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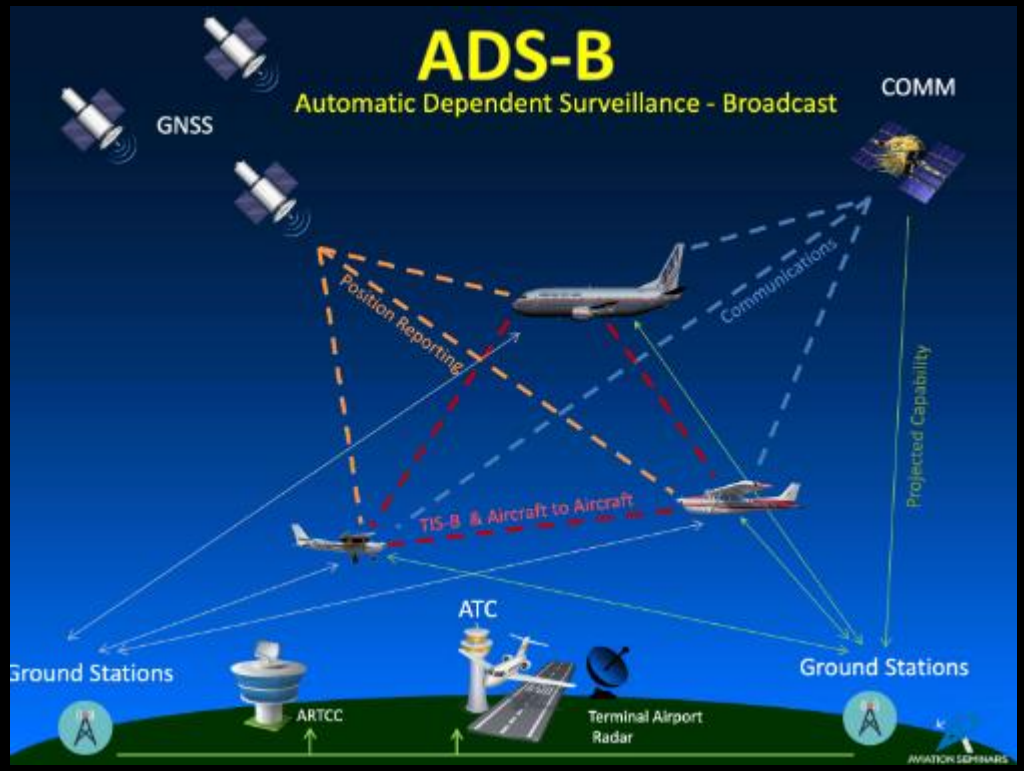
INTERNATIONAL CIVIL AVIATION ORGANIZATION

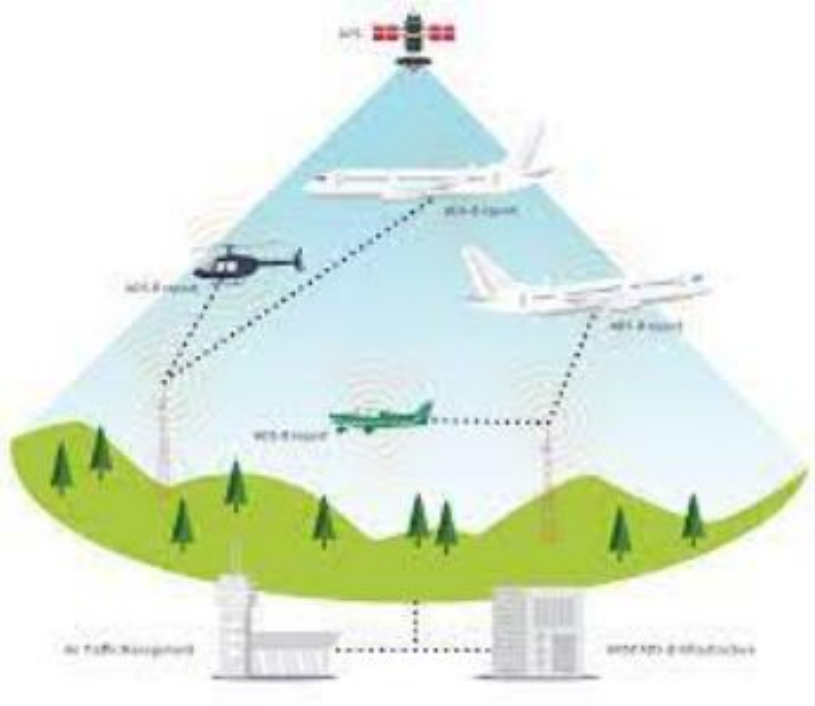
A UN SPECIALIZED AGENCY

Automatic Dependent Surveillance – Broadcast (ADS-B)



