NACC/WG/2 - WP/17
International Civil Aviation Organization 22/04/08
North American, Central American and Caribbean Office
Second North American, Central American and Caribbean Working Group Meeting (NACC/WG/2)
Ocho Rios, Jamaica, 12-16 May 2008

Agenda Item 3 CNS Developments
3.6 Surveillance Data Exchange Activities

SURVEILLANCE DATA EXCHANGE AND SHARING

(Presented by the Secretariat)

SUMMARY

This working paper presents a summary of aspects related with the sharing and exchange of surveillance data, its operational considerations, current radar systems, ADS-B use and other relevant aspects.

References:

- CAR/WG/1 Meeting Report
- GREPECAS/11 and GREPECAS/12 Meeting Reports
- CAR/SAM Regional Air Navigation Plan (Doc 8733)
- Manual of Air Traffic Services Data Link Applications (Doc 9694)

Strategic Objectives	*This working paper relates to Strategic Objectives A and D.*

1. Background

1.1 Initial regional guidelines for radar data sharing in the CAR/SAM Regions were defined through GREPECAS Conclusion 11/47, which urges States/Territories/International Organizations to use the ASTERIX protocol as a common regional protocol for SSR data exchange; to take into account revised regional guidelines on radar data exchange; and, to establish bilateral/multilateral agreements on radar data exchange.

1.2 Likewise, GREPECAS Conclusion 12/49 urged that CAR/SAM States / Territories / International Organizations upon planning SSR data exchange extensively use the communications facilities available in intra/inter regional networks, as well as coordinate pertinent technical-institutional aspects at bilateral or multilateral meetings.

1.3 In previous Meetings of the Eastern Caribbean Working Group, it has been identified that the MEVA II Satellite Network has the capacity to broadcast radar data, as well as the proposal of radar data exchange between Caiman Islands, Cuba, Jamaica and COCESNA for the corresponding ATS units through bilateral/multilateral agreements. Also, data exchange has been identified among some Eastern Caribbean States. It is also known that some Central American States have radar data exchange with COCESNA.

1.4 The CAR/WG/1 Meeting was informed that Trinidad and Tobago had signed an agreement with Barbados and French Antilles to remote use radar data; as well as the Cuban trials and a forthcoming agreement with Jamaica.

2. Discussion

Current Radar Systems

2.1 FASID Table CNS 4A – Surveillance Systems has been updated in accordance with the information provided through IP/10 of this Meeting. Based on this update and in order to illustrate the estimated radar coverage offered by the current radar systems, **Appendices A, B** and **C** present:

Appendix A: FL 200 for the Central American, Central and Eastern Caribbean Areas
Appendix B: FL 250 for the Central American, Central and Eastern Caribbean Areas
Appendix C: FL 300 for the Central American, Central and Eastern Caribbean Areas

2.2 Recently, Mexico and COCESNA subscribed a technical cooperation agreement for radar data exchange, particularly between the Belize and Cancun radar systems. Furthermore, it has been informed that Cayman Islands and COCESNA regarding radar data sharing as part of the current cooperation agreement between both Administrations. Taking into account regional guidelines, it is expected that similar initiatives be implemented and informed accordingly.

Operational Considerations

2.3 Part VII "Automatic Dependent Surveillance Broadcast," Chapter 4 of the *Manual of Air Traffic Services Data Link Applications* (Doc 9694) describes the considerations and procedures in a radar surveillance environment, in ADS-B and mixed surveillance, as well as ADS-B use and requirements for ATS surveillance in en route, terminal and airport environments:

a) The increased accuracy, the update rate and additional parameters available with ADS-B should result in the following benefits:
   - improved services in airspace not having radar coverage;
   - improved airspace utilization;
   - improved conflict prediction and detection;
   - improved airport surface movement, guidance, and control;
   - improved runway incursion prevention; and
   - improved automated conformance monitoring.

   Some benefits can be realized even before full aircraft equipage.

b) An operating environment with ADS-B will enhance ATC surveillance in the following ways:
   - in a mixed ADS-B/radar surveillance environment, ADS-B data will complement or supplement radar data; and

- ADS-B will extend surveillance services into nonradar airspace, such as low-altitude airspace, remote airspace and coastal waters.

At such time that an airspace is fully populated with aircraft equipped with ADS-B, ATS providers may evaluate the necessity of replacing or maintaining other ground-based surveillance equipment. First results could be obtained based on the trials strategy that have commenced in the CAR Region.

Systems Update

2.4 Several CAR Region States/Territories/International Organizations have a high level progress in the ATM automation subject, they have a considerable processing capacity and have several automated functionalities, which, together with the surveillance data sharing would allow to accomplish the operational benefits regarding safety and efficiency, improved airspace utilization and mutual backup between adjacent ATS units, significantly improving airspace harmonisation.

2.5 GREPECAS Conclusion 12/31 – *Regional Strategy for the Integration of ATM Automated Systems*, urged States, Territories and International Organizations to define an action plan for the integration of ATM automated systems using guidelines contained in the conclusion, in which radar data sharing is an important activity to accomplish the integration of automated systems.

ADS-B Data Sharing

2.6 Other regions have had the experience of surveillance data sharing including radar and ADS-B data, which is the case of Australia and Singapore, who have prepared an agreement letter sample (**Appendix D** to this paper), based on a similar EUROCONTROL document that contains:

- ADS-B data sharing commitments;
- ADS-B station implementation plan;
- Cooperation methods;
- Implementation calendar;
- Performance requirements;
- State responsibilities; and
- Performance monitoring

3. Suggested Actions

3.1 The Meeting is invited to:

a) take note of the information contained in this working paper;

b) consider GREPECAS guidelines as well as activities identified in previous meetings regarding radar data sharing, presented in paragraphs 1.1 to 1.4;

c) take note of the estimated radar coverage illustrated in Appendices A, B and C, in accordance with available radar systems contained in FASID Table CNS 4A;

d) take note of the operational considerations contained in paragraph 2.3;

e) consider to begin automation plan activities, improve services and expand ADS-B trials in accordance with the information provided in item c) above, the systems automation capacity (paragraphs 2.4 and 2.5) and the experience of States in other Regions (paragraph 2.6);

f) urge their Administrations to report the surveillance data exchange/sharing activities, as described in paragraph 2.2; and

g) review and propose any other actions deemed appropriate.

