

## ICANA 2016 - Lufthansa SESAR AAL Trials

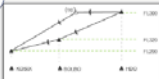
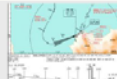


Frank Nagel

Frankfurt, 25.11.2016

## Frank Nagel

- Instructor ATPL (A/H)
- Flight Operations Officer
- Programme Manager SESAR Demonstrations



<p>1</p>  <p><b>Optimized Descent Profile (ODP)</b></p> <ul style="list-style-type: none"> <li><b>Inhalt:</b> Einführung von Continuous Descent Operations (aus Cruising Level, über ACC/UAC Grenzen)</li> <li><b>Benefits:</b> Treibstoffeinsparungen</li> <li><b>Konsortium:</b> DFS, LX, Skyguide, Air France, DSN, Austrocontrol, EUROCONTROL</li> <li><b>LH Verantwortung:</b> Durchführung/Konsolidierung "A/C Profile Studies" (mit AF und LX) <i>Demonstrations in</i> FRA, MUC, ZRH, VIE, NUE, STR, GVA</li> </ul>	<p>2</p>  <p><b>Augmented Approaches to Land (AAL)</b></p> <ul style="list-style-type: none"> <li><b>Inhalt:</b> Übergang mittels genauer und flexibler RNP-Flugwegführung zum Landesystem (ILS / GLS)</li> <li><b>Benefits:</b> Reduktion Treibstoffverbrauch / Lärmemissionen</li> <li><b>Konsortium:</b> Netjets/Honeywell, DFS, Fraport, Airbus, Skyguide, LX, ZRH Airport</li> <li><b>LH-Relevanz:</b> Risk Assessment, <i>Risiko:</i> Sondergenehmigung des LBA für "RNP"-Trials auf Revenue Flights</li> <li><b>Demonstrations in</b> BRE(A319), FRA(B748/A380/A319), ZRH(A319)</li> </ul>
<p>3</p>  <p><b>Free Route Environmental and Efficient Solutions (FREE)</b></p> <ul style="list-style-type: none"> <li><b>Inhalt:</b> Cross-Border Directs und Entwicklung Free-Route-Area zwischen zwei FABs, Optimierung einzelner Citypairs, dynamische Nutzung militärischer Lufträume</li> <li><b>Benefits:</b> Treibstoffeinsparungen, Flugzeitminimierungen <i>Spezielles Interesse LH:</i> Optimierung FRA-MAD (Durchflug TRA Lauter, Abkürzung Paris ACC)</li> <li><b>Konsortium:</b> ENAV, DFS, MATS, Skyguide, DSN, Alitalia, Air France, Ryanair, LX</li> <li><b>LH Verantwortung:</b> Mitarbeit Konzeption, Teilnahme Flight Trials</li> </ul>	<p>4</p>  <p><b>Integrated SESAR TRIals for Enhanced Arrival Management (iStream)</b></p> <ul style="list-style-type: none"> <li><b>Inhalt:</b> Konzeptevaluierung integrierte Kollaboration zum AMAN, Optimierung Kapazität/ATC/Verkehrsfluss bei Integration Nutzerpräferenzen (CTOT to TT)</li> <li><b>Benefits:</b> Einbringung LH-Interessen bei Entwicklung von AMAN Konzepten und Prozessen, Demand-Capacity Balancing durch Networkmanager</li> <li><b>Konsortium:</b> DSNA, Skyguide, LX, Air France, Aéroports de Paris, ZRH Airport, EUROCONTROL (Networkmanager)</li> <li><b>LH Verantwortung:</b> Mitarbeit Konzeption, Teilnahme Flight Trials</li> </ul>

