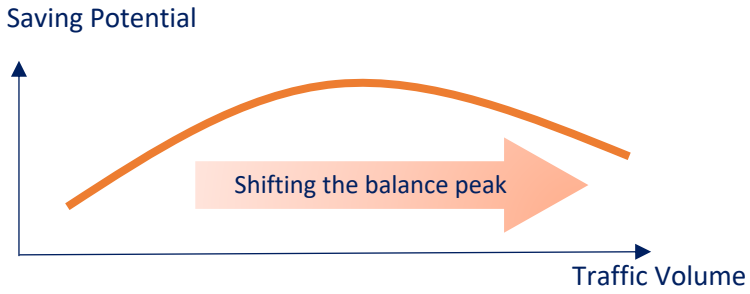
FABEC Workshop
Vertical Flight Efficiency
December, 10th 2020

An Aircraft Operator View on VFE

Understanding the COVID-19 Crisis as a chance!
Today is the time to prepare the more efficient future



Task:
Implement efficiency driven air traffic management concepts
and
Move the balance peak as far as possible towards higher traffic volumes (!)

Pre-Crisis Operation

- Pre-crisis operation required focus on capacity
- Balancing of capacity and efficiency aspects challenging
- Little room for improvement trials and new balancing concepts

Crisis Operation

- Low traffic volumes generate an environment to facilitate long thought concepts
- Efficient trajectories are always in the focus of airlines and can now be brought to life

Lufthansa

The evolution from a „Low-Demand-Season-Concept“ towards an „Efficient-Flight-Profile-Concept“

Collaboration – the imperative pre-condition

- DFS and Lufthansa (DLH) cultivated a long-history cooperation
- The cultural atmosphere is the foundation to drive airspace use concepts successfully

Crisis

- Understand it as a chance
- Simplify the vision
- Create the most efficient trajectory
- Monitor the success

The „Two-Dimensional“ Approach

- (a) Define the most optimum lateral trajectory
- (b) Create best profile on given trajectory

The optimum vertical profile requires a defined lateral trajectory

Both affect long lived air traffic management concepts and structures

Lufthansa

STEP 1 - „Efficient-Flight-Profile-Concept“
Analysis and Definition

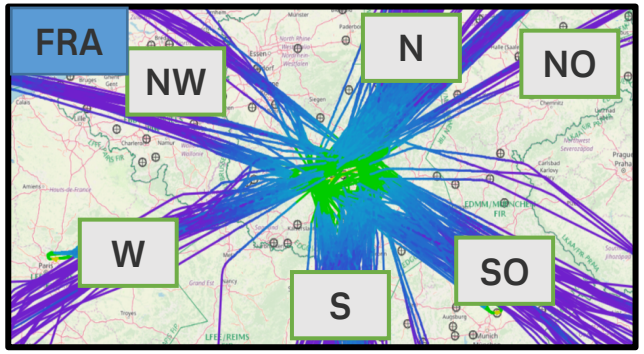
- Concentration on hubs
- Identify traffic streams
- Develop the flow management concept

