

Chapter 9

Instructor Pilot Simulator Lesson on Controlled Flight Into Terrain (CFIT)

Task – Set up a departure with certain distractions to possibly cause controlled flight into terrain.

Keywords – CFIT, “Stay 16 miles ahead of the jet,” point-to-point navigation, turbulent air, practice flying exactly on altitude and airspeed, “using the moving map in your head,” MSA (6100’), Black arrow(s) for highest terrain on chart (4400’).

Motivation



19 years later, remnants of C-130 crash removed¹
Volunteers gather, bag and haul historic debris off side of Sleeping Indian.
Sep 30, 2015 by Mike Koshmrl

This picture is about 9.2 miles east of the Jackson Hole airport. The crash occurred about 3.5 minutes after 'GO' and hit about 500 feet below the ridge.² (I would encourage you not to go to a crash site – especially one still smoking – and stinking.)

¹ https://www.jhnewsandguide.com/news/environmental/article_7c2fdce2-4f28-5fdf-84b1-d17da34c211b.html

² https://flightsafety.org/ap/ap_aug00.pdf



The orange line shows the 9.2 mile path from Jackson Hole to Sleeping Indian.

Impacted at altitude of 10,392 feet on the west side of Sheep Mountain, also known as Sleeping Indian Mountain, Teton National Forest.

“It appears that the crew was not aware of the climb out terrain and the obstacles on departure.”

“The Runway 18 departure procedures required, in part, an initial climb to 11,000 feet via the 188-degree radial of the Jackson VOR/DME (which is located on the airport), then a climbing left turn to the Jackson VOR/DME.”

“If neither a SID nor radar vectors are available [or] used, the published departure procedures should be used to avoid obstacles unless alternate procedures are used to ensure all obstacles can be safely avoided.”

“The report said that the CVR transcript shows that the crew did not discuss the published instrument departure procedures.”

“At 2250:25, the pilot said, ‘My radar altimeter just died.’ This was the last statement recorded by CVR.”³

³ U.S. Air Force Aircraft Accident Investigation Board report AFI 51-503, 17 August 1996, C-130 Aircraft, USAF, S/N 74-1662.

*It is better to be careful
a hundred times
than to be killed once* - Mark Twain

Simulator Flight

We are parked off to the side of runway 28R in Portland holding short and doing a quick brief on 'what is next' in G. Heart Country. Of course, the crew has not been exposed to anything about this CFIT mishap in Jackson Hole – in this class. No hints are being given as I am going to try and run them into 'a little 4400 foot hill' out northeast about 16 miles. For sure, they may have heard someone talk about me doing this – and that is fine, but I don't believe very many discussed this specific event to other pilots. I ran a lot of guys through this hoop. Actually, it is a pretty good training event and pushes the idea of really staying ahead of the jet and not leaving your situation awareness back at base ops.

The crews all know we will be doing our 'local' training at PDX so they should be familiar with the airport, nav aids, procedures, and terrain clearances. The approach plates show this sector out north east has a Minimum Safe Altitude (MSA) of either 5600' or 6200.' I will test them on this.

"Ok, we'll depart 28R fly a more or less north rectangular pattern and come back around for an ILS to this same runway. Today I want you guys to work on flying exactly the given altitude and airspeed – I want to test my equipment back here to see just how close the numbers are.

The weather will be low vis, rough air, and I will give you a point-to-point problem to work with right after takeoff."

"Fame 21, taxi into position and hold."

NOTE: I place the weather to 100 feet, visibility ¼ of mile, tops at 6,000, turbulent air on.

"Fame 21, runway heading to 800 feet, right turn to 340, then climb to 2,000. You are cleared for takeoff."

NOTE: When the gear comes up I fail the Ground Proximity Warning System (GPWS) – this means, of course, they won't get a "PULL UP" aural warning signal when the system sees the rising terrain coming up ahead of them (in a few minutes).

The GPWS warning light shows a failing indication but it is never seen on this event during the rough air, gear coming up, and me giving instructions in the back.

The radar altimeter, however, will show as we close on the hill, a decrease in the distance below the jet starting at about 2500 feet then a small warning light will illuminate at about 4-500 feet. Some see this and some don't.

