AIRSPACE MANAGEMENT IN FREE ROUTE AIRSPACE (FRA)

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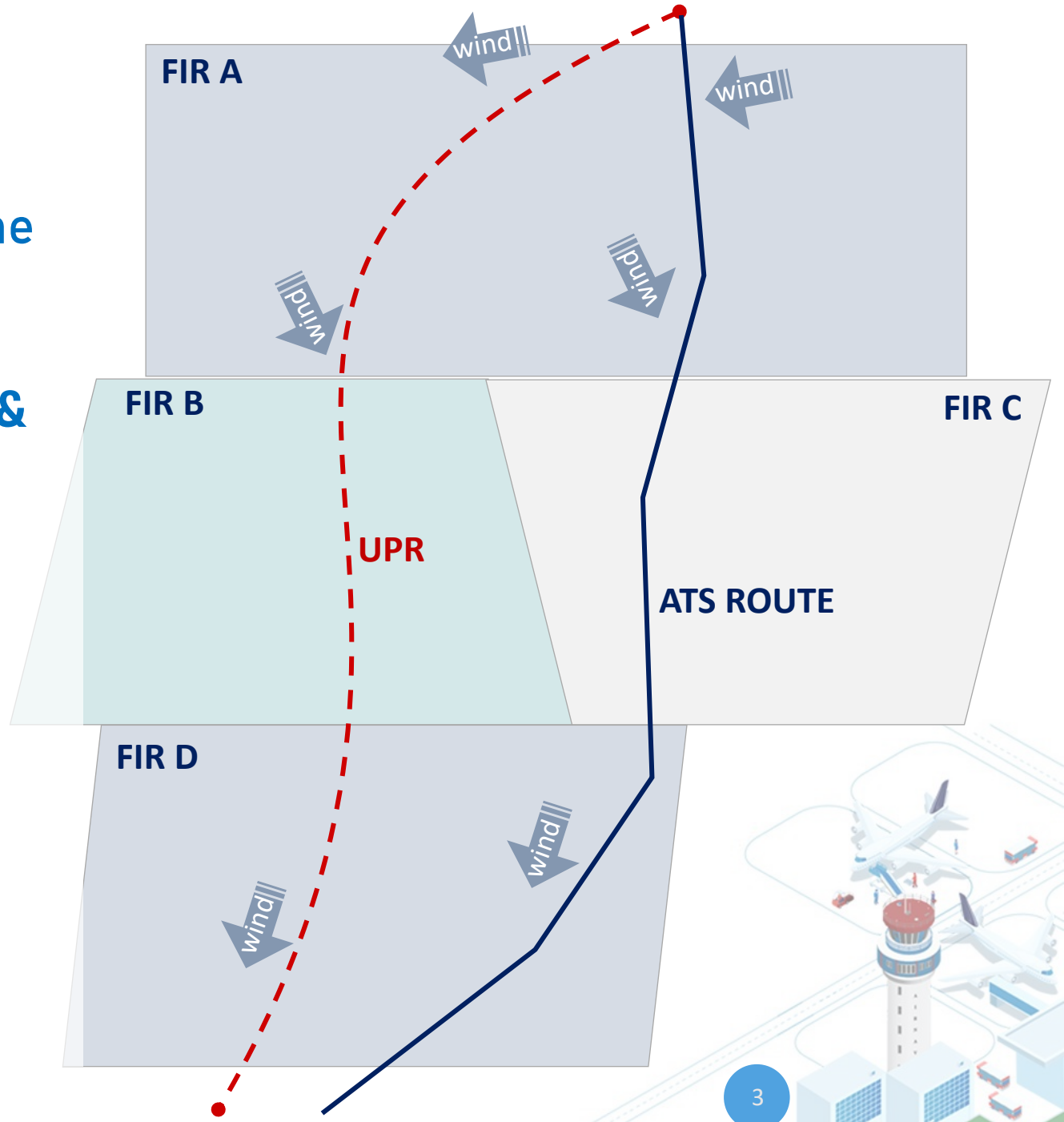
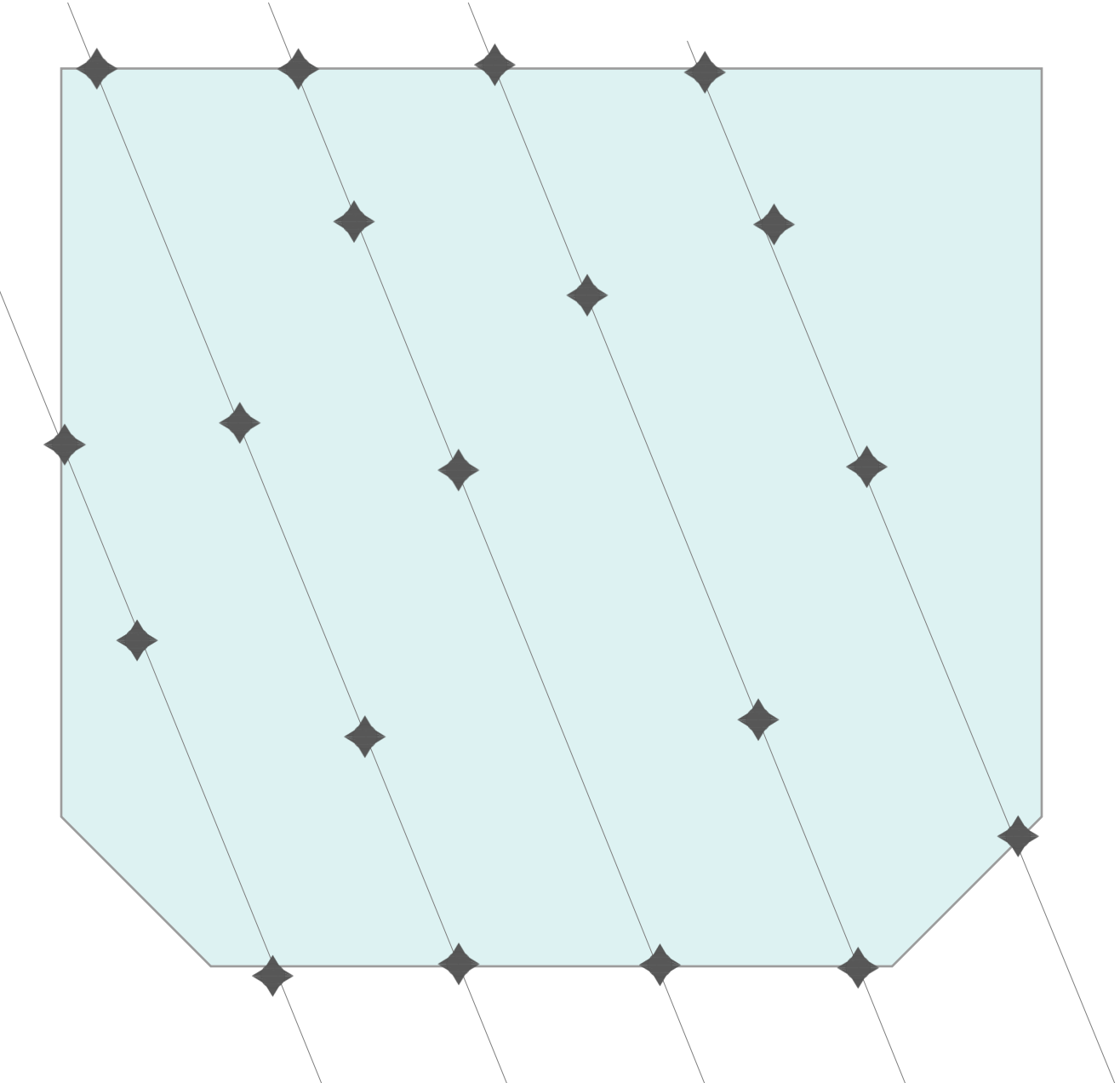
DEFINITION

