

Approaches to achieving environmental sustainability

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ECAC/EU DIALOGUE, VALENCIA



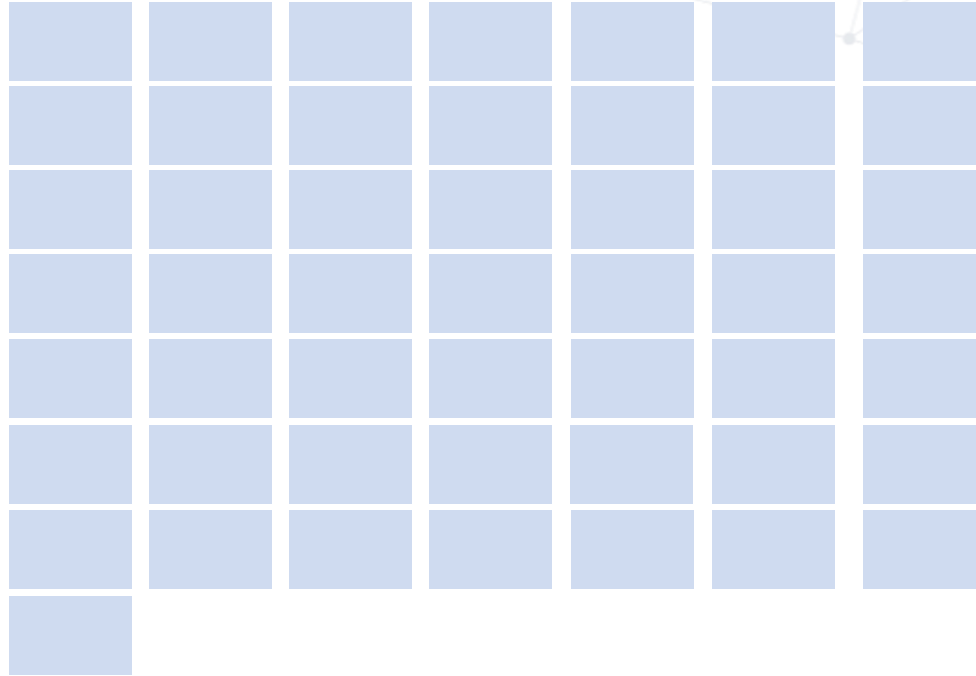
Enav approach to environmental sustainability



Main Pillar:

- Flexible configuration concept to achieve flight efficiency and Free Route
- ATCOs support tools
- Remote Twr control center

