

Department of Transport
Bureau of Air Safety Investigation

INFORMATION PAPER

IP94/04

**Report into the Frequency of
Breakdowns in Co-ordination
Between Australian and Indonesian
Air Traffic Services**



Released by the Director of the Bureau of Air Safety Investigation under the provisions of Air Navigation Regulation 283

When the Bureau makes recommendations as a result of its investigations or research, safety (in accordance with its charter) is its primary consideration. However, the Bureau fully recognises that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

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ABBREVIATIONS

AFTN	Aeronautical Fixed Telecommunications Network
ATC	Air Traffic Control
ATS	Air Traffic Services
CAA	Civil Aviation Authority
EST	Australian Eastern Standard Time
FIR	Flight Information Region
ICAO	International Civil Aviation Organisation
IP	Information Paper
LOA	Letter of Agreement
MOC	Memorandum of Cooperation
SAN	Safety Advisory Notice
SITA	Societe Internationale de Telecommunications Aeronautiques

Introduction

During 1992 and 1993 there was an increase in the frequency of reported occurrences involving co-ordination between Australian and Indonesian ATS. Although some involved aircraft travelling from Australia to Indonesia, the majority (92%) involved aircraft travelling from Indonesian airspace into the Australian FIR.

The CAA Australia and the Indonesia Directorate General of Air Communications are signatories on a LOA between the two countries. This LOA supplements ICAO documents in respect to separation standards and co-ordination procedures and is updated periodically. The latest update was on 18 December 1993 (see Appendix 1).

The CAA have sent a series of delegations to Indonesia to liaise with their ATS authorities. These visits have included several briefing sessions to all levels of Indonesian ATS from the Director Aviation Safety to operational controllers. Specific attention has been paid to boundary conflict situations and the importance of correct and timely co-ordination, all of which are covered in the LOA. In August 1992, a major visit to the Indonesia was undertaken by CAA staff which resulted in 16 recommendations and 10 observations (see Appendix 2). These were accepted by the Indonesian authorities. In December 1993 another visit took place involving CAA supervisory field staff, managers and representatives of the CAA Quality Assurance section.

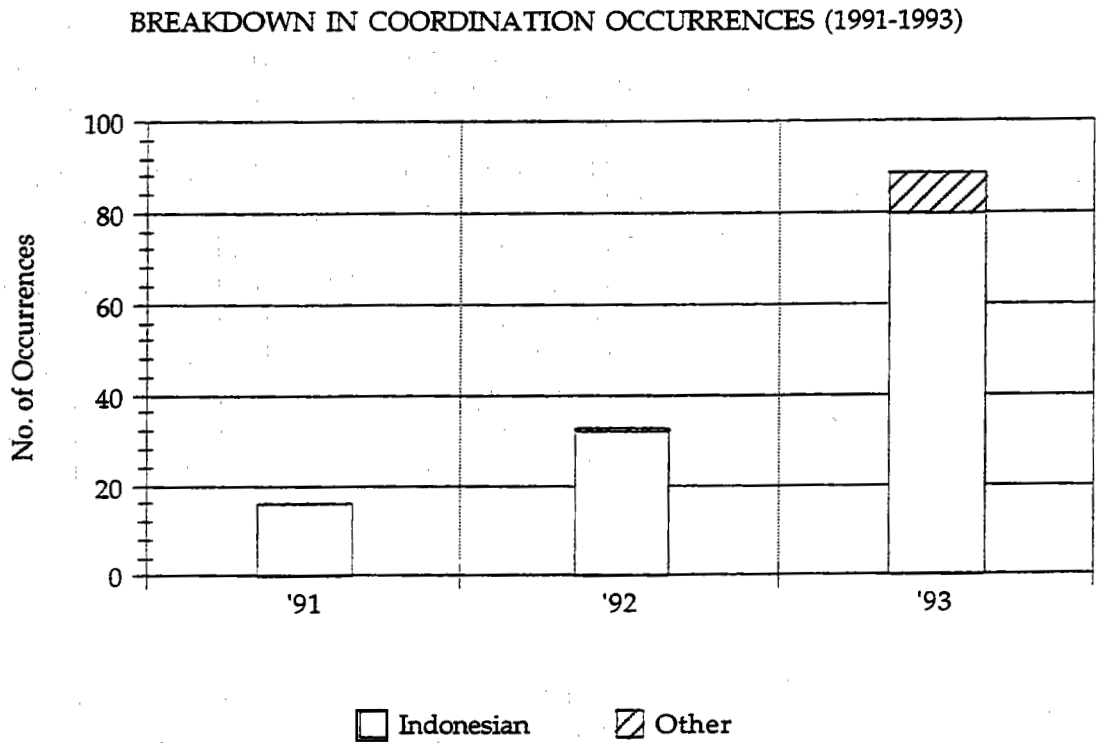
Statistics

In the 25 month period (1 January 1992 - 31 January 1994) there were 151 breakdowns in co-ordination involving aircraft transiting between Indonesian and Australian airspace. Of these, seven were attributed to failures on the part of Australian ATS systems and four others could not be attributed to either Australian or Indonesian authorities. In the remaining 140 occurrences, Indonesian ATS or problems with communications equipment appeared to be the main contributing factors (see figure 1).

During this same 25 month period, there were 13 other occurrences involving a breakdown in international co-ordination. These however, occurred between Australia and the other six FIRs which adjoin the Australian FIR. Consequently statistics indicate that the Indonesian FIR boundary contributes 92% of all international breakdown in co-ordination occurrences involving Australia whilst handling 47% of all international air movements entering or leaving Australian Territory.

