

# PBN, RNP and what it all means

OPSGROUP Team  
4 May, 2021



All across Europe, 'Airspace Improvement Events' are occurring. It sounds huge. We were expecting new regions, routes, maybe some special-filtered cleaner air being puffed out into it...

Alas, we read through all the Airspace Improvement Event notices, and from what we gather, it is part of a big, ongoing project to implement things like **Free Route Airspace**, more **PBN routes**, and to basically **tidy up the airspace** a little. This is not limited to just Europe though - the world is going PBN.

## So, less an 'Event' and more a 'Something'?

Everything is moving to Performance Based Navigation. It has something to do with being compliant with EC Regulation 2018/1048, but really just comes down to more efficient, better, safer, increased capacity airspace and approach benefits for everyone.

As simply as possible - **VORs are out, Waypoints are in.**

In a bit more detail - fixed ATS routes will continue to be implemented for better flow management and lateral separation, you'll hear more about Free Route Space, and you'll start seeing more RNP approaches popping up at airports.

So it is actually quite a big change, but one that will be slow to get implemented. Actually, most countries brought in things like **RNAV5 routes** and **SIDs/STARs that use RNAV1 and GNSS** instead of old-fashioned, Navaid-based manoeuvres quite some time ago, so this isn't something pilots will necessarily notice and there is no Big Date to look out for.

Except for one - **December 1 2022** (but we will get to that later).

## Why don't we like conventional Nav aids anymore?

Well, old Nav aids need a lot of maintenance and they break a lot. Ok, not a lot, but they do potentially **double the chance of some sort of issue** for an airplane relying on them. Take your bog standard ILS

for example - it has ground transmitters and aircraft receivers (and all the bits around them and in between then) and if any one of these conks out then you can't fly the ILS (quite so well) anymore.

Your **GPS approach** on the other hand relies on the aircraft system only, which means less to go wrong.\*

\*Actually satellites can have issues too - GPS Jamming is a big problem and the plan to decommission NavAids is being delayed because of this.



A relic almost as old as Stonehenge

### **So, what does this all actually mean, practically?**

For operators, it doesn't mean a whole lot. Most aircraft will have been operating to RNAV5 for a fair old while now, so the only noticeable change will probably some **newly named waypoints**, and some **slightly more efficient routings**.

You might need to **pay a little more attention to any MELs** that affect your performance capabilities, and be aware that approaches might no longer have conventional NavAids as backups in the future because a bunch of these are getting decommissioned.

But overall, it really means keeping an eye on them charts to see what's happening where, and to make sure you pull the right plate out for your arrival.

### **PBN, Say Again?**

So, PBN, again. And December 1 2022. What happens then?

ICAO has ordered **all approach charts** to reflect the new specifications **by December 1, 2022**.

<b>Navigation Specification</b>	<b>Existing chart title, permitted until 30 November 2022</b>	<b>Chart title required from 1<sup>st</sup> December 2022</b>
RNP APCH	RNAV (GNSS) RWY 23	RNP RWY 23
RNP AR APCH	RNAV (RNP) RWY 23	RNP RWY 23 (AR)

