LUFTWAFFE

Air Componant Command

GERMAN ARMED FORCES

Captain Christian Fenner

BUNDESWEHR

Captain Christian Fenner

Instrument Flight Procedure Designer and Air Traffic Control Officer (ADI, APS, PAR)

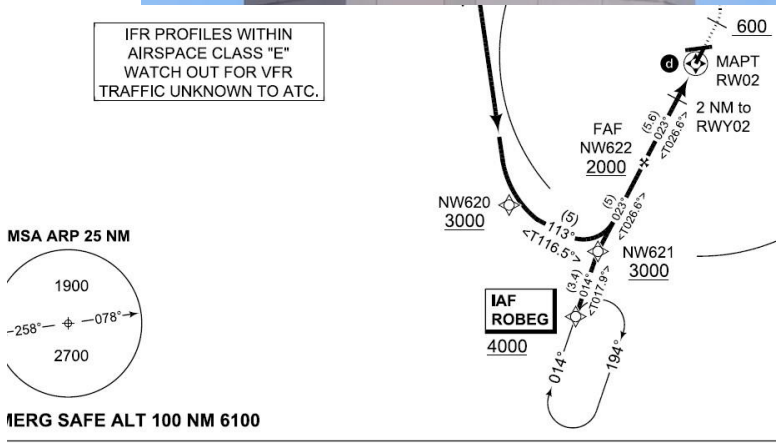
Preparation of Instrument flight procedures

Commissioning of survey flights

Initiation of the approval procedure Bw/ US

ICARD and SBAS

Refueling Anchors



Structure

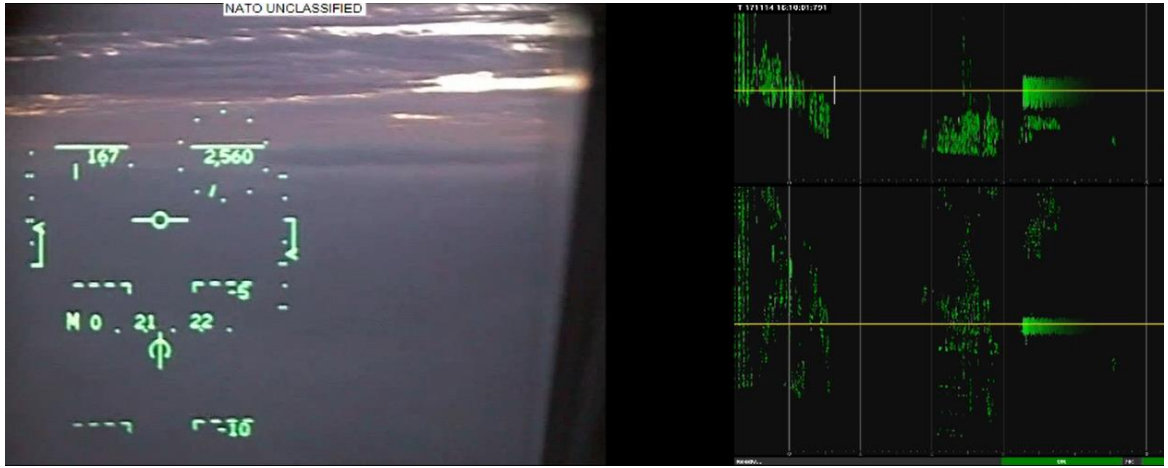
- Instrument Flight Procedures flown by the GAF
- Introduction of EGNOS
- Future use of EGNOS

Instrument Flight Procedures GAF

20 IFR Aerodromes of the German Armed Forces (+7 US Forces) – main weapon systems Germany are:

Instrument Flight Procedures GAF

Different approach procedures depending on the aircraf stationated - NDB, TACAN, ILS, ARA/IAA, PAR



Instrument Flight Procedures GAF

In the development of military combat aircraft, no emphasis is placed on IFR flying

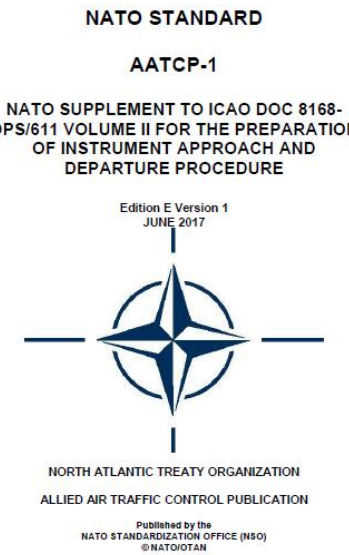
This leads to limitations in the usability of PBN-based procedures

For example:

German Eurofighter will be able for LNAV in 2032 (planed)

Instrument Flight Procedures GAF

Other needs require their own regulations that suppliment ICAO DOC 8168.