Mayda Alicia Ávila
Regional Officer, Communications, Navigation and Surveillance
International Civil Aviation Organization North American, Central American and Caribbean Regional Office

Automatic Dependent Surveillance – Broadcast (ADS-B)



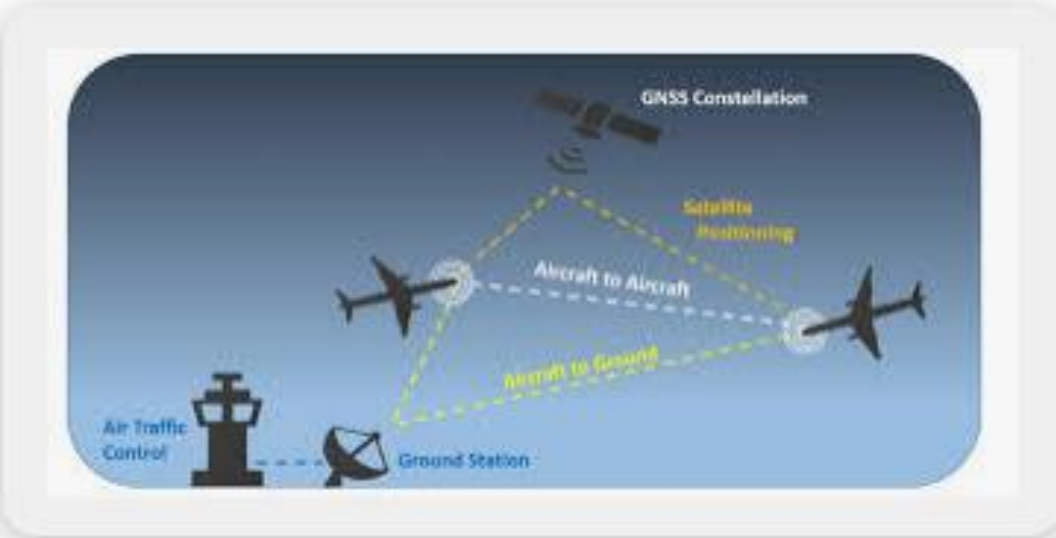
- Surveillance System (ASUR)
- ASUR-B0/1
- Technology

Automatic Dependent Surveillance – Broadcast (ADS-B)

Main purpose

To support the provision of Air Traffic Services and operational applications at reduced cost and increased surveillance coverage.

The why: *summary of the essence of the element. For operational elements this should have a direct relationship with performance.*



Automatic Dependent Surveillance – Broadcast (ADS-B)