UPR DEFINITION

- **User Preferred Route** (UPR) allows the airspace user to PLAN their flight through the **most efficient trajectory** taking into consideration **wind speed & direction, turbulence, temperature, aircraft type & performance**
- UPR trajectories may be constructed, subject to airspace availability, via:
  - ATS Route and/or
  - Direct Route and/or
  - Free Route



FREE ROUTE AIRSPACE



- Definition: A specific airspace within which airspace users may freely PLAN a route between a **defined entry point** and a **defined exit point** with the possibility to route via intermediate way points *without referring to the ATS route network.*

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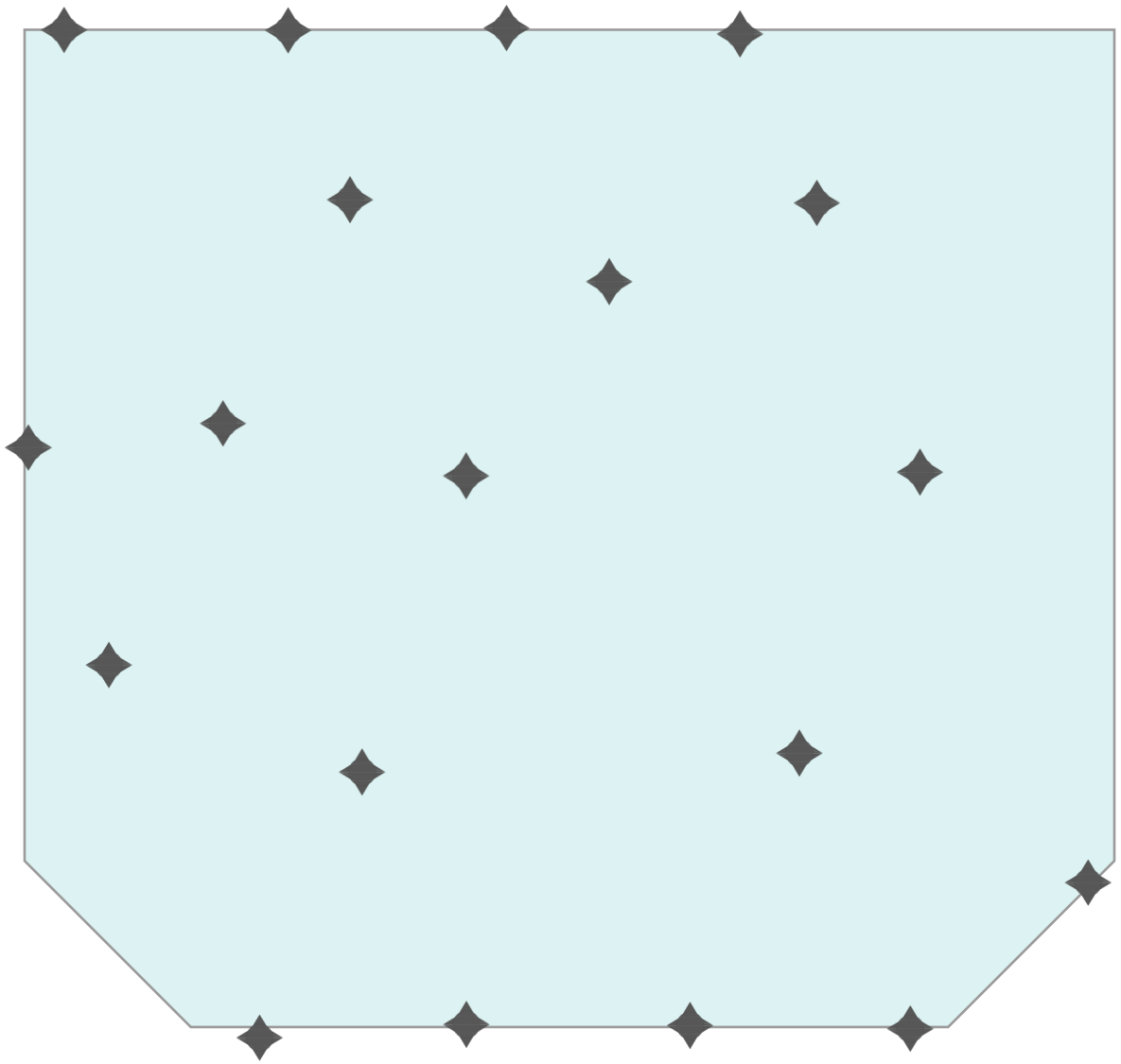

