCH SYSTEMS (Item 5.1)

15. The meeting agreed that the provision of information on volcanic activity by BMG to the Darwin Volcanic Ash Advisory Centre was of vital importance in view of its implications for aviation in particular. It was suggested that exchange of such information and advice through Internet needed to be explored. On data exchange, the meeting was informed that DIFACS was not WMO standard technology, and that BoM might phase it out and switch to TCP/IP in the near future. The meeting agreed that BMG would be provided with DIFACS in the first instance, followed later by a changeover to TCP/IP (Internet). In respect of RAPIC, the meeting was informed that while it was a good tool, exchange of RAPIC data would place a heavy load on telecommunication circuits and cause congestion. Regarding calibration and quality control procedures, further exchange visits by BoM and BMG personnel would be necessary. The following activities were agreed upon:

Category A

- . visit by one BoM scientist to Bukit Koto Tabang GAW Station under twinning basis for 1-2 weeks.
- . weekly messages from BMG/VSI on volcanic eruptions to Darwin VAAC
- . visit by one BoM officer to install DIFACS and introduce TCP/IP for future use, June 1997, for 1-2 weeks
- . visit by one BoM officer on upper air data improvement project.
- . visit by one BMG officer to learn the use of barometer correction software
- . instrument comparison (with regional standard in Melbourne)

Category B

- . visit by a BoM officer to review the BMG EEC radar network and provide advice on upgrading
- . one BoM officer to visit BMG to explore possibilities of introducing the Australian Integrated Forecast System (AIFS)
- . one BoM officer to carry out a technical review of the AWS network
- . provide information on the PC-based satellite data ingest/display system being developed by BoM.

METEOROLOGICAL RESEARCH (Item 5.2)

16. The following activities were agreed upon:

Category A

- . exchange visits on monsoon research
- . one BMG officer to attend BMRC annual workshops
- . visit by one BMG scientist to study and acquire NWP models, 3 months
- . visit by BMG scientist to learn nowcasting techniques

CLIMATE MONITORING AND SEASONAL/INTERANNUAL FORECASTING (Item 5.3)

17. On seasonal/interannual forecasting, the meeting recognized that a number of follow on cooperative initiatives could be undertaken: modernisation of climate data processing, training in the use of statistical packages for quality control, provision of seasonal forecasting technology, information exchange on seasonal forecasting through access to external web pages, participation in the CLIVAR project to gather data on climate extremes (funded by the US National Data Climate Centre). The following activities were agreed upon:

Category A

- . visit by one BoM consultant to investigate the development of a climate database for BMG
- . provide support to ACIAR (Australian Centre for International Agricultural Research) project on the application of seasonal forecasting to agriculture
- . visit by one BoM officer to advise on data rescue (eg electronic data entry, digitizer)

Category B

- . BMG visit by one BMG officer on climate data analysis, diagnostics, quality control and seasonal forecasting
- . BMG contribution to climate reviews

METEOROLOGICAL TRAINING (Item 5.4)

18. It was agreed that there were two avenues available for training. The first would be short term and involve sending BoM instructors to BMG to undertake a feasibility study of WMO Class I level, observer and radio technician training within BMG including the preparation of syllabus, curricula, and training manuals, followed by the training of BMG trainers at the Bureau of Meteorology Training Centre (BMTTC) for about 3 months to prepare training material for use in BMG. The long

term strategy would involve reorganization of BMG training facilities eg new building (now being constructed), new equipment, and the recruitment of degree holders. The following activities were agreed upon:

Category A

- . visit by BoM officers to conduct feasibility studies on curricula, and training facilities for BMG
- . attachment of BMG instructors to BMTC to develop training material
- . two officers from BMG to attend the 1997 marine meteorology training course in Melbourne

Category B

- . guest lecturer from BoM to give lectures at BMG/Indonesian university

19. TRANSBOUNDARY AIR POLLUTION PROBLEMS (Item 5.5)

The following activity was agreed upon:

Category A

- . joint work on the transfer of the BoM dispersion model for use on a BMG workstation (use of GAW station data)

OTHER COOPERATIVE AREAS (Item 5.6)

20. The following activities were identified:

Category A

- . establish a joint Technical Committee (see Terms of Reference in Appendix 6)
- . visit by one BoM officer to explore regional cooperation in
 - marine meteorology
 - tropical cyclones
 - tsunami
 - SEAWATCH buoy data
 - marine/tropical cyclone warning boundaries
- . offshore AWS cooperation

Category B

- . jointly study possibilities for enhanced information exchange through Internet
- . urban flooding

Offshore Automatic Weather Station (AWS) cooperation

21. The meeting noted that the more northern Automatic Weather Stations in the north of Australia installed by BoM had on several occasions been vandalized or units or components had been stolen. The data from these AWS's are vital for monitoring and predicting tropical cyclones. Apart from the loss of data that results from the incidents, the cost of replacement or repairs are very high and pose many logistic difficulties due to the remoteness of the sites. The meeting agreed on the following ways of tackling the problem by : a) putting up a suitably worded BoM/BMG warning board in both English and Bahasa Indonesia; b) publicising the existence of the AWSs through the media, for example by organizing public relations activities in Indonesia on the first installation/major maintenance events, and c) broadcasting the weather reports obtained from the stations. The respective Foreign Affairs authorities would be consulted and details would be agreed through correspondence.

Marine/tropical cyclone warning boundaries

22. The meeting considered current arrangements for the issue of cyclone warnings for the high seas across the boundary between the designated areas of responsibility of Australia and Indonesia. It agreed that arrangements for warnings across boundaries between Indonesian and Australian areas of responsibility were unsatisfactory. The following courses of action were agreed to: a) examine, resolve and formalize with Regional Association V and any other Regional Association concerned, the assignment of warning responsibilities, and arrangements and procedures for the issue of warnings across the warning boundaries between Australia and Indonesia; and b) in the interim and in parallel to resolve the problem through direct telephone contact at the operational level between BMG Forecasting and Services Division and the Perth and Darwin Cyclone Warning Centres.

Coordination

23. The meeting agreed to establish a joint Technical Committee to coordinate the detailed planning and implementation of all technical activities carried out under the MOU. The Terms of Reference of the Committee are given in Appendix 6. The Committee could conduct its business mainly through correspondence but would meet approximately annually. It would report to the JWG.

24. The Technical Committee would replace the existing system of contact points established following JWG-1.

DATE AND VENUE OF THE THIRD SESSION OF THE JOINT WORKING GROUP AND THE FIRST SESSION OF THE TECHNICAL COMMITTEE (Agenda Item 6)

25. It was agreed that the third session of the JWG would be held in Denpasar/Bandung, Indonesia in July 1999.

26. The first Technical Committee session would be held in Darwin. The agenda and the timing of the session would be arranged by correspondence.

ANY OTHER MATTERS (Agenda Item 7)

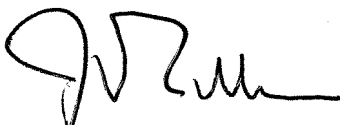

27. No other matters were raised.

ADOPTION OF THE SUMMARY REPORT OF THE SESSION (Agenda Item 8)

28. The JWG adopted the summary report of the second session.

CLOSURE OF THE SESSION (Agenda Item 9)

29. Mr Sri Diharto expressed his thanks and gratitude for the warm hospitality and friendship extended to the Indonesian delegation by Dr Zillman and BoM delegates during the second session. In particular, he thanked Mr L Broadbridge for the excellent arrangements in Perth. Dr Zillman expressed his and BoM's great satisfaction at the close and effective cooperation during and between the two sessions and closed the session at 11.45 AM on 15 March 1997.

	<u>15/3/97.</u>		<u>15/3/97</u>
J W Zillman	Date	Sri Diharto	Date
Co-chairperson from Australia		Co-chairperson from Indonesia	
Australia-Indonesia Joint		Indonesia-Australia Joint	
Working Group on Cooperation		Working Group on Cooperation	
in Meteorology		in Meteorology	

LIST OF PARTICIPANTS at JWG-2

AUSTRALIA:

Dr J W Zillman	Director of Meteorology
Dr D J Gauntlett	Deputy Director (Research and Systems)
Dr M J Manton	Chief, Bureau of Meteorology Research Centre
Dr R R Brook	Assistant Director (Observations and Engineering)
Mr L Broadbridge	Regional Director, Western Australia Regional Office
Dr V K Tsui	Superintendent, International and Public Affairs
Mr W R Kininmonth	Superintendent, National Climate Centre
Mr R Krishna	Supervisor, International and Public Affairs

INDONESIA:

Mr Sri Diharto	Director-General, Badan Meteorologi dan Geofisika (BMG)
Dr Gunawan Ibrahim	Secretary of BMG
Dr P A Winarso	Chief of Forecast and Services Division
Mr Damsyik	Head of Regional Centre III, Denpasar
Mr Putu Pudja	Head of Regional Centre V, Jayapura
Ms Rosliany	Chief of Legal Matters and Technical Cooperation Section

Indonesia-Australia Joint Working Group
Second Session, Australia, 1997

AGENDA

1. Opening of the session
2. Adoption of the agenda
3. Overview of recent developments and future plans of BMG and BoM
4. Review of activities since JWG-1
5. Future cooperative activities:
 - 5.1 World Weather Watch Systems
 - 5.2 Meteorological research
 - 5.3 Climate monitoring and seasonal/interannual forecasting
 - 5.4 Meteorological training
 - 5.5 Transboundary air pollution problems
 - 5.6 Other cooperative areas
6. Dates and venue of the third session
7. Any other matters
8. Adoption of the summary report of the session
9. Closure of the session

REVIEW OF ACTIVITIES SINCE JWG-1

Attachment C of the summary report of the first session of the Joint Working Group provided a list of the agreed activities to be undertaken after JWG-1. The status of these activities is as follows:

CATEGORY A

1 Visit by Dr Winarso to attend the workshop on volcanic ash detection and to assess the potential of greater use of Darwin RSMC products by BMG, one week in September 1995.

Achievements: Dr P Winarso visited Darwin during 17-23 September 1995. He attended the Asia/Pacific Regional Aviation Workshop on Volcanic Ash 18-21 September, and visited Darwin RSMC and the Volcanic Ash Advisory Centre (VAAC) on 22 September. Arrangements made for improved access to Darwin products included:

- a) weekly Tropical Climate Note to be faxed to BMG each week
- b) additional products placed on the Darwin Metfax for polling by BMG
- c) gale/storm warnings affecting Indonesian waters to be sent by fax as well as GTS.

A number of suggestions were made to BMG to improve cooperation on volcanic ash detection and warning service.

2 Visit by one BoM officer to explore opportunity for cooperation in training in BMG, one week in 1996/97.

Achievements: Mr John Mottram visited BMG on 8-12 September 1996 to discuss training issues including a visit to the BPLMG (Education and Training Agency of the Department of Communications). Subsequently, Mr Herujono made a reciprocal visit to the Bureau of Meteorology Training Centre on 26-27 September 1996.

3 Visit by one BMG officer to BoM to assess availability and exchange of data and products from RSMC and WMC Melbourne, 1-2 weeks in 1995-96.

Achievements: Mr Rameyo Adi visited BoM on 9-13 September 1996. He held discussions with BoM staff in the National Meteorological Centre, Communications Section, Regional Computing Section, National Climate Centre and the Bureau of Meteorology Research Centre.

4 Visit by one BoM officer to explore the opportunity of optimizing the utilization of the existing GTS link, one week in 1996/97.

Achievements: Mr Mike Hassett will visit BMG in May 1997.

5 Exchange of scientist to formulate joint activities for seasonal/interannual forecasting.

Achievements: Mr W R Kininmonth visited BMG on 6-8 December 1995 in conjunction with a WMO CLIPS mission, but managed to conduct some bilateral discussions with BMG while in Jakarta. A reciprocal visit by Mr Endro Santoso to BoM's National Climate Centre and Bureau of Meteorology Research Centre took place subsequently on 9-13 September 1996.

6 Visit by one BoM officer to advise on installation of GAW instrumentation, 1-2 weeks in 1995/96.

Achievements: This activity did not proceed, pending further detailed technical consultation between Mr Hery Harjanto of BMG and Mr P Price of BoM.

