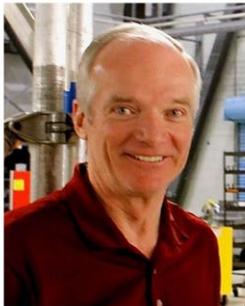


— LATEST BRIEFING —

## CJP Issues our First Safety Bulletin

*Heads-up on Baro-VNAV, a primer on the upcoming Safe to Land(sm) course, and a Textron Aviation accident review*

*by Charlie Precourt, CJP Safety Committee Chairman*



In this edition of *Right Seat*, we are issuing our first CJP-produced Safety Bulletin for members. With Neil Singer's initiative, we looked at a very close call of an Airbus on a Baro-VNAV approach that reinforces the importance of the altimeter setting.

Also in this issue, we will preview the Safe to Land(sm) course we've developed with FlightSafety International, along with a practical application for this information related to a recent Citation runway excursion accident.

To wrap up this issue of *Right Seat*, Henry Soderlund of Textron Aviation provides a recap of an accident that occurred due to failure to properly de-ice the aircraft - another lesson we can all learn from, especially as we approach the winter flying season.

Henry works with Peter Basile in the accident investigation arm of Textron Aviation and helps us keep track of lessons learned from accidents and incidents in our jets. Thanks, Henry!

### **CJP Safety and Education Foundation Safety Bulletin: Baro-VNAV Approaches and QNH settings**

by Neil Singer, CJP Safety Consultant and Master Instructor

In May of 2022, an Airbus A320 with 178 passengers and crew aboard came within six feet of the surface while nearly a mile from the runway threshold of runway 27R at Paris' Charles de Gaulle (LFPG) airport. The aircraft had received an incorrect altimeter setting from the approach controller, and as a result was flying 280 feet lower than indicated altitude throughout the final segment of the approach.

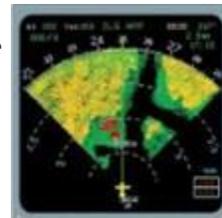


Due to the ILS 27R being out of service, the aircraft was required to fly the RNP 27R. ICAO approach terminology differs from that used by the FAA; an "RNP" approach in Europe is what the FAA labels an "RNAV (GPS)" approach, not to be confused with RNP approaches that require special equipment, training, and authorization.

Because the aircraft was not equipped with space-based augmentation (SBAS) - the European Geostationary Navigation Overlay Service (EGNOS) in the case of an approach to LFPG, or the wide area augmentation system (WAAS) used in North America - the A320 flew the approach using barometric VNAV guidance on final to LNAV/ VNAV minimums.

An under-appreciated threat of baro-VNAV guidance on final approach is that an incorrect altimeter setting will result in a centered vertical deviation indication (VDI) when the aircraft is actually low or high. Contrasted with an ILS (vertical guidance from a ground-based signal) or a WAAS approach (vertical guidance from augmented GPS position), a baro-VNAV approach creates the opportunity for a single point of failure in the form of a mis-set altimeter.

Of importance to note is that a Terrain Awareness Warning System (TAWS) may not provide an alert due to the phasing out of alerts as the aircraft approaches the airport. The A320 in question did not receive any TAWS warnings during approach.



As the correct altimeter setting is of crucial importance during a baro-VNAV approach, the CJP Safety and Education Foundation strongly recommends members adopt the following SOPs:

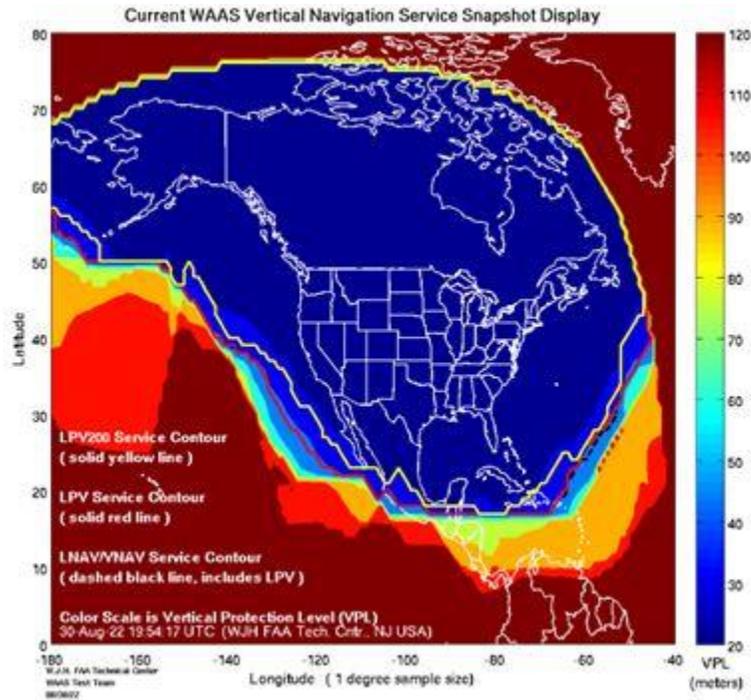
- When flying an approach with baro-VNAV guidance on final, the pilot should obtain and cross-check a minimum of two independent altimeter settings. Possible sources include:
  - o ATIS/ AWOS/ ASOS
  - o ATC
  - o METAR received via SXM, ADS-B in, or datalink
- Approaching minimums the pilot should check the radar altitude (if equipped), against the charted height above TDZ at minimums. Understand that variations in terrain and buildings can cause a difference in displayed RA.
  - o If the aircraft has the ability to set two different minimums alerts (e.g. ProLine 21), consider setting one alert to radar height above TDZ and one to baro minimums.

