DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.



Europe

What Could, Might and Will **Happen to Your Operation Here**

February 9, 2017 - 8:45 am - 10:00 am

PRESENTED BY:

Terry Yoemans, IS-BAH Manager IBAC, Luton, England

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SCHEDULERS & DISPATCHERS CONFERENCE

February 7-10, 2017 | Fort Worth, TX



Flight Operations

$$f(x) = \frac{-2x^2}{n\pi} \cos\left(\frac{n\pi x}{2}\right) \Big|_0^2 + \int_0^2 \frac{4x}{2\pi} \cos\left(\frac{n\pi x}{2}\right) dx$$
$$= \frac{-2x^2}{n\pi} \cos\left(\frac{n\pi x}{2}\right) \Big|_0^2 + \frac{4x}{n\pi^2} \sin\left(\frac{n\pi x}{2}\right) \Big|_0^2 + \frac{8}{n^2\pi^3} \cos\left(\frac{n\pi x}{2}\right) \Big|_0^2$$
$$= \left[\frac{2}{\pi} \cos(n\pi) \left[\frac{4}{n^2\pi^2} - \frac{4}{n}\right] + \frac{8}{n\pi^2} \sin(n\pi)\right] - \left[\frac{2}{\pi} \cos(0) \left[\frac{4}{n^2\pi^2}\right] + 0\right]$$

$$b_{n} = \frac{8}{n^{2} \pi^{3}} [(1 - n\pi^{2}) \cos(n\pi) - 1] + \frac{8}{n\pi^{2}} \sin(n\pi) \quad n = 1, 2.....$$

Useful LOA/OpsSpecs



A056 Data Link Communications (CPDLC ADS-C)

A061 Use of Electronic Flight Bag

A153 ADS-B Ops Outside the U.S.-Designated Airspace

B030 IFR Navigation Using GPS/WAAS RNAV Systems

B034 RNAV-5 Class I (P-RNAV too)

B036 Multiple Long Range Navigation Systems (M-LRNS)

B039 NAT HLA (Formerly NAT MNPS)

B046 RVSM

C052 RNAV (GPS) Approach (LNAV, LNAV/ VNAV using Baro-VNAV)

C063 RNP 1

C384 RNP AR Approach



Avionics requirements for Civil aircraft





EUROCONTROL has prepared a short summary offering an overview of avionics requirements for civil aircraft. The intention is to list key avionics requirements including those recently or soon to be brought into force.

L	States of the European Civil Avia
	It should also be noted that only formal and liable information co
	Where a system requirement is If a State elects to waive the IC It is up to each Member State to
	Disclaimer
	The information on this Avionics infi for information purposes only. All m "as available".
	The contents are provided without v reliable, complete or correct, that th free of viruses or other harmful con
1	In no event shall EUROCONTROL be use this Web Site, especially for, bu inaccurate transmission or misdirec even if EUROCONTROL has been ad
1	Upon request by EUROCONTROL, the

It is important to note that the i States of the European Civil Avia	Civil aircraft – Communications requirements							
It should also be noted that only	Domain Programme Area	Equipment Requirement	ECAC Airspace Requirement	Airworthiness or Operational Requirement	Remarks			
residual also be information or formal and liable information or Where a system requirement is If a State elects to waive the IC It is up to each Member State to Disclaimer The information on this Avionics infor information purposes only. All m "as available". The contents are provided without veiliable, complete or correct, that if free of viruses or other harmful con In no event shall EUROCONTROL be	VHF Com 8.33 KHZ	The probability of the loss of voice communication is better than or equal to remote. Depending of the size of the aircraft and the kind of operation, this could mean that only one set of 8.33kHz COM is required. Manufacturers of radios intended to operate in the VHF band, or their authorised representatives established in the Union, shall ensure that from 17 November 2013 all radios placed on the market, are 8, 33 kHz channel spacing capable.	Mandatory carriage above FL195 from 15 March 2007. Below FL195: the European Commission published the new vocames spacing and the commission published the new vocames spacing the Official Journal of the EU on the 15 November 2012 as Regulation (EU) No 1079/2012	For guidance on airworthiness and operational aspects see 3AA TGL 7 Rev 1 See also EASA NPA 2013-06	Below Fi.195: Europe has agreed to extend the use of 8.33 kHz radios in several phases: Phase 2 (2014), a small number of control sectors in the most frequency congested areas in which most aircraft are already 8.33 kHz capable will require 8.31 kHz radio equipage. Phase 3 (by 31 st Dec. 2018), aims for full deployment in all European aircspace, however European States can propose to delay deployment in areas that have a limited network impact. Attention: Possible amendments to regulation: 29/2009 may follow			
accurate transmission or misdirect ren if EUROCONTROL has been ad non request by EUROCONTROL, th	VHF Com Immunity from FM radio broadcasts	All VHF Comm. equipment		For guidance see JAA TGL16	Some states may have exempted from the requirement.			
ttorney's fees that arise from use (is the users' responsibility to mak sers are reminded that States rem dvised to continue to consult Natio	Controller-Pilot Data Link Communications (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 Elibert Bane science (TRID).	SES Data Link Services Implementing Rule - EC Reg. No. 29/2009 for above FL 285 (all of EU): Feb 2018	See EASA CS	Airframe Dates All aircraft: Feb 2020 ** Additional information Link2000 + Programme Website			