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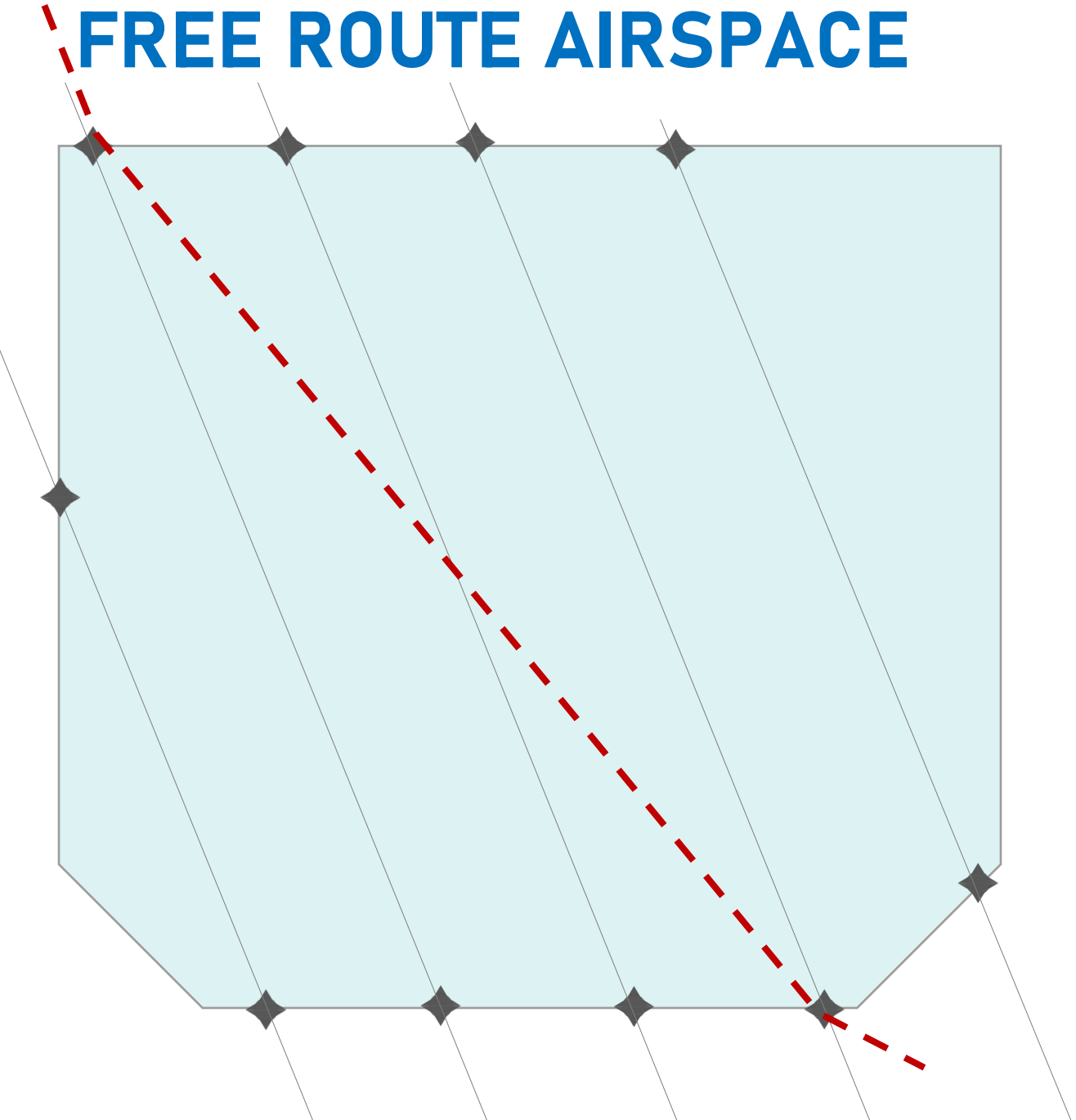

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  1. DIRECT ROUTE
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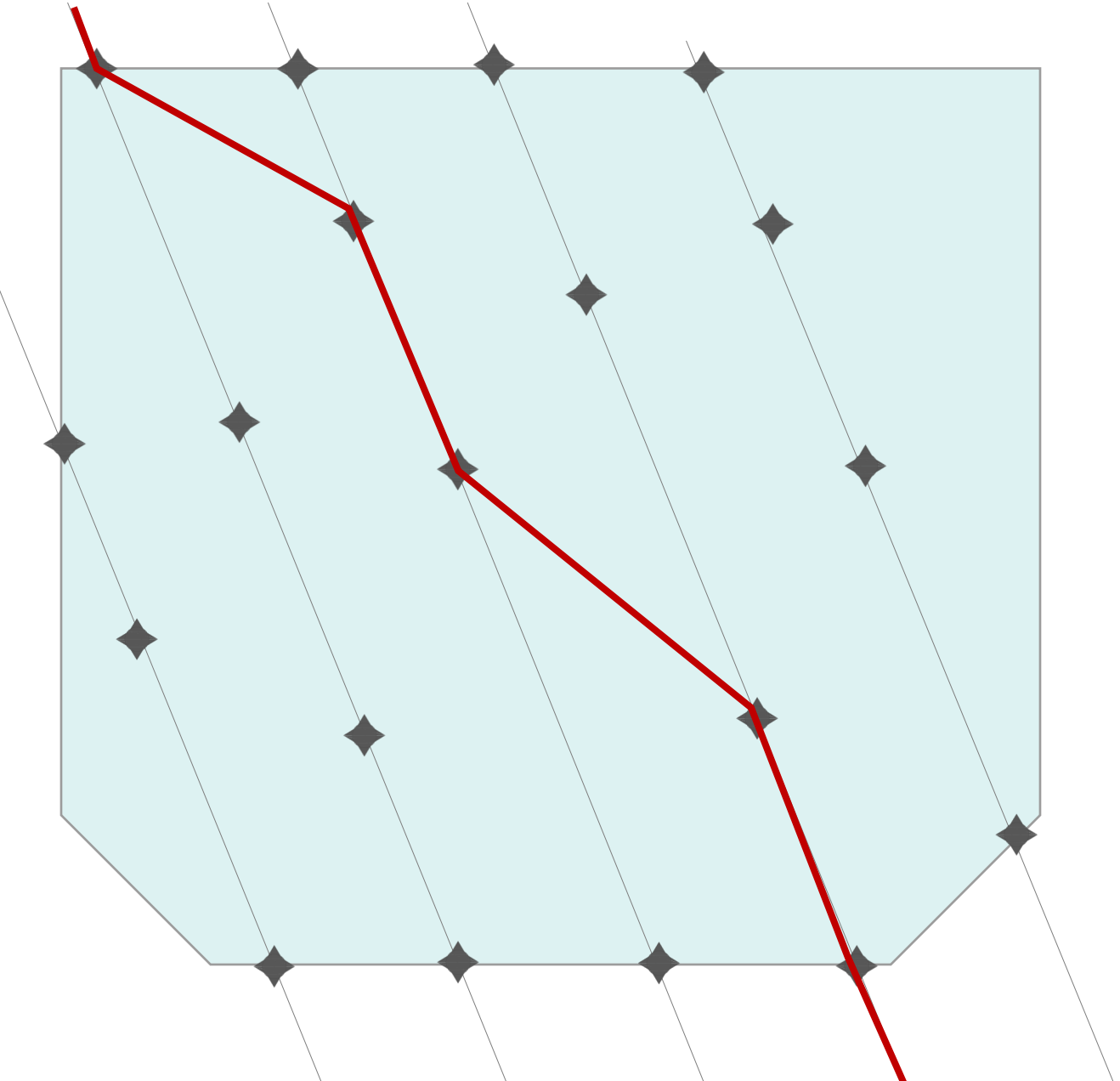

