



*The* UNIVERSITY *of* NEWCASTLE

---

AUSTRALIA

***The Clarity and Accessibility of NOTAM  
Information for the Aviation Industry***

**Technical Report Prepared for the  
Bureau of Air Safety Investigation (BASI)**

**October 1997**  
ISBN 0 642 27455 X

Robert F. Potter & Michael D. Nendick

**Department of Aviation & Technology  
University of Newcastle**

## **DISCLAIMER**

*This report was commissioned by the Bureau of Air Safety Investigation as a preliminary investigation of the human factors issues associated with the NOTAM system in Australia. It is distributed by BASI in the interests of industry discussion. The views expressed in this report are those of the authors and do not necessarily reflect BASI policy.*

## **ACKNOWLEDGMENTS**

The authors would like to acknowledge the assistance of those individuals who volunteered to be interviewed to provide representative views of the industry for inclusion in this report. The information that they provided was instrumental in providing a foundation for future objective analysis of the various issues involved in providing an optimal NOTAM system to the Australian aviation industry.

# CONTENTS

<b>DISCLAIMER</b> .....	<b>II</b>
<b>ACKNOWLEDGMENTS</b> .....	<b>II</b>
<b>CONTENTS</b> .....	<b>III</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>IV</b>
BACKGROUND.....	IV
BASI REQUIREMENTS .....	IV
OBJECTIVES .....	IV
<b>INTRODUCTION</b> .....	<b>1</b>
HUMAN FACTORS AND NOTAM .....	1
THE REGULATORY DEFINITION OF NOTICES TO AIRMEN (NOTAM) .....	1
THE CONTENT OF NOTICES TO AIRMEN (NOTAM) .....	2
OBLIGATIONS TO OBTAIN AND USE NOTICES TO AIRMEN (NOTAM) .....	2
THE AVAILABILITY OF NOTICES TO AIRMEN (NOTAM) .....	3
THE STRUCTURE OF NOTICES TO AIRMEN (NOTAM) .....	3
DISSEMINATORS AND USERS OF NOTAM INFORMATION.....	4
<b>METHODOLOGY</b> .....	<b>6</b>
IDENTIFYING NOTAM USERS .....	6
IDENTIFYING NOTAM ORIGINATORS AND DISSEMINATORS .....	9
PARTICIPANTS.....	10
<i>NOTAM Users</i> .....	10
<i>NOTAM Disseminators</i> .....	10
PROCEDURE .....	10
<b>RESULTS AND DISCUSSION</b> .....	<b>12</b>
IDENTIFYING NOTAM ACCESSIBILITY.....	12
IDENTIFYING NOTAM SELECTIVITY .....	13
NOTAM PRESENTATION .....	14
NOTAM CLARITY.....	15
THE QUALITY AND RELEVANCE OF INFORMATION IN NOTAM.....	15
PARTICIPANT INTERVIEWS .....	17
<i>System Users</i> .....	17
<i>System Disseminators</i> .....	18
CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH .....	18
<b>REFERENCES</b> .....	<b>20</b>
<b>APPENDICES</b> .....	<b>21</b>

## **EXECUTIVE SUMMARY**

### **Background**

This report was commissioned by the Bureau of Air Safety Investigation (BASI) to investigate the system of Notices to Airmen (NOTAM) following statements from some airline flight crews that current NOTAM presentation is not optimised to meet their needs. Pilots had stated that:

- Some NOTAM are not clearly written,
- The NOTAM format can be difficult to decipher,
- There is too much irrelevant information provided.

### **BASI Requirements**

BASI has requested a preliminary report to identify the main issues involved with the current NOTAM system. The authors were requested to indicate the problems that are presently perceived to exist, to obtain industry recommendations for improvements, and to suggest a suitable procedure for further research into providing an optimal NOTAM service to the Australian aviation industry.

BASI required the following author qualifications for the report:

- An aviation background and experience,
- Familiarity with the use of NOTAM.

The primary investigator, Captain Rob Potter has an ATPL with over 6000 hours Regular Public Transport (RPT) and General Aviation (GA) Charter experience. He is a qualified ICAO Pans-Ops Procedure designer. Mike Nendick, is an aviation psychologist with a PPL, over 2200 hours as a military navigator, and Air Traffic Control experience.

### **Objectives**

The NOTAM system provides information which is of direct operational significance and which may immediately affect aircraft operations. Pilots preparing for a flight are required to quickly obtain and assess the applicability of available flight information. The NOTAM system should provide such information in a format that is:

- Accessible for timely delivery,
- Precise and easily understood,
- Relevant to the type of operation and the route being flown.

The objectives of this research project are to evaluate:

- NOTAM accessibility to each aviation industry sector,
- NOTAM presentation for clarity and quality of information,
- NOTAM selectivity for information relevance and flexibility.

# INTRODUCTION

## Human Factors and NOTAM

Human Factors provides a framework with which to evaluate the person-machine systems and allied technologies within aviation. Human factors being a discipline “that discovers and applies information about human behaviour, abilities, limitations, and other characteristics to the design of tools, machines, systems, tasks, jobs, and environments for productive, safe, comfortable, and effective human use” (Sanders & McCormick, 1992). NOTAM are an example of a person-machine system that can be evaluated in terms of an ideal from the users’ perspective. This report will consider the issues associated with NOTAM from this viewpoint.

## The Regulatory Definition of Notices to Airmen (NOTAM)

Regulation 2 (1) of the Civil Aviation Regulations defines Notices to Airmen or NOTAM as having the meaning given by Regulation 2 of the Air Services Regulations<sup>1</sup>

Regulation 2 of the Air Services Regulations requires that the Aeronautical Information Service (AIS)<sup>2</sup> must publish, from time to time, notices to be known as “Notices to Airmen” or “NOTAM”. These NOTAM are to include :

- a) Aeronautical Information **required to be published** in a NOTAM by:
  - i) the Air Services Regulations, or
  - ii) the Civil Aviation Act (1988), or
  - iii) the Civil Aviation Regulations, or
  - iv) any other Commonwealth Law; and,
- b) other Aeronautical Information, of importance to safe air navigation, that:
  - i) requires early publication and can be published more quickly in NOTAM than in the Aeronautical Information Publication (AIP);  
or
  - ii) is of temporary relevance.

---

<sup>1</sup> It should be noted that the Air Services Regulations is a document which would not normally be accessed by flight crew. The primary equivalent working regulatory document for flight crew is the Civil Aviation Regulations.

<sup>2</sup> The Aeronautical Information Service (AIS) is established pursuant to para. 8(1) of the Air Services Act 1995 and is responsible for the collection, collation and dissemination of aeronautical information and instructions relating to the safety, regularity and efficiency of air navigation. The AIS is administered by Airservices Australia.

## **The Content of Notices to Airmen (NOTAM)**

The Air Services Regulations define Aeronautical Information, for dissemination in the AIP and NOTAM, to be information in connection with :

- a) aerodromes;
- b) air traffic services and facilities;
- c) communication and air navigation services and facilities;
- d) meteorological services;
- e) search and rescue services and facilities;
- f) procedures and regulatory requirements connected with air navigation;
- g) notification of hazards to air navigation.

## **Obligations to Obtain and Use Notices to Airmen (NOTAM)**

The obligations to obtain and use the Aeronautical Information contained in the AIP and NOTAM are essentially threefold:

- a) Duty of Care obligations<sup>3</sup>;
- b) Particular Operational Requirements which would logically presuppose that flight crew have availed themselves of current information which would affect their ability to comply with the requirement;
- c) Specific Instructions contained in the Civil Aviation Regulations, Civil Aviation Orders or Aeronautical Information Publication (AIP).

The Civil Aviation Regulations do not directly specify the use of NOTAM, but Civil Aviation Regulation 239 (1) details a requirement to study information which, as detailed previously, would be provided by the AIS in the form of AIP information and NOTAM:

“Before beginning a flight, the pilot in command shall study all available information appropriate to the intended operation, and, in the cases of flights away from the vicinity of an aerodrome and all IFR flights, shall make a careful study of:

- a) current weather,
- b) the airways facilities available on the route to be followed and the condition of those facilities,
- c) the condition of aerodromes to be used and their suitability for the aircraft to be used,
- d) the Air Traffic Control rules and procedures appertaining to the particular flight;

---

<sup>3</sup> In general legal terms and under sections 20A and 28B of the Civil Aviation Act (1988), which deal with carelessness, recklessness and duty to exercise due care and diligence.

and the pilot shall plan the flight in relation to the information obtained.”