Aircraft Equipage Requirements, General



ELT

Annex 6, Part 1, Paragraph 6.17 Annex 6, Part 2 Section 2, Chapter 2.4, Paragraph 2.4.12

CVR/FDR

Annex 6, Part 1, Paragraph 6.3 Annex 6, Part 2 Paragraph 3.6.3 Appendix 8



Aircraft Equipage Requirements, General

GPWS

Annex 6, Part 1, Paragraph 6.15 Annex 6, Part 2 Paragraph 2.4.11

SMS

Annex 6, Part 1 Paragraph 3.3.3, 8.7.3, Annex 6, Part 2 Paragraph 3.3.2

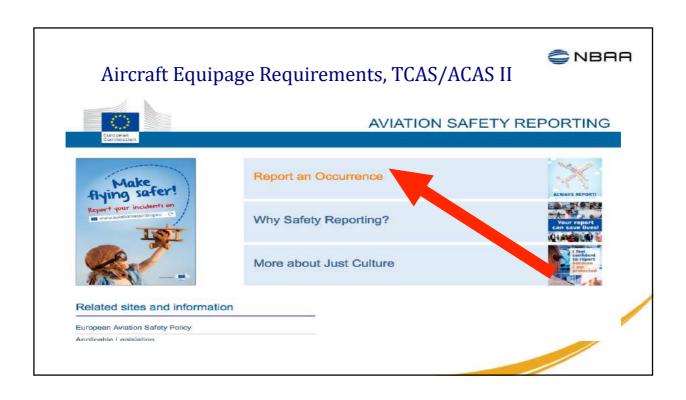
Aircraft Equipage Requirements, TCAS/ACAS II

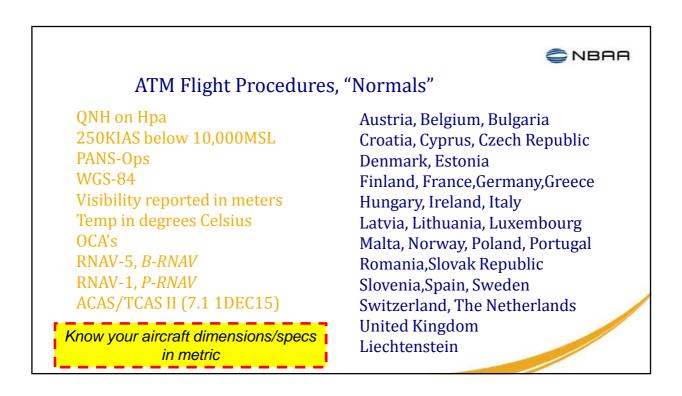


ACAS/TCAS

Annex 6, Part 1, Paragraph 6.18 Annex 6, Part 2 Paragraph 3.6.10

TCAS Advisory	Version 7.1 Annunciation	Version 7.0 Annunciation	6.04a Annunciation		
Traffic Advisory		Traffic, Traffic	nl.		
Climb RA	Climb	Climb	Climb, Climb, Climb		
Descend RA	Descend	Descend, Descend, Descend			
Altitude Crossing Climb RA	Climb, Crossing Climb; Climb, Crossing Climb				
Altitude Crossing Descend RA	Descend, Cross	ing Descend, Descend, Cr	ossing Descend		
Reduce Climb RA	Level Off, Level Off	Adjust Vertical Speed, Adjust	Reduce Climb, Reduce Climb		
Reduce Descent RA	Level Off, Level Off	Adjust Vertical Speed, Adjust	Reduce Descent, Reduce Descent		
RA Reversal to Climb RA	Climb, Climb NOW, Climb, Climb NOW				
RA Reversal to Descend RA	Descend, Descend NOW; Descend, Descend NOW				
Increase Climb RA	Inc	crease Climb, Increase Cli	mb		
Increase Descent RA	Incr	ease Descent, Increase De-	scent		
Maintain Rate RA	Maintain Vertice	Monitor Vertical Speed			
Altitude Crossing, Maintain Rate RA (Climb and Descend)	Maintain Vertical Spe	Monitor Vertical Speed			
Weakening of RA	Level Off, Level Off	Adjust Vertical Speed, Adjust	Monitor Vertical Speed		
Preventive RA (no change in vertical speed required)	Monitor Ve	Monitor Vertical Speed, Monitor Vertical Speed			
RA Removed	Clear of Conflict				