7 Ongoing exchange visits by BoM and BMG officers to advise on calibration and quality control procedures for both surface and upper-air observations, first visit of 1-2 weeks duration in 1995/96.

Achievements: Dr Jane Warne visited BMG on 12-23 November 1995 and delivered a number of lectures on calibration and quality control procedures. Mr Akhmad Sasmita subsequently made a reciprocal visit on 9-13 September 1996 and held discussions with BoM staff mainly in the Observations and Engineering Branch. Inter alia, a list of agreed actions on upper-air data quality improvement was drawn up.

8 Visit by one BMG officer to participate in conference on agrometeorology in Australia in July 1996.

Achievements: This Conference held in the University of Queensland was postponed to 1-4 October 1996 and Mr Dodo Gunawan of BMG attended during his visit to Brisbane on 29 September - 4 October 1996. He made a poster presentation during the Conference, and also visited BoM's Queensland Regional Office.

9 Visit by one BoM officer on management matters, 21-22 September 1995.

Achievements: Mr P Spehr visited BMG on 21-22 September 1995.

NON-CATEGORISED ACTIVITIES

a) Dr R Brook of BoM visited BMG in November 1995 in conjunction with an AusAID mission to review the FMT-6 project.

b) Mr Sri Diharto, Director-General of BMG, led an Indonesian delegation to visit BoM during 23-25 September 1996. Accompanying him were Messrs Sawito, Wasito and Sutrisno of BMG and later Herujono of the Department of Communications.

Appendix 4

SUMMARY LIST OF CATEGORY 'A' ACTIVITIES

- . visit by one BoM scientist to Bukit Koto Tabang GAW Station under twinning basis for 1-2 weeks.
- . weekly messages from BMG/VSI on volcanic eruptions to Darwin VAAC
- . visit by one BoM officer to install DIFACS and introduce TCIP/IP for future use, June 1997, for 1-2 weeks
- . visit by one BoM officer on upper air data improvement project.
- . visit by one BMG officer to learn the use of barometer correction software
- . instrument comparison (with regional standard in Melbourne)
- . exchange visits on monsoon research
- . one BMG officer to attend BMRC annual workshops
- . visit by one BMG scientist to study and acquire NWP models, 3 months
- . visit by BMG scientist to learn nowcasting techniques
- . visit by one BoM consultant to investigate the development of a climate database for BMG
- . provide support to ACIAR (Australian Committee for International Agricultural Research) project on the application of seasonal forecasting to agriculture
- . visit by one BoM officer to advise on data rescue (eg electronic data entry, digitizer)
- . visit by BoM officers to conduct feasibility studies on curricula, and training facilities for BMG
- . attachment of BMG instructors to BMTTC to develop training material
- . two officers from BMG to attend the 1997 marine meteorology training course in Melbourne
- . joint work on the transfer of the BoM dispersion model for use on a BMG workstation (use of GAW station data)
- . establish a joint Technical Committee (see Terms of reference in Appendix 6)
- . visit by one BoM officer to explore regional cooperation in

- marine meteorology
- tropical cyclones
- tsunami
- SEAWATCH buoy data
- marine/tropical cyclone warning boundaries

. offshore AWS cooperation

Note:

The financial year indicated in the list refers to that of the sending party.

SUMMARY LIST OF CATEGORY 'B' ACTIVITIES

- . visit by a BoM officer to review the BMG EEC radar network and provide advice on upgrading
- . one BoM officer to visit BMG to explore possibilities of introducing the Australian Integrated Forecast System (AIFS)
- . one BoM officer to carry out a technical review of the AWS network
- . provide information on the PC-based satellite data ingest/display system being developed by BoM.
- . visit by one BMG officer on climate data analysis, diagnostics, quality control and seasonal forecasting
- . BMG contribution to climate reviews
- . guest lecturer from BoM to give lectures at BMG/Indonesian university
- . jointly study possibilities for enhanced information exchange through Internet
- . urban flooding

JWG Technical Committee

Terms of Reference

- 1) To coordinate all technical aspects of cooperative activities agreed by the JWG;
- 2) To consider individual project proposals approved in principle by the JWG, and recommend detailed implementation plans within the resources allocated;
- 3) To coordinate any necessary follow up action to implement the activities;
- 4) To evaluate the performance of each cooperative activity and submit a report to the JWG.

**SUMMARY REPORT OF
THE THIRD SESSION OF THE JOINT WORKING GROUP
BETWEEN
BADAN METEOROLOGI DAN GEOFISIKA, INDONESIA
AND
THE AUSTRALIAN BUREAU OF METEOROLOGY
ON COOPERATION IN METEOROLOGY**

Jakarta, 11-13 July 1999

INTRODUCTION

1. A Memorandum of Understanding (MOU) on cooperation in meteorology was signed between the Australian Bureau of Meteorology (BoM) and the Badan Meteorologi dan Geofisika (BMG), Indonesia in September 1995. A Joint Working Group (JWG) was established for the coordination and implementation of cooperative activities and other related matters undertaken under the MOU. This report summarises the outcome of the third session of the JWG held in Jakarta, 11-13 July 1999.

OPENING OF THE SESSION (Agenda Item 1)

2. Mr R Sri Diharjo, Director-General of BMG and co-chairman from Indonesia, opened the session on 11 July 1999 in the Head Office of BMG. He extended a warm welcome to Dr J W Zillman, Director of Meteorology, BoM and co-chairman from Australia, and his delegation.

3. Dr Zillman noted with pleasure that cooperation between BMG and BoM has strengthened since the last meeting of the JWG-2 in 1997. He also noted that both organizations had had difficulties with their budgets, but nevertheless they have continued to meet the needs of their users. He expressed particular delight at the success of the meeting of RA-V held last year in Bali and the election of Mr Sri Diharjo as the Association's Vice President. It has been a great pleasure to work with Mr Sri Diharjo in many activities and many locations including Indonesia, Australia, Europe and the Pacific. Dr Zillman felt that the largest challenges facing National Meteorological Services follow from the globalised economies. He strongly feels that the NWSs must continue to cooperate between nations because meteorology is a truly international activity that is absolutely dependent on this cooperation. Their futures are also absolutely dependent on free exchange of data and information. Dr Zillman stated that the members of working group were in tight trip schedule after some travelling abroad. He introduced the Australian delegation members. They are Dr. R. R. Brook, Assistant Director (Observations and Engineering) and Mr. R. B. Wright, Manager of Special Services Unit.

4. A list of the participants is at Attachment A.

ADOPTION OF THE AGENDA (Agenda Item 2)

5. The agenda, as shown in Attachment B, was adopted.

OVERVIEW OF RECENT DEVELOPMENTS AND FUTURE PLANS OF BMG AND BoM (Agenda Item 3)

6. Mr Sri Diharto stated that the meeting is to review activities taken in the last two years after the JWG-2 meeting in Perth. Many things had been done during this period.

REVIEW OF ACTIVITIES SINCE JWG-2 (Agenda Item 4)

7. The JWG-3 made a review of the past activities since JWG-2 held in Perth in March 1997. It was noted that although a few of the Category A activities had not, for various reasons, been implemented, twelve Category A, one Category B and six other urgent activities were successfully completed. A summary is given in Attachment C.

8. The JWG then established a list of future cooperative activities for the next few years. A summary is at Attachment D. Details were as follows:

FUTURE COOPERATIVE ACTIVITIES (Agenda Item 5)

World Weather Watch Systems (Agenda Item 5.1)

9. The two agencies agreed to cooperate in refurbishing and maintaining the weather watch radar at Kupang. A working agreement was reached and a copy of the agreement, which was signed by Mr Sri Diharto and Dr Zillman, in the presence of Minister of Communications is attached.

10. Computer Message Switching System: In principal, BMG agreed with the proposal from BoM for a collaborative project. However, the implementation of the program will depend on progress on some budgetary and administration procedures. As part of the projects, if it proceeds, BMG staff will have on the job training in BMG during installation.

11. Tropical cyclone warnings: The JWG recalled that at the session of WMO RA V-XII in September 1998 agreed that Australia would assume interim responsibility for tropical cyclone warnings around Indonesia until such time as the BMG operational staff had received sufficient training to provide the tropical cyclone warning service. It noted that two BMG forecasters had benefited from a tropical cyclone training course in Melbourne in 1998 (with one supported by WMO and the other by BoM) and that a copy of the Australian Tropical Cyclone Workstation software on CD-ROM had been provided to BMG for their operational use. The meeting agreed that some more BMG tropical cyclone forecasters should be trained in Australia during the next WMO tropical cyclone course in 2000.

12. BMG operates a network of 12 radio theodolite type upper air systems. WMO monitoring of the data from these has raised some technical questions. Although the BoM

does not operate such systems, it was agreed that a radiosonde expert would visit BMG to assist in examining the situation.

13. BMG is interested in the possibility of implementing AMDAR to supplement its upper air observations. As the BoM has considerable experience in this it will provide assistance to BMG including facilitating contacts with experts.

14. It was noted that the TLAPS products were of interest to BMG. The BoM agreed to arrange for TLAPS data in GRIB format to be sent to BMG.

15. BMG and BoM will arrange for the exchange of non-RSBN observations to assist with analysis and prediction. The list of stations for exchange and the method of exchange will be agreed by correspondence. This list will be open to review at any time.

16. BMG and the Bureau agreed to cooperate on the specification of a system for BMG to receive full resolution MTSAT imagery.

17. BMG recognises the importance of instrument calibration and is in the process of establishing an instrument calibration facility. As the BoM operates a RA V Instrument Center and has expertise in this area it was agreed that the BoM would make available one of its scientists to give advice to BMG on instrument standards and calibration.

18. It was noted that the information on volcanic activity in Indonesia was of value to the Darwin VAAC. It was agreed that BMG would arrange for weekly summaries of volcanic activity to be passed to the Darwin VAAC in the appropriate code format.

19. The following Category A activities were agreed:

Radar: agreed on implementation of joint operation of Kupang radar.

Computer Message Switching System: agreed on arrangement of the implementation of CMSS.

1-2 BMG tropical cyclone forecasters to participate in the 2000 Tropical Cyclone Course in Australia.

Visit by one BMG officer to learn on instrument calibration and visit by one BoM officer to supervise on instrument calibration.

Weekly messages from BMG on volcanic activities to Darwin VAAC

Visit by one BoM officer on upper air data improvement.

Joint Research on Climate and Seasonal Forecasting (Agenda Item 5.2)

20. The JWG agreed on the following Category A activities:

Exchange visit by NCC scientists and BMG scientists to conduct research on climate/seasonal forecasting.

To continue joint research on meteorological field monsoon research.

One BMG officer to attend BMRC annual workshops.
Visit of four BMG scientists to continue studying modeling (TLAPS).

Climate Monitoring and Seasonal/ Interannual Forecasting (Agenda Item 5.3)

21. The following Category B activities were agreed:

Visit by one BoM consultant to investigate the development of a climate database management system for BMG.

Visit of BoM expert for data rescue.

Meteorological training (Agenda Item 5.4)

22. The JWG recalled that Mr J Mottram conducted a feasibility study in 1997-98 for the upgrade of Indonesian meteorological training under AusAID's Government Sector Linkages Program (GSLP). A copy of the 30 recommendations is at Attachment E. Mr Sri Diharto said that some recommendations have been able to be done. However, some recommendations that deal with financial problems will be discussed with related agencies/ departments. The recommendations are under active consideration. He is still considering having guest lecturers from BoM / Universities to give lecturers at BMG/ Indonesian Universities.

23. The following category A activities were agreed:

One BMG officer to learn satellite interpretation and radar imagery (RAPIC system)

One BMG officer to visit BoM for marine meteorology training

Transboundary air pollution problems (Agenda Item 5.5)

24. Mr Sri Diharto thanked BoM for allowing BMG to access, as a Registered User of BoM's Internet Homepage, the special smoke haze trajectory forecasts over Indonesia since 1997.

25. The following activities were agreed:

Category A

Visit by Dr N Tindale to Bukit Koto Tabang GAW Station for 1-2 weeks to advise on the scientific program

Visit by one BMG scientist to BoM to learn on trajectory modeling/ smoke dispersion.

