

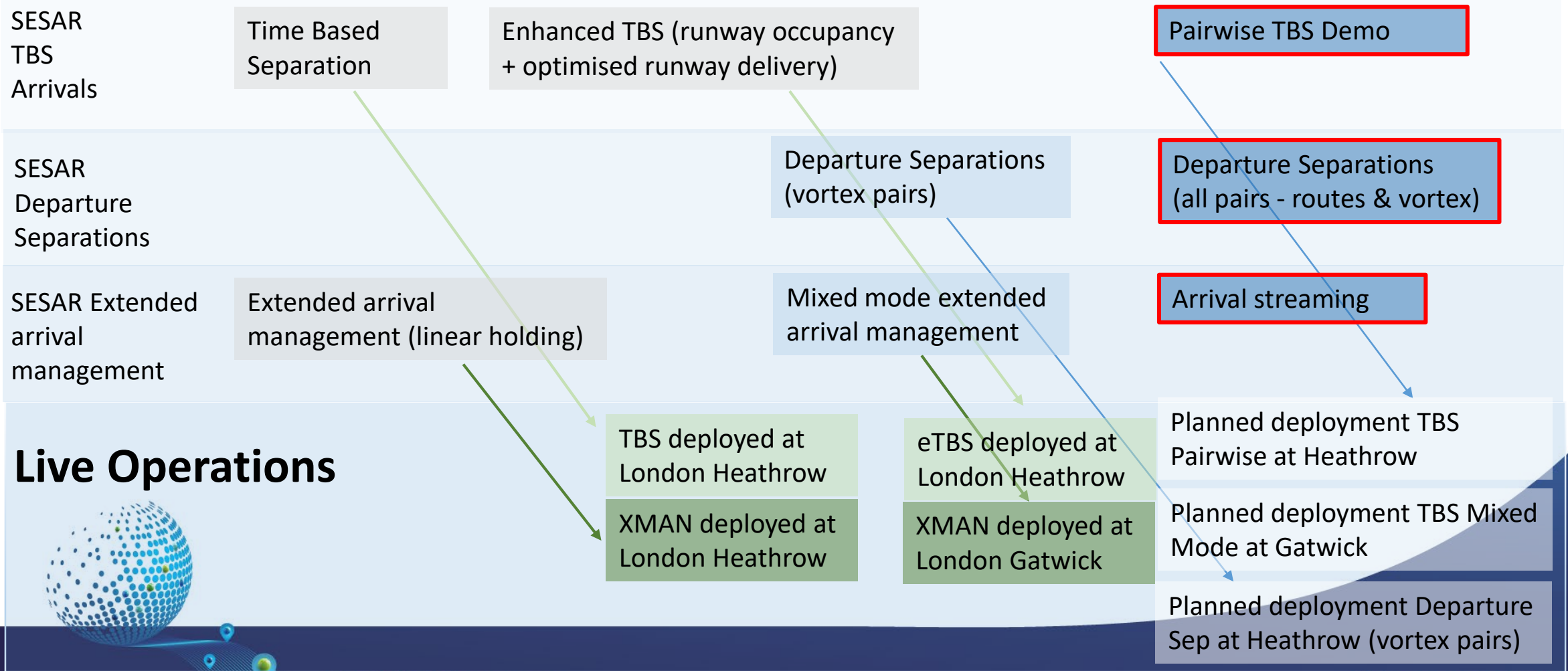
# Arrival Streaming and Time-Based Separation: from SESAR into Operations

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NATS

## SESAR 2020 SHOWCASE

# SESAR Queue Management projects in NATS Operations



## Live Operations



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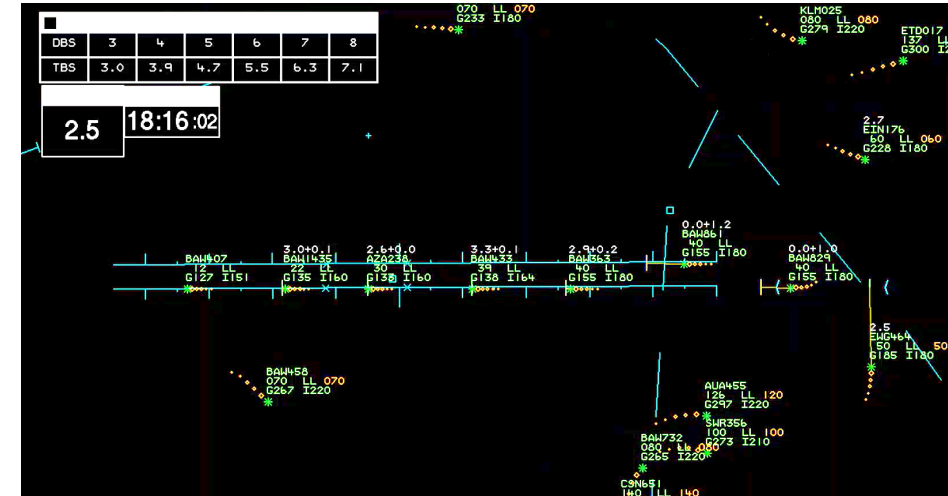
# Pairwise Time-Based Separation for Arrivals Results