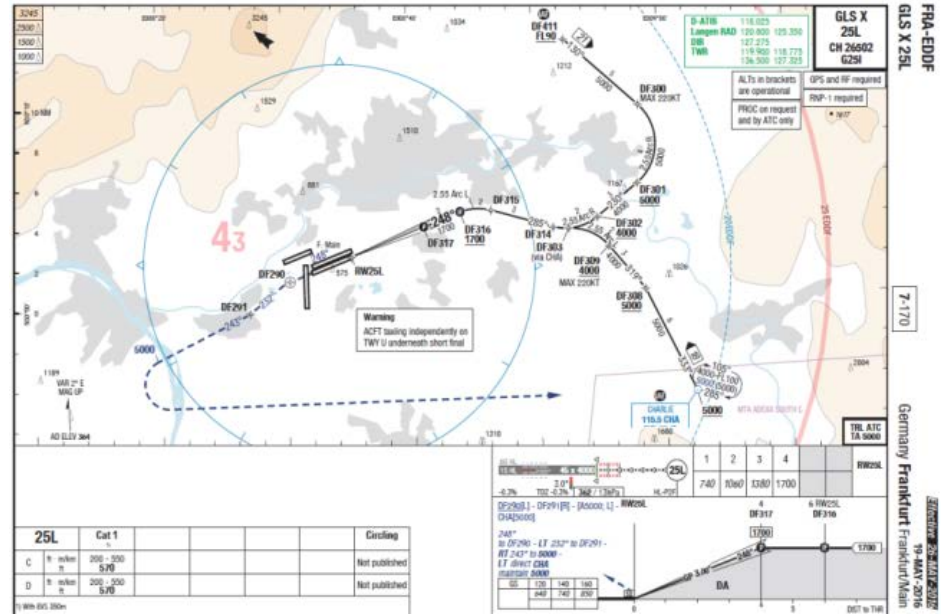
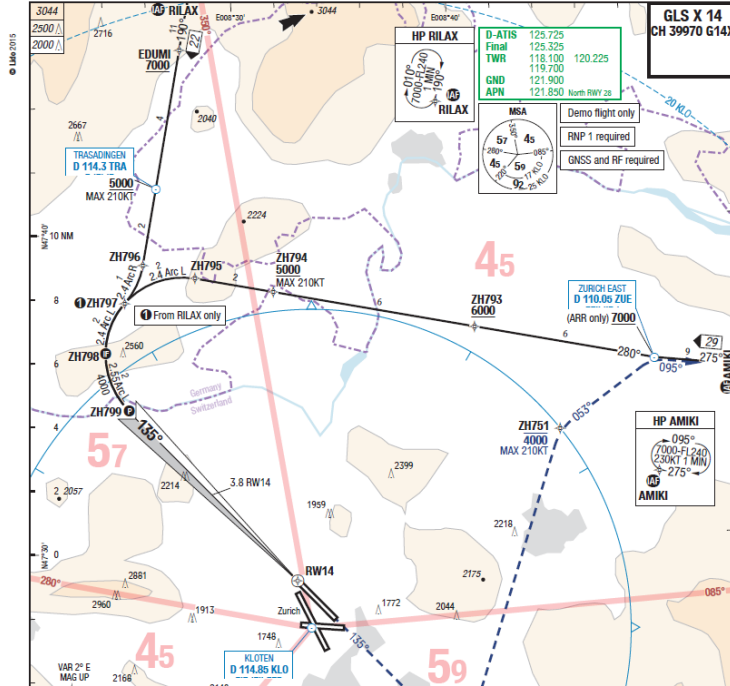
# Augmented Approaches to Land

