



Enhanced arrivals and departures Descent phase support *Siân Andrews / NATS*



PJ01 Enhanced Arrivals and Departures Descent Phase Support



Our Objectives:

Reduce overall fuel burn and CO₂ emissions

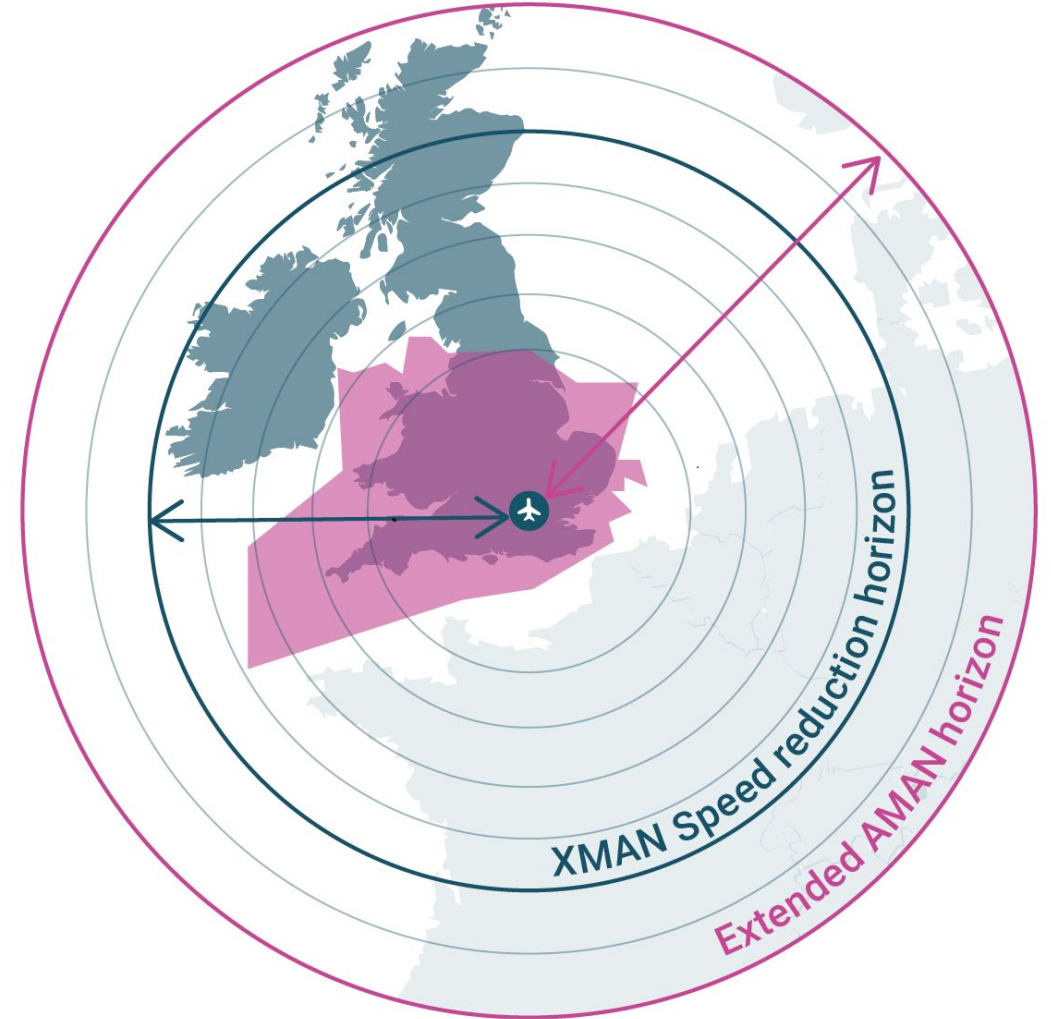


Develop a Streaming AMAN to provide descent phase support by:

- Transfer of delay away from holding stacks
- Sequence and Stream Arriving aircraft into the London TMA
- Enable use of a Systemised PBN Route Structure
- Facilitate Continuous Descent Operations from ToD