## Heathrow Baseline:

- Enhanced TBS (deployed 2018)
- Increases resilience in strong head winds
- **Additional 4 movements per hour** compared with no TBS, saving 90,000 minutes holding and 15,000 tonnes of fuel per annum
- Uses RECAT EU wake vortex categories, Optimised Runway Delivery (deceleration profile inside 4nm) and Runway Occupancy Time

## Pairwise TBS:

- R&D Simulation: a **further 2 movements per hour** are possible
- Simulation using Intelligent Approach industrialised prototype - Mar 23
- Uses pairwise wake vortex categories (over 100 aircraft types) and runway occupancy time
- Accounts for vortex, runway occupancy and minimum radar separation



# Departure Separations

## R&D Baseline:

- Optimised Separation Delivery tool: countdown advice to Tower ATC for separation between vortex-constrained aircraft pairs
- Ten second separation granularity
- Uses RECAT Pairwise EU vortex categories



## Recent R&D Development:

- Delivers consistent longitudinal spacing into the TMA in all wind conditions
- Departure spacing provides greater granularity than ICAO standard 1, 2 or 3 minute separations
- Simulations show that departure rate raised to the level of 'good weather' rate in most weather conditions





# Arrivals Streaming Results

## Heathrow Baseline:

- XMAN (deployed 2015)
- Saved **8000 tonnes fuel** per annum (2019 traffic)
- Reduced stack holding by **132,000 minutes** per annum (2019 traffic)

## Arrival Streaming:

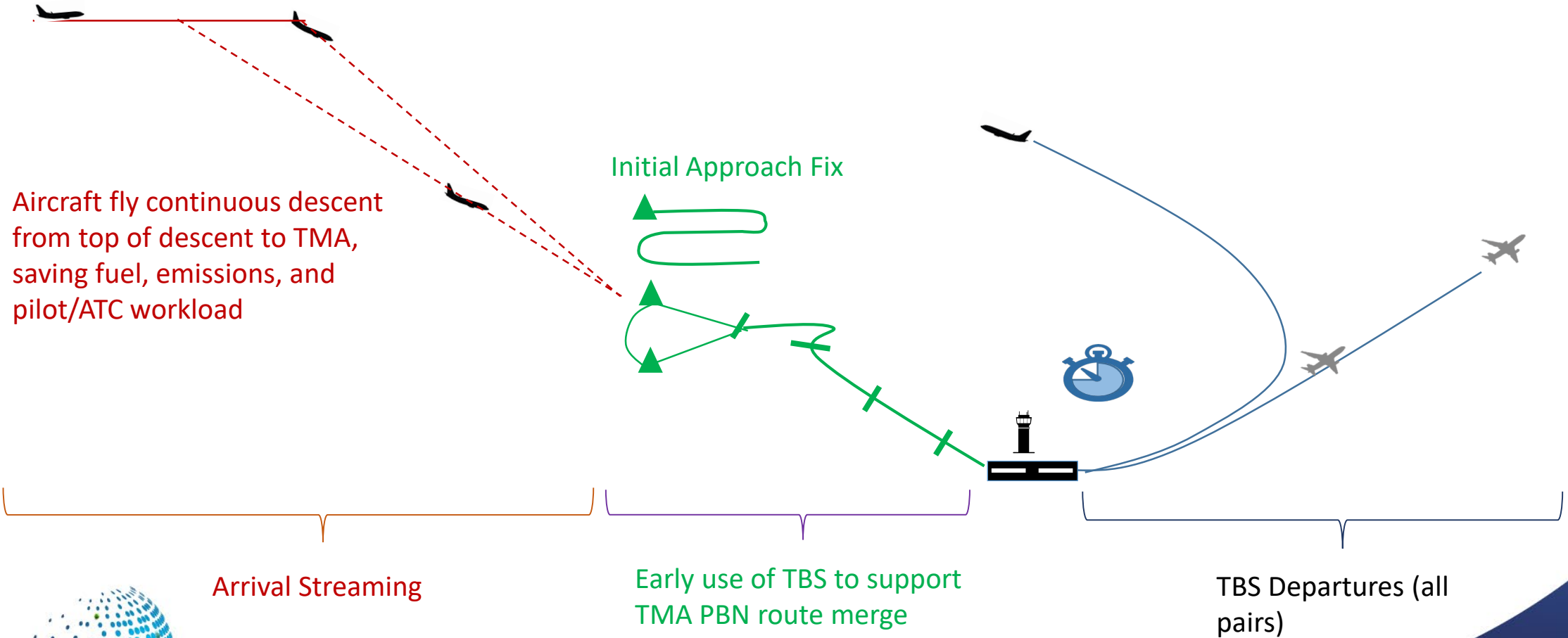
- Objective to preserve or increase linear holding fuel saving (in en route and descent) *and also* to stream arrivals (debunch) so each aircraft can fly a continuous descent from cruise
- Used an industrial prototype (Frequentis Orthogon)
- Results: fuel savings delivered by current XMAN preserved and arrival bunches reduced by 40%



# TBS & Arrivals Streaming Inter-Operability: Next R&D Phase



Inter-Operable Advanced Processes



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Further details available after this session, or at the NATS stand, or at [adrian.clark@nats.co.uk](mailto:adrian.clark@nats.co.uk)

VLD3-W2 SORT



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