The situation could arise where a pilot may obtain all of the information required to operate a particular type of aircraft in a particular type of operation without needing to obtain NOTAM or indeed the AIP or other publications.

### **The Availability of Notices to Airmen (NOTAM)**

NOTAM are available via three primary means:

- a) direct access to the AFTN <sup>4</sup>,
- b) verbal briefing by telephone,
- c) electronic briefing by Facsimile, either via “self-help” systems or via verbal request by telephone.

The AIP states that the preflight briefing service is primarily an automated service<sup>5</sup> and that the responsibility for requesting appropriate information rests with the pilot<sup>6</sup>.

Details of the services available and user instructions for the automated system are listed in a separate publication called the Enroute Supplement Australia (ERSA).

Logically a user would need to possess the necessary Australian Publications, or their equivalent, in order to obtain the necessary instructions and codes to access the NOTAM provided by the automated system.

### **The Structure of Notices to Airmen (NOTAM)**

The AIP details<sup>7</sup> the structure or format which is used to present information in NOTAM. This format is consistent with the recommendations of the International Civil Aviation Organisation (ICAO).

The general format consists of seven “fields” identified as (A) to (G) as follows:

- (A) Location identification, NOTAM identification, subject reported, date/time of issue;
- (B) Time of commencement of the information contained in field (E);
- (C) Time of cessation of the information contained in field (E);
- (D) Times of periods of activity;
- (E) Plain language text detailing the information;

---

<sup>4</sup> This service is available to selected operators only, being the two primary domestic carriers.

<sup>5</sup> RAC 1.2

<sup>6</sup> RAC 11, in a note under the heading.

<sup>7</sup> GEN 1.

(F) Lower limit;

(G) Upper limit.

NOTAM are issued in three primary and distinct groupings:

- a) Head Office NOTAM (applicable to the whole system);
- b) Flight Information Region (FIR) NOTAM (applicable to specific regional areas); and
- c) Location NOTAM ( applicable to a specific aerodrome, navigation facility, or special use airspace).

Head Office NOTAM are issued as a single group with a single automated access code.

Flight Information Region (FIR) NOTAM have been divided into sub-groups delineated by the weather Area Forecast boundaries. Each area has a separate automated access code.

Location NOTAM are identified with a separate automated access code for each location. A location could be an aerodrome or navigation facility.

A complete NOTAM briefing is detailed<sup>8</sup> as requiring NOTAM from all three primary groups. Thus:

- a) All Head Office NOTAM;
- b) Relevant FIR NOTAM; and
- c) Relevant Location NOTAM.

### **Disseminators and users of NOTAM information**

The legislative requirements affect two primary groups, the **disseminators** and the **users**.

The **disseminators** are directly involved in the initiation, collection and dissemination of Aeronautical Information of the kind already described. This group has two major imperatives, driven by a set of working legislation<sup>9</sup> which differs from that governing the users<sup>10</sup>.

Firstly the disseminators must publish any information which they are specifically directed to publish by:

- a) the Air Services Regulations,

---

<sup>8</sup> AIP RAC 1.2 as a paragraph note, and ERS A GEN-41 A(b) as a paragraph note.

<sup>9</sup> The Air Services Act 1995, the Air Services Regulations and the Airways Operations Instructions.

<sup>10</sup> The Civil Aviation Act 1988, the Civil Aviation Regulations and the Aeronautical Information Publication.



- b) the Civil Aviation Act (1988),
- c) the Civil Aviation Regulations, or
- d) any other Commonwealth Law.

This first imperative removes any interpretation as to the relevance or usefulness of the information and presents itself as a simple issue of compliance.

The second imperative is for the disseminators to publish “other Aeronautical Information of importance to safe air navigation”. The potential here is that all or any information is disseminated in order to ensure that no important information is overlooked. The possibility that criminal proceedings or litigation could take place, in the event that an oversight contributes to an accident, may be a source of pressure to publish more rather than less.

The **users** have the responsibility for obtaining and assessing the information provided by the disseminators. This group has a single imperative guided by a separate set of working legislation to that of the disseminators.

The primary imperative for users is to make appropriate operational decisions based upon relevant Aeronautical Information. The possibility that criminal proceedings or litigation could take place, in the event that an oversight contributes to an accident, may be a source of pressure and resulting stress faced by users, particularly when large volumes of information must be assessed in a short period of time.

There is potential for a divergence to develop between the interests of the two groups. This implies that the needs and requirements of both groups should be observed and that consistency between the separate sets of legislation should be monitored.

## METHODOLOGY

### Identifying NOTAM Users

The Civil Aviation Regulations and Air Services Regulations require that various information originators **must** publish information in the Aeronautical Information Publication (AIP) and NOTAM. This is an effort to ensure that all information considered necessary for the safety of air navigation is at least available in one form or another.

The Civil Aviation Regulations, however, do not require pilots to obtain NOTAM. The regulations require pilots to plan<sup>11</sup> any flight and to obtain the necessary information before flight, but do not specifically require pilots to obtain that information from NOTAM. The situation could arise where a pilot may obtain all of the information required to operate a particular type of aircraft in a particular type of operation without needing to obtain NOTAM nor indeed the AIP and other publications.

This broad regulatory obligation along with the extensive and diverse range of possible NOTAM users makes the task of identifying all NOTAM users difficult.

As the primary use for NOTAM is for aircraft operations one might assign the type of aircraft being operated as the primary category for NOTAM users. This, however, would be too simplistic. The nature of the operation being conducted, as well as the type of aircraft used, has a significant influence upon the regulatory obligations and therefore the information needs of aircraft operators and pilots. Operations can be Commercial or Non-commercial; Instrument Flight Rules (IFR) or Visual Flight Rules (VFR); wholly Inside Controlled Airspace (CTA) or wholly Outside Controlled Airspace (OCTA). Additionally parachutists are NOTAM users, however parachutes are not classified as aircraft<sup>12</sup>.

Although many types of aircraft operate under specific exemptions from some provisions of the Civil Aviation Regulations, none are exempt from the requirement that "...the pilot in command shall study all information appropriate to the intended operation..." as detailed in Civil Aviation Regulation 239(1). Table 1 identifies possible NOTAM users based on the type of aircraft used. It should be noted that the aircraft group has many sub-groups, with significantly differing information requirements.

Users operating parachutes and aircraft can be further divided according to whether the operation they are conducting is commercial type or non-commercial. Table 2 details the regulatory sub-groups defined for commercial and non-commercial operations as detailed in Civil Aviation Regulation 206.

---

<sup>11</sup> This is separate from any obligations to submit an official Flight Plan which applies to certain types of operations.

<sup>12</sup> Powered parachutes are classified as aircraft.

Additionally aircraft operations may be conducted wholly within Australian territory or across international borders. Australian registered aircraft must operate to Australian regulations, even when operating overseas while still complying with local laws and regulations.

**Table 1: NOTAM user categories based on the airborne device.**

<b>Aircraft</b>	<b>Heavier than Air</b> (Aerodynes)	<b>Aeroplanes</b>	Large (>5700 Kg) Small (<=5700 Kg) Ultralight (<=300 Kg) Weight Shift Aeroplanes Powered Parachutes
		<b>Gliders</b>	Sailplanes Powered Sailplanes Power Assisted Sailplanes Hang Gliders (<70 Kg) Kites
		<b>Rotorcraft</b>	Helicopter Gyroplane
	<b>Lighter than Air</b>	<b>Balloons</b> <b>Airships</b>	
<b>Parachutes</b>		<b>Normal Parachutes</b> <b>Emergency Parachutes</b>	

**Table 2: Regulatory sub-groups for commercial and non-commercial operations:**

<b>Non-commercial Operations</b>	<b>Private operations</b>	
<b>Commercial Operations</b>	<b>Aerial work (Airwork)</b>	Aerial Advertising Aerial Spotting Agricultural Operations Aerial Photography Advertising Flying Training (other than conversion training) Ambulance Functions Goods for trade owned by the aircraft pilot, owner or hirer Purposes substantially similar to the above.
	<b>Charter</b>	Carriage of passengers or cargo for hire or reward not in accordance with fixed schedules and terminals Carriage of passengers or cargo for hire or reward in accordance with fixed schedules and terminals, but not available to the persons generally.
	<b>Regular Public Transport (RPT)</b>	Carriage of persons generally or cargo for persons generally, for hire or reward, in accordance with fixed schedules and terminals over specific routes.

