Handling non ADS-B State aircraft in European airspace

Information for State Aircraft Operators
Disclaimer:
This advisory leaflet does not replace the information contained in National Aeronautical Information Publications or Aeronautical Information Circulars. It is non-binding and serves only to heighten awareness.
EXECUTIVE SUMMARY

This leaflet contains useful information for operators of transport type State aircraft which are not compliant with secondary surveillance Mode S and Automatic Dependent Surveillance – Broadcast (ADS-B) OUT. It will help them to prepare flights to be conducted in European airspace with General Air Traffic (GAT) status. The leaflet aims to fill a temporary gap until the regulatory framework has been established and all relevant information has been published in National AIPs.

The performance and interoperability requirements related to the carriage of Mode S (ELS and EHS) and ADS-B OUT in European airspace, for flights under GAT status, are regulated by the (soon to be updated) Commission Regulation (EU) No 1207/2011 (SPI IR) amended by (EU) 1028/2014 of 26 September 2014 and (EU) 2017/386 of 06 March 2017. Article 8 covers State aircraft and defines the cases for exemptions.

The SPI IR provisions do not apply to foreign (non-EU) State aircraft operators due to the non-extra territorial application of Union law. EU Member States publish the procedures for the handling of State aircraft, which are not equipped, in national Aeronautical Information Publications (AIPs) in accordance with SPI IR, Article 8, paragraph 6.

State aircraft operators that plan to conduct flights with non-ADS-B OUT transport type State aircraft in European airspace must consult the National AIPs of the States to be overflown, and submit case by case requests for dispensation/waivers for such flights, in line with current arrangements and published procedures.

Dispensations for ADS-B OUT obligations may be granted by the competent National Authority. Users are notified about the conditions for issuing these dispensations and the applicable procedures by the Aeronautical Information Service. Points of contact with postal addresses, telephone numbers or email addresses are given in the national AIP section GEN 3.1 AERONAUTICAL INFORMATION SERVICES.

In European airspace, non-ADS-B OUT transport type State aircraft flying as GAT will normally be accommodated on Mode S (Elementary or Enhanced Surveillance). Some States decided to rely on SSR Mode A/C to handle non-ADS-B OUT (or non-Mode S) State aircraft as described in National AIPs/AICs. State aircraft engaged on nationally sensitive operations or training exercises that require security and confidentiality, may also be allowed to revert to Mode A/C. Mode S (ELS and EHS) and ADS-B OUT are not secure from a military perspective.
SUPPORTING STATE AIRCRAFT OPERATORS

The objective of this advisory leaflet is to outline useful information for operators of transport type State aircraft which are not compliant with secondary surveillance Mode S and Automatic Dependent Surveillance – Broadcast (ADS-B) OUT. It will help them to prepare flights to be conducted in European airspace under General Air Traffic (GAT) status.

The information given below focuses on the implementation and operational use of Mode S and ADS-B OUT and forms part of the Network Manager’s task to help stakeholders prepare and implement transition plans.

This information leaflet is a response to recurrent requests for support submitted to EUROCONTROL by a significant number of State aircraft operators. The leaflet aims to fill a temporary gap until the regulatory framework has been established and all relevant information has been published in National AIPs.

This leaflet does not replace the information contained in regulatory materials, in National Aeronautical Information Publications or in Aeronautical Information Circulars. It is of a non-binding nature and serves only to heighten awareness.

EUROPEAN REGULATORY CONTEXT

The performance and interoperability requirements related to the carriage of Mode S (ELS and EHS) and ADS-B OUT in European Union airspace for flights under GAT/IFR status, are regulated by Commission Regulation (EU) No 1207/2011 (SPI IR1) amended by (EU) 1028/2014 of 26 September 2014 and (EU) 2017/386 of 06 March 2017. This regulation lays down requirements for the performance and interoperability of surveillance for the single European sky. Article 8 of the SPI IR covers State aircraft and defines the cases for exemptions.

It is important to note that some additional national-level local requirements remain in place. After 31 March 2009, many European States mandated the carriage of Mode S equipment for State aircraft for GAT, OAT, IFR or VFR, for different phases of flight, airspace volumes or dates of implementation, depending on the State concerned. These requirements are published in national AIPs.