New Capabilities

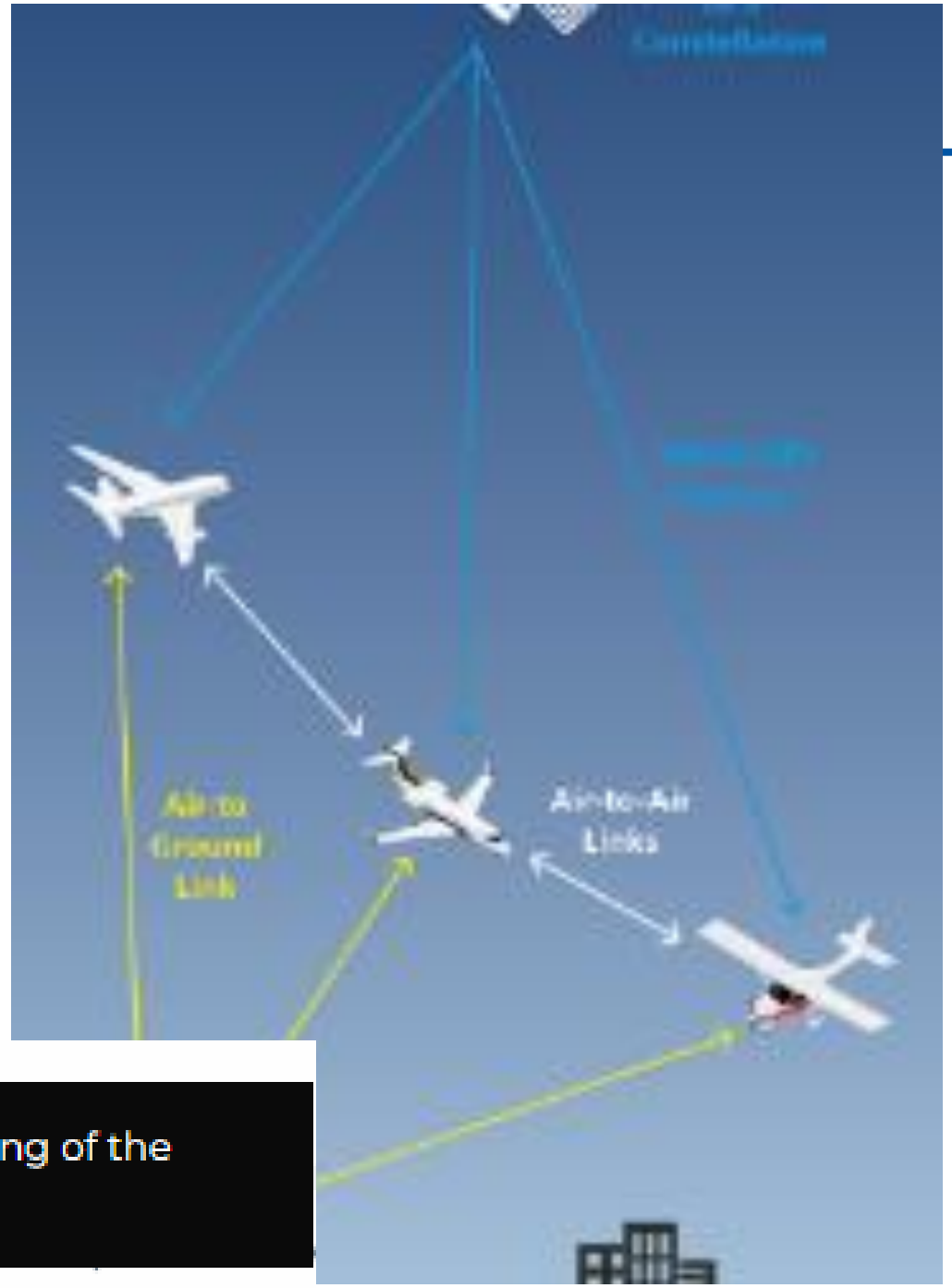
- *ADS-B provides precise position/velocity information in all airspace (accuracy not range-dependent as with radar). It also provides aircraft call sign and precise position/velocity information to nearby aircraft with ADS-B-In receivers.*
- *ADS-B can also support State aircraft airspace access, however it should, when possible, leverage benefits from dual-use of State aircraft capabilities to reduce cost and technical impact.*

The What: Description of what the stakeholders can do with this element that could not be done before. This section is not meant to describe performance improvement or benefits.

Automatic Dependent Surveillance – Broadcast (ADS-B)

Description

- *ADS-B provides an aircraft's identification, position, altitude, velocity, and other information to any receiver (airborne or ground) within range. The broadcasted aircraft position/velocity is normally based on the global navigation satellite system (GNSS) and transmitted at least once per second.*



The How: Additional information to improve understanding of the element.

Automatic Dependent Surveillance – Broadcast (ADS-B)

ENABLERS

- **Ground system infrastructure**
- **Airborne system capability**
- **Training**
- **Legislation/ regulation**

Automatic Dependent Surveillance – Broadcast (ADS-B)

ENABLERS

Ground system infrastructure

Enabler Category: ***Ground system infrastructure***

Enabler Type: ***Surveillance***

Enabler Name: ***ADS-B ground stations***

Description / References:

ADS-B ground stations receive information from aircraft and transmit it to one or more Service Delivery Points.