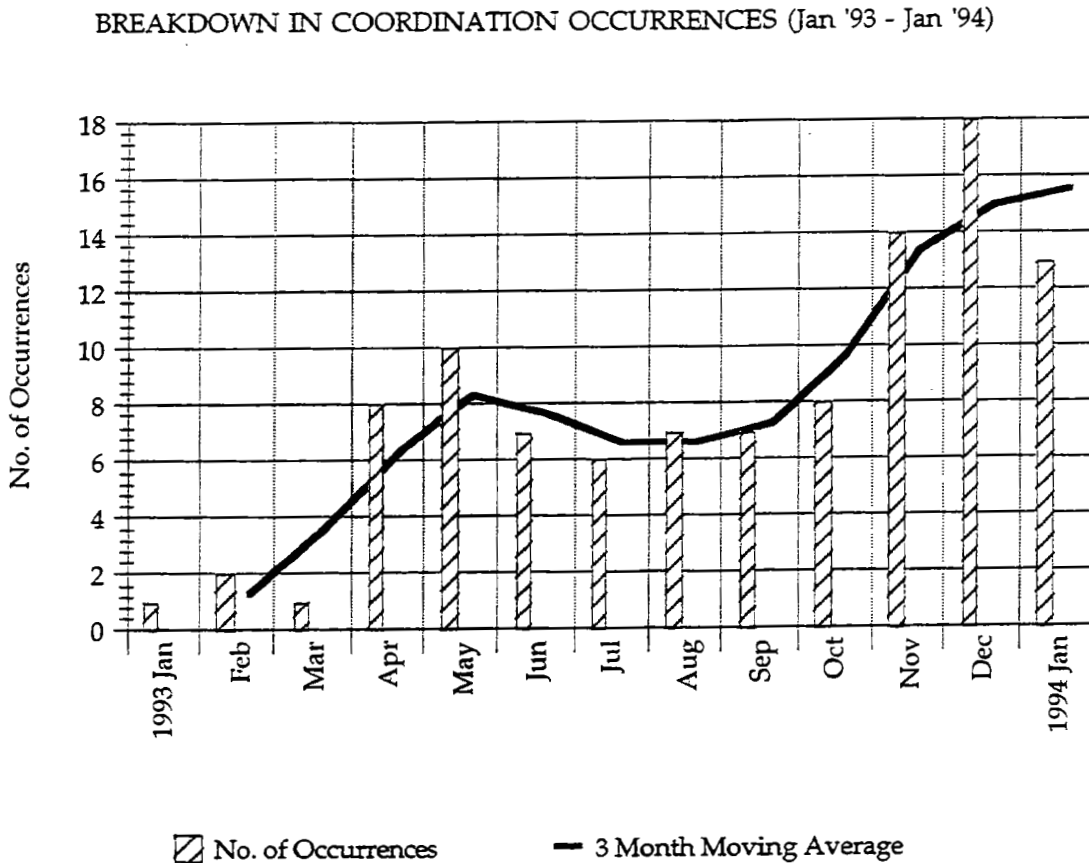
Figure 1: Chart showing the numbers of Breakdown in Co-ordination occurrences between Australian and Indonesian ATS Authorities

The shaded area indicates those occurrences where known factors indicate that Indonesian ATS authorities had no significant factor attributed to them. In the remainder, known factors indicate that Indonesian ATS did not carry out the correct co-ordination. The reasons for these occurrences are mostly unknown.



The frequency of reported occurrences has risen over the period 1 January 1993 to 31 January 1994 (see figure 2). Of the 15 reported in January 1994, 13 originated in Indonesian airspace. In 12 of these it would appear that Indonesian ATS did not follow the procedures contained in the LOA.

Figure 2: Chart showing the monthly Breakdown in Co-ordination occurrences from January 1993 to January 1994.



Note: The numbers of “breakdown in co-ordination” occurrences cannot always be verified due to the depth of the relevant investigation and must therefore be treated with caution.

The information on which the analysis of these statistics is based can be minimal at best and involves much subjective assessment. Very few occurrences are investigated in any depth due to the difficulties of investigation across international boundaries. Even when the reason for the occurrence appears obvious, based on the information available to the Bureau, other factors which have contributed to the occurrence may remain hidden from the assessor.

One possible cause of increased occurrences is the improved reporting from Australian ATS resulting from resectorisation and consolidation programs which commenced in 1993. Consequently, the underlying frequency of the occurrences

may not have risen in accordance with the statistics. If this is the case, it means that the current level of incidents has existed for a longer period than that indicated.

The statistics indicate that despite the actions taken by the Australian and Indonesian ATS authorities, the number of co-ordination related occurrences is not diminishing.

Main Factors in Occurrences

The three prevalent deficiencies within these occurrences are:

1. Incorrect Level - Indonesian ATS co-ordinate a particular level but the aircraft reports approaching the boundary at a different level.
2. Incorrect Time - Indonesian ATS co-ordinate a time at the boundary but the aircraft reports at the boundary at a different time.
3. No Co-ordination - An aircraft contacts Australian ATS at the boundary without any prior co-ordination.

Procedures in the LOA specify that notification and amended levels and times must be co-ordinated within certain time limits. However this is not happening for reasons which are mostly unknown. Australia has a 30 minute co-ordination standard in all its international LOAs.

One factor that may be relevant is the Indonesian equipment. Although they have excellent radar and much state of the art communications equipment, they use older technology in parts of the communications link. These areas are not so reliable. As both the telephone and AFTN use these older style links, it is often the case that when the voice link fails then the AFTN also fails, thereby preventing back up co-ordination taking place. The LOA specifies actions to take in such circumstances.

Although the data available do not allow an accurate assessment of the percentage of occurrences that can be attributed to equipment failure, anecdotal evidence suggests that 30% would not be unreasonable. The CAA are conducting trials in conjunction with Indonesia and SITA, which are attempting to improve the standard of communications between the satellite terminal and the local airport facility. Currently messages can be reliably transmitted to the Jakarta satellite terminal but lose that reliability in the domestic transmission. This is where the main problems occur and Indonesian authorities point out that when Jakarta ATS are out of communications with Australia, they are also out of communication with other Indonesian ATS centres.

Air Routes and Navigation

The air routes between Australia and Indonesia are all 'two way' ie. the same track being used in both directions. This results in a scenario whereby any altitude error made by ATS, may place aircraft in a 'nose to nose' situation of potential conflict. As modern navigational equipment is extremely accurate, should such a conflict occur, the likelihood of two aircraft being in exactly the same point of space at exactly the same time is increased.

Australia is currently attempting to minimise risk in this area by reviewing its air routes and introducing more laterally separated tracks. A 'one way' route system is also being proposed, which will add a safety net when implemented. The new 'two way' route structure has been designed for easy conversion to a 'one way' structure should any change be agreed to by both Indonesia and ICAO. Such changes would require close liaison with the international community.

The conflict opportunities on 'two way' route systems have in the past been minimised by the use of standard flight levels and the 'pulse' effect of international timetables. The Australian east coast has been a terminus for many international airlines and this has meant that the majority of movements came southbound in the morning and departed northbound in the afternoon (EST). This pulsing resulted in the nominally 'two way' routes becoming mainly 'one way' in practice. With the present increase in aircraft and airlines and the introduction of new air routes to service new markets, this pulse effect can no longer be expected to reduce possible conflict near the FIR boundary.

Additionally, modern technology enables aircraft to take advantage of changing en route cruising levels to obtain the best combination of fuel burn with meteorological weather patterns. The Indonesian/Australian boundary happens to be in a position where the long haul aircraft have reached a weight that allows the captain to climb/descend more freely and take advantage of this technology. This, in turn, results in many more requests to ATC for a change in cruising level. Normal procedure dictates that aircraft will fly at 'standard levels' which provides separation from opposite direction aircraft. As the requirement for altitude changes for improved efficiency increases, accurate and timely co-ordination of such altitude changes between ATS is vital to avoid 'nose to nose' conflicts during a change of level.

