



# GreAT Project

## Greener Air Traffic Operations



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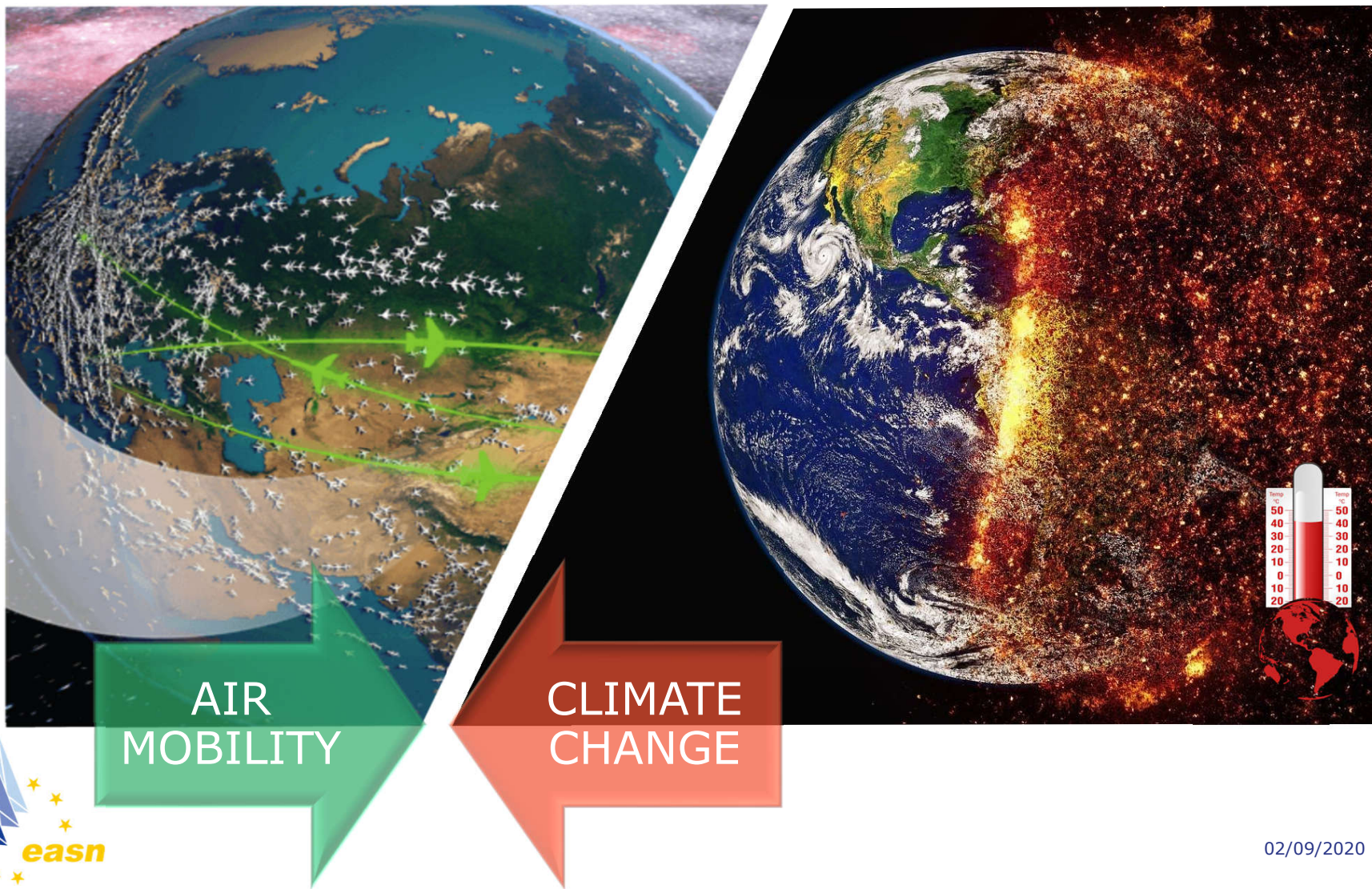
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# MOTIVATION & CHALLENGES