Reference material: Technical standards and guidance material:

- ICAO Annex 10 Volume IV Chapter 2,3 and 5
- ICAO Doc. 9871 Technical Provisions for Mode S Services and Extended Squitter
- RTCA/EUROCAE MOPS: DO-260/ED-102, DO-260A, or DO-260B/ED-102A EUROCAE ED-129, ED-129A or ED-129B ICAO Doc. 9924 Aeronautical Surveillance Manual

Automatic Dependent Surveillance – Broadcast (ADS-B)

ENABLERS

Ground system infrastructure

Enabler Category: ***Ground system infrastructure***

Enabler Type: ***Surveillance***

Enabler Name: ***Service Delivery Point(s) for ADS-B information***

Description / References:
Service Delivery Point(s) receive ADS-B information provides it to ATC automation for processing and display to controller Reference material: Guidance material: ICAO Doc. 9924 Aeronautical Surveillance Manual

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Automatic Dependent Surveillance – Broadcast (ADS-B)

ENABLERS

Ground system infrastructure

Enabler Category: ***Ground system infrastructure***

Enabler Type: ***Technical systems***

Enabler Name: ***HMI that supports controller awareness***

Description / References:

Human Machine Interface (HMI) of the Air Traffic Controller Working Position (ATCo CWP) Reference: Guidance material:

- ICAO Doc. 9924 Aeronautical Surveillance Manual

Automatic Dependent Surveillance – Broadcast (ADS-B)
ENABLERS: Airborne system capability

Enabler Category: ***Airborne system capability***

Enabler Type: ***Surveillance***

Enabler Name: ***SSR Mode S transponder with extended squitter version 0, version 1 and version 2***

Description / References:
Technical standards and guidance material: ICAO Annex 10 Volume IV Chapter 2,3 and 5 ICAO Doc. 9871 Technical Provisions for Mode S Services and Extended Squitter RTCA/EUROCAE MOPS: DO-260/ED-102, DO-260A, or DO-260B/ED-102A ICAO Doc. 9924 Aeronautical Surveillance Manual

Automatic Dependent Surveillance – Broadcast (ADS-B)
ENABLERS: Airborne system capability

Enabler Category: ***Airborne system capability***

Enabler Type: ***Navigation***

Enabler Name: ***Basic Aviation GNSS receiver with RAIM***

Description / References:
Position source. Basic Aviation GNSS receiver with RAIM. Such a receiver must comply with the technical performance requirements of either [E]TSO-C129, or [E]TSO-C196, or [E]TSO-C145/-C146. (Note that the US/Europe and equivalent ADS-B mandates require more – see FAA AC 20-165 or EASA CS-ACNS).

Automatic Dependent Surveillance – Broadcast (ADS-B)
ENABLERS: Training

Enabler Category: ***Training***

Enabler Name: ***Training requirements ADS-B implementation***

Description / References:
Depending on the ANSP implementation, some controller training on new symbology may be required. If phraseology is changed by an ANSP, then controller and pilot training on the new phraseology is required. If new ANSP equipment is installed, then training for maintenance personnel may be required (see ICAO Doc 8071).

Automatic Dependent Surveillance – Broadcast (ADS-B)

ENABLERS: Legislation/regulation

Stakeholders

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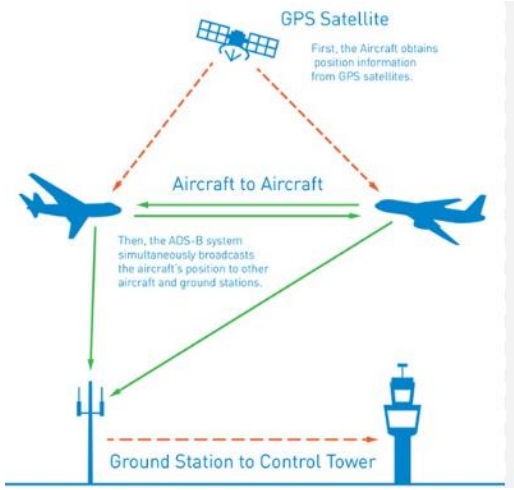
ANSP: ***AIR NAVIGATION SERVICE PROVIDER***