At the time of writing, a consultation process is being concluded to amend EU Regulation 1207/2011 (SPI IR) and EU Regulation 1206/2011 (ACID). Once amendments to these regulatory instruments have been published, this leaflet will be updated.

07 June 2020 (07 December 2020 in the proposed amendment) is the SPI IR deadline for implementing Mode S ELS (all State aircraft) as well as Mode S EHS and ADS-B Out (transport-type State aircraft). Article 8 of the SPI IR also stipulates:

- Member States had to communicate by 1 January 2019 at the latest a list of transport-type State aircraft that cannot be equipped with secondary surveillance transponders that comply with the requirements set out in Part B and Part C of Annex II (EHS and ADS-B OUT) of the SPI IR (Paragraph 3) to the European Commission. This obligation covered State aircraft with a maximum certified take-off mass exceeding 5,700 kg and/or having a greater than 250 knots maximum cruising true airspeed capability, and a justification for non-equipage was required.

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1 Commission Implementing Regulation nr 2019/123 of 24 January 2019, article 7.2. (g)
2 SPI IR – Surveillance performance and interoperability implementing rule
3 The precise text of the SPI IR can be found here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R1207
4 Aircraft used in military, customs and police services as defined by ICAO
5 State aircraft with a maximum certified take-off mass exceeding 5 700 kg or having a maximum cruising true airspeed capability greater than 250 knots. It is assumed that it refers to fixed wing aircraft.
At the request of the European Commission in 2018, the SESAR Deployment Manager (SDM) developed an ADS-B Implementation Plan to map, guide and support the broader adoption of ADS-B as a surveillance technique alongside radar and multilateration. SDM’s information on ADS-B implementation in Europe is accessible here: https://ads-b-europe.eu/

Existing information indicates that ADS-B OUT equipage levels of transport-type State aircraft in European inventories will remain rather low in 2020. A rate of equipage of 27.5% has been estimated for 07 June 2020; the plans are to reach 76.1% by 31 December 2025. The indicative target number of transport-type State aircraft in ECAC6 inventories that need to be equipped is some 639 airframes.

- Air Traffic Service Providers ensure that the State aircraft identified in paragraph 3 of the Regulation can be accommodated, provided they can be safely handled by the air traffic management system (Paragraph 5).

- Member States must publish the procedures for the handling of State aircraft which are not equipped in national Aeronautical Information Publications (Paragraph 6).

- ATS providers have to communicate to the Member State that has designated them, their plans for the handling of non-equipped State aircraft on an annual basis. These plans shall take into account the associated capacity limits of the ATM system (Paragraph 7).

The abovementioned regulatory provisions apply to State aircraft operators in European Union States.

EUROCONTROL does not make any SES regulatory interpretations. Consequently, any legal questions related to SES regulatory provisions must be submitted to the European Commission.

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6 European Civil Aviation Conference (https://www.ecac-ceac.org/)
APPLICABILITY AND EXEMPTIONS

In line with the Implementing Regulation (EU) No 1207/2011, State aircraft operating in European Union airspace as General Air Traffic are to be equipped with serviceable secondary surveillance radar transponders in line with these requirements:

- Mode S Elementary Surveillance (ELS) - all State aircraft
- Mode S Enhanced Surveillance (EHS) and ADS-B OUT – fixed wing transport-type State aircraft (MTOM above 5,700 kg and/or TAS greater than 250 knots).

The same Regulation covers these exemptions:

- State aircraft included in the lists communicated to the European Commission in compliance with SPI IR article 8 paragraph 3;
- State aircraft conducting “military operations and training” as referred to in Article 1(2) of Regulation (EC) No 549/2004 of 10 March 2004 (Framework Regulation) and as indicated in recital (14) of the SPI IR.

State aircraft from non-EU States are not covered by the requirements to equip in accordance with Article 8 of the SPI IR Regulation. There is no extra-territorial application of Union law. Each Member State decides whether or not to allow non-equipped State aircraft from non-EU States to operate in the airspace under their responsibility. Non-EU States would need to request such permission directly from each Member State.