Invitation for one BMG officer to attend the next BoM Fire Weather Conference.

Invitation to BMG to send a scientist to attend annual GAW meeting in Australia

Category B

Joint work on the transfer of BoM's trajectory and dispersion model for use on a BMG workstation

Other cooperative areas (Agenda Item 5.6)

26. The JWG agreed that in the light of prevailing economic conditions, the work of the joint Technical Committee would continue through correspondence, fax or email. Technical Committee meeting in Darwin will be held ASAP.

Exchange visits of BoM and BMG experts on library matters.

One BoM officer to visit a tsunami observing station in Tretes.

SEAWATCH buoy data to be sent through TCP/IP.

BoM and BMG to cooperate on transmission of SADIS through DIFACS

27. The BMG and BoM agreed to cooperate in development of the BMG library. The following activities were agreed:

Category A:

Visit of a BMG librarian to BoM.

Visit of a BoM librarian to BMG.

28. The BoM agreed to provide BMG with documents on its approaches to charging policies.

DATE AND VENUE OF THE FOURTH SESSION (Agenda Item 6)

29. It was agreed that JWG-4 would be held in Australia in 2001. Details would be determined by correspondence.

ANY OTHER MATTERS (Agenda Item 7)

30. It was agreed that the funding arrangement whereby BoM would cover the per diem expenses of BMG officers while in Australia on exchange visits under the MOU would be extended until JWG-4. Discussion on cost sharing will be carried out by Dr. Ven Tsui and Ms. Rosliany.

ADOPTION OF THE SUMMARY REPORT OF THE SESSION (Agenda Item 8)

31. The JWG adopted the summary report of JWG-3.

CLOSURE OF THE SESSION (Agenda Item 9)

32. Dr Zillman expressed his thanks and gratitude to Mr Sri Dihartha for the warm hospitality and friendship extended to the BoM delegation during the session. The JWG-3 closed on 13 July 1999.

A handwritten signature in black ink, appearing to be 'Sri Dihartha', written in a cursive style.

(SRI DIHARTO)
CO-CHAIRMAN FROM BMG

A handwritten signature in black ink, appearing to be 'J W Zillman', written in a cursive style.

(J W ZILLMAN)
CO-CHAIRMAN FROM BoM

LIST OF PARTICIPANTS AT JWG-3

Australia

Dr J W Zillman	Director of Meteorology, BoM
Dr R.R. Brook	Assistant Director (Observations and Engineering), BoM
Mr R.B. Wright	Manager, Special Services Unit, BoM

Indonesia

Mr. R Sri Diharto	Director-General, BMG
Dr. Gunawan Ibrahim	Secretary of BMG
Mr. Sawito Kusnohadi	Director of Processing and Analysis
Mr. J. Sutijanto	Director of Center for Operation Management
Mr. Hery Harjanto	Chief of Analysis Division
Dr. P.A. Winarso	Chief of Forecast and Service Division
Dr. P.J. Prih Harjadi	Chief of Processing Division
Mr. T. Mulyana	Chief of Meteorological Division
Mr. Suroso Hadijanto	Chief of Climatological Division
Mrs. Juana Rimba	Chief of Telecommunication and Instrumentation Division
Mr. Wasito Hadi	Chief of Planning Division
Mr. Djelantik Purwanto	Chief of Personnel Division
Mr. Ibnu Purwana	Chief of Geophysical Division
Mr. Heruyono	Chief of Training Division
Mrs. Widiastuty	Chief of Agrometeorology Sub Division
Ms. Nuraini	Chief of Aerology Sub Division
Mr. Erland D. Azis	Chief of Instrumentation Sub Division
Ms. Rosliany	Chief of Legal Matters and Co-operation Section
Ms. Nurhayati	Minute Writer of the Meeting
Mr. R. Mulyono R. Prabowo	Minute Writer of the Meeting
Mr. Tri Samyo R	Minute Writer of the Meeting

AGENDA

1. Opening of the session
2. Adoption of the Agenda
3. Overview of recent developments and future plans of BMG and BoM
4. Review of activities since JWG-2
5. Future cooperative activities:
 - 5.1 World Weather Watch Systems
 - 5.2 Joint Research on Climate and Seasonal Forecasting
 - 5.3 Climate Monitoring and Seasonal/Interannual Forecasting
 - 5.4 Meteorological training
 - 5.5 Transboundary air pollution problems
 - 5.6 Other cooperative areas
6. Date and venue of the fourth session
7. Any other matters
8. Adoption of the summary report of the session
9. Closure of the session

REVIEW OF ACTIVITIES SINCE JWG-2

Appendix 4 of the summary report of the second session of the Joint Working Group provided a list of the agreed activities to be undertaken after JWG-2. The status of these activities is as follows:

Category A

1) Visit by one BoM scientist to Bukit Koto Tabang GAW Station under twinning basis for 1-2 weeks.

Achievements: Dr Neil Tindale, new Officer-in-charge of the Cape Grim Baseline Air Pollution Station, had been nominated as the scientist to visit Bukit Koto Tabang GAW Station. However, his visit was postponed because of the Indonesian presidential election in June 1999.

2) Weekly messages from BMG/VSI on volcanic eruptions to Darwin VAAC

Achievements: BoM provided a copy of the latest ICAO operational procedures on International Airways Volcano Watch to Mr T Mulyono in February 1999, to enable him to prepare for the collection of weekly volcanic data in Indonesia for transmission to Darwin VAAC. Unfortunately, the weekly messages had not yet begun by the time of JWG-3.

3) Visit by one BoM officer to install DIFACS and introduce TCP/IP for future use, June 1997, for 1-2 weeks

Achievements: Mr M Hassett of BoM visited Jakarta from 8 to 13 June 1997. During his visit, he installed the DIFACS and discussed various communications issues including the changeover to a digital line for the GTS circuit between Jakarta and Melbourne and the future use of TCP/IP. In response to Dr Zillman's question about the disturbance of the received difacs picture in Denpasar, Mr Sawito explained that it was caused by the low speed of the telephone line transmission.

4) Visit by one BoM officer on upper air data improvement project

Achievements: Not implemented, because the designated Australian expert (Mr J Stickland) had left BoM for employment overseas. BMG operates 11 upper air observing stations, 8 stations are of analog type and 3 stations are of digital type.

5) Visit by one BMG officer to learn the use of barometer correction software

Achievements: Not yet implemented.

6) Instrument comparison (with regional standard in Melbourne)

Achievements: Not yet implemented.

7) Exchange visits on monsoon research

Achievements: Dr J McBride from the Bureau of Meteorology Research Centre (BMRC) visited Jakarta and Ujung Padang during 6-28 November 1997. While in Indonesia, he participated in an International Conference on Science and Technology for the Assessment of Global Environment Change and its Impact on Indonesian Maritime Continent, Jakarta, 10-12 November and collected climatological data (especially rainfall) for monsoon research. Reciprocal visits were made in April to May 1998 by Mr Dodo Gunawan and Mr Sutanto of BMG to conduct joint research in El Nino in the BMRC using the data collected by Dr McBride. All these exchanges were funded by AusAID under the Government Sector Linkages Program (GSLP).

8) One BMG officer to attend BMRC annual workshops

Achievements: Mr Syamsul Huda of BMG participated in the 1997 BMRC workshop (on the theme of nowcasting) in Melbourne from 8 to 10 October 1997.

9) Visit by one BMG scientist to study and acquire NWP models, 3 months

Achievements: Mr Mulyono Rahadi Prabowo and Hadi Widiatmoko visited Darwin and Melbourne from 7 April to 4 June 1999 to study NWP (particularly TLAPS) in RSMC Darwin and BMRC respectively.

10) Visit by BMG scientist to learn nowcasting techniques

Achievements: Mr Syamsul Huda visited the various Bureau forecasting and research facilities related to nowcasting operations and techniques during 6-7 October 1997 prior to his participation in the BMRC annual workshop (see activity No. 8).

11) Visit by one BoM consultant to investigate the development of a climate database for BMG

Achievements: Not yet implemented.

12) Provide support to ACIAR project on the application of seasonal forecasting to agriculture

Achievements: BMRC had been in contact with ACIAR and provided policy support to the ACIAR project on the application of seasonal forecasting to agriculture in Indonesia. It is necessary for BMG to have a standard method/ procedure in seasonal forecasting for agriculture in Indonesia.

13) Visit by one BoM officer to advise on data rescue (e.g. electronic data entry, digitizer)

Achievements: Not implemented, in order to avoid duplication with a recent KNMI-sponsored project on data rescue for BMG. BMG has cooperated with IPTN (Nasional Aircraft Industry) in developing the database for meteorology and geophysics.

14) Visit by BoM officers to conduct feasibility studies on curricula and training facilities for BMG

Achievements: Mr J Mottram, consultant appointed by the Bureau, visited Jakarta from 15 to 23 October 1997 to review the training and education infrastructure in BMG. Mr M Williams then conducted a study on Class 1 training in Jakarta and Bandung from 8 to 12 December, followed by a visit by Mr P Froude from 24 February to 7 March 1998 on technician training and by Mr D Morrison from 1 to 12 March on observer training. Mr Mottram made a final wrap-up visit to Jakarta from 13 to 18 April 1998 and submitted a consultancy report in May 1998. All these exchanges were funded by AusAID under the GSLP.

15) Attachment of BMG instructors to BMTC to develop training material

Achievements: The following BMG officers visited the Bureau from April to June 1998: Mr Achmad Zakir on interpretation and application of weather radar, Mr Damianus Tri Harjanto on instrumentation, telecommunication and computer facilities and Mr R Mulyono Rahadi Prabowo on training areas of meteorology. All these exchanges were funded by AusAID under the GSLP.

Training on weather radar needs to be continued with radar image interpretation to improve the prediction capability by using RAPIC system.

Mr Haryadi asked the possibility of obtaining unused BoM's instruments to be utilized as practical training facilities at BPLMG.

16) Two officers from BMG to attend the 1997 marine meteorology training course in Melbourne

Achievements: Mr Triadi Karpo and Mrs Fransina Ireuwuw participated in a Marine Meteorology Training Course in Melbourne from 29 September to 10 October 1997.

Marine meteorology is very important for Indonesia. However, there are no such stations operated by BMG. The ones that are operated are synoptic stations located near by coastline.

17) Joint work on the transfer of the BoM dispersion model for use on a BMG workstation (use of GAW station data)

Achievements: Not yet implemented.

18) Establish a joint Technical Committee

Achievements: Although the joint Technical Committee was established shortly after JWG-2, no meeting had been convened because of the economic downturn in Indonesia.

Mr Sri Diharto proposed to conduct a joint technical meeting in Darwin within the 1999/2000 fiscal year.

19) Visit by one BoM officer to explore regional cooperation in

- marine meteorology
- tropical cyclones
- tsunami
- SEAWATCH buoy data
- marine/tropical cyclone warning boundaries

Achievements: Mr L Broadbridge visited both Jakarta and Denpasar from 9 to 16 February 1998. He visited the BMG Headquarters, Regional Centre II, Jakarta Airport Forecasting Office and

Regional Centre III. One significant achievement was the presentation of a draft RA V paper to Mr Sri Diharto on marine tropical cyclone warnings for sea areas around Indonesia. Mr Sri Diharto invited BoM staff to visit a tsunami observing station in Tretes, East Java. The Department of Mining and Energy of Indonesia will be contacted to obtain the buoy data. Marine/ tropical cyclone warning boundary has been discussed in Tropical Cyclone Committee meeting in Denpasar in September 1998.

20) Offshore AWS cooperation

Achievements: After a period of consultations involving also the Ministries of Foreign Affairs, the wordings (in English and Bahasa Indonesia) for warning signboards on Australian offshore islands with automatic weather stations for fishermen were agreed to by both sides in early September 1997.

Dr Zillman considers to reactivate the offshore AWS cooperation.

Category B

1) Visit by a BoM officer to review the BMG EEC radar network and provide advice on upgrading

Achievements: This was upgraded to Category A in May 1997 when two BoM officers Messrs A West and H Edwards visited Indonesia to review the BMG radar network. Subsequent visits to BMG radar facilities were also made.