*Why might I be flying an approach with baro-VNAV guidance on final?*

In short, when flying an RNAV approach without SBAS availability. This could be due to jamming, a satellite outage, or geographical location.

*Where geographically might I need to fly a baro-VNAV approach?*

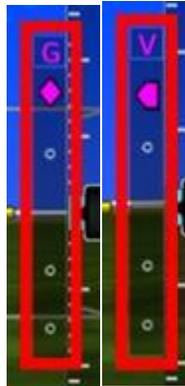
Outside of SBAS coverage. Each "brand" of SBAS has a limited geographical footprint of coverage. WAAS, for example, extends into the Caribbean but start to "fade" around Puerto Rico.



The red outline above shows the real-time limit of the WAAS service for LPV or LNAV/ VNAV minimums. Outside that area baro-VNAV would be needed for vertical guidance during an RNAV approach.

*How do I know if the aircraft is utilizing baro-VNAV during the approach?*

Garmin based flight decks differentiate between a SBAS-generated VDI and a baro-VNAV generated VDI:



*Left: SBAS generated VDI with "G" and diamond. Right: baro-VNAV generated VDI with "V" and pentagon.*

Collins FMS do not display the VDI differently; the pilot must check the ARRIVAL DATA page to see the source of vertical guidance.

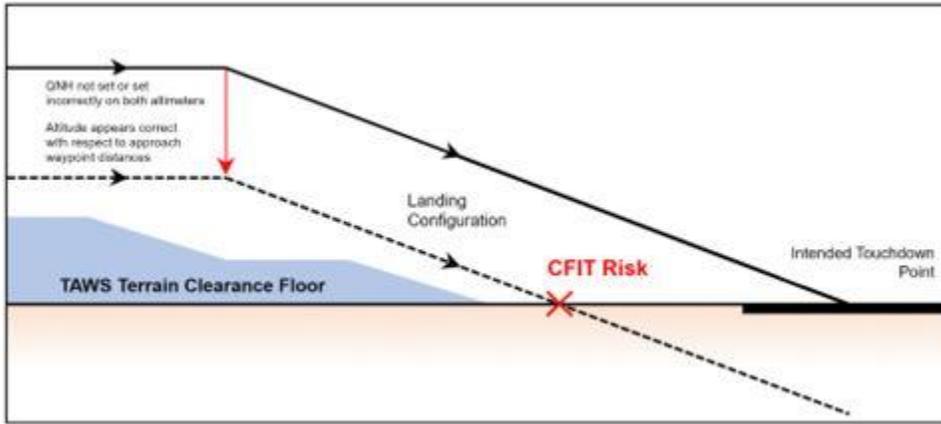
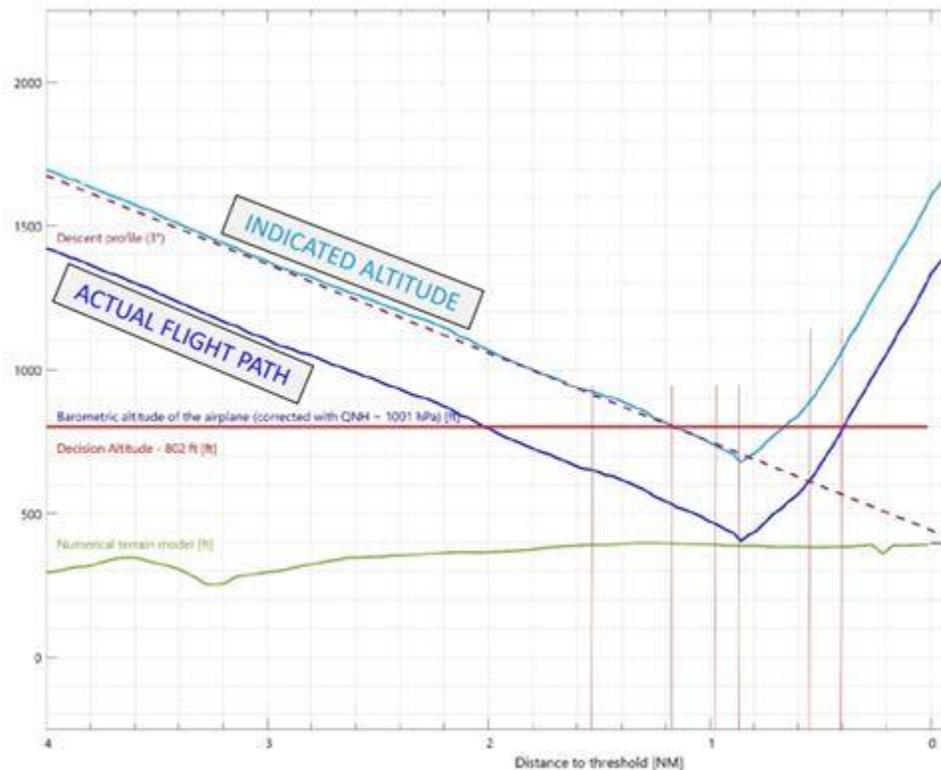