This

### **What is changing?**

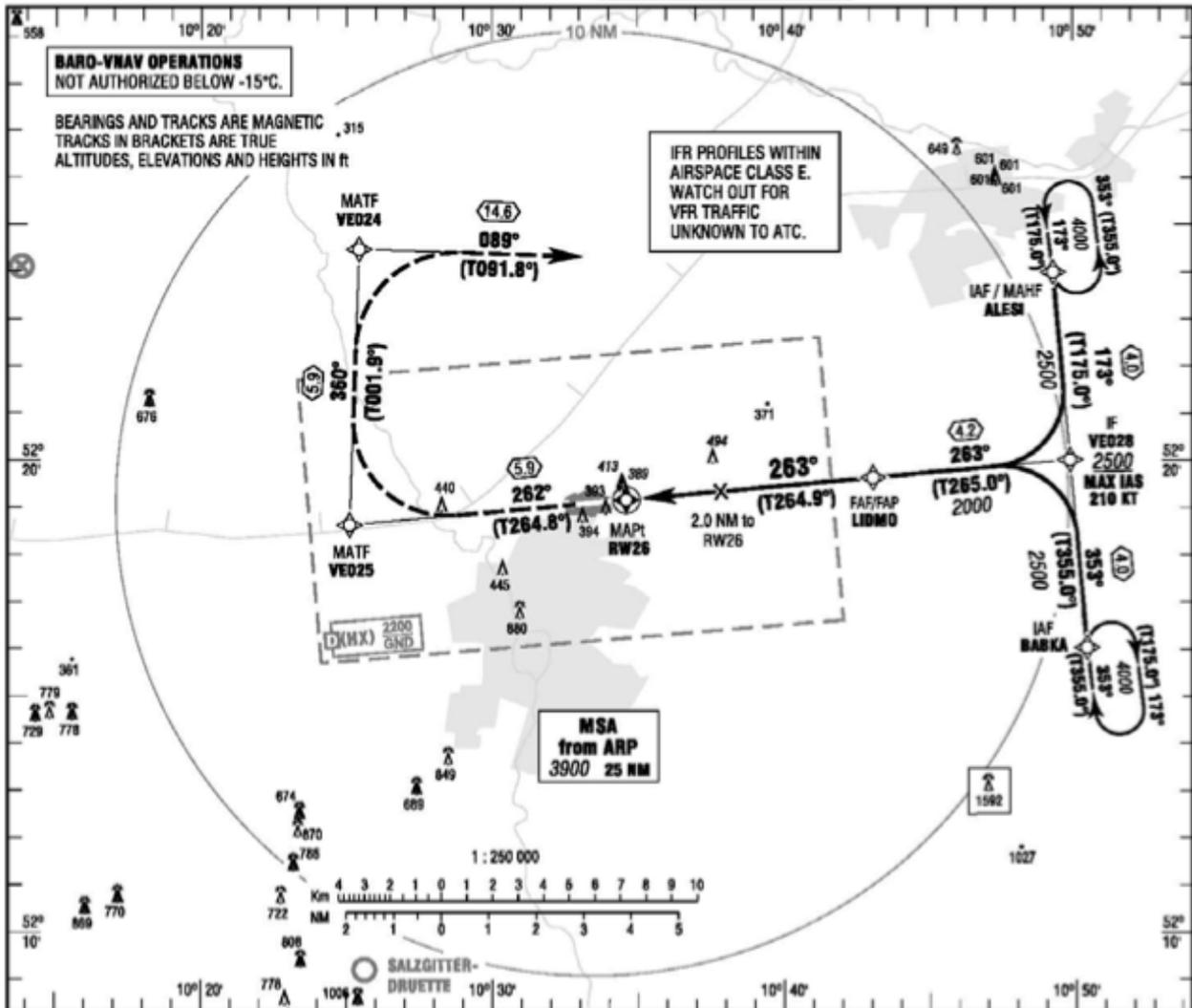
All charts will say **RNP APCH** on them (or **RNP AR APCH**) instead of *RNAV*, *RNP (GNSS)* or whatever other random title they currently have. The chart should have the three lines of minima on it which you will need to know - your **LNAV**, **LNAV/VNAV** or your **LPV**.

INSTRUMENT  
APPROACH  
CHART - ICAO

VAR 2° E  
ELEV 297  
OGH RELATED TO  
THR 26 ELEV 288

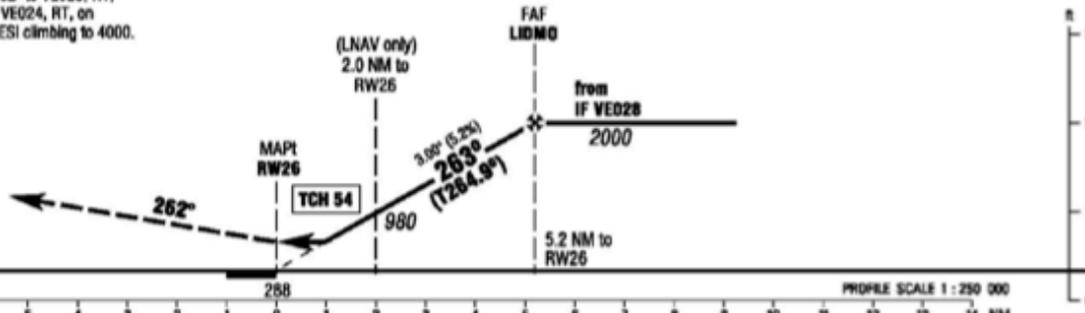
BRAUNSCHWEIG ATIS 134.455  
BREMER RADAR 131.330  
BRAUNSCHWEIG TOWER 120.055

BRAUNSCHWEIG-WOLFSBURG  
RNP RWY 26  
EGNOS CH 99971 E26A



**MISSED APPROACH PROCEDURE**

Climb on track 262° to VED25, RT,  
on track 360° to VED24, RT, on  
track 089° to ALES1 climbing to 4000.