NON-CATEGORISED ACTIVITIES

1) Senator Ian Macdonald, Parliamentary Secretary to the Australian Minister for the Environment with responsibility for the Bureau of Meteorology, visited BMG on 18 November 1997.

2) Following RA V-XII, Mr Rameyo Adi of BMG was sponsored by BoM to attend a WMO Tropical Cyclone Course in Melbourne from 12 to 30 October 1998. Later on in January 1999, BoM provided a copy of the Australian Tropical Cyclone Workstation software on CD-ROM to Mr Adi for operational use in Indonesia..

3) Mr Sri Diharto, accompanied by Mr Khalif Atma, visited BoM on 21-22 December 1998. Topics of discussions included Radar, Weather/climate modeling, Operational climate matters, Global Telecommunication System and BMG's latest soft loan proposal.

4) Mr Sawito Kusnohadi visited Melbourne from 9 to 13 February 1999, in order to select a successful tenderer for upgrading the GTS circuit between Melbourne, Jakarta and Singapore.

5) Mr M Hassett, C Sanders and I Senior of BoM visited BMG from 9 to 15 May 1999, in order to make a scoping study on a replacement Computer Message Switching System for BMG.

6) Mr Budi Suhardi and Uly Nasrullah of BMG visited the Cape Grim Baseline Air Pollution Station for a week in May 1999 and the BoM Head Office in Melbourne on 2 June 1999.

SUMMARY LIST OF FUTURE ACTIVITIES

Category A

1. Agreed on implementation of joint operation of Kupang radar.
2. Agreed on arrangement of the implementation of CMSS.
3. One or two BMG tropical cyclone forecasters to participate in the 2000 Tropical Cyclone Course in Australia.
4. Visit by one BMG officer to explore development in instrument calibration and visit by one BoM officer to supervise on instrument calibration.
5. Weekly messages from BMG on volcanic activities to Darwin VAAC.
6. Visit of two weeks by one BoM officer to assist BMG with upper air data systems quality procedures.
7. Exchange visit by NCC scientists and BMG scientists to conduct research on climate / seasonal forecasting.
8. To continue joint research on meteorological field monsoon research.
9. One BMG officer to attend BMRC annual workshops.
10. Visit of four BMG scientists to continue studying modeling (TLAPS).
11. One BMG officer to learn satellite interpretation and radar imagery (RAPIC system).
12. One BMG officer to visit BoM for marine meteorology training.
13. Visit by Dr. N. Tindale to Bukit Koto Tabang GAW Station for 1-2 weeks to advise on the scientific program.
14. Visit by one BMG scientist to BoM to study latest technology on trajectory modeling / smoke dispersion.
15. Invitation for one BMG officer to attend the next BoM Fire Weather Conference.
16. Invitation to BMG to send a scientist to attend annual GAW meeting in Australia.
17. Technical Committee meeting in Darwin will be held ASAP.

18. Exchange visit by BMG librarian to BoM followed by visit by BoM librarian to improve library services.
19. One BoM officer to visit the tsunami observing station in Tretes.
20. BMG to investigate the possibility of SEAWATCH buoy data to be sent to BoM through TCP/IP.
21. BoM and BMG to collaborate on transmission of SADIS through DIFACS.

Category B

1. Visit by one BoM consultant to investigate the development of a climate database management system for BMG.
2. Visit of BoM expert for data rescue.
3. Joint work on the transfer on BoM's trajectory and dispersion model for use on a BMG workstation.

**OUTCOMES OF THE FEASIBILITY STUDY FOR THE UPGRADE OF
INDONESIAN METEOROLOGICAL TRAINING IN CO-OPERATION WITH THE
AUSTRALIAN BUREAU OF METEOROLOGY**

- CONSOLIDATED RECOMMENDATIONS -

NOTE: A number of the recommendations require some form of agreement between the Australian Bureau of Meteorology and the BMG for their full implementation. These generally have resources implications for the Australian side. They may also require funds to be found from external sources. Such recommendations are marked with an **asterisk (*)**.

A. FINDINGS AND RECOMMENDATIONS OF A GENERAL NATURE

Recommendation A1

To enable the BPLMG to effectively train staff to the standard required by the BMG, completely new facilities (building and equipment) are urgently required. Australian expertise should be sought from the BMTC early in the design stage.

Recommendation A2

The BPLMG should acquire a number of personal computers, preferably under a maintenance contract, for the purpose of developing training notes, syllabus and curriculum documents and for lecturers to develop computer skills so that more computer aided learning material can be introduced into existing courses. INTERNET access should also be obtained as soon as possible.

Recommendation A3

The Director-General of the BMG should take steps to implement closer organisational ties between the BMG and the BPLMG with the aim of improving communication links and ensuring that the BPLMG's training objectives are closely aligned to the BMG's priorities.

Recommendation A4

The proportion of Instructors in the BPLMG with relevant operational meteorological experience needs to be urgently increased and the organisational structure of the BPLMG should be examined at an appropriate time in the future with a view to making it less internally focussed and more outcomes oriented.

Recommendation A5

Ways of recruiting staff into the BMG that better utilise some of the strengths of the Indonesian education system should be investigated. A subsequent review of the BPLMG's training syllabi should be carried out in the light of any changes in recruitment practices.

B. FINDINGS AND RECOMMENDATIONS IN RELATION TO THE TRAINING OF METEOROLOGISTS

Recommendation B1

Multiple PC RAPIC and DIFACS systems should be installed in the BPLMG as soon as possible. A minimum of two PC RAPICS and DIFACS systems need to be installed before training of BPLMG staff commences. Consideration should be given to installing a number of multimedia PCs that are capable of supporting PC RAPIC, DIFACS, and COMET training modules.

Recommendation B2 (*)

Copies of PC RAPIC data sets, which are case studies of tropical cyclones and thunderstorms, should be sent to the BPLMG along with exercises currently available in the BMTC. Copies of notes on the theory of radar currently available in the BMTC should also be sent to the BPLMG with copies of the notes "Radar Observations of Tropical Cyclones" by Phillip J Meighan.

Recommendation B3 (*)

Stand-alone notes on the interpretation of radar in general, which would be suitable for use in the BPLMG, should be developed by the BMTC. (This would take about 8 person weeks.) These notes should then be sent to the BPLMG.

Recommendation B4 (*)

Consideration should be given to the BPLMG and BMG acquiring the COMET training modules. For example, the module "Anticipating Convective Storm Structure and Evolution" provides excellent training on understanding and forecasting convective weather systems. The BMTC could provide guidance and assistance for their acquisition.

Recommendation B5 (*)

Copies of the "Workbook on Tropical Clouds and Cloud Systems" by Vernon F. Dvorak and Frank Smigielsky, under NOAA/NESDIS/NWS contract, should be supplied to the BPLMG.

Recommendation B6 (*)

Some notes on the basic interpretation of tropical NWP products in the Indonesian region, which are available on DIFACS, should be developed in the Australian Bureau (this would take about 8 person weeks) and be provided to the BPLMG. They need to address the following topics:

- an overview of the analysis component of the tropical NWP system, including how conventional observations, satellite data and aircraft observations are assimilated into the analysis,***
- an overview of the prognosis component of the tropical NWP system, including the limitations on forecasts brought about by model resolution, the need for parameterisations of many of the physical processes and the requirement for the winds to be consistent with deep tropical convection,***
- guidance on how to realistically interpret a number of diagnostics available including vertical motion, relative humidity, rainfall, Total Totals, relative vorticity, 24 hour wind change charts and wind shear charts, and guidance on how to efficiently utilise conventional analyses, satellite and radar imagery together with the tropical NWP system to produce the best quality forecasts possible.***

Recommendation B7 (*)

An Australian expert in radar imagery interpretation and tropical satellite picture interpretation should make a visit to the BPLMG for a period of 4 weeks to provide instruction in radar and tropical satellite picture interpretation. This should be done only after the appropriate equipment is installed in the BPLMG. This person should also provide assistance to BPLMG staff in upgrading the syllabi and curricula for their courses especially to ensure that there is a practical emphasis based on the operational forecasting requirements of the BMG.

Recommendation B8 (*)

An Australian expert in the use and interpretation of NWP products at low latitudes should visit the BPLMG and the BMG to provide instruction for the teaching staff. The visit should be for about 3 to 4 weeks duration.

Recommendation B9 (*)

At least one Instructor from the BPLMG should join the Meteorologist Course for "The Regional Scale" module that includes instruction in tropical meteorology and satellite imagery interpretation. One Instructor from the BPLMG should join the Meteorologist course for "The Smaller Scale" module that includes instruction in PC RAPIC and radar imagery interpretation. One Instructor from the BPLMG should join the "Advanced Meteorology" module that includes NWP interpretation.

Recommendation B10 (*)

A set of notes on seasonal forecasting methods appropriate for Indonesia should be developed using Australian expertise. (This would take about 8 weeks of work by one person.) These notes should include:

- ***instruction on the current state of knowledge of the ENSO phenomenon,***
- ***instruction on how to interpret the Climate Monitoring Bulletin Australia and the Seasonal Climate Outlook, both issued by the National Climate Centre Australia, and the Darwin Tropical Diagnostic Statement issued by the Northern Territory Regional Office of the Bureau of Meteorology,***
- ***information on known correlations between ENSO and rainfall and temperature over Indonesia, and methods of presenting forecasts in probabilistic terminology, and***
- ***information on relationships between climate and the SST over the Indian Ocean, and***
- ***charts of the mean circulation over Indonesia and likely changes to those circulations during El Ninos and La Ninas.***

A Bureau staff member should then visit the BPLMG (for a period to be determined after these notes have been developed) to provide training in the provision of seasonal forecasts using the notes.

C. FINDINGS AND RECOMMENDATIONS IN RELATION TO THE TRAINING OF TECHNICIANS

Recommendation C1

All students should undertake AWS training during the proposed new D3 program for the training of Technicians

Recommendation C2

Students in the proposed new D3 program for the training of Technicians should be selected to specialise in either Radar or Radiosonde in their final semester, depending on the equipment located at the station of their ultimate posting by the BMG.

Recommendation C3

The BMG should provide access to operational equipment, preferably within the BPLMG, to enable practical demonstrations and faultfinding exercises for trainee technicians.

Recommendation C4

The BPLMG should have the support of a specialised 'electronics' lecturer, to teach the more advanced circuit techniques associated with equipment such as radar.

Recommendation C5

BPLMG should conduct 4 different types of in-service courses for technicians covering (a) Radar, (b) Radiosonde, (c) AWS and (d) Basic Instrument Calibration, Quality Control, and Basic Communications.

Recommendation C6

The BMG should give a very high priority, at least in the short term, to Technician in-service training and should ensure that the BPLMG is provided with (access to) all the necessary items of operational equipment to accurately simulate requirements in the field.

Recommendation C7 (*)

That, as soon as possible, and subject to adequate resources being available, the BMTC should conduct a suitable training course at the Australian Bureau's Field Training Annexe in Melbourne for a number of BMG Technicians. The coursework should cover the EEC Weather Radar, Raptic Data Transmitter and maintenance of PC based equipments such as Difacs and Raptic.

Recommendation C8

The practice of a limited number of BMG technicians undertaking degrees in Instrumentation, at the Institute of Technology in Bandung or the University of Indonesia, should continue, as it provides a valuable method of improving the skill levels of both the staff and the organisation as a whole. Means of enhancing cooperation between the above two tertiary institutions and the BMG, through instrument access arrangements and coursework directed at BMG needs, should be investigated.

Recommendation C9

The BMG should seek formal approval for a D3 class at the Aviation College to be dedicated to BMG staff as a matter of urgency, to ensure that improvement in the skills of BMG technical staff begins prior to the establishment of the BPLMG's own D3 training program and facilities

D. FINDINGS AND RECOMMENDATIONS IN RELATION TO THE TRAINING OF OBSERVERS

Recommendation DI (*)

The Australian Bureau of Meteorology should provide, for reference purposes;

- **One copy of the Surface Observation Handbook, Inspection Handbook and Guidelines for the Siting of Instruments – Instrument Specification 2013.1 to the Head of the BPLMG for the Training Library and to the Chiefs of the Division of Meteorology and the Analysis Division (BMG).**
- **One copy of the Inspection Handbook and relevant Meteorological Engineering Instructions (MEI's) to the Chief of the Electronics Sub division (BMG).**

Recommendation D2 (*)

That a BPLMG Instructor responsible for providing training for surface observations should attend the 4 week Introduction to Observations and Communications and the 4 week Surface Observations modules of the Australian Technical Officer (Observer) course conducted by the BMTC.

