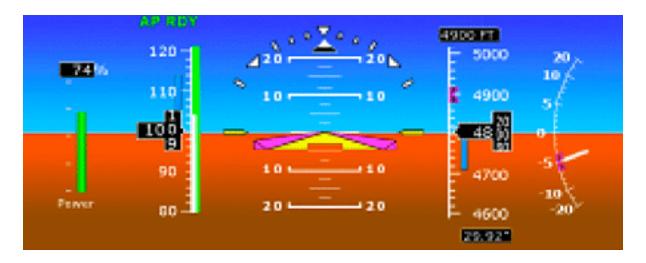# General overview

1. Because we often rely on the MFD for navigational information, we need to make sure that the database is current with the most up–to-date information.
2. Differences between glass and 'steam gauge' cockpits
     - OAT probe is now located on the underside of the left wing
     - Standby instruments
          - Airspeed
          - Attitude indicator
          - Altimeter
     - System is *all electric* – no vacuum system
3. Data sources
     - **AHRS** – Attitude Heading Reference System
          - This computer collects and gives information to the Attitude Indicator and HSI.
          - Replaces the gyroscopic vacuum system
     - **ADC** – Air Data Computer
          - This computer collects and gives information to the Airspeed, VSI, and Altimeter.
          - Replaces the pitot/static system
     - These 2 computers are located in the PFD and make up the ADAHRS – Air Data and Attitude Heading Reference System
          - System **must be aligned before flight**
     - MFD uses external GPS to receive information for the flight display and position.
     - Probes get engine data directly.
4. Limitations
     - The PFD and MFD are not interchangeable and cannot share attitude or air data.
     - Don't shut them down in flight, or AHRS won't come back.

Primary Flight Display (PFD)

The Primary Flight Display is a 10.4 inch color LCD, with one knob and four bezel keys per side. Brightness is controlled with the rocker switch at top right.

Attitude and air data – the PFD's upper half

1. % power tape or tachometer
2. Autopilot Annunciation Area – Displays the autopilot annunciations
3. Airspeed Tape – Indicated airspeed with a range of 20–300 kts. The colors depicted on the airspeed tape are shown below. In the middle of the airspeed tape is the airspeed window which displays the current indicated airspeed

Tape Color		Meaning
Red		V_{NE} up to top of airspeed tape
Yellow		V_{NO} to V_{NE}
Green		V_S to V_{NO}
White		V_{SO} to V_{FE}
Red		20 knots to V_{SO}

4. Bank Angle Indicator – An inverted white triangle and an upright white triangle. The upright triangle points to the specified bank, with markings at 0, 10, 20, 30, 45 and 60 degrees.
5. Slip Skid Indicator – The black trapezoid underneath the bank angle indicator. Full scale deflection is the width of the trapezoid. Not as sensitive as an inclinometer.

7. Pitch Ladder – Shows pitch indications. Blue is the sky and brown is the ground, with markings every 2.5, 5, and 10 degrees.
8. Altitude Tape (left of the Pitch/Bank indicator) – Displays current indicated altitude with a range from –1,000 ft to 35,000 ft. Each minor graduation is 20' and every 100' is labeled. In the middle of the tape is an Altitude Window that displays current altitude
9. Vertical Speed Indicator – Displays the vertical speed in Foot per Minute. The scale is ±2,000 fpm, with scale graduations of every 100 fpm.

HSI and nav info – the PFD's lower half

1. Air Data Data Block – Displays TAS and GS in knots.
2. Magnetic Heading
3. Rate of Turn Indicator – The tip of the blue band displays the current rate of turn. The indicator is marked with half-standard and standard rate. An arrow will be displayed if beyond 1½ times standard.
4. Wind Vector – Displays the current wind speed and direction.
5. Horizontal Situation Indicator
    • Projected Track Line – Displays the current ground track of the aircraft.
    • Bearing pointer – Blue dual-line bearing RMI pointer. Source, but not bearing, is controlled by the bezel key.
    • Course Deviation Line & To/From Flag – Green single-line CDI is displayed.
    • HSI Moving Map – Displays up to 15 different waypoints from the active flight plan. The active leg is depicted in magenta.