# CONTEXT – Climate change vs. Air mobility



# MOTIVATION – Climate Change Mitigation



## Mitigate the causes

- Use more efficient aircraft
- Use alternative fuels / propulsion
- Use more efficient flight maneuvers along optimized trajectories

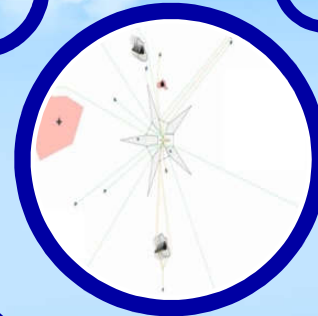
## Mitigate the consequences

- Actively remove CO<sub>2</sub> (and other gases) again from the atmosphere
- Influence thermal balance of the earth



# CHALLENGES

Investigation of new possibilities to **reduce gas emissions** of flight trajectories at local and global level



New concept to manage air traffic in a ,greener` way, e.g. by using Trajectory Based Operations (**TBO**) and **adapted airspace design**



Determination of the potential to save gas emissions with **greener trajectories**

# PROJECT OVERVIEW



# GREAT PROJECT - In Brief



**GREAT**  
GREENER AIR TRAFFIC OPERATIONS

The European-Chinese Research and Innovation project **GreAT** aims to **reduce aviation's impact on climate change across continents.**