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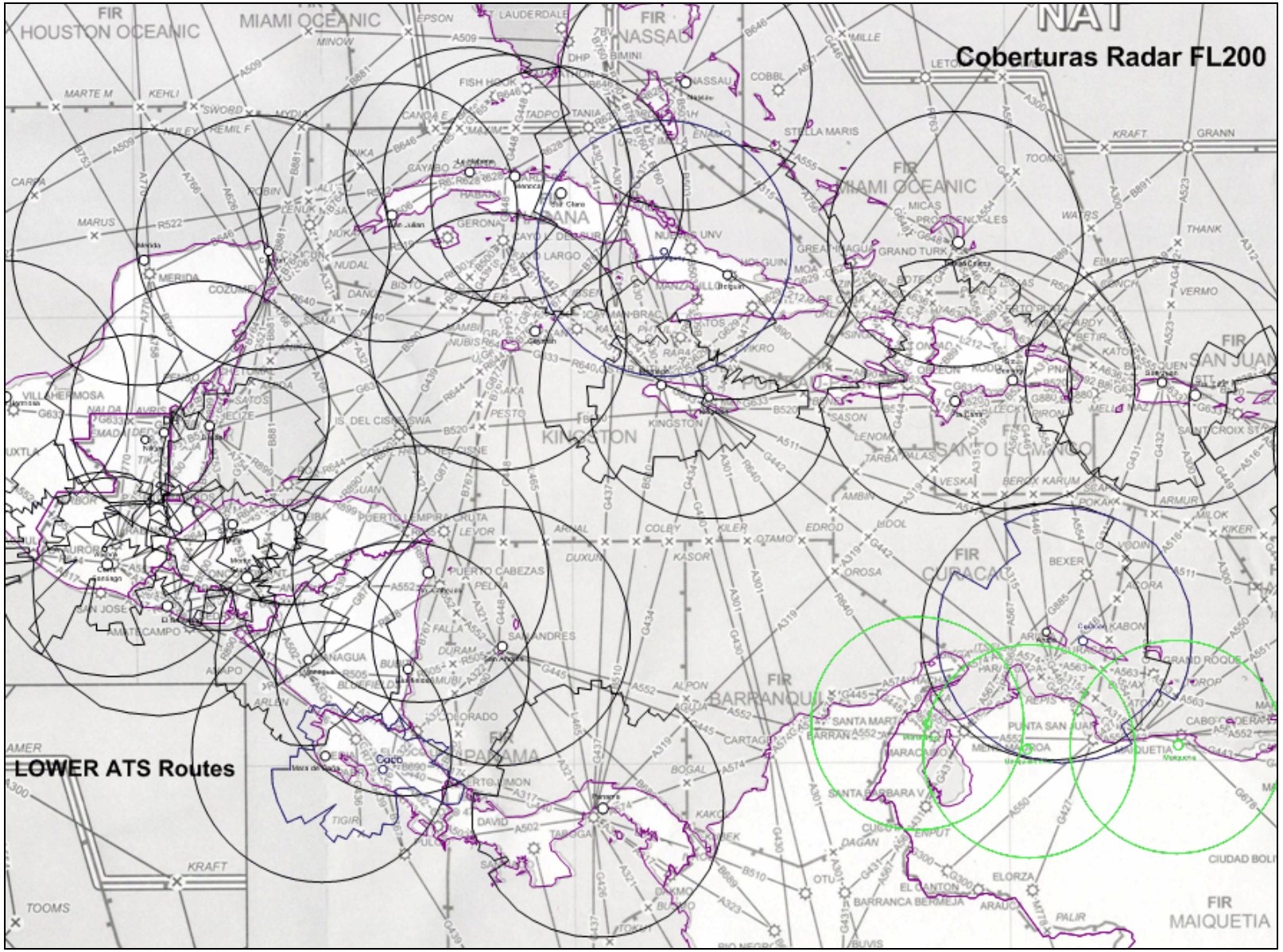
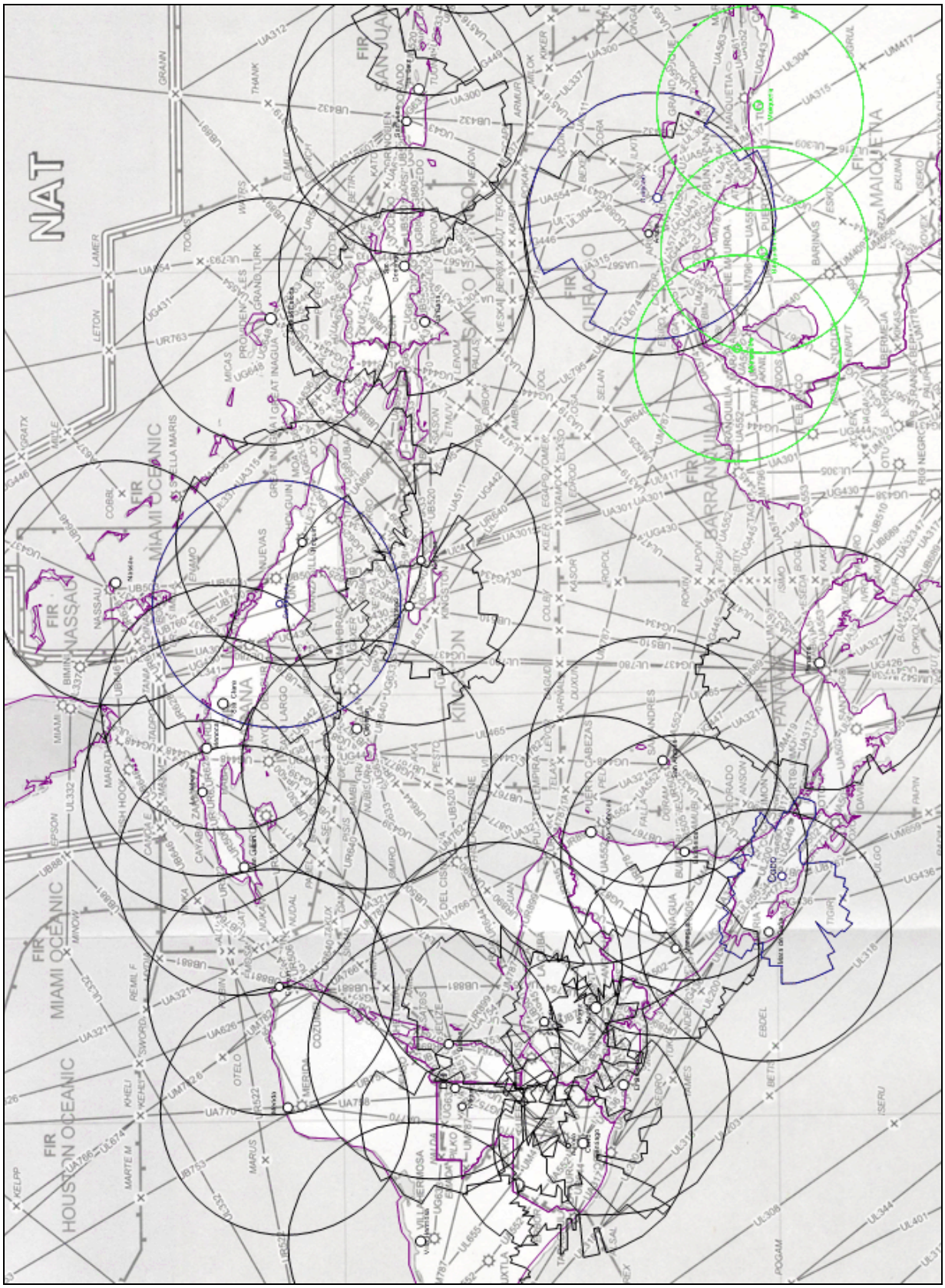
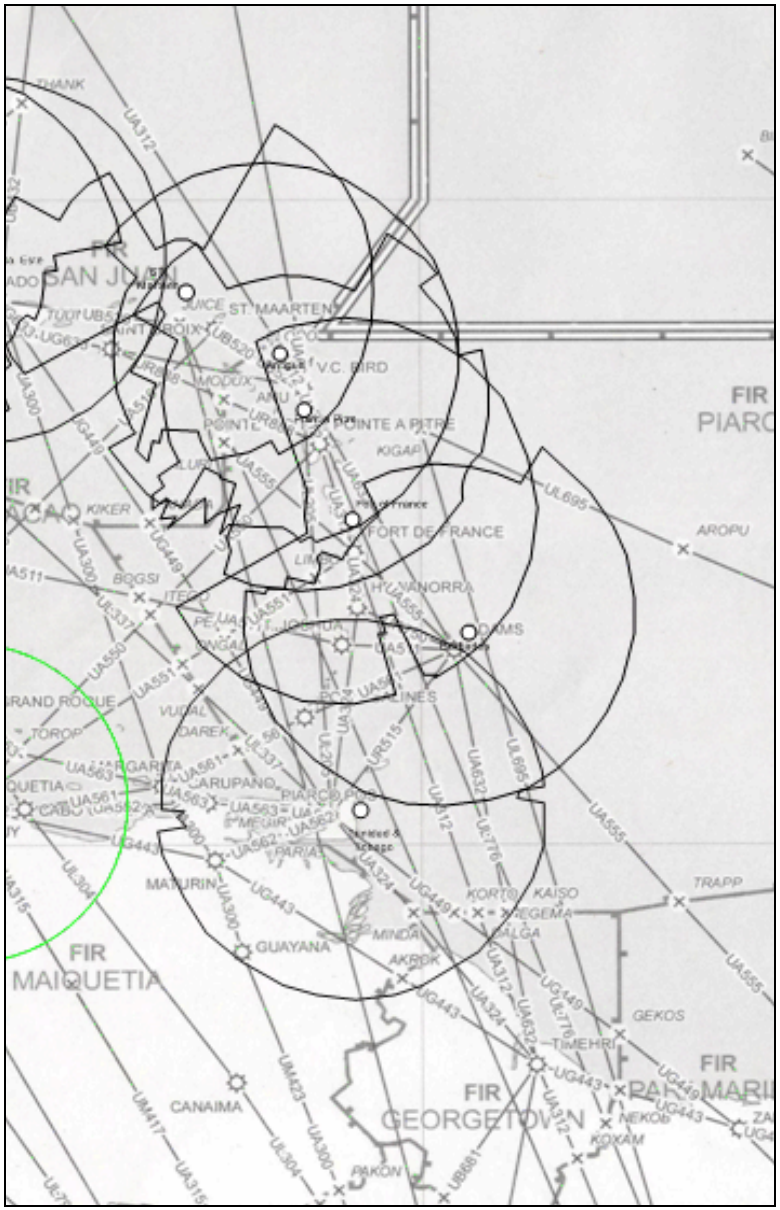
Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 200 and Lower ATS Routes