## **Identifying NOTAM Originators and Disseminators**

The Civil Aviation Regulations and Air Services Regulations require that various information originators must publish information in the Aeronautical Information Publication and NOTAM.

The Air Services Regulations direct that the Aeronautical Information Service (AIS) has the task of publishing the AIP and NOTAM. The AIS is controlled by Airservices Australia (AA). Thus, all NOTAM originators must direct their information to the AIS for publication as a NOTAM. The disseminators of NOTAM are the officers of Airservices Australia who operate the Aeronautical Information Service (AIS).

Originators are many and varied. They may be aerodrome operators, officers of CASA, the Parachuting Federation, Ultralight Federation, Gliding Federation, pilots or any person who identifies information which may affect aviation services or facilities or affect the safety of air navigation. It is not within the scope of this report to review all of the regulations and safety issues upon which NOTAM are generated by originators, although this may have some influence upon the issue of the relevance of some NOTAM.

## **Subjective and Objective Analysis**

As outlined on page 4, the stated evaluation objectives of this NOTAM project were to evaluate the accessibility, presentation style, relevance and flexibility of NOTAM information.

Each of these criteria may be evaluated by both Subjective and Objective measures. The subjective data used for this report was gathered from interviews with both information users and information disseminators. As it is not the purpose of this report to carry out a definitive study, but to identify directions for further detailed research, the interview sample was designed to be small but indicative.

The objective measures used for this report were empirical and comparative analysis. This was accomplished by utilising the experience of the primary investigator to:

- a) Use the system instructions, provided by the source documents, and obtain the information required by the regulations for a variety of operations. The results of the access obtained were analysed.
- b) Compare the information obtained for any given operation with the regulatory and operational requirements for the operation and determine any differences.
- c) Measure the volume of information obtained and compare this with the volume of information required by regulatory guidance.

## **Participants**

### ***NOTAM Users***

The wide variety of NOTAM users makes the task of conducting a full and broad investigation into all sectors of the aviation industry a large and possibly expensive project.

As the original concerns were expressed by flight crews of a Low Capacity Regular Public Transport (RPT)<sup>13</sup> operation, the emphasis chosen for this report is in the area of Fixed-Wing Aeroplane operations. A second influence for this decision is that this industry segment, by virtue of the types of aircraft and types of operational activities conducted, is the most likely to need operational information from the NOTAM system in order to achieve regulatory and safety compliance. This preliminary investigation should give an indication of the general issues involved, and whether problems exist for this segment of the aviation industry. A significant problem in this industry segment would provide the impetus for further investigation into other industry segments.

The Fixed-Wing Aeroplane segment has been further sub-divided into three types of operations:

- a) High Capacity RPT operations;
- b) Low Capacity RPT operations;
- c) IFR Charter operations in light aircraft ( $\leq 5700$  Kg);

Interviews were conducted with representative volunteers within these categories.

Two participants were employed by High Capacity RPT operators, two were employed by Low Capacity RPT operators and one was employed by a company conducting IFR charter operations.

### ***NOTAM Disseminators***

The disseminators of NOTAM are the officers of Airservices Australia who operate the within the Aeronautical Information Service (AIS) as the AIS is controlled by Airservices Australia (AA).

Interviews were conducted with representative volunteers.

## **Procedure**

The project proceeded in two parts, a desktop analysis and interviews of selected industry users and disseminators.

The desktop analysis utilised the experience of the primary investigator to evaluate the various issues raised in the listed objectives of the project. General Human Factors principles were applied from the pilot's user perspective. The analysis was carried

---

<sup>13</sup> RPT operations in aircraft with 38 or fewer seats or a maximum payload of 4200 Kg or less constitutes Low Capacity RPT. (CAO Section 8 Sub-section 2)

out using the publications provided by the Publications Division of Air Services Australia.

In order to address the general criteria consistent with the analysis, the following sequence of events, which is likely to be initiated or encountered by a user of the NOTAM system, was used:

- a) Analysis of the regulatory obligations placed upon the user to obtain the required information,
- b) Analysis of the instructions available to the user which indicates the type and detail of the information available in order to complete a self briefing,
- c) Analysis of the instructions available to the user which indicates how to obtain the information required by the above determinations,
- d) Analysis of the resultant information content.

The information obtained will be analysed and reported using the following headings :

- a) Accessibility,
- b) Selectivity
- c) Presentation,
- d) Clarity,
- e) Quality and Relevance of Information.

It should be noted that the interaction of pilots with the NOTAM system will vary depending on the type of operation that he/she is involved. The following types of primary operational groups covers the majority of aeroplane operations in Australia :

- a) RPT operators; aircraft >5700 Kg; between major centres; above FL200,
- b) RPT operators; aircraft >5700 Kg; between regional centres; below FL200,
- c) Charter operators; aircraft <5700 Kg; between regional centres; below A100,
- d) Private pilots flying irregularly in regional areas in light aircraft.

The opinions of industry users, selected as representative by the primary investigator, were sought by way of initial telephone contact. The initial contact explained the objectives of the project and determined the willingness of the person contacted to participate. A written request followed to obtain formal confirmation of participation. The resultant interviews were intended to gauge the general impressions and opinions of the various industry users. The disseminators were interviewed by telephone.

## RESULTS and DISCUSSION

### Identifying NOTAM Accessibility

NOTAM are currently accessible to users through a limited number of channels. There are three means available :

- a) Direct access to the Aeronautical Fixed Telecommunication Network (AFTN) database, restricted to the two major RPT operators in Australia. Use of this system presents its own problems, but it is a method not available to regional operators or general aviation.
- b) Verbal briefing by telephone, which is available via a single toll free telephone number which directs the user to one of two briefing centres in either Brisbane or Melbourne. If large amounts of information are to be communicated to a system user, this process can be very time consuming and tends to promote "short-cutting" and abbreviating by both user and disseminator.
- c) Briefing by facsimile, either via "self-help" systems or via telephone initiated verbal request. This is the only method by which a system user is able to obtain a "hard copy" of NOTAM. The supposition being that the user has or can obtain access to facsimile facilities.

The Aeronautical Information Publication states that the preflight briefing service is primarily an automated service<sup>14</sup> and thus NOTAM access is structured toward providing briefing by Facsimile using the "self-help" system.

It should be noted that a user requires dual access codes in order to access the automated system. Application (Customer Registration Form) must be made to the AVFAX Office Help Desk for issuance of a five digit "account number" and a four digit "password" before access to the automatic system is possible. The required form is available from the AVFAX Office or by automated selection code using the system to which access is sought.

Details of the services available and user instructions for the automated system are listed in a separate publication called the Enroute Supplement Australia (ERSA).

Logically a user would need to possess the necessary Australian Publications, or their equivalent, in order to obtain the necessary instructions and codes to access the NOTAM provided by the automated system.

---

<sup>14</sup> RAC 1.2



## Identifying NOTAM Selectivity

The objective was determine if there was an overriding criteria for determining how NOTAM are presented to users for selection.

The result is clear. User selection codes (referred to as access codes in the AIS documents) are based upon **geographical applicability**, making this the dominant criteria for NOTAM selection.

There are three tiers of geographical applicability applied to user selection codes:

- a) **Overall Applicability.**  
Only NOTAM applicable to the overall system as a whole are distributed as a **Head Office NOTAM** under a single selection code. No sub-groupings are available.
- b) **Regional Applicability.**  
Only NOTAM applicable to a defined part of a Flight Information Region (FIR), delineated by the weather Area Forecast Boundaries, are distributed as **FIR NOTAM**. This gives rise to 31 regional sub-groups for FIR NOTAM, and 33 selection codes (including the two primary FIR).
- c) **Specific Location Applicability.**  
Only NOTAM applicable to a specific location are distributed as **Location NOTAM** under a single location selection code. A specific location may include an aerodrome, a navigation facility, special use airspace such as Prohibited/ Restricted/ Danger Areas or groups of associated military airspace located at a single military establishment.

