Requirements for civil aircraft

Communications

Domain Programme Area	Equipment Requirement	ECAC Airspace Requirement	JAA / EASA Airworthiness or Operational Requirement	Remarks
VHF Com 8.33 KHZ	2 Sets of VHF Transceivers with 8,33 KHZ channel spacing	Mandatory carriage above FL195 from 15 March 2007. 8.33 kHz expansion below FL195 and amendment of EC regulation are under preparation.	For guidance on airworthiness and operational aspects se JAA TGL 7 Rev 1	Given that further phases of vertical expansion below FL195 are under consideration, it is recommended 'All Airspace Users' equip with 8.33 KHz capable equipment for new aircraft or where existing radios are replaced. See useful site below
VHF Com Immunity from FM radio broadcasts	All VHF Comm. equipment		For guidance see JAA TGL16	Some states may have exempted from the requirement,
LINK2000+ CPDLC/ATN/VDL Mode 2	3rd VHF Digital Radio, also either: Communications Management Unit (CMU) and Multi-function Control Display Unit (MCDU), or Air Traffic Service Unit (ATSU) and Dedicated Control and Display Unit (DCDU) or Integrated solution (e.g. Boeing FANS2) or Electronic Flight Bag solution (TBD)	SES Data Link Services Implementing Rule - EC Reg. No. 29/2009 for above FL 285 Core Europe (LINK Region): Feb 2013 Rest of EU: Feb 2015	EASA Special Condition on ATN B1 Data Link installation.	Airframe Dates Forward Fit : Jan 2011 Retro Fit : Jan 2015 ** Additional information Link 2000 + Programme

Useful sites

- VHF 8.33 - Homepage
- Link 2000+ Controller-Pilot Data Link Communications (CPDLC)

Navigation

Capability	Civil Requirements	Mandate Status	State Aircraft equivalent equipage
ILS	ILS Nav receiver		Available as part of Multi-Mode Receiver (MMR)
MLS	MLS receiver (EU OPS 1.865)		Available as part of Multi-Mode Receiver (MMR)
B-RNAV	RNAV systems capable of + - 5 NM accuracy See EASA AMC 20□5 and FAA 90-96)	Mandatory all en - route airspace.	For ECAC airspace the primary sources of navigation information are VOR/DME, DME/DME and GPS. The availability and continuity of VOR and DME coverage have been calculated for most of Europe and they are considered to be capable of meeting the

			requirements of the en-route phase of operations. State aircraft are exempted from the B-RNAV mandatory requirement. Within TMAs, non B-RNAV State aircraft should be routed via non-RNAV-based SIDs and STARs. For en route, State aircraft should be routed via VOR/DME-defined ATS routes or via conventional navigation aids. See national AIPs.
P-RNAV	RNAV systems capable of + - 1 NM accuracy (See EASA AMC 20□5, FAA 90-96 and JAA TGL10 -Revision 1 OPS approval required to fly P-RNAV)		Currently being introduced (whilst no ECAC-wide mandate for the carriage of P-RNAV is foreseen, some States may require P-RNAV certification for IFR operations in notified terminal airspace). For certain TMAs for aircraft that are not approved for P-RNAV operations conventional procedures may continue to be available as stated in national AIPs
RVSM	ICAO Min. Aircraft System Performance Standard (MASPS) The RVSM MASPS include: (1) Two independent, cross-coupled altitude measurement systems; (2) One automatic altitude control system (□65'); (3) One altitude alert system (□300'/□50'); (4) One SSR altitude reporting transponder (5) RVSM compliant avionics configuration. (See JAA TGL 6 Revision1 and EU OPS 1 Subpart L (1.872))	Mandated From FL 290 to FL410	State aircraft benefit from RVSM exemption. Military aircraft operating as GAT which are non MASPS RVSM compliant are allowed in RVSM airspace but are subject to 2000ft vertical separation from all other aircraft. However, States are requested to adapt their State aircraft for RVSM approval, to the extent possible, and especially those aircraft used for General Air Traffic (GAT). See additional details at: http://www.ecacnav.com/RVSM
APV/Baro VNAV		Under consideration at selected airports (See AMC 20-27. See also FAA documents AC20-138, AC20-130A AC20-129)	APV is to be introduced as a replacement for NPA and therefore a means to reduce CFIT incidents by providing aircraft a stabilised approach. Specific applicability to State aircraft not defined. May be considered in the context of PBN.
RNP-RNAV		Under consideration (See AMC 20-26)	Specific applicability to State aircraft not defined. May be considered in the context of PBN.
SBAS APV I /II	Requirements for SBAS receivers is contained in ICAO annex 10 Volume 1 Also see specification RTCA DO 229C and FAA TSO C145/146A	Under consideration at selected airports (See AMC 20-27)	Currently SBAS will not be capable to provide CAT 1 precision approach but may provide lower minima than APV/Baro VNAV. Specific applicability to State aircraft not defined. May be considered in the context of PBN.