AIRCRAFT MANUFACTURER

AIRCRAFT OPERATOR

OTHERS



PREVIOUS ADS-B ACTIVITIES

- NAM/CAR/SAM Automatic Dependent Surveillance – Broadcast (ADS-B), Implementation Meeting/Workshop (ADS-B/IMP), Lima, Peru, 13 to 16 November 2017

  https://www.icao.int/NACC/Pages/meetings-2017-adsb.aspx

- Automatic Dependent Surveillance – Broadcast (ADS-B) Implementation and Regulation Meeting for the NAM/CAR/SAM Regions (ADS-B/LEG), Mexico City, Mexico, 26-30 November 2018

  https://www.icao.int/NACC/Pages/meetings-2018-adsb.aspx

- Automatic Dependent Surveillance – Broadcast OUT Implementation Meeting for the NAM/CAR Regions (ADS-B/OUT/M) Ottawa, Canada, 21-23 August 2019

  https://www.icao.int/NACC/Pages/meetings-2018-adsbout.aspx

THE AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) OPERATIONAL CONCEPT

The purpose of this document is to facilitate coordination between stakeholders who will be involved in, or affected by, the implementation of services using ADS-B. This concept of operations was developed to assist ICAO CAR region States considering the use of ADS-B as part of an ATS Surveillance System as defined in ICAO's Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM, Doc 4444). Individual CAR region States may develop complementary implementation documents as needed to reflect their unique operating environments.

PREVIOUS ADS-B ACTIVITIES

- Automatic Dependent Surveillance – Broadcast OUT Technical On-Line Workshop for the NAM/CAR Regions (ADS-B/OUT/W) 26 to 29 January 2021 from 9 AM to 12 PM, UTC-6.

https://www.icao.int/NACC/Pages/meetings-2021-adsb.aspx

- Technical Assistance Mission Meeting of the Surveillance Task Force (SURV), of the Air Navigation Services (ANS), Mexico City, Mexico, 13 to 15 July 2022

https://www.icao.int/NACC/Pages/meetings-2022-tfm.aspx

- NAM/CAR/SAM Workshop on the Development of the regulation for the implementation of Automatic Dependent Surveillance – Broadcast (ADS-B) (ADS-B-Imp)
  ICAO NACC Regional Office, Mexico City, Mexico, 17 to 21 July 2023

https://www.icao.int/NACC/Pages/meetings-2023-adsb.aspx

PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS FIRST EDITION

The purpose of this document is to identify the general parameters to evaluate the performance of the Automatic Dependent Surveillance - Broadcast (ADS-B OUT) and to perform statistical analyses of the ADS-B information provided by aircraft using a performance monitoring system.