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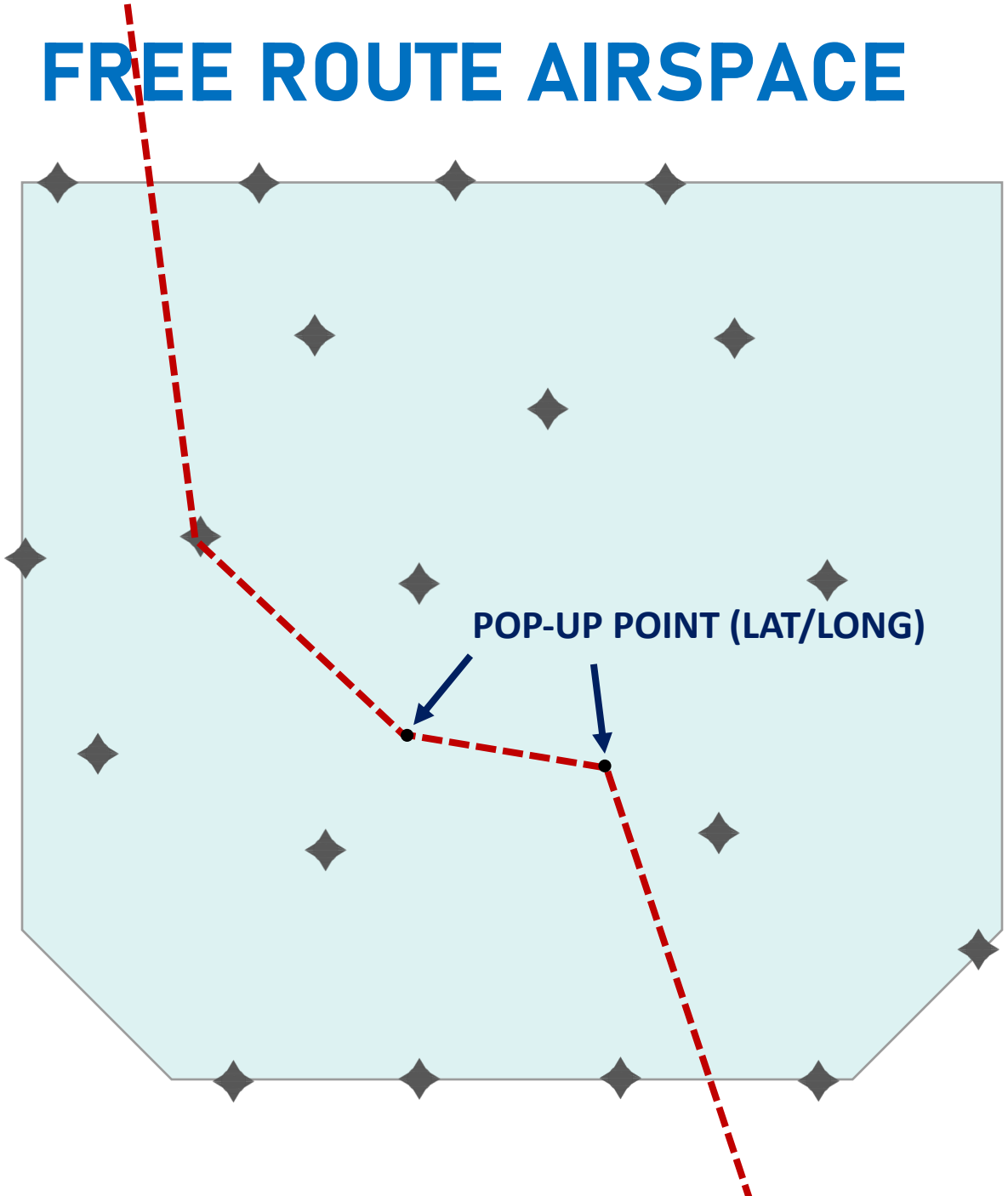
  1. DIRECT ROUTE
     a. Direct Entry to Exit
     b. Via Intermediate Way Point

FREE ROUTE AIRSPACE



- Definition: A specific airspace within which airspace users may freely plan a route between a defined entry point and a defined exit point with the possibility to route via intermediate way points *without referring to the ATS route network*, subject to airspace availability
- Two type of Free Route:
  1. DIRECT ROUTE
  2. FREE ROUTE. Using "NEW DESIGNATED POINT" based on Latitude and Longitude