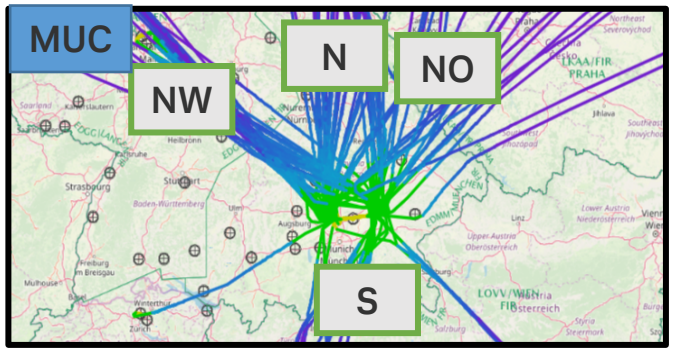
Departures

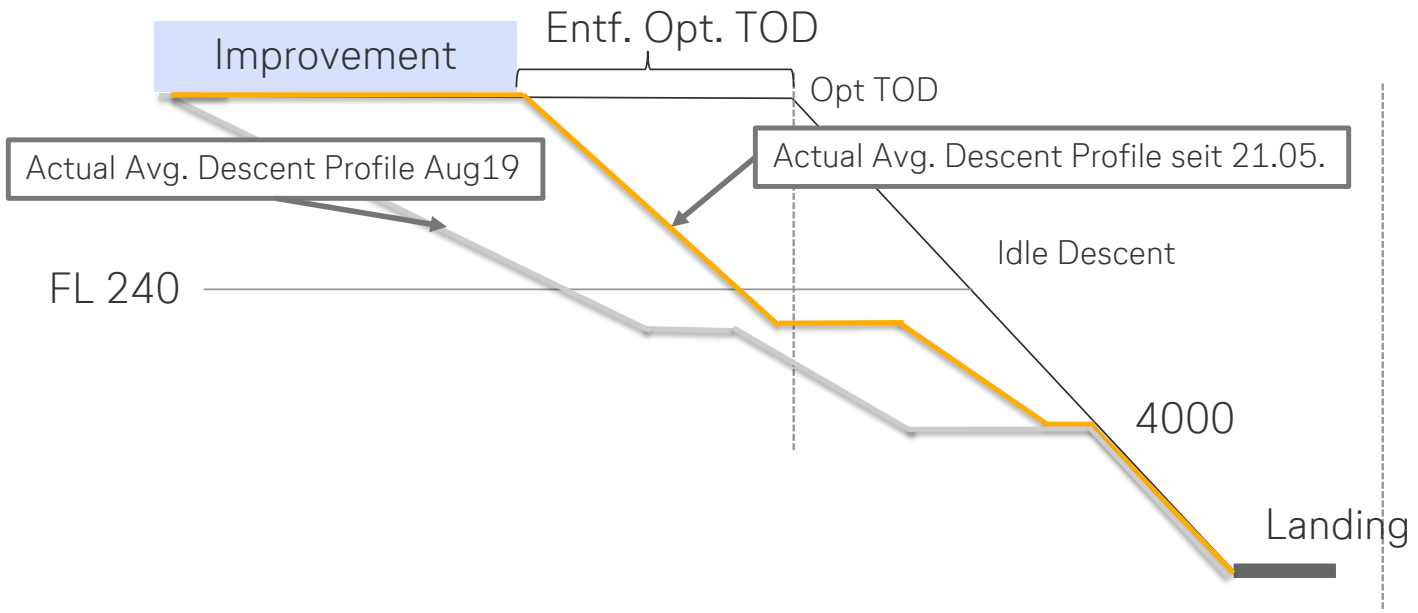
- Passing 6000ft DCT EXIT Point German Airspace

Arrivals

- Entering German Airspace DCT Metering Fix
- REPORT/REQUEST optimum ToD







Lufthansa

STEP 2 - „Efficient-Flight-Profile-Concept“ Implementation

Implementation is a x-stakeholder change management task

Flight Deck

- Be aware of the concept
- A more proactive culture required
- Request the concept
- Accept non-optimal trajectories whenever necessary

Radar Screen

- Be aware of the concept
- Intensified coordination with adjacent sectors
- Understand optimization task as a stream-oriented task not limited to own sector

DFS Deutsche Flugsicherung

Lufthansa

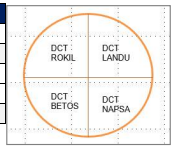
Anhang:

A) Zielpunkte und Zielhöhen des Konzepts für Frankfurt:

Ex	EDDF RWY07	Expected FL	EDDF RWY25	Expected FL
Maastricht UAC	DCT **DF652**	4000FT	DCT **DF411**	FL 70
	DCT **COL**	FL 200	DCT **MTR**	FL 100
	DCT **KERAX**	FL 80	DCT **KERAX**	FL 110
Rhein UAC	DCT **DF635**	FL 100	DCT **SPESA**	FL 100
Munich ACC	DCT **KERAX**	FL 130	DCT **KERAX**	FL 110
	DCT **DF635**	FL 100	DCT **DF623**	4000FT
			DCT **SPESA**	FL 110

B) Zielpunkte des Konzepts für München:

Ex	EDDM
Karlsruhe UAC	DCT **ROKIL** oder **LANDU**
Langen ACC	DCT **ROKIL**
Zurich ACC	DCT **BETOS**
Praha ACC	DCT **LANDU**
Vienna ACC	DCT **NAPSA**



Nach Übergabe zu MUC Approach gibt es dann eine weitere Clearance, die lateral den kürzest möglichen Weg zu einem ca 12 NM Final abbildet.

