GACE Flying Club

KLN 94 IFR

Michael T. Carey
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(631) 293-8600
mcarey@itsystemsgroup.com

KLN 94 IFR Agenda

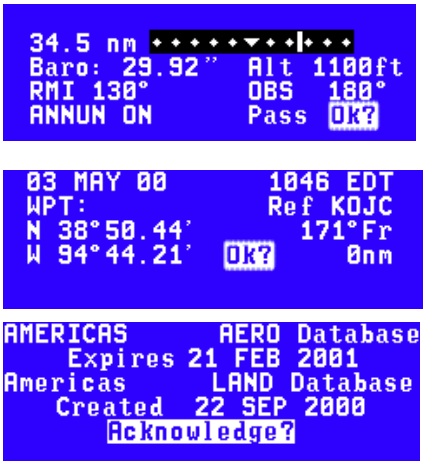
- Review of power on sequence – things to check for IFR flight
- Expired databases
- Review of flight plan entry and management of flight plans
- Practical/examples: Clearance to flight plan
- OBS mode review and some rules regarding switching back to leg mode from OBS mode
- GPS approaches in depth – LPV, LNAV/VNAV, LNAV, Circling
- WAAS Intro
- RAIM – when to worry, AUX 3 page
- Review GPS approaches at KISP (with plates)
- Missed approaches – what happens? Procedure?
- DPs and STARs
- Sample flight KISP to OXC
- Sample flight from ISP to POU – DP to enroute to approach.
- Sample flight from POU to ISP - DP to enroute to approach.

Power On Sequence

- Power is linked to avionics master switch
- Push = On, Pull = Off, Dial for brightness
- Warm-up screen during very cold operations
- After self tests complete and no errors:
  - See Baro, adjust as needed, press ENT
  - Confirm Pass, see OK, press ENT
  - Confirm Position & time/date, see OK, press ENT
  - Confirm database expiration, see Acknowledge (ENT)
- Generally, the last airport waypoint is displayed with frequencies (APT +5 page)

Check GPS I/O

- Confirm NAV 1 CDI switch is on “GPS”
- Nav 1 CDI – half deflection to the right with FROM indication
- Set Baro, confirm ALT with altimeter, confirm pressure ALT with transponder
- NAV 1 OBS – spin and confirm readings match
- Pass = OK. If not, cycle power only once
- Confirm all reported data



Flying with an expired database

GARMIN Ltd. or its subsidiaries
c/o Garmin International
1200 E. 151st Street, Olathe, KS 66062 USA

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for a Garmin 400W Series Navigation System

a) IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.

b) GPS instrument approaches using the 400W Series units are prohibited, unless the 400W Series unit's approach data is verified by the pilot or crew to be current. Instrument approaches must be accomplished in accordance with an approved instrument approach procedure that is loaded from the 400W Series unit database.

- If expired, file /R (/G with no GPS Aprchs)
- If current, file /G

Interface Review

- Buttons
  - PROC = Procedure (used for selecting approaches)
  - MSG = Message
  - OBS = Toggles between Leg and OBS modes
  - ALT = Altitude (sets Baro)
  - NRST = Nearest
  - D = Direct
  - CLR = Clear
  - ENT = Enter/Acknowledge
  - MNU = Menu (used with MAP pages)
  - RNG (up/down) = adjusts range for map page
  - CRSR = Cursor

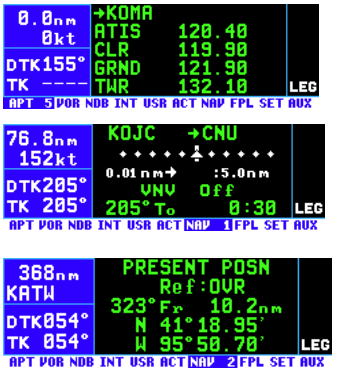
Interface Review

- Knobs
  - Brightness
  - Inner (smaller knob), pull for scan*
  - Outer (larger knob)
  - Key Point: Inner & Outer knobs behave differently with cursor on versus cursor off
- Other
  - Database Card
  - Data Port

*Very useful when used with the Direct Button when selecting a future waypoint in the active flight plan

Display Pages Review

- Chapters: APT, VOR, NDB, INT, USR, ACT, NAV, FPL, SET, AUX
- Pages: NAV 1, NAV 2, APT 1, APT 2, etc.
- With the cursor OFF, select the Chapter with outer knob and the page with the inner knob



Enter IFR flight plan as a numbered plan

- Use the outer and inner knobs to get to FPL 1..25
- If the flight plan is not empty and you want to clear it:
  - Make sure the cursor is OFF
  - Press CLR
  - Confirm deletion (Note “Copy FPL 0” at top)
- Enter your flight plan starting with the departure airport and ending with the destination airport. Note that after you enter the first waypoint, the “Copy FPL 0” is gone and is replaced by “Use? Inverted?”
- Insert or delete waypoints as needed
- When finished, move the cursor over “Use”
- Press Enter and the flight plan is copied to FPL 0 which means that it is activated. Or, leave the flight plan there for future use.

Clearance Examples

- Use your IFR low altitude enroute chart
- Listen to clearance and create the list of waypoints or the “waypoint stack”
- KISP to KOXC
- KISP to KPOU
- KISP to KACY
- Practice with http://www.fltplan.com
- *Aside: See http://www.voiceflight.com/ for a demo of voice activated flight plan entry*

IT Systems & CONSULTING

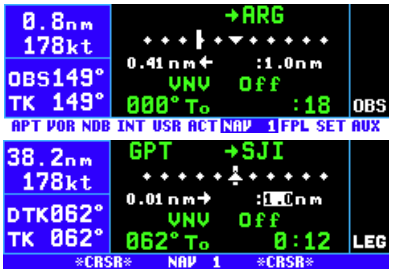
OBS mode for IFR

Applications:

- NDB/VOR overlay approach
- Terminal Procedures (DP)
- Holds

Quirk:

- If you switch from Leg mode to OBS mode during the enroute phase of a flight, pressing the OBS key again to return to the active leg will NOT work unless the waypoint is behind you (From)
- If the waypoint is ahead (To), the DTK becomes the OBS course. See page 5-17.