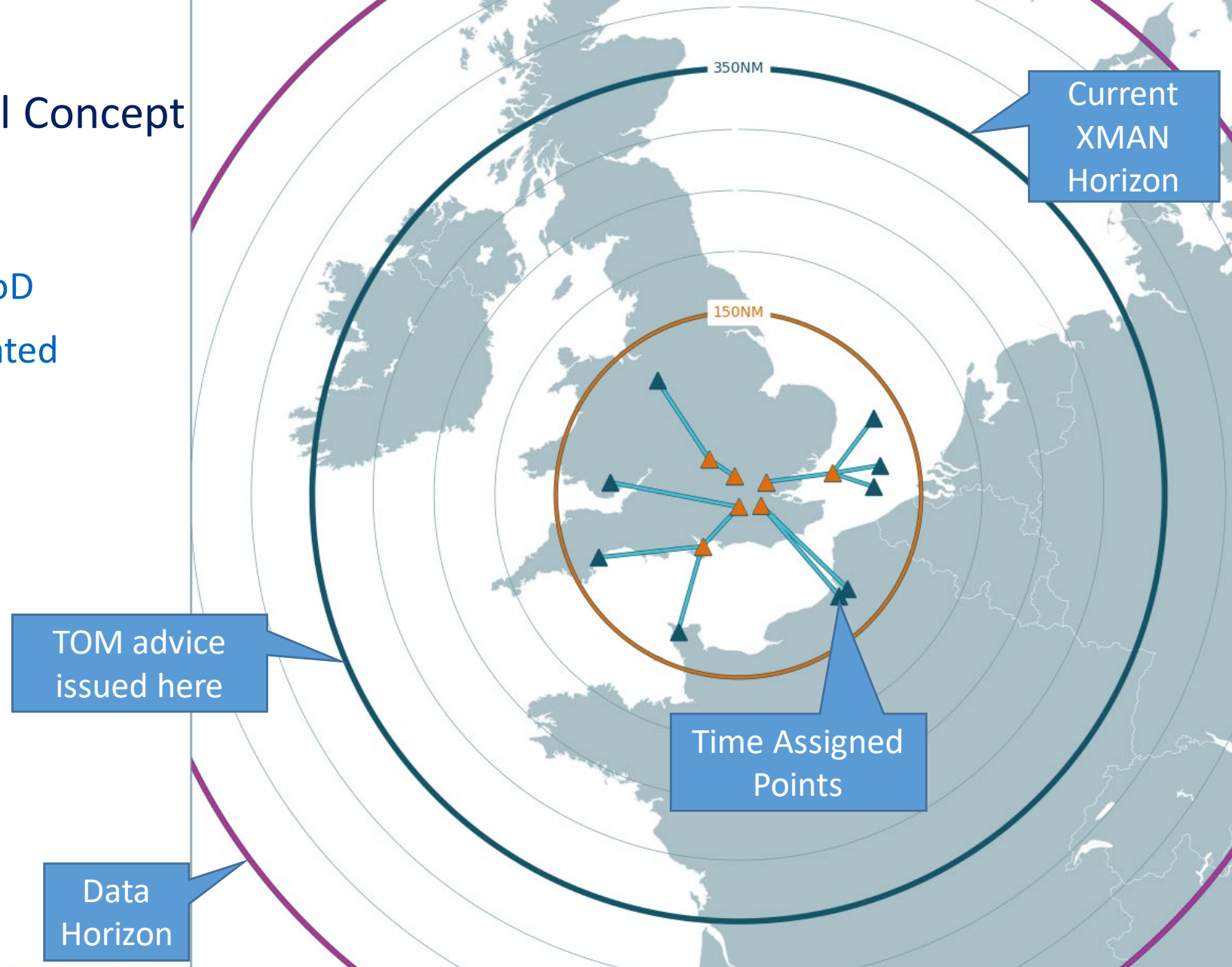
Current XMAN operations

- Heathrow and Gatwick arrival manager (AMAN) uses a 550nm data horizon
- At a 350nm speed reduction horizon, when delay predicted to be ≥ 7 mins, XMAN partners (MUAC, DSN, Shannon, Prestwick) slow aircraft by up to Mach 0.04.
- Prior to descent, when delay predicted to be ≥ 5 mins, NATS controllers apply 250kts descent speed.
- These two measures reduce stack holding by around 90 seconds per slowed flight and save an average of around 50kg fuel per slowed medium vortex category flight.