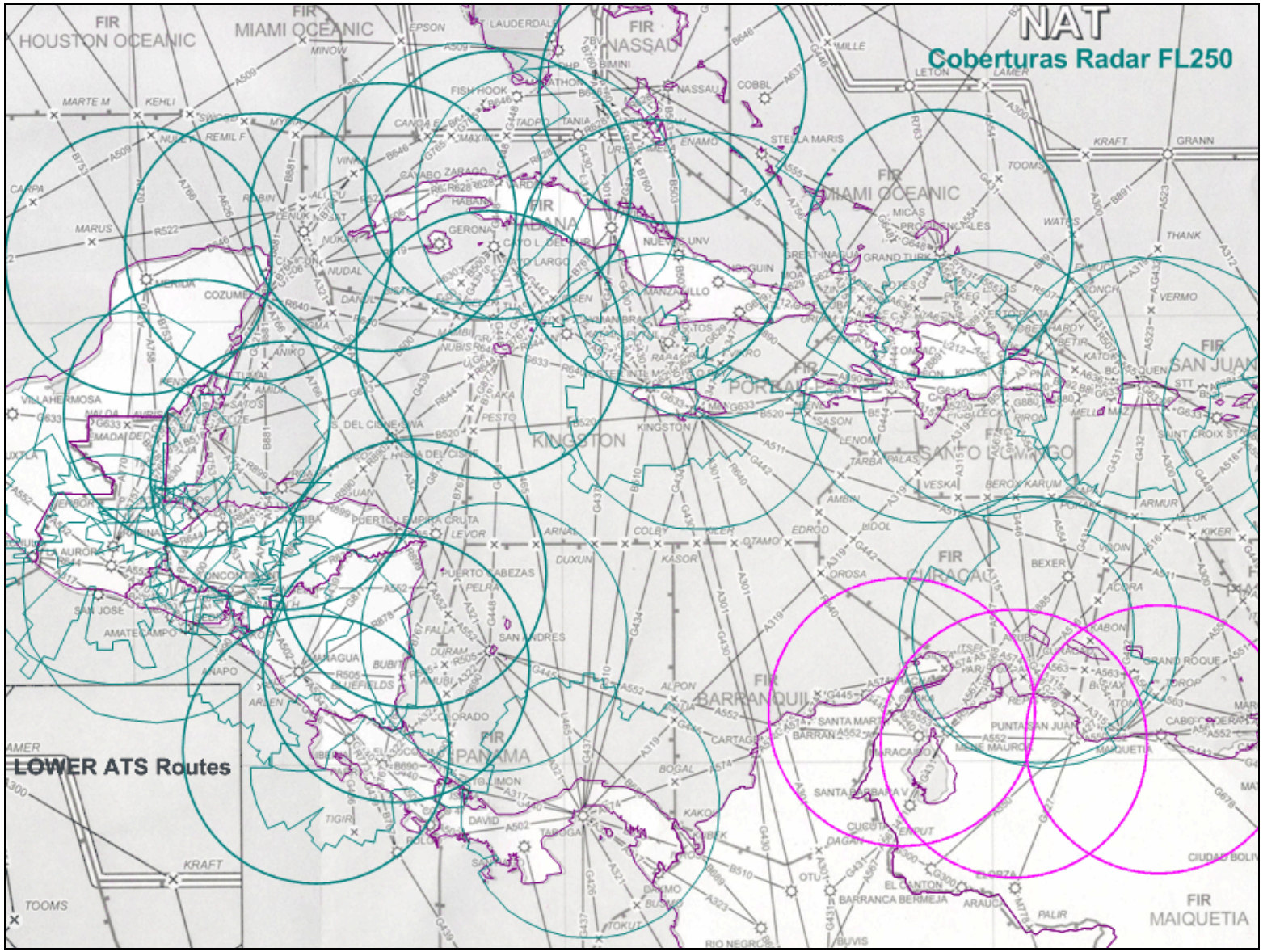
Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 200 and Higher ATS Routes