OCA (OCH)	A	B	C	D
LNAV	670 (380)	670 (380)	670 (380)	670 (380)
LNAV / VNAV	545 (257)	555 (267)	565 (277)	574 (286)
LPV	545 (257)	555 (267)	565 (277)	574 (286)

DIST THR / RW26	1	2	3	4	5
ALTITUDE	670	980	1300	1620	1940

Timing not authorized for defining the MAPt.

GS	kt	80	100	120	140	160	180
LIDMO - RW26 (5.2 NM)	MIN-SEC	3:54	3:07	2:36	2:14	1:57	1:44
Rate of descent (5.2%)	ft / MIN	420	530	640	740	850	960

Correction: Communications.

The Chart and the Minimas

## Which country is winning the chart race?

ICAO post updates on the implementation which you can follow here, although they last updated it in 2017 so let's hope it is looking a little better now.

## All the R's

In case you are still lost at RNP instead of RNAV, here is a quick recap on some terms for you:

- **GNSS** is your Global Navigation Satellite System and it is a generic term for all satellite navigation systems including GPS, Galileo, GLONASS, and ones augmented by ABAS, SBAS, GBAS... all the BASEs.
- **LNAV, VNAV, LPV, LP** are your different minima given on an RNP approach chart.
- **PBN** is Performance Based Navigation based on performance requirements of the aircraft on a route or approach or in designated airspace.
- **RNP** is required navigation performance which basically means the onboard monitoring and alerting system your aircraft has.
- **RNP Approach** is a generic term for any approach which uses GNSS to enable it and an RNP system to fly it.
- **RNAV Approach** is what RNP approaches used to be called.
- **RNP APCH** is the name of the navigation specification in the ICAO PBN manual for the 4 types of approach:
  - LNAV (GPS NPA)
  - LP (SBAS-based NPA)
  - LNAV/VNAV (APV Baro-VNAV)
  - LPV (APV SBAS or SBAS Cat I)
- **RNP AR APCH** is an approach that requires a specific aircraft qualification and operational approval. Usually because it takes place in an environment "rich in obstacles". The AR stands for 'approval required'. So you might be allowed to fly an RNP (RNAV) but not an RNP AR and your OpSpec (and training) are going to make this pretty clear.

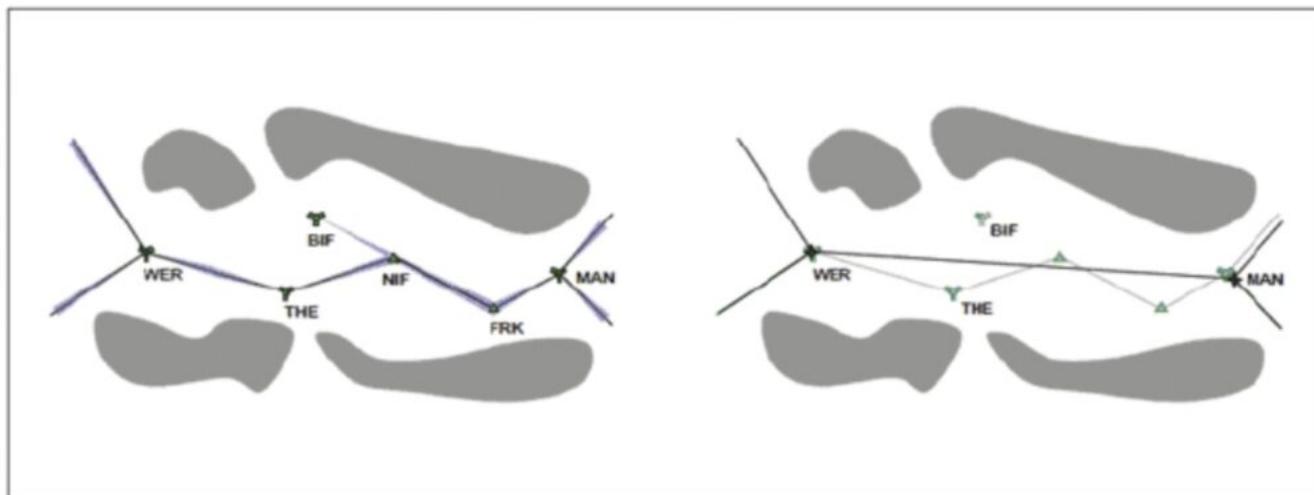
## What is Free Route Airspace?