ATM Flight Procedures, "Non-Normals"

None General Oceanic None Weather Deviation None Interception None **RVSM**

Reporting Required Wake Vortex/Turbulence RNAV vs. Ground Based Long Range Navigation Failure

7min vice ICAO 20 **Lost Communication** SOP's and/or drills? Ditching at Sea **SOP, SMS Resources SAR Procedures**

CAA's vs. Manufacturer's Volcanic Ash

No



ATM Flight Procedures, "USA Normals"

Land after Procedure

3.8.3.1

SLOP

Normally, only one aircraft is permitted to land or take-off on the runway-in-use at any one time. However, when the tramic sequence is two successive landing aircrait, the second one may be allowed to land before the first one has cleared the runway-in-use, providing:

- The runway is long enough;
 it is during daylight hours;
- 3. the second aircraft will be able to see the first aircraft clearly and continuously until it is clear of the runway;
- 4. the second aircraft has been warned. ATC will provide this warning by issuing the second aircraft with the instruction 'land after (first aircraft type)' in place of the usual instruction 'Cleared to land'. Responsibility for ensuring adequate separation between the two aircraft rests with the pilot of the second aircraft.



ATM Flight Procedures, "ICAO-Normals"

12-2

Air Traffic Management (PANS-ATM)

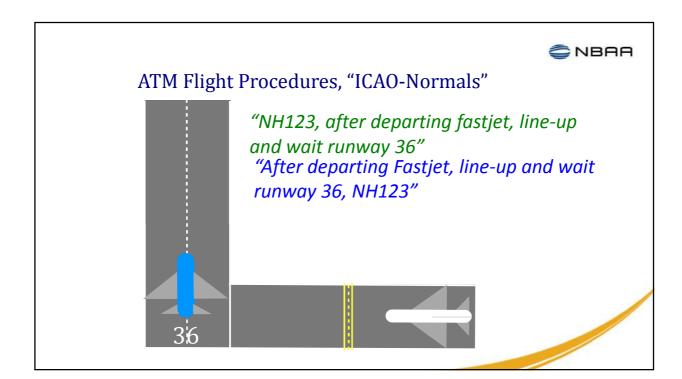
12.2.7 Conditional phrases, such as "behind landing aircraft" or "after departing aircraft", shall not be used for movements affecting the active runway(s), except when the aircraft or vehicles concerned are seen by the appropriate controller and pilot. The aircraft or vehicle causing the condition in the clearance issued shall be the first aircraft/vehicle to pass in front of the other aircraft concerned. In all cases a conditional clearance shall be given in the following order and consist of:

- a) identification;
- b) the condition;
- c) the clearance; and
- d) brief reiteration of the condition,

for example:

"SAS 941, BEHIND DC9 ON SHORT FINAL, LINE UP BEHIND".

Note. — This implies the need for the aircraft receiving the conditional clearance to identify the aircraft or vehicle causing the conditional clearance.





ATM Flight Procedures, "Similar Wake Separation"

(c) Wake Turbulence Category. Insert an oblique stroke followed by one of the following letters to indicate the wake turbulence category of the aircraft:

(1) H — HEAVY, to indicate an aircraft type with a maximum certificated takeoff weight of 300,000 pounds ($136\,000$ kg), or more;

(2) M — MEDIUM, to indicate an aircraft type with a maximum certificated takeoff weight of less than 300,000 pounds (136,000 kg), but more than 15,500 pounds (7,000 kg);

(3) L—LIGHT, to indicate an aircraft type with a maximum certificated takeoff weight of 15,500 pounds (7,000 kg) or less.

ICAO Medium behind Heavy 5NM and 2min

EU/EASA Medium behind Heavy 5NM and 2min

USA Medium behind Heavy or 757 4NM or 2min

ATM Flight Procedures, "Similar Wake Separation"



Weight Parameters	(MaxImum	take-off	mass	(MTOM)	In	ka)
Treight i arametere	(IIIIAXIIII	tanc on i	maco	(101 1 0 101)	••••	····

Category	ICAO and Flight Plan (kg)	UK Departures (kg)	UK Arrivals (kg)
Heavy (H)	≥ 136000	≥ 136000	≥ 136000
Medium (M)	> 7000 & > 136000	>40000 & < 136000	N/A
Upper Medium (UM)	N/A	N/A	>104000 & < 136000
Lower Medium (LM)	N/A	N/A	>40000 & ≤ 104000
Small (S) (UK only)	N/A	>17000 & ≤ 40000	17000 & ≤ 40000
Light (L)	≤ 7000	≤ 17000	≤ 17000

(c) Wake Turbulence Category. Insert an oblique stroke followed by one of the following letters to indicate the wake turbulence category of the aircraft:

type with a maximum certificated takeoff weight of 300,000 pounds (136 000 kg), or more;