STARTING DATE  
1<sup>ST</sup> JANUARY  
2020



DURATION  
42 MONTHS



TOTAL BUDGET  
6 992 163



GRANT  
AGREEMENT  
n°875154



**DLR**



**CIRA**



**UNIVERSIDAD POLITECNICA MADRID**



**eNRIIE**



**NUAA**



**AVIC**



**CAUC**

**HungaroControl**



**ANSPs**



**PildoLabs**

move smart



**CEIC**

Industrials

**Research partners**



**KLM**

Airline



**UP**

Consultancy Company

GREAT CONSORTIUM



# GREAT PROJECT - Clustering

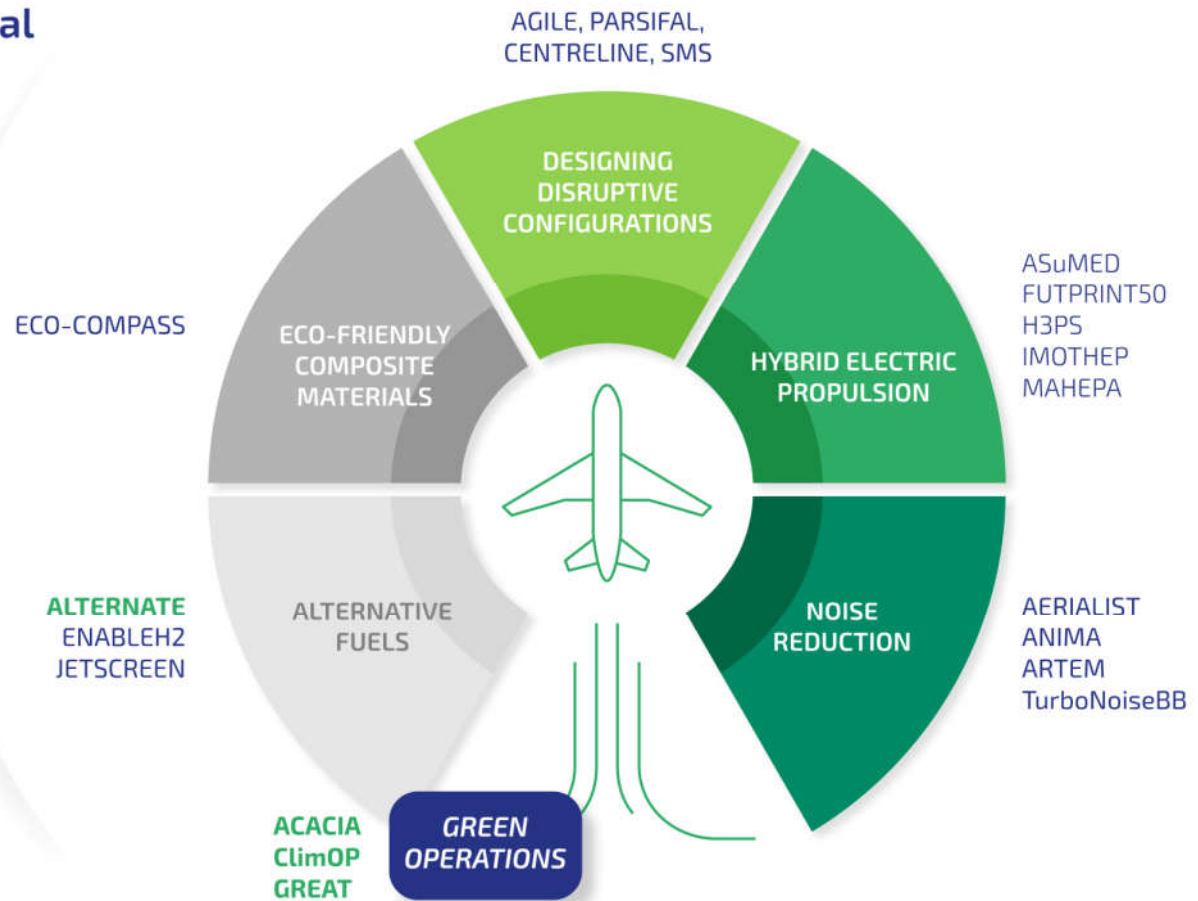
## Towards Climate-Neutral Aviation

### FlighPath 2050 goals

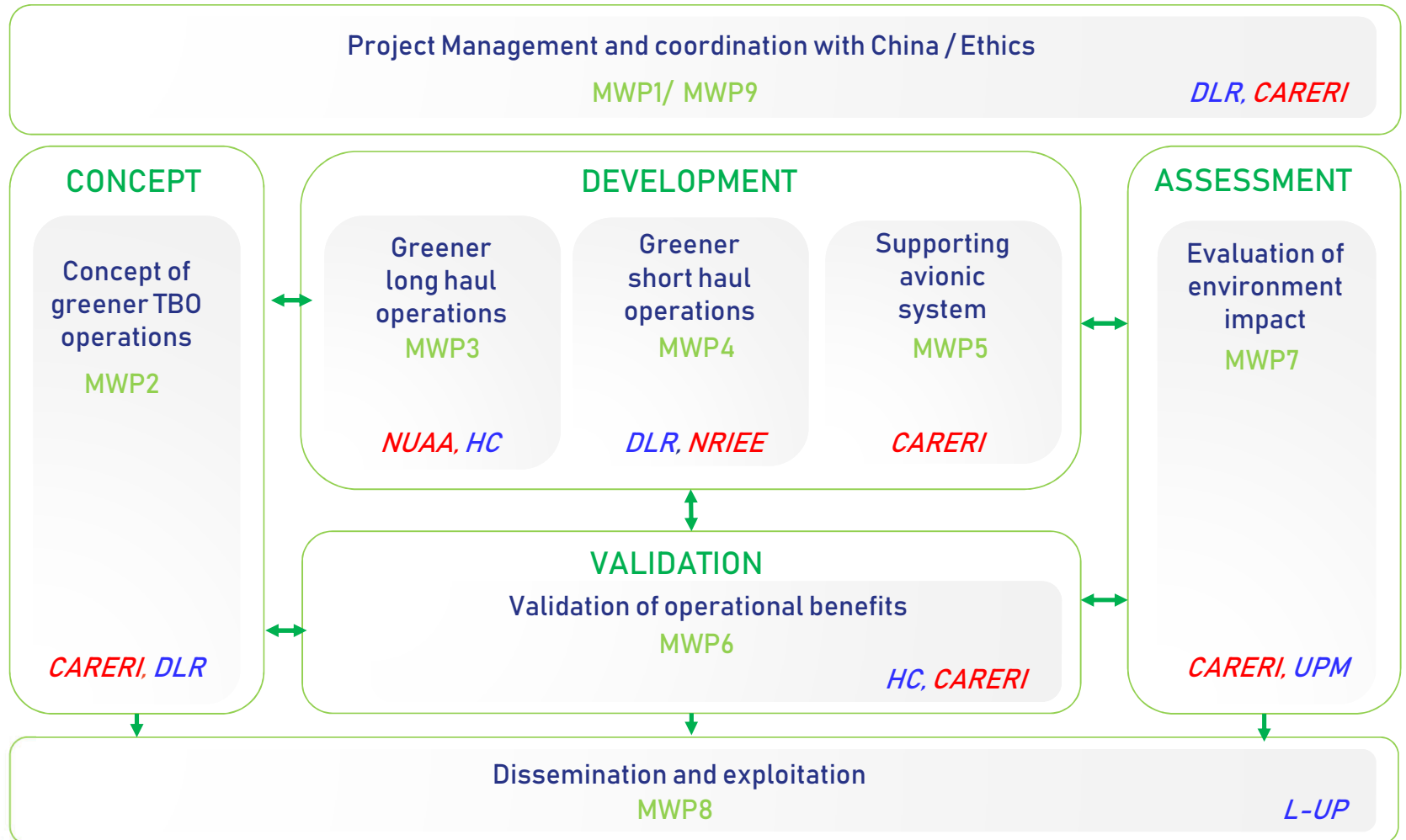