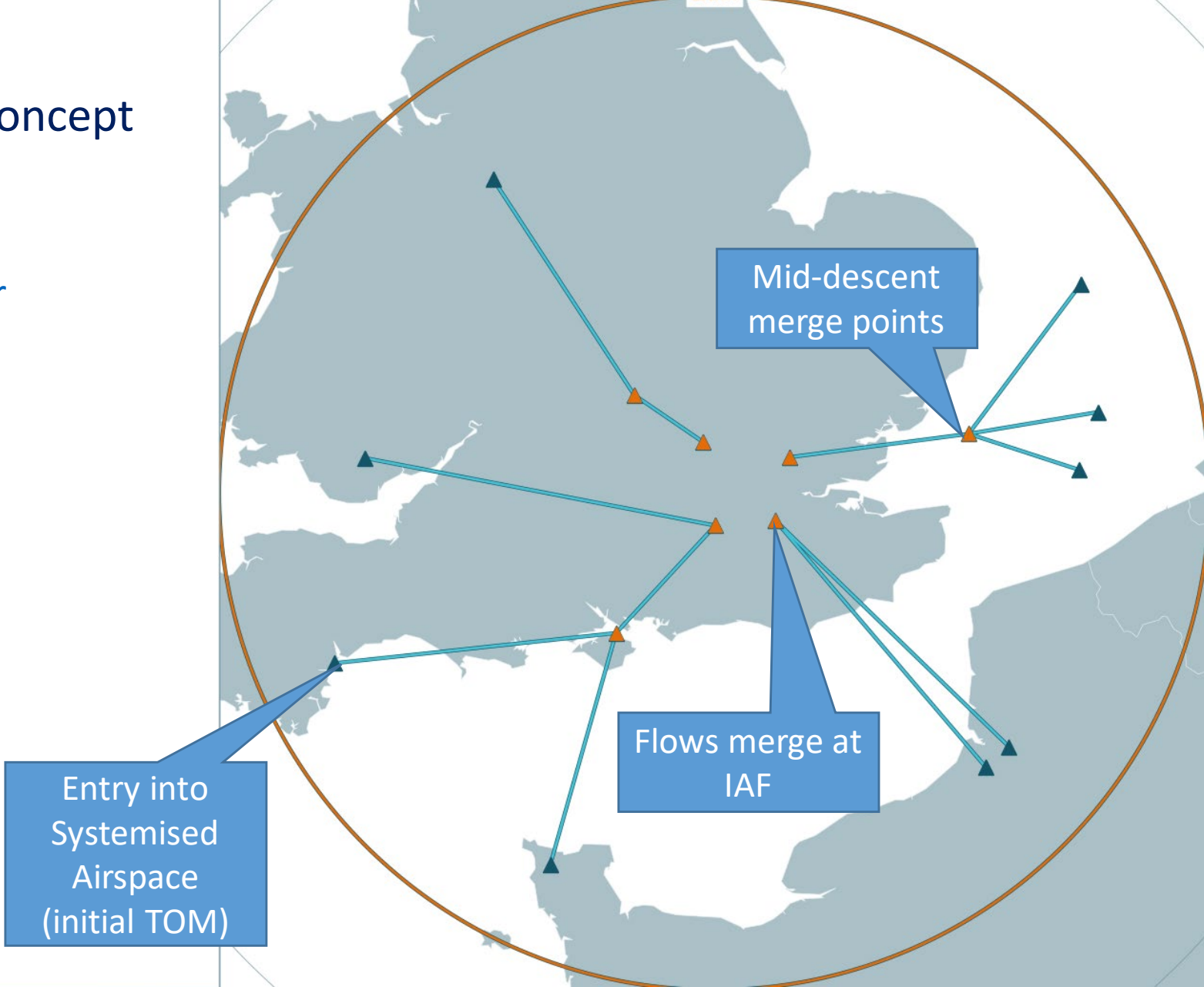
Descent Phase Support Operational Concept

- Aircraft to be 'de-bunched' prior to ToD
- Time over Metering Fix (TOM) calculated in phases ahead of issuing horizon
- Streaming of aircraft is provided by aircraft flying to the TOMs
- Delay absorption is incorporated
- Optimised descents enabled

