



Introduction to GreAT project



GreAT Final Event, 24/05/2023

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875154

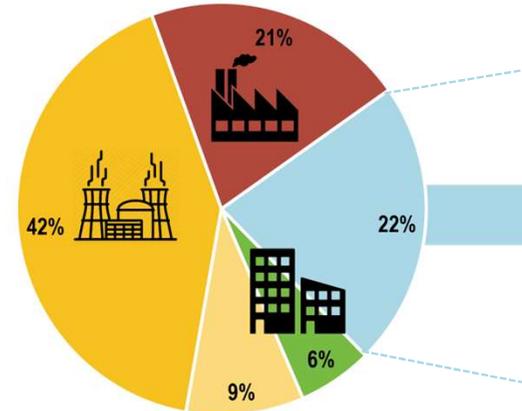
CONTEXT – Climate change vs. Air mobility



Aviation is one of the pillars of modern economy

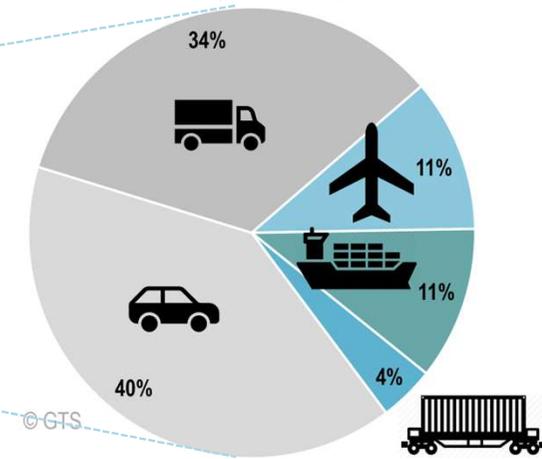
2-4% (2.42%) of all emissions from fossil fuel combustion

CO2 Emissions by Economic Sector



- Electricity and heat production
- Transport
- Other
- Manufacturing and construction
- Residential

CO2 Emissions by the Transport Sector



- Automobiles
- Trucks
- Aviation
- Marine
- Railways

Source: transportgeography.org

MOTIVATION – What can aviation do to counteract the climate change without reducing air mobility?



“Avoid” - Strategy

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

“Compensate” - Strategy

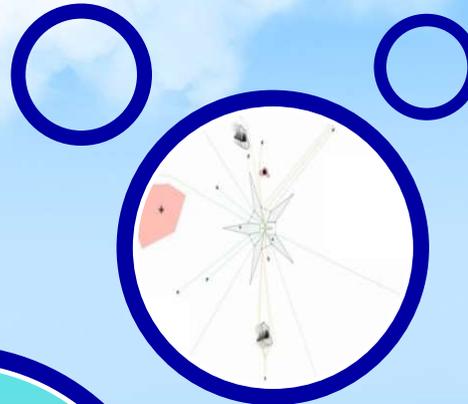
- Actively remove CO₂ (and other gases) again from the atmosphere
- Influence thermal balance of the earth (Use of Cooling Effects)