Consequently, State aircraft flights (GAT) conducted by non-EU operators are not concerned by the Mode S and ADS-B mandates stemming from SPI IR provisions; they are to be handled on the basis of arrangements defined on a national level.

For State aircraft operators belonging to European Union States, the SPI IR article 8 exemptions identified above do not represent a dispensation from other national-level mandates or arrangements.

ADVICE TO STATE AIRCRAFT OPERATORS

Transport type State aircraft\(^7\) that are not equipped with ADS-B OUT capability can be authorised to conduct flights in European airspace with GAT status when exempted from or falling outside the applicability scope\(^8\) of Regulation (EU) 1207/2011 article 8, as described in paragraph 2 above, in accordance with arrangements and procedures published in National Aeronautical Information Publications (AIPs) (or associated Aeronautical Information Circulars (AICs) or NOTAMs).

State aircraft operators that plan to conduct flights with non-ADS-B OUT transport type State aircraft in European airspace must consult the National AIPs of the States to be overflown, and submit case by case requests for dispensation/waivers for such flights in line with current arrangements and published procedures.

Links to National AIPs are provided in Annex B. Links to worldwide AIS/AIM services can be found here: https://www.eurocontrol.int/articles/ais-online

Dispensations from ADS-B obligations may be granted by the competent National Authority. Users can find the conditions for issuing these dispensations and the applicable procedures in Aeronautical Information Services. Points of contact with postal addresses, telephone numbers or email addresses are given in the national AIP section GEN 3.1 AERONAUTICAL INFORMATION SERVICES.

Such requests for ADS-B OUT dispensation must be preceded by diplomatic clearance to cross national borders/prior permission required (PPR) as applicable.

State aircraft operating under GAT status must submit flight plans to EUROCONTROL/NM IFPS\(^9\). For ADS-B OUT dispensation, a specific flight planning procedure applies. State aircraft operators must insert indicator SUR/EUADSBX in field 18.

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\(^7\) State aircraft with a maximum certified take-off mass exceeding 5,700 kg or having a maximum cruising true airspeed capability greater than 250 knots
\(^8\) No extra-territorial application of Union law
\(^9\) Initial Flight Plan Processing System
INTEROPERABILITY CONSIDERATIONS

The carriage of a serviceable SSR Mode A/C (Surveillance with Altitude reporting) transponder is required in accordance with ICAO Annex 10, Volume IV. However, in some regions, the requirement in national airspace can vary, as is described in relevant National AICs and AIPs.

In European airspace, non-ADS-B OUT transport type State aircraft flying as GAT/IFR will normally be accommodated based on their capability of being interrogated by and responding to the cooperative surveillance infrastructure, typically Mode S (Elementary or Enhanced Surveillance).

As stated before, after 31 March 2009, many European States mandated the carriage of Mode S equipment for State aircraft for GAT, OAT, IFR or VFR, for different phases of flight, airspace volumes or dates of implementation, depending on the State concerned. Such requirements are published in national AIPs.

Based on agreed national arrangements defined specifically for State aircraft in 2009, those flights began to be handled on the basis of local dispensations/waivers, granted on a case by case basis under the conditions published in national AIPs (or in national regulatory materials) when safety conditions permit.

In practical terms, to determine which requirement (Mode S ELS or EHS / GAT or OAT / VFR or IFR) is applicable in a designated airspace volume, which aircraft types (e.g. transport type, fighters, trainers) are affected and the date of applicability, the National AIP of the State must be contacted. In any case, procedures do exist for local dispensation/waivers should State aircraft not be equipped or non-capable. This process remains in place today.

Some States decided to rely on SSR Mode A/C (Surveillance with Altitude Reporting) to handle non-ADS-B (or non-Mode S) State aircraft as described in National AIPs/AICs. An amendment is being proposed to Regulation (EU) 1206/2011 of 22 November 2011 (Aircraft Identification – ACID IR) to cover the non-assignment of a conspicuity code to “State aircraft engaged on nationally sensitive operations
or training, that require security and confidentiality. This will allow State aircraft to revert to Mode A/C for such operations.