Radar Coverage in the CAR Region, Eastern Caribbean Portion
Flight Level 200, Lower and Higher ATS Routes



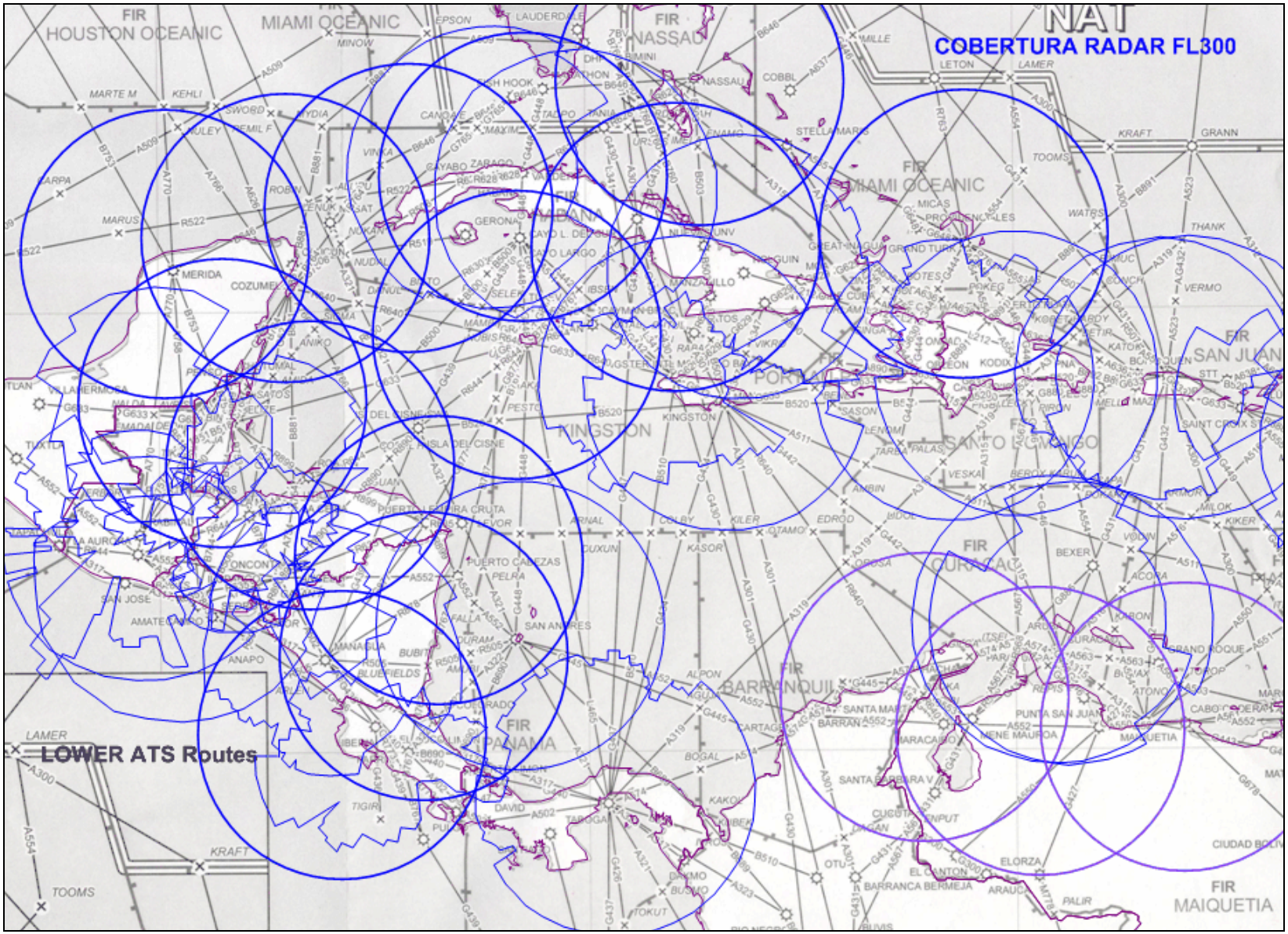
Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 250 and Lower ATS Routes



