The implementation of User Preferred Routes in Australian Airspace.

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Introductions

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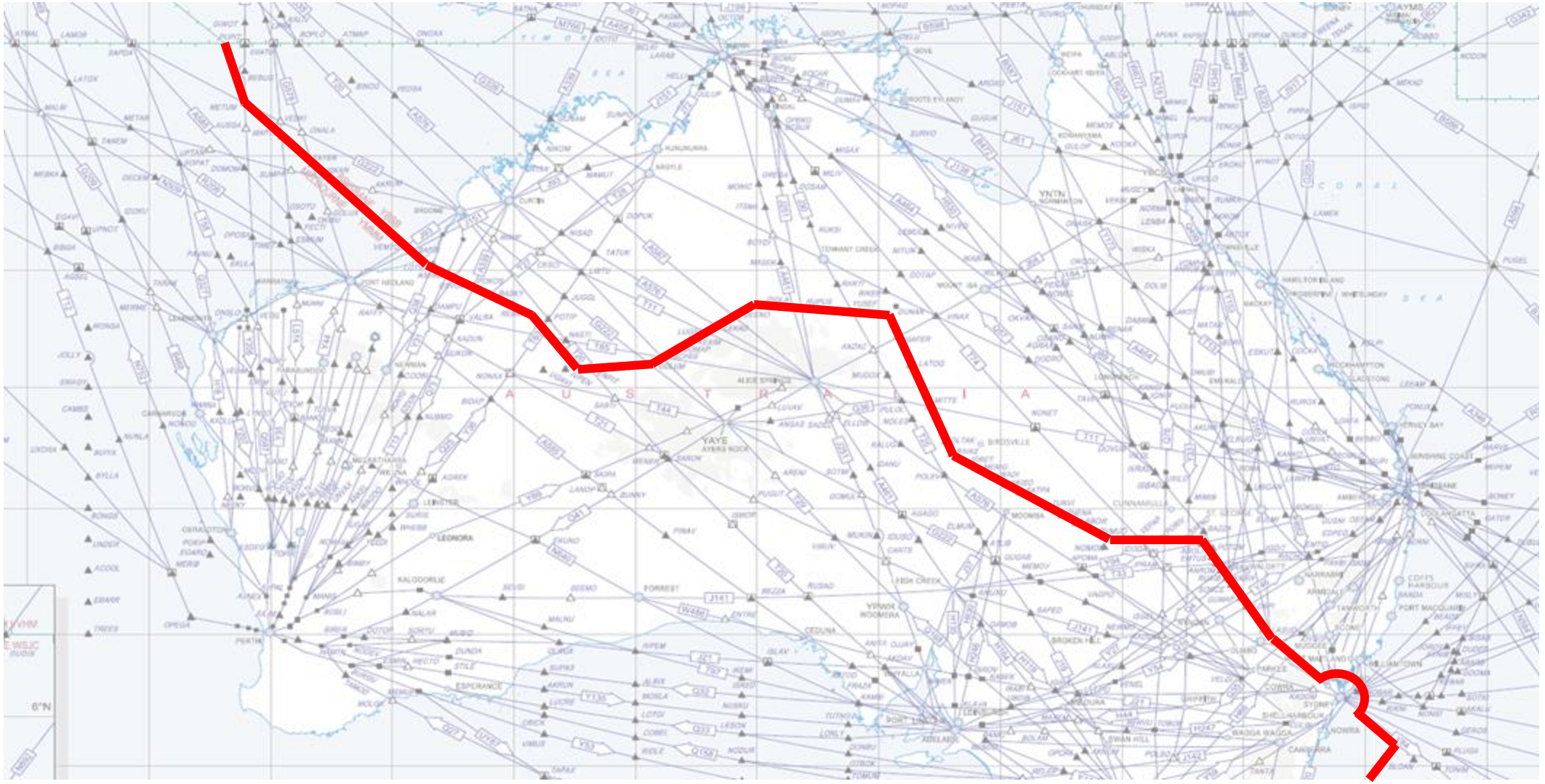
Overview

Key topics

- Australia's fixed air route network.
- Journey towards UPR Airspace.
- Off Air Route Planning, Known Directs and Flex Tracks.
- Transition to User Preferred Routing Airspace during the COVID Pandemic.
- The Updated OARP.
- Benefits of UPR Airspace.
- Where to next.