CAA Actions

The CAA have taken a number of steps to improve the situation, including:

- [i] Sending various experts to discuss with the Indonesian authorities possible actions in relation to mutual improvements.
- [ii] In conjunction with Indonesian ATS, updating the LOA at least annually to include specific methods of passing co-ordination information. This is a statement of agreed practices and procedures.
- [iii] Instigating a requirement for all southbound aircraft to contact Australian ATS twenty minutes prior to the boundary.
- [iv] In conjunction with Indonesian ATS, instigating an Operational Awareness Program which allows for controller interchange between the two countries for observation and familiarisation purposes. This interchange was agreed to on 14 April 1994 and will commence during 1994.
- [v] The signing of a Memorandum of Cooperation (see Appendix 3) between Australia and Indonesia on 28 March 1994 which sets out the framework for cooperation in several areas including some of the technical deficiencies included in this paper.

The reintroduction of the call 20 minutes prior to the boundary has added a safety net in the southbound direction.

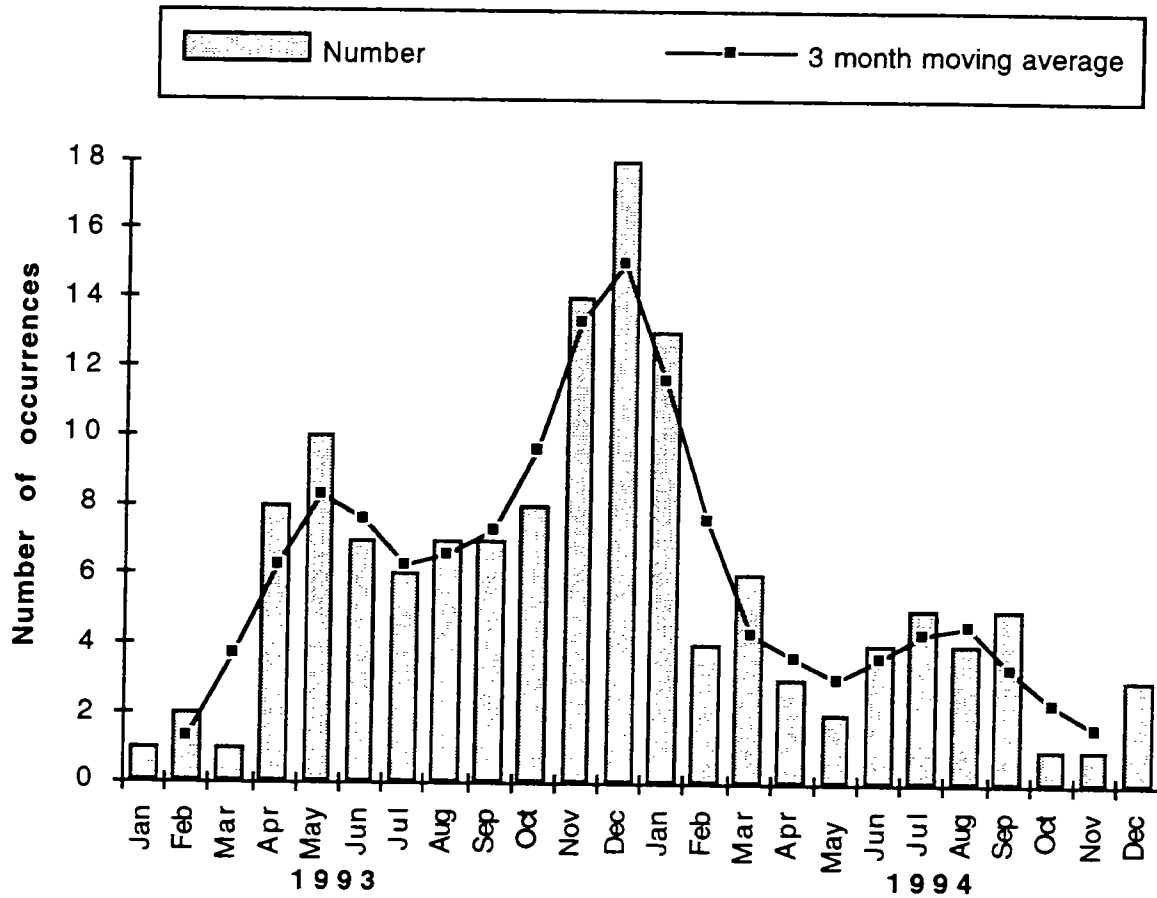
Current Joint Considerations

The potential to remedy some of the deficiencies has been facilitated by these changes. Indonesian ATS authorities have informed Australia of a plan for technical improvement and modernisation during 1994 which acknowledges the existing situation.

Another item now being considered by the CAA and Indonesian ATS, is to display relevant parts of the LOA written in the Indonesian language at the consoles of the Indonesian ATS officers. They are currently printed in English only.

ADDENDUM

BREAKDOWN IN COORDINATION OCCURRENCES INVOLVING AUSTRALIAN AND INDONESIAN ATS (JANUARY 1993 TO DECEMBER 1994)



Conclusions

This review has identified a frequency and possible upward trend in the numbers of breakdowns in co-ordination occurrences involving aircraft transiting between Indonesian and Australian flight information regions. This is a concern for the Bureau of Air Safety Investigation, a concern which is also expressed by the CAA as evidenced by their negotiations with the Indonesian authorities and the joint signing of the LOA and MOC documents.

Safety Advisory Notice (SAN) 940072 has been raised to document the Bureau's concerns in this area.

Safety Actions

Safety Advisory Notice: SAN940072

This advisory notice concerns the number of ATS co-ordination breakdowns between Indonesia and Australia. Information Paper (IP94/04) details the statistical data for the period 1 January 1992 to 31 January 1994 and is presented for your information.

The Bureau of Air Safety Investigation suggests that:

1. The Civil Aviation Authority and Indonesian ATS authorities continue to actively pursue implementation of the provisions of their Letter of Agreement in an attempt to minimise the number of co-ordination failures affecting the FIR boundary;
2. The CAA and Indonesian ATS authorities, in accordance with the Memorandum of Cooperation, jointly pursue technical improvements to assist in overcoming co-ordination deficiencies; and
3. The Civil Aviation Authority and the Indonesian ATS authorities, together with ICAO, construct a new air route structure which requires 'one way' tracking when south of the Indonesian land mass.

In addition the Bureau of Air Safety Investigation will monitor breakdowns in co-ordination occurrences and provide both the Civil Aviation Authority and Indonesian ATS authorities with quarterly statistical reports.