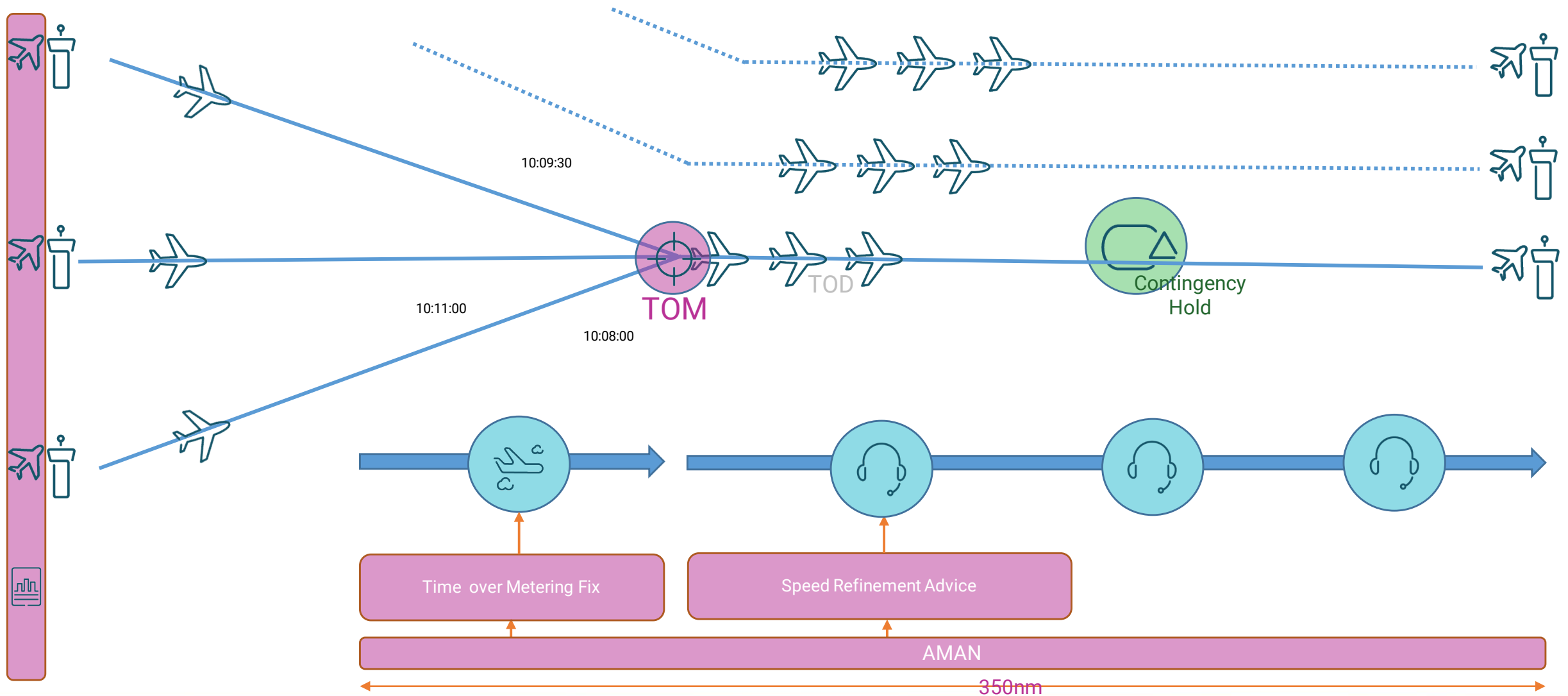


Descent Phase Support Operational Concept

- Streaming AMAN assigns initial TOMs for a point prior to ToD
- TOMs are also applied to mid-descent merge points and translated to descent speeds
- Benefits not just for periods of high demand, but also to solve bunches that occur in lower traffic situations
- Aim to improve on current day delay absorption