Diagram in 2019 UK CAA safety notice of threat of mis-set altimeter during baro-VNAV approach



Flight path of NSZ 4311 vs. indicated altitude and desired path

Thanks for the great heads up, Neil. We have had some help from FlightSafety International with testing this scenario in the simulators for us so we could understand if our TAWS and/or EGPWS systems would alert, or whether alerts would be suppressed by software design due to proximity to the field. We will provide that information as soon as we have it... and it's likely to vary by model of avionics and terrain alerting system installed.

Fly Safe!

Charlie

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**Safe to Land<sup>(sm)</sup> Course to Debut at CJP Annual Convention in Austin**

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*by David Miller, CJP Director of Programs and Safety Education*



After more than one year of research, testing, and development, the CJP Safe to Land(sm) ground school course will be rolled out during a special presentation at our upcoming Austin convention.

In collaboration with FlightSafety International (FSI), the 2-hour course will be taught, for no additional charge, by Charlie Precourt and Dax Beal, FSI instructor and TCE. Completion of the ground school course is step one. Step two is a 2-hour simulator session in FSI simulators programmed to replicate various instabilities defined during our groundbreaking research with the Presage group.

After completion of both steps, the pilot will receive a certificate of completion from FSI and a notation in their record of training. Beginning in 2024, completion of the entire course will be a requirement for the CJP Gold

Standard Safety Award.

The ground school includes over seventy new reference slides and multiple videos created specifically for the course. Highlighted are use of the STL cue card, calculation of the TPL (touchdown point limit) new callouts for stable and unstable approaches and much, much more.

Additionally, FSI is pleased to extend a 50% discount off the simulator portion of the STL course for owners who complete STL ground school at the convention, so plan to attend this important course Thursday afternoon. This is just another great value for attending the CJP 2022 convention!

FSI will also have more information on course availability after the convention for those who cannot attend.

## **A Practical Application**

*Thanks David... and here's an example of where the Safe to Land(sm) course could have prevented a recent, expensive runway excursion. - Charlie*

A CJ3+ overran the runway after touching down long at KCDW, Essex County Airport in Caldwell, NJ in April of this year. [The NTSB final report is out on N225SC](#), operated by a crew into the airport, which has a 4,400-foot-long runway. Peter Basile of Textron will do a deep dive of this interesting scenario at our convention in Austin next month, but here's a teaser that relates directly to our STL course and the concept of the Touchdown Point Limit, or TPL.



*NTSB Photo (cropped) Docket ERA22LA190*

In short, the TPL equals the landing distance available minus factored landing distance plus 1,000 feet. We add back the 1,000 feet of air distance from the threshold in the TPL calculation, so we are only working with on-ground distances.

On the day of landing, the weather had changing-direction, strong, gusty winds. The reconstructed data at time of landing showed dry runway, winds 290/13, runway 22, landing weight 10,100 pounds. OAT 11 deg C, altimeter 30.14. The calculated Vref was 97 and the landing distance (unfactored) was computed to be 2,400 feet. If you add a 25% safety factor (the minimum we recommend per CJP SOP) the landing distance required would be 2,400 x 1.25, or 3,000 feet.