Recommendation D3

The BMG and the BPLMG should aim to strengthen the practical aspects of training necessary for Observers, particularly by ensuring sufficient observing systems and associated equipment are available for the BPLMG to conduct training under simulated operational conditions.

Recommendation D4

The training course for Observers should be increased to D2 status, which would allow for increased practical training.

Recommendation D5 (*)

That the BMG and the BPLMG, with advice and support from the BMTC as appropriate, develop an in-service training program for Observers which covers instrument maintenance, radiosonde and upper wind observation quality control procedures, surface observation quality control procedures, and use of TMOS and other new technology observing systems.

Recommendation D6 (*)

That, subject to suitable resources being available, BMG considers sending staff who use the CLICOM system to a BMTC CLICOM course in the future.

BMG – BoM JWG-3, JAKARTA 11-13 JULY 1999

Agenda Item 5 : Future Cooperative Activities

BMG proposed the following draft for Future Cooperative Activities :

5.1 World Weather Watch System :

5.1.1 Computer Message Switching System.

- Referring to the report by BoM team, BMG agrees to assess further on the financial and administration matters. It is preferred that the plan for the implementation also includes the project management, hardware procurements software installation, training and on site installation. Inspection by experts during first week of operation is also required. A high-level computer expert will have an opportunity to joint the installation of the software.
- The MSS will also be a concern of the regional centers. It is expected that the replacement of the existing system can be implemented by the end of this year. The requirement and specification should be finished by August 1999.

5.1.2 Radar in Kupang.

Background

BMG has a network of seven weather surveillance radars at the following locations:

- Medan
- Palembang
- Semarang
- Denpasar
- Ujung Pandang
- Kupang
- Biak

The radars are all of the WSR 74 type manufactured by Enterprise Electronics Corporation (EEC) of Alabama, USA. They were installed in 1982 and mostly have been out of commission since 1986-1989.

In 1997/1998 BMG had a project to restore the weather radars in Medan, Semarang and Denpasar to bring them into operation and at the same time to improve their function, reliability and maintainability by adding RAPIC control and display system.

A key feature of the rehabilitation strategy is to remove completely the existing signal processing, scan conversion, display equipment and to replace them by RAPIC Data Transmitter and RAPIC Display. The basic antenna, servo and transmitter-receiver subsystems of the radar will be amenable to repair and overhaul. They will not need a complete replacement.

The same things have been done for weather radar in Palembang in 1998/1999, and will also be done for the radar in Ujung Pandang in 1999/2000.

Hopefully, through the MoU between BMG and BoM, there will be a cooperation in refurbishing the Kupang weather radar because both parties recognize that the information from the radar will be beneficial to both parties.

Current Situation

The Kupang weather radar is of EEC WSR-74 C band type. It was installed in 1982 but it has been out of commission since 1986.

Due to the fact that the radar has not been operated for such a long time, the basic antenna, servo and transmitter-receiver subsystems of the radar should be repaired and overhauled.

The building, in which the equipment is installed, is of the size 6 x 6 meters and 6 meters in height. The radome (radar dome) is located right above on the building so it has no radar tower. The building is not in good condition, therefore it needs to be renovated.

There is a ground clutter south of the building, so a detailed analysis should be done whether the radome is high enough or it needs to be elevated by increasing the height of the building, for example to 10 meters.

The 25 KVA electricity is provided by PLN but generator set, UPS and AC are not available.

The distance between the radar building and the forecaster room is approximately 1 km. At present time there is no leased line and neither telephone line connecting those two locations.

Activities

In order to bring the Kupang radar to an operational standard that is compatible with the basic PC-RAPIC operation, the BoM will provide the followings:

- RAPIC Data Transmitter and associated interface equipment as necessary for a fully functional system;
- Personal Computers, to a maximum of three units, for operational PC-RAPIC displays and for technician's maintenance purposes;
- Telephone modems for cross-site connection of PC-RAPIC displays and for dial-up data access from and within Indonesia and Australia;

- Replacement of the radar parts as required, where suitable items are not available from BMG spares;
- Technical supervision of the newly installed equipment, and commissioning of the refurbished radar system;
- On-site initial training of BMG operational and technical staff, with more comprehensive training in Australia as may be required;

In refurbishing of the radar, BMG will provide the followings:

- Refurbishment of buildings and radome as necessary;
- Provision of electric power supply and telecommunication services;
- Provision of radar spare parts, where suitable items are available from BMG stocks;
- Provision of radar test equipment in a calibrated and fully functional condition;
- Assistance with equipment installation and commissioning.

5.1.3 Surface Meteorological Data Exchange

- Surface meteorological data from 62 basic stations are available to support WMO World Weather Watch program;
- For national purposes BMG operates 52 non-basic stations which also produce surface meteorological data.
- Exchange of non-basic surface meteorological data over the southern part of Indonesia and the northern part of Australia will be useful to improve weather analysis in both countries. Designation of the stations can be done by BMG and BoM. The list of non basic stations in the southern part of Indonesia is as follows :
 1. Serang, West Java (24 hours)
 2. Curug, West Java (24 hours)
 3. Citeko, West Java (24 hours)
 4. Jatiwangi – Cirebon, West Java (24 hours)
 5. Tegal, West Java (24 hours)
 6. Bawean, East Java (24 hours)
 7. Kalianget, East Java (24 hours)
 8. Banyuwangi, East Java (24 hours)
 9. Ampenan, West Nusa Tenggara (24 hours)
 10. Mali-Alor, East Nusa Tenggara (18 hours)
 11. Rote, East Nusa Tenggara (18 hours)
 12. Sabu, East Nusa Tenggara (18 hours)
 13. Komoro, East Timor (24 hours)
 14. Namlea-Buru Island, Maluku (18 hours)
 15. Amahai-Seram Island, Maluku (18 hours)
 16. Fak-Fak, Irian Jaya (18 hours)
 17. Nabire, Irian Jaya (18 hours)
 18. Enarotali (18 hours)

5.1.4 Upper Air Data Improvement

- BMG operates twelve radio theodolites for upper air observation systems.
- Referring to the WMO upper air monitoring report, the upper air data from Indonesia are suspected of having some deviation and bias of geo-potential height and wind, especially at mid/upper levels.
- Technical assistance from BoM to overcome this problem is needed, especially in term of data quality control.
- AMDAR : possible co-operation of BoM-BMG-ITB-IPTN.

5.2 Joint Research on Climate and Seasonal Forecasting.

BMG has performed some collaboration research in climate and seasonal forecasting research with other research institutions and universities i.e. Agency for Assessment and Application of Technology (BPPT), National Space and Aeronautic Institute (LAPAN), Bogor Institute of Agriculture (IPB) and Bandung Institute of Technology (ITB). This activity has been done since the last two years. The main purpose is to coordinate research application to support the Climate and Seasonal Forecasting over Indonesia Maritime Continent. As the NCC of BoM conducts a similar activity in Australia, an extended climate and seasonal forecast over Australia and Indonesia is proposed for a further discussion. Exchanged personnel involved in the preparation of the climate and seasonal forecasting should be in a further consideration for a real action.

5.3 Climate Monitoring and Seasonal / Interannual Forecasting.

Dr. John McBride has collected rainfall data of Indonesia as a part of the Monsoon Research Work. A further result of the research work, rainfall type over maritime continent, would be implemented to improve and to add the seasonal forecasting areas. An expansion of this activity is proposed to help BMG in improving the seasonal forecasting into inter-annual (quarter year, half year and one year) forecasting as part of climate variability forecasting. These works are required by BMG in a near future and hopefully requirement of these activities would be discussed for further consideration.

BMG propose to continue cooperation on seasonal/ inter-annual forecasting. BMG has just been starting to develop the initiation of climate database management systems. It is collaborated with IPTN (National Aircraft Industry). BMG officers need to be trained on the use of statistical packages for data quality control.

5.4 Meteorological Training.

- Sending BMG officers for training on marine meteorology
- Sending BMG officers to continue to study on interpretation and application of weather radar and satellite imagery.
- Sending BMG scientist to continue to study on modeling particularly TLAPS.

- To continue scientist exchange program in the field Monsoon Research and Climate and Seasonal Forecasting.
- Inviting BoM experts to assist and to advise BMG in improving of data recovery.
- Scientist exchange program in the field of weather study on border waters of Indonesia – Australia.

Cost sharing for the attachment will be discussed between Ms. Rosliany of BMG and Dr. Tsui of BoM.

5.5 Transboundary Air Pollution Problems.

- These problems are still in progress especially from the meteorological aspect. Since WMO offered a workshop on Regional Transboundary Haze in South East Asia as part of the Program ASEAN Regional Transboundary Smoke (PARTS) and the Regional Haze Action Plan (RHAP) up to now, the problem solutions only emphasize on the environmental concerns especially for combating the fires. The meteorological aspect of this is still inadequate, especially in discussing on the role of the meteorological aspect in supporting the haze development.
- Regional Technical Assistance (RETA), a project from ADB for ASEAN Secretariat, is still going on with emphasize for RHAP to implement action in suppressing the fires. The discussion of the problems are started with the meteorological aspect for haze development study, existing meteorological facilities to support the monitoring of haze and other in relation with transboundary haze pollution (trajectory model, hot spot in relation with haze development and the role of climate information for anticipation planning of fires and haze). These meteorological aspects are only a little to be considered in current project to cope the transboundary haze problems. Rearrangement to solve the transboundary haze problems from the meteorological point of view is proposed for further consideration from the meteorological community for the improvement. The need of action for assessing the current project, offering the activities to obtain financial assistance from other sources and other related action would be appropriate.
- Information about RETA 5778.

RETA 5778 is a Regional Technical Assistance Project on Strengthening ASEAN's Capacity to Prevent and Mitigate Transboundary Atmospheric Pollution. Asian Development Bank and Association of ASEAN Countries funded the project.

On the Final Regional Workshop held on 21-23 June 1999 in Jakarta, the Draft Operationalized Regional Haze Action Program has been finalized and accepted as a Regional Haze Action Programme (RHAP). According to these action programme, three working groups were established to formulate action plans, i.e. Working Group A: Haze Mitigation, Working Group B: Monitoring and

Working Group C: Prevention. BMG, in this case, was deeply involved in Working Group B.

The formulated action plans of Working Group B are as follows:

- The ASMC fire and haze information is currently only available to NMS and national environmental agencies through a password access on the internet. It was recommended that product made is available to other interested organizations and individuals.
- To identify strategic locations for siting of monitoring stations to strengthen the existing network in order to enhance the availability and quality of meteorological and fire data in the region.
- BMG has now enhanced its telecommunication capability with VSAT facilities. BMG proposed that the VSAT system can be used to complement data telecommunication between NMSs in the region.
- It is recommended that the ASEAN NMSs are more actively involved in various US SEA Environmental Initiative Projects in the region, namely the Climate prediction and PART programmes.
- Hot spot information provided by ASMC and various agencies differ slightly due to differences in threshold values used. Although ASMC and LAPAN have consulted each other on the threshold used, other agencies are not involved in the discussion. We recommend that the ASMC holds a forum that concerns to harmonize the fire algorithms.
- The group recommends studies done to establish correlation between hot spots and actual fires.
- The groups recommend that Singapore coordinate a meeting of relevant agencies involved in hot spot activities. The objective is to agree on various fire algorithms.

Action Proposed:

- The JWG is invited to discuss and take action for possible collaboration in facilitating BMG to enable providing required services.

5.6 Other Co-operative Areas.

5.6.1 Librarian Training

BMG's library has a large collection of old publication. In order to modernize the library, it is strongly expected to have librarian training for BMG librarian staff at BoM. New publications on meteorology from BoM and international publication that can be accessed electronically by BMG's library will be greatly appreciated.

5.6.2 Data Base Recovery

1. Introduction

BMG has digital archive data as early as 19th Century. The data are stored in the Magnetic Tape of DPS 7000 mainframe, which is not Y2K compliant.

