

SESAR 2020 Concept

A Brief View of the “Business Trajectory”

The Presentation

SESAR Concept: Capability Levels

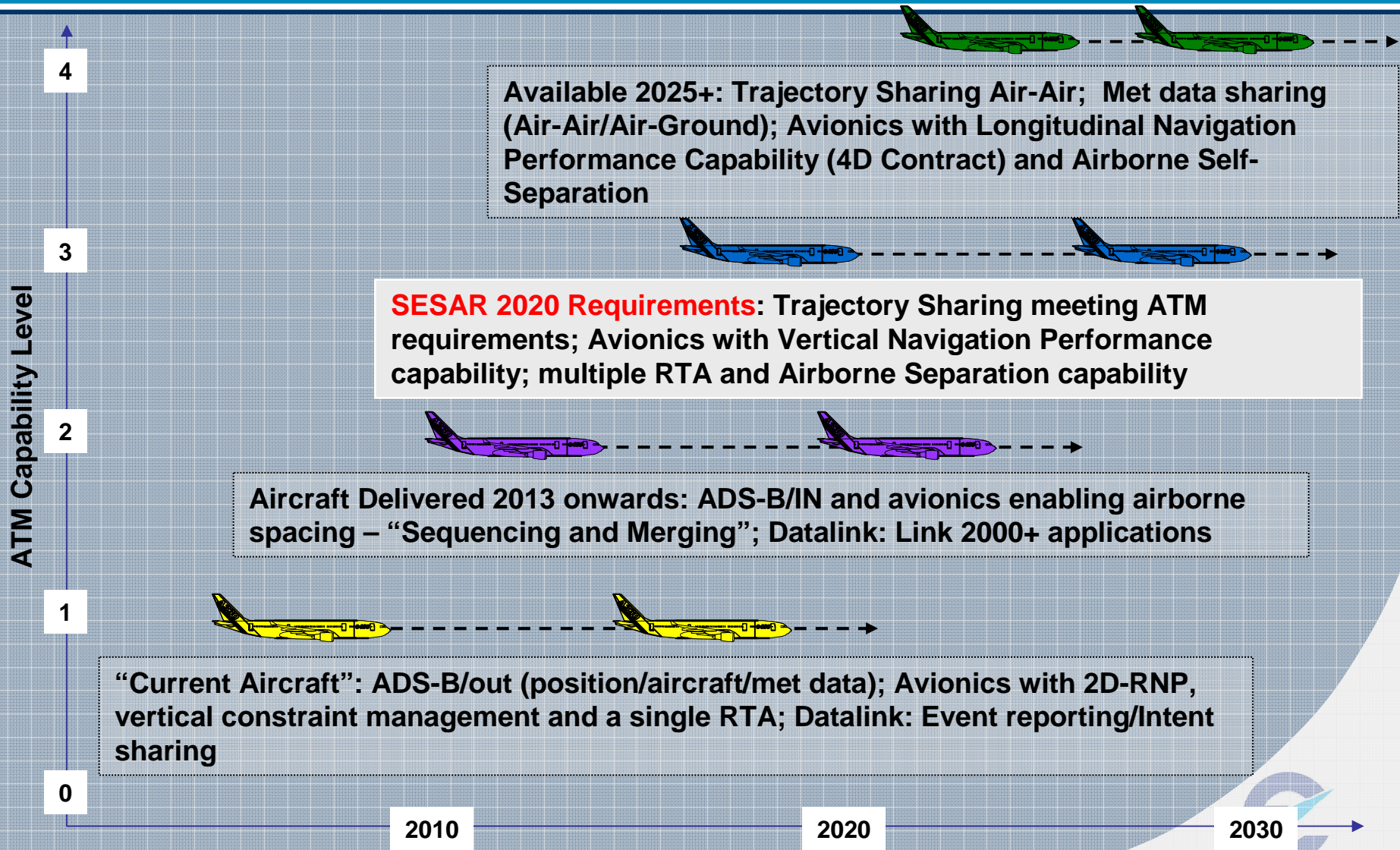
Key Themes: Paradigm change

Business Trajectory

Issues

Conclusion

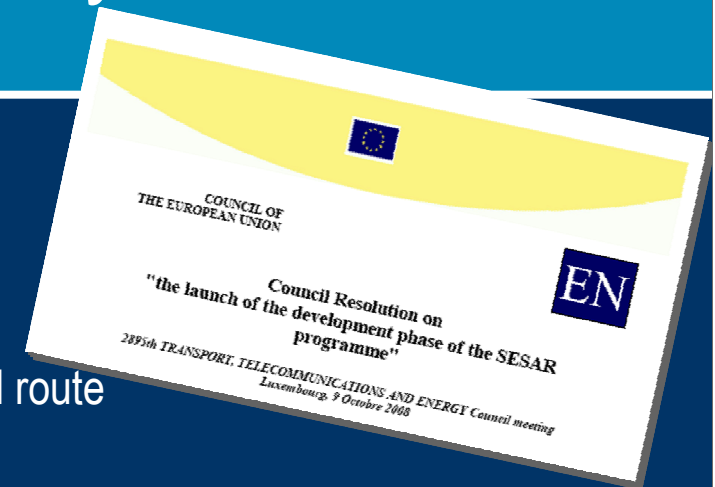
ATM Capability Levels



Key Themes

SESAR's concept brings a new approach to air traffic management - key features are:

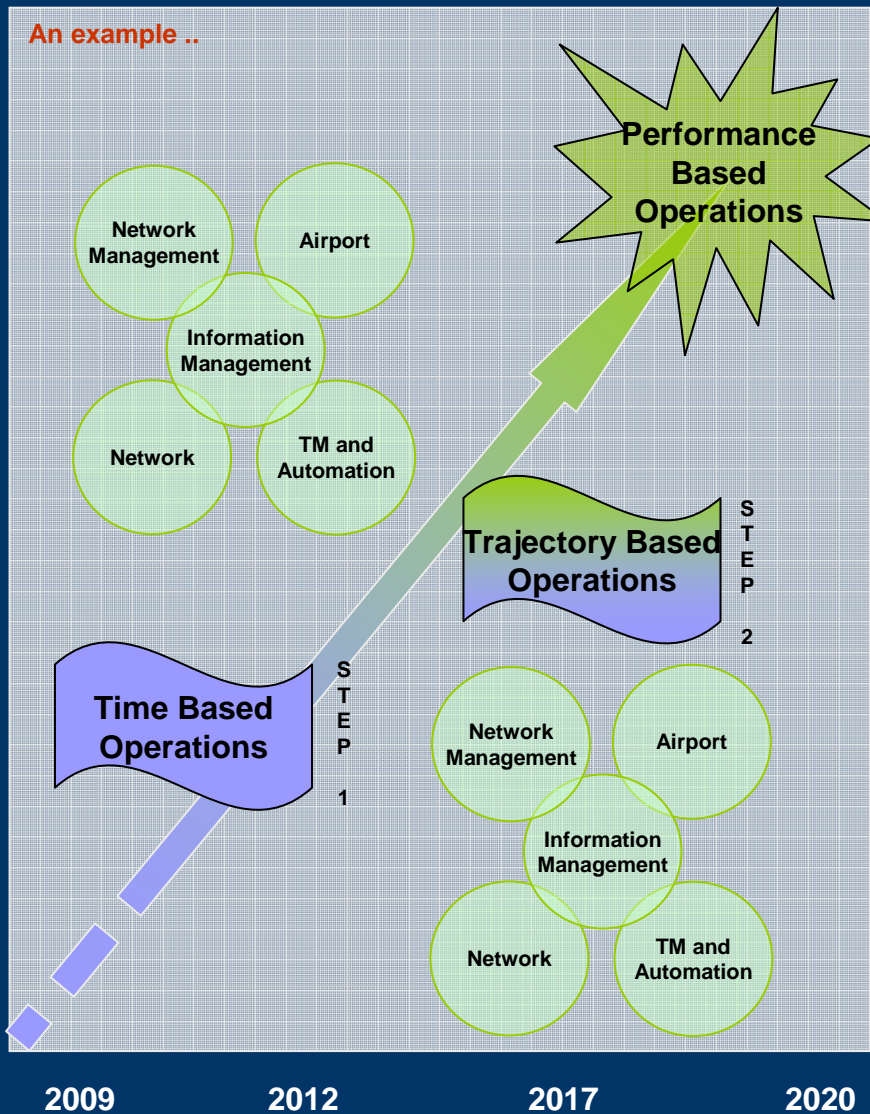
- Moving from airspace to trajectory based operations, so that each aircraft achieves its preferred route and time of arrival.
- Collaborative planning, so that all parties involved in flight management from departure gate to arrival gate can plan their activities based on the performance the system will deliver.
- Dynamic airspace management through enhanced co-ordination between civil and military authorities.
- New technologies providing more accurate airborne navigation and optimised spacing between aircraft to maximise airspace and airports capacity.
- Central role for the human, widely supported by advanced tools to work safely and without undue pressure.