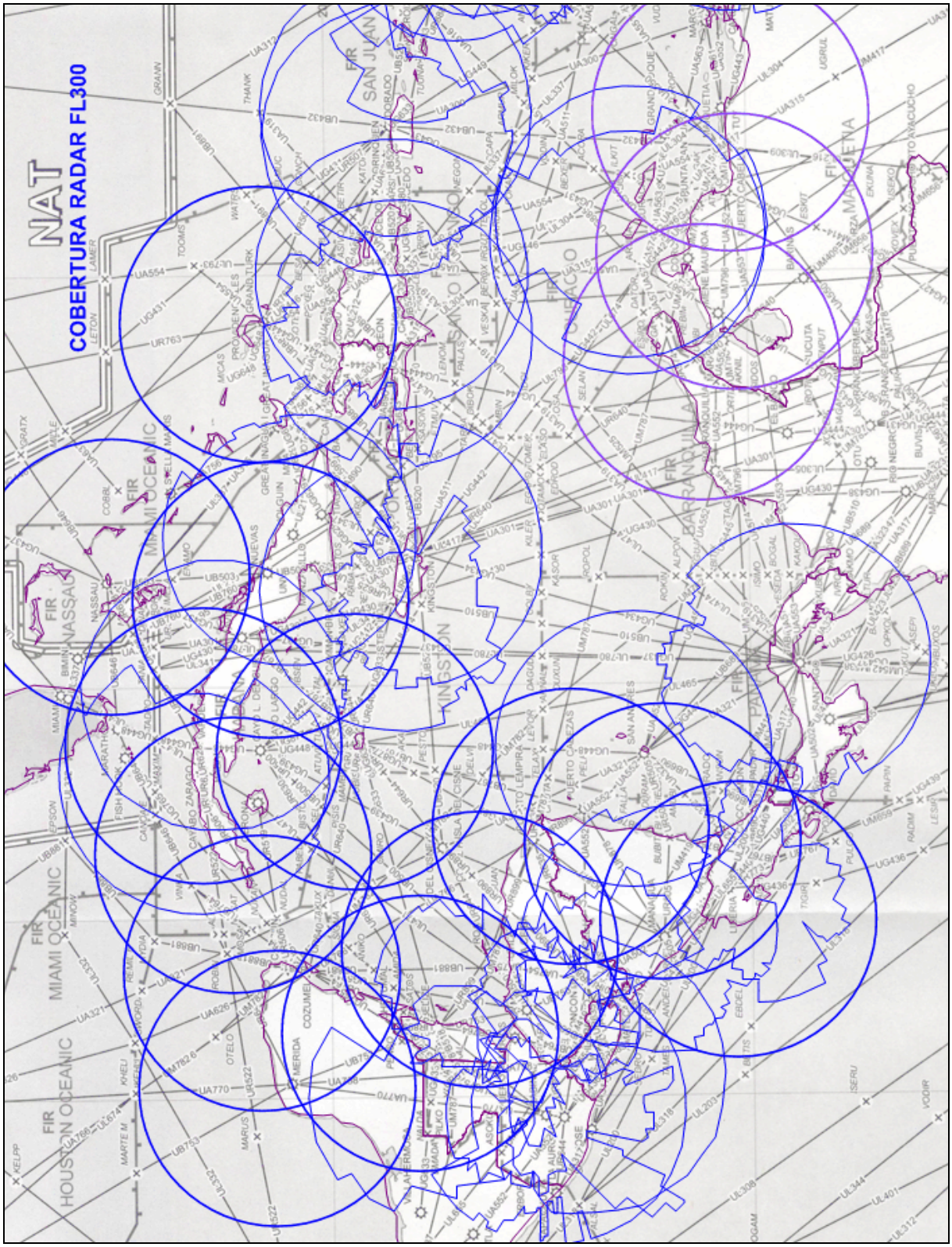
Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 250 and Higher ATS Routes

Radar Coverage in the CAR Region, Eastern Caribbean Portion
Flight Level 250, Lower and Higher ATS Routes

Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 300 and Lower ATS Routes



Radar Coverage in the CAR Region, Central America and Central Caribbean Portion
Flight Level 300 and Higher ATS Routes



Radar Coverage in the CAR Region, Eastern Caribbean Portion
Flight Level 300, Lower and Higher ATS Routes

Proposed Sample ADS-B Data Sharing Agreement

INTERNATIONAL CIVIL AVIATION ORGANISATION
ASIA AND PACIFIC OFFICE

SAMPLE AGREEMENT FOR THE SHARED USE OF ADS-B DATA

Edition	**:**	**1.0**
Edition Date	**:**	**2008**
Status	**:**	**Draft**

SOUTH EAST ASIA SUB-REGIONAL AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B) IMPLEMENTATION WORKING GROUP

Proposed Sample ADS-B Data Sharing Agreement

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED
1.0	February 2008		

Proposed Sample ADS-B Data Sharing Agreement

TABLE OF CONTENTS

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Proposed Sample ADS-B Data Sharing Agreement

1. FOREWORD

1.1 The present document concerns the guidelines for the drafting of agreements for the shared use of ADS-B data.

1.2 This document is related to the SEA ADS-B WG.

1.3 These guidelines were constituted from:
the Guidelines for an Agreement for the shared use of radar sensor data used by Eurocontrol.

1.4 Notes containing extra information on the use of the proposed contract text are printed in light face, the status being indicated by the prefix **NOTE.**

1.5 The original version of this document is in the English language.

Proposed Sample ADS-B Data Sharing Agreement

2. SCOPE

2.1 This document constitutes the SEA ADS-B WG guideline concerning the drafting of an agreement for the shared use of ADS-B data between ATS Organisations in the SEA ADS-B WG and the provision of ADS-B data by service providers. This document contains the proposed text for a bilateral sharing agreement for ADS-B data. The changes required to make it a multilateral sharing agreement for ADS-B data are put in as suggestions.

2.2 The agreement consists of the proposed text for twelve numbered articles and nine annexes, named Annex A up to Annex I. These annexes contain information which is likely to change from time to time. Deviations from the proposed text in the agreement as well as in the annexes, can be necessary due to legal, organisational or technical reasons. Examples of such changes are:

- The starting date could be set to the date the radar data has been delivered for the first time;
- The notice period to end the contract could be chosen differently;
- When installation at the providers' premises requires, i.e. additional staff, the cost could be charged to the user.

The clauses enclosed in brackets ([]) should be replaced by the information described in these clauses.

Proposed Sample ADS-B Data Sharing Agreement

3. REFERENCE DOCUMENTS

The following documents and standards contain provision which, through reference in this text, constitute provisions of the document. At the time of publication of this document the editions indicated for the referenced documents were valid.

Revisions of the referenced documents shall not form part of the provisions of this document until they are formally reviewed and incorporated into this document.

In case of conflict between this document and the contents of these other referenced documents, this document shall take precedence.

1 [To list the relevant documents]

Proposed Sample ADS-B Data Sharing Agreement

4. ABBREVIATIONS AND ACRONYMS

For the purposes of these guidelines the following are used:

ADS-B Automatic Dependent Surveillance - Broadcast

ASTERIX All Purpose Structured Eurocontrol Radar Information Exchange

Proposed Sample ADS-B Data Sharing Agreement

5. PROPOSED TEXT FOR THE AGREEMENT

The [name of the State's responsible Organisation or name of the (privatised) ATC Organisation] represented by [function],

hereinafter called "the *Provider*",

And

The [name of the State's responsible Organisation or name of the (privatised) ATC Organisation] represented by [function],

hereinafter called "the *User*";

Suggestion: If there are more than one Provider or more than one User, the above lines are to be repeated for each Provider or User.