Further subgrouping is possible on the following bases :

- a) If full NOTAM text is desired regardless of the “age” of the NOTAM or Single Line Summary for NOTAM more than seven days old.
- b) If NOTAM are sought for an intended landing or for overflying a specific location.

In general the regulatory material provides a requirement to obtain and “ make a careful study ” of information of the type contained in the NOTAM system. The regulations are written in broad terms and do not, on the surface, provide the system user with any specific instructions as to what information available from the NOTAM system would be needed in order to comply with these requirements.

The Aeronautical Information Publication, while defining the meaning of the term NOTAM does not appear to give the user any guidance as to what might constitute an adequate briefing using the information available.

The Enroute Supplement (ERSA) contains the only direct instruction detected so far which advises what information might be required for an adequate briefing. This consisted of text stating that Head Office NOTAM and FIR NOTAM “..should be checked prior to each flight.”

Although the publications appear to lack significant direct information regarding what information may be needed for NOTAM briefing, it presupposes that all pilot will have access to these documents or an equivalent. The authors are aware that some users, particularly private pilots, do not purchase aeronautical publications at all or do not maintain the documents to a current standard. This separate issue may be worthy of further investigation.

Criteria such as IFR or VFR operation; operations in CTA or OCTA; Aircraft Performance Requirements; Large or Small Aircraft type are not available for selection of NOTAM.

### **NOTAM Presentation**

The following outline of NOTAM presentation is based upon the assumption that the NOTAM are received by a standard facsimile machine rather than a computer. Computerised reception has the capability of modifying the font and text presentation according to user settings.

The NOTAM presentation can be broken down into three primary criteria :

a) **Structure.**

If NOTAM are sent after a telephone request, the presentation structure of the NOTAM is in accordance with the structure outline in the AIP GEN section. A sample of this presentation can be found at Appendix One.

NOTAM received on the automated AVFAX system differs in presentation to that received from a verbal request. The essence of the presentation structure appears to conform with the AIP structure, however, the NOTAM generally commence with field B rather than field A as detailed in the AIP. A sample of this presentation can be found at Appendix Two.

b) **Text Font and Case.**

All NOTAM are presented in Upper Case text. The Font used differs between the verbally requested NOTAM and the Automated AVFAX NOTAM (See Appendices 1 and 2). Human factors research has shown that text written entirely in upper case is generally more difficult to read than text written in lower case (Hawkins 1993).

c) **Abbreviations and Jargon.**

Extensive use of abbreviations jargon and coding is made throughout all NOTAM. Users must become familiar with the abbreviations and coding used. See Appendices 1 and 2.

## **NOTAM Clarity**

The clarity of NOTAM is closely linked to the presentation of the information in the NOTAM. Some of these issues have already been discussed under the heading of Presentation, however, other issues also affect the clarity of the information found in NOTAM.

a) Cultural Issues.

The date time groups used throughout the Aviation system while conforming to the ICAO standard present the month as the first entry and the date as the second entry. This is different from the normal presentation in the wider Australian community where the date is usually presented first and the month second. The use of six figure date time groups in NOTAM may present difficulties for some users.

b) Plain Text.

The AIP states that field E of a NOTAM which contains the essential information in the NOTAM is in "...plain language text...". The extensive use of abbreviations and coding would appear to make this statement incongruous.

c) Terms without Literal Meaning

An example of a term whose literal meaning is different from the intended meaning is the term "NIL CURRENT". If a NOTAM request is met with a response of Nil Current the literal interpretation would appear to be that no information is held for the particular location selected or if airspace activity is desired that the airspace is not active. The intent of the term is to convey that no information is held which would otherwise vary any information already published for that location. Thus if a restricted area is normally active 24 hours a day and a request is made for any NOTAM, a NIL CURRENT response means that no variations to this status is indicated. The restricted area is still active. Some NOTAM do not stand alone in meaning but must be used in conjunction with other documents.

## **The Quality and Relevance of Information in NOTAM**

There are three main issues concerning the quality and relevance of NOTAM:

a) Information Accuracy

No instances of inaccurate information in NOTAM were found in this limited survey. The use of NOTAM to correct errors in other documents was apparent and is discussed in a following point.

b) Usefulness to Aircrew

NOTAM information is often required to be published by regulatory dictates. Some information is either not directly understood by aircrew, not able to be used by aircrew in some operations because of the technical nature of the effects, or not of any apparent operational significance. Two examples will be discussed here to illustrate these points.

Example One (See Appendix three for the NOTAM text) shows a NOTAM (C1047/96) for Sydney airport amending take-off and supplementary take-off distances. The crew of a large aircraft required to operate in accordance with CAO Section 20.7.1b are unlikely to have the facilities to utilise this information in order to calculate a revised take-off performance limit. This information would normally need to be processed by a specialist department within the crew's company to generate revised aircraft data for the crew to use. The pilot of a small aircraft is only compelled to take the Take-off Distance Required into account and thus he/she will only be interested in a small component of the information provided.

Example Two (See Appendix Four for the NOTAM text) shows a NOTAM (C0929/96) for Sydney airport indicating the presence of an apparent obstruction. The location of the crane mentioned is in a form which is difficult for pilots to relate to specific obstacle clearance requirements. Aircrew would not be aware of the assessed obstacle surfaces of any of the Standard Instrument Departure flight paths in order to determine if they are infringed. In this case they are not. Aircrew of large aircraft would not have the facilities to determine if the CAO Section 20.7.1b Take-off Area obstacle clear surfaces have been infringed. In this case they are not. Aircrew would not have the facilities to determine if the ICAO Annex 14 runway approach surfaces have been infringed. In this case they are not. Aircrew would not have the facilities to determine if the ICAO Instrument Approach Obstacle clear surfaces have been infringed. In this case they are not. In this case the obstacle, a crane, is located in an area of multi-story buildings with adjacent transmission towers which are 370 ft higher than the crane in question. This obstacle is required to be notified by the requirements of the aerodrome obstacle limitation surfaces even though this NOTAM has no practical value.

c) Timeliness.

NOTAM are not only issued with immediate implementation requirements but also with implementation dates which may be some time in the future. The premise is that prior notification is given of impending changes which require advanced consideration. This requires aircrew to read but effectively ignore NOTAM which are not effective on the actual day of intended operation. Where this involves a number of NOTAM a significant amount of time is consumed searching through NOTAM which have no relevance to operations within the current time frame.

d) Use as a Substitute for General Quality Control.

The NOTAM system is, at times, used to correct errors in other publications or to institute changes in publications between normal periodic amendments.

Error corrections can become an excessively burdensome task for aircrew in the field when faced with large numbers of hand written corrections. An example of this can be found at Appendix Five. Extensive errors in the maps provided by AIP MAP Amendment N<sup>o</sup>.11 dated 05 December 1996 resulted in 38 separate NOTAM being issued to correct chart errors which contained approximately 116 hand written chart amendments. These NOTAM have recently (approximately February 1997) been effectively moved from one notification system to another by being incorporated into an AIC until the next MAP amendment in June 1997.

The issue of incorporating changes between periodic amendments is also worthy of investigation. An example of this can be found at Appendix Six. This example shows a NOTAM (C0949/96) for Sydney airport which renames a turning point on a SID. This appears have been the result of a lack of coordination with the MAP amendment which also changed the name of the same turning point.

## **Participant interviews**

### *System Users*

Interviews with system users revealed and emphasised the same issues that have been identified by the previous desktop results. Of particular interest was the general feeling that too much irrelevant information was provided even when an experienced user attempts to streamline system use.

Only one respondent was prepared to respond in writing to the request (verbal and written) for opinion on this subject as there was a perception that no official company criticism of the authorities was desired.

Only one respondent (from a regional carrier) felt that the current system presented no real problems and that the current workload faced by aircrew was not unreasonable and not likely to contribute to overall safety questions.

One respondent's organisation (a major carrier) has taken a generally reactive position to the problems identified and welcomed any attempt to find a solution to the primary issues raised. The primary comments were about the large volume of information provided by the system and the small amount of the information provided which was directly relevant to any given operation on any given day. The respondent spoke of one day receiving 35 pages of NOTAM of which only 3 NOTAM were applicable to the particular operation in question.