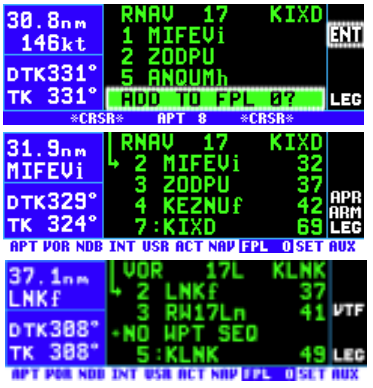
- OBS Mode can be very helpful with departure procedures when tracking an outbound course

GPS Approaches

- The KLN 94 GPS is approved for non-precision approach procedures.
- Approaches are loaded using the PROC button and then choosing “Select Approach?”
- Next, the airport is selected
- Then the approach
- Then either an initial approach fix (IAF) or Vectors
- Choosing Vectors will navigate via the final approach course and depict the final approach fix (FAF)

GPS Approaches (cont.)

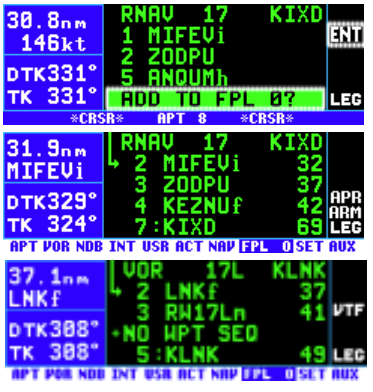
- Once you choose the IAF or Vectors, select “ADD TO FPL 0”
- The approach waypoints are added to the flight plan just before the destination airport waypoint
- APR ARM – The approach is armed, but not yet active. The CDI scale factor is +/- 1.0 NM
- APR ACTV should occur at 2 NM from the FAF and the CDI scale factor will change to +/- 0.3 NM
- RAIM – always working, most strict during APR ACTV



APR ARM mode will automatically occur if an approach is loaded and you are within 30 NM of the airport.

GPS Approaches (cont.)

- Expect “Press ALT to Set Baro” within 30 NM of airport – important for integrity monitoring
- There is no SUSP button – see “NO WPT SEQ”
- If going missed, the GPS will maintain the FAC past the MAP. Press “Direct.” The first waypoint of the missed approach procedure will be displayed.
- Use OBS mode in hold
- Re-select the approach at the appropriate time



Identify the lower case letters above. You will be reminded about OBS mode within 4 NM of the holding fix.

GPS Approach Types

- LPV – Localizer Performance with Virtical Guidance (WAAS only)
- LNAV/VNAV – Originally designed for FMS-equipped airplanes that used altimiter data to construct the glide path. Easily emulated with a WAAS GPS
- LNAV – Classic non-precision GPS approach
- LNAV+V – Flown to LNAV minimums and gives advisory glidepath information to smooth out or stabilize the approach path (versus “dive and drive”).

Approach Plate Review

RAIM and WAAS

- RAIM – Receiver Autonomous Integrity Monitoring - always active in the KLN 94, more strict during approaches. RAIM predictions are done automatically, ex) APR ACTV will not occur if the tests fail
- FltPlan.com will predict RAIM outages provided that you select a GPS equipped aircraft. For a country-wide view, see www.raimprediction.net.
- WAAS – Wide Area Augmentation System. Gives us very precise position information (better than 3 meters 95% of the time), vertical guidance, flight along curved paths, holds, 3 dimensional variable position fixes

DPs and STARs

- DPs – Departure Procedures
  - Press PROC key
  - Choose “Select Depart?”
  - Select Airport (departure airport is elected)
  - Select DP by name
  - Select Runway
  - Select Transition
- STARs – Standard Terminal Arrival Routes
  - Press PROC key
  - Choose “Select Arrival?”
  - Select Airport (destination airport is elected)
  - Select STAR by name
  - Select Transition
  - Select Runway
- Automation is limited – see page 6-39

Practice - Sample Flights

- Review all GPS operations from startup to shutdown
- Use ATC issued clearance and DP
- Ex) Work with the following clearances:
  - KISP to KOXC
  - KISP to KPOU
  - KPOU to KISP
- What is the flight plan or “waypoint stack?”
- How do you handle the departure procedures?
- Step through what happens during the flight
- Be aware of your pending “GPS keystrokes” for each change in flight phase

Conclusion and Suggestions

- Map out IFR routes and be aware of the “breaks” or “turns” in your routes.
- Use FltPlan.com for IFR route suggestions and to see what ATC has issued recently for your flight
- Use FlightAware.com to see the route that ATC is intending to issue you (it can be helpful to review the route and right it down prior to receiving your official clearance)
- Enter your flight plan into a numbered plan (1..25)
- Make your flight plan active (“Use” it) before leaving the tie down spot, confirm you are navigating to the first waypoint
- Practice with an instructor or safety pilot in VFR conditions – with and without the hood
- File short IFR trips in VFR conditions and request a GPS approach
- Stay ahead of the GPS, know what you are going to do next
- Enjoy the benefits of GPS Navigation!

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Thank You!

Michael Carey
mcarey@itsystemsgroup.com
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