In other words, a test pilot could achieve 2,400 but our expected best performance would be 3,000 feet in these conditions. Interestingly, with a 4,400-foot-long runway, TPL is only 2,400 feet down the runway; in other words, any touchdown beyond 2,400 feet down the runway is nearly certain to go off the runway.

Surveillance cameras showed the aircraft touched down 3/4ths the way down the runway, or 3,300 feet from the approach end. No one should ever land on a runway and then wonder if they have enough runway to stop!

If you are not yet familiar with the TPL concept, not to worry, we will cover it in detail in the STL ground school at the convention. If this crew at KCDW knew they were in trouble for any touchdown beyond 2,400 feet, they would almost certainly have initiated a go-around.

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## Deicing Failure Accident: Citation 560 Encore

*by Henry Soderlund, Chief Air Safety Investigator, Textron Aviation*



On January 11, 2017, a C560 Encore took off from Runway 19L at Oslo Airport Gardermoen (ENGM), Oslo, Norway. After passing through 2,000' MSL the crew retracted the flaps and the aircraft's nose dropped to a pitch attitude of -33°; the pilots later reported they were "hanging by their seat belts."

By this time the aircraft had entered IMC conditions. As the aircraft's nose continued to drop the aircraft accelerated through 230 knots. The Cockpit Voice recorder recorded the

Enhance Ground Proximity Warning System issuing warnings for, "Sink Rate, Pull Up, Too Low Terrain, Windshear, Bank Angle." The crew called, "MAYDAY" and the First Officer initiated a pull-out but not before the aircraft's pitch attitude lowered to -53°. During the recovery to a nose high attitude, the aircraft entered VMC conditions and experienced a positive G load of 5.99 approximately 10 seconds after the flaps were retracted.

Review of flight data indicated the aircraft reached a speed of 325 KIAS and descended as low as 170' AGL during the recovery. After recovery, the crew canceled the MAYDAY and the aircraft continued to its destination of Torp Sandefjord Airport where it landed uneventfully.

The Norwegian Accident Investigation Board (AIBN) was notified of the event by a tower supervisor at ENGM and subsequently launched an investigation. The aircraft had arrived at Oslo from Bern, Switzerland, an over two-hour flight in -50°C temperatures, to drop off a passenger. The crew's intention was to immediately depart for Torp with no plans to refuel or deice. In fact, they left one engine running while deplaning the passenger. Due to this, the First Officer conducted a pre-flight inspection on only one side of the aircraft.

When the crew received their taxi information, they were given a different departure runway than they had planned for. This, in turn, resulted in a longer taxi time and a longer exposure to the icing conditions at the airport. According to the investigating authority, the aircraft was on the ground for approximately 15 minutes with an ambient temperature of 0°C and the taxiways and runways were covered in 0.1 to 0.25 inches of slush. Additionally, snow was falling during the aircraft's takeoff.

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Onsite technical assistance was provided by Textron Aviation during an examination of the aircraft and its systems, no pre-event malfunctions were found. During the examination, multiple instances of structural damage were noted to the aircraft including: creases on the upper surfaces of both stub wings and contour deviations on the left and right sides of the fuselage near the engine nacelles. No system abnormalities were noted.

The investigation determined, through the use of CVR data, that the anti-ice and de-ice systems had been activated by the crew before the event. The investigation could not determine if the flap retraction played a role in the upset. The AIBN concluded that the upset was caused by the tailplane stalling due to accumulation of slush and snow while on the ground due to a lack of deicing on the ground. This included slush spray from the tires during taxi and takeoff.

This is not the first aircraft to have a takeoff accident due to a lack of deicing. In 2018, a Beechcraft B100 King Air stalled after takeoff and impacted terrain resulting in serious injuries to five of the aircraft's ten occupants. After being removed from a hangar the aircraft was exposed to a temperature of -2°C with moderate to heavy snowfall for 14 minutes without ground deicing. The pilot had planned to take off sooner but was delayed waiting for an inbound aircraft to land.

Flight crews need to factor in the possibility of their planned taxi route changing or an extended time until takeoff when making decisions about ground deicing. It is also important to not allow continuation bias to drive a decision to continue to takeoff when the safest decision is to taxi back for deicing.

Citation Jet Pilots is the world's premier Cessna Citation aircraft owner-pilot organization. If you are a Citation owner-pilot who wants to operate your aircraft more safely, professionally, and economically, this is the place to be.