Airspace Fragmentation



Flexible Configuration



Sector 1

Sector 2

Sector 3

Sector 4

Sector 5

Sector 6

Sector 7

Sector 8

Many Options



Sector 1

Sector 2

Sector 4

Sector 5

Sector 8

Sector 3

Sector 7

Sector 6

According to traffic demand



Sector 1

Sector 2

Sector 4

Sector 3

Sector 5

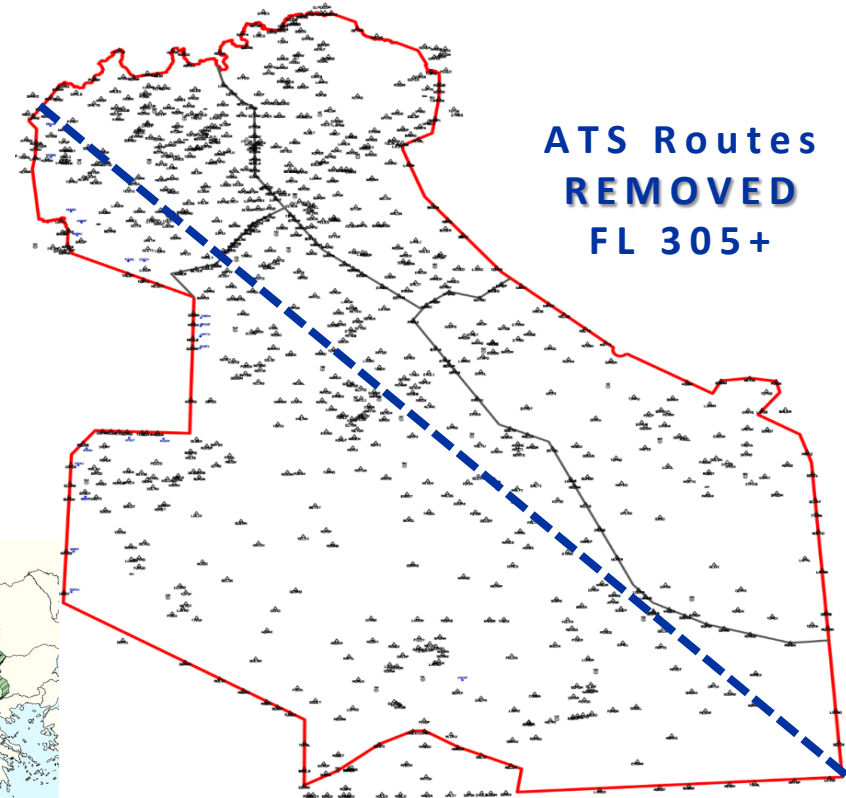
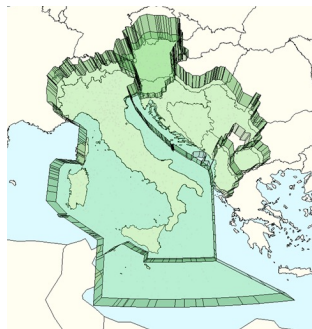
Sector 6

Sector 7

Sector 8

Flexible FREE ROUTE: FRA IT

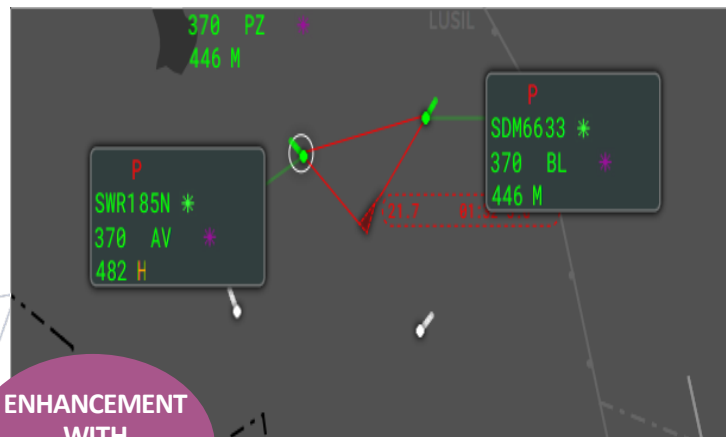
- Airspace Users may plan a direct route between entry and exit points taking into account the availability of restricted areas and the preferred route.
- Available for all airlines that intend to fly a portion of their flights above FL305.
- Next step in March 2024 with:
 - lowering to FL195;
 - Introducing cross border free route




ATCO SUPPORT TOOLS

CONFLICT DETECTION:

AUTOMATED TACTICAL CONFLICT TOOL + CONFLICT RESOLUTION ASSISTANT



ENHANCEMENT
WITH
ADS-C/EPP
DATA



1 RESA 2049 ACA890A			
LVL	SPD	HDG	DCT
FL310 05:39 [+]	M0.73 07:00 [+]	15.0R 07:00 [+]	-

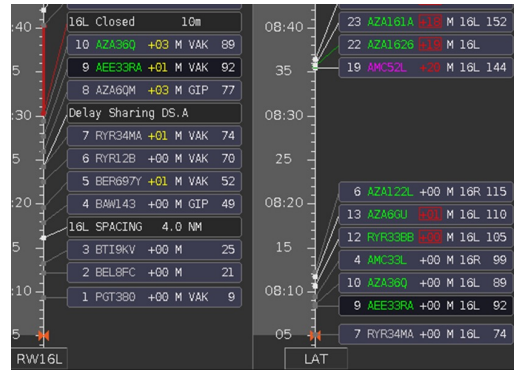


4 RESA 2049 ACA890A			
LVL	SPD	HDG	DCT
FL310 03:19 [-]	-	10.0R 03:11 [+]	-
FL290 03:19			
FL270 03:19			
FL250 03:19			

ATCO SUPPORT TOOLS

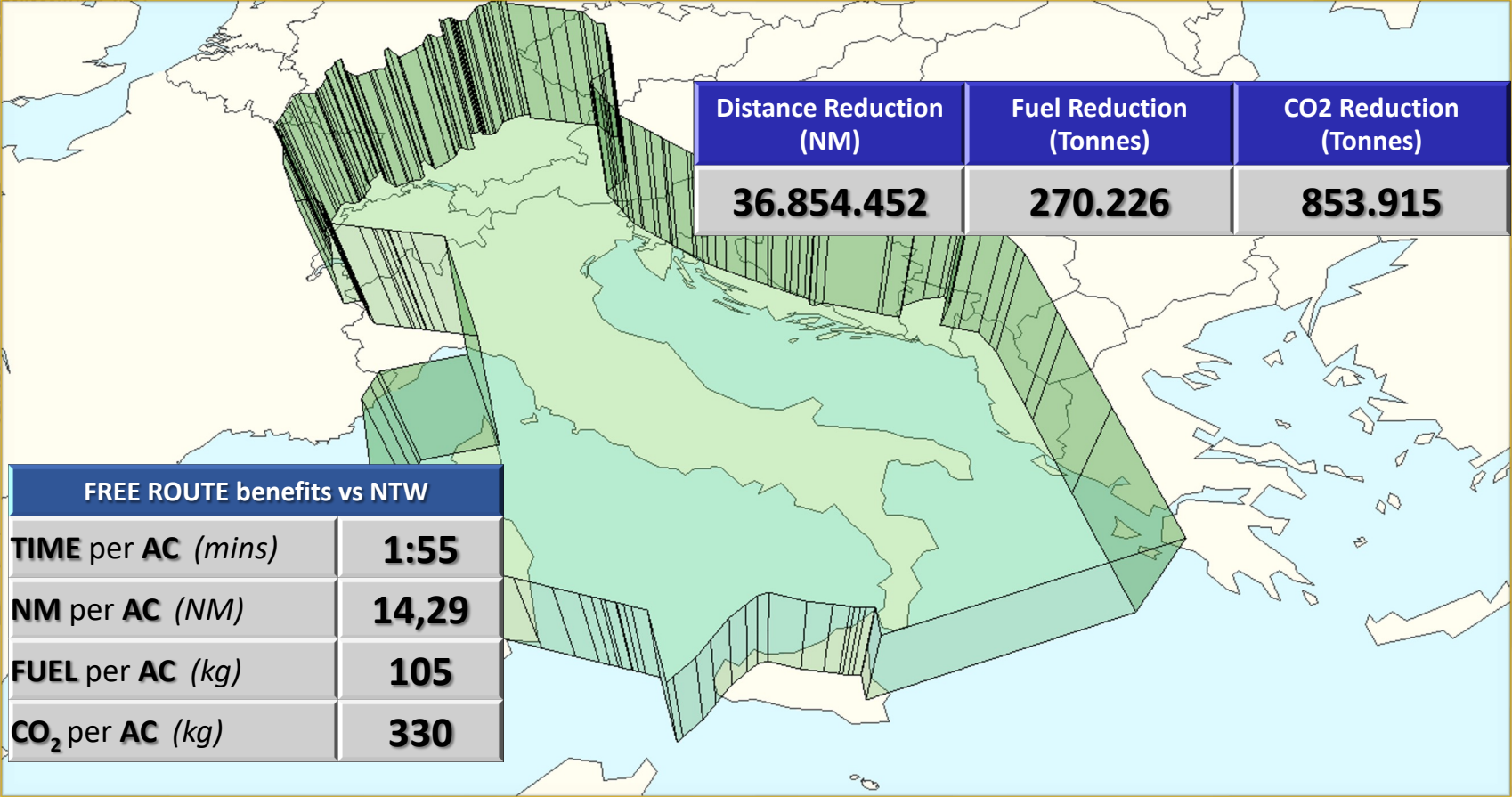
AMAN (Arrival Manager)

AMAN is a decision support tool for efficiently identifying and managing the sequence of flights arriving at one or more airports, reducing the length of trajectories and managing any delay to be assigned to each flight in the most efficient way possible