Collaborative ATM!



Key Themes – Pulling Together



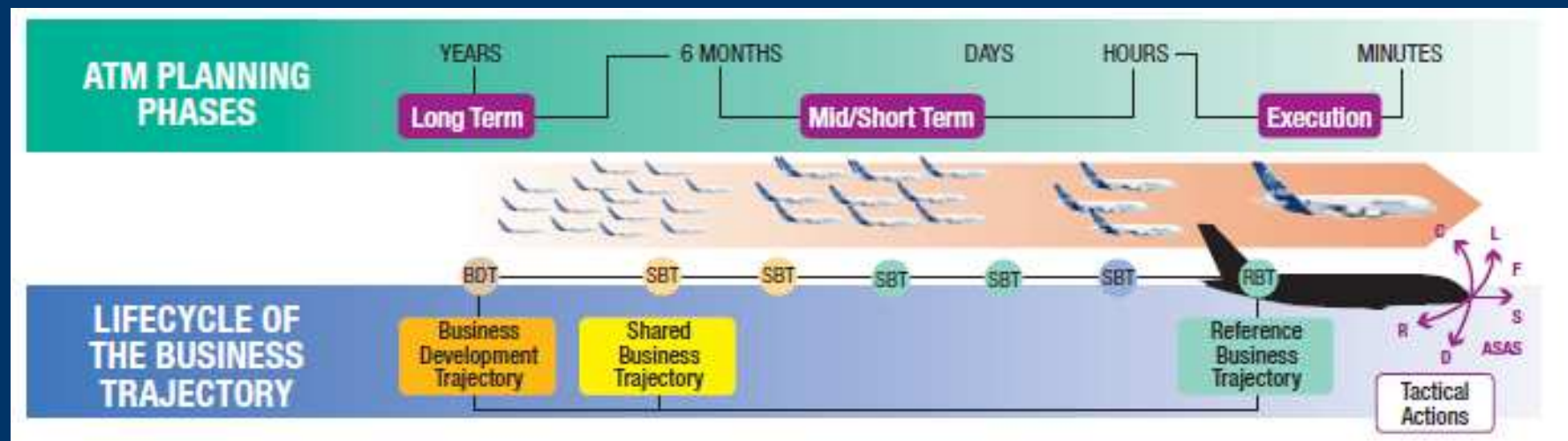
Capability 1+2

Capability 4

SESAR 2020

Capability 3

The Business Trajectory



The Business Trajectory

The Business Trajectory

Expresses the Business/Mission intention of the airspace user.

Owned by the airspace user and agreed with the ANSP and Airport:-

- Changes via CDM processes involving user **BUT does not interfere with ATC/Pilot time-critical decision processes.**
- When constraints are needed the solution is chosen by the user whenever possible.

Based on most timely and accurate data available:-

- AOC, Airborne Automation, ANSP, 3rd Party on behalf user.
- ANSP will compute trajectory for Military or non-capable users during flight.

Exists through out all phases of the ATM process.

The Business Trajectory

“Business” emphasises that the trajectory has a purpose, be it commercial or mission orientated.

RBT is iteratively negotiated until agreed.

