

Lesson Plan - ATC Script - EAA PPC 2022

Pilot in Command

The Art of IFR Clinic - **ATC Script**

MISSION SUMMARY: It's September July 12th, 2017 at 1956Z. The pilot is headed from Redding, CA to Arcata, California (KACV) for a business meeting. KRDD is currently MVFR, but the TAFs are calling for LIFR conditions all along the Northern California coast. They'll need to be on their game for the approach into KACV. The airplane has a full tank of fuel with one (1) soul on board.

OBJECTIVE: This scenario is designed to challenge the pilot-in-training (P-I-T / PIT) to choose the best approach for the successful completion of an IFR flight. Will the pilot choose an approach into the wind but without lighting at minimum visibility, or will they opt for choosing an approach with a benign tailwind and MALSR's?

INSTRUCTOR NOTES: "Pilot in Command" is a very challenging scenario and should be reserved for more advanced instrument training. Clearly a diversion to the filed alternate airport would be a sound decision if this were a real IFR cross country flight; however, this is a simulation flight and we know that the programmed weather conditions will permit a well flown approach to runway 32 at KACV. The lesson for the pilot-in-training in this scenario is that the best runway may not always be upwind.

Prior to the scenario starting the instructor should provide the P-I-T with the reported weather at KACV:

KACV 121956Z 3/4SM 15006 OVC003 24/24 A2992

Allow the PIT to make their choice of approach to KACV. Once they have made their choice have them load their requested approach into the GPS. (Do note that if they load Vectors-to-final any and all approach fixes outside of the FAF will disappear from the flight plan.)

In the real world the pilot would be handed off to Seattle Center (124.85) around 14 miles east of the YAGER intersection. (The clearance up to this point had been, "KENDL.4.KENDL, TOMAD, V195, FOT, V494, SEVLY, DIRECT.) At that point the P-I-T would make their request with Center as to which approach they would like.

The P-I-T has several choices here. They can request: Vectors for the RNAV 14; Starting at CULDU for the full procedure RNAV14; the YAGER transition for either the RNAV or ILS 32; direct VOMAC for either the RNAV or ILS 32; or Vectors for either the RNAV or ILS 32.

Dependent upon the P-I-T's choice of approach the scenario will start at one of two points. If they have selected the RNAV 14 the scenario will start with the airplane positioned 5 miles to the west of KACV at 5000'. Heading 310°. If they have requested the RNAV or ILS 32 the scenario will start with the airplane positioned 4 miles southeast of VOMAC (on the YAGER transition) at 6000' cleared DIRECT VOMAC. (note: Even if the pilot requests vectors for the 32 approach, because of the position of the airplane when the request was made, they would

most likely be cleared YAGER and the YAGER transition.)

Things will happen fast once the scenario is started so the pilot should be encouraged to spend some time briefing the situation, choosing the approach and preparing for a rapid sequence of procedures:

- Confirming the published weather with the KACV ASOS.
- Setting up proper NAV / COM frequencies.
- Communicating the desired approach with ATC.
- Briefing the missed approach procedure (MAP).

Communication frequencies have been preset as follows:

COM 1 Active - 124.85 (Seattle Center) Standby - 123.0 (KACV UNICOM)

COM 2 Active - 118.525 (KACV ASOS) Standby - 123.0 (KACV UNICOM)

NAV 1 Active - 113.7 Standby - 117.2

NAV 2 Active - 110.6 Standby - 116.8

The ATIS at KACV shows the weather at minimums

KACV 121956Z 3/4SM 15006 OVC003 24/24 A2992

The winds favor runway 14, which is over 6,000' long, but it is not equipped with approach lighting. The LPV visibility mins for the RNAV Rwy 14 are for RVR 45 or 7/8, but the reported visibility of $\frac{3}{4}$ SM is 1/8 of a mile less than the RVR. The ceilings for all three approaches are just slightly above the approach minimums. This doesn't prevent the pilot-in-training from flying the RNAV Rwy 14 approach to "take a look" with the hope that the visibility will increase by the time they reach the DA. But upon reaching it they will not be able to see the runway and this will lead to a missed approach.

At that point the P-I-T has several choices:

1. Go back for a second try;
2. Request direct Fortuna (FOT) for either the ILS or RNAV 32;
3. Direct VOMAC with the HLPT for either the ILS or RNAV 32;
4. Request vectors for either the ILS or RNAV 32. If they request direct VOMAC they will have to fly the hold in lieu of procedure turn. It's the only way the approach can be loaded from their position on the missed approach.

As the instructor you should coach the P-I-T on ways to prepare for the missed approach intention.

The minimums for both the RNAV and ILS or LOC for Rwy 32 have a lower RVR, 18 or 1/2, with a MALSR to light the way to the runway. The mission is designed such that the pilot will be able to identify the runway environment at the DA early enough to make a safe landing if the approach to runway 32 is flown properly.