Another respondent's organisation (a major carrier) has taken a pro-active role in attempting to find a solution to the perceived problems described so far. The system developed by this organisation appears to be successful and in the opinion of the authors is worthy of thorough investigation.

### ***System Disseminators***

The two officers of Airservices Australia (AA) interviewed, felt that far too much information was being generated and distributed and that the relevance of much information was questionable. There was a general anecdotal perception among the officers of AA that "...if in doubt, publish in order to cover yourself.."(from possible consequences). It should be noted that these comments do not necessarily reflect an official Airservices position.

Additional problems were revealed concerning the fact that during telephone briefings, the pilot is responsible for requesting relevant information. Some officers will only provide the information directly requested even if the pilot appears to have made an obvious oversight. The Officers agreed that issues of duty of care may still require AA officers to attempted to correct pilot oversights but that the general opinion was that it is the pilot's responsibility to know what he wants. Also if a pilot requests a verbal briefing then technically the officer should read out all NOTAM verbatim regardless of how long this may take. Some officers attempt to use their judgement to filter the NOTAM in order to keep the briefing to a reasonable length otherwise many pilots appear to "switch off" and cut the briefing short even if they are not in receipt of all of the NOTAM.

### **Conclusions and Suggestions for further research**

"Human error remains the most common contributing factor in aviation accidents and incidents, yet strategies for mitigating their impact are well known and widely documented" (Cardosi & Murphy, 1995).

It is clear that on the balance of probabilities there are several potential areas of breakdown in the person-machine system which makes up the current NOTAM system. The potential for human error, particularly for oversight of critical information, in the current NOTAM system appears to be significant.

It is not within the scope of this report to detail specific solutions but rather to identify areas for further research into problem quantification and possible solutions. The results so far indicate several areas for further research. These include :

- a) The development of broader NOTAM selection criteria than only geographical applicability;
- b) The Human Factors implications of the style and clarity of NOTAM presentation including character fonts, character case, use of abbreviations and codes in place of plain language, use and structure of date time

groupings in the Australian cultural environment, the use of terms with meanings contrary to intuitive or literal meanings and presentation of information in a manner which users can directly relate to the operational environment;

- c) The investigation of the relevance and use of information presented in NOTAM and a review of the criteria for compulsory publication of some information in NOTAM by specific regulations;
- d) The Human Factors implications of the relationship between NOTAM users and NOTAM disseminators and the sharing of responsibility for success of the system as a whole;
- e) Investigation of the development and use of automated NOTAM filtering systems and in particular the success of the system currently in use by QANTAS Airways.

## REFERENCES

- Cardosi, K.M., & Murphy, E.D. (1995). *Human Factors in the Design and Evaluation of Air Traffic Control Systems*. USA. DOT/FAA/RD-95/3.
- Hawkins, F. H. (1993) *Human factors in Flight*, Aldershot: Ashgate
- Sanders, M. S., & McCormick, E. J. (1992). *Human factors in engineering and design*. (7th Ed.). Singapore: McGraw-Hill.



# ***APPENDICES***

Appendix One

Sample of NOTAM presentation sent by facsimile after verbal request.

96-12-20 01:21 1

AIRSERVICES AUST Pg2

AIRSERVICES AUSTRALIA. 20-Dec-1996 0119 UTC

Page 0

SYDNEY (YSSY): (cont.)

=====

- AD \* A) SYDNEY C1071/96 (AD) 12180441  
B) 9612211200 C) 9612211800  
E) TWY 60LF 1 NOT AVBL
- AD \* A) SYDNEY C1076/96 (AD) 12180452  
B) 9612211200 C) 9612211800  
E) RWY 07/25 RWS REDUCED TO 150M  
RWY TRANSITIONAL SFC INFRINGED NORTH SIDE BTN 75M AND 100M FROM  
BY EQUIPMENT OPR TO 20FT AGL
- AD \* A) SYDNEY C1079/96 (AD) 12182311  
B) 9612201200 C) 9612201600  
E) ILS RWY 16L (ISS) ON TEST  
NOT TO BE USED FOR NAV
- AD \* A) SYDNEY C1080/96 (AD) 12190637  
B) 9612211200 C) 9612231900  
D) DAILY 1200/1900  
E) RWY 07/25 NOT AVBL FOR TKOF OR LDG  
DUE WIP. AVBL FOR TAXIING ACFT.
- AD \* A) SYDNEY C1082/96 (AD) 12200000  
B) 9612192359 C) 9703200000 EST  
E) REIL (RWY END IDENT LETS) RWY 34R ON TEST  
LIGHTS ARE W STROBES WITH THREE SELECTABLE INTENSITY LEVELS  
AND OPERATING IN CONJUNCTION WITH T-VASIS RWY 34R  
PILOTS COMMENTS TO CASA SYDNEY DISTRICT OFFICE PH (02)95566815  
FAX (02)95566800.

=== YSSY 24 current NOTAM. (6 new)

KATOOMBA (YKAT): EN-ROUTE

=====

=== YKAT (EN-ROUTE) 0 current NOTAM. (0 new)

ORANGE (YORG):

=====

=== YORG 0 current NOTAM. (0 new)

PARKES (YPKS):

=====

=== YPKS 0 current NOTAM. (0 new)

DUBBO (YSDU):

=====

=== YSDU 0 current NOTAM. (0 new)

## Appendix Two

### *Sample of NOTAM presentation sent by facsimile after an automated request.*

HEAD OFFICE (YSHO)

=====

- NAV \* FROM: 10 090132 TO: 01 100100 EST (C0229/96)  
ACT OF SSR TRANSPONDERS MODE 3C (ALT)  
NON-COMPLIANCE WITH THE RQMNTS TO ACT MODE 3C IN AUSTRALIAN AIRSPACE  
CAN CAUSE A DISCREPANCY TO AN ACFT PSN ON ATC RADAR RESULTING IN DLY  
TO AIR TFC. ALL OPR ARE TO ENSURE TRANSPONDERS ARE ACT  
AS PER AIP OPS 8 72.2  
SPECIFICALLY REGARDING SQUAWKING ALT (MODE 3C
- DOC \* FROM: 10 182000 TO: 01 170600 EST (C0241/96)  
AIP SUP H73/96 ACT 9610182000  
SIMUL OPPOSITE DIRECTION PARL RWY OPS SYDNEY (KSA)  
IMPLEMENTED WEF 9610182000
- DOC \* FROM: 11 042337 TO: 03 270400 EST (C0247/96)  
WEF 9611061600 TWO FIR IMPLEMENTED.  
TWO AUSTRALIAN FLIGHT INFORMATION REGIONS IMPLEMENTED WEF 9611061600  
AIP SUPP H63/96 REFERS.
- DOC \* FROM: 11 140114 PERM (C0269/96)  
MANUSCRIPT AMDT AIP MAP L3  
VER LIMTS R557 (CAMDEN VICINITY) ARE LL 4500 UL 6500  
THE DEPICTED LABEL LL 0 UL 4500 APPLIES TO D551C  
AMD AIP MAP ERC L3 (5 DEC 96
- DOC \* FROM: 11 140136 PERM (C0271/96)  
MANUSCRIPT AMD AIP MAP ERC L8  
1. MERREDIN CTAF FREQ AMD TO 120.1  
2. DIST PORT HEDLAND - LOGOL AMD TO 116NM  
3. TR PORT HEDLAND - TROCHUS S AMD TO 060  
4. IN THE PRD WI THE PERTH AREA BOX AMD R145 TO READ 0-FL250 NOTAM  
AMD AIP MAP ERC L8 AND DAH (5 DEC 96
- DOC \* FROM: 11 140205 PERM (C0272/96)  
MANUSCRIPT AMDT AIP MAP ERC L1  
INSERT TR DETAILS LAUNCESTON - FLINDERS ISLAND  
LAUNCESTON ---/009  
FLINDERS ISLAND 009/--- 94NM LSALT 6100  
AMD AIP MAP ERC 1 (5 DEC 96
- DOC \* FROM: 11 140224 PERM (C0275/96)  
AMD AIP MAP TAC 1 BRISBANE CHART DATED 5 DEC 1996  
1. AMD CTA STEP DISTANCES AT BRISBANE FROM 12 DME AND 15 DME TO -  
12NM AND 15NM  
2. ADD MISSING CTA DIVISION LINE. THE MISSING CTA DIVISION LINE IS  
CORRECTLY DEPICTED ON AIP MAP VTC BRISBANE DATED 5 DEC 1996. THE  
MISSING LINE DIVIDES BRISBANE CTA LOWER LEVEL STEPS 1000 AND 1500  
BETWEEN THE 7NM BRISBANE CONTROL BOUNDARY AND THE NNW CORNER OF  
THE ARCHERFIELD CTR. THE MISSING LINE LIES NE/SW AND STARTS FROM  
THE NNW CORNER OF THE ARCHERFIELD CTR TO JOIN THE 7NM BRISBANE CTR  
BOUNDARY.