Owned by the airspace user, respects a set of agreed 4D constraints and is facilitated by the ANSP and Airport.

Aircraft is “Authorised” to proceed in accordance with the RBT by defined “conflict free” segments.

This set of “business objectives” may be “Updated” or “Revised”

Business Development:

Internal to the User – corporate business planning (schedule)

Business Development

out all

Planning phase:

‘Published’ by the user and shared by all participants. Refined and Negotiated

Shared Business Trajectory

SS.

Execution:

Agreed by airspace user, Network, ANSPs and Airports Authorised, Revised, Updated

Reference Business Trajectory

Reference Business Trajectory Authorisation

Trajectory Authorisation

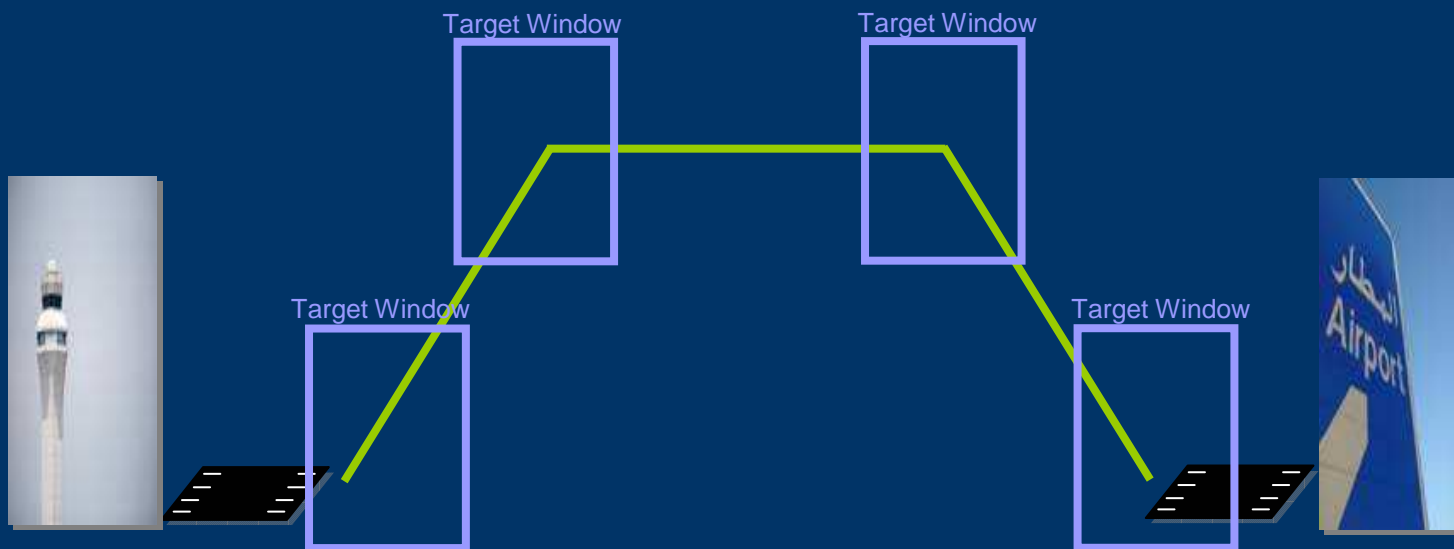
- The RBT is authorised in segments. Authorisations are similar to ATC clearances



Reference Business Trajectory Authorisation

Trajectory Authorisation

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Reference Business Trajectory Update

Trajectory Update

RBT is updated with the latest trajectory predictions

- Trajectory Management Requirements (TMR)
 - Specify the aircraft requirement to share the predicted trajectory in the event that the flight detects a delta (Δ_{time} , Δ_{level} , Δ_{lateral}) from previous predictions
 - Designed to minimise network loading by specifying the accuracy and frequency of updates
 - May specify any periodic trajectory sharing and the data content required
- Updates
 - Do not trigger trajectory revision unless the update indicates that a constraint on the trajectory cannot be respected (TMR)
 - Transparent to controllers and pilots. The primary benefit will be for conflict detection, sequencing and monitoring tools
- Parameters may be set according to separation needs and operational context
 - May be 'carried' by airspace/route/procedure, or
 - Tailored to specific needs