As they turn north I stay on them for exact airspeed and holding their altitude in spite of being bounced around. I chastise their manhood and press them to focus on just the basics and not what is coming. The

next distraction is to give them an odd altitude of 2150 feet to hold and exactly at 250 knots. Then I give them the point-to-point of

“Fame 21, Cleared to the Battleground 066 slant 18. I need your ETA for the DME of 18 as soon as you can get it.”

Battleground (BTG) is about nine miles north and they really have to hustle to get turning to the north east to this point. I help them with a vector turn to 045 and continue the harping on their altitude and airspeed.

Just about the time they start the turn to go point-to-point *they have about 3.5 minutes to go.*

As they finally get everything settled down by knowing where the point is and how long it will take to get there – along with really having the pilot flying spend this energy on altitude and heading. Some will ask when can they turn back to the field for the ILS. Some start in on “We are little low out here” or “Ask for a higher altitude” or what IS MSA where we are.”

Then the left generator light illuminates.

This distraction takes the pilot not flying (in this scenario in the copilot’s seat) out of cross checking the instruments as he knows he will have to do something with a checklist pretty soon or have a report to the pilot on what the GEN light means to the flight. They should determine the GEN problem before they call for the checklist but right now it is a big planned distraction.

And he will probably miss seeing the radar altimeter start showing less and less altitude as they approach the upslope to the 4400 foot hill.

I try to let them go as far as I can without running into the hill because I want to freeze the jet and clear up the weather so they can see they are just about ready to make a hole in the side of it – I do point out all the holes other crews have made.

Discovery Learning

Pretty much self-critiquing - but we do visit a few minutes to let it set in as, for sure, this is place to suffer the consequences of losing **spatial** and situational awareness.

This is the place to ask what happened to the GPWS.

This is the place to look at the approach plate(s) for the airport to see what the MSA is in all areas.

This is the place to see how maybe one could be talked into letting down or turning into a big hill – maybe not in the US of A but on a foreign shore where the English is not so good.

This is the place to discuss the error management and ask how can a crew get caught up and miss where they are.

How many distractions does it take?

[Question for the PQPs – especially C-130 drivers: *“What does a C-130 radar altimeter look like (or do) as it dies?”*

Finish this session

The clearance now is to begin a climbing turn to the right, turn to heading of 230, and climb to 8,000 feet.

New day new way...

As they climb out I set up the weather to about 6 miles vis with no cloud. They are not that far from PDX when they get to altitude and I then fail both engines. I wait for them to:

1. Turn to the airport.
2. Set up a glide of 180 KIAS.

But, because they still have Battleground (again, 9 miles north of PDX) in the VORs I tell them something like “Look at your RMI - the airport is straight ahead at 5 miles. What kind of pattern are you going to fly?” Notice the poor vis is not helping them any as they can’t see a lot of the geography and I am trying to get them to commit to a VOR rather than the Portland airfield.

I take a snap shot as we may want to come back to this exact same spot and do it over again or let the other guy have a swing at it.

We are at another pivotal point in our training and it is dead stick time again noting we just talked about this in Chapter 7.

“How about a clearance Clarence?”

Let’s go back to the C-130H with the call sign “Havoc 58 and note they should have followed the procedure for departing runway 18 by climbing to 11,000 feet on the 188 radial of the VOR (on the field) and making a left turn back to the VOR and then turned east on course to the Boysen TACAN station.

At an uncontrolled airfield they can do what they want to but it would have been nice to have had a clearance for them to follow. Maybe they could have used the 18 departure and read it back to the three of them and been ok. What I am leading up to and segueing into is a happy ending for this lesson by using an old movie and an older book which has a scene in it of a copilot who can’t copy a clearance. Let me give it to you:⁴

“A.T.C. clears Pacific Central Airlines Flight Seven to Los Angeles International Airport – cleared to Montebello, direct Springfield, Victor One-Five-One-Eight, cross Springfield at two thousand, Continuing to climb in the holding pattern west of Springfield on the one-five-one-degree radial of the Herndon omni – to gain sufficient altitude to re-cross Springfield at six thousand – cross the Herndon one-eight-xero-degree radial at seven thousand, cross Casanova at one-two-thousand. Cross Montebello at two-zero-thousand. Maintain two-zero thousand. Victor One-Five-One-Eight, Flight Plan. Read back” (p. 48).