Australia's Fixed Air Route Network



Australia's Fixed Air Route Network

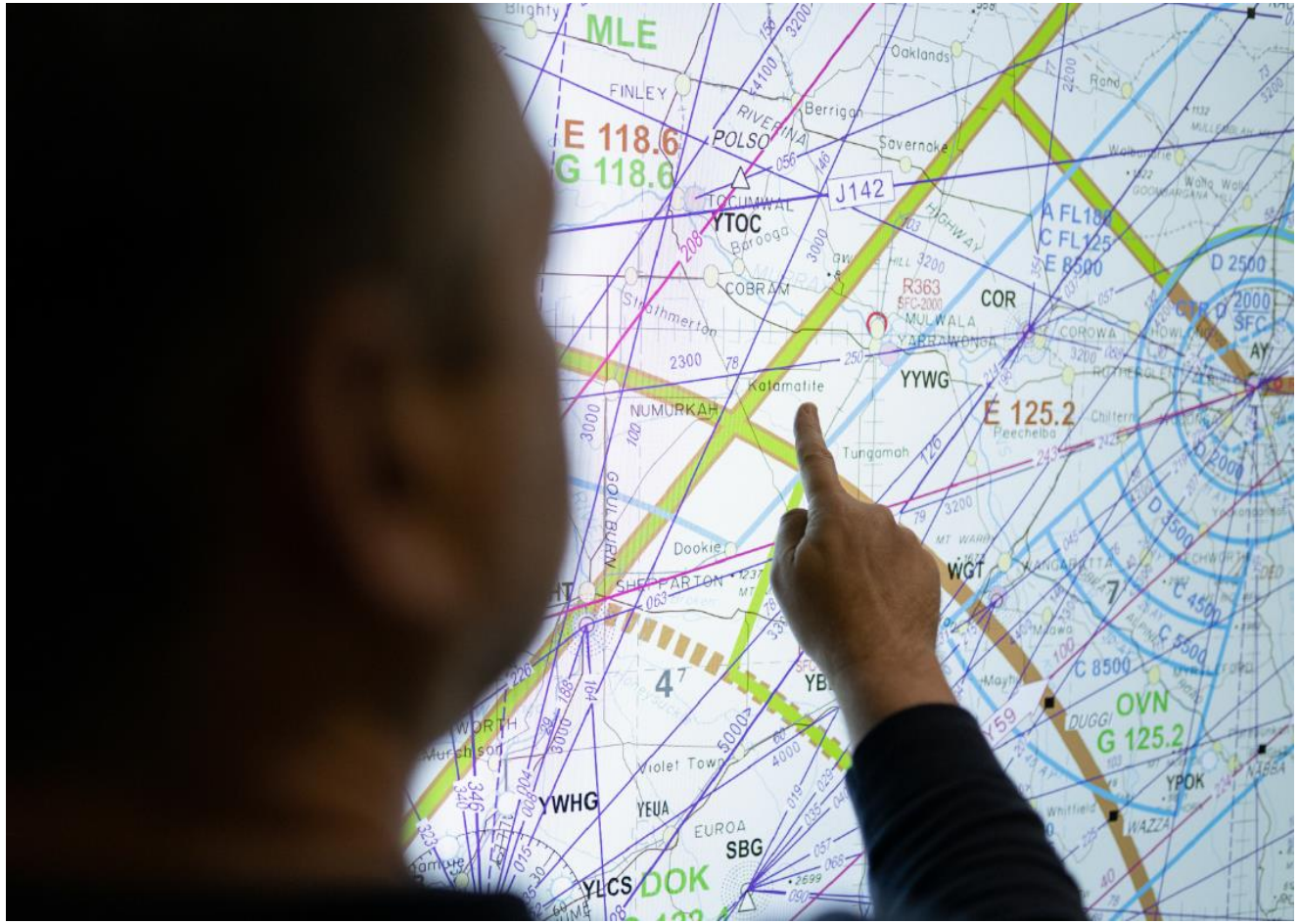
- Airservices Australia is responsible for approximately 11% of the world's total airspace.
- Incredibly vast area that has, in the past, required a network of fixed air routes with designated reporting points and other usage requirements to be published to ensure the safety of air travel.
- Over the years the fixed air route network, as well as Australia's entire ATM system, has been refined and expanded to take advantage of advances in aircraft navigation, communication and surveillance.
- Air route structures, ground-based communication infrastructure locations, tower/approach service locations and other factors have influenced the Flight Information Region design that is currently in operation today.
- However, a fixed air route network remains exactly that – fixed. It does not allow operators to account for weather, winds, turbulence and other phenomena which results in a less that optimum flight plan being produced.
- Thus, the decision was made to work towards the implementation of UPR's using a staged approach due to the limitations of TAAATS and then the expected delivery of the Civil-Military Air Traffic Management System (CMATS).