FREE ROUTE ≠ FREE FLIGHT

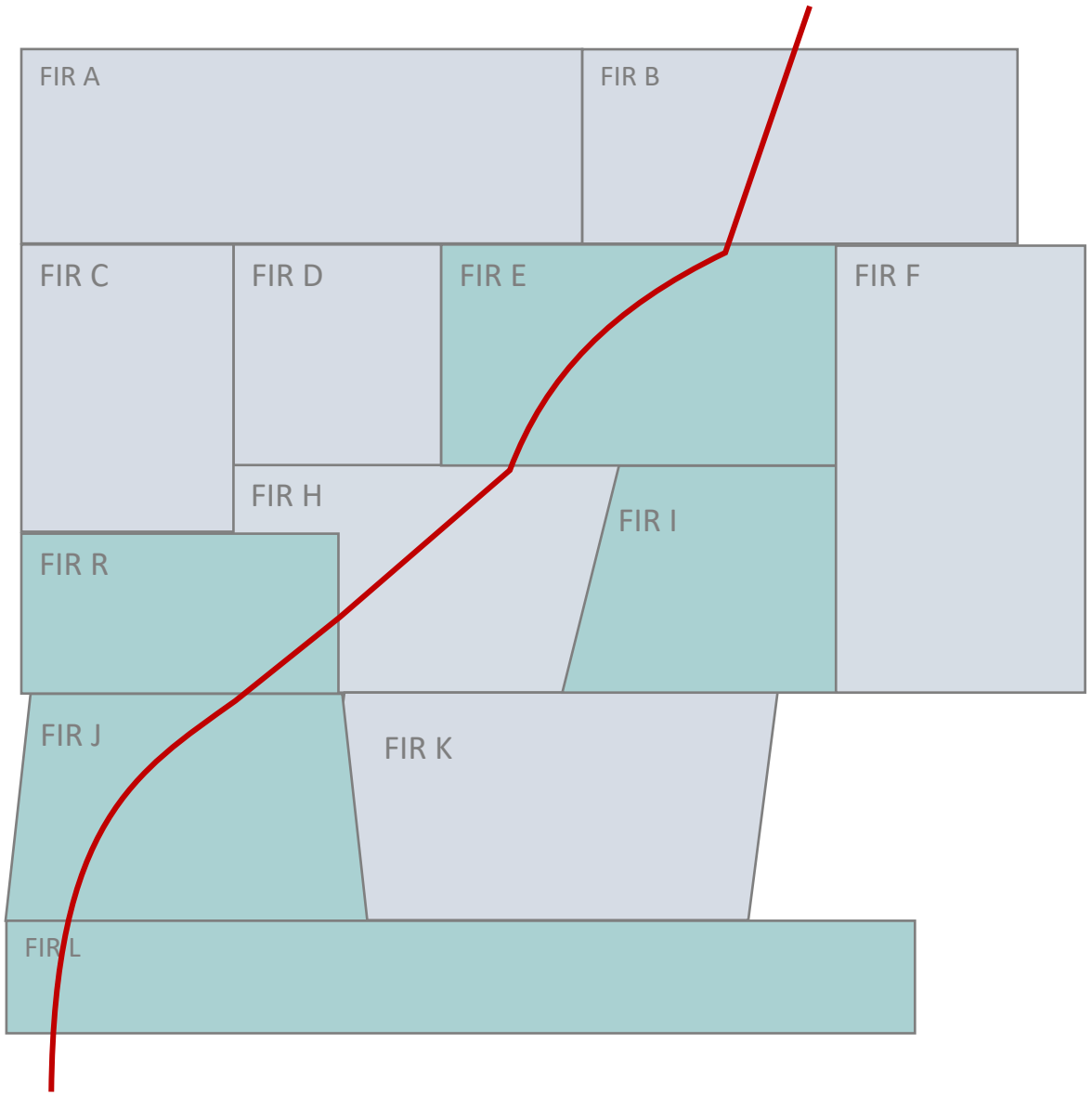
Until the day when TBO implemented..

and FRA is one of the TBO enabler!

AIRSPACE ORGANISATION

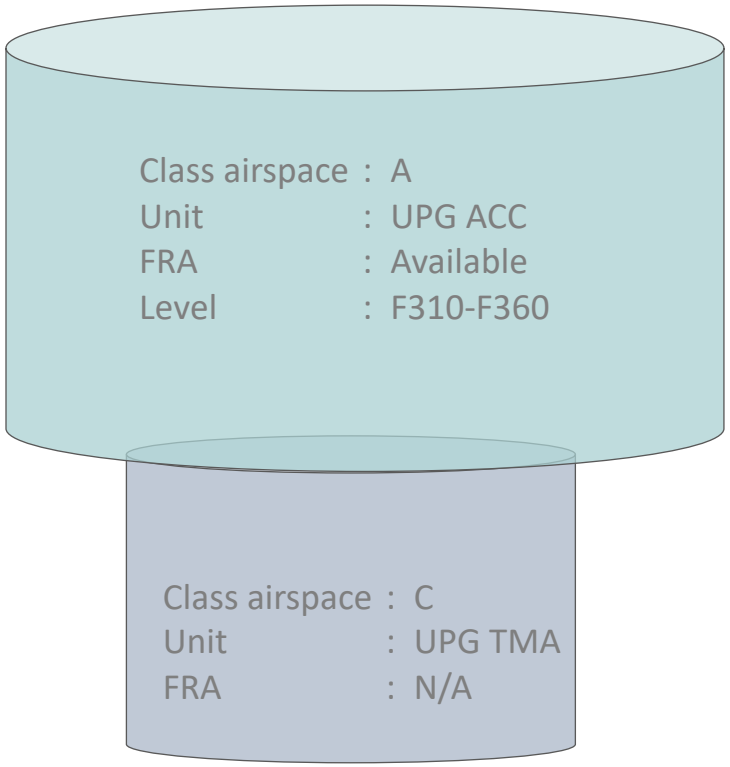
Setting up Free Route Airspace

GENERAL PRINCIPLEs (1)



