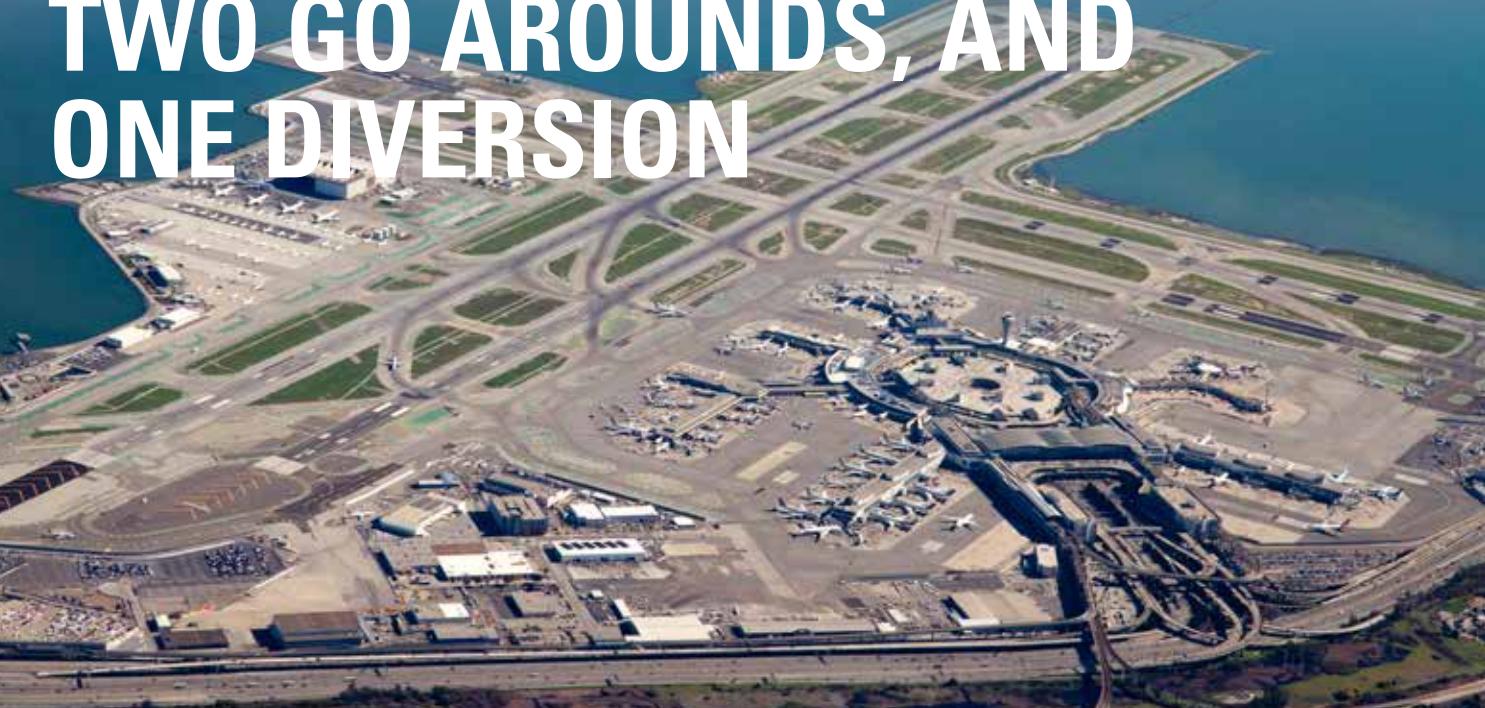


THREE APPROACHES, TWO GO AROUNDS, AND ONE DIVERSION



A surprise in the air often means surprise on the ground, but controllers and pilots rarely have the chance to share perspectives. In this article, **Eric Carter** and **James Norman** present a case study to highlight the benefit of a collaborative voice.

KEY POINTS

- Rare runway configurations, aircraft warnings, and ATC instructions can compound to surprise both pilots and controllers.
- ATC works to mitigate surprises by using predictive continuity with flight operations.
- Learning from surprises is crucial in a safety management system.
- In the open-source era, don't be surprised if your work is recorded and distributed.