Greener ATM

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**

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
1ST JANUARY
2020



DURATION
42 MONTHS



TOTAL BUDGET
6 992 163



GRANT AGREEMENT
n°875154



Research partners

GREAT EU CONSORTIUM



ANSPs



Industrials



Airline



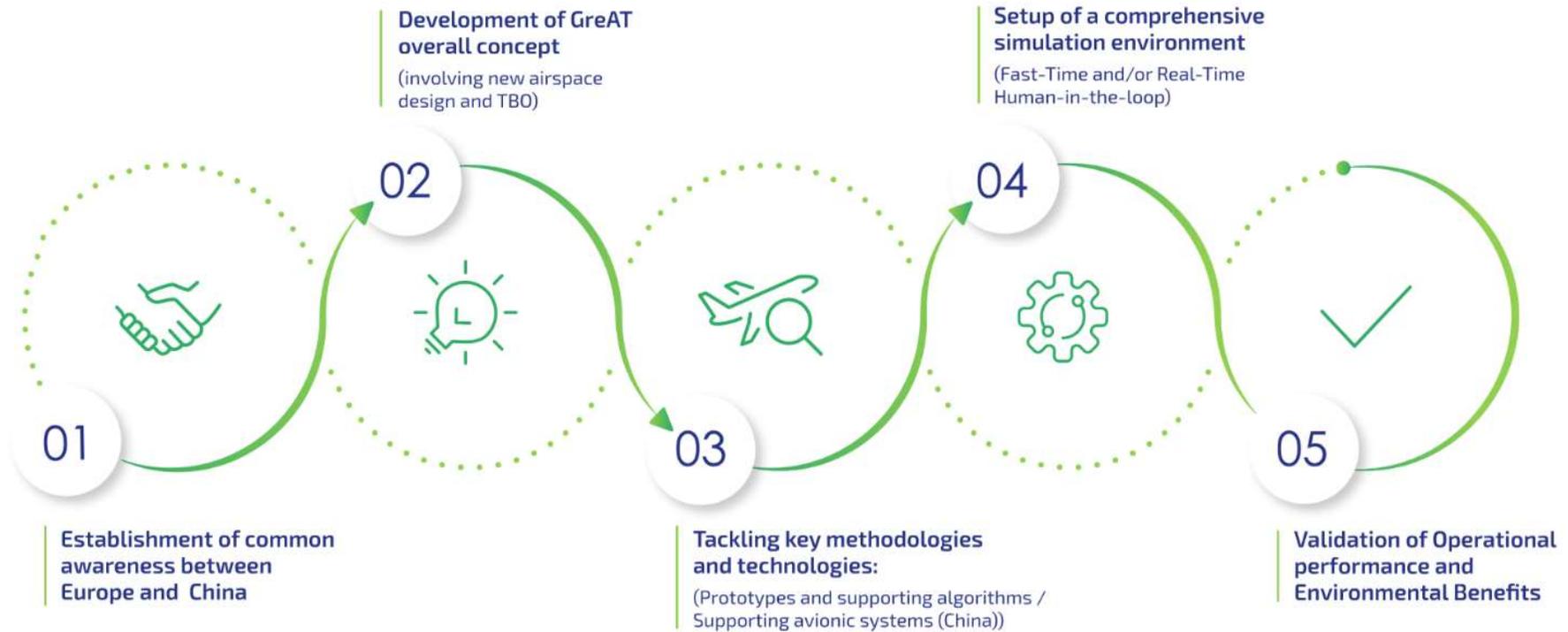
Consultancy Company