In case the Providers are also Users (e.g. each party supplies information from an Automatic Dependent Surveillance – Broadcast (ADS-B) to the other party), one can replace the words Provider and User with the names of the Organisations and indicate in Annex A who is Provider and who is User for each source of the ADS-B data.

- Having regard to the South East Asia Sub-regional Automatic Dependent Surveillance – Broadcast (ADS-B) Implementation Working Group (SEA ADS-B WG) objectives, including the optimisation of the provision and use of the ADS-B surveillance function through the installation of new facilities or the sharing of ADS-B data;

Proposed Sample ADS-B Data Sharing Agreement

- With a view to the establishment of the categories of services through the airspace of the regions specified in Annex A and I;

NOTE- More reasoning and motivations for the contract can be inserted here

- Have agreed as follows:

ARTICLE 1 - Objective of the Agreement

1 The objective of this Agreement is to improve safety and operations efficiency of civil air traffic by enhancing ADS-B coverage and ADS-B data availability in the Flight Information Regions for which the *User* is responsible and the areas within 150Nm from the boundaries of these Flight Information Regions

2 For this purpose, the *Provider* shall provide its ADS-B data to the *User* with effect from [date] and in accordance with the implementation schedule in Annex G.

3 The ADS-B data to be provided are specified in Annex B, H and I.

Proposed Sample ADS-B Data Sharing Agreement
ARTICLE 2 - Limitations 1 The *User* shall use the ADS-B data provided only to ensure the safe, proper and continuous operation of civil Air Traffic Services or activities in support of his Air Traffic Services and for technical demonstration, evaluation and test purposes related to his operational tasks, unless otherwise specified in Annex A. 2 The *User* shall not communicate to any party not specified in this Agreement in any matter of form whatsoever any information supplied pursuant to this Agreement. The said information shall not be used for any purpose other than those specified in paragraph 1 hereof, without the prior written consent of the *Provider*. [NOTE : To include a definition: Air Traffic Services shall mean Civil Air Traffic Services.]
ARTICLE 3 - Installation 1 The *Provider* and the User shall install all required equipment at their respective premises. 2 Both the *Provider* and the *User* shall arrange for the provision, installation and commissioning of private circuits and other associated equipment as specified in Annex B and F, required for the transmission of the ADS-B data from the *Provider* to the *User*.

Proposed Sample ADS-B Data Sharing Agreement
3 Initial testing of the equipment and private circuits for the provision of the ADS-B data shall be carried out in conjunction with the *Provider* and the *User*. 4 The provision of the present article shall also apply in the event of modifications to the equipment or private circuits.
ARTICLE 4 - Maintenance 1 Unless otherwise specified in Annex C, the routine maintenance, repair and replacement service for the equipment and the private circuits installed for the provision of ADS-B data under this Agreement shall be executed by technical staff available at the *Provider's* and at the *User's* premises. 2 Unless otherwise specified in Annex D, the routine maintenance, repair and replacement at the Provider's premises referred to in paragraph 1 hereof shall be carried out free of charge by the Provider to the standards of maintenance commonly adopted by the Provider. 3 The routine maintenance, repair and replacement at the User's premises shall be done by and at the expense of the *User* to the standard of maintenance commonly adopted by the *User*.
ARTICLE 5 - Modifications 1 Both the *Provider* and the *User* shall implement any modification in the equipment and the private circuits for the provision of ADS-B data at their respective premises due to any decision of the *Provider*. The modification shall be carried out in accordance with Article 3.

Proposed Sample ADS-B Data Sharing Agreement
2 The *User* may propose technical modifications of the specifications for the provision of ADS-B data to the *Provider*. The *Provider* shall decide on the implementation of it. 3 The modifications to be implemented shall be specified by the *Provider* in writing to the *User* not less than six months before the date the modification shall be implemented.
ARTICLE 6 - Cost 1 The cost apportionment for the use of ADS-B data as specified in Annex A, B and I shall be in accordance with Annex D.
ARTICLE 7 - Integrity 1 The *Provider* shall take all reasonable steps, in accordance with the standards commonly adopted by him, to monitor and maintain the quality and continuity of the provision of ADS-B data of the facilities specified in Annex B and F. 2 Where this is reasonably practicable the *Provider* shall give the *User* such notice in respect to any planned periodic break in service as soon as such information is available and a minimum of 24 hours notice in case of any other planned break in service. 3 The *Provider* shall report immediately or at the earliest reasonable opportunity any failure in the provision of the ADS-B data or any abnormality of ADS-B data provided, to the *User's* technical supervisor centre. 4 The *User* shall, in accordance with the standards commonly adopted by him, monitor the ADS-B data received from the *Provider* and report immediately or at the earliest

Proposed Sample ADS-B Data Sharing Agreement
reasonable opportunity any failure in the reception or any abnormality of the ADS-B data, to the *Provider's* technical supervisor centre.
ARTICLE 8 - Liability [*The requirements on this Article should be agreed bilaterally between States]*
ARTICLE 9a - Legal Aspects
ARTICLE 9b - Settlement of Dispute

Proposed Sample ADS-B Data Sharing Agreement
ARTICLE 10 - Correspondence 1 Correspondence to be applied in the framework of this Agreement is specified in Annex E.
ARTICLE 11 - Annexes 1 Annex A, B, C, D, E, F, G, H and I are attachments to this Agreement. The *Provider* and *User*, in mutual consent and formal acceptance, are allowed to amend and up-date, as circumstances deem necessary, the contents of the Annexes, in so far as the amendments are not in contradiction to or out of scope with the text in this Agreement.
ARTICLE 12 - Duration 1 The present Agreement shall enter into force on the day on which it is signed by the last of the contracting Parties, for a period of [duration to be decided by the Parties]. 2 Thereafter, that period shall be automatically prolonged unless any of the contracting Parties has, by giving written notice at least [duration to be decided by the Parties] before the expiry of the contract period or the termination date of prolonged period, terminated the Agreement. 3 The Agreement can early terminate in the event the provision of ADS-B data as specified in Annex A hereof is to be permanently withdrawn from service. The *Provider* shall give to the *User* not less than [duration to be decided by Parties] notice in writing in advance thereof. 4 The Agreement can early terminate on request of the *User* in the event of modifications

Proposed Sample ADS-B Data Sharing Agreement

to be implemented. The *User* shall give to the *Provider* not less than [duration to be decided by Parties] notice in writing in advance thereof.

In witness whereof, the undersigned having been duly authorized, sign the present Agreement.

Done at [place] on [date] in the English language in [number] originals.