ENAV: Environmental Benefit Free Route

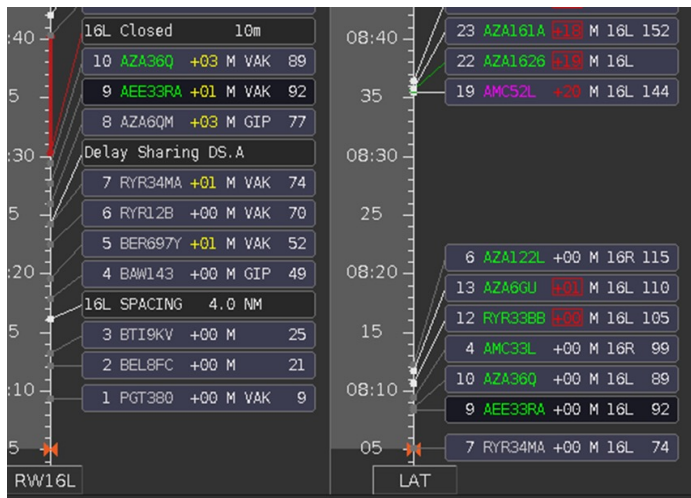
8 December 2016 - 31 december 2022



Distance Reduction (NM)	Fuel Reduction (Tonnes)	CO2 Reduction (Tonnes)
36.854.452	270.226	853.915

FREE ROUTE benefits vs NTW	
TIME per AC (mins)	1:55
NM per AC (NM)	14,29
FUEL per AC (kg)	105
CO ₂ per AC (kg)	330

ENAV: Environmental Benefit AMAN LIRF



AMAN benefit from 1° MAY 30° September

NM	16.929
FUEL reduction(kg)	188.100
CO ₂ minor emission (kg)	592.500

AMAN benefit per A/C

NM	0.99
FUEL reduction(kg)	11.00
CO ₂ minor emission (kg)	35.00

AMAN emission reduction projection 2023

NM	32.955
FUEL reduction(kg)	366.500
CO ₂ minor emission (kg)	1.155.000

A-CDM



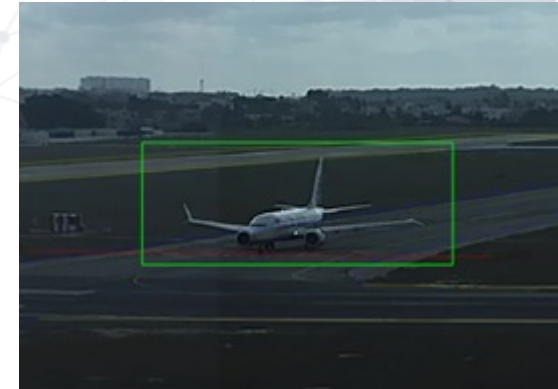
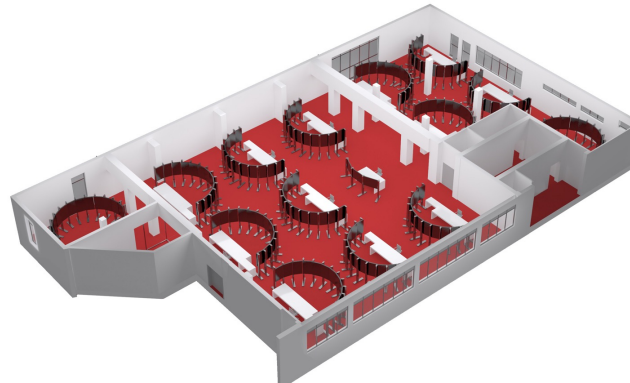
A-CDM is an operational process whose goal is to optimize the turn-around process. Flight Plans and all services related to the management of arriving and departing flights are managed in a single process, with well-defined responsibilities, operational procedures, and progress milestones.

The A-CDM platform enables a continuous flow of information between the Airport, Handlers, Airlines, ANSP and NMOC for both incoming and outgoing flights.



Remote TWR: Machine Learning and Augmented Reality

- Improve capacity and flexibility in airport domain
- Reduction in flight time
- Cost efficiency benefits:
 - Human resources flexibility
- Environmental benefits



- The system allows you to select or search for a target , using machine learning techniques, and follow it with the PTZ camera.





THANKS FOR YOUR ATTENTION