The pre-flight briefing for this scenario is important so allow time for this. Careful review of the airport environment will reveal the superiority of runway 32 with its lighting system and landing area. With a usable landing length of 4,824' beyond the glide slope, a six knot tail wind is not a big factor. A Cessna 172 needs approximately 1250' to land and a tailwind wind up to 10 knots will increase that distance by 21%, or to 1,513'. So there is still an ample error margin for an SR22 or even a Baron.

If the pilot-in-training selects the RNAV approach to Rwy 14 allow them to fly it and initiate a missed approach. When ATC asks them to "say intentions" the pilot-in-training should be prepared for their request.

If the pilot flies the RNAV 32 approach correctly they will see the runway lighting in time to make a successful landing so there is not a planned alternate for this scenario.

It is important to note that if the P-I-T loads vectors-to-final, (as well as once they have activated VTF) any and all fixes outside of the FAF will disappear from the flight plan. You, as the instructor playing the role of ATC, have the opportunity to clear them direct to either CULDU (RNAV 14) or VOMAC (ILS / RNAV 32) if they have already loaded VTF, forcing them to reload the approach.. they would now have to reload the approach starting at VOMAC.

If vectors to final for the RNAV 14 is activated while situated southwest of UYFOR, the approach will be in suspend mode. (It will unsuspend automatically when the GPS senses the 30° intercept heading). It can be manually unsuspended but if that is done while still on the "inside" hemisphere of UYFOR the entire approach will be lost. In that case the P-I-T will have to reload the entire approach. Also note that the GP will not appear until the "suspend" has been cancelled.)

Air Traffic Control (ATC) Scripts:

Note: SC = Seattle Center; PIT = Pilot-in-Training.

SCENARIO 1 - Pilot initially chooses an Approach to Runway 14

SCENARIO 1A - RNAV 14, Vectors to Final,

SC: "Cessna xxxxx fly heading 310 descend and maintain 3000'"

PIT: "Fly heading 310 descend and maintain 3000', Cessna XXX"

When the DIS (distance to UYFOR) shows between 5-8 NM outside UYFOR -

SC: "Cessna XXX turn right heading 050°"

PIT: "Turn right 050° XXX"

When the XTK (cross track error – found on the HSI) shows .8NM-

SC: "Cessna XXX, X miles from UYFOR, turn right heading 110,° maintain 3000 until established, cleared RNAV 14 at Arcata"

PIT: "Turn right 110° maintain 3000, cleared the approach, XXX"

2 miles before UYFOR-

SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

Upon initiating the missed approach, and after cancelling the suspension:

PIT: Seattle Center, Cessna XXX missed approach Arcata, XXXX' climbing 3000'"

SC: "Say intentions"

At this point hopefully you have already discussed with the P-I-T what their "plan" is, and they should already be prepared for their request. See below for scripts for the possibilities on the missed approach.

SCENARIO 1B - RNAV 14, Procedure Turn at CULDU,

SC: "Cessna XXXXX cleared direct CULDU, cross CULDU at or above 4000 cleared RNAV 14 at Arcata, report CULCU inbound.

PIT: Direct CULDU, cross CULDU at or above 4000 cleared the approach, report CULDU inbound.

2 miles before UYFOR-

SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

Upon initiating the missed approach, and after cancelling the suspension:

PIT: Seattle Center, Cessna XXX missed approach Arcata, XXXX' climbing 3000'"

SC: "Say intentions"

At this point hopefully you have already discussed with the P-I-T what their "plan" is, and they should already be prepared for their request. See below for scripts for the possibilities on the missed approach.

If the PIT chooses to fly the approach again use the VTF script above.

If the PIT chooses direct Fortuna for either the RNAV or ILS 32 approach-

SC: "Cessna XXX cleared Fortuna, climb and maintain 5700', cross Fortuna at 5700', cleared RNAV or ILS 32" (whichever the pilot chooses) report VOMAC inbound

PIT: Cleared direct Fortuna, climb 5700, cross Fortuna at 5700 cleared the RNAV or ILS 32" (whichever the pilot chooses) report VOMAC inbound

If the PIT chooses direct VOMAC-

SC: Cessna XXX cleared direct VOMAC, climb and maintain 5700',cross VOMAC at 5700', cleared RNAV or ILS 32" (whichever the pilot chooses), report VOMAC inbound.

PIT: Cleared direct VOMAC, climb and maintain 5700',cross VOMAC at 5700', cleared RNAV or ILS 32", report VOMAC inbound.