Journey Towards UPR Airspace

- Over a number of years, slow yet steady progress was made towards the implementation of UPR airspace within Australia.
- Small pockets of UPR airspace were opened in low density traffic areas such as in the oceanic airspace of Australia's east coast which allowed both Industry and Airservices to trial technologies and procedures without implementing wide scale UPR airspace thus ensuring safety was maintained.
- While there was a high level of desire to move further towards the adoption of UPR airspace on a wider basis, Airservices was hampered by the limitations of TAAATS, which by this point was approaching its end of life.
- The main problems were the absence of a medium-term conflict detection capability for the Air Traffic Controllers, some inadequacies within the Flight Plan Safety Net Alert and the absence of strategic airspace conflict detection.
- In order to account for these limitations yet still provide as much flexibility as possible, Airservices created and implemented an Off Air Route Planning (OARP) ruleset. This ruleset allowed some limited use of UPR concepts and offered a restricted level of benefit to operators.

Off Air Route Planning

- Off Air Route Planning was a method for Airservices to facilitate as much of the UPR concept as possible whilst still operating within the constraints imposed by the TAAATS system.
- The options that were available to airspace users through OARP were limited to Direct Route Segments, Flex Tracks and some low traffic density areas of UPR Airspace.
- The ruleset that operators were required to adhere to was published as an OARP manual.
- This manual remains in effect today and has continued to be refined and updated over the years.
- At this stage, the intention was to move further towards full UPR airspace in line with the implementation of the CMATS system which contained more reliable long- and medium-term warning systems.



Off Air Route Planning

- Direct Route Segments
  - Direct route segments allowed aircraft to leave fixed routes so as to transition to or from a UPR or Flex Track.
  - In addition, direct route segments allowed aircraft to ‘cut corners’ on routes and fly directly between two points on the same fixed route or between two different fixed routes.
  - These direct segments differed from fixed routes in that they were not published within standard navigation charting products but were pre-approved by Airservices, listed within the OARP, and available for use H24.