## Curved approaches for the reduction of fuel and noise

ZRH-LSZH  
GLS X 14

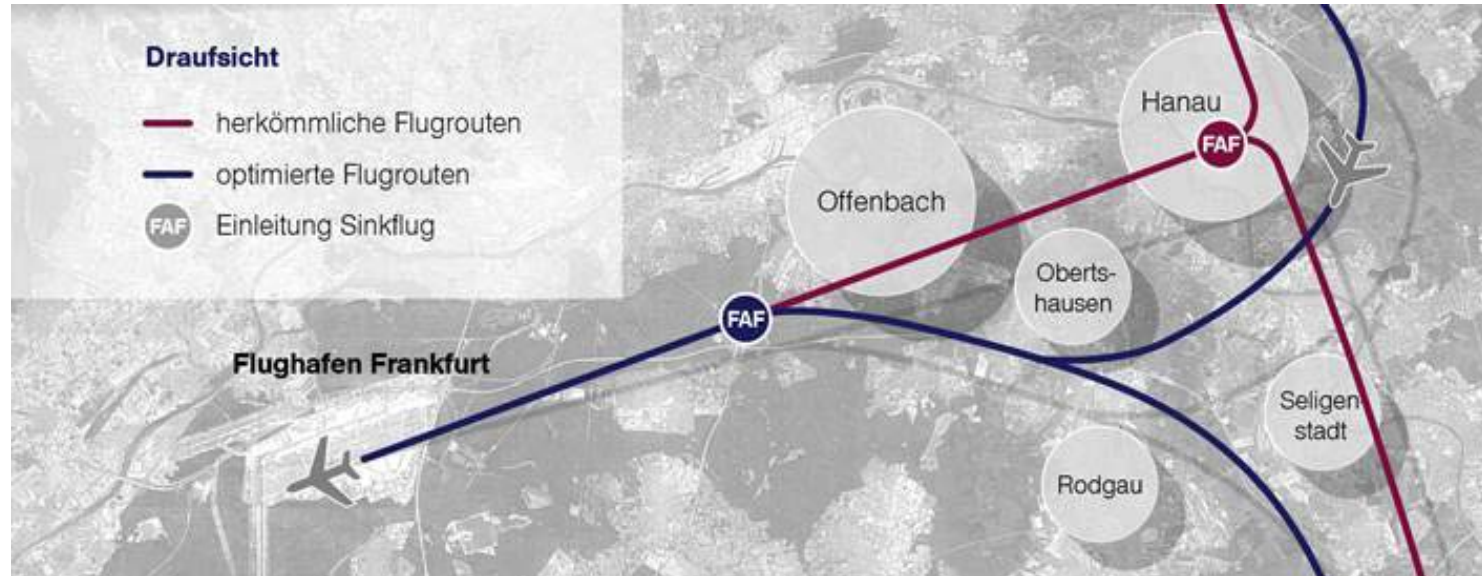
01-OCT-2015  
Switzerland Zurich

IAC



# Augmented Approaches to Land

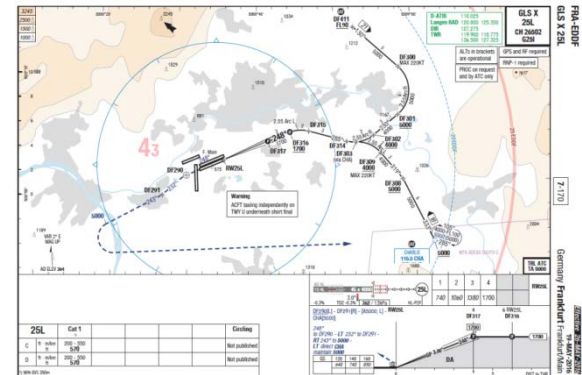
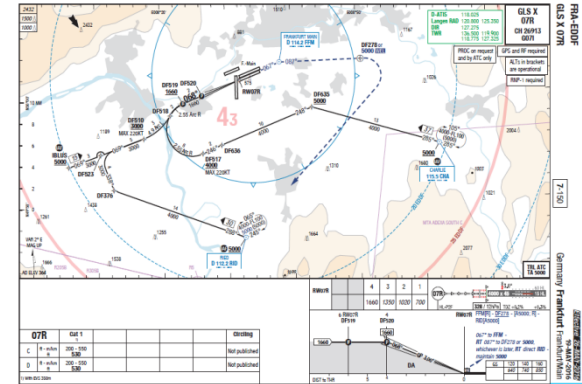
Curved approaches for the reduction of noise



# Results AAL

## FRA

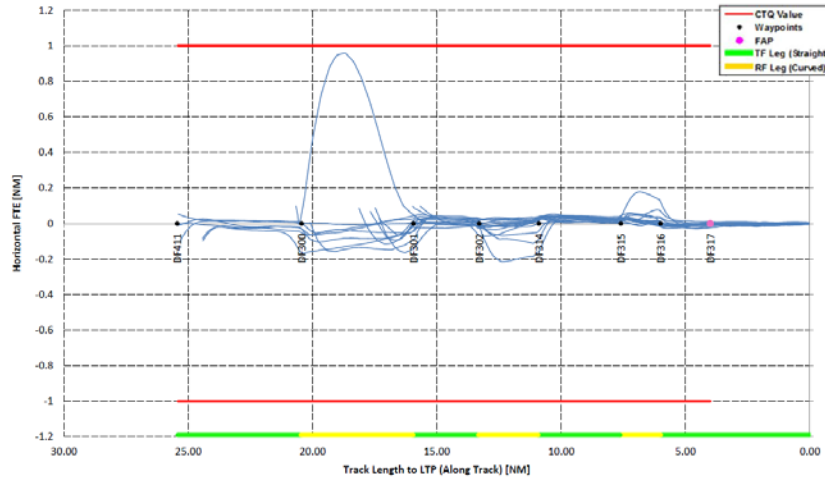
- **3 Fleets** (B748, A380, A320 Family )
- **3 Airports** (ZRH, BRE, FRA)
- **3 Procedures** (RNP to ILS, RNP to GLS, IGS 3,2)
- 221 flown trials
- 160 total evaluable flights
- **116 flights in FRA**
- 248 Crew Feedbacks received and evaluated