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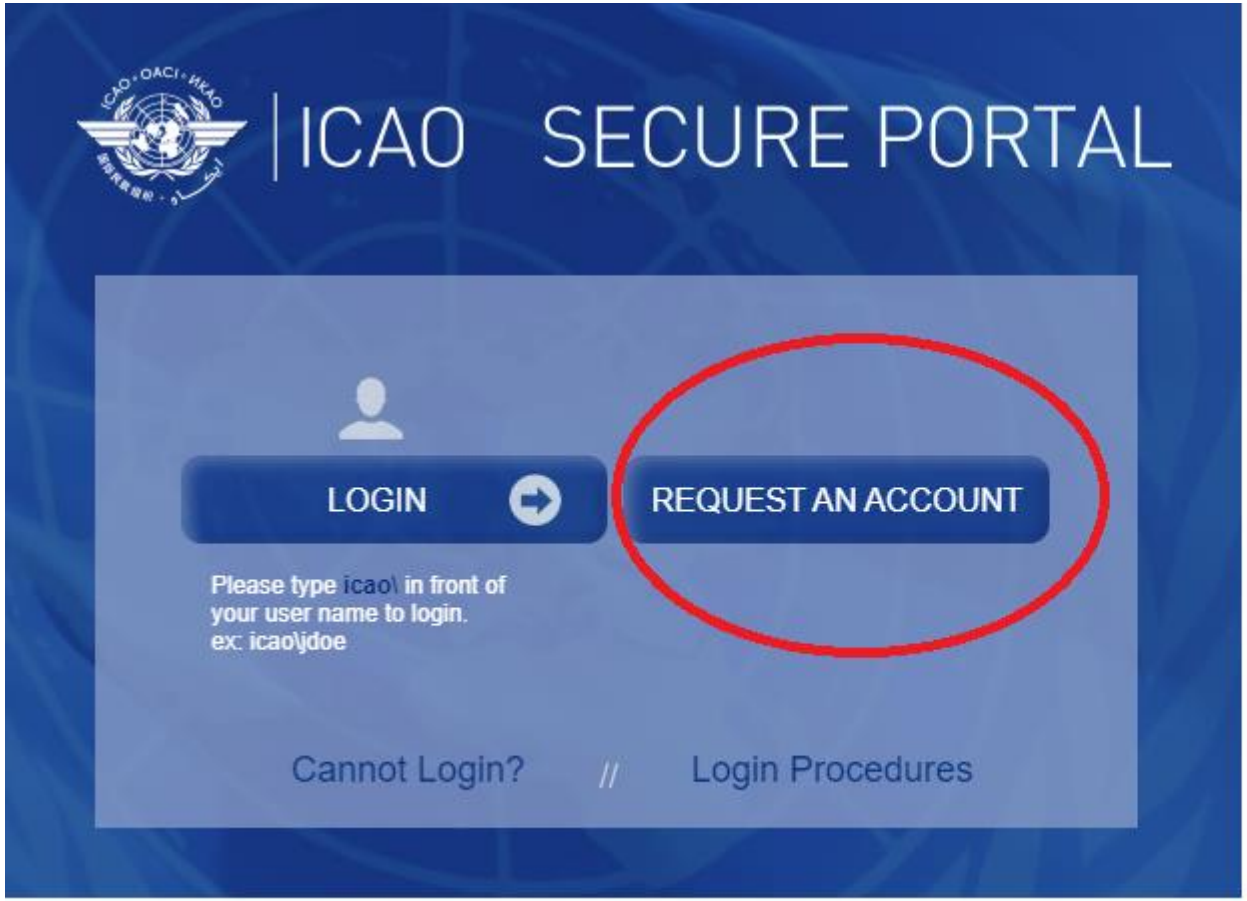