At VOMAC inbound-

SC: Cessna XXX SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

If the PIT chooses VTF,-

SC: Cessna XXX turn left heading 160, climb and maintain 4700', vectors for the RNAV or ILS 32" (whichever the pilot chooses)

PIT: "Turn left heading 160, climb and maintain 4700', vectors for the RNAV or ILS 32" XXX"

When the airplane reaches an XTK of 5 miles-

SC: Cessna XXX turn left heading 140°

PIT: Turn left heading 140°, XXX

As the airplane is passes JEBGA outbound -

SC: Cessna XXX turn left heading 050°

PIT: Turn left heading 050° XXX

When the airplane is at an XTK of 1 mile-

SC: Cessna XXX, 9 miles from VOLEW, turn left heading 340°, maintain 4700' until established, cleared RNAV / ILS 32 at Arcata.

PIT: Turn left 340°, maintain 4700 til established cleared the approach, XXX

When the airplane is at SAWGU-

SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

SCENARIO 2 - Pilot initially chooses an Approach for Runway 32

SCENARIO 2A - ILS / RNAV Rwy 32, Vectors to Final

If the P-I-T chooses vectors to final and has already loaded it they will perhaps be surprised when center clears them direct VOMAC. (It makes no sense to be vectored considering the request would be made outside YAGER on the initial contact with Seattle Center and there is a transition to either 32 approach from YAGER.)

SC: Cessna XXX I have your request, cleared direct VOMAC maintain 5700'

PIT; Proceed direct VOMAC, maintain 5700'. (If the P-I-T has already loaded vectors for the Rwy 32 approach they will now have to reload the approach, as all the fixes outside of VOLEW, the FAF, will have been removed from the flight plan.)

When the airplane is 2 miles from VOMAC-

SC: "Cessna XXX cross VOMAC at 5700', cleared ILS / RNAV 32 straight in"

PIT; "Cross VOMAC at 5700', cleared ILS / RNAV 32, straight in"

When the airplane is at SAWGU-

SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

SCENARIO 2B - ILS or RNAV Rwy 32, from VOMAC, straight in.

SC: "Cessna XXX cleared direct VOMAC, cross VOMAC at 5700', cleared ILS / RNAV 32 straight in"

PIT; "Cleared direct VOMAC, cross VOMAC at 5700', cleared ILS / RNAV 32, straight in"

When the airplane is at SAWGU-

SC: Cessna XXX frequency change approved, cancel in the air, or on the ground with Flight Service

PIT: Frequency change approved XXX

TRAINING ELEMENTS:

- The importance of briefing the entire runway environment, including the lighting system, as part of their choice of approach.
- Knowing the required landing distance for the aircraft with a six (6) knot tail wind and balancing that risk against benefits of an opposite runway.
- Understanding RVR and minimum visibility of a runway environment.
- Knowing when the GPS will annunciate the type of approach (when the final fix becomes

the active waypoint).

- Knowing when the GPS will switch from GPS to VLOC if the PIT selected the ILS 32
- Planning multiple step downs on the RNAV or ILS 32 approach
- Transitioning to the runway environment at the DA.
- Preparing for a missed approach as part of briefing the approach.
- Introducing the pilot-in-training to glass panel technology if their first time flying the G1000.
- Proper GPS programming of the route, and selection of approach.
- Awareness that loading or activating vectors-to-final removes any and all approach fixes outside of the final fix.
- Knowing when to manually unsuspend on vectors for the RNAV 14.
- Knowing how to reload the approach if the P-I-T unsuspends the VTF RNAV14 while still "inside" UYFOR
- The use of proper pitch/power/configuration to obtain requisite performance without "chasing" airspeeds, or glide slope.
- Flying the glidepath with elevator.
- Controlling airspeed on approach with power
- Developing a good scan.
- Developing situational awareness Where am I? What's next? What has to be done when I get there? What can I be doing now to prepare?
- Properly and sequentially briefing the approach.
- Proper avionics set-up.
- Communicating with ATC.
- Proper use of an HSI (if first time using one.).
- Proper automation management (optional).

COMMON ERRORS:

- Failure to brief the lighting for an approach.
- Over-controlling the airplane.
- Fixation / failure to maintain instrument scan.
- Skidding turns/using rudder to maintain heading on the approach.
- Using power instead of pitch to maintain the GS (glide slope).*
- Loss of situational awareness.
- Improper setup of avionics.
- Not using known control/performance numbers.
- Failure to set heading bug to reference heading.
- More than 3/4 scale deflection of CDI / VDI.
- Misinterpretation of HSI information.
- Failing to select APR so that the autopilot will fly the GP.
- Unsuspending the GPS when activating vectors to final for the RNAV14 while still "inside" UYFOR.

* From the Instrument Flying Handbook: Chap.9 – 40. "The heaviest demand on pilot technique

occurs during descent from the OM to the MM, when you maintain the localizer course, adjust pitch attitude to maintain the proper rate of descent, and adjust power to maintain proper airspeed.