Concept





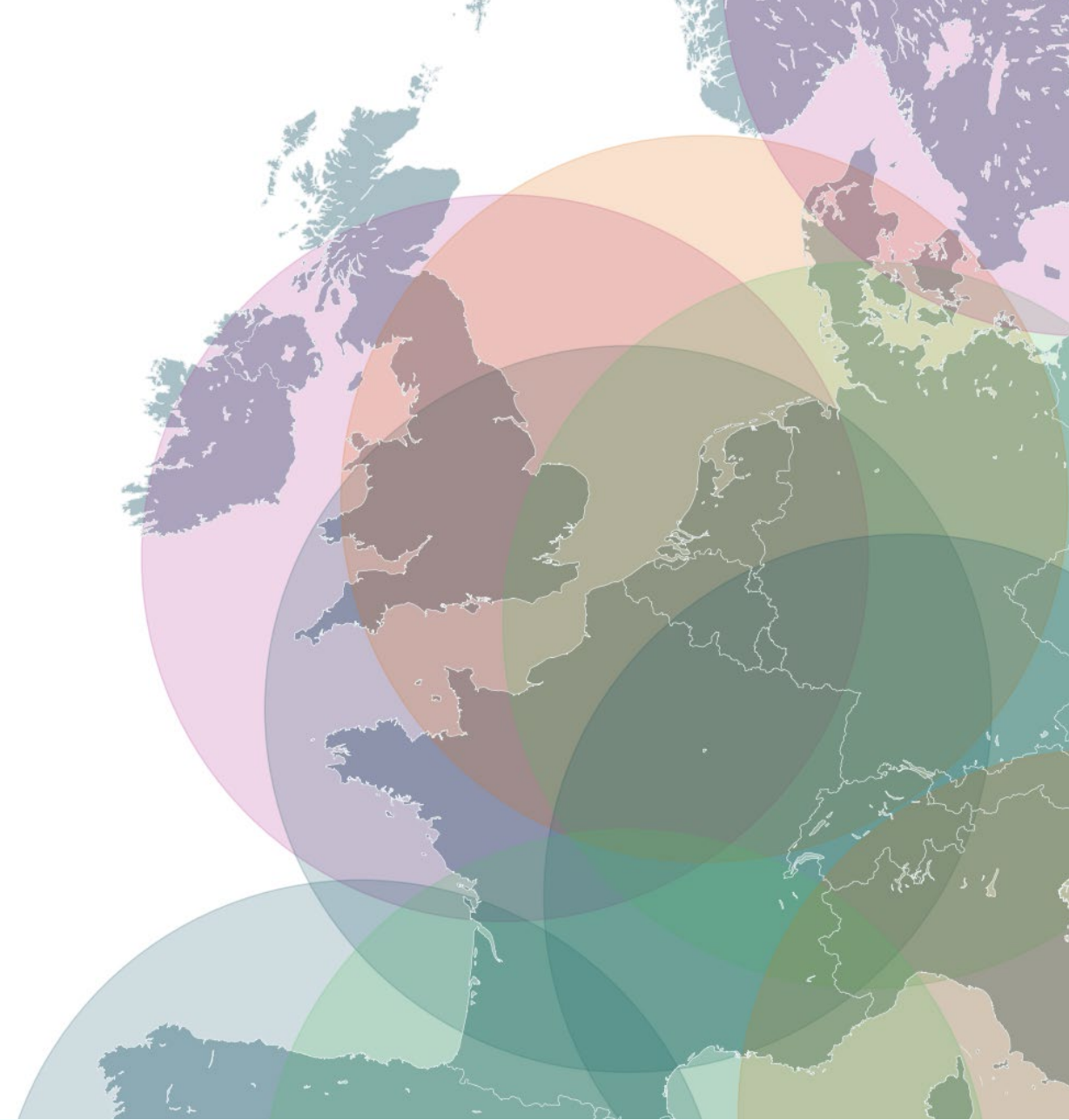


Descent Phase Support – investigative activities

- Recorded Data trial was run in 2020 using 2019 traffic data – COMPLETED – Revealed that the current trajectory source was not sufficiently accurate
 - Exploring use of ADS-B for greater accuracy to support the granularity required
 - Exploring management of in-horizon flights once in the cruise
 - Plan to use existing SWIM process to pass constraints to neighbouring ANSPs for relay to aircraft
- NATS simulation to test the industrial prototype – to be run in November 2021
 - Supplemented with controller workshops and a limited human in the loop RTS
 - Looking at accurate source of trajectory data - Live non-ops ATC demonstration of AMAN trajectory prediction capability – to be run in 2022

Summary

- Manage aircraft in the most efficient manner
- Take a portion of delay in the cruise
- Space aircraft for descent
- Enable Optimised Descents





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