NOTE-If the Agreement is in more than one language the following text can be used to replace the previous paragraph.

Done at [place] on [date] in the English, [other language(s)] languages in [number] originals. In the event of any inconsistency, the text in the [language] language will prevail.

For [State's Organization/name of the (privatized) ATC Organisation, Provider] :
[name]
[function]

For [State's Organization/name of the (privatized) ATC Organisation, *User*] :
[name]
[function]

ANNEX A. PARTIES

A.1 In the Framework of this Agreement the providers and users are :

Provider 1 :
Provider 2:
User 1:
User 2:

(NB: In a many cases, each ANSP is likely to be both a Provider and user. Ie ANSP sends & receives

Proposed Sample ADS-B Data Sharing Agreement

ADS-B data))

Having regard to Article 2 : Limitations,

the *Provider* authorises the *User* to communicate the provided ADS-B ground station data to the following parties :

insert the name of the 3rd parties (if any)

USER 1 :
- List of 3rd parties (if any)

USER 2 :
- List of 3rd parties (if any)

A.2 For this purpose, the *User* to this Agreement shall arrange for (an) identical ADS-B ground station Sharing Agreement(s) acting as *Provider*, with the specified parties.

NOTES -
Whenever the user wants to supply the ADS-B ground station data or a processed version thereof to a third party, the name of the third party has to be added to the list in this annex. The sharing agreement made between the user and the third party must be approved by the Provider in writing. The Provider decides whether it is necessary to update this agreement between Provider and user(s). The User could become a Provider of data to another specified party

ANNEX B. INTERFACE SPECIFICATION

B.1 This Annex describes the Interface Specification, needed for the interfacing between the *Provider* and the *User* to share ADS-B ground station data.

Proposed Sample ADS-B Data Sharing Agreement

B.2 ADS-B Data sharing interface

B.2.1 Data Elements

ADS-B messages shall comprise the data elements defined in Eurocontrol Asterix Category 21 version 0.23.

[NOTE : To include a definition: Asterix Category 21 shall mean Eurocontrol Asterix Catergory 21 Version 0.23.]

ADS-B Data received from each aircraft from each ADS-B ground station shall be transmited at a rate of <Rate to be agreed between *User & Provider*>

The Asterix Category 21 version 0.23 standard allows packaging of multiple ADS-B records into a single data block, or alternatively to place a single ADS-B record per data block. Record packaging shall be performed to the extent possible to minimise communication bandwidth requirements without delaying transmission of any given record.

B.2.2 Message Description

The message format shall be in accord with the Asia Pacific ADS-B data interface sharing standard : Namely Asterix Cat 21 version 0.23.

<Not required>

B.2.4 Communication Protocol

NOTE : The communication protocol should be decided by the Parties. Relevant aspects of the communication protocol should be specified in this Annex such as ;

- name of the communication protocol including version of the protocol;
- options used of the protocol, if any;
- parameter setting;
- addressing issue;
- link speed; etc

Proposed Sample ADS-B Data Sharing Agreement
{eg *The network layer is to be implemented using the Internet Protocol (IP). The network shall support Internet Group Management Protocol (IGMP) level 0, 1 and 2 as defined in RFC3300.* *Note: IGMP level 1 supports transmission of Multicast datagrams, level 2 supports transmission and reception of multicast datagrams, while level 0 corresponds to IP unicast.* *For Asterix messages, the Network Layer shall use the Internet Protocol (IP) for the delivery of packets* *using MULTICAST broadcast techniques. A multicast addressing scheme, as agreed, shall be used.* }
B.2.5 Physical Aspects Add appropriate details as available. Eg DDS circuit using service from <Company> Eg: Satellite datalink service using <Company> and Modems…
ANNEX C. MAINTENANCE **C.1** The maintenance, repair and replacement service for equipment installed at the *Provider*'s and the *User*'s premises shall include the following activities during normal working hours: - routine maintenance, repair and replacement service for the equipment installed at the *Provider*'s and the *User*'s premises; - support by staff for testing the equipment and modifications. **C.2** During as well as outside normal working hours, the maintenance service at their premises shall be carried out by the *Provider* and the *User* in accordance with the standards of maintenance commonly adopted by the *Provider* and the *User*. **C.3** The *User* shall collect and replace any faulty equipment or spare part, subject of this Agreement, at the *Provider*'s and the *User*'s premises.

Proposed Sample ADS-B Data Sharing Agreement

The *User* shall procure at its own expense the following maintenance and repair support service contracts:

- [equipment] with [maintenance and repair support agency]

.....

- [equipment] with [maintenance and repair support agency]

The *Provider* shall procure at its own expense the following maintenance and repair support service contracts:

- [equipment] with [maintenance and repair support agency]

<In some cases it may be appropriate for the Provider to procure or provide the maintenance of equipment located at the Provider premises>

C.4 For routine co-ordination and report the following technical supervisor centres shall be responsible:

At the *Provider*'s premises : [telephone and fax number]
At the *User*'s premises : [telephone and fax number]

ANNEX D. COST

<the details of cost issues will be agreed bi-laterally>

D.1 General

Costs borne by parties will based on a mutually-agreed basis between ANSPs of adjoining member States and/or ADS-B data service providers.

Costs considered include equipment costs, installation costs, maintenance costs, line or equipment

Proposed Sample ADS-B Data Sharing Agreement

lease costs, costs of performance reporting and costs of related services.

Cost apportionment is based upon the user-pays principle, elaborated as follows:

(a) If an ADS-B ground station serves solely (or significantly) the need of the Provider, as far as possible the cost of installation and maintenance should be borne by the Provider.

(b) If an ADS-B ground station provides surveillance data to the *Provider* as well as the *User*, the Provider may, if it desires to do so, work out the cost apportionment with the User. Cost apportionment should be on a mutually-agreed basis between the User & Provider, and could cover three cost components: (i) installation of the ADS-B ground station; (ii) maintenance of the ADS-B ground station; and (iii) costs of sharing of ADS-B surveillance data.

(c) If it is necessary for an ADS-B ground station to be installed to serve solely (or significantly) the need of the *User*, the cost of installation and maintenance should, as far as possible be borne by the *User*.

D.2 Data Cost

The cost for providing ADS-B ground station data itself, as agreed between *provider*(s) and *User*(s) should be specified here. When the data is supplied free of charge it should be mentioned here too.

D.3 Installation Cost

The cost of installing communication circuits and the equipment for the provision of ADS-B ground station data as agreed between *provider*(s) and *User*(s) should be specified here.