Reference Business Trajectory Revision

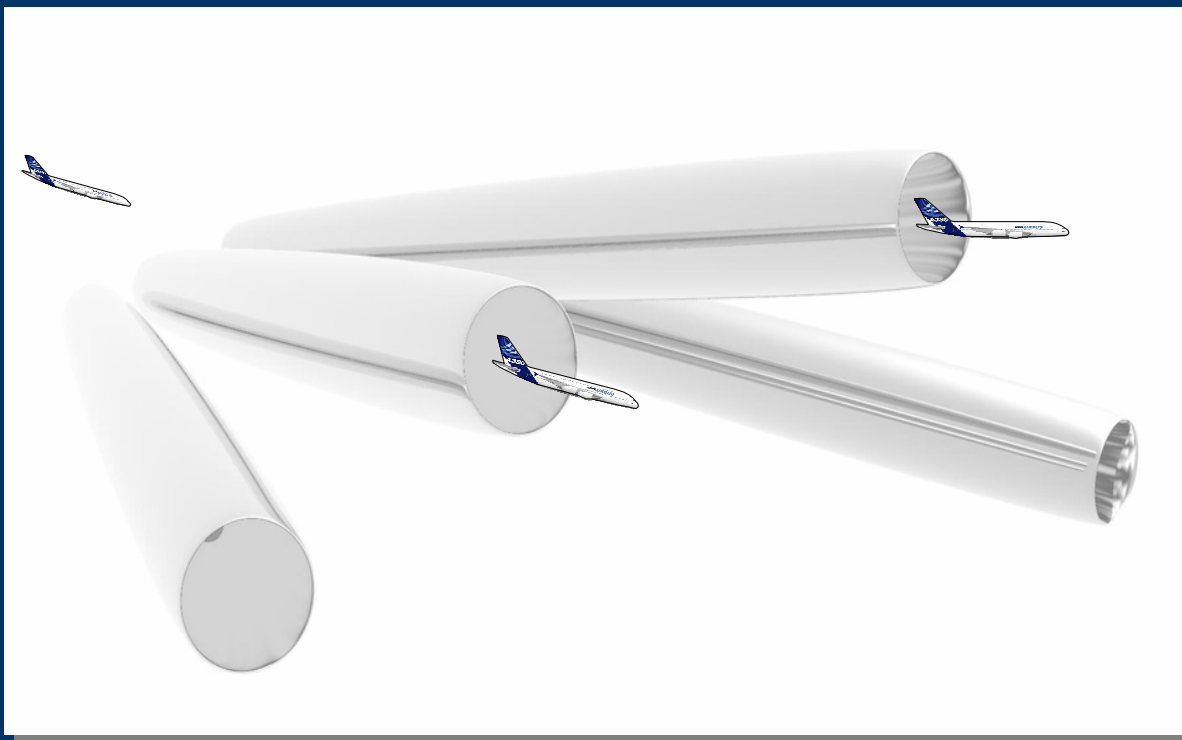
Trajectory Revision

- Trajectory Revision may be triggered by
 - Inability of the aircraft to respect constraints in the RBT
 - Need to change trajectory due to weather or urgent operational reasons (i.e. diversion)
 - Need to provide separation
 - Need to organise a queue for a constrained resource (i.e. runway)
 - Due a new operational constraint (i.e. airspace segregation or runway change)
- Trajectory revision will be a collaborative process except under time critical conditions

Contract of Objectives ...

- Network Managers, ANSPs, Airports and Airlines working together to define and agree an optimum trajectory that is safe, efficient, economic and acceptable to the environment.
- Controllers and pilots working together to flexibly manage constraints according to that agreement.

One way of achieving
the SESAR Business
Trajectory



Issues – Validation & Verification

Detailing the concept and retaining “buy-in”.

Defining the Architecture and technical systems.