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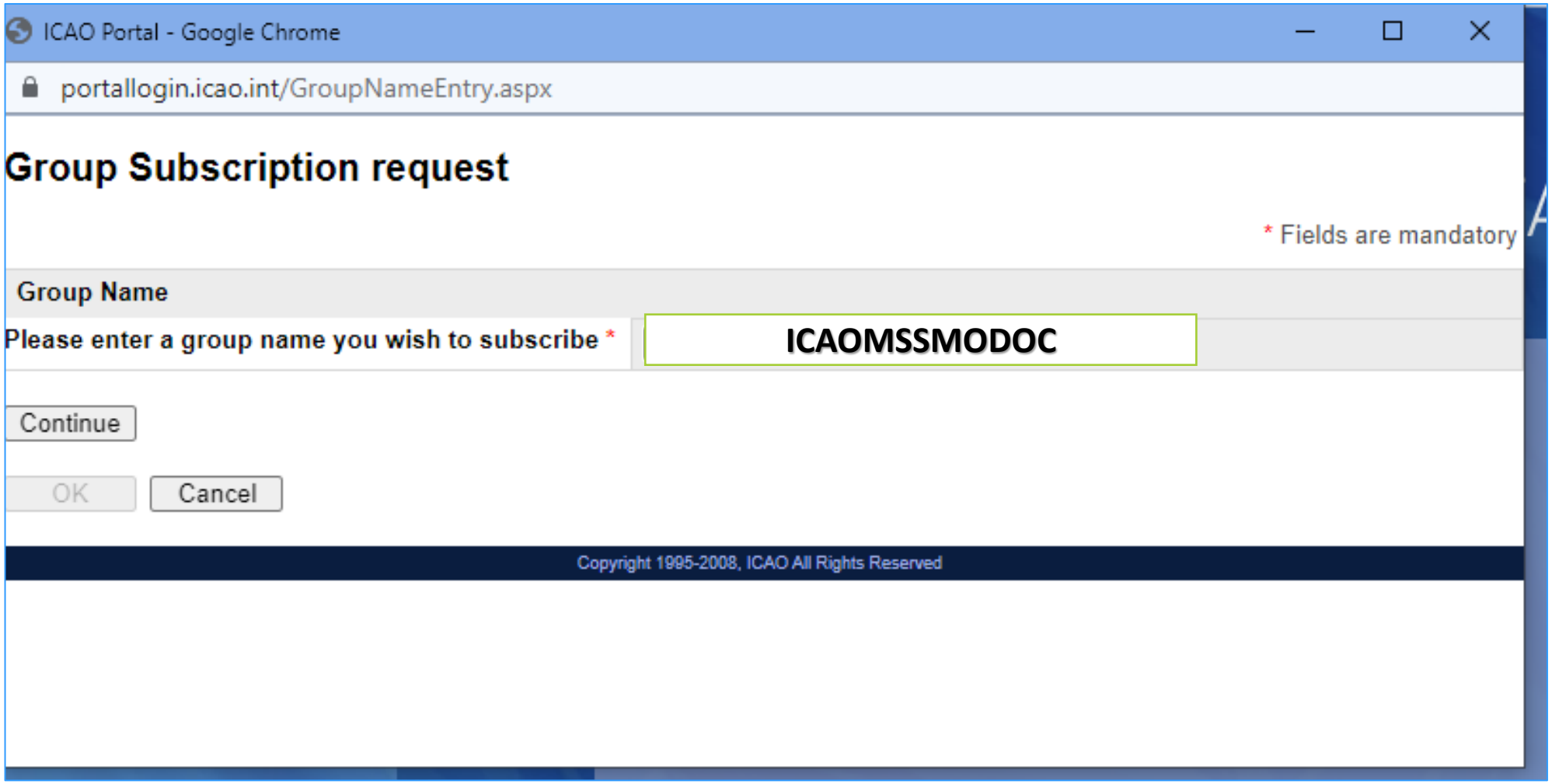
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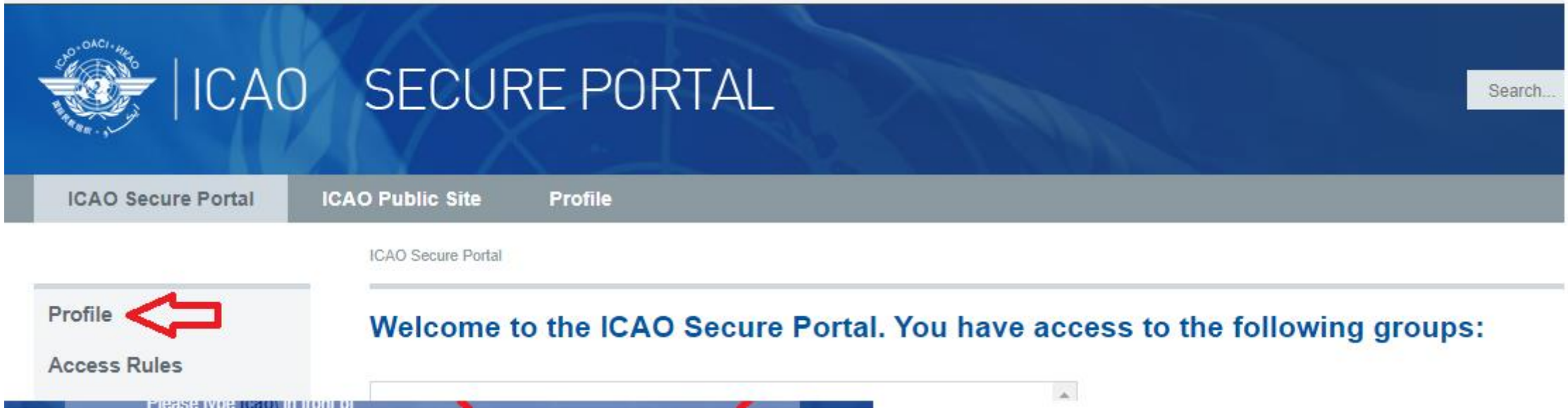

