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# Automatic Dependent Surveillance-Broadcast (ADS-B) Out

## White Paper

21GR001-WPR

Rev: IR

Date: 22-February 2021

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**LIST OF ACRONYMS AND ABBREVIATIONS**

<b>Acronym</b>	<b>Definition</b>
AC	Advisory Circular
ADS-B	Automatic Dependent Surveillance-Broadcast
ATC	Air Traffic Control
ATS	Air Traffic Service
Corp.	Corporation
DO	Direct Order
EASA	European Union Aviation Safety Agency
FAA	Federal Aviation Administration
FMS	Flight Management System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Global	Global Aerospace Design Corporation
LOA	Letter of Authorization
RTCA	Radio Technical Commission for Aeronautics
STC	Supplemental Type Certificate
TSO	Technical Standard Order

## REFERENCES

Document	Rev / Date	Title
RTCA/DO-282B	02-December 2009	Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B)
RTCA/DO-260B	17-December 2020	Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance-Broadcast (ADS-B)
TSO C-154c	02-December 2009	Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on Frequency of 978 MHz
TSO C-166b	02-December 2009	Extended Squitter Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Service-Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 MHz
TSO C-195a	12-April 2015	Avionics Supporting Automatic Dependent Surveillance-Broadcast (ADS-B) Aircraft Surveillance Applications
AC 20-165a	11-July 2012	Airworthiness Approval of Automatic Dependent Surveillance-Broadcast (ADS-B)
AC 20-138C	08-May 2012	Airworthiness Approval of Positioning and Navigation Systems
AC 20-172B	20-May 2015	Airworthiness Approval of ADS-B in Systems and Applications
AC 90-114	30-December 2019	Automatic Dependent Surveillance-Broadcast (ADS-B) Operations
WHTP-2013-14-05	Feb 2014	Understanding Compliance with Automatic Dependent Surveillance-Broadcast (ADS-B) Out

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## 1 ABOUT GLOBAL AEROSPACE DESIGN CORP.

Global Aerospace Design Corporation (Global) is a technical services organization comprised of a highly experienced engineering staff focused on meeting your aircraft certification needs both in front of and behind the cockpit door. Our depth of experience with projects, ranging from full interior modification projects to complete cockpit upgrades, permits Global to provide technical solutions from nose-to-tail on any aircraft.

Comprised entirely of aircraft engineers, Global has the dedicated focus of maintaining positive cash flow while keeping overhead costs extremely low. This permits direct cost savings to our customers and maximizes our ability to outperform other integration services competitors.

## 2 AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B) OUT

### 2.1 Overview

Automatic Dependent Surveillance-Broadcast (ADS-B) Out is an aircraft ground and satellite-based transmission system. This system is a key part of the Federal Aviation Administration's (FAA) and European Union Aviation Safety Agency (EASA) NextGen program. ADS-B Out is intended to increase the safety and efficiency of shared commercial airspace. This system makes aircraft visible in-real-time to Air Traffic Control (ATC) by updating with greater frequency and accuracy. This white paper discusses the system requirements, mandates, and Global's ADS-B Out solution.

### 2.2 Required Components

The minimum required equipment to support ADS-B Out for FAA approval includes:

- **Extended Squitter Mode S Transponder** – the FAA requires the ADS-B Out transmission or receiving equipment to be approved using either TSO-C154c (UAT) or TSO-C166b (1090Mhz Extended Squitter Transponder). To operate in Class A airspace in accordance with FAR 91.225 extended squitter transponder equipment compliant with TSO-C166b is required. ADS-B Out standards are documented in RTCA DO-260B.
- TSO-C146c approved Flight Management System (FMS)
- TSO-145c and TSO-C190 approved Global Positioning System (GPS)
- ADS-B Out Failure Annunciator

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### 2.3 Mandates

The FAA requires aircraft operating in most controlled U.S. airspace be equipped with ADS-B Out by January 1, 2020. However, there are no mandates for ADS-B In currently.

The European Union Aviation Safety Agency originally mandated ADS-B Out by June 6, 2020; however, due to the COVID-19 Pandemic, European Union Implementing Regulation 1207/2011 has been amended to grant the following extensions:

- December 7, 2020 for aircraft being issued with first individual Certificate of Airworthiness on or after December 7, 2020
- June 7, 2023 for aircraft being issued with first individual Certificate of Airworthiness between June 6, 1995 and June 6, 2020
- Aircraft with first individual Certificate of Airworthiness issued before June 6, 1995 will be exempt

Aircraft that have been granted an extension until June 7, 2023 must have a retrofit program established by December 7, 2020 demonstrating compliance prior to June 7, 2023.

### 2.4 Upgrade Path

Global is the owner of two FAA Supplemental Type Certificates (STC) ST04298CH and ST04298CH; as well as European Union Aviation Safety Agency (EASA) STC 10071068 for the installation of ADS-B Out.

- FAA STC ST04298CH/EASA STC 10071068
  - Rockwell Collins TPR-901 Mode S Transponders
  - Rockwell Collins GLU-920/-925
- FAA STC ST04299CH
  - ACSS XS-950 Mode S Transponders
  - Rockwell Collins GLU-920/-925 or FreeFlight 1203C GNSS

### 2.5 Certification

In accordance with AC 90-114, ADS-B Out equipment compliant with TSO-C166b or TSO-C143c shall only be installed on OEM production equipment, OEM service bulletin, or Supplemental Type Certificate (STC).

AC 20-165A states that all ADS-B Out complaint systems must include the transmitter/receiver and interfacing equipment in the STC.

Furthermore, in addition to the STC an FAA Letter of Authorization (LOA) will be required for approval to operate outside of U.S. airspace upon STC issuance.

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### 3 CONCLUSION

The ADS-B Out mandate in conjunction with the FAA's NextGen program aims to create a safer, more efficient airspace by reducing ground holds and improving flight times, ultimately, creating a safer and more enjoyable form of transportation for the millions of travelers flying every day. Global is continually working on expanding our ADS-B Out solution offerings. For more information regarding our ADS-B Out solutions contact us at [info@gadc.aero](mailto:info@gadc.aero) or by visiting [www.gadc.aero](http://www.gadc.aero).

## 4 GLOBAL EXPERIENCE



# “ Modifying Any Aircraft Anywhere in the World.”

### ABOUT US

Located in Cincinnati, Ohio and established in 2012, by a group of talented ex-airline professionals with over 30 years of industry experience, *GLOBAL* is a highly talented engineering team dedicated to meeting all aircraft certification and modification needs.

### WHY CHOOSE US

*GLOBAL* will always treat our customers as though our business depends on it! Our team is known for being highly reactive and responsive to any and all customer needs. We are dedicated to supporting our customers to the highest standard.

#### AVIONICS

*GLOBAL* has experience on the flight deck as well as in the cabin. Our team can integrate any system on every type of aircraft.



#### CABIN INTERIORS

*GLOBAL* has gone on to complete several interior programs for a wide variety of customers. These programs ranged from minor LOPA changes to complete interior retrofits.

#### CABIN ELECTRONICS

*GLOBAL* is able to provide cabin electronics solutions as well. The *GLOBAL* team can provide system integration solutions for all cabin equipment and ensure that everything is fully qualified to be on the airplane.



#### T-PED TESTING

Transmitting Portable Electric Device testing demonstrates that an aircraft is tolerant to the use of portable electric devices from gate to gate. This testing is a necessary step for the integration of Wi-Fi and wireless in-flight entertainment.

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