COORDINATION WITH A COMPARABLE CHINESE CONSORTIUM

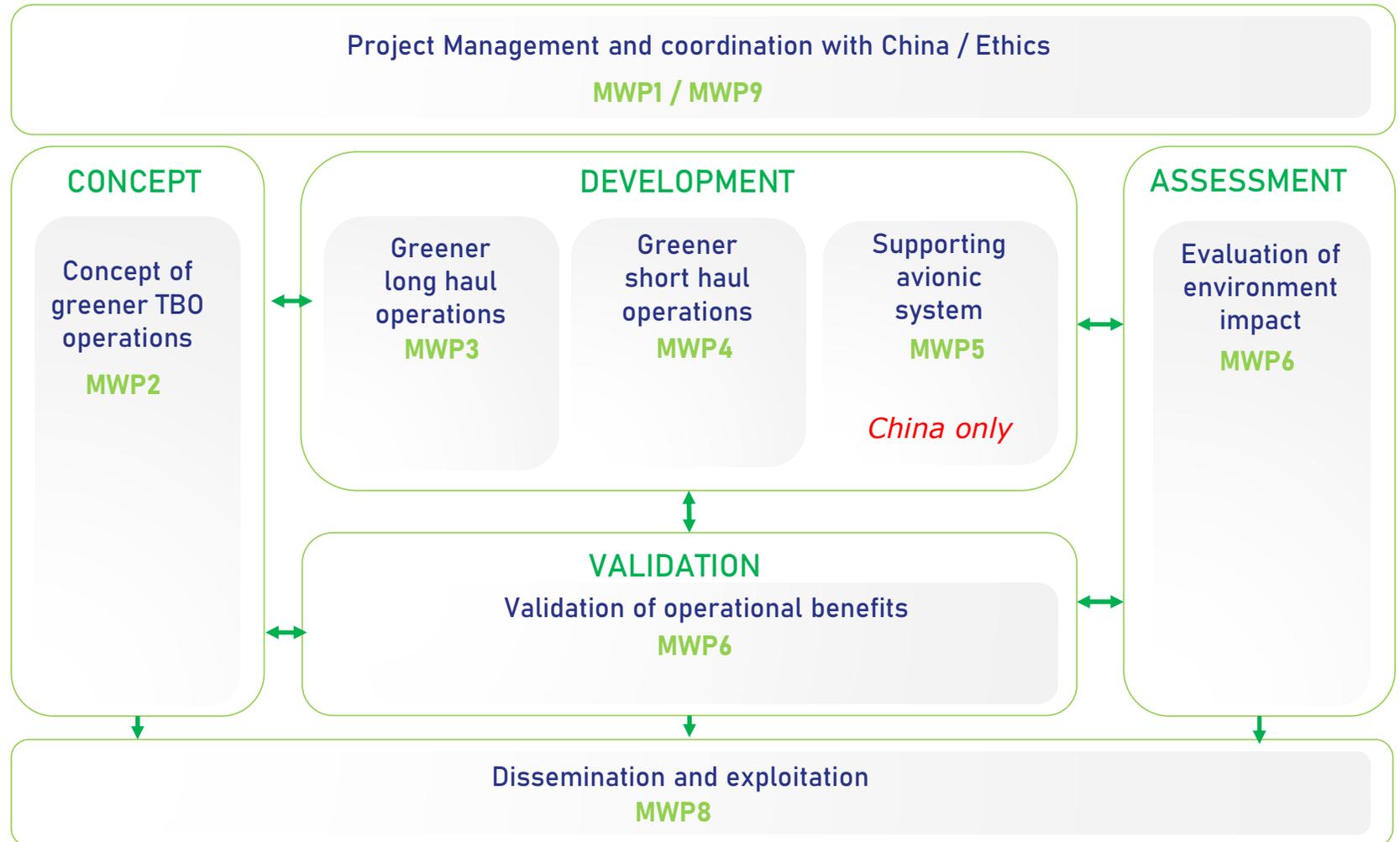
COOPERATION WITH
„SISTER PROJECTS“



GREAT PROJECT - Steps