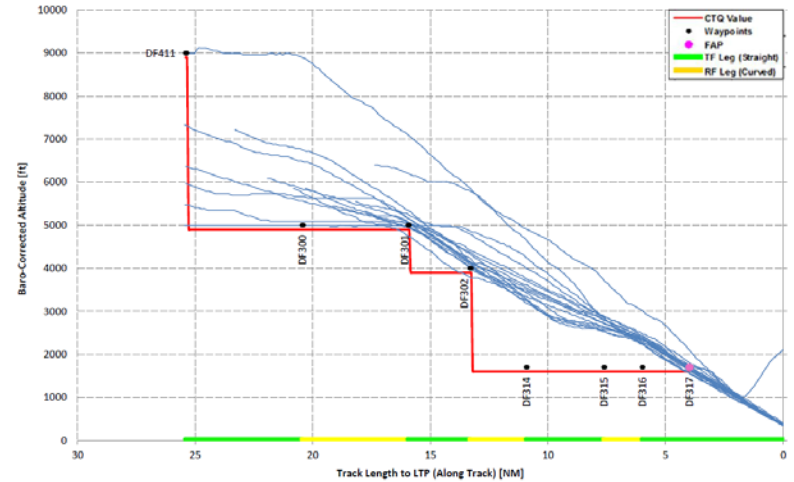
# Results AAL

## FRA 25L B747-8

RNP to GLS (Revenue Flights) – Horizontal FTE, EDDF, xLS RWY 25L, via DF411,  
16 Approaches



RNP to GLS (Revenue Flights) – Flown Height, EDDF, xLS RWY 25L, via DF411,  
16 Approaches





# Results AAL

FRA 25L/R (1 x A380, 2 x A319, 1 x B748)



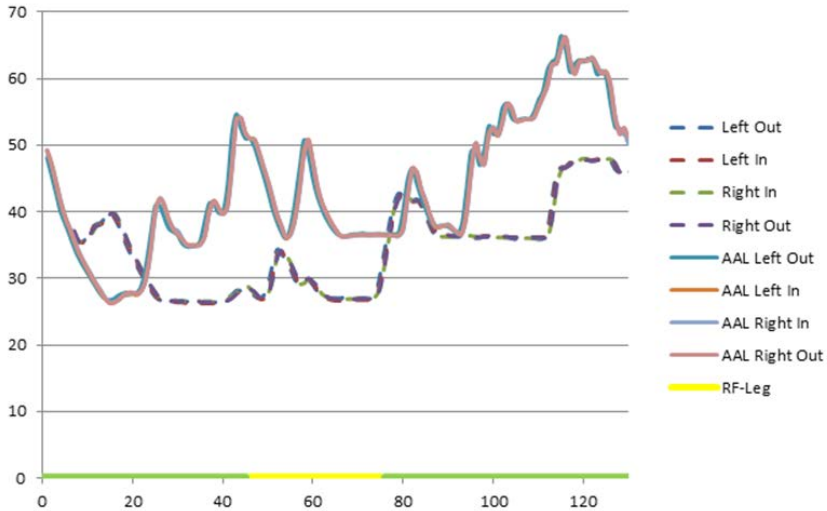
- Flyability proven (first proof of concept worldwide)
- Track precision well within limits (RNP 0,3!)
- Sensor Changes good
- *Noise measuring results promising*
- Reduced fuel burn/track miles in BRE and ZRH
- Input for group PBN Training concept
- Findings for future procedure design