**- 75%**  
reduction in CO<sub>2</sub>

**- 90%**  
reduction in NO<sub>x</sub>

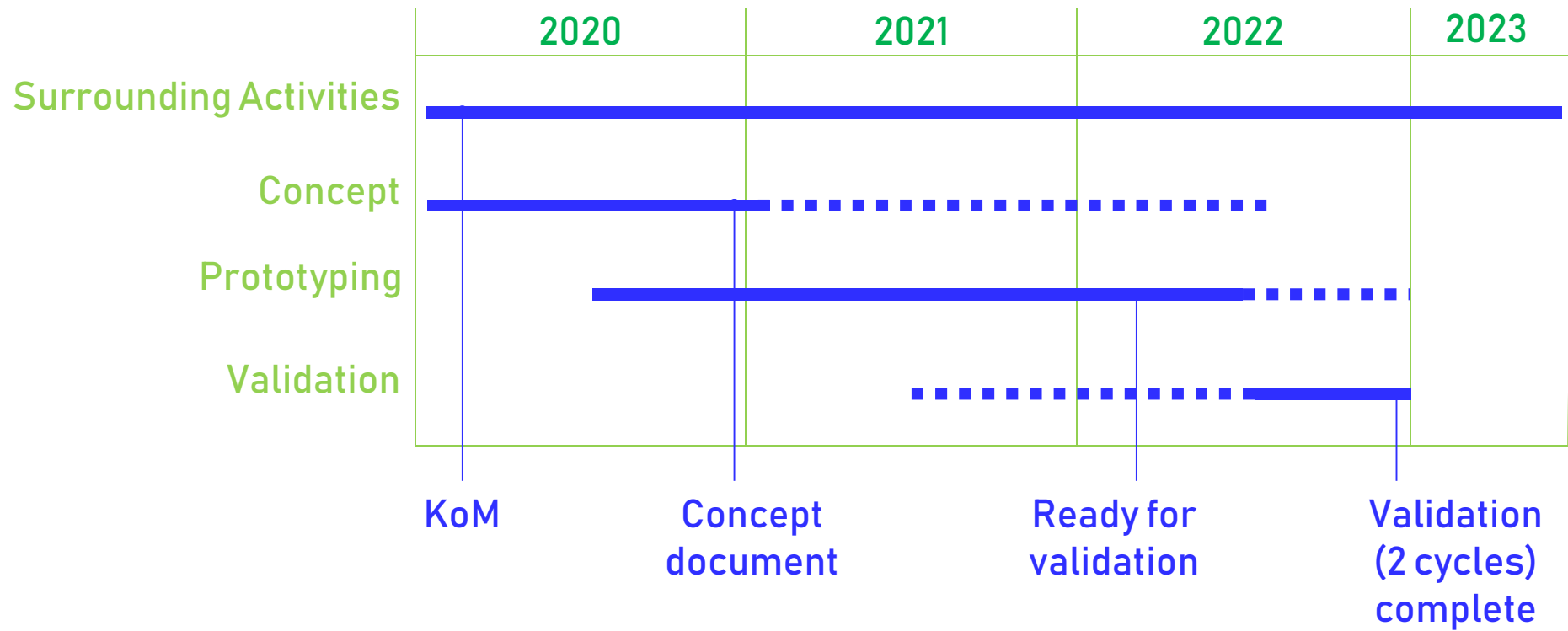
**- 65%**  
perceived noise



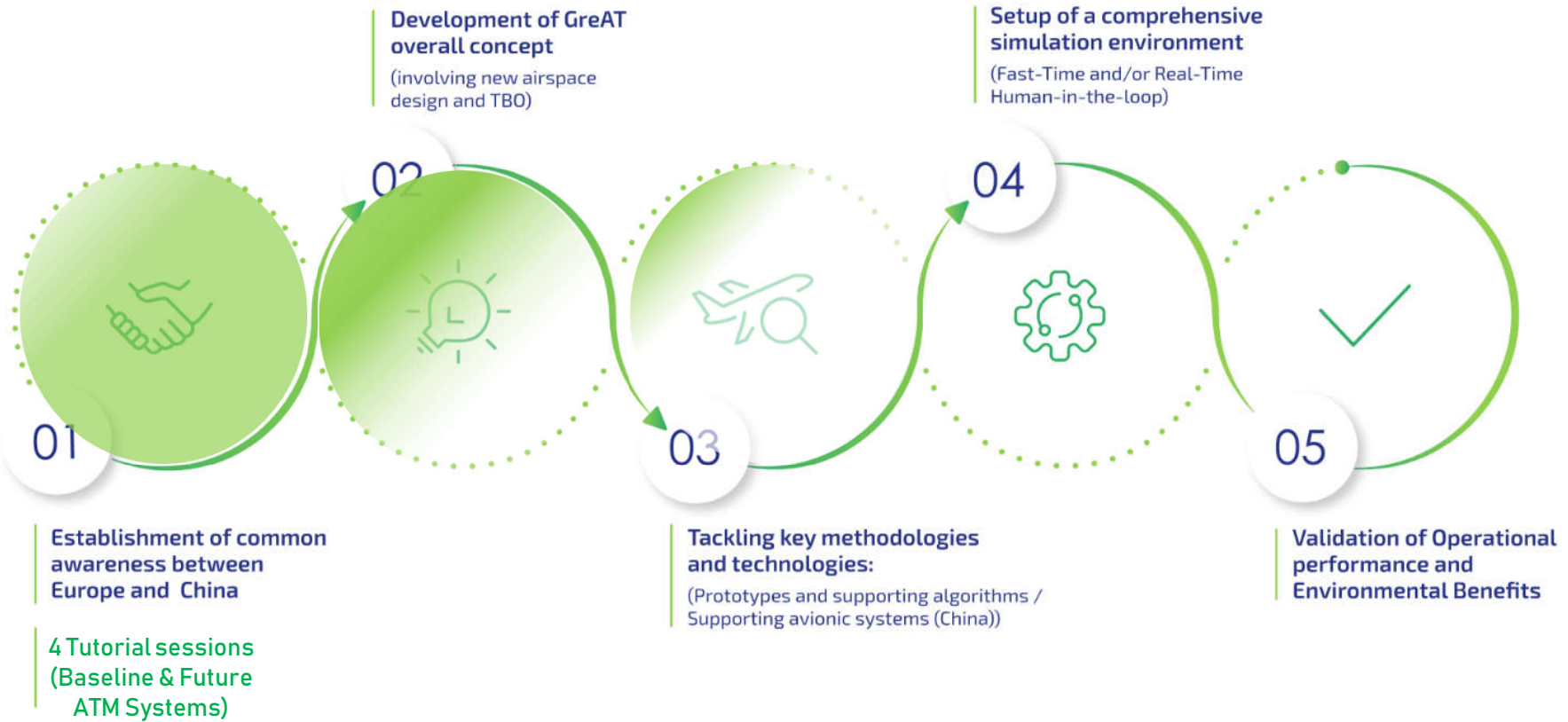
# GREAT PROJECT - Main Work Packages



# GREAT PROJECT - Roadmap



# GREAT PROJECT - Progress