(1) H - HEAVY, to indicate an aircraft

(2) M — MEDIUM, to indicate an aircraft type with a maximum certificated takeoff weight of less than 300,000 pounds (136,000 kg), but more than 15,500 pounds (7,000 kg);

(3) L—LIGHT, to indicate an aircraft type with a maximum certificated takeoff weight of 15,500 pounds (7,000 kg) or less.

sidered to form the medium category group and is not split for departure wake

UK
Medium behind Heavy or 757
5NM or 2min



ATM Flight Procedures, "USA RECAT Separation"

>300,000lbs >245'	>300,000lbs 245' to 175'	>300,000lbs 174' to 125'	<300 >41Klbs 90' to 124'	>41Klbs 65' to 89'	<41Klbs ≥ 125'
Category A	Category B	Category C	Category D	Category E	Category F
A380	B747 series	MD11	B757 series	AT72	E120
AN-225	A340 series	B763	B737 series	RJ100	B190
	B777 series	A306	A320 series	RJ85	C650
	A330 series	C-17	B727 series	B463	H25B
	C-5		MD80 series	B462	C525
			DC9 series	E170	
			E190	CRJ1/2	
			B717	CRJ7/9	
			GLF5	AT45	
			DH8D	AT43	
			F100	GLF4	
			F70	SF34	
			C-130 series	DH8A/B/C	
			C/KC-135 series	E135/145	

NBAA

ATM Flight Procedures, "Similar Wake Separation"

Table 2 details the RECAT wake separation standards.

Table 2: RECAT Wake Separation Standards

RECAT Separation Matrix

		Follower					
		A	В	C	D	E	F
	A	MRS	5.0	6.0	7.0	7.0	8.0
٠.	В	MRS	3.0	4.0	5.0	5.0	7.0
eader	C	MRS	MRS	MRS	3.5	3.5	6.0
ea	D	MRS	MRS	MRS	MRS	MRS	5.0
-	E	MRS	MRS	MRS	MRS	MRS	4.0
	F	MRS	MRS	MRS	MRS	MRS	MRS

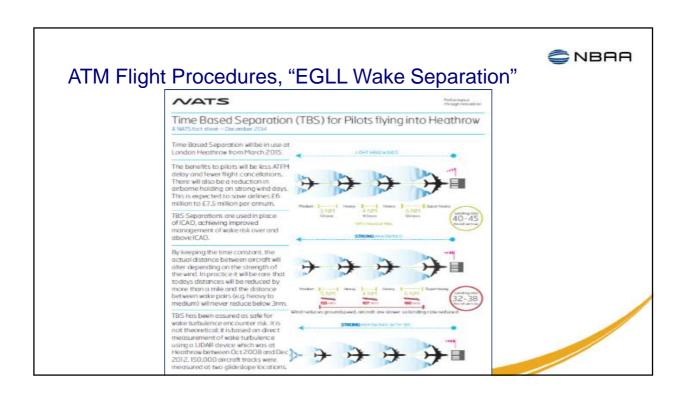
Separation was increased for some or all aircraft pairs

Separation remained the same for some or all aircraft pairs Separation was decreased for some or all aircraft pairs

MRS Minimum Radar Separation (3NM, or 2.5 NM when existing requirements are met)

Table 3, illustrates the current wake separation standard and the RECAT separation standard between a B767 and B747-400.

Table 3: Example RECAT Wake Separation



ATM Flight Procedures, "Transistion Altitude"

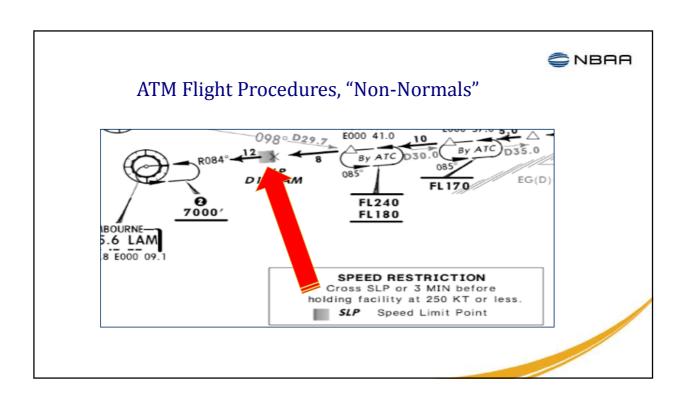
NBAA

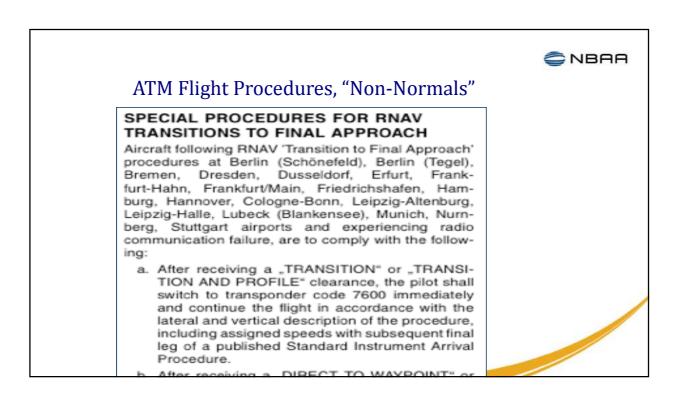
Austria 4 - 11,000 Ireland 5,000
Denmark 4/3,000 Italy 3 -15,000
Finland 5,000 Netherlands 3,000
France 5,000 Poland 6,500
Germany 4,000 Spain 6 - 13,000