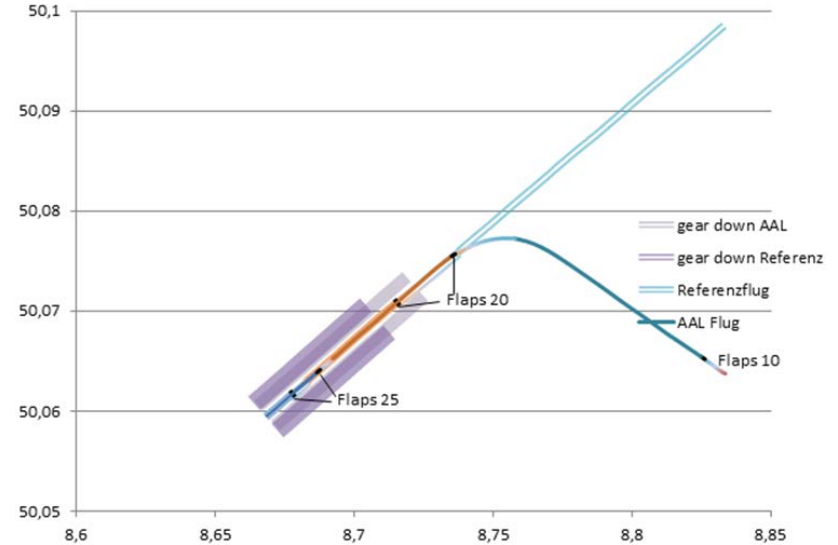
# Results AAL

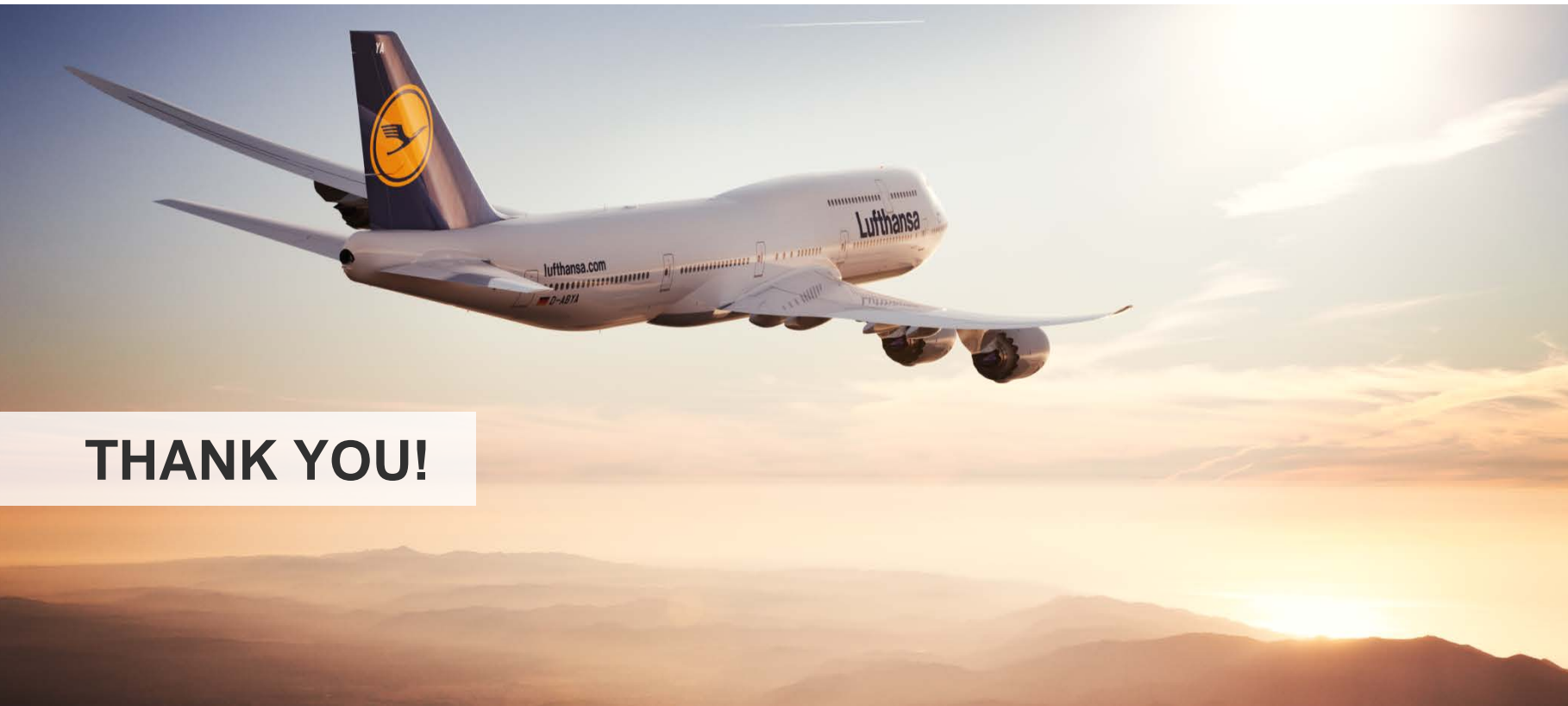
## Comparison of Straight in ILS to RNP to ILS (B748)

### Thrust Setting



### Configuration





**THANK YOU!**

A STAR ALLIANCE MEMBER



**Lufthansa**