FRA is a specified volume of airspace in which users can freely plan a route between defined entry and exit points. It makes the sector much more efficient.

## And because we mentioned it earlier, what about RNAV?

Way back in the olden days (not as far back as when airplanes just had a compass and a map to use, but before GPS came in), there used to be NavAids. Ancient relics called VORs and NDBs which helped pilots work out where they were.

## Navigation by Conventional Navigation Compared to Area Navigation



Possibly the least necessary (and most boring) visual explanation of something we've ever seen

But then GPS came along and brought with it a way more effective and accurate way to navigate. How accurate is defined by ICAO under their four main navigation specifications - **RNAV10, RNAV5, RNAV2 and RNAV1**

**RNAV5** is actually fairly basic. It has been around in Europe since 1998 and is mandated in pretty much all high level airspace there.

The 5 bit refers to the requirement for aircraft to operate to a **minimum navigational accuracy of +/-5nm for 95%** of the time.

**RNAV1** is your precision RNAV (1 being +/-1nm). **RNAV10** is generally what you find over the oceans, and **RNAV2** is generally used in en-route areas of the US.

**Fun fact:** The UAE and Bahrain FIRs implemented RNAV1 a while back, which means you need GPS Primary to route into here. If you've encountered GPS jamming en-route, (common in Turkey, Iran, Iraq etc, read all about that here), then this might cause problems for you.

### What do you need for RNAV5 operations?

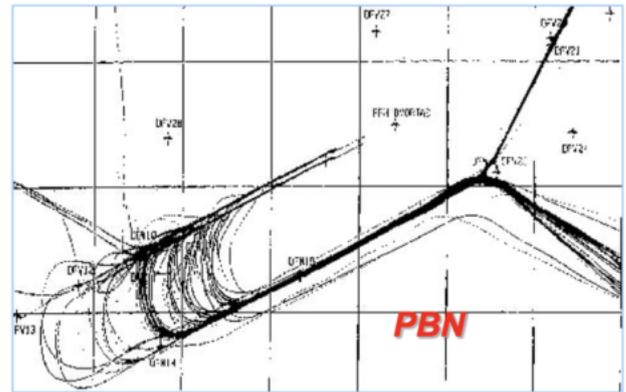
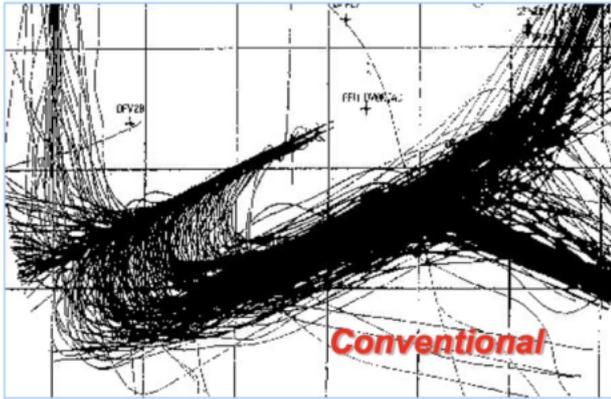
You need some sort of FMS, 1 IRS, 1 GPS or VOR/DME receiver and 2 nav displays.

### What about RNP?

If it is an RNP navigation specification then there is also a requirement for on-board performance monitoring and alerting. RNAV refers to 'area navigation' and it is slightly different to an RNP system (the monitoring and alerting requirements). PBN requires an RNAV or RNP system, while an RNP APCH specifically requires an RNP system.