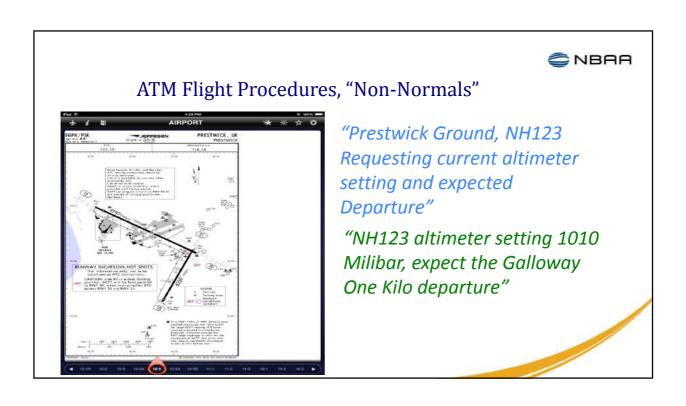
Greece 2,000 Sweden 5 - 9,000 Hungary 9,000 United Kingdom 3 - 6,000

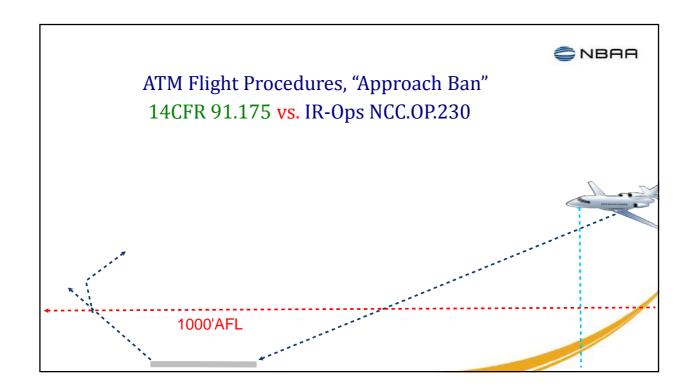
Iceland 7,000 EASA = NO

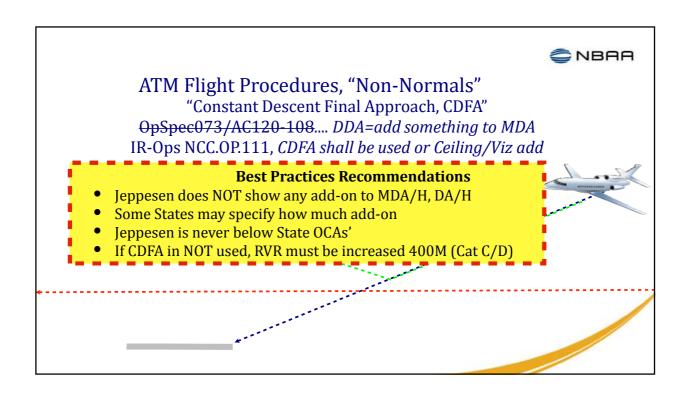
UK = 18,000 MSL-November 2015

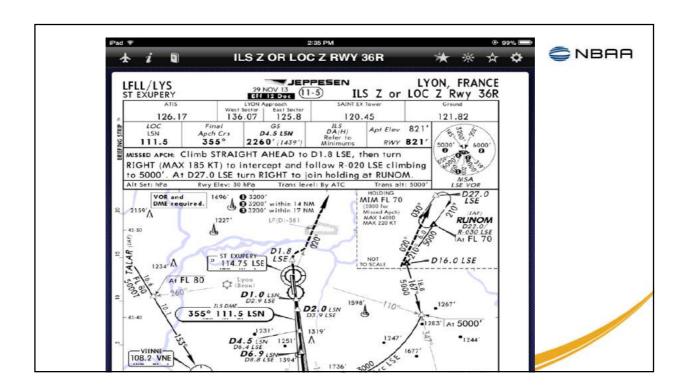


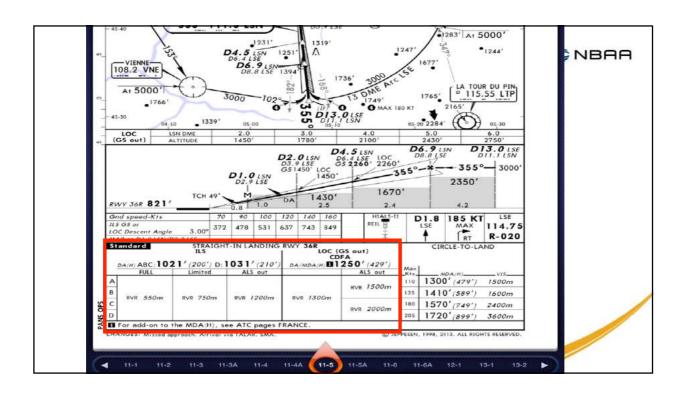


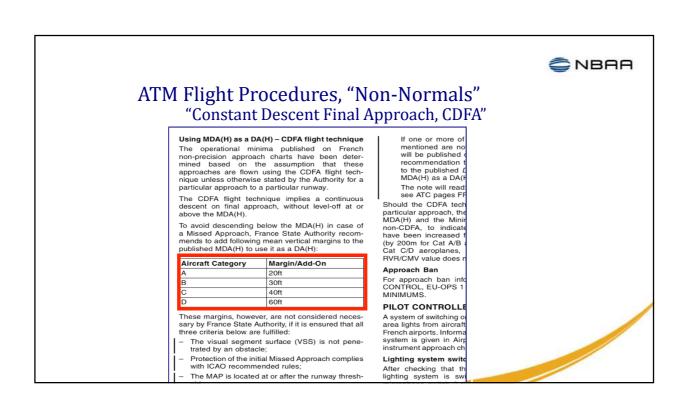














a NBAA

Safety Assessment of Foreign Aircraft, 1996 "RIP 2016"

- Overseen by the European Aviation Safety Agency
- Authority for Air Operations (ARO)-Ramp, active 270CT14
- Applies to EU countries and operations inside EU