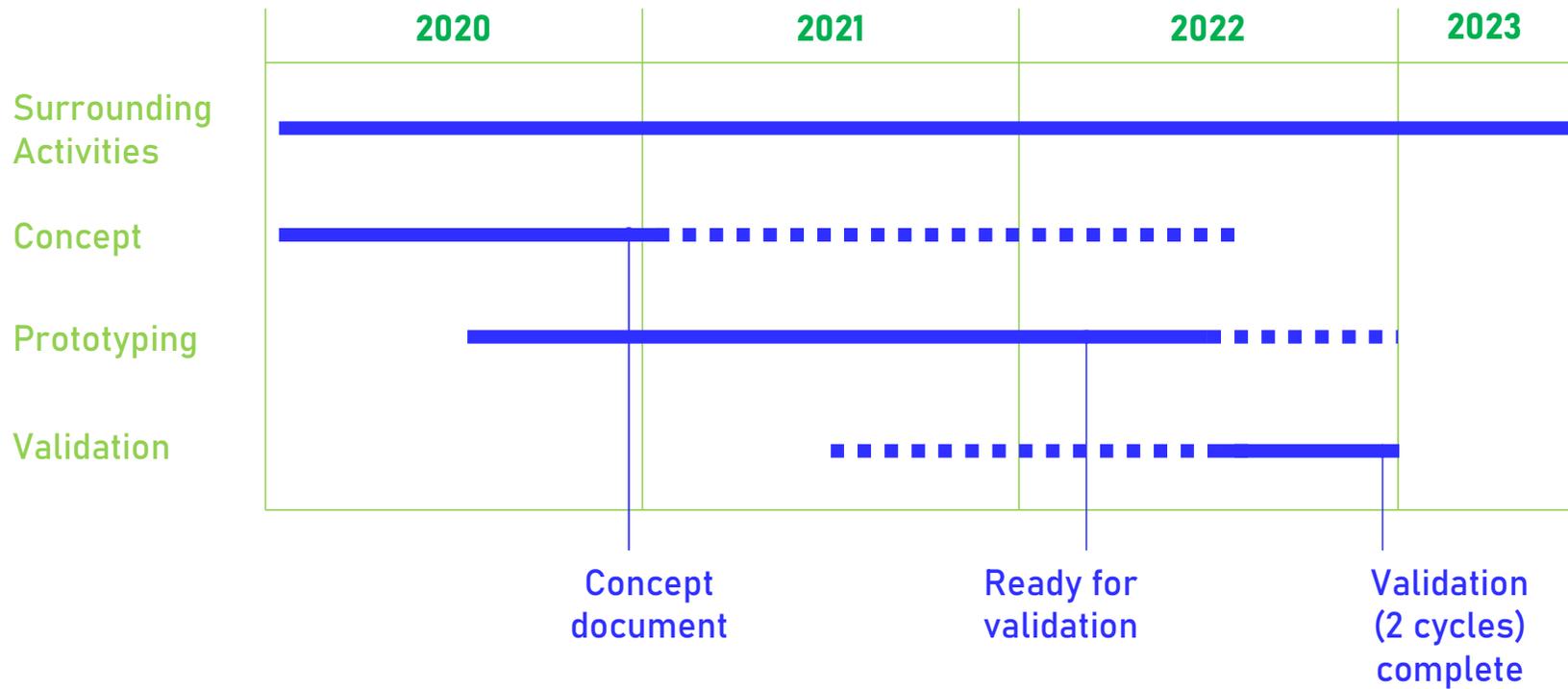
GREAT PROJECT - Main Work Packages



ACTIVITIES- Roles of partners

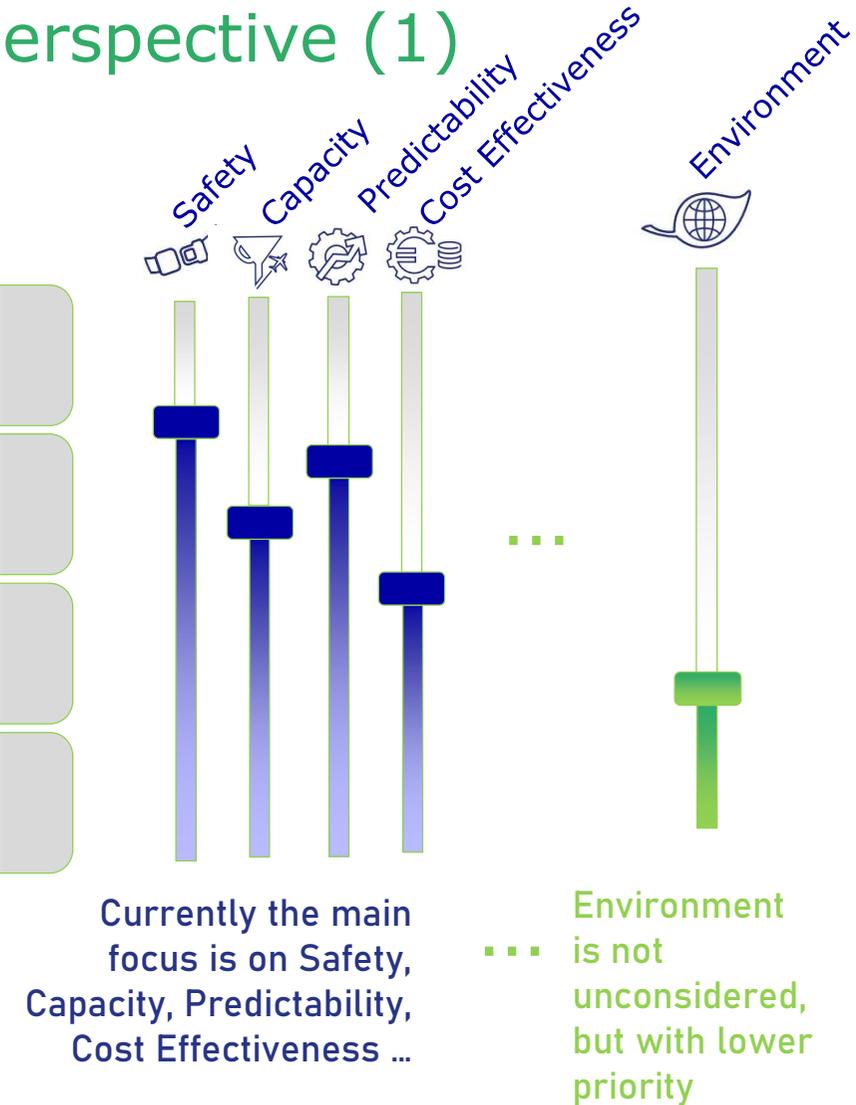
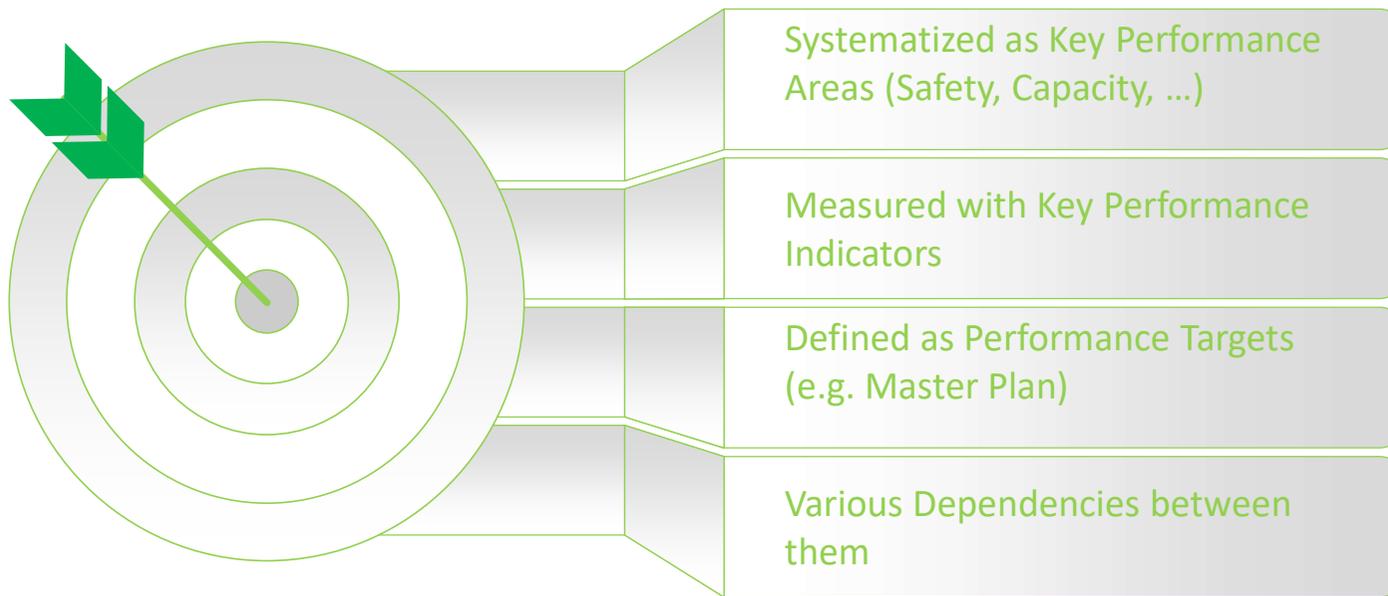