Appendix Three

NOTAM C1047/96.

AIRSERVICES AUSTRALIA. 18-Dec-1996 2326 UTC

Page

SYDNEY (YSSY) (cont.)

=====

AD \* FROM: 12 110003 TO: 02 210500 (C1047)  
AMD AIP ERSA - RDS 64/65 (EFF 5TH DEC 1996) GRADIENT AND  
SUPPLEMENTARY TKOF DISTANCES.

	TORA	TODA	ASDA	LDA
RWY 07	2529	2590(4.04)	2529	2529
RWY 16L	2438	2528(2.98)	2438	1920
RWY 16R	3962	4053(3.01)	3992	3877
RWY 34L	3962	4023(4.20)	3962	3962
STODA:				
RWY 07	2079(1.90)	2244(2.20)	2359(2.50)	2515(3.30)
RWY 25	1236(1.60)	1940(1.90)		
RWY 16L	2433(1.60)	2473(1.90)	2503(2.20)	2517(2.50)
RWY 16R	3907(1.60)	3955(1.90)	3991(2.20)	4019(2.50)
RWY 34L	3343(1.60)	3649(1.90)	3872(2.20)	

**Appendix Four**

**NOTAM C0929/96.**

AIRSERVICES AUSTRALIA. 18-Dec-1996 2326 UTC

Page 09

SYDNEY (YSSY) (cont.)

=====

AD \* FROM: 11 140457 TO: 01 310200 EST (C0929/96)  
DAILY 1900-0800  
TEMPO OBST CRANE 630FT AMSL BRG 350 MAG 7.4 NM FM SYDNEY VOR.  
OBSTR MARKED HJ AND HN. CRANE LOWERED WHEN NOT IN USE.

Appendix Five

Various NOTAM used to correct AIP MAP amendment production errors.

AIRSERVICES AUSTRALIA. 18-Dec-1996 2326 UTC

Page (

HEAD OFFICE (YSHO) (cont.)

=====

- DOC \* FROM: 11 140401 PERM (C0276)  
AMD AIP MAP TAC 4 DATED 5 DEC 1996  
1 INSERT R184 LANCELIN. A CIRCLE 1.5NM RADIUS CENTRED  
ON S30 52.9 E115 16.2.  
2 ROTTNEST ISLAND NAVAID BOX - AMD CTAF FREQ TO 126.0  
AND MORSE ID TO 'RTI'.  
3 PERTH ILS SYMBOL AT '076 FROM' TO BE REALIGNED TO  
'017 RADIAL FROM' PERTH.  
4 TRACK FROM DULYA (31 39.7 E119 04.2) TO PEPPA  
(S31 44.9 E116 44.8) AMD TO 267
- DOC \* FROM: 12 041600 PERM (C0277)  
AMD FLT PLN RTE RQMNTS TO MAROOCHYDORE  
AMD FLIGHT PLAN PREFERRED ROUTES TO MAROOCHYDORE AS FLW:  
1. YMML YBMC DCT DOSEL H29 CAS DCT CG DCT ESTER DCT TRIKI DC  
2. YSSY YBMC DCT KAMBA DCT WMD H33 CAS DCT CG DCT ESTER DCT  
DCT  
AMD AIP ERS A DATED 5 DEC 1996 - PAGES GEN 55 AND GEN 59 REFER
- DOC \* FROM: 11 140635 PERM (C0279)  
AMD AIP MAP ERC H1 DATED 5 DEC 1996  
1. DELETE PSN KAMEP (S25 35.4 E156 17.1) FM ATS RTE R587  
2. AMD DIST BEAGL - GUXIB TO 244  
3. DELETE THE 'C FL200/F125' LABEL BRG 235 DEG 70NM DARWIN
- DOC \* FROM: 11 190149 PERM (C0284)  
MANUSCRIPT AMDT AIP AMP TAC 2  
SYDNEY - CANBERRA CHART  
1. TO THE PRD WI SYDNEY - CANBERRA AREA BOX AMD R445A, R445B AN  
R445C HR OF ACT TO MON-FRI 2000-0800  
2 HONEYSUCKLE LOC (HSK - CANBERRA VICINITY) DCMSD  
3. SYDNEY-BANTU (S34 12.7 E150 54.2) AMD DIST TO 21NM  
WILLIAMTOWN - SYDNEY CHART  
1. DELETE W149 FM LORD HOWE ISLAND - PORT MACQUARIE RTE  
2. ADD W768 TO LORD HOWE ISLAND - PORT MACQUARIE RTE  
3. ADD W149 TO LORD HOWE ISLAND - WILLIAMTOWN RTE  
MELBOURNE CHART  
TO THE YARROWEE NAVAID BOX AMD MORSE IDENT TO 'YWE'  
AMD AIP MAP TAC 2 (5 DEC 96)
- DOC \* FROM: 12 041300 PERM (C0281)  
AMD AIP MAP ERC L8 (5 DEC 1996) LSALT.  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
J93 LEARMONTH - ONSLOW - LEARMONTH 2100/2100
- DOC \* FROM: 12 041300 PERM (C028)  
AMD AIP MAP ERC L6 (5 DEC 1996) LSALT.  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
J51 TROCHUS SOUTH - PORT HEDLAND - TROCHUS SOUTH 2400/1700
- DOC \* FROM: 12 041300 PERM (C028)  
AMD AIP MAP ERC L5 (5 DEC 1996) LSALT.  
AMD LSALT ON FLW ROUTE/ROUTE SEGMENTS:  
J37 CUNNAMULLA - JACKSON - CUNNAMULLA 2400/2500  
J52 MOOMBA - GUGAB - MOOMBA 2700/4700

HEAD OFFICE (YSHO) (cont.)  
=====

- DOC \* FROM: 12 041300 PERM (C0291/96)  
AMD AIP MAP ERC L4 (5 DEC 1996) LSALT.  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
J37 CUNNAMULLA - JACKSON - CUNNAMULLA 2400/2500
- DOC \* FROM: 11 250738 PERM (C0293/96)  
AMD AIP MAP ERC H1 (5 DEC 96) LSALT.  
AMD LSALT ON FOLLOWING ROUTE/ROUTE SEGMENTS:  
J37 CUNNAMULLA - JACKSON - CUNNAMULLA 2400/2500  
J38 NORMANTON - BIDAG - NORMANTON 3500/4000  
J51 KOOKA - PILLO - KOOKA 2600/3300  
TROCHUS SOUTH - PORT HEDLAND - TROCHUS SOUTH 2400/1700  
J52 MOOMBA - GUGAB - MOOMBA 2700/4700
- DOC \* FROM: 11 250739 PERM (C0294/96)  
AMD AIP MAP ERC H2 (5 DEC 96) LSALT.  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
J93 LEARMONTH - ONSLOW - LEARMONTH 2100/2100
- DOC \* FROM: 12 041300 PERM (C0306/96)  
AMD AIP MAP ERC H1 (5 DEC 1996) LSALT  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
W184 YASS - MUDGEE - YASS 6100/5400  
W148 WAGGA - CANBERRA - WAGGA 6500/6200
- DOC \* FROM: 12 041300 PERM (C0307/96)  
AMD AIP MAP ERC H2 (5 DEC 1996) LSALT  
AMD LSALT ON ROUTE/ROUTE SEGMENT  
W148 WAGGA - CANBERRA - WAGGA 6500/6200  
W184 YASS - MUDGEE - YASS 6100/5400
- DOC \* FROM: 12 041300 PERM (C0308/96)  
AMD AIP MAP ERC L1 (5 DEC 1996) LSALT  
AMD LSALT ON ROUTE SEGMENT  
MELBOURNE - TATE - MELBOURNE 2400/2400
- DOC \* FROM: 12 041300 PERM (C0309/96)  
AMD AIP MAP ERC L2 (5 DEC 1996) LSALT  
AMD LSALT ON ROUTE/ROUTE SEGMENTS  
W184 YASS - MUDGEE - YASS 6100/5400  
RUGBY - CUDAL - RUGBY 5100/4700  
HOLBROOK - BATLOW - HOLBROOK 6700/6700  
BATLOW - CANBERRA - BATLOW 7500/7200
- DOC \* FROM: 12 041300 PERM (C0310/96)  
AMD AIP MAP ERC L3 (5 DEC 1996) LSALT  
AMD LSALT ON ROUTE/ROUTE SEGMENTS  
W184 YASS - MUDGEE - YASS 6100/5400  
TUCKI - THE LAKE - TUCKI 2500/2500  
KEMPSEY - TAREE - KEMPSEY 4000/4000  
GUNNEDAH - PARKES - GUNNEDAH 5100/5400  
COFFS HARBOUR - JINGL - COFFS HARBOUR 6200/5500  
JINGL - SINGLETON - JINGL 6700/6700  
MT MCQUOID - CALGA - MT MCQUOID 2900/2900  
RUGBY - CUDAL - RUGBY 5100/4700  
OAKEY - TAROOM - OAKEY 3200/3600