4D RNAV		Under consideration	Long term objective Specific applicability to State aircraft not defined. May be considered in the context of PBN.
GBAS Cat 1	GBAS equipment is contained in aircraft multi mode receiver (MMR). GBAS performance specification is contained in RTCA DO 253a LAAS receiver MOPS	Under consideration at selected airports. (See AMC 20-26 and AMC 20-27)	GBAS SARPS for Cat 1 became applicable in Nov 2001 (refer to ICAO SARPS annex 10 volume 1) Also see specification RTCA DO 229C and FAA TSO C145/146 Specific applicability to State aircraft not defined. May be considered in the context of PBN taking due account of available MMR capability.

Useful sites

- P-RNAV
- B-RNAV
- RVSM

Surveillance

Domain Programme Area	Equipment Requirement	ECAC Airspace Requirement	JAA /EASA Airworthiness or Operational Requirement	Remarks
Emergency Locator / ELT	MANDATED 1/1/2002 ICAO SARPS Annex 6 Part 1, para 6.17 See also EU OPS 1 subpart K (1.820)		See EU OPS 1 Subpart L (1.820)	ICAO Worldwide aircraft requirement. All aircraft with a C of A after 1/1/2002 shall be equipped with an automatic ELT capable of transmitting on 121.5 MHz and 406MHz.Aeroplanes with a C of A before 1/1/2002 must have any type of ELT capable of transmitting on 121.5MHz and 406MHz. An Operator shall ensure that all ELTs that are capable of transmitting on 406 Mhz shall be coded in accordance of ICAO Annex 10 and registered with the national agency responsible for initiating a search & rescue service.
SSR Mode A +C (Surveillance with Altitude reporting)	ICAO Annex 10 Annexe 10 Volume IV Chapter 2	Mandated	EASA Certification Specification for Airborne Communications, Navigation and Surveillance (CS-ACNS), which is expected to be published late 2012/early 2013, following the standard EASA NPA consultation process, is expected to include requirements and acceptable means of compliance for Mode A/C only surveillance. The CS-ACNS will be compliant with Commission Implementing Rule (IR) (EU) No 1207/2011	The requirement within each National Airspace can vary therefore refer to National AIP's

SSR Mode S Elementary Surveillance(ELS)	ICAO Annex 10 SARPS Amendment 77 or later	Commission Implementing Rule (IR) (EU) No 1207/2011 (laying down requirements for the performance and the interoperability of surveillance for the single European sky) specifies the airborne equipage requirements for Mode S ELS. However, existing State mandates that stipulate equipage compliance earlier than the dates specified in this rule remain applicable.	JAA TGL13 Revision 1 or latest EASA released document. This will be replaced by EASA Certification Specification for Airborne Communications, Navigation and Surveillance (CS-ACNS) that is expected to be published late 2012/early 2013, following the standard EASA NPA consultation process. The CS-ACNS will be compliant with Commission Implementing Rule (IR) (EU) No 1207/2011	(IR) (EU) No 1207/2011 specifies overall airborne equipage deadlines, however, The requirement within each State's jurisdiction can vary. Therefore refer to National AICs and AIPs. By early/mid 2012, Mode S ELS will be is currently operational within MUAC airspace, and the designated airspace of DE, NL, and FR., CH, AT, IT, CZ, HU, and RO ELS operations will extend to all of the airspace defined in Article 1(3) of Regulation (EC) No 551/2004 of the European Parliament and of the Council, by not later than 02 January 2020.
SSR Mode S Enhanced Surveillance (EHS)	ICAO Annex 10 SARPS Amendment 77 or later	Commission Implementing Rule (IR) (EU) No 1207/2011 (laying down requirements for the performance and the interoperability of surveillance for the single European sky) specifies the airborne equipage requirements for Mode S EHS. However, existing State mandates that stipulate equipage compliance earlier than the dates specified in this rule remain applicable. EHS is currently mMandated currently in designated airspace of France, Germany and the United Kingdom. Also mandated above FL 245 in the airspace of Belgium and the Netherlands (within airspace delegate to	EASA AMC 20-13. Previous certification with JAA NPA 20-12a remains valid. Guidance Document for MEL Policy JAA TGL 26 This will be replaced by EASA Certification Specification for Airborne Communications, Navigation and Surveillance (CS-ACNS) that is expected to be published late 2012/early 2013, following standard EASA NPA consultation process. The CS-ACNS will be compliant with Commission Implementing Rule (IR) (EU) No 1207/2011	(IR) (EU) No 1207/2011 specifies overall airborne equipage deadlines, however, the requirement within each State's jurisdiction can vary. Therefore refer to National AICs and AIPs The requirement is likely to be expanded into other portions of ECAC airspace. Thus National AICs and AIPs should be consulted. (eg From 31 May 2012 the carriage and operation of EHS functionality will be mandatory for specified IFR flights within the Prague FIR – see Czech Republic AIC A 6/09).