### What else?

Actually, that's about it. Except for the poor old UK that will no longer support LPV approaches from June.



In case you were wondering about the accuracy, here is a glorious image to show you

### Need to know more?

Here is ICAO EUR Doc 025 which contains all the EUR RNP APCH Guidance Material.

# Canadian Ops Update

OPSGROUP Team  
4 May, 2021



Just a short update on a few things happening in Canada that you might have missed...

### Nationwide

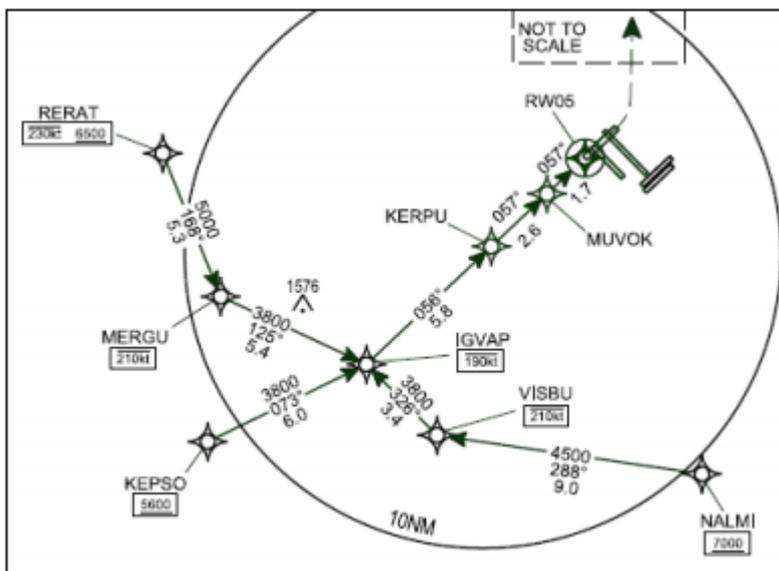
- There has been a change in the **Maximum Indicated Airspeeds for holding patterns** to bring them more in line with the rest of the world. This came into effect on 11OCT18 and will be reflected in the 08NOV18 AIP update. Refer AIC 25/18.

Altitude (ASL)	Maximum Holding Airspeed (KIAS)
At or below 6 000 ft	200
Above 6 000 ft up to and including 14 000 ft	230
Above 14 000 ft	265
Shuttle climbs (all altitudes)	310 (subject to CAR 602.32)

- It's been over a year and a half since NavCanada suspended its **Climb/Descend via SID** phraseology, adding a complication for pilots that regularly cross the border from USA to Canada and v.v. It initially trialed then quickly suspended them *"out of concern over altitude deviations we were seeing in the system and the unforeseen large increase in workload as a result. We are continuing to communicate with airlines, aircraft operators and our employees as we revert to the phraseology rules that were in place prior to this change."* We understand this phraseology has now been officially put in the trash and wont be returning.

### CYYZ/Toronto Pearson Airport

- There are new **nighttime RNAV approaches** starting in **CYYZ/Toronto Pearson** from 08NOV18. These RNAV (GNSS) X instrument approach procedures are for night-time ops between 0030L-0630L on runways 5/6L/6R/23/24L/24R. The procedures are designed to minimize the noise footprint. The ATIS will advertise these as the primary approach type when they are active. Pilots can expect to be cleared directly to the initial approach waypoint, then subsequently cleared for the approach including the appropriate transition. Refer AIC 28/18.



- Slots are currently required for all flights between 0030-0630 local time. The airport authority was planning to make slots mandatory for all GA/BA flights H24 from Nov 17 onwards, but this will now be delayed to some time in early 2019. For more info, contact the Airport Reservation Office at [aro@gtaa.com](mailto:aro@gtaa.com)

Do you know more? Drop us a line!