LETTER OF AGREEMENT

BETWEEN

CIVIL AVIATION AUTHORITY AUSTRALIA

and

INDONESIA DIRECTORATE GENERAL OF AIR COMMUNICATIONS

SUBJECT: Separation standards, level assignment, and co-ordination procedures applicable between ie following Air Traffic Services (ATS) units:

BRISBANE AREA APPROACH CONTROL CENTRE (AACC);

BRISBANE FLIGHT INFORMATION CENTRE (FIC);

PERTH AREA APPROACH CONTROL CENTRE (AACC);

PERTH FLIGHT INFORMATION CENTRE (FIC);

TOWNSVILLE¹ AREA CONTROL CENTRE (ACC).

and

JAKARTA AREA CONTROL CENTRE (ACC);

JAKARTA FLIGHT INFORAMTION CENTRE (FIC);

BALI AREA CONTROL CENTRE (ACC);

BALI FLIGHT INFORMATION CENTRE (FIC);

UJUNG PANDANG AREA CONTROL CENTRE (ACC);

UJUNG PANDANG FLIGHT INFORMATION CENTRE (FIC);

BIAK FLIGHT INFORMATION CENTRE (FIC)

¹ Townsville ACC to be relocated to Brisbane ACC during February/March 94 - details to be notified

1. INTRODUCTION

1.1 EFFECTIVE DATE : 18 December 1993

1.1.1 This Letter of Agreement cancels and replaces the previous agreement which was effective from 15 March 1993.

1.2. **OBJECTIVE** : A statement of agreed procedures applicable between Australian and Indonesian ATS Units in respect of aircraft operating on routes between Australian and Indonesian Flight/Upper Information Regions.

1.3. **SCOPE** : The procedures contained in this operational Letter of Agreement supplement or detail, where so required in the vicinity of the common FIR boundary, those prescribed by ICAO in Annex 2, Annex 11, PANS/RAC (Document 4444), Regional Supplementary Procedures (Document 7030), and local AIP and ATS instructions.

1.3.1 Annexes providing supplementary information on technical statements of agreed procedures, between specified ATS Units, are described at paragraph 6.

2. AIRSPACE

2.1. Within the Australian FIRs, Oceanic Controlled Airspace (OCA) is established between FL245 and FL460.

2.2 Within the Indonesian UIRs, on designated ATS routes, Upper Control Area (UTA) is established between FL245 and FL460.

2.3 The ATS responsibilities of the applicable Australian and Indonesian ATS units are outlined at Attachment A.

3. SEPARATION

3.1 **VERTICAL** : Assignment of cruising levels shall follow the international standards and recommended practices of ICAO Annex 2 and PANS-RAC (Document 4444).

3.1.1 Assignment of cruising levels shall comply with the IFR table of cruising levels in Appendix C of ICAO Annex 2, except as specified in para 3.1.2.

3.1.2 Levels which do not correlate to track may be assigned subject to prior co-ordination and agreement.

NOTE: This provision is to be used judiciously; an example would be to make more optimum levels available at times of significant one way traffic flow.

- 3.2 **HORIZONTAL** : With regard to the longitudinal crossing separation as specified in ICAO Document 4444, Section III, paragraph 8.2.1.2, the Indonesian and Australian positions are as follows:
- 3.2.1 Indonesia and Australia both define crossing tracks as tracks which cross at an angle of forty-five degrees or greater.
- 3.2.2 The Indonesian position follows ICAO advice, which applies a fifteen minute case for crossing tracks in Oceanic Airspace, whilst the Australian position is that for crossing tracks, lateral separation, and not longitudinal separation, is applied.
- 3.2.3 While specifying the above difference, both parties agree that the appropriate Indonesian or Australian standard shall be effective from the point of transfer of control at the common FIR boundary, except where specified in the attached Annexes.
- 3.2.4 The **LONGITUDINAL SEPARATION MINIMA** shall be:
- (a) **FIFTEEN MINUTES** between aircraft equipped with serviceable enroute navigational equipment, INS/IRS or VLF/Omega operating in controlled airspace on route segments between the Indonesian and Australian FIRs; or
- (b) **LESS THAN FIFTEEN MINUTES** - refer ATTACHMENT B
- 3.2.4.1 If circumstances warrant, such as failure of nav-aids or poor communication, an increase in longitudinal separation may need to be applied. Any increase in separation shall be co-ordinated with applicable ATC units.
4. **CO-ORDINATION PROCEDURES - CONTROLLED AIRSPACE**
- 4.1. The Transfer of Control Point (TCP), which is also the point of acceptance of transfer of primary guard, shall be the common FIR boundary.
- 4.2 All ATS units shall advise the EST for the TCP at least thirty (30) minutes prior to the time at which the aircraft becomes the responsibility of the accepting unit. Such messages constitute an offer of transfer of control.
- 4.3 After the EST has been advised, prior co-ordination is required with the adjacent unit before amending the ATC clearance;
- 4.4 Clearances shall be co-ordinated with the adjacent unit, prior to issue, when the flying time to the TCP is less than thirty (30) minutes.
- 4.5 When within fifteen (15) minutes flying time after passing the TCP, co-ordination shall occur in respect of amendment to the ATC clearance.

4.6 After the EST for the TCP has been advised, units shall relay any revised EST that varies by 3 minutes or more.

4.7 Units shall relay significant details of any flight which is, or intends, operating in controlled airspace, at or within 50NM of the common FIR boundary.

4.8 The EST message shall contain, in the order shown:

- (a) aircraft identification; and
- (b) the FIR boundary position and time; and
- (c) the assigned level; and
where applicable:
- (d) Mach Number; and
- (e) the longitudinal distance between aircraft.

4.9 Use of communications systems for co-ordination between adjacent units shall use voice communication in the following order of priority:

- (a) ATS direct speech circuits;

Note : circuit identified as - Indonesia : "D" circuit
Australia : L999 (Satlink)

- (b) international telephone system;

4.10 Readbacks shall comprise all elements of the Estimate Message listed in para 4.8. Readback by the receiving unit confirms acceptance of the offer of transfer of control, subject to any other conditions negotiated.

4.11 If the above facilities are inoperative then co-ordination shall be carried out in accordance with the following contingency measure;

- i) AFTN EST message, and
- ii) Aircraft instructed to provide the adjacent centre with boundary estimate and flight level via the appropriate communications unit.

Receiving unit shall provide formal acceptance to the aircraft.

Aircraft will be expected to provide confirmation to the requesting ATS unit that the co-ordination has been affected.

This process shall be initiated no later than 30 minutes prior to the EST for the FIR boundary

- 4.11.1 In case of the need to adopt the contingency measure listed in para 4.11 (ii), the following phraseology shall be used;

Advice to aircraft

"(callsign), unable to co-ordinate with (adjacent unit), contact (ATS unit) on (frequency) and advise estimate for (boundary fix) and flight level - advise acceptance by (adjacent unit)"

Acceptance

"(receiving unit) accepts (callsign), (boundary fix) - FL___"

- 4.11.2 When an AFTN EST message is required, the following format shall be used;

(EST-QFA52-WSSS-KIKEM1731/M079F370-YBBN)

5. CO-ORDINATION PROCEDURES - UNCONTROLLED AIRSPACE

- 5.1 These procedures cover flights proceeding between:

- (a) Australian OCA and uncontrolled airspace within the Indonesian FIR; and
- (b) Uncontrolled airspace between Australian FIRs and Indonesian FIRs.

- 5.2 All ATS units shall, in respect of IFR flights;

- (a) advise the EST for the FIR boundary (TCP) at least thirty (30) minutes prior to the time at which the aircraft becomes the responsibility of the accepting Unit.
- (b) after exchange of an EST message, co-ordinate any level change occurring prior to the aircraft crossing the FIR boundary (TCP).