There is data that has not been keyed in to the mainframe especially that came from other Agencies.

To fully utilize the data for further process and for research purposes, BMG has to recover its database stored not only in the Head Office but also kept in Coordinator Stations and Regional Offices.

2. Activities

To do this job there are activities

2.1. Inventory

2.2. Design a new data base structure that fulfills modern data base system (RDBMS) and entry/ format

2.3. Key entry validation data for rainfall data stored at Head Office (year I) up to 1998.

3. Current Situation

- Inventory has been done at 30 %
- Structure data has not been done
- Collecting hard copy of rainfall data

4. Recommendation

These activities should be continued for the next year budget to complete the data base system.

5.6.3 SADIS

5.6.4 Determine cost of data and product for private sectors.

WORKING AGREEMENT
BETWEEN
BADAN METEOROLOGI DAN GEOFISIKA INDONESIA
AND
THE AUSTRALIAN BUREAU OF METEOROLOGY
CONCERNING THE KUPANG WEATHER WATCH RADAR

HAVE AGREED AS FOLLOWS:

ARTICLE 1
BACKGROUND

The Badan Meteorologi dan Geofisika Indonesia (BMG) and The Australian Bureau of Meteorology (BoM) recognize information from the weather watch radar at Kupang benefits the activities of both services. They therefore wish to cooperate in its operation.

The BoM has been cooperating with BMG in refurbishing its present radar network, but this activity is independent of that.

As a preliminary action BMG and BoM officers have inspected the radar facility at Kupang and have identified the requirements to bring it to an operational condition.

ARTICLE 2

A I M S

The aims of the activity are to :

- bring the Kupang radar to an operational standard compatible with the basic PC-RAPIC operations of both the BoM and BMG;
- maintain the radar in an operational condition; and
- assist BMG in capacity building in the area of operation and maintenance of weather radars;

ARTICLE 3

ACTIVITIES

In order to achieve these aims it is proposed:

- the BoM will provide the following to assist in the refurbishment of the radar;
 - RAPIC Data Transmitter and associated interfacing equipment as necessary for a fully functional system;
 - Personal Computers for operational PC-RAPIC displays and for technician's maintenance purposes, to a maximum of three units;
 - telephone modems for cross-site connection of PC-RAPIC displays and for dial-up data access from within Indonesia and Australia;
 - replacement radar parts as required, where suitable items are not available from BMG spares;
 - technical supervision of new equipment installation, and commissioning of the refurbished radar system;
 - on-site initial training of BMG operational and technical staff, with more comprehensive training in Australia as may be required;
- the BMG will provide the following to assist in the refurbishment of the radar :
 - refurbishment of buildings, radome and radar tower, as necessary;
 - provision of electric power supply and telecommunication services;
 - provision of radar spare parts, where suitable items are available from BMG stocks;
 - provision of radar test equipment in a calibrated and fully functional condition;
 - assistance with equipment installation and commissioning;
- BoM and BMG technicians will undertake the refurbishment of the equipment, each side meeting the travel and per-diem expenses of its staff;
- the maintenance of the radar will be the responsibility of the BMG, with assistance from BoM technicians who will be available for a maximum of two visits to Kupang per year for this purpose;

- spare parts required for the maintenance of the radar will be provided by the BoM, where suitable items are not hold in BMG stocks, but these spares must only be used for the Kupang radar;
- BMG will make every endeavor to use the visits by BoM technicians for capacity building of BMG technicians; and
- The BoM will have unrestricted access to data from the Kupang radar by dial-up telephone modem, or other agreed telecommunications method, for maintenance and operational purposes; likewise, the BMG will have access to data from BoM radars for normal operational purposes.

ARTICLE 4

PROPERTY

The Kupang radar is owned and operated by BMG, and any activities under this Agreement will not change that status.

ARTICLE 5

MODIFICATION

On request of both BMG and BoM and by common agreement this Agreement can be modified by additional clauses.

ARTICLE 6

T E R M

This Agreement shall come into effect on the date of signature and remain in effect for a period of five years. It shall automatically be extended for subsequent period of 5 years unless either Party has notified the other in writing about its intention to terminate the present Agreement six months prior to its expiration.

The termination of this Agreement shall not affect any other existing or prospective arrangements between the Parties and the validity of any contracts or projects made under this Agreement until the completion of such arrangements, contracts and/or projects.

IN WITNESS WHEREOF, the undersigned have signed this Agreement.

DONE at Jakarta on Tuesday 13 July 1999 in two original documents in English language. Both documents are equally authentic.

**FOR BADAN METEOROLOGI
DAN GEOFISIKA**



R. SRI DIHARTO
Director General

**FOR THE AUSTRALIAN BUREAU
OF METEOROLOGY**



J.W. ZILLMAN
Director of Meteorology

**SUMMARY REPORT OF
THE FOURTH SESSION OF THE JOINT WORKING GROUP
BETWEEN
BADAN METEOROLOGI DAN GEOFISIKA, INDONESIA
AND
THE BUREAU OF METEOROLOGY, AUSTRALIA
ON COOPERATION IN METEOROLOGY**

Melbourne, 12-15 August 2002

INTRODUCTION

1 A Memorandum of Understanding (MOU) on cooperation in meteorology was signed between the Australian Bureau of Meteorology (BoM) and the Badan Meteorologi dan Geofisika (BMG), Indonesia in September 1995. A Joint Working Group (JWG) was established for the coordination and implementation of cooperative activities and other related matters under the MOU. This report summarises the outcome of the fourth session of the JWG held in Melbourne, 12-15 August 2002.

OPENING OF THE SESSION (Agenda Item 1)

2 Dr John Zillman, Director of Meteorology and co-chairperson from Australia, opened the session at 9.30 AM on 12 August 2002 in the Head Office of BoM. He extended a warm welcome to Dr Gunawan Ibrahim, Director-General of BMG and co-chairperson from Indonesia, and his delegation.

3 Dr Zillman remarked that increasingly close working relationship had developed between the two Services. Both shared many common problems, for example, the need to help the community and government better use and better understand the potential values of meteorological services. Other common issues included the optimal use of limited funds for modernisation and the challenge of closer coordination and collaboration with the Democratic Republic of East Timor. He introduced members of the Australian delegation.

4 Dr Gunawan said that BMG looks after both meteorology and geophysics in Indonesia. After JWG-4, the Indonesian delegation would visit Geoscience Australia in Canberra to discuss seismology and geomagnetism. He was pleased to note that both BMG and BoM became self-contained agencies on 1 July 2002. He looked forward to closer collaboration with BoM in the future. He introduced members of the Indonesian delegation.

5 A list of the participants is at Attachment A.

ADOPTION OF THE AGENDA (Agenda Item 2)

6 The provisional agenda, as shown in Attachment B, was adopted.

OVERVIEW OF RECENT DEVELOPMENTS AND FUTURE PLANS OF BMG AND BoM (Agenda Item 3)

7 Dr Zillman gave a general overview of BoM. He highlighted the following major developments since JWG-3 (July 1999):

- Measures to overcome the Y2K problem
- Review of BoM initiated by the Parliamentary Secretary, culminating in the change of status to that of an Executive Agency on 1 July 2002

- Proposed move of BoM Head Office
- Recommendation of Productivity Commission that Government should fund the core activities of information agencies such as the BoM
- Strengthening of cooperation with other National Meteorological Services in the South-West Pacific Region.

8 Dr Gunawan said that BMG would be reorganised, following its conversion into a non-departmental institution on 1 July 2002. BMG is in the process of establishing a new organisational structure. The new BMG would have a wider mandate to cover services other than for transport. Priorities for development would include:

- Improvement of services to all users
- Modernisation of facilities
- Human resources development, especially training and research within BMG
- Instrument calibration facilities.

REVIEW OF ACTIVITIES SINCE JWG-3 (Agenda Item 4)

9 The JWG made a review of the past activities since JWG-3, Jakarta, July 1999. These also included the activities agreed at the first session of the BoM-BMG Technical Committee held in Darwin in September 2000. It was noted that although a few of the Category A activities had not yet been implemented because there was no pressing requirement to proceed, there were altogether 15 major projects that had been successfully undertaken. A summary is given in Attachment C.

FUTURE COOPERATIVE ACTIVITIES (Agenda Item 5)

10 To help assist the Indonesian delegation to better understand the role and operation of the BoM, guided visits were made to the following Australian facilities: National Meteorological and Oceanographic Centre, Observations and Engineering Branch, Bureau of Meteorology Research Centre, National Climate Centre, Bureau of Meteorology Training Centre, Victorian Regional Office and the Special Services Unit.

WORLD WEATHER WATCH (Item 5.1)

11 Mr P Gigliotti gave a presentation on the Computer Message Switching System (CMSS) project which was successfully completed in March 2000 to overcome the Y2K problem in BMG. However with the aging of the equipment, the JWG agreed that bridging steps had to be taken to improve the System until the next major upgrade through an IDB project to be started in Indonesia in 2003. The JWG decided that:

- A team of 4 BoM information technology specialists led by Mr Gigliotti visit BMG for a period up to 3 weeks in September-October 2002 to provide advice and assistance on a range of technical issues related to the CMSS
- Mr Djelantik to liaise with Mr Gigliotti to coordinate the timing of the visit, refine its objectives and develop a detailed program

- **Mr Gigliotti and Mr Djelantik to provide a detailed report to the co-chairpersons of the JWG by early November 2002 and list any recommended follow-up action.**

12 The JWG expressed great disappointment that the Kupang Radar project had had to be delayed because of security concerns in West Timor for Australian travellers. The JWG agreed to take the following measures:

Step 1: BoM to identify the radar experts and pass their passport details to BMG

Step 2: BoM to send by air-freight the radar spare parts to Jakarta for customs clearance; BMG to transport the spare parts to Kupang

Step 3: BMG to seek security clearance from the Indonesian Air Force and coordinate with the Kupang police to guarantee the safety of the Australian officers, who will also be accompanied by BMG radar experts from Denpasar and Jakarta

Step 4: BoM to seek travel clearance from the Australian Department of Foreign Affairs and Trade

Step 5: recommissioning of the Kupang radar.

13 BMG confirmed that they would be able to install the 10 rainfall data-loggers provided by BoM. BoM indicated that it was willing to give further support if required.

14 Because of the urgency to establish a new national calibration laboratory in Jakarta, it was agreed that 1 BoM expert would visit BMG to advise on calibration facilities and operational/coordination procedures. The need to provide background information (eg existing instruments, networks, physical building and requirements for the future) by BMG before the visit was emphasised.

15 On the issue of Terminal Aerodrome Forecasts (TAFs) from Indonesia, BMG advised that from August 2002, regular TAFs from Ambon, Biak, Kupang and Manado would be sent by AFTN to Darwin (YPDMYMYX).

16 The JWG noted that some upper air data from Indonesia had been rejected by ECMWF because of poor quality. Dr K Puri offered to liaise with ECMWF and to conduct analysis in BMRC in order to identify the problems. It was agreed that 1 BoM officer should visit BMG and further assist with upper air management systems and quality control procedures.

17 BoM confirmed that two BMG forecasters would be accepted for training at the 5th Southern Hemisphere Training Course on Tropical Cyclones, Melbourne, September-October 2002, one under WMO sponsorship and the other under bilateral arrangements.

18 It was agreed that 1 BoM expert would visit BMG to advise on the management of radar operation and maintenance. Mr Djelantik and Mr G Brough would consult on the timing etc. Background information would be provided by BMG before the visit.

19 1 BMG officer would visit BoM to study the interpretation of satellite and radar imagery.

JOINT RESEARCH (Item 5.2)

20 In view of the priority to establish a research centre in BMG, Dr Zillman provided a copy of the 1999 "BMRC Review" to Dr Gunawan. The meeting noted that there might be an opportunity to draw on the experience of BoM in assisting BMG to develop its research centre and scientific program.

21 Dr Puri offered to host attachments for BMG scientists in BMRC if required, and invited BMG participation at the annual BMRC workshops.

22 BoM agreed to consider provision of partial contribution to long-term fellowships to enable BMG officers to pursue PhD research at Australian universities.