# EXAMPLES OF CONCEPT ELEMENTS



# GREAT PROJECT- Examples of concept elements (1/2)

## Impact on short haul operations

### ✈️ Ground Side

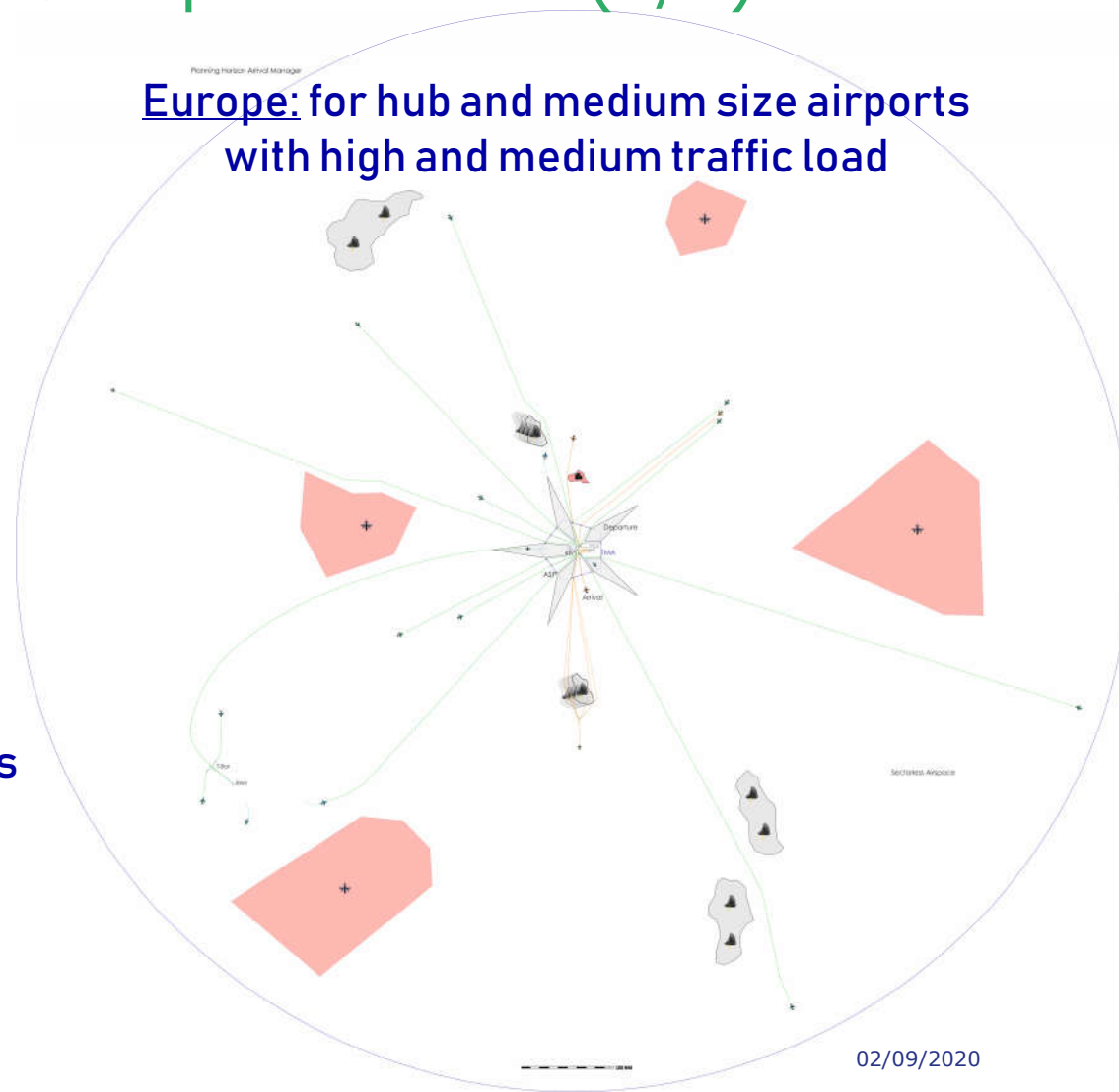
- ✈️ Reduced waiting times with engine running
- ✈️ Continuous steady taxiing
- ✈️ Optimized taxiing support for ATCO