- 5.3 ATS units shall co-ordinate significant details of any IFR flight, (with the exception of those flights in the Timor Sea associated with oil rig activities), which intends operating, at or within fifty nautical miles of the common FIR boundary.

NOTE: VFR aircraft operating outside Australian controlled airspace are not required to report position to Australian ATS units prior to the common boundary, but may use reporting schedules whilst within Australian FIRs. VFR aircraft exiting Australian FIR for the Jakarta, Bali, Ujung Pandang or Biak FIR are responsible for establishing communications and their own SAR requirements with the relevant FIC prior to crossing the common FIR boundary.

6. ANNEXES TO THIS LETTER OF AGREEMENT

6.1 The following technical statements of agreed procedures are annexed to this operational letter of agreement:

ANNEX A - Between Perth and Jakarta .

ANNEX B - Between Perth and Bali .

ANNEX C - Between Brisbane and Ujung Pandang .

ANNEX D - Between Brisbane and Bali .

7. REVISION

7.1 This agreement, and the Annexes specified in paragraph 6, shall be subject to revision whenever a modification to ICAO Standards, Recommended Practices and/or Regional Supplementary Procedures and Indonesian or Australian Operational procedures or instructions, which might affect the procedures contained in this agreement occurs; or when new communications facilities, or air traffic services which might affect these procedures, are commissioned.

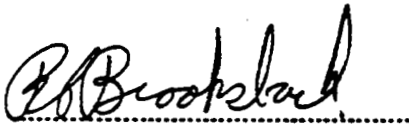
7.1.1. In the case of changes in ICAO regulations, either State shall initiate the modification procedures, and in the case of new installations or modifications to existing installations, the State concerned shall initiate the modification procedure.

7.1.2. For any other matter which might make it advisable to change this agreement, or the associated attachments, the interested State shall propose the pertinent revision.

8. DISSEMINATION.

8.1 The dissemination of this agreement and of its subsequent modification shall be made in full 30 days before the effective date.

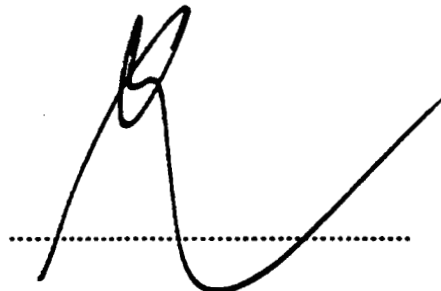
Signed in CANBERRA and JAKARTA



MR B A BROOKSBANK

General Manager
Air Traffic Services
Civil Aviation Authority Australia

Date: 5 November 1993



MR PRAJITNO

Director of Aviation Safety
Indonesian Directorate
General of Air Communications

Date: November 1993

ATTACHMENT A

para 1 **ATS UNITS, AREAS of RESPONSIBILITY, and ATS SERVICES**

para 2 **ATS units involved in this agreement, with their area of responsibility at the FIR boundary and direct speech circuit identifier.**

para 3 **AUSTRALIAN ATS UNITS**

BRISBANE AREA APPROACH CONTROL CENTRE (AACC)

Supervisor : +61 7-8663530

Fax : +61 7-8681203

Sector 11 is responsible for the provision of ATC services to aircraft operating in OCA between 123 30E and 140 00E

Circuit identifier	94
Telephone	+61-7-8663711

TOWNSVILLE AREA CONTROL CENTRE (ACC)²

is responsible for the provision of ATC services to aircraft operating in OCA east of 140 00E.

Supervisor: +61-77-273976

Fax: +61-77-273975

Circuit identifier	n/a
Telephone	+61-77-791991

BRISBANE FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of a traffic information and a SAR alerting service to aircraft operating outside controlled airspace in the Brisbane FIR.

Circuit identifier	n/a
Telephone	+61-7-8663609

²Townsville ACC to be relocated to Brisbane AACC during February/March 94 - details to be notified

PERTH AREA APPROACH CONTROL CENTRE (AACC)

Supervisor : +61 9 476 8620

Fax : +61 9 476 6814

SECTOR 1 is responsible for the provision of ATC services to aircraft operating in OCA west of and including ATS route B469 (LAMOB).

Circuit identifier	91
Telephone	+61-9-476-8616

SECTOR 2 is responsible for the provision of ATC services to aircraft operating in OCA from ATS route A585 (SAPDA) in the west to ATS route R575 (UPLOK) in the east.

Circuit identifier	93
Telephone	+61-9-476-8617

PERTH FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of flight information and a SAR alerting service to aircraft operating outside controlled airspace in the Perth and Darwin FIRs and also provides a communication and SAR alerting service on behalf of Brisbane and Perth AACC outside their VHF coverage.

Circuit identifier	n/a
Telephone	+61-9-476-8607

para.4

INDONESIAN ATS UNITS

JAKARTA AREA CONTROL CENTRE (ACC)

is responsible for the provision of ATC services in the Jakarta UTA between GOBOX and XMX VOR

Circuit identifier	77
Telephone	+62-21-550-6178

JAKARTA FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of flight information and SAR alerting services to aircraft beyond Jakarta controlled airspace XMX-02S 92E, and for providing communication and SAR alerting services on behalf of Jakarta ACC, within Jakarta controlled airspace beyond VHF coverage.

Circuit identifier	81
Telephone	+62-21-550-6188

BALI AREA CONTROL CENTRE (ACC)

is responsible for the provision of ATC services to aircraft operating in the Bali UTA

Circuit identifier	42
Telephone	+62-361-755140

BALI FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of flight information and SAR alerting services to aircraft operating beyond Bali controlled airspace and for providing SAR alerting and communications services on behalf of Bali ACC within Bali controlled airspace beyond VHF coverage.

UJUNG PANDANG AREA CONTROL CENTRE (ACC)

is responsible for the provision of an ATC service to aircraft operating in the Ujung Pandang UTA. This includes ATS routes B583 in the west to B473 in the east.

Circuit identifier	32
Telephone	+62-411-510253

UJUNG PANDANG FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of flight information and SAR alerting services to aircraft operating beyond Ujung Pandang controlled airspace in the Ujung Pandang UIR and communications services on behalf of Ujung Pandang ACC within Ujung Pandang controlled airspace beyond VHF coverage.