NATO STANDARD

AATCP-1

NATO SUPPLEMENT TO ICAO DOC 8168-
OPS/611 VOLUME II FOR THE PREPARATION
OF INSTRUMENT APPROACH AND
DEPARTURE PROCEDURE

Edition E Version 1
JUNE 2017

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AIR TRAFFIC CONTROL PUBLICATION

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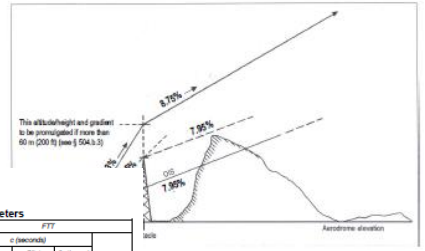
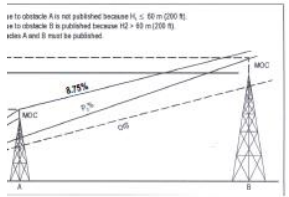
Table 3 RVR/Visibility v. DH/MDH

DH or MDH			Class of Lighting Facility							
			FALS		IALS		BALS		NALS	
Feet			m	km	m	km	m	km	m	km
200	—	210	550	0.8	750	0.8	1 000	1.0	1 200	1.2
211	—	220	550	0.8	800	0.8	1 000	1.0	1 200	1.2
221	—	230	550	0.8	800	0.8	1 000	1.0	1 200	1.2
231	—	240	550	0.8	800	0.8	1 000	1.0	1 200	1.2
241	—	250	550	0.8	800	0.8	1 000	1.0	1 300	1.3
251	—	260	600	0.8	800	0.8	1 100	1.1	1 300	1.3
261	—	280	600	0.8	900	0.9	1 100	1.1	1 300	1.3
281	—	300	650	0.8	900	0.9	1 200	1.2	1 400	1.4
301	—	320	700	0.8	1 000	1.0	1 200	1.2	1 400	1.4
321	—	340	800	0.8	1 100	1.1	1 300	1.3	1 500	1.5
341	—	360	900	0.9	1 200	1.2	1 400	1.4	1 600	1.6
361	—	380	1 000	1.0	1 300	1.3	1 500	1.5	1 700	1.7
381	—	400	1 100	1.1	1 400	1.4	1 600	1.6	1 800	1.8
401	—	420	1 200	1.2	1 500	1.5	1 700	1.7	1 900	1.9
421	—	440	1 300	1.3	1 600	1.6	1 800	1.8	2 000	2.0
441	—	460	1 400	1.4	1 700	1.7	1 900	1.9	2 100	2.1
461	—	480	1 500	1.5	1 800	1.8	2 000	2.0	2 200	2.2
481	—	500	1 500	1.5	1 800	1.8	2 100	2.1	2 300	2.3
501	—	520	1 600	1.6	1 900	1.9	2 100	2.1	2 400	2.4
521	—	540	1 700	1.7	2 000	2.0	2 200	2.2	2 400	2.4
541	—	560	1 800	1.8	2 100	2.1	2 300	2.3	2 500	2.5
561	—	580	1 900	1.9	2 200	2.2	2 400	2.4	2 600	2.6
581	—	600	2 000	2.0	2 300	2.3	2 500	2.5	2 700	2.7
601	—	620	2 100	2.1	2 400	2.4	2 600	2.6	2 800	2.8
621	—	640	2 200	2.2	2 500	2.5	2 700	2.7	2 900	2.9
641	—	660	2 300	2.3	2 600	2.6	2 800	2.8	3 000	3.0
661	—	680	2 400	2.4	2 700	2.7	2 900	2.9	3 100	3.1
681	—	700	2 500	2.5	2 800	2.8	3 000	3.0	3 200	3.2
701	—	720	2 600	2.6	2 900	2.9	3 100	3.1	3 300	3.3
721	—	740	2 700	2.7	3 000	3.0	3 200	3.2	3 400	3.4
741	—	760	2 700	2.7	3 000	3.0	3 300	3.3	3 500	3.5
761	—	800	2 900	2.9	3 200	3.2	3 400	3.4	3 600	3.6
801	—	850	3 100	3.1	3 400	3.4	3 600	3.6	3 800	3.8
851	—	900	3 300	3.3	3 600	3.6	3 800	3.8	4 000	4.0
901	—	950	3 600	3.6	3 900	3.9	4 100	4.1	4 300	4.3
951	—	1 000	3 800	3.8	4 100	4.1	4 300	4.3	4 500	4.5
1 001	—	1 100	4 100	4.1	4 400	4.4	4 600	4.6	4 900	4.9
1 101	—	1 200	4 600	4.6	4 900	4.9	5 000	5.0	5 000	5.0
1 201 and above			5 000	5.0	5 000	5.0	5 000	5.0	5 000	5.0