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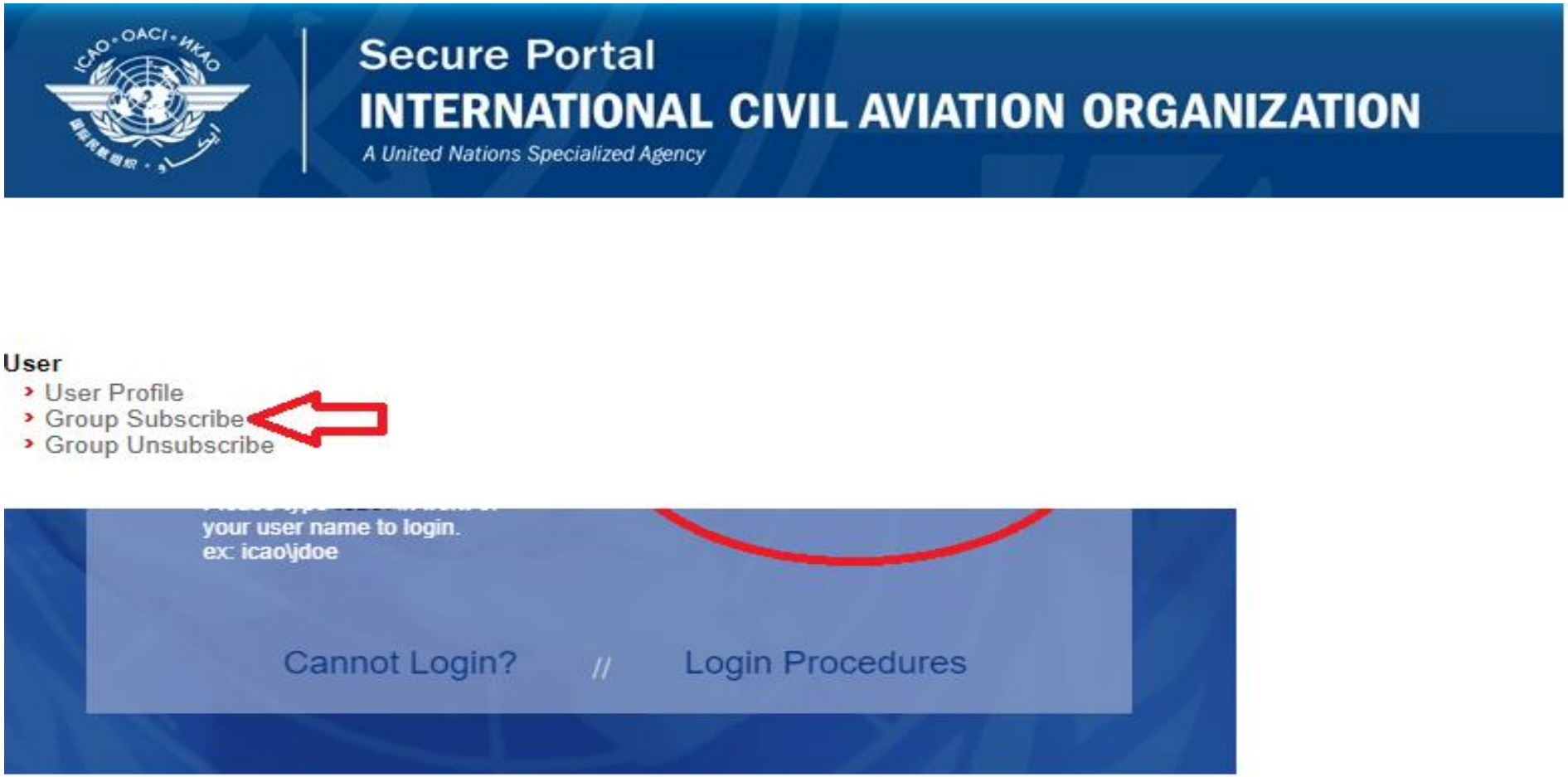

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Thank You!

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FIRST WORKSHOP ASSIGNMENT FOR PARTICIPANTS' WORK

Enabler Category	Enabler Type	Enabler Name	Stakeholders	State Status implementation
Ground system infrastructure	Surveillance	ADS-B ground stations		
Ground system infrastructure	Surveillance	Service Delivery Point(s) for ADS-B information		
Ground system infrastructure	Technical systems	HMI that supports controller awareness		
Airborne system capability	Surveillance	SSR Mode S transponder with extended squitter version 0, version 1 and version 2		
Airborne system capability	Navigation	Basic Aviation GNSS receiver with RAIM		
Training	----------	Training requirements ADS-B implementation		