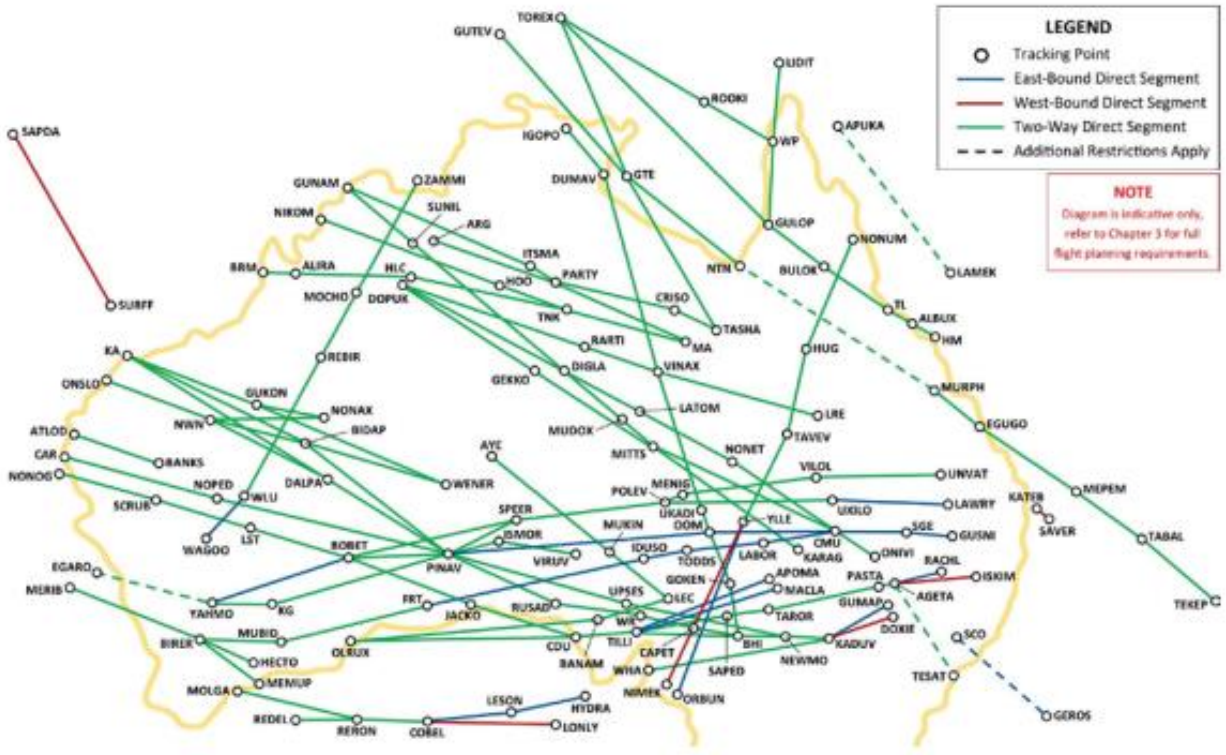
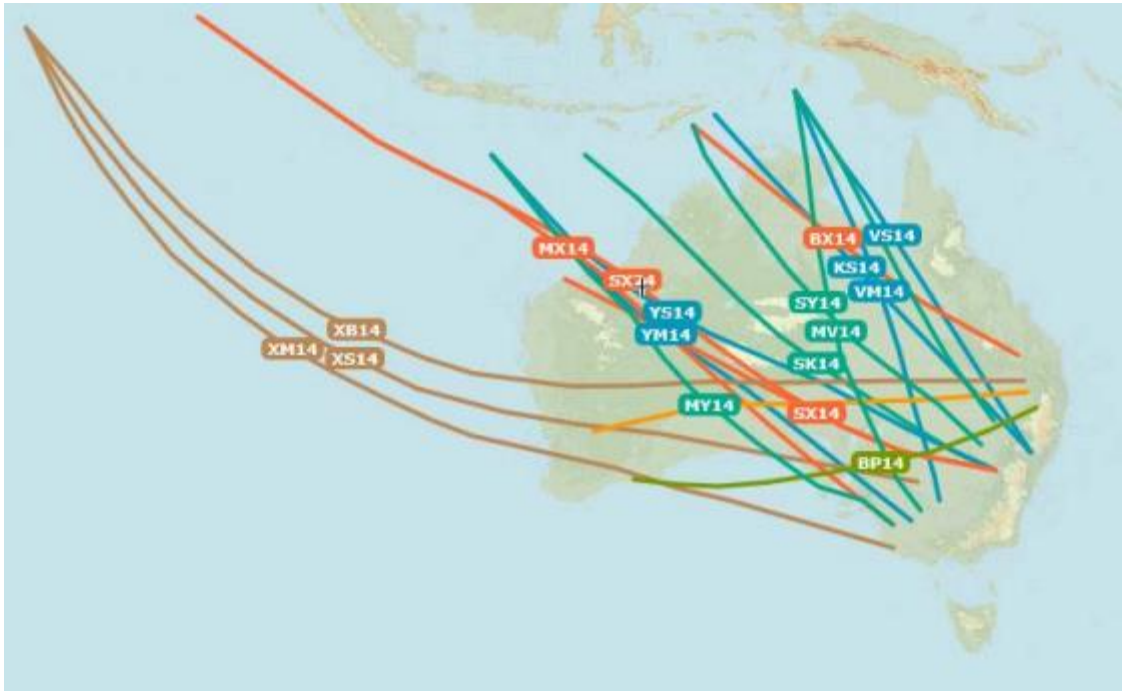


Figure 1 - Australian direct route segments

Off Air Route Planning

- Flex Tracks
  - Flex Tracks were a temporary route, defined daily for an approved city pairing, with specified validity periods.
  - They were proposed by an airline or generated by Airservices and were then published through the Airservices Network Coordination Centre (now the National Operations Management Centre).
  - The flex track was then published internationally through NOTAM and were limited for use between Australia and the Middle East, Australia and South East Asia and Brisbane and Perth.