Achieving the target performance

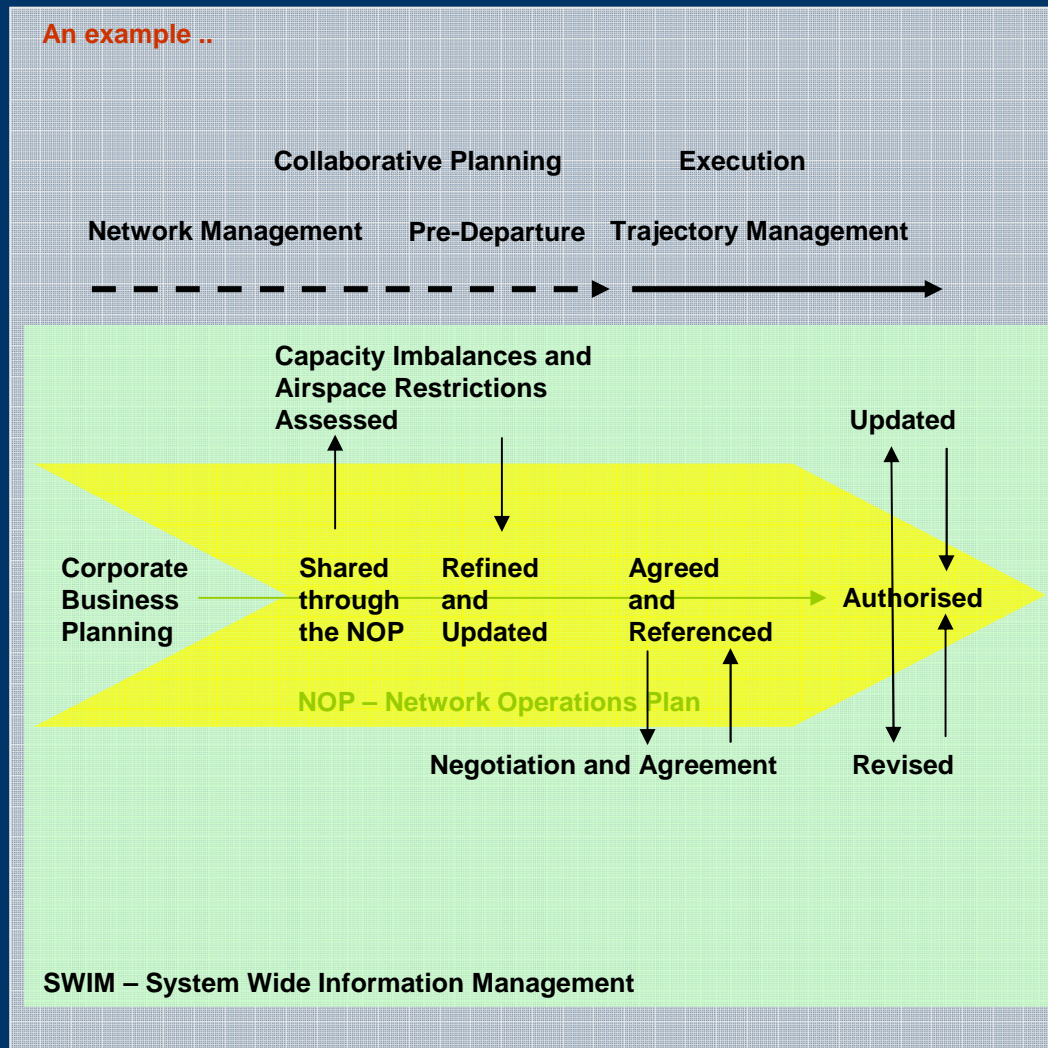
Proving performance through Validation and Verification

Achieving endorsement by the ATM Community

A “Huge Challenge!”

Summary of Business Trajectory Process

An example ..



Conclusions

The SESAR concept moves ATM from Airspace to Trajectory Management.

The Business Trajectory is owned by the “Airspace User” and any revisions to it need to be agreed with the owner.

It is the shared objective of the Airspace User, Service Providers and Airports to achieve the Business Trajectory.



- Can provide us with an opportunity to further understand the SESAR Business Trajectory and how it may operate.
- Will input significant understanding to the validation required for complex concepts