## HEAD OFFICE (YSHO) (cont.)

=====

- DOC \* FROM: 12 041300 PERM (C0311/  
 AMD AIP MAP ERC L4 (5 DEC 96) LSALT.  
 AMD LSALT ON ROUTE SEGMENTS:  
 ST GEORGE - CHARLEVILLE - ST GEORGE 3000/2800  
 CHARLEVILLE - BLACKALL - CHARLEVILLE 3000/2900  
 OAKEY - TAROOM - OAKEY 3200/3600  
 LORNE - BLACKALL - LORNE 4000/4100  
 MIDDLETON - BIMERAH - MIDDLETON 2700/2700  
 MT MORRIS - CHARLEVILLE - MT MORRIS 3000/2800
- DOC \* FROM: 12 041300 PERM (C0312/  
 AMD AIP MAP ERC L6 (5 DEC 96) LSALT.  
 AMD LSALT ON ROUTE SEGMENTS  
 BORROLOOLA - SHEPARDS YARD - BORROLOOLA 2600/2700  
 KOWANYAMA - TRUDY - KOWANYAMA 2300/2400.
- DOC \* FROM: 12 041300 PERM (C0313.  
 AMD AIP MAP ERC L5 (5 DEC 96) LSALT.  
 AMD LSALT ON ROUTE SEGMENTS:  
 LORNE - BLACKALL - LORNE 4000/4100  
 MIDDLETON - BIMERAH - MIDDLETON 2700/2700  
 MT MORRIS - CHARLEVILLE - MT MORRIS 3000/2800  
 GUNNEDAH - PARKES - GUNNEDAH 5100/5400  
 ST GEORGE - CHARLEVILLE - ST GEORGE 3000/2800  
 CHARLEVILLE - BLACKALL - CHARLEVILLE 3000/2900
- DOC \* FROM: 12 041300 PERM (C0314  
 AMD AIP MAP L7 (5 DEC 96) LSALT.  
 AMD LSALT ON ROUTE SEGMENT.  
 MOUNT HOPE - PORT LINCOLN - MT HOPE 2900/2900
- DOC \* FROM: 12 041300 PERM (C0315  
 AMD AIP MAP L8 (5 DEC 96) LSALT.  
 AMD LSALT ON ROUTE SEGMENT  
 NEWMAN - PARABURDOO - NEWMAN 5300/5300
- DOC \* FROM: 12 041300 PERM (C0316  
 AMD AIP MAP TAC - I (5 DEC 96) LSALT  
 AMD LSALT ON ROUTE SEGMENTS :  
 TUCKI - THE LAKE - TUCKI 2500/2500  
 OAKEY - TAROOM - OAKEY 3200/3600
- DOC \* FROM: 12 041300 PERM (C031  
 AMD AIP MAP TAC - 2 (5 DEC 1996) LSALT.  
 AMD LSALT ON ROUTE/ROUTE SEGMENTS:  
 W148 WAGGA - CANBERRA - WAGGA 6500/6200  
 W184 YASS - MUDGEE - YASS 6100/5400  
 MT MCQUOID - CALGA - MT MCQHOID 2900/2900  
 RUGBY - CUDAL - RUGBY 5100/4700  
 HOLBROOK - BATLOW - HOLBROOK 6700/6700  
 BATLOW - CANBERRA - BATLOW 7500/7200  
 MELBOURNE - TATE - MELBOURNE 2400/2400  
 KEMPSEY - TAREE - KEMPSEY 4000/4000  
 COFFS HARBOUR - JINGL - COFFS HARBOUR 6200/5500  
 JINGL - SINGLETON - JINGL 6700/6700



HEAD OFFICE (YSHO) (cont.)

=====

- DOC \* FROM: 12 041600 TO: 02 161600 (C0318/96)  
 AMD AIP DAP EAST CHECKLIST AS FLW:  
 REF LIST OF IAL CHARTS PAGE DAP EAST 1-2 DATED 5 DEC 96  
 AMD CHECKLIST DATE OF CAIRNS DME OR GPS ARR PAGE 2 TO 20 JUN 96.
- DOC \* FROM: 12 041300 PERM (C0328/96)  
 AMD AIP MAP ERC L2 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 POPLA - WEE JASPER - POPLA 5900/5900  
 YARROWEE - STONE - YARROWEE 3000/3000  
 EDINBURGH - PORT AUGUSTA - EDINBURGH 4600/4000
- DOC \* FROM: 12 041300 PERM (C0329/96)  
 AMD AIP MAP ERC L3 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 MT SANDON - TAREE - MT SANDON 6100/6100  
 SINGLETON - SCONE - SINGLETON 4200/4200  
 SINGLETON - TAREE - SINGLETON 4900/4900  
 MUDGEE - DUBBBO - MUDGEE 4300/4300
- DOC \* FROM: 12 041300 PERM (C0330/96)  
 AMD AIP MAP ERC L4 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE/ROUTE SEGMENTS  
 W153 ROCKHAMPTON - GLADSTONE - ROCKHAMPTON 3500/3500  
 WINTON - KYNUNA - WINTON 2500/2500  
 LLAMA - BREWARRINA - LLAMA 2300/2300  
 WHARTON CREEK - EMERALD - WHARTON CREEK 5400/4900
- DOC \* FROM: 12 041300 PERM (C0331/96)  
 AMD AIP MAP ERC L5 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 BROKEN HILL - POPILTAH - BROKEN HILL 2600/2600  
 WINTON - KYNUNA - WINTON 2500/2500  
 LLAMA - BREWARRINA - LLAMA 2300/2300  
 THARGOMINDAH - MT ALFRED - THARGOMINDAH 2700/2500  
 WHARTON CREEK - EMERALD - WHARTON CREEK 5400/4900
- DOC \* FROM: 12 041300 PERM (C0332/96)  
 AMD AIP MAP ERC L6 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 WEIPA - COEN - WEIPA 3500/3500  
 RIDGEBACK - TINDAL - RIDGEBACK 2900/2600
- DOC \* FROM: 12 041300 PERM (C0334/96)  
 AMD AIP MAP TAC-2 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 POPLA - WEE JASPER - POPLA 5900/5900  
 MT SANDON - TAREE - MT SANDON 6100/6100  
 SINGLETON - SCONE - SINGLETON 4200/4200
- DOC \* FROM: 12 041300 PERM (C0335/96)  
 AMD AIP MAP TAC-3 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE SEGMENTS  
 EDINBURGH - PORT AUGUSTA - EDINBURGH 4600/4000