LUFTHANSA 2/2

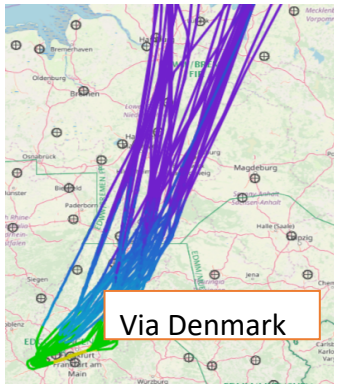
Intern

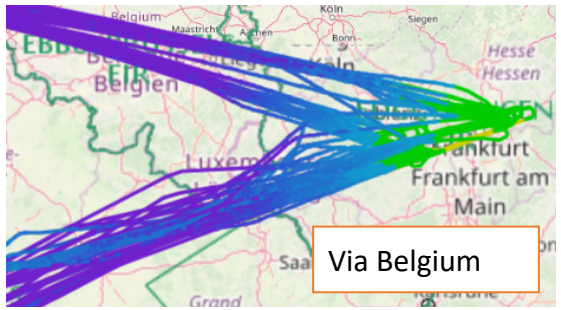
Lufthansa

STEP 3 - „Efficient-Flight-Profile-Concept“ Monitoring Success (I)

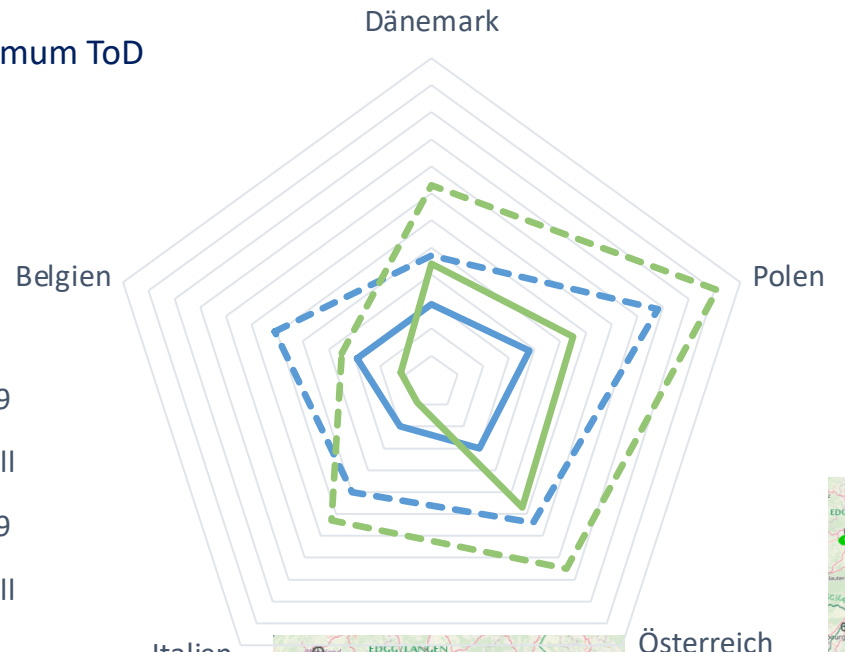
		Denmark	Poland	Austria	Italy	Belgium
RW25 AUG19	NM	47	88	64	50	61
RW25 JUN20	NM	29	38	30	20	29
RW07 AUG19	NM	73	111	85	63	35
RW07 JUN20	NM	44	55	57	9	12

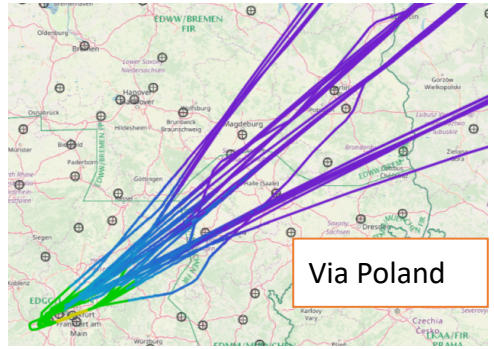
JUN20: Savings due improved ToD 5.900kg fuel per day in EDDF