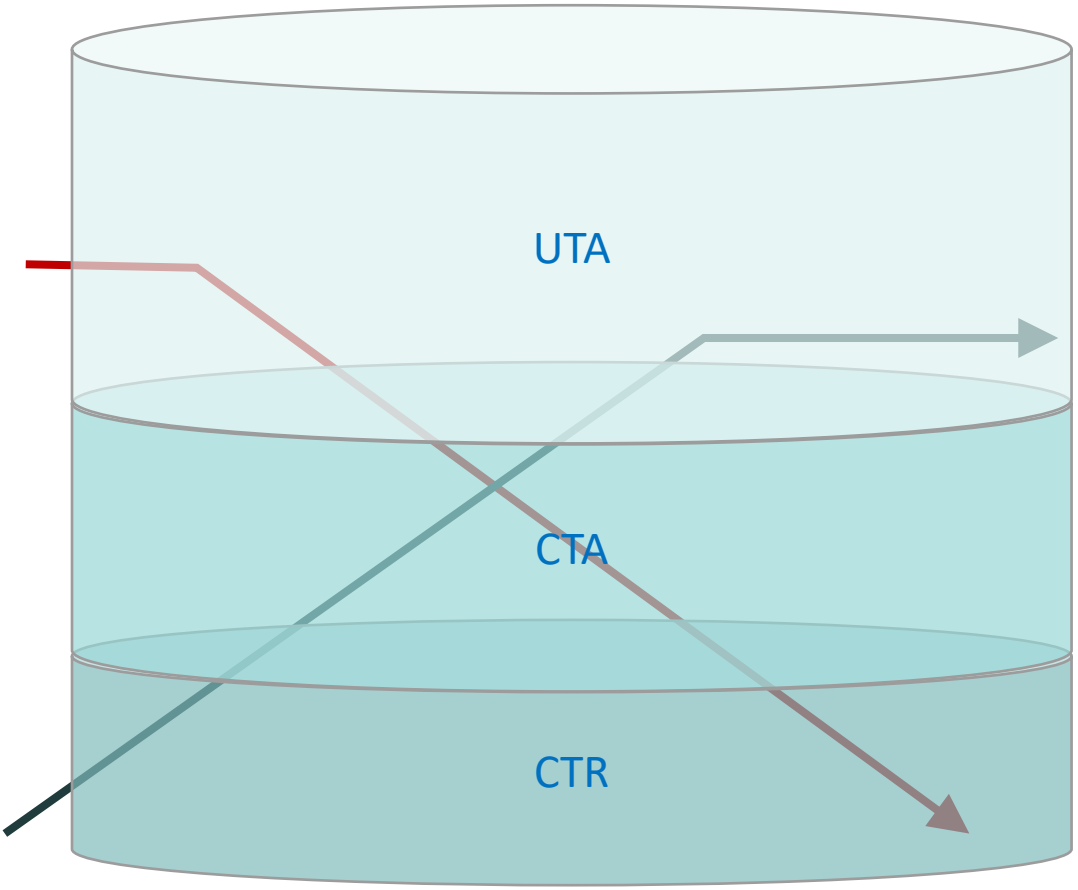
- Airspace Management in FRA *different* from that of the fixed ATS route network in that Airspace User *will no longer be given information on which routes are available, but* will need to know **which airspace is available/not available for FRA**

GENERAL PRINCIPLEs (2)



- Control airspace with defined class
- Compatible with existing operation
  - Surveillance or procedural environment
  - Does not change FLOS (Flight Level Orientation Scheme) and FLAS (Assignment) procedures
  - Accommodating any stage of FUA implementation
  - Flight planning and ATM system capabilities
- Introduce simple rules, gradually to more complex FRA rules
- Publish detailed rules in Aeronautical Publication to minimize ambiguity

VERTICAL LIMIT

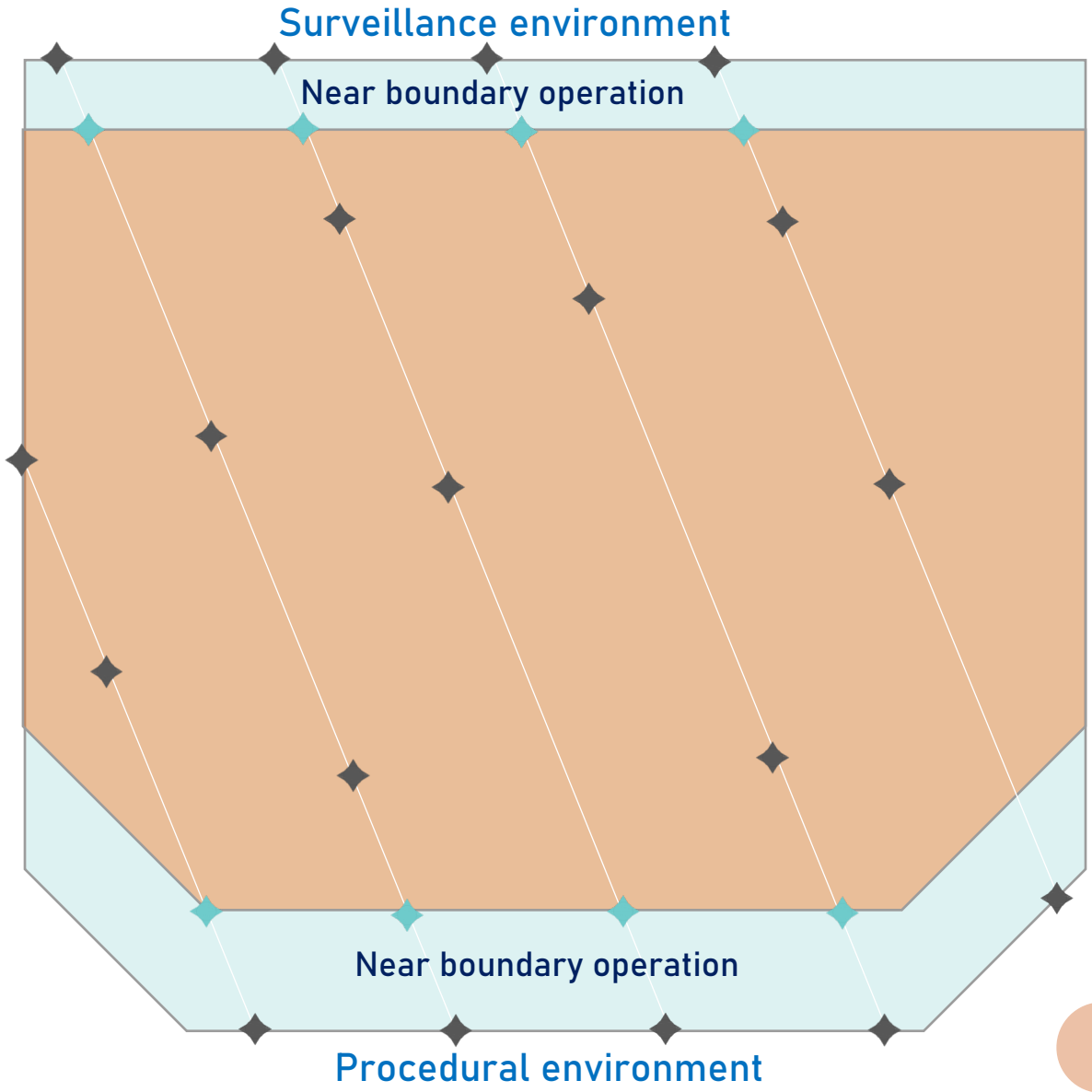


Based on **operational requirements**, not necessarily on ATC unit boundaries

Start with limited level band, consider:

- Airspace level organization
- ATC vertical sectorization
- Complexity of airspace
  - SID and STAR design
  - ATC procedures
- Type of flight

HORIZONTAL LIMIT



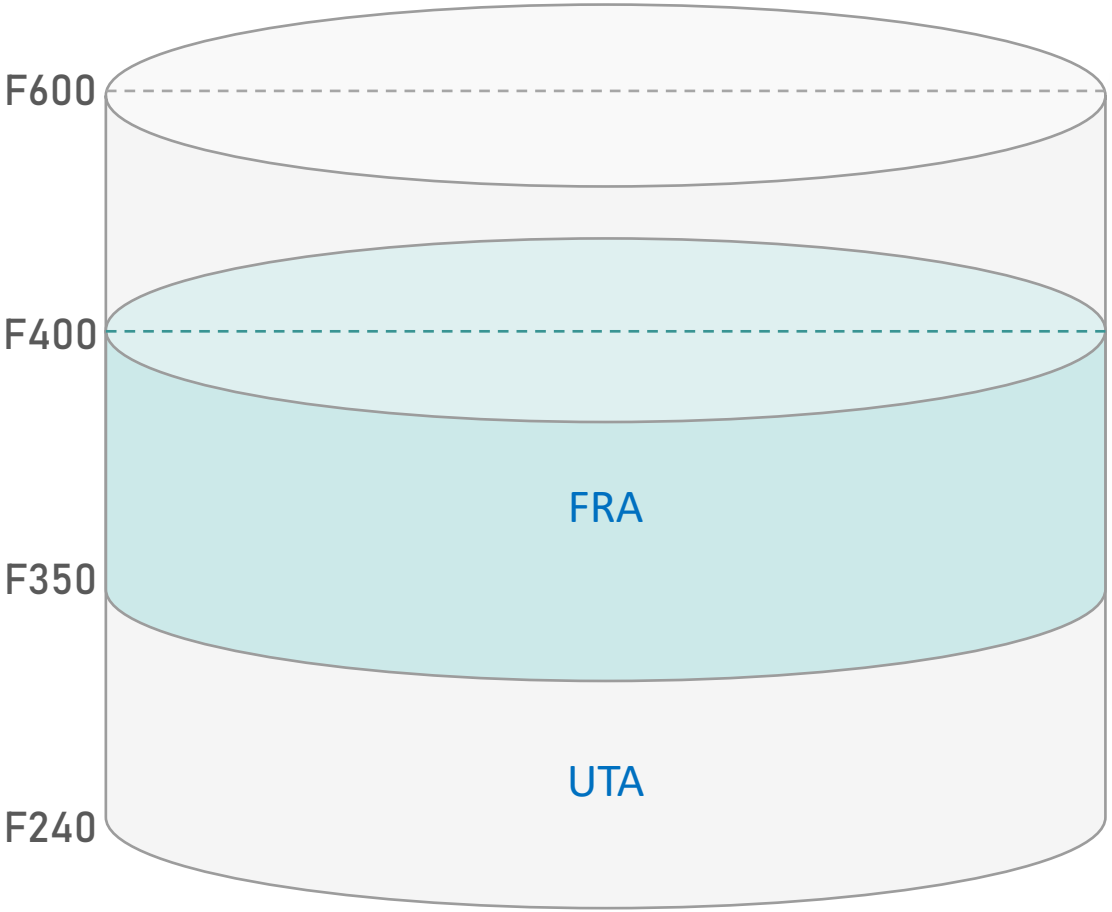
Based on **operational requirements**, not necessarily on FIR or ATC unit boundaries

- Be mindful of
  - Near Boundary Operation
  - Application of separation on adjacent ATS unit
- Start simple and gradual
  - DCT Route: Entry, Exit & Intermediate via Published Waypoint
  - Limit implementation without NBO area
    - Considering publish “pseudo point” at the NBO Area to potentially omit extra coordination on deviation
  - Discuss with Adjacent ATS unit in full area implementation
  - Next: Cross-border FRA with each adjacent

FRA horizontal limit setup without hassle

FRA AIRSPACE MANAGEMENT EXAMPLE

VERTICAL LIMIT



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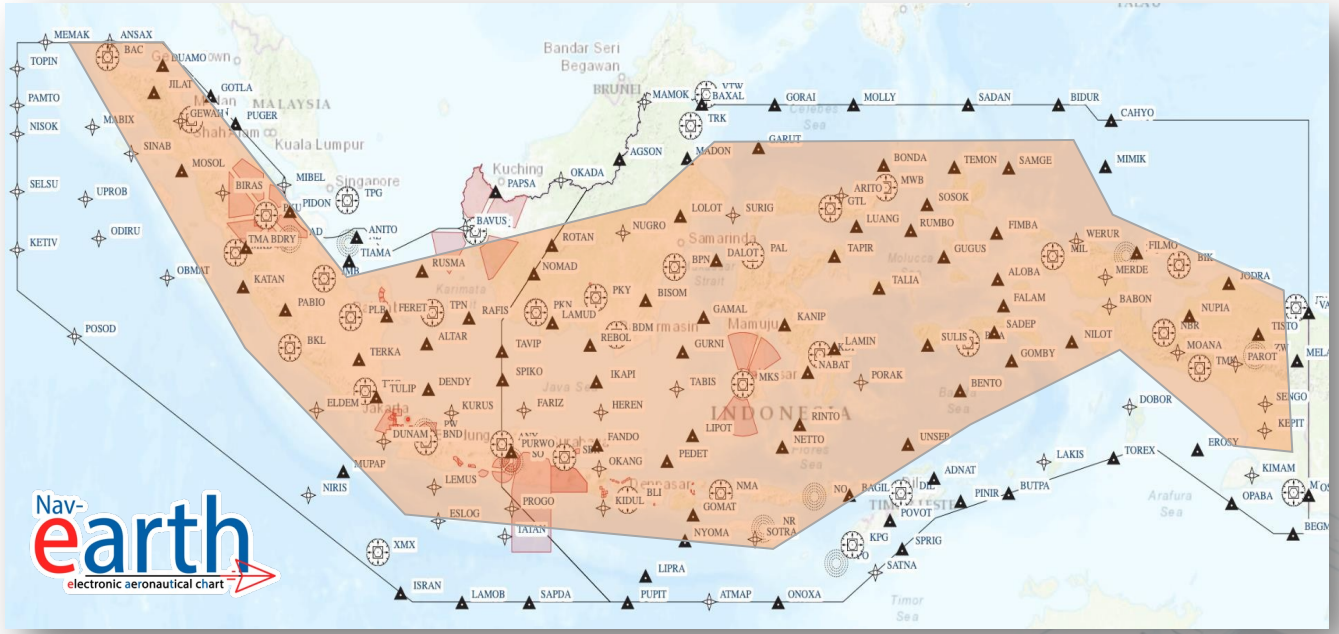


EXAMPLE FRA IMPLEMENTATION PHASE

INITIAL

PHASE 1.