An opportunity presented by the Pandemic

- As the pandemic took hold in early 2020 and the level of air traffic was suddenly and drastically reduced, Airservices saw an opportunity to open up UPR's over a much wider area.
- In April 2020, an AIP SUP was published which allowed international aircraft to utilise UPR's rather than be forced onto the Flex Tracks that were being published by Airservices.
- Originally, the intent was to move back to the same OARP procedures (Direct Segments, Flex Tracks) which were in place prior to the pandemic when traffic levels increased.
- However, ATC specialists working as part of the team implementing UPR's in Australia were able to implement a small change to the Flight Plan Safety Net Alerting (FPSNA) system. This change, which improved conflict detection on flights planned on UPR's, was put in place and routinely monitored over a significant period as pandemic related travel restrictions were eased, and domestic and international travel began the long journey back to pre pandemic levels.
- Traffic levels post COVID came back in a 'drip feed' fashion which allowed controllers to adjust to separating aircraft on UPR's as opposed to Flex Tracks – an opportunity that would never have presented if not for the pandemic.
- In parallel, the OARP team completed a major re-write of the manual which had significant impact on the ability of operators to plan via UPR in Australia.
- On 15 June 2023, the OARP was updated to permanently remove Flex Tracks and replace them with UPR's covering both oceanic and continental airspace.

The updated OARP

- The June 2023 update to the OARP essentially created two new classifications of Airspace were created, sitting above the traditional classes in use (A, C, E etc)
- UPR Airspace
  - All Class A airspace within Australia excluding any non-UPR airspace as described below. Aircraft operators can plan via UPR in this airspace so long as they adhere to the requirements laid out in the OARP.
- Non-UPR Airspace
  - Airspace within which aircraft operators are not permitted to plan via UPR's. These 'exclusion zones' are published in the OARP and are in place to ensure the safety of flights tracking via fixed routes, usually in high density traffic areas.
  - Includes areas such as the J-Curve, the Perth basin and all areas of Special Use Airspace (SUA).
  - Available for UPR in some cases during periods of low traffic density (timings published in OARP).

The updated OARP (cont)

- Essentially, aircraft operators are now able to plan the most efficient route in designated UPR airspace within the Australian FIR, so long as they adhere to the requirements of the OARP.
- The OARP does contain several restrictions and requirements, such as:
  - Aircraft equipment and surveillance requirements
  - The need to use published ‘gates’ when operating into or out of major Australian Airports
  - The need to commence or cease planning via UPR at known reporting points
  - The need to include a known reporting point on, or within 1nm of, the YBBB or YMMM FIR boundary or an Australian Administered FIR and a Foreign FIR.
  - The need to remain clear of all active SUA
  - Restrictions on ‘hem stitch planning’ over the boundary of two FIR’s due to coordination issues that arise from automated messaging within TAAATS.
  - A small amount of location specific requirements to assist with maintaining the safe flow of air traffic.

1.1 Aircraft Equipment Requirements

Aircraft operating on UPRs must have the following equipment and navigation approvals:

Within CTA Airspace	Within OCA Airspace
a) INS/IRS;	a) INS/IRS;
b) GNSS;	b) GNSS;
c) RVSM Approved;	c) RVSM Approved;
d) ADS-B; and	d) ADS-B;
e) At least one of the following navigation approvals: i) RNP2; ii) RNP4; or iii) RNP10/RNAV10.	e) At least one of the following navigation approvals: i) RNP4; or ii) RNP10/RNAV10; and
	f) HF Radio.

Benefits of UPR's

- As part of the wider CMATS implementation program, a study was undertaken on the expected benefits of the UPR program over the full 20 year life of the CMATS system
- The expected time, fuel and environmental impact savings offered by the implantation of UPR airspace within Australia are significant.
- Airservices expects airlines to be able to save $21.9m on fuel per year whilst also saving $2.9m in carbon emissions at the same time.
- All up, over the 20-year life of the CMATS program it is expected that UPR, in conjunction with Dynamic Airborne Reroute Procedures (DARP), will provide over $739.6m in benefits to industry and the public in general.

Where to next

- As Airservices moves towards the delivery of CMATS with its increased level of support for controllers in terms of its medium- and long-term conflict detection, it is expected that UPR airspace will continue to be expanded.
- Further refinements are planned to include:
  - The transition of UPR procedures into the AIP.
  - Further reductions in the amount of Non-UPR Airspace
  - Facilitating the use of UPR's between major ports (UPR City Pairs)
  - The removal of all direct route segments that have not been formalised into fixed routes.
  - The removal of the OARP once UPR airspace is fully integrated into the Australian Air Traffic Management System.
- Airservices is also committed to coordinating with out neighbours in the Asia Pacific and Oceanna region to allow the use of UPR's across FIR boundaries, ensuring the most efficient flight operations possible in this part of the world.

Questions

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Thank you!

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