CLIMATE MONITORING AND SEASONAL FORECASTING (Item 5.3)

23 Mr M R Prabowo gave a presentation on the progress of his PhD project at Monash University on the "Onset and retreat of the monsoon over Indonesia".

24 BoM's National Climate Centre will provide its "seasonal climate outlooks" to BMG through email. It will also provide timely "El Nino Updates" to BMG to assist briefings to the Indonesian President. In exchange, BMG agreed to provide climate bulletins to BoM in English.

25 The JWG noted that Dr J McBride had acquired, through an ACIAR project, a 40-year rainfall dataset covering 63 stations in Indonesia (Attachment D). BMG agreed to keep it up-to-date by decoding rainfall data from SYNOP reports collected through the CMSS. If there were any requests to BMRC for the dataset, they would be referred to BMG for response. The PC-based seasonal forecast model for Indonesia developed by Dr McBride had already been transferred to BMG. BoM would make available to BMG through the Internet relevant SST data to be used as predictors for running the forecast model.

26 Dr D Jones announced that there would be an Asia-Pacific Network (APN) Workshop on climate monitoring to be held in BoM in December 2002. BoM will invite BMG to participate.

METEOROLOGICAL TRAINING (Item 5.4)

27 In view of BMG's priority to establish its own training centre to be known as the "Academy of Meteorology and Geophysics", the JWG agreed that Mr Djelantik and Ms D Bumpers should firstly review the recommendations by Mr John Mottram who did a feasibility study on education and training in Indonesia in 1997-98. They should then develop a detailed implementation plan, which would cover, inter alia:

- Training of trainers
- Curriculum development

- Visiting lecturers from overseas.

Their report should be submitted to the co-chairpersons of the JWG.

TRANSBOUNDARY AIR POLLUTION PROBLEMS (Item 5.5)

28 The delay in the transfer of the smoke haze transport model was due to the fact that BMG did not currently have the capability to generate forecast winds to drive the model, because of the lack of Numerical Weather Prediction in BMG and the inability to process GRIB data. The JWG noted the following two options:

- (a) Use of an interactive web site to allow BMG staff to initiate and specify calculations, using the computing facilities in Melbourne; or
- (b) Transfer the transport model to BMG, after it has acquired the capability to use GRIB data containing forecast winds from Melbourne (re paragraph 11).

29 It was agreed that should (b) be chosen as the preferred option, the following steps should be taken:

Step 1 – Make sure that GRIB bulletins could be processed in BMG

Step 2 – 1 BMG officer to visit BoM to conduct case studies and sensitivity tests, and to receive training on the installation and operation using a PC workstation

Step 3 – Visit by 1 BoM officer to install the transport model in Jakarta, and provide further training.

30 Mr Hery and Dr P Stewart would serve as focal points to decide which way to proceed.

31 The JWG agreed that the new Officer-in-charge of the Cape Grim Baseline Air Pollution Station (to be appointed in December 2002) should visit the Bukit Koto Tabang GAW Station to advise on the scientific program.

OTHER COOPERATIVE AREAS (Item 5.6)

32 Dr Zillman agreed to send some WMO documents on the role and operation of National Meteorological Services to Dr Gunawan, to assist BMG's re-organisation as a non-departmental institution.

33 The JWG agreed that to facilitate technical cooperation and to consider other cooperative areas that might arise during the inter-sessional period, there would be a need to convene the second session of the Technical Committee, tentatively in Indonesia, in 2003-04. Details would be determined by correspondence.

DATE AND VENUE OF THE FIFTH SESSION (Agenda Item 6)

34 It was agreed that JWG-5 would be held in Indonesia in 2005. Details would be determined by correspondence.

ANY OTHER MATTERS (Agenda Item 7)

35 It was agreed that the funding arrangement whereby BoM would cover the per diem expenses of BMG officers while in Australia on exchange visits under the MOU would be extended till JWG-5.

36 In line with the WMO Regional Association V (South-West Pacific) statement made at its 13th session, Manila, May 2002, encouraging East Timor's neighbouring countries to take steps to assist East Timor in the development of its national meteorological infrastructures and services, Dr Gunawan and Dr Zillman decided to write a joint letter to the Director of Meteorology in Dili, extending an offer to jointly provide assistance with development of the meteorological infrastructure and service capacity for East Timor, subject to the approval by both governments. A copy of the letter is at Attachment E.

ADOPTION OF THE SUMMARY REPORT OF THE SESSION (Agenda Item 8)

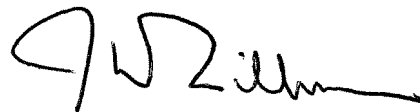
37 The co-chairpersons adopted and signed the summary report of JWG-4 on 15 August 2002.

CLOSURE OF THE SESSION (Agenda Item 9)

38 Dr Gunawan expressed his thanks and gratitude to Dr Zillman for the warm hospitality and friendship extended to the BMG delegation during the session. JWG-4 closed on 15 August 2002.



**(Dr GUNAWAN IBRAHIM)
CO-CHAIRPERSON FROM BMG**



**(Dr J W ZILLMAN)
CO-CHAIRPERSON FROM BoM**

JWG-4: LIST OF PARTICIPANTS

AUSTRALIA (BoM)

Dr J W Zillman	Director of Meteorology and Co-chairperson from Australia
Dr R R Brook	Acting Deputy Director (Services)
Dr K Puri	Acting Chief, Bureau of Meteorology Research Centre
Dr J McBride	Principal Research Scientist, BMRC
Mr P Gigliotti	Assistant Director (Central Operations and Systems)
Mr P Price	Acting Assistant Director (Observations and Engineering)
Dr V K Tsui	Superintendent, International and Public Affairs
Mr T Hart	Superintendent, National Meteorological and Oceanographic Centre
Ms D Bumbers	Superintendent, Bureau of Meteorology Training Centre
Mr G Brough	Superintendent, Instrument Engineering
Mr B Gunn	National Manager, Special Services Unit
Mr I Senior	Supervisor, Communications Software
Dr D Jones	Supervisor, Climate Analysis
Mr R Krishna	Supervisor, International and Public Affairs

INDONESIA (BMG)

Dr Gunawan Ibrahim	Director-General BMG and Co-chairperson from Indonesia
Mr Hery Harjanto	Director for Climatology and Air Quality Center
Mr Djelantik Purwanto	Director for Meteorological Center
Mr Sunarjo	Director for Geophysical Center
Dr P J Prih Harjadi	Head of Planning Division
Ms Rosliany	Head of Legal Aspect and Organization

ATTACHMENT B

JWG-4, Melbourne, 12-15 August 2002
PROVISIONAL AGENDA

- 1. Opening of the session**
- 2. Adoption of the agenda**
- 3. Overview of recent developments and future plans of BMG and BoM**
- 4. Review of activities since JWG-3**
- 5. Future cooperative activities:**
 - 5.1 World Weather Watch**
 - 5.2 Joint research**
 - 5.3 Climate monitoring and seasonal forecasting**
 - 5.4 Meteorological training**
 - 5.5 Transboundary air pollution problems**
 - 5.6 Other cooperative areas**
- 6. Date and venue of the fifth session**
- 7. Any other matters**
- 8. Adoption of the summary report of the session**
- 9. Closure of the session**

REVIEW OF ACTIVITIES SINCE JWG-3

Attachment D of the summary report of JWG-3 (July 1999) and the report of the first session of the BMG-BoM Technical Committee (September 2000) provided two lists of prospective future bilateral activities. The status of these activities is as follows:

Category A

- 1) **Kupang radar: Inspection visit by Messrs H Edwards and P Prokop in July 2000. BoM engineers ready to re-commission radar, subject to security advice by Australian Foreign Affairs. Meanwhile, BMG had refurbished the radar compound.**
- 2) **Implementation of CMSS: This was successfully completed in 2000.**
- 3) **Participation in 2000 tropical cyclone course in BMTC: Mr Sridadi Budihardjo participated in the Course at Melbourne 16-27 October 2000 under bilateral arrangements.**
- 4) **Exchange visits on instrument calibration: (Not implemented – no pressing requirement)**
- 5) **Routine messages from BMG on volcanic activities to Darwin VAAC: commenced in October 1999. Frequency for updating still to be further improved.**
- 6) **Visit by BoM officer to further assist with upper air data systems quality procedures: (Not implemented – no pressing requirement)**
- 7) **Exchange visits on climate/seasonal forecasting: Dr J McBride visited Lombok and Jakarta in October 2000 and Jakarta and Bali in June 2002, in conjunction with an ACIAR project. Dr P Winarso and Mr Soetanto made a reciprocal visit to BoM in April 2001. Since October 2000, monthly seasonal outlooks for the South Pacific had been emailed to Dr Winarso for BMG operational use.**
- 8) **Joint research on monsoon: BoM contributed partially to an Australian fellowship to enable Mr Prabowo of BMG to do a PhD thesis on rainfall over Indonesia.**
- 9) **One BMG officer to attend BMRC annual workshop: Mr F Setyawan attended the 2001 workshop in November.**
- 10) **BMG scientists to study TLAPS: Mr A Zakir visited Darwin in March 2001.**
- 11) **Visit by 1 BMG officer to learn satellite interpretation and radar imagery: (Not implemented – no pressing requirement)**

- 12) 1 BMG officer to visit BoM for marine meteorology training: Mr A Zakir visited Perth in February-March 2001.
- 13) Visit by 1 BoM officer to Bukit Koto Tabang GAW Station to advise on the scientific program: (Not yet implemented)
- 14) Visit by 1 BMG officer to study trajectory modelling / smoke dispersion: (Not yet implemented – no pressing requirement)
- 15) 1 BMG officer to attend BoM Fire Weather Conference: (Not yet implemented – no pressing requirement)
- 16) BMG scientist to attend annual GAW meeting in Australia: (Not yet implemented – no pressing requirement)
- 17) Technical Committee meeting in Darwin: successfully held on 20-22 September 2000.
- 18) Exchange visits by librarians: (Not yet implemented – no pressing requirement)
- 19) BoM officer to visit tsunami observing station in Tretes: (Not implemented – no pressing requirement)
- 20) BMG buoy data to BoM: Not implemented – program ended.
- 21) Transmission of SADIS through DIFACS: Not implemented – requirement ceased when BMG acquired its own SADIS workstation.
- a) Exchange telephone numbers of tropical cyclone warning centres: completed in November 2000.
- b) Availability of Indonesian TAFs in Australia: only partially completed when TAF WRKK (Kupang) became available from May 2002.
- c) Provision of 10 raingauge data-loggers to BMG: One data-logger was provided during the visit by Mr R Hibbins to Jakarta in August 2001. Nine others were sent by mail in January 2002, and were received by BMG in July 2002.
- d) Visit by 1 BMG officer on Climate Data Management System: Mr D Siwamura visited the Bureau's National Climate Centre in November 2001 and studied ADAM.
- e) Visit by 1-2 BMG officers on planning: Mr Sunarjo and Dr Harjadi visited Melbourne in August 2002.