PROCEDURES
- F350 - F400
- Enroute flights
- Entry & Exit boundary via Published point
- Intermediate point

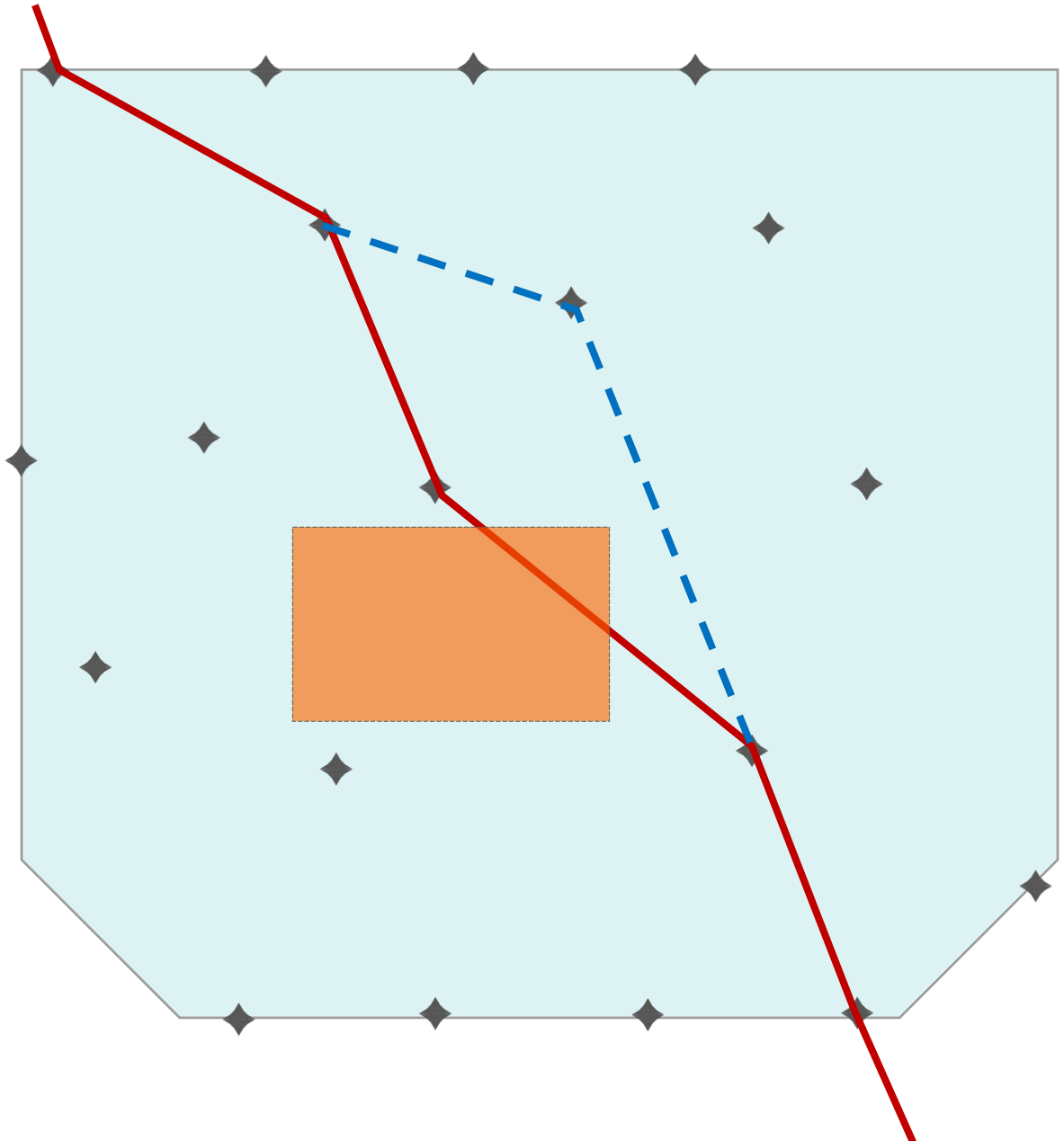
PHASE 2.

PROCEDURES
- F350 - F600
- Enroute flights
- Entry & Exit boundary via Published point
- Intermediate designated point (Lat/Long)

PHASE 3.

PROCEDURES
- F310 - F600
- International flights
- Entry & Exit boundary via Published or Designated point
- Intermediate designated point

AREA RESERVATION IN FRA



- FRA does not change procedures to avoid Prohibited, Restricted and Danger (PRD) area
- Ideally Flexible Use of Airspace (FUA) is put in place, to optimized FRA implementation

  Notes : FUA is airspace management concept where airspace is designated as A CONTINUUM in which all user requirements are accommodated to the greatest possible extent

  - Taking into consideration Stage of FUA implementation
- Align FRA rules with area reservation procedure
  - Assess system capabilities in analyzing proposed trajectories;
  - Tactically ATC will ensure FR trajectories does not conflict with area reservation

KEY TAKEAWAYS

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- FRA allow Airspace User to PLAN most efficient trajectory between point without referring to the ATS route network;
- Under FRA, Airspace User will need to know which airspace is available/not available for FRA, rather than ATS route availability;
- FRA design should be based on operational requirements, not necessarily on FIR or ATC unit boundaries;
- FRA implementation does not change most procedures like ATC separation, FLOS or FLAS, Airspace Restriction procedures;
- Assess system capabilities required for FRA implementation
- Introduce simple rules, gradually to more complex FRA rules

Question?