The Check can Include...

- Licenses of pilots
- Both pilots must be type rated
- Must have an ICAO first class physical
- Based on Certificate Vice Seat





Safety Assessment of Foreign Aircraft, 1996 "RIP 2016"

The Check can Include...

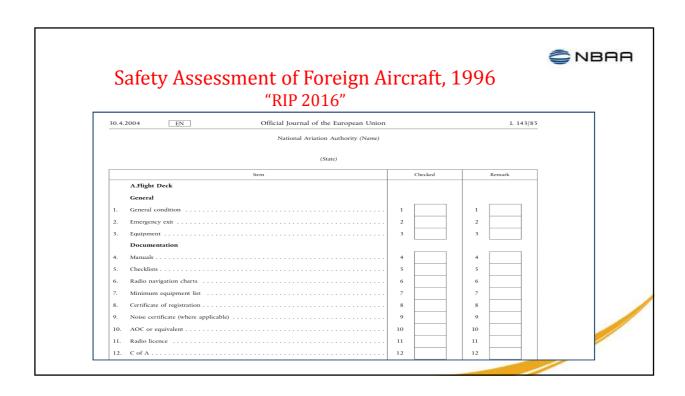
- Age requirements

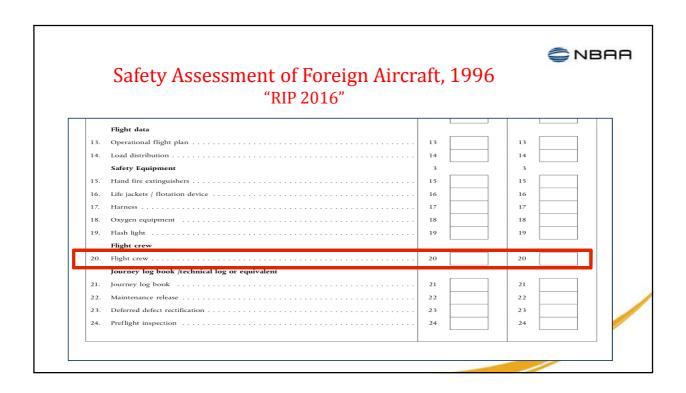
Commercial vs. Private

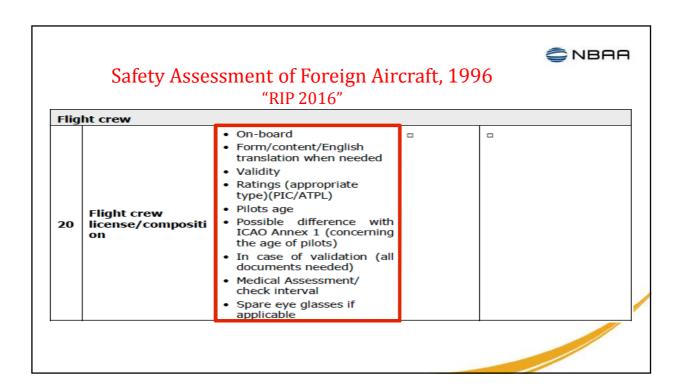
- Procedures and manuals that should be carried in the cockpit
- Compliance with these procedures by flight and cabin crew
- Safety equipment in cockpit and cabin
- Cargo carried in the aircraft

HAZMAT or DG?