## HEAD OFFICE (YSHO) (cont.)

=====

- DOC \* FROM: 12 041600 TO: 01 020300 EST (C0337/9)  
 AIP AMDT/SUP NOTAM  
 1. AIP DOC EFFECTIVE WEF 5 DEC 96  
 AIP ERSA DATED 5 DEC 96  
 AIP DAP EAST AMDT LIST 56 DATED 5 DEC 96  
 AIP DAP WEST AMDT LIST 56 DATED 5 DEC 96  
 AIP AMDT LIST 17 DATED 5 DEC 96  
 AIP MAP DATED 5 DEC 96  
 AIP DAH DATED 5 DEC 96  
 2. ADDN AIP SUP EFFECTIVE 5 DEC 96  
 H70/96 CHANGES TO PROVISION OF AIR TRAFFIC SERVICES PERTH/JANDAKO AREA  
 H71/96 CHANGES TO PROVISION OF AIR TRAFFIC SERVICES PERTH AREA  
 H72/96 AIP MAP ROUTE INFORMATION - LOWEST SAFE ALTITUDE (LSALT)  
 H78/96 FIA BOUNDARY CHANGES EAST OF BRISBANE  
 H79/96 WESTERN AUSTRALIAN STATE GLIDING CHAMPIONSHIPS NARROGIN 14 JANUARY - 25 JANUARY 1997  
 H80/96 SYDNEY (KINGSFORD SMITH) AIRPORT RELOCATION OF RWY 16L THRESHOLD.  
 H81/96 MANUSCRIPT AMENDMENTS TO WAC 1:1000000 SERIES  
 H82/96 SYDNEY (KINGSFORD SMITH) AIRPORT PAVEMENT OVERLAY WORKS  
 3. ADDN AIC EFFECTIVE 7 NOV 96  
 H15/96 CHANGES TO AIP MAP AMENDMENT NUMBER 11 EFF 5 DECEMBER 1996  
 H17/96 INTRODUCTION OF ADVANCED AVIATION AUTOMATIC WEATHER STATICS  
 H18/96 ENVIRONMENTAL AWARENESS ARRANGEMENTS.  
 H19/96 MILITARY EXERCISE TANDEM THRUST 97 - MARCH 1997.  
 H20/96 TERMINATION OF OMEGA NAVIGATION SYSTEM  
 H21/96 CHANGES TO AVAILABILITY OF EXAMFAX FOR PPL EXAMINATIONS.
- DOC \* FROM: 12 040043 PERM (C0338/9)  
 MANUSCRIPT AMDT AIP MAP ERC H5  
 AMD TR TABAL (S28 15.3 E159 10.3) - POVOP (S27 26.7 E157 55.1) TO 293 DEG  
 AMD AIP MAP ERC 5 DATED 5 DEC 1996
- DOC \* FROM: 12 050600 PERM (C0357/)  
 AMD AIP MAP ERC H1, H2, H3, H4, TAC-4 (5 DEC 96) LSALT  
 AMD LSALT FOR FOLLOWING ROUTES/ROUTE SEGMENTS
- |                                             |           |
|---------------------------------------------|-----------|
| ERC H1 A339 IKUMA - ELBIS - IKUMA           | 4700/4700 |
| ERC H2, H4, TAC-4 A463 QUINS - BIGAK -QUINS | 1600/2600 |
| ERC H3 B472 TOREX - IDELU - TOREX           | 1900/1700 |
| ERC H4 A464 KIKEM - IKUMA - KIKEM           | 3500/3500 |
- DOC \* FROM: 12 082348 PERM (C0363/)  
 AMD AIP MAP ERC H2 H3 H4 H5 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE/ROUTE SEGMENTS
- |                                  |           |
|----------------------------------|-----------|
| H2 H4 G337 POKIP - AGPOK - POKIP | 2600/2600 |
| H2 H4 G337 AGPOK - AGSEL - AGPOK | 2100/2100 |
| H3 R340 GUTEV - IGOPO - GUTEV    | 3500/3500 |
| H5 B586 IKODA - BODEG - IKODA    | 2500/2500 |
- DOC \* FROM: 12 110048 PERM (C0364/)  
 AMD AIP MAP ERC H3 (5 DEC 1996) LSALT  
 AMD LSALT ON FLW ROUTE SEGMENTS
- |                                    |           |
|------------------------------------|-----------|
| MUNEL - GODIP - MUNEL              | 3500/3500 |
| GODIP - YORKE ISLAND - GODIP       | 2100/1600 |
| YORKE ISLAND - DARU - YORKE ISLAND | 2100/1500 |

HEAD OFFICE (YSHO) (cont.)

=====

- DOC \* FROM: 12 110505 PERM (C0365/96)  
 ERSa FLT PLAN RQMTS SYDNEY SOUTH.  
 REF ERSa DATED 5 DEC 96 GEN-47. PROPELLER DRIVEN ACFT DEP  
 WOLLONGONG MAY PLAN WOL NDB - OAKDALE AT A060. ATS RTE W340 NOT TO  
 BE FLT PLANNED NORTHBOUND.
- DOC \* FROM: 12 041300 PERM (C0367/96)  
 AMD AIP MAP TAC-2 (5 DEC 96) LSALT AND ROUTE DESIGNATOR  
 AMD ROUTE DESIGNATOR AND LSALT ON FOLLOWING ROUTE SEGMENTS  
 PORT MACQUARIE - KOALA - PORT MACQUARIE W768 1900/1900
- GEN \* FROM: 10 261600 TO: 03 301600 (C0262/96)  
 EASTERN DAYLIGHT SAVING TIME IN THE STATE OF NEW SOUTH WALES.  
 UTC TIMES PROMULGATED IN DOCS FOR THE PROVISION OF SER AND ACT  
 OF AIRSPACE WILL BE EFFECTIVE ONE HR EARLIER.
- GEN \* FROM: 12 041300 PERM (C0333/96)  
 AMD AIP MAP TAC-1 (5 DEC 96) LSALT  
 AMD LSALT ON FOLLOWING ROUTE/ROUTE SEGMENTS  
 W153 ROCKHAMPTON - GLADSTONE - ROCKHAMPTON 3500/3500
- MELBOURNE FIR (YMMM) 7210 7220 7510  
 =====
- PRD \* FROM: 11 122209 TO: 02 270600 EST (C0593/96)  
 LOWER: SFC UPPER: 6000FT AMSL  
 TEMPO RESTRICTED AREA ACT  
 ORRORAL VALLEY (24NM SSW CANBERRA AD) 5NM RAD CENTRED ON 353811S  
 1485621E EXC OVERFLYING CTA DUE LASER OPRT
- DOC \* FROM: 11 301600 PERM (C0569/96)  
 SYDNEY CENTRE 129.8 TRANSFERRED TO MELBOURNE  
 AIP ERSa (5 DEC 96)  
 ACC SYDNEY CENTRE 129.8 WI 30-80NM SW OF SYDNEY: AMD SYDNEY CENTRE TO  
 READ MELBOURNE CENTRE  
 MELBOURNE ACC/FIC: ADD ACC MELBOURNE CENTRE 129.8 WI 30-80NM SW OF  
 SYDNEY
- DOC \* FROM: 12 131030 PERM (C0741/96)  
 WAGGA TWR CTR/CTA CLOSED.  
 REF AIP MAP VTC WAGGA, VTC ALBURY, ERC L2, AND TAC 2 CANBERRA DATED  
 5 DEC 1996.  
 DELETE DEPICTIONS OF WAGGA CTR AND CTA. WAGGA CTR/CTA AIRSPACE  
 RECLASSIFIED CLASS G  
 MBZ PROC APPLIES H24 WI 15NM SFC - 5000FT AGL

**Appendix Six**

**NOTAM C0949/96.**

DOC \* FROM: 12 041600 PERM (C0949  
RENAME 'PAGER' TO 'CORDO' - AIP DAP REF  
AMD AIP DAP SID RWY SOUTH (NON-JET) DATED 10 OCT 1996.  
AMD PROC AS FLW:

PLAN VIEW: RENAME 'PAGER' TO 'CORDO', AMD DETAILS TO READ (30DI  
S34 19.8 E150 47.1, AND AMD TRACK TO SHELLEYS (SLS) TO 227 DE

TEXT:

1. RENAME SHELLEYS (SLS) FOUR DEP TO SHELLEYS (SLS) FIVE DEP
2. UNDER 'FOR SLS' AMD 'PAGER' TO 'CORDO'