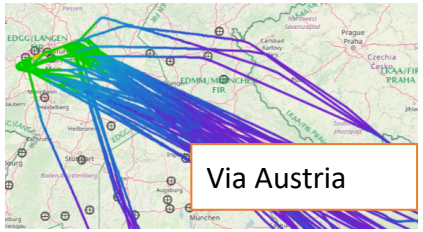


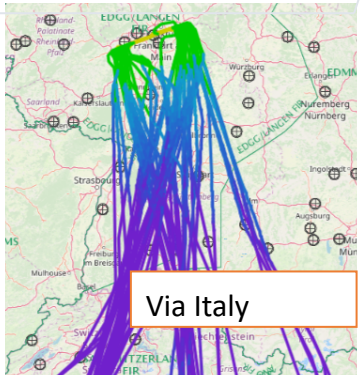


Distance to optimum ToD







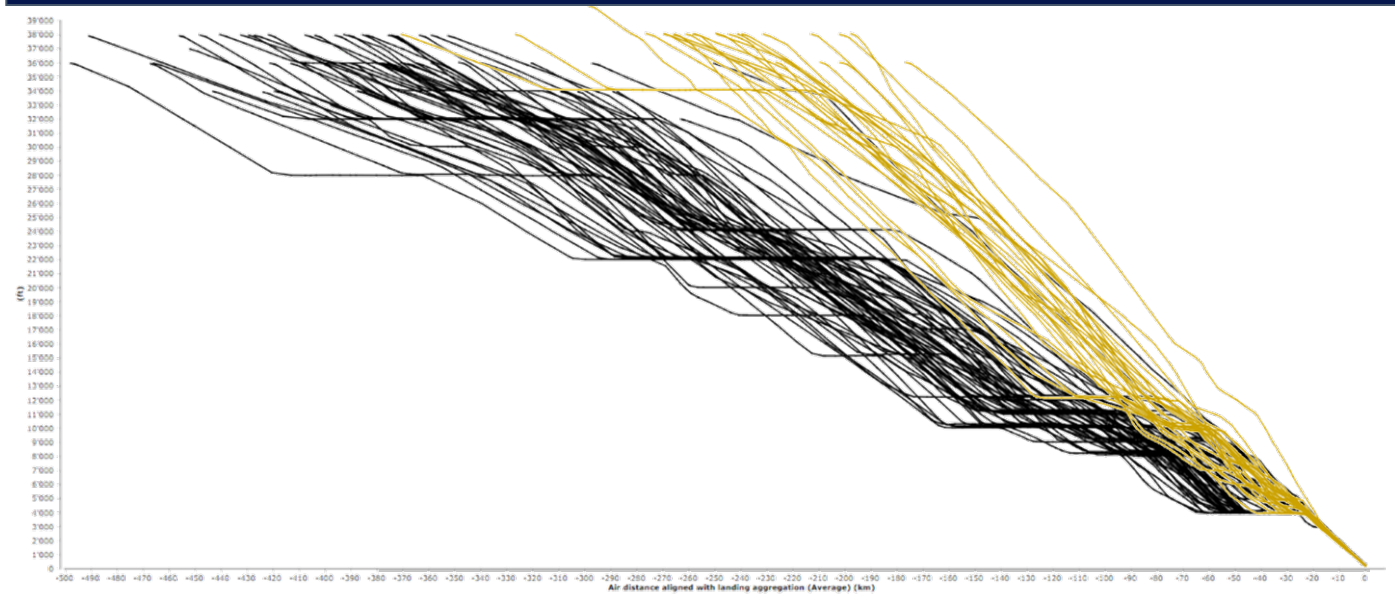


Lufthansa

STEP 3 - „Efficient-Flight-Profile-Concept“
Monitoring Success (II)

Top of Descend could be shifted by average 30NM towards Optimum for MUC and FRA

Example Profiles: Arrivals FRA ex Italy

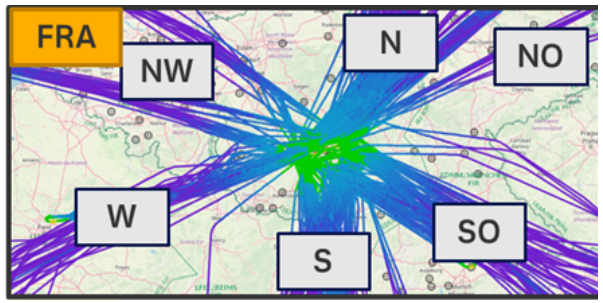


FRA	RW25	RW07
ToD Improvement [NM]	29	32
Fuel saving by vertical optimization short range [kg]	47	52
Fuel saving by vertical optimization long range [kg]	164	181
MUC	**RW 26**	**RW 08**
ToD Improvement [NM]	29	34
Fuel saving by vertical optimization short range [kg]	47	55
Fuel saving by vertical optimization long range [kg]	164	192

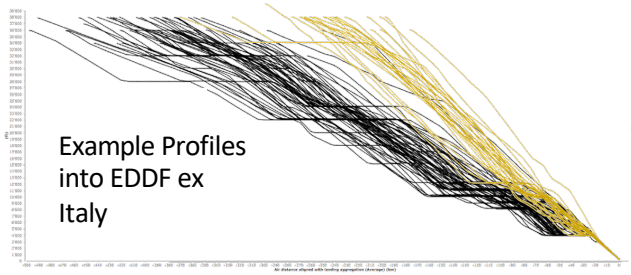
Lufthansa

STEP 3 - „Efficient-Flight-Profile-Concept“
Monitoring Success (III)