GREAT PROJECT - Roadmap



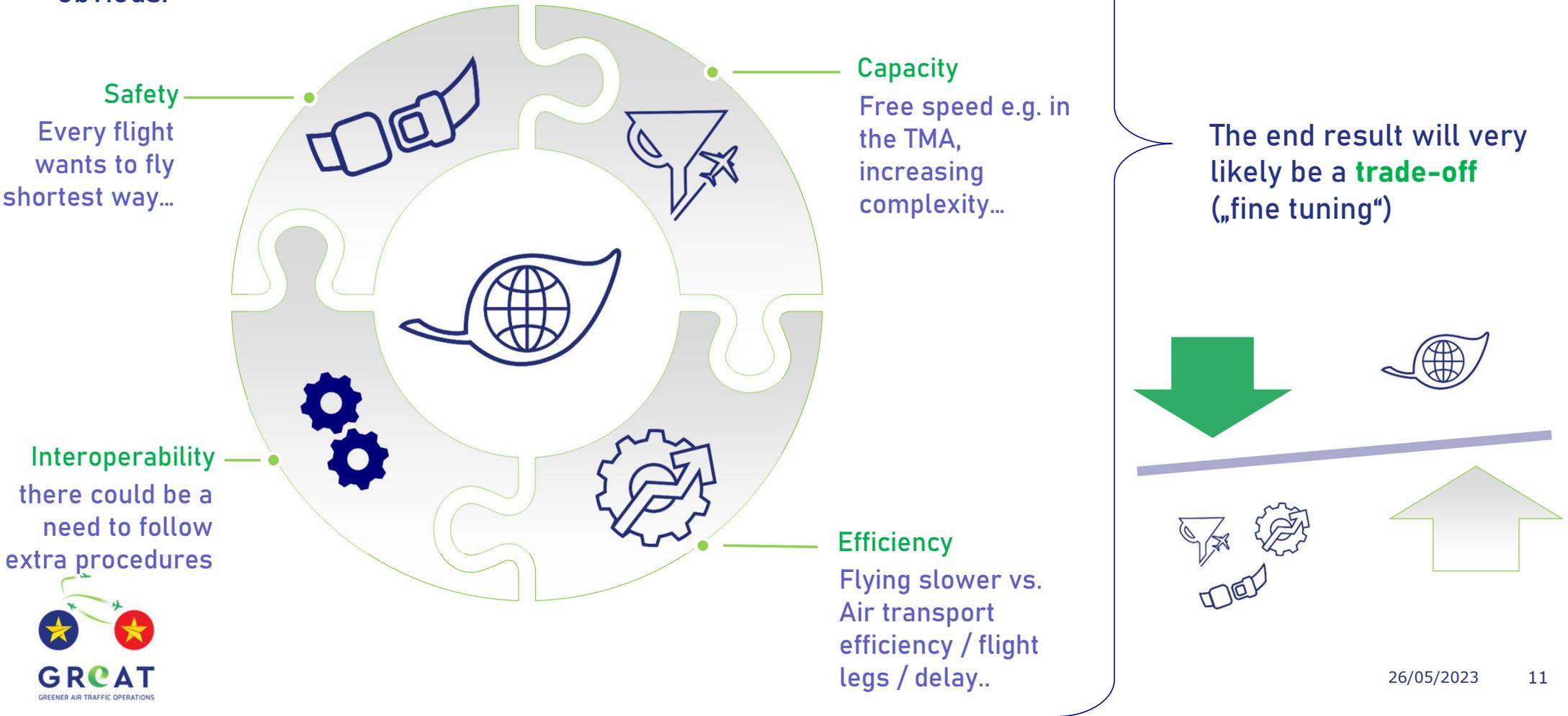
Greener ATM ... From the Performance perspective (1)

ATM has to fulfil several performance expectations / requirements



Greener ATM ... From the Performance perspective (2)

→ Also for KPA Environment, several dependencies are very likely / obvious:



Approach ... (1)

When applied to all flights it results in a fictional traffic scenario without any de-conflicting, sequencing etc.

= technical minimum for fuel consumption, and consequently, emissions

= Reference

Optimum speed
Optimum level
Optimum route

What is the most fuel efficient flight path from a flight-centric perspective?



Reference

This „reference“ indicates what needs to be changed in detail

Challenge: find measures to enable flying along, or close to, this optimum route with this optimum level / speed (optimum flight profile)

Various very different reasons why airplanes deviate from this optimum flight profile

→ **No „one solution fits all“
No „Big-Bang approach“**

Approach ... (2)

- Greener ATM „toolset“ of individual measures:
 - „Concept elements“ which can be combined to full concepts for the detailed use case
 - Tailored down to local circumstances (to achieve maximum performance)
 - May not fit everywhere ...

Green TMA airspace design (supporting free speed and CDO)

Free Route Airspace

Vertical RNP

Late Merging

Latency-tolerant / Infinitely variable delay absorption

Flexible Use of Airspace

Flexible Instrument Approaches

„Lowest Impact of Deviation“



Project Video

[GReAT Official Video – Updated - YouTube](#)



Thank you for listening!



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