BIAK FLIGHT INFORMATION CENTRE (FIC)

is responsible for the provision of flight information and SAR alerting services to aircraft operating in the Biak FIR

ATTACHMENT B

para 1 LONGITUDINAL SEPARATION (PARA 2.2.4 REFERS)

para 2 As outlined in ICAO Regional Supplementary Procedures (DOC 7030), the minimum longitudinal separation minima between turbo-jet aircraft using INS/IRS or VLF Omega, that are NAV/AUSEP or Minimum Navigation Performance Specifications (MNPS) approved (see para. 4), operating on controlled Oceanic route segments between Australia, Indonesia and Singapore, when the Mach number technique is applied, and whether in level, climbing or descending flight, shall be:

a. ten (10) minutes, provided :

- i) the aircraft concerned have reported over a common point and follow the same track or continuously diverging tracks until some other form of separation is provided; or**
- ii) if the aircraft have not reported over a common point it is possible to ensure, by radar or other means approved by each State, that the appropriate time interval will exist at the common point from which they either follow the same track or continuously diverging tracks; or**

b. between nine (9) and five (5) minutes inclusive, provided:

- i) it is possible to ensure, by radar or the passage of the aircraft over the same, on track radio fix, that the required time interval will exist at the common point from which they either follow the same track or continuously diverging tracks; and**
- ii) the preceding aircraft is maintaining a greater Mach number than the following aircraft, in accordance with the following table:**

Difference in Mach	Time interval required between aircraft
0.02	9
0.03	8
0.04	7
0.05	6
0.06	5

- para 3 Application of the longitudinal separation between aircraft, when the Mach Number Technique is used is based on the assumption that the last assigned Mach Number will be maintained at all times, including during any climbs and descents. In the event that for operational reasons it is not feasible to do so, the pilot must inform ATC at the time of initial clearance or subsequent climb/descent request or clearance.
- para 4 NAV/AUSEP approval relates to those aircraft and operators that have been approved by their state of Registry as meeting the RNAV equipment and operating standards specified in the Australian Flying Operations Standards & Instructions (FOSI) and the Australian AIP. Such operators indicate AUSEP approval by inserting NAV/AUSEP in field 18 of their flight plans. Similarly, MNPS approval relates to those aircraft and operators that meet the Minimum Navigation Performance Specification (MNPS) as specified in ICAO Doc 9426. Such operators indicate MNPS approval by inserting the letter "X" in field 10 of their flight plan.

ANNEX A - BETWEEN PERTH AND JAKARTA

A1. INTRODUCTION

A1.1 **OBJECTIVE** : A technical statement of agreed procedures between Perth AACC and Jakarta ACC/FIC in respect of aircraft operating between Jakarta and Perth Upper/Flight Information Regions.

A2. CO-ORDINATION

A2.1 TCP from Jakarta ACC to Perth AACC are:

ROUTE	TCP	PERTH SECTOR	CDN
G333	GOBOX	Sector 2	93
A585	SAPDA	Sector 2	93
B469	LAMOB	Sector 1	91
R586	TENON	Sector 1	91

A2.1.1 TCP from Perth AACC to Jakarta ACC are:

ROUTE	TCP		CDN
G333	GOBOX		77
A585	SAPDA		77
B469	LAMOB		77
R586	TENON		77

A2.1.2 Published transfer from Jakarta FIC to Perth AACC is:

ROUTE	TCP	PERTH SECTOR	CDN
B335	POSOD	Sector 1	91

A2.1.3 TCP from Perth AACC to Jakarta FIC is:

ROUTE	TCP		CDN
B335	POSOD		81

A2.2 CHRISTMAS ISLAND : GENERAL

Aircraft overflying XMX VOR shall be co-ordinated in the same manner as described in the main letter of agreement except that the TCP shall be XMX VOR.

A2.3 CHRISTMAS ISLAND : ARRIVALS

A2.3.1 R206 : PD - XMX

Perth AACC shall provide Jakarta ACC with the estimate for ATMAL and XMX no later than 30 minutes prior to the estimate for ATMAL. On receipt of this advice Jakarta ACC shall specify restrictions on descent. (Perth AACC is responsible for the issue of a descent clearance)

A2.3.2 LM - XMX and ATS ROUTE G337

Perth AACC shall provide Jakarta ACC with the estimate for XMX no later than 30 minutes prior to that estimate. On receipt of this advice Jakarta ACC shall specify restrictions for descent.

A2.3.3 CC - XMX

Perth AACC has no requirement to co-ordinate with Jakarta ACC in respect of these flights.

A2.3.4 HLM - XMX and PLB - XMX

Jakarta ACC has no requirement to co-ordinate with Perth AACC in respect of these flights.

A2.4 CHRISTMAS ISLAND : DEPARTURES

A2.4.1 ATS ROUTE R206, XMX-LM or ATS ROUTE G337

Perth AACC shall provide Jakarta ACC taxi advice on these flights. Jakarta ACC shall specify any restrictions to the clearance proposed by Perth AACC. Perth is not required to advise Jakarta ACC of the departure time of these aircraft.

A2.4.2 XMX-PLB and XMX-HLM

Jakarta ACC has no requirement to co-ordinate with Perth AACC in respect of these flights.

A2.5 CHRISTMAS ISLAND : CO-ORDINATION REQUIREMENTS

A2.5.1. Primary guard for flights from the Australian mainland to Christmas Island shall normally be retained by Perth FIC until SARWATCH is terminated in the circuit area of Christmas Island.

A2.5.2. Primary guard for flights from the Cocos Islands to Christmas Island shall normally be retained by Perth FIC until SARWATCH is terminated in the circuit area Christmas Island.

A2.5.3. Where a flight will depart Christmas Island for the Australian mainland, Perth FIC shall normally accept primary guard from receipt of the taxi report.

A2.5.4. Where a flight will depart Christmas Island for Cocos Island, Perth FIC shall normally accept primary guard from receipt of the taxi report at Christmas Island.

A2.6 ATTS ROUTE B335

A2.6.1 These flights operate in uncontrolled airspace in the Jakarta FIR, and in controlled airspace in the Perth FIR.

A2.6.2 Co-ordination shall be effected directly between Jakarta FIC and Perth AACC utilising the "D" channel/L999 direct speech circuit.

A2.6.3 Jakarta FIC shall provide Perth AACC with an estimate for POSOD for westbound flights on B335.

A2.7 SEPARATION RESPONSIBILITIES

A2.7.1 When longitudinal separation does not exist Perth AACC shall separate vertically aircraft northbound on the following ATTS routes;

- a) G333 and A585(sector 2)
- b) B469 and R586(sector 1)
- c) B469 and A585(sector 1/2)

A2.7.1 The provision of separation between aircraft northbound on ATTS route A585 (PD - HLM) and ATTS route R586 (CAR - PLB) shall be the responsibility of Jakarta ACC.

A3. MACH NUMBER TECHNIQUE

A3.1 When applying Mach Number Technique between aircraft southbound on the G333/A585 route combination, Jakarta ACC shall determine the appropriate spacing at IPKON in accordance with the following table;

Closing MACH	Time interval required at IPKON
0.01	11
0.02	12
0.03	13
0.04	14
0.05	15
0.06	16
0.07	17

ANNEX B - BETWEEN PERTH AND BALI

B1. INTRODUCTION

B1.1 **OBJECTIVE :** A technical statement of agreed procedures between Perth AACC and Bali ACC in respect of aircraft operating between Bali, Darwin and Perth Upper/Flight Information Regions.