After a thorough briefing, we began vectoring via left traffic. We made sure to have our terrain awareness system up on our flight displays; unlike the usual SFO approaches to the 28s, this was a 'black hole' approach over unfamiliar mountainous terrain.

On speed and configuration, we were seconds away from the 1000 ft "cleared to land" callout, when the airplane blared "*Terrain, terrain!*" – a warning most pilots only ever hear in the simulator. Although our aircraft was stabilised and being flown as per standard operating procedure (SOP), we are trained to honour any type of system caution or warning. We know that 'plan continuation bias' (the tendency to continue with an original course of action that is no longer viable) only increases as we near a goal – in this case the runway. It sometimes takes a highly salient cue such as a loud alert to snap us out of our routine.

Flight Deck Perspective

"Terrain, terrain...whoop whoop...pull up!"

They say that being a pilot is hours of boredom punctuated by seconds of terror. This was one of those moments.

Rewind 30 minutes. In our Boeing 767, the captain and I were beginning to plan our arrival and landing into San Francisco after an otherwise routine

transcontinental flight originating in New York's JFK airport, in December 2021.

The ATIS (automatic terminal information service) provided our first surprise of the evening: due to rare easterly winds, SFO was landing to the east on 10L. (A pilot could spend their entire career flying into SFO and never land on the '10s'.) As an added bonus, the runway only had a non-precision approach.

My early pilot instructors taught me to think of a go around as the expected outcome of an approach. This might help to mitigate unwanted effects of surprise, perhaps even the startle effect, as we are primed more effectively if actually called upon to conduct the manoeuvre.

Despite the well-laid plan, there is usually something askew each time we perform a go around. This time it was our next surprise: "Fly the *published* missed approach." In a matter of seconds, the workload was multiplying due to (1) a rare approach, (2) a rare (dire) warning, and (3) an ATC instruction that was usually only heard in the simulator.

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It is important to note here that most approaches are visual approaches. Per U.S. regulations, a visual approach is not a standard instrument approach procedure and has no missed approach segment. Tower will issue a heading and altitude. During instrument approaches, many facilities will often issue a heading and altitude in the event of a missed approach. There is no requirement for a controller to issue a "published missed approach" in the U.S. during an instrument approach.

After brief troubleshooting, my colleague and I figured that the warning must have been spurious and decided to try again. ATC queried us more than once for the reason for the go around, which we replied with a stoic "*standby.*" Aviate, navigate, communicate.

Our second approach was a carbon copy of the first, except we were now making right traffic. To our amazement, once again at 1100 feet we received a "*Terrain, terrain, pull up, pull up*" warning! And once again, we did another go around.

We concluded that trying a third time would probably yield the same result, and elected to divert to Oakland where terrain would hardly be a factor. ATC was gracious and accommodated our request quickly. And as it turned out, many of our passengers lived in Oakland, so this divert actually saved them an expensive cab ride across the Bay Bridge!

What caused the terrain warnings in this event? To this day, we are unsure. Possibilities include an anomaly in the terrain database, the design of the non-precision approach, or 5G.

But now the biggest surprise of all. One month after our event, a member of the public made a YouTube video of our event, combining the ATC audio tapes and the live ground track from ADS-B. In a matter of days, the video was getting tens of thousands of hits, and was being shared all over aviation social media. Imagine your surprise to wake up one day to dozens of text messages saying, "*you're famous!*" Not fun.

But the story gets even stranger. In the previous issue of *HindSight*, I (James Norman) contributed an article titled *De-risking FOQA: Flight Data Management and Pilot Protection in an ADS-B World*. I explored the consequences of our increasingly open-source world of flight data, and posited the consequences of 'pseudo' flight data tethered to ATC 'tapes'. Now that hypothetical scenario was playing out with the person who wrote the article!

Needless to say, this event has been incredibly educational for me, both for the experience as a pilot and also for the opportunity *HindSight* magazine has provided to share frontline stories, as well as raise awareness of cutting-edge issues like the rise of open-source data and the new world we live in.