Can you believe that clearance?

⁴ Searls, Henry Hunt, Jr. (1960). *The crowded sky*. New York, NY: Harper & Brothers.

Flying them ole four-engine Douglas DC-7s I'll bet were a lot of fun but copying the clearance is a bitch. Here is a picture⁵ of the copilot getting ready to ask ATC to repeat it again. This shows Dana Andrews as the captain and John Kerr as the copilot – Anne Francis is the head stewardess.



[Only in a G. Heart Country class – under the rubric of history and flying in books and movies – this movie showed a mid-air collision between the DC-7 and a Navy T2V (like an ole Lockheed T-33). The Douglas was, as shown here, flown by Dana Andrews and the T2V was flown by Efrem Zimbalist Jr.

“Airport 75” came out in 1974 and although I was distracted by Karen Black’s piercing eyes and her flying a 747, I noticed the captain was Efrem Zimbalist Jr. and the guy flying the twin Barron was Dana Andrews – so they had swapped seats since the last time they had had a mid-air.

Now, to tie this with the reality and remarkability of the class. Having a little time in four engine equipment (C-118, C-54) both riding and flying; the Boeing 747 (just like the Model shown in this movie); T-33A, Barron; and **now here comes Charlton Heston in a Lear Jet 23** (or 24A – four 23s were modified to 24s).

(See the movie trailer in the footnote on the next page.)

⁵ Garrison, Michael (Producer) & Pevney, Joseph (Director). (1960). *The crowded sky*. [Motion Picture]. United States: Warner Brothers.



Lear Jet 23⁶

This “Barbie Jet” is still one of the most beautiful aeroplanes ever built...

Since this book is being written a few years after my last class the appreciation of airplanes has come through from a number of student IP graduates who have excelled in their flying field and are now flying different equipment from Learjets to C-32s to B2 bombers.

It has been a joy to promote the love of flying and comment “You need to go out there sometime and put your arms around a tip tank and tell your Barbie Jet that you love her!”

Won’t mention them all, but we did talk about aeroplanes in class and reflect on flying the likes of a Stearman, T-37, sailplane, C-5, and a 100 more – even some of them ole Fokkers the Germans flew during WWII!

May we always have the love of flying in our veins, the joy of flying people paying passengers, and teaching the warp and woof of rudder, aileron, and elevator. It all boils down to Fly the Jet!

⁶ For the movie clip to see these aeroplanes see the short 2:51 minute trailer:
https://www.imdb.com/title/tt0071110/videoplayer/vi2869561113?ref=tt_ov_vi
And credit for the ‘Columbia’ Lear Jet:
http://www.impdb.org/images/4/41/AP75_LJ23.jpg

Development of the
LEAR JET
 Model 23

by Ronald D. Neal

Today, the name "Lear Jet" has become synonymous for that class of airplanes known as business jets. In this context, many people believe that the *Lear Jet* was the first business jet; yet, in terms of first-flight dates, it was preceded by six other airplanes—the MS760, *JetStar*, *Sabreliner* (T39), DH125, *Jet Commander* and the *Mystere 20*. In fact, the first delivery of a business jet to a commercial customer—a Lockheed *JetStar*—took place in September 1961, some two years before the *Lear Jet* even flew.

In spite of these facts, a 1979 article appearing in *Fortune* magazine identified Bill Lear as "the father of the corporate jet." A 1980 aviation trade publication specifically identified Bill Lear as the man "... who conceived and developed the first business jet. . . ."

If the *Lear Jet* was not the first business jet to fly, why has it attracted so much interest and recognition? The answer is certainly a mixture of many factors, but one of the major reasons was the personality of William P. Lear, Sr., and his accurate understanding of the need for such an airplane. Bill Lear liked to say that he was right and others were wrong—and then prove that he was right. This determination then produced an airplane—the *Lear Jet*—that introduced performance and excitement that had not been seen in the general aviation market for many years.