B2 CO-ORDINATION

B2.1 Published transfer of control (TCP) points between Bali and Perth are:

ROUTE	TCP
R575	UPLOK
A576	ATMAP
G578	EGATU
G463	OGAMI

B2.2 When aircraft are northbound on ATS route G333 Perth may impose a requirement on aircraft departing Denpasar :

- (a) on ATS route G463 - Reach FL (assigned level) by 185 DME Bali; or
- (b) on ATS route G578 - Reach FL (assigned level) by EGATU.

B2.3 Perth AACC shall separate vertically, aircraft northbound on ATS routes R575, A576, G578, G463 when a longitudinal minimum of 15 minutes does not exist overhead the BLI VOR, except in the following cases;

- (a) when application of the Mach Number Technique reduces the route longitudinal time minimum to 10 minutes, or
- (b) when one or both aircraft in the following route combinations are landing at Denpasar.

G463/A576
G463/R575
G578/R575

B2.4 As an exception to the requirements of para 3.2.3 in the letter of agreement, Perth AACC shall consider aircraft southbound on ATS route A576 to be laterally separated from aircraft southbound on ATS route R575.

B2.5 The co-ordination requirement is waived for aircraft landing at Denpasar upon positive radar identification.

B2.6 In accordance with para 4.4 of the letter of agreement, Bali ACC shall provide taxi advice to Perth AACC on turbo-jet aircraft departing Denpasar on ATS routes G463 or G578, .

B3 COMMUNICATION

B3.1 Perth shall transfer aircraft northbound on ATS routes G463, G578 and A576 to Bali ACC (VHF frequency 120.7Mhz).

ANNEX C - BETWEEN BRISBANE AND UJUNG PANDANG

C1. INTRODUCTION

C1.1 **OBJECTIVE** : A technical statement of agreed procedures between Brisbane and Ujung Pandang in respect to aircraft operating between Ujung Pandang and Darwin Upper/Flight Information Regions.

C2. CO-ORDINATION

C2.1 Published transfer of control points between Ujung Pandang and Brisbane are:

ROUTE	TCP
B473	OPABA
B472	TOREX
A461	BUTPA
A339	ELBIS
B583	ELBIS

C2.2 The provision of separation between aircraft on ATS routes:

- W54 and B472; and

- W54 and B473

shall be the responsibility of Ujung Pandang ACC.

C2.3 Ujung Pandang ACC is not required to co-ordinate traffic on ATS route W54 with Brisbane ACC.

C2.4 Lateral separation with ATS route W54 exists as follows:

- B472 - 20NM south of TOREX;

- B473 - 55NM south of OPABA.

C2.5 For aircraft southbound on ATS routes B472 and B473, Brisbane ACC will co-ordinate any amendments to flight levels or clearances within 20 minutes flying time after passing the FIR boundary (TCP).

ANNEX D - BETWEEN BRISBANE AND BALI

D1. INTRODUCTION

D1.1 OBJECTIVE : A technical statement of agreed procedures between Brisbane and Bali in respect of aircraft operating between Bali FIR, Jakarta UIR and Darwin FIR.

D2. CO-ORDINATION

D2.1 Published transfer of control points between Bali and Brisbane are:

ROUTE	TCP
A464	KIKEM
G462	SATNA

D2.2 For aircraft operating Kupang to Darwin, co-ordination shall be effected between Bali ACC and Brisbane ACC prior to departure.

D2.3 Brisbane AACC is not required to co-ordinate traffic on ATS route A339 with Bali ACC.

**RECOMMENDATIONS, OBSERVATIONS AND CONSIDERATIONS FROM CAA AUSTRALIA
VISIT TO INDONESIA DGAC DURING THE PERIOD 14 - 21 AUGUST 1992**

Recommendations :

It is recommended that :

1. Australia and Indonesia continue to co-operate and jointly identify the causes of, and solutions to, ATC co-ordination problems, and to promptly implement any corrective action required to ensure compliance with the requirements of the AUS/INDO ATS Letter of Agreement (LOA).
2. Both States ensure that their controllers are fully aware of and apply the co-ordination requirements of the LOA:
 - co-ordinate any revised estimates or levels; and
 - provide 30 minutes prior boundary notice or taxi advice of aircraft departures to Australia.
3. An amendment to the LOA be implemented on 12 November 1992. The amendment will address the specific ATS requirements relating to the permanent introduction of separation minima between Australia and Indonesia in accordance with ICAO Regional Supplementary Procedures (Doc 7030).
4. A NOTAM be issued by Australia, Indonesia and Singapore to introduce longitudinal separation minima (10 minutes with Mach Number Technique), as approved by ICAO, between RNAV approved aircraft, on specified ATS routes, between Australia, Indonesia and Singapore. This NOTAM to be effective from 9208231600 UTC.
 - NOTAM issued on August 18.
5. As the 7th Annual International Oceanic Airspace Conference and the 3rd Informal South Pacific ATS Co-ordinating Group (ISPACG) Meeting, will both be hosted by the FAA in Honolulu, during the period 20 - 30 October, and be used to review the RNAV Demonstrations outlined in recommendation 4, it is hoped that Indonesia will accept the FAA invitation to participate in these meetings.
6. To improve the co-ordination on international flights Kupang direct Darwin, Indonesia consider improving the quality and reliability of the direct speech circuit between Kupang and Bali.

7. That "unit identification" be adopted as an essential element of standard intercom technique.
8. Indonesia issue a NOTAM, at the earliest possible opportunity, to instruct aircraft departing Kupang for Australia to call Perth Radio immediately after departure. This call should include departure time, intended level and boundary estimate.
9. Aircraft operating within airspace associated with tracks to and over Christmas Island (XMX VOR) be provided with an ATC service above FL245 and the sector boundary be amended accordingly. It is also recommended that a direct route be introduced between XMX VOR - PKU VOR via PB NDB to accommodate flights between Perth and Kuala Lumpur/Bangkok/Phuket.
10. Indonesia consider the provision of an ATC service on ATS route B335.
11. As the distance between IPKON and SAPDA on ATS routes G333/A585 is 303NM, the wall display and charts at Jakarta ACC be amended.
12. An "ATS Operational Awareness Program", designed to provide Air Traffic Service personnel (management and controllers) with an opportunity to visit adjoining centres to observe and improve ATC procedures and practices, be established between Australia and Indonesia at the earliest possible opportunity.
13. Indonesia support Australia's submission to ICAO for the introduction of an 80NM RNAV longitudinal separation minima in the Asia and Pacific Regions. The submission has received formal support from eight States and IATA.
14. Indonesia support Australia's proposal for amendment of the MID/ASIA Air Navigation Plan relating to new ATS routes through Southeast Asia.
15. As recommended by ICAO, Australia and Indonesia continue to liaise and exchange information regarding the introduction of the ICAO Annex 11 Airspace Classification System.
16. Indonesia consider the provision of training programs for ATS supervisory and operational staff such as those programs that are specifically designed to enhance ATS system performance, e.g. On-The-Job-training (OJTI) and Shift Supervision courses.