Left controls

1. NAV (Primary) – Controls the course of the CDI and the data block. Available sources are GPS 1 & 2, VLOC 1 &2
2. Bearing – Chooses the source for the bearing pointer and data block. Sources are the same as NAV, with the option to turn it off.
3. Aux – Controls the source of the adjacent data block only
4. HSI moving map range – Pushing the knob cycles the HSI views and rotating the knob changes the range when available.
5. Left knob – Depends on the enabled button. If one of the four bezel buttons are pushed it enables the knob to change its function.

Right controls

6. Right knob – Depends on the en-abled button. If one of the four bezel buttons are pushed it enables the knob to change its function.
7. Heading bug – Controlled by the right knob when the heading bezel is selected; solid when tied to the autopilot (if installed).
8. Altitude bug – Hollow bug, set to target altitude
9. Altitude preselect – Displays the numerical value of the Altitude bug, can be moved by thousands, hun-dreds, or tens.
10. VSI bug
11. Barometric correction setting – Kollsman window equivalent. Al-lows Hg, Mb, Hp, the allowable range is 27.50" to 31.50" of Hg.
12. Current barometer setting is repeated below the altitude tape.

Multi-Function Display (MFD)

The Multi-Function Display is a 10.4 inch color LCD, with one knob and *five* bezel keys per side. Brightness is controlled with the rocker switch at top right. Information displayed includes a moving map, flight plans, engine data, and system settings.

Map page

1. Left bezel keys
   - Multipurpose buttons used to provide various information for the current display of information. Pages include: Map, TAWS, Chart, Trip, Nrst, Chklst, Aux, and Engine
2. Right bezel keys
   - View – Orients the map for either Track Up, North Up, or Heading Up, either Centered or Forward.
   - Declutter – Gradually filters out navigational information. Loops.
   - Base map
   - Terrain – water and terrain, with colorized elevation data.
   - Base – water and political borders.
   - None – black background only.
   - WX Overlay – Displayed only when weather datalink is installed.
3. Range knob – changes map scale, from 1 nm to 1,500 nm.

Traffic page

When the datalink reports a Traffic Advisory, a message pops up on the lower right of the MFD. Pushing the ACK softkey switches the MFD to a dedicated traffic page that looks just like the Garmin 430 display.

Trip page

1. Ground speed and track information
2. Flight plan information from the GPS.
3. Digital CDI shows course data.
4. Local and UTC time, handy if you're bad at converting.
5. Destination information
6. Display softkey cycles through available information sources.
7. Textual METAR, if datalink available.
8. Select knob moves between waypoints.

Nearest page

1. Type cycles through nearest objects:
    • Airports
    • VORs
    • NDBs
    • intersections
    • obstacles
2. List of the objects, including bearing, distance, frequency, and name.
3. Selection keys
4. Filter applies the preset airport types.
5. Airport info shows layout and frequencies for selected airport.
6. Graphical METAR icon appears if data has been downloaded.

Engine page

1. Gauges show manifold pressure (if applicable), RPM, % power (if applicable), oil temperature, and oil pressure.
2. Electrical information shows current bus voltage and alternator output.
3. OAT shows temp in °F or °C, controlled by the bezel key.
4. Fuel information depends on hardware installed and may require original fuel load to be input at

startup.

5. CHT and EGT information, when installed.

AUX / Settings page

Generally should be left alone in UND aircraft, as we're always flying different aircraft, but settings include:

1. Airport filter sets criteria for nearest airport searches.
2. Declutter setup allows the user to customize what is taken out with each press of the Declutter button.
3. Data block allows the pilot to adjust what is presented in each of the data blocks on all the pages.

Questions and scenario

1. Where is the turn coordinator located? Inclinometer?
2. How can we determine wind aloft?
3. We need to change our heading. What steps do we need to take?
4. How do we switch the source for Bearing or Course data?
5. Which setting changes barometric pressure?
6. What are the six MFD pages?
7. How can we change the map range? Orientation?
8. Can we remove extra map information? How?
9. How do we view traffic information in greater detail?

- Using the MFD trainer, create a flight plan in the GPS from KBLI to KOLM, via the PAE VOR
- Verify the flight plan is loaded into the MFD with the appropriate waypoints.
- Using the filters, change the requirements for nearby airports to display.
- Configure the map display to show only the forward view.
- Declutter the map page.