This article is not a complete history of the *Lear Jet* Model 23, for the story of this remarkable airplane will not be finished until the last Model 23 flies no more. However, this article does attempt to document the development of the *Lear Jet*—including the history of the two flight test airplanes—from the early conception of the program through the delivery of the first aircraft.

The Beginning of the Program—Since the 1930s, the name of Bill Lear had been identified with new ideas. However, the achievement and success of the *Lear Jet* is undoubtedly the contribution for which history will most remember this remarkable man. Yet, the development of the *Lear Jet* was not

his first, nor his last, aircraft venture. In the early 1950s, Lear had seen a need for a new executive airplane that offered improved speed and comfort over existing equipment, and this resulted in the "Learstar." The *Learstar* used the basic airframe of the Lockheed *Lodestar*, but was modified to include many Lear changes and improvements. The first production *Learstar* to come out of the Lear plant at Clover Field (Santa Monica, California) made its initial flight on May 10, 1954. Chief engineer was Gordon Israel, and acting as a special assistant to Mr. Lear was a young Texan by the name of Ed Swearingen.

Always a man on the go and with an eye toward the future, Lear, in the late 1950s, began to envisage a need for an all-new type of airplane. In his own words, this new airplane would be "an airplane that was equal in performance, reliability, safety, quietness and comfort to the airline jets, but small and very fast so as to be economically feasible, relative to our schedules and capital investment."

Even for a man of Lear's energy and drive, the road from dream to reality was not without its road blocks. One of the major hurdles to clear was the board of directors of Lear, Inc., for the board was not as enthusiastic about a venture into the jet airplane manufacturing field as was the founder of the

The earliest known sketch of Bill Lear's new jet airplane (March 1960).



FRANK SINATRA AND HIS LEAR JET N175FS

The way he flew his plane

In late May 2005, Ronnie Powers casually flipped through some papers left on his desk. They detailed the ownership history of an abandoned plane he had recently bought in California for \$45,000. The sheaf was, he assumed, just more paperwork cluttering his office at Griffin Spalding Airport, 38 miles south of Atlanta.

Powers, CEO of Atlanta Air Salvage, frequently bought such aircraft. Even today, Atlanta Air is known as a "boneyard," the end of the line for hundreds of planes too damaged, too outdated or too forgotten to be of much use to anyone else. Powers pulls them from water, drags them from ditches, takes them wherever he can find them -- and for all he knew, this latest aircraft, now rusting out in San Jose, was a typical purchase. "A lawyer called one day and said, 'We've got an old Lear for sale. Will you give us X?'" Powers recalls. "We were just going to break it down for parts, and I wasn't even sure it was good for that."

Powers sent his chief operating officer, Ken Williams, to the San Jose Jet Center to see what it would take to drag Learjet Serial No. 31 back to Georgia for its autopsy. Williams snapped photos and took notes. The plane had been locked in a hangar for more than a decade, abandoned by its owner until the unpaid hangar fees had reached nearly \$20,000, at which point someone had simply hauled it out back and left it in the rain. There were twigs stuck in the wheels. The logbooks were gone.

When Williams returned to Atlanta, he called Lear to run a historical-records search, which he forwarded to his boss. Powers thumbed through the stack now, half-interestedly scrolling back through the plane's life. Before being shipped out to San Jose, it had bounced between owners in Illinois. It had been repainted multiple times. Oddly, the N number seemed to have been switched back to its original vanity registration after having been changed several times.

Then, deep in the pile, Powers came across a letter dated October 30, 1964. It was a receipt from Lear Jet Corporation, made out to California Airmotive Corporation, which was buying a plane for a client. The receipt said simply, "Please convey to Mr. Sinatra our congratulations and our intention to deliver to him the world's finest business machine." Powers looked at that N number again -- N175FS. His eyes widened. Suddenly, this was no mere hunk of scrap metal.