Observations and Considerations :

The following observations are made for your consideration.

1. Indonesia consider adoption of Australia's practice of establishing communications systems that utilise duplicated satellite earth stations strategically positioned adjacent to the Area Control Centre. The implementation of such a system would reduce reported co-ordination problems and thereby enhance system integrity and performance.
2. Indonesia consider the establishment of an ATS Quality Assurance (QA) program to enhance ATS system performance.
3. Channel overloading was observed on the "D" circuit which resulted from the amount of traffic the line was required to carry. It was considered that the establishment of separate International and Domestic co-ordination circuits would rectify the problem.
4. There was a twenty minute delay in the generation of a departure message from Kupang to Darwin. Such delays mean that an aircraft departing Kupang for Australia are well within Australian airspace prior to message receipt in the Darwin ACC. AFTN messages are not the primary means of co-ordination, but an essential element of the safety net.
5. The individual responsibilities of the radar controller and the planning controller should be more clearly defined.
6. Benefit will be gained as part of the Operational Awareness Program, of having the Indonesian controllers observe and consider for their application, Australian methods of recording data on flight progress strips.
7. Throughout the visit, the group has observed that documentation and maps used in wall and overhead displays are outdated.
8. Greater use of headsets and the provision of a facility for controller monitoring would be beneficial.
9. Contrary to Australian practice, television sets were observed in operational areas.

10. It is considered that the co-ordination on ATS route B335 would be simplified if the route was controlled by either Jakarta or Medan ATC. It is also recommended that a similar approach be applied to a new ATS route proposal between Plaisance - ELATI - Medan, which is currently being co-ordinated by ICAO Bangkok.

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G LAWSON-SMITH
Manager Airspace Management
Air Traffic Services Division
CAA Australia
Date : 21 August 1992

.....
M KADARUSMAN
Assistant Director Airways
Operations
Indonesia DGAC
Date : 21 August 1992

MEMORANDUM OF COOPERATION

BETWEEN

**CIVIL AVIATION AUTHORITY
AUSTRALIA**

AND THE

**DIRECTORATE GENERAL OF AIR COMMUNICATIONS
INDONESIA**

WHEREAS, the Government of Australia, represented by the Civil Aviation Authority, subsequently referred to as the CAA, and the Government of Indonesia represented by the Directorate General of Air Communications, subsequently referred to as the DGAC, have as a common purpose the promotion and development of technical cooperation in civil aviation between the two countries, **a n d ;**

WHEREAS such cooperation will enable more people to benefit from safe aviation through a focus on safety, efficiency and level of service,

NOW THEREFORE, the CAA and the DGAC, subsequently known as the parties, jointly decide to undertake joint programs, in accordance with the following understanding and arrangements.

ARTICLE 1 – PURPOSE OF MEMORANDUM

A. The purpose of this Memorandum of Cooperation (MOC) is to broadly describe arrangements for mutual cooperation in the area of civil aviation .

B. Areas of cooperation may include but are not limited to the following :

1. Human resources development

This includes activities in the field of training, familiarisation and visit programs, exchange of staff and any other activities relating to personnel matters.

2. Operational

Operational issues may include the exchange of information regarding programs and projects of research, research results or publications, data on operational occurrences, volcanic ash arrangements, activities with regard to harmonisation of airspace management (including ATS procedures and separation standards application), quality assurance, joint organisation of symposia or conferences, and any other matter related to the safety and efficiency of operations, and ARFF (Aircraft Rescue Fire Fighting).

3. Regulation

Matters of regulation will be examined with the aim of harmonisation in the areas of airworthiness and safety regulations.

4. Equipment/facility

This will include exchange of relevant information on equipment and facilities which support operational activities, the conduct of system joint trials and demonstrations, and any other technical matters.

- C. The specific activities to be performed by the parties under this MOC will be detailed by mutual consent in annexes to this MOC.

ARTICLE II – FUNDING

Unless otherwise specified in the annexes, each party will assume the cost of work to be done by it, in accordance with specific tasks identified in the annexes.

ARTICLE III – IMPLEMENTATION

- A. This MOC shall be implemented through technical annexes, which when mutually agreed to by both parties shall form part of this MOC and become effective in accordance with article X of the MOC.
- B. Representatives from the CAA and the DGAC will meet periodically to discuss potential new program activities. A joint review of the program status of ongoing activities, which are the subject of annexes to this MOC, will be conducted at least once each year by the parties.

ARTICLE IV – PERSONNEL PARTICIPATION

Under this MOC and as identified in the annexes to this MOC, an exchange of personnel may be undertaken as required to pursue the activities described in the annexes. Such personnel will accomplish work as mutually agreed by the parties in the annexes. Such personnel may be from the CAA, the DGAC, or supporting Government agencies, as mutually agreed. Administrative support provisions for personnel being exchanged shall be delineated in each appropriate annex.

ARTICLE V – EQUIPMENT AND LOAN ARRANGEMENTS

Equipment which will be identified in each appropriate annex may be loaned or exchanged by the parties. With respect to the exchange of equipment, the following general provisions apply unless otherwise specified in the annexes :

- Upon completion of use or expiration or termination of the pertinent annex or the MOC, the borrower will return the equipment to the lender.
- Any transfers of technology, equipment or other items pursuant to this MOC shall be subject to the applicable laws and policies of the parties.

ARTICLE VI – RIGHTS

Except as required by applicable law, neither party will release any information or material pertinent to the tasks, or related to the agreed program to third parties other than contractors or subcontractors engaged in the program, unless agreed to in the applicable annex.

ARTICLE VII – LIAISON

Program liaison will be established as indicated in the annexes for specific activities.

ARTICLE VIII – AMENDMENTS

This MOC or its annexes may be amended by mutual consent of the parties to provide for change of requirements and continuation of the programs. Any changes in the services furnished or other provisions shall be formalised by an appropriate written amendment, signed by both parties, which shall outline the nature of change.

ARTICLE IX – RESOLUTION OF DISAGREEMENTS

Any disagreement regarding the Interpretation or application of this MOC or its annexes will be resolved by consultation between the two parties and will not be referred to any international tribunal or third party for settlement.

ARTICLE X – EFFECTIVE DATE AND TERMINATION

This MOC will become effective upon signature of both parties and will remain in effect for a period of five (5) years. This MOC may be terminated at any time by either party by providing sixty (60) days notice in writing to the other party.

ARTICLE XI – AUTHORITY

The CAA and the DGAC agree to the provisions of this MOC as indicated by the signature of their duly authorised representatives.

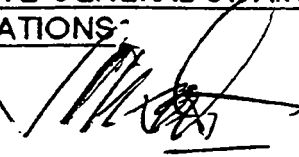
AUSTRALIA

CIVIL AVIATION AUTHORITY

BY : 
TITLE : CHIEF EXECUTIVE OFFICER
DATE :

INDONESIA

DIRECTORATE GENERAL OF AIR COMMUNICATIONS

BY : 
TITLE : DIRECTOR GENERAL
DATE :