It is important to stress that Mode A/C operation in Mode S environment could have a detrimental impact on the Radio Frequency saturation of 1030/1090 MHz channels but only if used routinely where a vast number of Mode A/C transmissions occur. Mode A/C detection must be ensured by technical measures implemented by the air traffic service providers.

State aircraft operators should also remember that the operation of Mode S (ELS and EHS) and ADS-B OUT is not secure: downlinked information is not protected. Mode A/C is not more secure, however: less information is broadcasted in Mode A/C.

Issues related to the confidentiality of sensitive missions (web-based flight tracking/flight entertainment services) have not yet been solved and mitigation procedures (reversion to Mode A/C with Modes S/ADS-B off) will only see some progress made when the proposed ACID IR (1206/2011) amendment has been published.
TEMPORARY NATURE OF PRESENT LEAFLET

As agreed by the Members of the Military ATM Board (MAB)\textsuperscript{11}, a number of short term recommendations are being progressed by EUROCONTROL, notably the preparation of a Compendium with information extracted from National AIPs to fully describe the arrangements and procedures for the handling of non-Mode S and non-ADS-B OUT transport-type State aircraft operating as GAT.

The Compendium will be used to support State aircraft operators, raising their awareness on ADS-B OUT arrangements and promoting the harmonisation of cross-border procedures.

EUROCONTROL is preparing detailed technical guidance on Mode S for military aircraft operators in close cooperation with NATO. Similar guidance will be developed to cover ADS-B requirements.

When all the information becomes available in national AIPs, when the related Compendium has been published and when amended SPI and ACID regulations have been published, the information contained in this technical leaflet will either be deemed to have been superseded or it will be updated.

DISCLAIMER

While the editors have taken every precaution to avoid any errors or omissions in this document, EUROCONTROL does not accept any liability for the accuracy of the information. Please refer to relevant official publications (e.g. national AIPs).


\textsuperscript{11} Reference: MAB Action Paper dated 24 January 2020

MODE S AND ADS-B TECHNICAL REQUIREMENTS

The EASA Certification Specification for Airborne Communications, Navigation and Surveillance (CS-ACNS)\textsuperscript{10}, provides the avionics certification references for Mode S and ADS-B.

EASA CS-ACNS details the requirements for aircraft compliance with ADS-B. EUROCAE ED 102A contains the MOPS for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) & Traffic Information Services – Broadcast (TIS-B). This standard is equivalent to RTCA DO-260B. EUROCAE ED 194A/RTCA DO 317A refers to ADS-B IN avionics.

Mode S transponders must comply, as a minimum, with the provisions of ICAO Annex 10, SARPS, Amendment 77. It must be an approved Mode S Level 2 transponder, as a minimum. EUROCAE ED-73E represents the current desired compliance standard for Mode S transponders. EASA ETSO-C112d and ETSO 166b refers.

The FAA TSO-C112d already calls out the technical equivalent document RTCA DO-181E. Therefore, EUROCAE ED-73E represents the appropriate Minimum Operational Performance Standard for Mode S transponder compliance. It also includes aircraft identification. EASA CS-ACNS identifies the performance requirements for Mode S in terms of integrity and continuity.

More details on avionics requirements can be found here: https://www.eurocontrol.int/publication/avionics-requirements-civil-and-state-aircraft
ANNEX A
ACRONYMS AND ABBREVIATIONS

ACID
Aircraft Identification

ADS-B
Automatic Dependent Surveillance - Broadcast

ATM
Air Traffic Management

AIC
Aeronautical Information Circular

AIP
Aeronautical Information Publication

ECAC
European Civil Aviation Conference

EHS
Enhanced Surveillance

ELS
Elementary Surveillance

GAT
General Air Traffic

ICAO
International Civil Aviation Organization

IFR
Instrument Flight Rules

MOPS
Minimum Operational Performance Standard

OAT
Operational Air Traffic

RF
Radio Frequency

TAS
True Air Speed

VFR
Visual Flight Rules
# ANNEX B
## LINKS TO EUROPEAN NATIONAL AERONAUTICAL INFORMATION PUBLICATIONS
(source: https://www.eurocontrol.int/articles/ais-online)

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