- The apparent condition of the aircraft









Safety Assessment of Foreign Aircraft, 1996 "RIP 2016"

2012 Results

Just over 11,000 Inspections Performed

- ✓ Over twice as many as 2005
- ✓ Evenly split between EU and Non-EU countries

Largest Number of SAFA Locations

- ✓ France (71)
- ✓ Italy (34), UK (31) and Germany (30)



Safety Assessment of Foreign Aircraft, 1996 "RIP 2016"

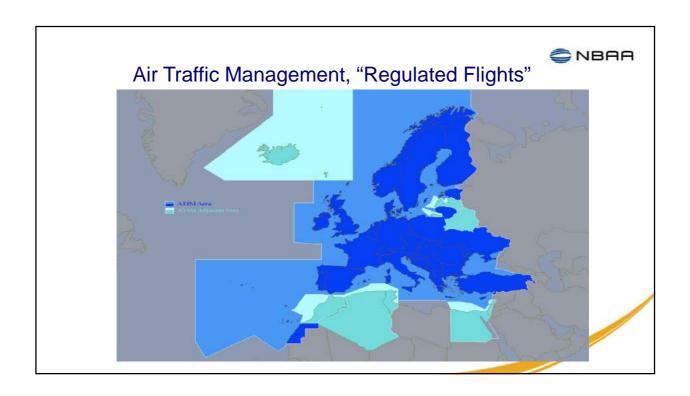
2012 Results

Most Frequent Commercial Operators Inspected

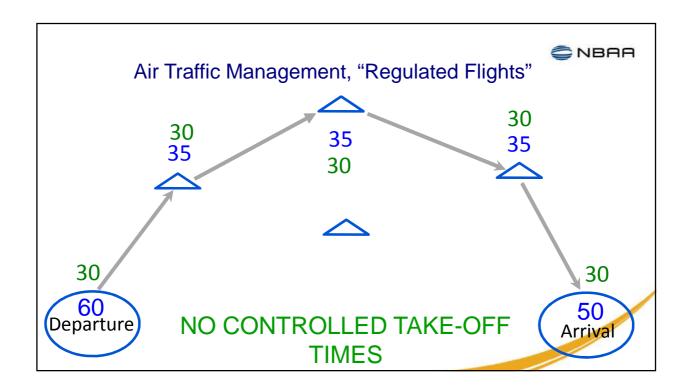
✓ Aeroflot, Lufthansa, EasyJet

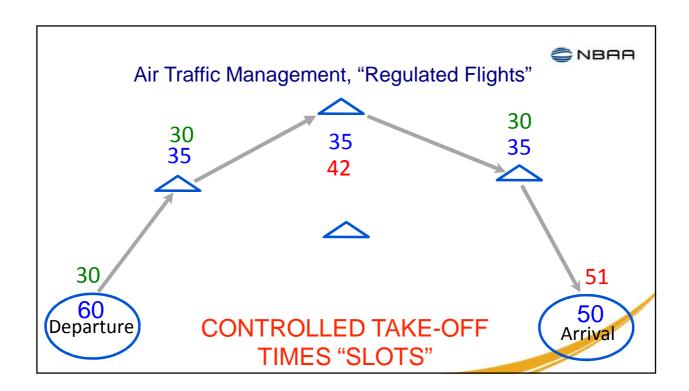
Most Frequent private operator's country of registration

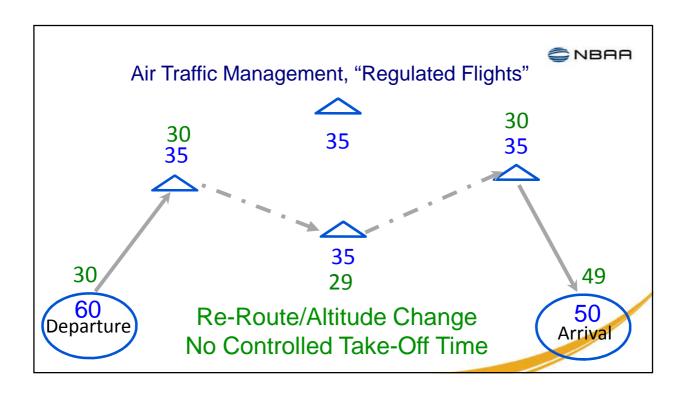
✓ USA, Isle-of-Man, Germany











NBAA Air Traffic Management, "Regulated Flights" 168 Hrs 7 Day Strategic flow management begins Max time to file 120 Hrs 5 Day Begin tracking WX, rwy configures, sector capacities 48 Hrs 20 Hrs RPL, repetitive flight plans entered into system 12 Hrs Once/hr 4-Dimension run of all flight plans known 4 Hrs Re-route w/o need for slots? Min time to file-if slots are required, (excpt State/SAR) 3 Hrs 2 Hrs CTOT "Slots" assigned via SAM Min time to file FPL w/o slots required 1 Hr Max time for EOBT improvement via REA 30 min Begin CTOT window 5 min -----Estimated Off Blocks Time------