e 1. Procedure Design Gradient.



igure 2. Close-in Obstacles

table 1 shall not be greater than 3° per second.

Table 1. Turn Construction Parameters

Segment or fix of turn location	Speed (IAS)[1]	Altitude/height	Wind	Bank angle	FTT			
					c (seconds)			
					Bank establishment time	Pilot reaction time	Outbound timing tolerance	Heading tolerance
Departure	650 km/h [7] (350 kt)	Turn at altitude/height: Specified altitude/height Turn at turn point: A/D elevation + height based on 36.4% climb from DER[2] or level of the next segment.	95% omni-directional wind or 56 km/h (30 kt) for wind spirals	30°	5	3	N/A	N/A
Holding	555 km/h [7] (300 kt)	Specified altitude	ICAO standard wind[3]	30°	5 For template	3 For template	10	5°
Initial approach – reversal and racetrack procedures	555 km/h (300 kt)	Specified altitude	ICAO standard wind[3] or statistical wind	30°	5	3	10	5°
Initial approach – DR track procedures	555 km/h (300 kt)	Specified altitude	ICAO standard wind[3] DR leg: – 56 km/h (30 kt)	30°	5	3	N/A	5°
IAF, IF, FAF	See Table 5-2 Use initial approach speed for turn at IAF or IF Use maximum final approach speed for turn at FAF.	Specified altitude	95% omni-directional wind or 56 km/h (30 kt)	30°	5	3	N/A	N/A
Missed approach	See Table 5-2[4]	A/D elevation + 300 m (1000 ft)	56 km/h (30 kt)	30°	5	3	N/A	N/A
Visual manoeuvring using prescribed track	405 km/h (220 kt)	A/D elevation + 300 m (1000 ft)	46 km/h (25 kt)	30°	N/A	N/A	N/A	N/A
Circling	405 km/h (220 kt)	A/D elevation + 300 m (1000 ft)	46 km/h (25 kt)	30°	N/A	N/A	N/A	N/A

GENERAL NOTES:
Note 1.— The conversion from IAS to TAS is determined using a temperature equal to ISA plus 15° C at the corresponding altitude. Holding procedures are an exception; the calculation formula includes

Introdution of EGNOS

Conclusion of the EWA required due to shared responsibilities between the two German ANSP DFS an Bundeswehr civ/ mil

First SBAS procedures were requested by the US Forces in Ramstein (ETAR)