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San Francisco Tower Perspective

As a 32-year veteran air traffic controller throughout medium and large facilities in the US, there isn't much I haven't seen. A windy stormy day causing a B777 to fly like it is in the hand of a child dreaming of flight, stands out.

For SFO tower, landing on the '10s' is an extraordinarily rare event – perhaps only used a few hours each year. Departing runways 1L/1R and landing runways 28L/28R is by far the most prevalent, with combined departing and landing runways 28L/28R. Typically, during the winter, we are departing runways 10L/R, landing runways 19L/R, and when the wind picks up departing and landing runways 19L/19R.

Go arounds can be surprising to flight crews, and they can be surprising to controllers as well. At SFO, we must manage one of the most challenging runway configurations in the country: parallel intersecting runways, all four of which can be active. To manage this challenge, we train by working from the intersection out. This means that the intersecting runway is always the main focus, and workload prioritisation determines the sequence of events and transmissions from there. Add an unexpected go around, and the temperature rises very quickly,

Because of this, one of my missions is to make life easier for both controllers and pilots. In my role as a leader and mentor, it is important to help my controllers better understand both sides of the mic. That is why I have promoted the use of "fly the published missed" at my facility. While heading/altitude is the norm at most other facilities, I believe the published missed is more predictable and more easily managed for both pilots and controllers. With the "published missed", a flight crew has a fighting chance to perform as they actually train. Once they "communicate" we can work on the "aviate" and "navigate" – a reset, of sorts. Of course, there are going to be times that this is just not possible, but that should not be the norm.

When I listened to this event, I was heartened to hear the younger controller issue the published missed to the crew. The takeaway for us was

that learning happens both formally and informally, and the relationships and positive collaborative culture I have promoted in the facility over the years came to fruition in this event when the controller took the lead and issued the published missed. Another 'pleasant surprise' for ATC is that, in this case, assigning a heading and altitude could result in a terrain loss, because the minimum vectoring altitude (MVA) is well above the aircraft's position when calling their go around.

For us, surprises can take many forms: technology, weather, NOTAMs, the list goes on. That's why I believe documenting them is so important. As part of our Voluntary Safety Reporting Program, we have aligned our program with the pilots' ASAP program. This is called the Confidential Information Sharing Program (CISP). CISP allows air traffic controllers' safety reports to be shared with pilots' reports. When each side reviews an event, there are so many opportunities to learn. Handling surprises in the heat of the moment is one thing, but having a data repository where we can start to track and see trends is what allows us to operate in a successful safety management system. And by disseminating these reported issues via 'lessons learned' discussion sheets to the frontline controllers and pilots, hopefully one person's surprise turns into the next person's "I read about that!".

Takeaways

From the pilot and controller perspective, the most important takeaway here has been in our collaborative effort. Both pilots and controllers inhabit workspaces that are tightly coupled, yet provide little opportunity for dialogue and discussion of events after-the-fact. We were able to use this event as a case study recently at a large aviation safety conference to highlight the benefit of collaborative voice. With the increasing use of CPDLC and datalink, we believe that the relationship between controllers and pilots will only unfortunately continue to become more separated. Hopefully both sides of the mic can find a space to maintain this dialogue in the future. Kudos to *HindSight* for promoting this important effort! **S**



Eric Carter is an air traffic controller at San Francisco Tower. Since 1990, Eric has been proactive in safety at the facility, regional, and national levels, as well as in the Voluntary Safety Reporting Program (VSRP). Eric most enjoys being able to use his expertise to close the information gap between controllers and pilots, particularly as it relates to technology and training.



James Norman is a B757/767 pilot and FOQA gatekeeper for a US airline. He also teaches safety leadership and risk management on behalf of the Air Line Pilots Association (ALPA). He is a Ph.D. Candidate at the University of North Dakota, and his dissertation research focuses on voluntary reporting culture in commercial aviation. He resides in Minnesota with his wife and twin daughters.

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