D.4 Maintenance Cost

The routine maintenance, repair and replacement service for the equipment installed for the provision of ADS-B ground station data as agreed between *provider*(s) and *User*(s) should be specified here..

D.5 Periodical Cost

Periodic cost of rental of private circuits, private circuit line checks, service contracts or any other

Proposed Sample ADS-B Data Sharing Agreement

periodic rent or fee as agreed between *provider*(s) and *User*(s) should be specified here.

The use at the *Provider*'s premises and the *User*'s premises of any installation space and the use of the power supply as agreed between *provider*(s) and *User*(s) should be specified here.

D.6 System technical and operational support Cost

The cost of any technical or operational support provided by one party to the other to establish an operational and sustainable *Provider* ADS-B system as agreed between *provider*(s) and *User*(s) should be specified here..

D.7 Termination costs

The pre-agreed cost of termination of the *Provider* ADS-B system as agreed between *provider*(s) and *User*(s) should be specified here..

D.8 Modification costs

If the *User* require and *Provider* may agree to modify the service. In such cases, the costs of any modification shall be negotiated in good faith taking into account the principles of cost sharing as described above,.

ANNEX E. CORRESPONDENCE

All correspondence in connection with this agreement shall be mail as follows:

[*Provider* State's Organisation or name of ATC Organisation, mail address, email address, telephone and fax number]

[*User* State's Organisation or name of ATC Organisation, mail address, email address, telephone and fax number]

ANNEX F. EQUIPMENT PROVIDED BY ONE PARTY to the OTHER.

Proposed Sample ADS-B Data Sharing Agreement

(only required if necessary – which is unlikely)

ANNEX G. IMPLEMENTATION SCHEDULE

Define Milestones :

FIR1 to FIR2

a) Inter FIR datalink installed for testing :<Dates>
b) Completion of data link testing :<Dates>
c) Ground station installation : <Dates>
d) Availability of ADS-B data for testing :<Dates>
e) Use of ADS-B data for situational awareness by ATC :<Date>
f) Use of ADS-B data for delivery of separation services: :<Date>

FIR2 to FIR1

g) Inter FIR datalink installed for testing :<Dates>
h) Completion of data link testing :<Dates>
i) Ground station installation : <Dates>
j) Availability of ADS-B data for testing :<Dates>
k) Use of ADS-B data for situational awareness by ATC :<Date>
l) Use of ADS-B data for delivery of separation services: :<Date>

ANNEX H. FUNCTIONAL PERFORMANCE REQUIREMENT

Capacity : The *Provider* ADS-B system shall be able to support no less than <to be agreed between Parties> aircraft from every site at one time.

Accuracy : Accuracy is provided by the airborne avionics and no accuracy requirement is imposed on the *Provider* ground system.

Update Rate : The *Provider* ADS-B system shall provide positional and information updates at a rate of <To be agreed> times per second.

Proposed Sample ADS-B Data Sharing Agreement

The *Provider* ADS-B system may collect received ADS-B messages between updates and then transmit a composite message to the ATC centre using the most up to date positional data. This allows collection of velocity and positional data into a single Asterix package and lowers the processing load of the ATC system. When data is received from an aircraft, the *Provider* ADS-B system track data is updated.

Network latency : The ADS-B network shall deliver reports to the User interface within 2 seconds of their output from the ADS-B ground station for 95% of the time. (Tier 1)

Network latency : The ADS-B network shall deliver reports to the User interface within 15 seconds of their output from the ADS-B ground station for 95% of the time. (Tier 2)

The *Provider* ADS-B system shall provide a MTBF (loss of ADS-B Service) to the User interface exceeding 50,000 hours. (Tier 1)

This requirement will typically require
= the communications infrastructure to be completely duplicated without a single point of failure.
= Two ADS-B ground stations shall be installed at each site. There shall be no common point single point of failure . Each ground station shall provide ADS-B data to the ATC centre.

The *Provider* ADS-B system shall provide a MTBF (loss of ADS-B Service) to the User interface exceeding 400 hours. (Tier 2)

Availability : The service shall be provided with a service availability from each ground station site of better than 99.9%. In calculation of availability, planned outages shall be included. (Tier 1)

Availability : The service shall be provided with a service availability from each ground station site of better than 95%. In calculation of availability, planned outages shall be included. (Tier 2)

Integrity
Integrity of ADS-B data is critical to system safety. The ADS-B ground station, the data communication system, and any processing before the interface shall not introduce errors (compared to the received ADS-

Proposed Sample ADS-B Data Sharing Agreement

B messages) more frequent than 1 in every million messages ($1* 10^{-6}$).

The provided service shall not deliver any received data to the interface which has not satisfied ADS-B downlink message cyclic redundancy checks (CRC)

Ground Station Receiver & Processing functionality requirements

The *Provider* ADS-B system shall be based upon Mode S extended squitter technology.

The *Provider* ADS-B system shall receive and decode all Mode S DF17, DF18 and DF19 messages defined in the RTCA standards DO-260 and DO-260A.

The *Provider* ADS-B system shall receive and decode Mode S DF17, DF18 and DF19 messages using the Lincoln Laboratory error detection and decoding techniques specified in RTCA DO-260 or demonstrate equivalent performance using other techniques

The *Provider* ADS-B system shall be configurable to transmit or not to the interface

- Messages for aircraft indicating they are "on ground"
- Messages resulting from aircraft equipped with DO260 compliant avionics
- Messages resulting from aircraft equipped with DO260A compliant avionics

The *Provider* ADS-B system shall be designed so that when DO260A messages are received, the *Provider* ADS-B system must calculate a Asterix FOM field. The FOM value for each combination of NIC, NAC and SIL shall be configurable and agreed

Site Monitor

The concept of the ADS-B Site Monitor is to independently test the end to end functional performance of the ADS-B System. The position, geometric altitude, FOM value, other asterix data and presence of the site monitor is tested by the ATC automation system

Site monitor Asterix messages including GPS determined position and GPS geometric altitude from each

Proposed Sample ADS-B Data Sharing Agreement
ADS-B ground station shall be transmitted to the interfaces to provide an independent system integrity verification function. The FOM value that is transmitted to the ATC centre shall be based upon the HPL value of the GPS receiver A failure of the site monitor shall not adversely affect the operation of the *Provider* ADS-B system equipment.
ANNEX I. COVERAGE or GROUND STATION DETAILS • The category of service and coverage of each source of ADS-B data provided; • Which party is the provider for each source Describe either the coverage volume or ground station supporting the shared service: Eg: Coverage volume : Above FL180 within the geographical region defined in the attached diagram.> Or Within line of sight coverage from ADS-B ground station at <lat-Long>