### ✈️ Air Side

- ✈️ Avoid holdings
- ✈️ Use always Continuous Descent Operation
- ✈️ Use always Continuous Climb Operation
- ✈️ Shortening route through direct approaches
- ✈️ Take disturbances into account
- ✈️ Use Early Full Clearance Approach (EFCA)



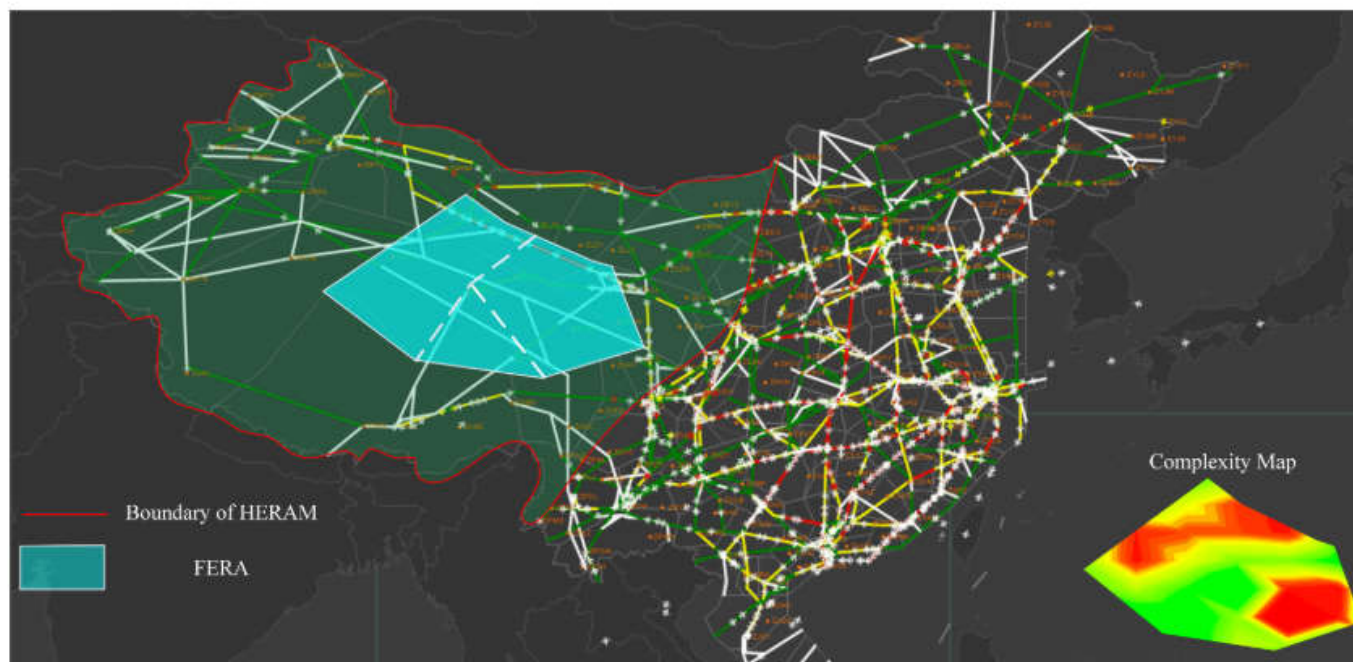
Planning Horizon: Arrival Manager  
**Europe: for hub and medium size airports with high and medium traffic load**



02/09/2020

# GREAT PROJECT- Examples of concept elements (2/2)

## Impact on long haul operations



HERAM: Heterogeneous Route Airspace Management  
FERA: Free En Route Airspace

### ✈️ New Airspace Structures

- ✈️ Shortening of flight routes for long haul flights coming from Europe
- ✈️ Definition of HERAM concept based on the « structured » and « flexible » airspaces

### ✈️ Integrated Air-Ground Data

- ✈️ Mastering the uncertainty of environmental data (e.g. high-altitude wind information)
- ✈️ Supporting trajectory optimization by enhancing the air-ground cooperative operation

# Contact points

## Zenodo

<https://zenodo.org/communities/great/about/>

## LinkedIn

<https://www.linkedin.com/company/great-h2020>

## Project Website

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# Thank you for listening!



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