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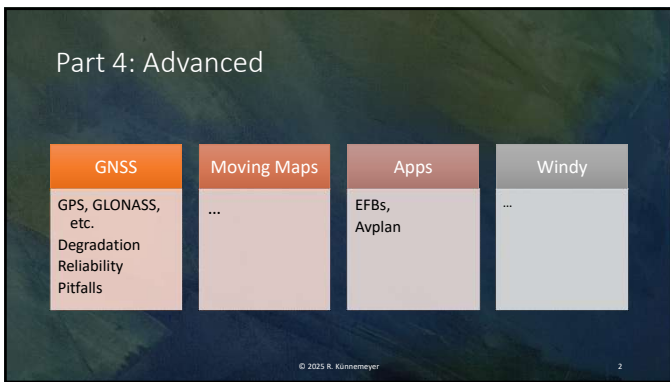
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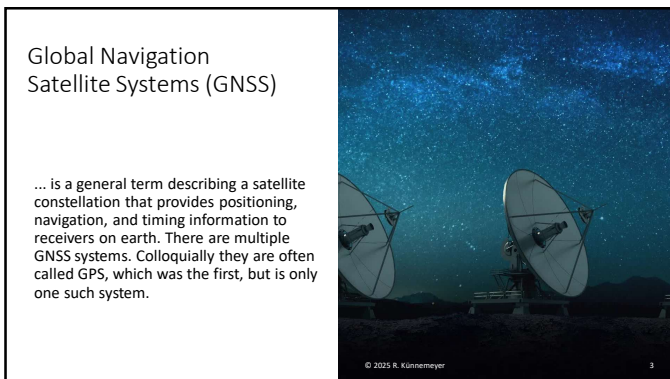
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### Current systems

The diagram shows a central globe labeled 'GNSS Global Navigation Satellite System' with arrows pointing to six systems:

- GPS**:
  - Control and operated by the United States of America
  - 24 satellites launched in 1978
  - Available globally
- GLONASS**:
  - Control and operated by Russia
  - 24 satellites launched in 1982
  - Available globally
- BeiDou**:
  - Control and operated by China
  - 30 satellites launched in 2000
  - Available globally
- Galileo**:
  - Control and operated by the European Union (EU)
  - 24 satellites launched in 2015
  - Available globally
- QZSS**:
  - Control and operated by Japan
  - 7 satellites launched in 2010
  - Available regionally
- IRNSS**:
  - Control and operated by India
  - 8 satellites launched in 2013
  - Available regionally

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### Global Positioning System (GPS)

The diagram shows a satellite constellation with 7 visible satellites and a world map with ground stations. A legend identifies:

- Master Control Stations
- Ground Antennae
- Air Force Monitor Station
- Alternate Master Control Station
- IFSCM Remote Tracking Station
- NGA Monitor Station

- GPS: the US System
- ~32 satellites
- 20,200 km altitude
- 55 degrees inclination
- 12 hour orbital period
- Need 4 satellites to be accurate
- Ground control stations
- Each satellite passes over a ground monitoring station every 12 hours

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### Degradation



The more satellites, the more likely you will get a position even in areas with limited sky such as in a city with tall buildings.



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### Other Problems


So far, New Zealand has been very lucky as there have been no major problems with GPS.

Elsewhere around the world, degradation or complete loss of GNSS is a serious issue. This could be because of simple GNSS malfunction or malicious acts like jamming.

In addition, there have been reports that the maps on GNSS devices were substantially wrong leading pilots to places where they did not want to be.

The iPad is a very attractive and common tablet used widely for navigation software. However, a very common problem is that they overheat in the cockpit of an aeroplane.

...and lastly, do not rely on the electronic devices, make sure you can still navigate with pen and paper when they fall over, and make sure you are looking out of the window!



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### Moving Maps

A moving map display shows an aircraft at the center of a map.



Mechanical displays using moving paper maps were used in the 1950s and 1960s, as the flight deck of this Hawker Siddeley Trident airliner illustrates.

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### Modern Glass Cockpit

This Tecnam Echo panel has digital moving maps with vastly improved resolution, capabilities, and features.



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### Electronic flight bag (EFB) (maps, AIP, weather, NOTAM)

- AvPlan EFB,
- OzRunways EFB,
- Garmin Pilot, etc.



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### Set up life AvPlan show

Setting up your iPad:  
(i.e. WiFi for uAvionics).

- Carrying back up chargers/batteries.
- Stop overheating especially in the sun.

AvPlan EFB is a legal map / AIP replacement.

Aircraft set up. Planning pane. Set up a plan. W&B, etc.  
Bottom panes: Enroute, terminal, weather, etc.

Features on the enroute page, i.e.:

- Georeferenced runway diagrams
- the green into wind runway
- LSALT calculator

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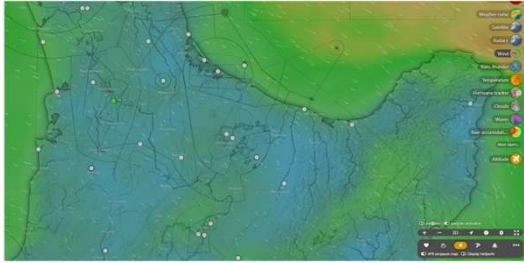
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Set up life [Windy](#) demonstration



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Set up life PreFlight, FlightAdvisor show

<https://gopreflight.co.nz/>

<https://flightadvisornz.io/>

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