**Fly me to the moon/ Let me play among the stars/ Let me see what
spring is like/ On Jupiter and Mars...**



If ever a plane played among the stars,
it was N175FS. From June 1965 until

SPEAKING OF BARBIE JETS



This lieutenant graduated with honors as he was observed – without any prompting – to practice giving the Barbie Jet copilot some very up close and critical remarks about flying. I heard him say on this initial flight for the copilot:

1. Don't touch anything red.
2. This half of the cockpit is mine.
3. Your half the cockpit is "ours."
4. If I want anything out of you I will ask for!

CONNECTING THE DOTS

“Taxi your ass up here and brief me for 1 minute on....”. “Sh#t”, you think, as you await your sentencing and try to think how you are going to brief without any preparation, and without being self-conscious that you will say “Umm” 10 times. You quietly wonder what the point is of all this, knowing the instructor has some lesson you should be learning from these abstract tasks...connecting the dots if you will. It is all designed to help you become a better instructor, better thinker, better do-er, better aviator.

When you go to fly, do you just hop up in the seat? No. You walk around the airplane and kick some tires. You get a feel for your aircraft. You familiarize yourself with your operating environment so you can master it, survive in it, and effectively teach others about it. It is about SFT. See it, feel it, and trust it. (your knowledge, your situation, your methods, your personal motivations and lines in the sand).

IP school is about learning about yourself. “Hit it with your biggest club while its happening”. “Tell him *&%\$ you, kick him in the shin, show him you can do it and that you’re not going to get me today you S.O.B.” It is testing yourself and your own weaknesses and strengths and developing yourself.

“Okay, lets walk through all the electrical system components one by one”. “NO!” the lugubrious instructor blurts out. “Hmm, what am I doing wrong this time?”, you think. The lesson to be learned? Who is your student? What is their background? What are the gaps in their knowledge and questions they may have? Perhaps they already know all this stuff I’m about to brief and it would be more beneficial *for the student* to

brief something else. Maybe it would help them out more and keep their motivation and attention to brief all this in terms of an actual emergency and how to keep themselves alive. Perhaps someone had this exact thing happen to them and we can talk about that.

The takeaway from all this, is that it is all about your student. Where is the student and where do they need to be? You want them to learn, you need to keep them engaged. Instructors need to think outside the box, be creative, and use their resources to teach. A disengaged, uninterested, unmotivated co-pilot is a waste of everyone's time. Does it benefit anyone to just spoon-feed the answers to a student or should we provoke their critical thinking skills and let them work through a problem to solve it? We are only building their brain capacity and confidence by doing the latter.

Why get up in front of class and talk about something unrelated to flying? It tests us. Practicing briefings to each other time and time again helps us as future instructors to sharpen our swords, point out each others flaws, discover ourselves, our styles, and creative ways to present material and get vital information past the Off Flags in the students eyes and into their brains.

FTA...Fly..the..airplane. It is the bottom line of a large percentage of the aircraft mishaps we study as pilots. It is the reason we hope in a big moving container that acts like our airplane and have our engines failed on purpose. To see if we can survive when sh*t hits the fan. To see if we know our airplane and not let the endless distractions keep us from remembering the basics of flying the damned airplane to safely get our butts back on pavement in one piece. As instructors we need to be able to teach our newbies these things. We need to be able to know their comfort zone, know our own comfort zone, and know when to be the man and take the airplane away from them to keep everyone safe.

Kern defines the pillars of airmanship as self, aircraft, team, environment, and risk. You must master all these things. Instructors need to be confident in their knowledge of their own capabilities, limitations and ambitions. They must know when to knock off the instructing and get back to aviating! They must know their airplane inside and out to be master of their environment and be credible. Are you king of the Dash-1? They must know their team, their crew, their peers and lean on them for wisdom and experience. They must know the risks at hand, the risks they are willing to take and let their students take. "What are you willing to climb the hill and die for?"

Successful leaders require foresight. Successful instructors require foresight. If you know the objective, you can have a plan. When you have a plan you are prepared to solve the problem, whether that is troubleshooting an emergency or system, or determining what the best way to teach a student a certain concept is. Being an IP is about *critical thinking* and problem solving methods and using your resources to help you reach an objective. "If you have the expectation, preparation and tools, how can you not be successful?"