# Great Australian Bight - RNAV/RNP only airways

OPSGROUP Team  
4 May, 2021



## 7.4. Perth - East Coast - Perth

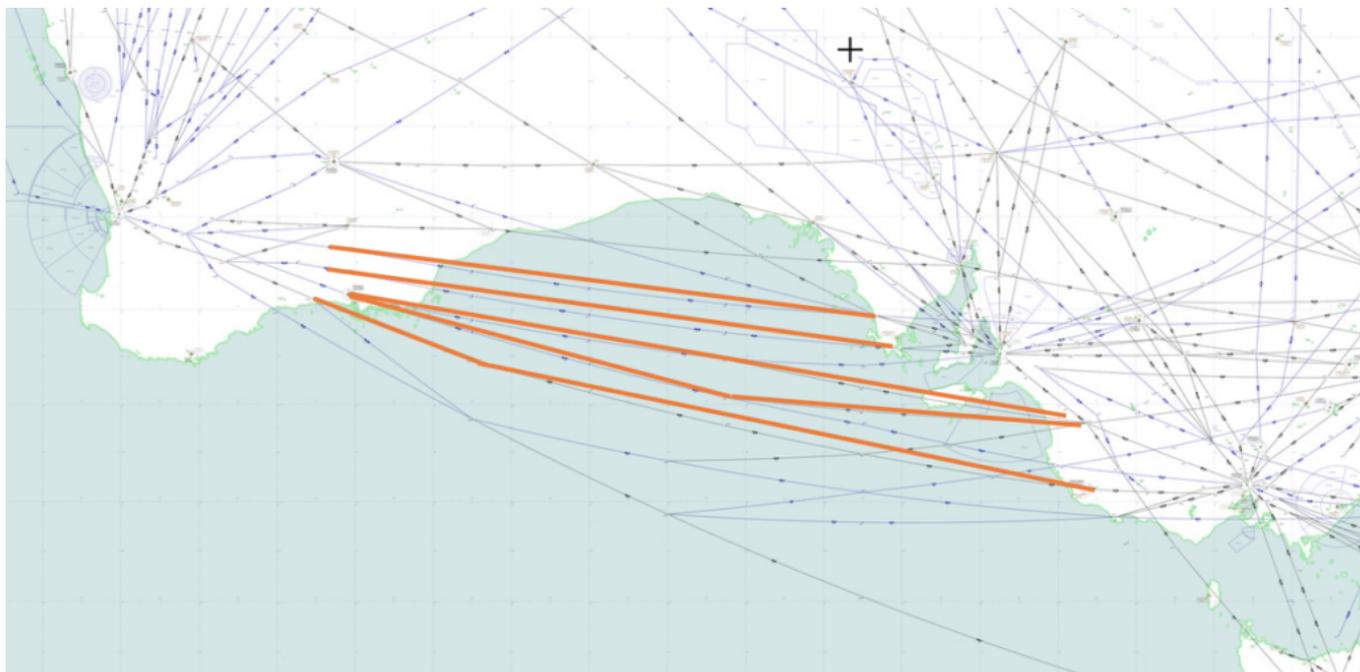
For ACFT operating in the Great Australian Bight area, only ACFT that are RNAV or RNP capable may flight plan on the following one-way routes between waypoints listed:

ATS ROUTE	ENTRY WPT	EXIT WPT
Q32	KAMBI	GRABL
Y135	BURGU	AD VOR
Q33	LONLY	ESP VOR
Q158	ML VOR	ESP VOR
Y53	BURGU	MTG VOR

ACFT flight planning on these routes without correctly indicating their relevant navigation specification, will be reclassified by ATC on a more suitable route.\*The following navigation specifications are acceptable: RNP2; RNP4; RNAV5 with GNSS or IRS/INS; RNAV10 or RNP10.

Australian AIP flight plan requirements (GEN - FPR - 18 - section 7.4) have been updated to remind operators to file the right navigation specifications on their ATC flight plan or risk a re-route for flights over the Great Australian Bight (in the YMMM/Melbourne FIR).

Specifically, for flights operating on the following airways: **Q32, Y135, Q33, Q158, Y53.**



Aircraft flight planning on these routes should meet the following navigation specifications.

- **RNP2; RNP4; RNAV5 with GNSS or IRS/INS RNAV10 or RNP10.**

Aircraft flight planning on these routes **without** correctly indicating their relevant navigation specification **will be re-cleared by ATC on a “more suitable route”**.

One to check next time you’re flying through the area, especially for a flight to/from **YPPH/Perth**.

**Further reading:**

- The Australian CAA have said they will now allow foreign operators to use RNAV1/2 in lieu of RNP 1/2.
- As of Feb 2017, all aircraft flying in Australian airspace now need to be ADS-B equipped.