JULY 03, 2024

ESSP and the German Armed Forces sign an EGNOS Working Agreement

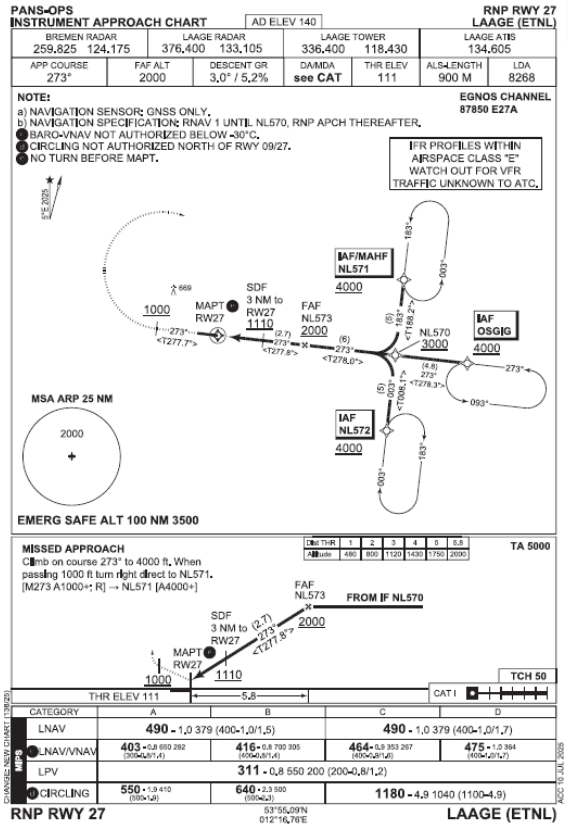
Introdution of EGNOS

First aerodrome of the German Armed Forces

with SBAS Procedure is Rostock Laage ETNL (mil/ civ)

Step by step, all aerodromes will follow

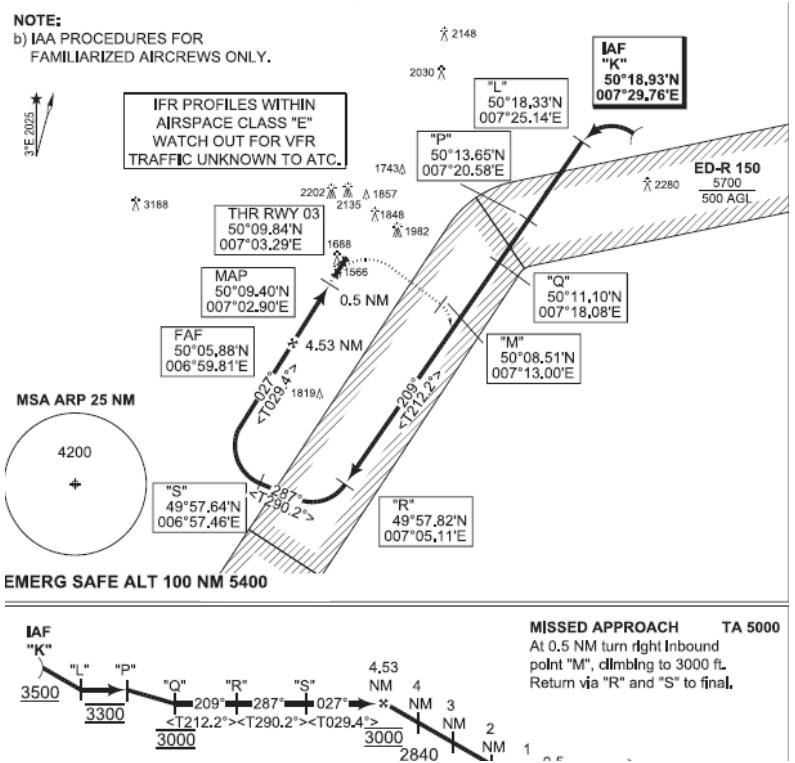
with LNAV, LNAV/VNAV and LPV



Introdution of EGNOS

Reason for the introduction is to enable civil aircraft to make an IFR approach to a military aerodrome (EU) 2018/1048

Some, such as Büchel (ETSB), have still only military instrument approach procedures (ARA, TAC, PAR) at the moment.



Future use of EGNOS in German Armed Forces

Remotely Piloted Aircraft Systems (RPAS) have different requirements for glide paths and touchdown points

Here we see the advantages of the flexibility and independence of SBAS

Future use of EGNOS in German Armed Forces

Different future Systems of RPAS in the German Airforce and Navy – SBAS equipped?

Future use of EGNOS in German Armed Forces

Development of an own RPAS category

according to its requirements (like HPMA)

Leads to many questions that we would like to clarify together with our allies to standarize RPAS flight operations in German/ European Airspace

Due to the flexibility I would prefer SBAS procedures for peacetime flight operations

Future use of EGNOS in German Armed Forces

Point in Space procedures for airports that are currently not accessible via IFR due to their geography

Future use of EGNOS in German Armed Forces

Usability for civil/mil aircraft under nearly all weather conditions, slingt increase in traffic numbers at mil Airfields

Questions?