Three levers control the success / Challenge to migrate the concept into medium traffic volume scenarios



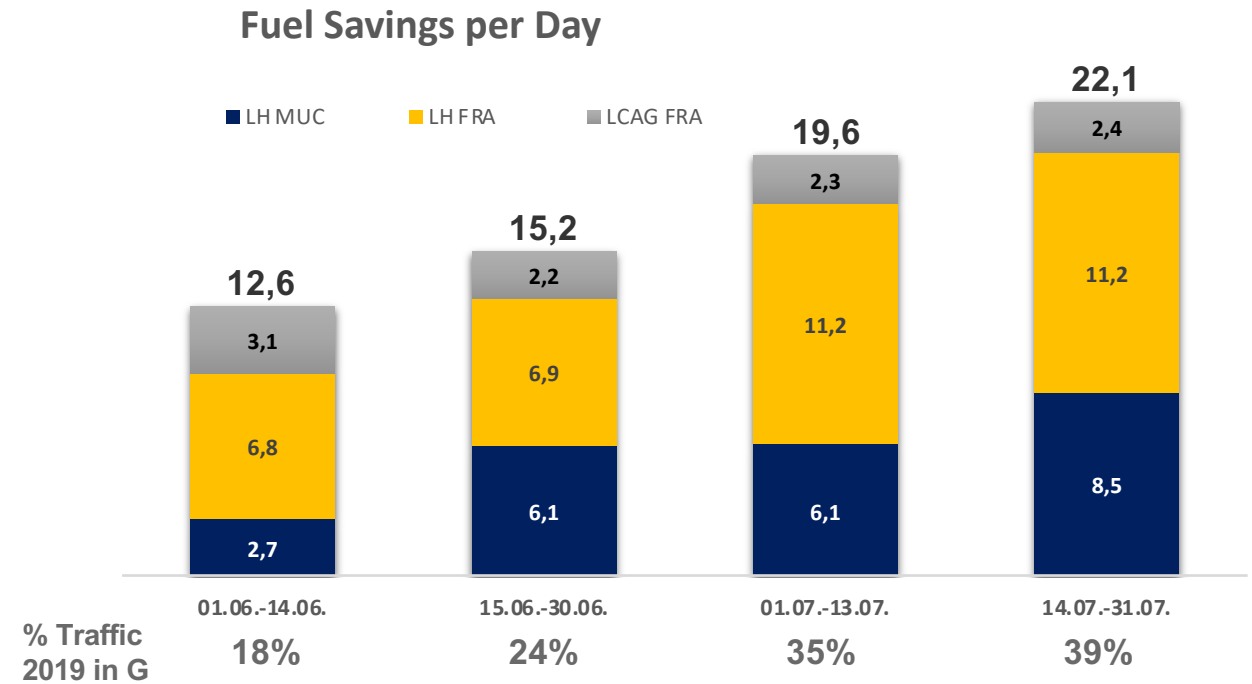
1 **Shortening flight tracks (lateral, tactical)**



2 **Optimization Vertical profile (vertical, tactical)**

More efficient planning since 21st of May 2020
1. Shorter Routes
2. Higher flight levels
3. Transition into MUC shortened by apprx. 30NM

3 **Adapted and Improved flight planning**



Except peak situations the concept is proven to be applicable up to a traffic volume of 40% pre-crisis level

Lufthansa

Thank you very much....

Q & A

Is VFE a focus for you?

- Yes! Apprx. 60% of the efficient flight profile savings concept are generated by optimization of the ToD

How do you measure VFE?

- Lufthansa is using a combination of software applications. FDM analytics, Honeywell GDFE tool (OMEGA), Honeywell GDFE tool at DFS (working group Optimized Flying analytics tool)

How important is VFE compared to HFE, delays and cost?

- VFE requires a defined trajectory and therefore interacts with HFE
- Improved VFE is primarily not a cost issue – it saves fuel cost
- VFE/HFE efforts need to be balanced with capacity demand

What are the main issues/ interdependencies concerning VFE?

- Airspace structure and sectorization effect VFE
- Non revised LoA's between sectors might lead to deficiencies
- RAD restrictions can contribute to capacity but influence VFE