



AUTOMATION MANAGEMENT

American 2134 cleared direct La Aurora VOR, cleared for the ILS DME 2 Runway 1. I line selected AUR (La Aurora) and entered it in the location on the Control Display (CDU) that when executed would command the Boeing to turn directly to La Aurora.

After confirming with the Captain that he liked what I had entered into the CDU I pushed execute and then confirmed LNAV (Lateral navigation) was still active. The Boeing turned on course. VNAV (Vertical Navigation) was also active. It was now my job to monitor the automation.



Control Display Unit

We descended and slowed on schedule. Each fix (or point) on the arrival and approach had a designated altitude and airspeed for us to safely fly through the mountains into Guatemala City.

The mountainous terrain and our position were clearly illustrated on the Multi function display (map mode). Our flight path that eventually made it's way to the pictorial runway was presented in a magenta color, while the terrain was evident in yellow and red (indicating terrain was above our altitude).



Welcome

Happy New Year! Instructor's Wing has over 300 readers and reaches as far as India and now Norway.

I hope you enjoy this issue on Automation Management. It is a broad subject that I am just touching the surface of, so expect future articles that are more specific to this subject.

Tailwinds,

Ruben Alconero

INSTRUCTOR'S WING

"2500" was announced throughout the cockpit. These auto altitude callouts would be issued throughout the approach and through the landing flare at specified intervals.

As we started turning inbound to the runway the Flight computer commanded the jet to slow even further.

I called for gear down and flaps "15". The jet slowed to 165 knots.

Once established inbound I pushed the APP button which allowed the autopilot to capture the glide-slope and localizer and fly down to the runway.

Imagine a vertical and horizontal path leading the airplane from a specified altitude and position down to the runway.



At roughly 1500 feet I announced I would be turning the autopilot off and hand flying the remainder of the approach. As I clicked the autopilot off I announced "emergency begins now".

It has become a standing joke in our profession that the autopilot and automation does such a good job at what it was designed to do pilots hand fly less and less, and when we do, it is so infrequent it feels like an emergency.

We taxied to the gate and performed the parking checklist. I could not help but compare this approach to one I shot in here over a decade ago on the Boeing 727. If you are not familiar with the 727 let's just say it is not a very automated aircraft. There is a reason it was given the nick name "jurassic jet" prior to its retirement at my airline.

With proper training and proficiency, automation can increase your situational awareness exponentially. Lack of understanding regarding automation can be disastrous as was shown in 2009 at Amsterdam Schipol's airport when a perfectly functioning B737-800 impacted the ground short of the runway.

As a pilot transitions to "glass" aircraft or Technologically Advanced Aircraft (TAA) one of the biggest challenges will be in understanding the Flight Management System (FMS). This also occurs in TAA aircraft like our flying club's Cirrus which has a Garmin 430 Global Positioning System (GPS).

This is due to both the complex nature and design of the FMS/GPS and to the pilot-FMS/GPS interface. I can tell you from my experience learning the Garmin 430 system was just as challenging as some of the Honeywell or Smith Systems FMSs I have used in the past.

As I prepare to train students on TAA aircraft I summarize 3 basic principles.

1. Learn to fly the aircraft.
2. Learn to fly the aircraft using the automation.
3. Learn to fly with various layers of automation or none at all.

Learning and building experience takes time, and many general aviation pilots are not afforded the luxury of flying 80-90 hours a month as professional pilots can fly. To help with this problem here are a couple ideas that will allow you to gain some experience and learn without paying the high cost of flying.

Have an auxiliary power unit available to power your aircrafts battery and avionics without running the engine. Sit in the cockpit and start "playing" with the avionics. Set up a flight plan, select an approach, pull up associated frequencies for the selected airport without ever leaving the ground.

A key factor to successfully learning the use of automation is "switchology". Learn where the data is located, and which buttons or knobs must be used to retrieve the desired information.

Simulators are also available, some at minimal or no cost. Garmin has free simulator downloads for the 430 and 530. They can be found at:

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<http://www8.garmin.com/include/SimulatorPopup.html>

If you are a member of the Penn Yan flying Club have one of our CFIs check you out on the ATD. We now have the Garmin 430 installed and there is no cost for the simulator rental.

After your ground school is complete and you have spent time practicing with the simulator it is time to have a certified instructor take you up in the airplane and apply what you have learned.

First and foremost fly the airplane. New TAA students will routinely try to hand fly and manage the GPS. Aviate, navigate, and communicate, this slogan learned from your emergency training applies here as well.

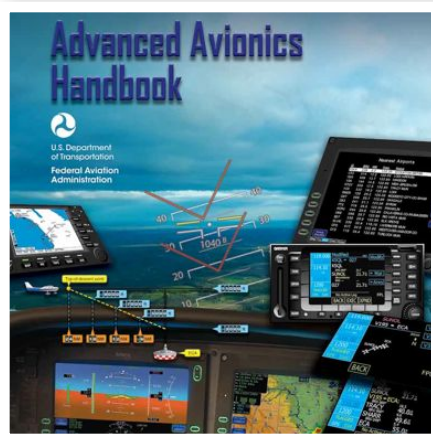
Have the autopilot fly the aircraft while you monitor it's operation and make modifications to the GPS as necessary. Any time you push a button on the autopilot or GPS make certain this is what you want, and then verify that this is what you are receiving through annunciators, or active colored buttons/ displays.



CFIT-Controlled flight into Terrain

According to Boeing Controlled Flight into Terrain leads all other air transport accident types. It has been a primary loss of aircraft and human life since the inception of commercial aviation. From general aviation to commercial airline flights roughly nine-thousands lives have been lost. Below is a link to a tool kit set up by the Flight Safety Foundation to better understand CFIT and how not to become a statistic

http://www.mtc.gob.pe/portal/transportes/aereo/aeronauticacivil/alar_tool_kit/start.pdf



<http://www.faa.gov/library/manuals/aviation/media/FAA-H-8083-6.pdf>

At the top of the Primary Flight Display (PFD) roll modes, pitch modes are displayed(I call it the scoreboard). Once you have selected a function on the autopilot or GPS, verify the command is active or armed on the scoreboard. You selected GPSS, is that the active mode? You selected and armed 4500 feet, is 4500 set and armed? You selected Direct to KSYR, are going to KSYR?

While you are building experience with this new technology always remember to check the automation, if the autopilot is doing something you do not want it to, then "click, click". Click, click translated means turn off the autopilot and fly the airplane like you learned as a student pilot, manually.

Train Like A Professional. Fly Like a Professional.....

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Ask the instructor

At what altitude can you see the curvature of the earth?



You can actually see proof of the curvature by simply standing on the shore of a beach and watch a ship sail into

the distance, the last thing you see is the sail as it disappears into the horizon.

I have noticed while flying some curvature at around 40,000 feet, faint but evident. However it appears that 60,000 feet is the altitude one can start to see substantial curvature on the horizon.

Here is a link to a site you can view the earth from different altitudes and positions from space.
<http://www.fourmilab.ch/cgi-bin/unc...mg=learth.evif>



Ask the Instructor-

Do you have a question you would like answered in the next issue?

Please contact:

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Next Issue: Having a Plan C

The sky was dark, thunderstorms made themselves known near the airfield. As we turned on to final a flash of lightening struck the ground ahead of us.

The runway lights disappeared, communication with the tower and approach control were gone.

As we executed our missed approach it was clear we did not have the fuel to make it to our alternate. It was time for Plan C..

Till next month Safe Flying.