NBAA

Air Traffic Management, "Regulated Flights"

5 min Begin CTOT window

-----Estimated Off Blocks Time-----

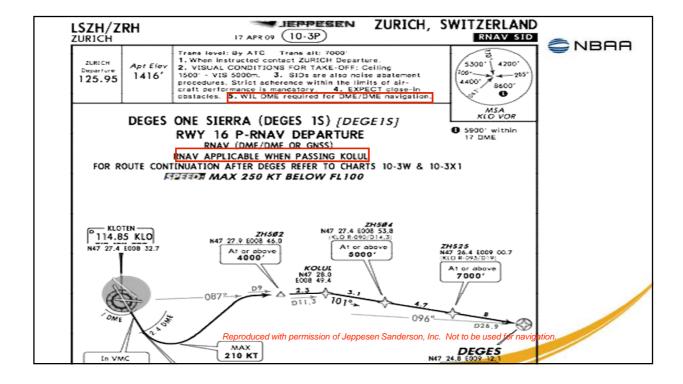
10 min End CTOT window

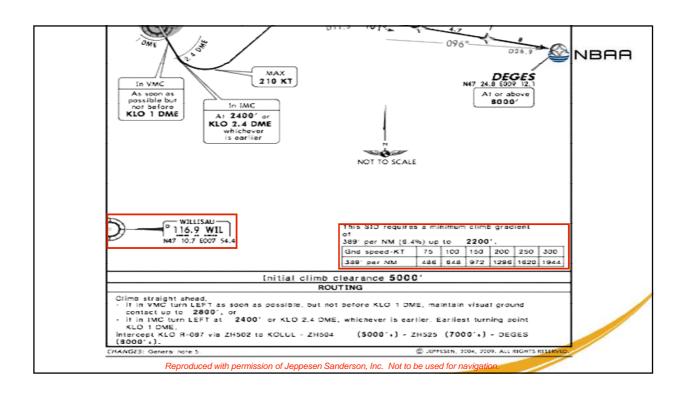
15 min Max delay request w/o new slot assigned

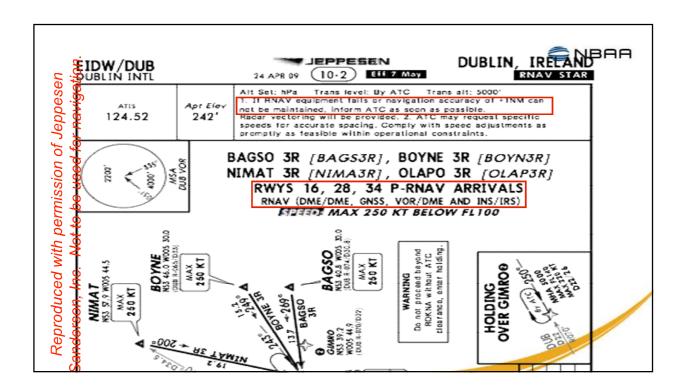
30 min Max time for flight plan in system left unused

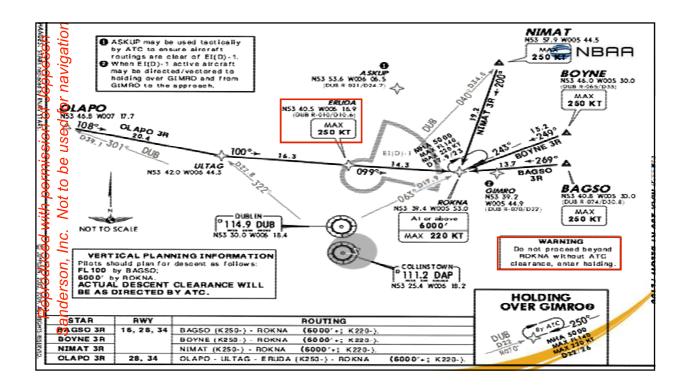
ICAO Flight Plan Block#18

- ✓ Below 2400RVR Capable?
- ✓ Telephone contact number?
- ✓ What-if re-routing?
- ✓ Cancel FPL as early as possible, if not to be flown









Crowd Source Question #3

What is the Source Document for Rules and Procedures Once Inside a Country?

- A. ICAO Annex 2, Annex 6 and Document #8168
- B. USA always, ignore local regulations
- C. Aeronautical Information Publication

NBAA



Crowd Source Question #3

What is the Source Document for Rules and Procedures Once Inside a Country?

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Do Not Forget:
Aeronautical Information Circulars
AIP Supplements
NOTAMS