		MUAC). If an exemption against the carriage and operation of Mode S airborne equipment is required, operator of the aircraft shall apply to the appropriate National Aviation Authorities. Operators should note that a separate exemption will be required from each of the Mode S implementing States within which flights are planned to take place.		
ADS -B Automatic Dependant Surveillance Broadcast	ADS-B Out Transmit System: EASA ETSO / C166b EUROCAE ED-102A / RTCA DO-260B ICAO Annex 10 Doc. 9871 Ed.2 ADS-B Out Horizontal Position Source:	Commission Implementing Rule (IR) (EU) No 1207/2011 (laying down requirements for the performance and the interoperability of surveillance for the single European sky) specifies the airborne equipage requirements for "ADS-B Out".	Commission Rule No 1207/2011 compliant "ADS-B Out" airworthiness approval requirements will be contained in the EASA Certification Specification for Airborne Communications, Navigation and Surveillance (CS-ACNS) that is expected to be published late 2012/early 2013. EASA AMC 20-24 remains applicable for initial implementations of "ADS-B Out" in a non-radar environment.	Standards and implementation timescales are being co-ordinated with FAA, Airservices Australia and NAV CANADA. Ground implementation commitment from ISAVIA, AVINOR, LVNL, NAV Portugal

Useful sites

- Mode S and ACAS
- ADS-B

Safety Assurance

Domain Programme Area	**Equipment Requirement**	**ECAC Airspace Requirement**	**JAA Airworthiness or Operational Requirement**	Remarks
ACAS II	TCAS II Software Version 7 ICAO Annex 10, PANS OPS Doc 8168. PANS ATM Doc 4444. EUR Regional Supplementary Procedures Doc	Mandated 1 January 2005. All civil fixed wing turbine engine aircraft Max. certificated Take Off Mass exceeding 5,700 kg or max. certificated seating configuration of more than 19.	EU-OPS 1 Subpart K (1.668) For certification JAA TGL 8 Revision 2 For pilot training and operational procedures	MEL for TCAS II throughout Europe is Class C - 10 days (excluding the day of discovery). MEL requirements concerning partial failures are listed in the TGL 26. Some States may have different

	7030, ICAO Doc 9863 (ACAS Manual) ICAO Annex 6, Operation of Aircraft, Part 1 – International Commercial Air Transport – Aeroplanes, 9th Edition, July 2010.		ICAO PANS-OPS Doc 8168, ICAO Doc 9863 and JAA TGL11. Guidance Document for MEL Policy JAA TGL 26	requirements. E.g. in German airspace, the time period during which TCAS II may be inoperative is reduced to 3 days (refer to German AIP GEN 1.5 para 5). This applies to all aircraft.
EGPWS/TAWS	ICAO ANNEX 6 part 1		EU OS 1 Subpart K (1.665) An operator shall not operate a turbine powered aeroplane having a maximum certificated take-off mass in excess of 5 700 kg or a maximum approved passenger seating configuration of more than nine unless it is equipped with a ground proximity warning system that includes a predictive terrain hazard warning function (terrain awareness and warning system TAWS).	Note ICAO world wide mandate For further guidance on EGWPS airworthiness requirements: refer to your state regulator.
Flight Data Monitoring			Awaiting EASA adoption	Proposal is for aircraft > 27,000kg to be equipped with a suitable electronic flight data recorder or quick access recorder where flight data can be regularly replayed for purposes of crew monitoring.

Useful Sites

ACAS

Disclaimer

“States remain ultimately responsible for mandating the carriage of avionics equipment in their respective airspace. Therefore, users should be advised to consult National Aeronautical Information Publications (AIPs) and Aeronautical Information Circulars (AICs)”.

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