List of 63 rainfall stations

No	Sta. Num. Based on the ROI	Sta. Num. Based on new BMG	Sta. Num. Based on WMO	Station Name	Elev. (m)	Latitude & Longitude	Period of data
1	107c	11	96011	Aceh	21	05°31'N - 095°25'E	1879-1941;1952-1999
2	102	15	96015	Meulaboh	6	04°15'N - 096°07'E	1896-1941;1953-1999
3	127I	35	96035	Medan	27	03°34'N - 098°41'E	1879-1941;1948-1999
4	82	73	96073	Sibolga	46	01°33'N - 098°53'E	1909-1941;1953-1999
5	43a	163	96163	Padang	3	00°53'S - 100°21'E	1879-1941;1950-1999
6	156b	109	96109	Pakanbaru	31	00°28'N - 101°27'E	1953-1999
7	166	91	96091	Tanjungpinang	17	00°55'N - 104°32'E	1879-1941;1951-1999
8	175b	195	96195	Jambi	26	01°38'S - 103°39'E	1952-1999
9	13	253	96253	Bengkulu	15	03°53'S - 102°20'E	1968-1999
10	191a	221	96221	Palembang	11	02°54'S - 104°42'E	1950-1999
11	242b		96221	Rejosari/Branti	100	05°16'S - 105°11'E	1951-1999
12	257	237	96237	Pangkalpinang	33	02°10'S - 106°08'E	1889-1941;1953-1999
13	262b	249	96249	Tanjungpandan	44	02°45'S - 107°45'E	1950-1999
14	273	581	96581	Pontianak	30	00°09'S - 109°24'E	1879-1941;1947-1999
15	285	615	96615	Ketapang	3	01°51'S - 109°58'E	1904-1941;1950-1999
16	291	645	96645	Pangkalanbun	9	02°42'S - 110°42'E	1947-1999
17	283	557	96557	Nangapinoh	42	00°21'S - 111°47'E	1909-1941;1950-1999
18	297	595	96595	Muaratewe	30	00°57'S - 114°54'E	1951-1999
19	308b	685	96685	Banjarmasin	20	03°26'S - 114°45'E	1951-1999
20	313d	633	96633	Balikpapan	30	01°16'S - 116°54'E	1948-1999
21	327a	509	96509	Tarakan	30	03°20'N - 117°34'E	1911-1941;1948-1999
22	364	72	97072	Palu	6	00°41'S - 119°44'E	1954-1999
23	352	48	97048	Gorontalo	20	00°31'N - 123°04'E	1974-1999
24	331e	14	97014	Manado	81	01°32'N - 124°55'E	1879-1941;1947-1999
25	367	86	97086	Luwuk	5	00°54'S - 122°47'E	1909-1940;1975-1999
26	385	96	97096	Poso	3	01°23'S - 120°44'E	1974-1999
27	396	120	97120	Majene	0	02°30'S - 119°00'E	1961-1999
28	373	146	97146	Kendari	10	04°06'S - 122°26'E	1909-1941;1947-1999
29	377	192	97192	Bau-bau, Buton	10	05°28'S - 122°37'E	1908-1940;1961-1999
30	415c	180	97180	Ujungpandang	14	05°04'S - 119°33'E	1948-1999
31	27 Jkt.	745	96745	Jakarta	7	06°11'S - 106°50'E	1864-1999
32	163 Pri.	783	96783	Bandung	791	06°53'S - 107°36'E	1953-1999
33	38 Cir.	791	96791	Jatiwangi	50	06°45'S - 108°16'E	1904-1999
34	35 Pek.	797	96797	Tegal	3	06°51'S - 109°09'E	1927-1999
35	41a Sng.	839	96839	Semarang	3	06°59'S - 110°23'E	1942-1999
36	16 Bwg.	805	96805	Cilacap	6	07°44'S - 109°01'E	1952-1999
37	50g Yog.	853	96853	Yogyakarta	122	07°47'S - 110°26'E	1951-1999
38	37 Madi.	881	96881	Madiun	66	07°37'S - 111°31'E	1951-1999
39	186 Bes.	987	96987	Banyuwangi	5	08°13'S - 114°23'E	1950-1999
40	24h Madi.	973	96973	Kalianget	3	07°03'S - 113°58'E	1951-1999
41	192 Sby.	925	96925	Bawean	25	05°51'S - 112°38'E	1900-1941;1961-1999
42	445b	230	97230	Denpasar	3	08°45'S - 115°10'E	1926-1941;1949-1999
43	446	240	97240	Ampanan	15	08°32'S - 116°04'E	1896-1930;1951-1999
44	455	260	97260	Sumbawa	20	08°26'S - 117°25'E	1911-1941;1961-1999
45	461	340	97340	Waingapu	10	09°40'S - 120°20'E	1911-1941;1949-1999
46	470g	372	97372	Kupang	102	10°10'S - 123°40'E	1880-1941;1947-1999
47		390	97390	Dilli	4	08°34'S - 125°34'E	1952-1999
48	479	900	97900	Saumlaki	24	07°59'S - 131°18'E	1962-1999
49	510	810	97810	Tual	3	05°41'S - 132°45'E	1966-1999
50	481a	748	97748	Geser	3	03°48'S - 130°50'E	1969-1999
51	490	724	97724	Ambon	1	03°42'S - 128°05'E	1879-1940;1950-1999
52	494a	600	97600	Sanana	2	02°05'S - 126°00'E	1918-1941;1974-1999
53	496	430	97430	Ternate	33	00°47'N - 127°23'E	1971-1999
54	0404	502	97502	Sorong	3	00°56'S - 131°07'E	1950-1999
55	0818	530	97530	Manokwari	3	00°53'S - 134°03'E	1901-1941;1955-1999
56	97560	560	97560	Biak	10	01°11'S - 136°07'E	1955-1999
57	2604	580	97580	Sarmi	3	01°50'S - 138°43'E	1921-1940;1974-1999
58	4418	690	97690	Sentani	10	02°34'S - 140°29'E	1947-1999
59	008	686	97686	Wamena	1550	04°04'S - 138°57'E	1957-1999
60	202	682	97682	Nabire	3	03°20'S - 135°30'E	1970-1999
61	4802	760	97760	Kaimana	5	03°40'S - 133°45'E	1956-1999
62	7606			Agats	2	05°30'S - 138°03'E	1972-1990
63	389810	980	97980	Merauke	3	08°28'S - 140°23'E	1952-1999

ATTACHMENT E

**The Director of Meteorology
Ministry of Transport, Communication and Public Works
c/- Mr Juliao Carlos, Director of Civil Aviation
Dili
DEMOCRATIC REPUBLIC OF EAST TIMOR**

Dear Colleague

We are writing to you, jointly, as the Heads of the National Meteorological Services of Australia and Indonesia, and as the Permanent Representatives of our respective countries with the World Meteorological Organization (WMO).

We are aware of initial informal interactions between the WMO and senior members of your Government on the scope for WMO assistance and advice to you in the establishment of the essential meteorological functions and infrastructure of East Timor. Indeed one of us (Zillman), in his capacity as President of the WMO, spoke with Foreign Minister Ramos Horta during his visit to Melbourne earlier this year.

We are also following up discussion at the recent (May 2002) session of the WMO Regional Association for the SW Pacific in Manila that included, in its session report, the following specific reference to meteorology in East Timor.

“10.7 The association noted that, on the day before the opening of the Session, East Timor had become a new independent nation within the Region. Conscious of the impact of weather and climate influences on the developing economy of the new nation and the importance of ensuring coordinated international assistance to East Timor in the Establishment of its meteorological service capability, the Association expressed its hope that East Timor would become a Member of WMO and thereafter a Member of Regional Association V at an early date. It urged East Timor’s neighbouring countries and other development partners, with the support of the WMO Secretariat, to take whatever steps they could to assist East Timor in the development of its national meteorological infrastructures and services”

As your nearest meteorological neighbours, we wish to conduct a series of meetings and discussions with your side which in turn may assist you in the development of your Meteorological Service. Both of our Services of course, have important historical and existing links with East Timor which we hope you will feel welcome to draw on in proceeding with the establishment of your Service.

The Bureau of Meteorology and Badan Meteorologi dan Geofisika (BMG) collaborate on a range of bilateral activities aimed at strengthening meteorological operations and services in our region. The Fourth Session of our Joint Working Group On Bilateral Cooperation in Meteorology is currently meeting in Melbourne reviewing progress in this cooperation and preparing our plans for the future. Subject to the approval by the governments of Australia and Indonesia, we would be pleased to identify joint assistance in the development of the East Timor meteorological infrastructure as a priority area within our bilateral cooperation program for the next few years, subject to further discussions.

In particular, and preparatory to any more formal communication at the diplomatic level, you may feel it appropriate and helpful if we were to arrange for a small team of senior experts from the Australian Bureau of Meteorology and BMG of Indonesia to visit Dili to meet with you to develop the framework for such technical assistance. We would be very pleased to arrange such a meeting at any time convenient to you.

We would be delighted to hear from you at your convenience. You might like to write to us at, respectively:

Dr J W Zillman
Director of Meteorology
GPO Box 1289K
Melbourne 3001
AUSTRALIA

Fax: (613) 9669 4548
Email: wmo@bom.gov.au

Dr Gunawan Ibrahim
Director General
Badan Meteorologi dan Geofisika
Jalan Angkasa 1 No. 2, Kemayoran
PO Box 3540 JKT
Jakarta 10720, INDONESIA
Fax : (6221) 4246703
Email: gunib@bmg.go.id;
gunib@indosat.go.id

In the light of your wishes, we would then be pleased to arrange for an initial visit and joint discussions or to proceed in whatever other way you would prefer.

Yours sincerely

(JOHN W ZILLMAN)
DIRECTOR OF METEOROLOGY
AUSTRALIA

(GUNAWAN IBRAHIM)
DIRECTOR-GENERAL, BMG
INDONESIA

15 August 2002

The Director of Meteorology
Ministry of Transport, Communication and Public Works
c/- Mr Juliao Carlos, Director of Civil Aviation
Dili
DEMOCRATIC REPUBLIC OF EAST TIMOR

Dear Colleague

We are writing to you, jointly, as the Heads of the National Meteorological Services of Australia and Indonesia, and as the Permanent Representatives of our respective countries with the World Meteorological Organization (WMO).

We are aware of initial informal interactions between the WMO and senior members of your Government on the scope for WMO assistance and advice to you in the establishment of the essential meteorological functions and infrastructure of East Timor. Indeed one of us (Zillman), in his capacity as President of the WMO, spoke with Foreign Minister Ramos Horta during his visit to Melbourne earlier this year.

We are also following up discussion at the recent (May 2002) session of the WMO Regional Association for the SW Pacific in Manila that included, in its session report, the following specific reference to meteorology in East Timor.

“10.7 The association noted that, on the day before the opening of the Session, East Timor had become a new independent nation within the Region. Conscious of the impact of weather and climate influences on the developing economy of the new nation and the importance of ensuring coordinated international assistance to East Timor in the Establishment of its meteorological service capability, the Association expressed its hope that East Timor would become a Member of WMO and thereafter a Member of Regional Association V at an early date. It urged East Timor’s neighbouring countries and other development partners, with the support of the WMO Secretariat, to take whatever steps they could to assist East Timor in the development of its national meteorological infrastructures and services”

As your nearest meteorological neighbours, we wish to conduct a series of meetings and discussions with your side which in turn may assist you in the development of your Meteorological Service. Both of our Services of course, have important historical and existing links with East Timor which we hope you will feel welcome to draw on in proceeding with the establishment of your Service.

The Bureau of Meteorology and Badan Meteorologi dan Geofisika (BMG) collaborate on a range of bilateral activities aimed at strengthening meteorological operations and services in our region. The Fourth Session of our Joint Working Group On Bilateral Cooperation in Meteorology is currently meeting in Melbourne reviewing progress in this cooperation and preparing our plans for the future. Subject to the approval by the governments of Australia and Indonesia, we would be pleased to identify joint assistance in the development of the East

Timor meteorological infrastructure as a priority area within our bilateral cooperation program for the next few years, subject to further discussions.

In particular, and preparatory to any more formal communication at the diplomatic level, you may feel it appropriate and helpful if we were to arrange for a small team of senior experts from the Australian Bureau of Meteorology and BMG of Indonesia to visit Dili to meet with you to develop the framework for such technical assistance. We would be very pleased to arrange such a meeting at any time convenient to you.

We would be delighted to hear from you at your convenience. You might like to write to us at, respectively:

Dr J W Zillman
Director of Meteorology
GPO Box 1289K
Melbourne 3001
AUSTRALIA

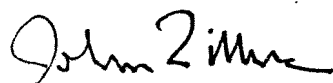
Fax: (613) 9669 4548
Email: wmo@bom.gov.au

Dr Gunawan Ibrahim
Director General
Badan Meteorologi dan Geofisika
Jalan Angkasa 1 No. 2, Kemayoran
PO Box 3540 JKT
Jakarta 10720, INDONESIA

Fax : (6221) 4246703
Email: gunib@bmg.go.id; gunib@indosat.go.id

In the light of your wishes, we would then be pleased to arrange for an initial visit and joint discussions or to proceed in whatever other way you would prefer.

Yours sincerely



(JOHN W ZILLMAN)
DIRECTOR OF METEOROLOGY
AUSTRALIA



(GUNAWAN IBRAHIM)
DIRECTOR-GENERAL, BMG
INDONESIA

15 August 2002