



AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

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May 23, 2023

Michael Hauf
Investigator-In-Charge
National Transportation Safety Board
490 L'Enfant Plaza SW
Washington, DC 20594

Reference: United Airlines, DCA22LA133

Dear Mr. Hauf,

In accordance with National Transportation Safety Board (NTSB) rules, the Air Line Pilots Association, International (ALPA) submits the attached comments and conclusions concerning the incident of United Airlines flight 2627, a Boeing 737-9MAX aircraft. This incident occurred on June 21, 2022, during landing at Pittsburgh International Airport.

The following contains a synopsis of ALPA's analysis of the facts surrounding the event, based on the information obtained through the NTSB's investigation. ALPA's suggested Safety Recommendations are based upon these same facts.

History of flight

On June 21, 2022, at about 0944 Eastern Daylight Time (EDT), United Airlines flight 2627, a B737-9MAX, N37513, landed at Pittsburgh International Airport (PIT), Pittsburgh, Pennsylvania. The flight was in contact with air traffic control and prior to the landing was cleared for and acknowledged the clearance to land on runway 28C. However, radar data indicated that the flight lined up for and landed on runway 28L. After landing, the airplane taxied to the ramp. The two flight crew members along with the other 172 occupants on board and were uninjured. The flight was operating under Title 14 *Code of Federal Regulations* Part 121 as a passenger flight from Chicago O'Hare International Airport (ORD), Chicago, Illinois to PIT.

ANALYSIS

Flight Management Computer (FMC) screen blanking

During the visual approach (an approach that was backed up with RNAV GPS Y 28C, pre-programmed into the FMC's), the captain asked the first officer to extend the centerline from the SUPPR waypoint in intercept the final approach course. At that time the first officer reported that both FMC's blanked out". The flight was already cleared for a visual approach to runway 28C and they had the Precision Path Approach Indicator (PAPI) lighting system in sight, therefore the flight crew elected to continue the visual approach. The flight crew stated that the FMC's returned to operational status around 1,000 to 700 feet agl. Once the displays came back on, there was no approach guidance displayed on the navigational displays.

ATC oversight

United Airlines flight 2627 was cleared for a visual approach to runway 28C. At about 2 miles from the threshold, United Airlines flight 2627 confirmed with the controller that they were cleared for the visual approach to runway 28C. The controller advised that there were ground vehicles in the vicinity of the runway and cleared the flight to land on runway 28C. Shortly thereafter the controller observed that United Airlines flight 2627 was lined up for runway 28L. The controller decided it was the safest course of action to have United Airlines flight 2627 continued to land on runway 28L, since there was very little air traffic in the area and no other aircraft approaching, landing, or taxing on runway 28L.

As stated in FAA Joint Order, JO 7110.65Z, section 3-10-5 Landing clearance:

b. When you become aware that an aircraft is aligned with the wrong surface, inform the pilot and:

- 1. Issue control instructions/clearances, or*
- 2. If time permits, verify the pilot is aligned with the correct runway. Issue control instructions/clearances as necessary.*

An example cited states the following:

"Southwest two thirty nine, you appear to be aligned with Runway 27 Left (pertinent information), Runway 27 Left, cleared to land."

In case of United Airlines flight 2627, the above statement should have been the course of action for the controller. Following the example in FAA JO 7110.65Z guidance would have

prevented a wrong runway landing and the subsequent NTSB investigation. Guidance detailed in FAA JO 7110.65Z only has two options listed, as stated above, one of which would be, either issue a new clearance such as go-around instructions or landing clearance for the actual runway the flight is lined up for. The second option, if time permits, confirm with the pilot that they are lined up for the wrong runway. None of these options were accomplished by the controller for this incident and the controller elected to allow United Airlines flight 2627 to continue to land on the wrong runway.

Aircraft based systems

As stated recently by the NTSB, the number of runway incursions — defined as the incorrect presence of an aircraft, vehicle, or person on a runway — has remained relatively stable over the past decade. However, there has been a recent increase in the number of the most serious incursions. It would be advisable to review commercial off the shelf (COTS) solutions to assist with alerting flight crews in case they are aligned on the wrong runway.

Some available products can be retrofitted to current unequipped aircraft through a software update to the Enhanced Ground Proximity Warning System (EGPWS). Such systems can provide additional situational awareness to flight crews.

It would be advisable to have the NTSB recommend that all presently operated transport category aircraft be equipped with such systems, including both current and future delivered airline aircraft.

Airport Surface Safety Systems

The PIT airport, nor its assigned FAA Air Traffic Control (ATC) tower, does not have runway safety technologies installed, such as Airport Surface Detection Equipment Model X (ASDE-X) or Airport Surface Surveillance Capability (ASSC). These surface safety systems are capable of determining the position and identification of aircraft and vehicles on airport movement areas, as well as aircraft flying on final approach corridors to each runway. System capability includes alerting ATC when unsafe conditions between aircraft / vehicles exist within runway safety areas, detect wrong surface landing alignment, aborted arrival / departures, and arriving aircraft position.

Currently, 35 airports have ASDE-X and 8 airports have ASSC installed in operational ATC towers. However, all of these 43 towers may not have the safety logic function installed that

alert ATC when an unsafe condition exists. The FAA should develop National Airspace System (NAS) policy standardizing these system requirements.

Specifically, for wrong surface landings, NAS policy standards should require the safety logic system alert ATC (visual AND aural) when aircraft are aligned to land on a taxiway; when ATC issues a landing clearance to a runway, but the aircraft is aligned to land on a different runway, similar to United Airlines flight 2627.

ATC Policy Guidance for Airport Surface Safety Systems

FAA Air Traffic Organization (ATO) policy contained in FAA JO 7110.65Z prescribes ATC procedures and phraseology for use by personnel providing air traffic control services. Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations not covered by FAA JO 7110.65Z

The FAA JO 7110.65Z contains explicit guidance controllers must follow when a safety logic system generates an unsafe warning alert. Of note, FAA JO 7110.65Z does not have guidance that a controller must issue missed approach / go-around instructions when an aircraft is aligned to a runway that a landing clearance was not issued and no threat exists (i.e., runway is clear of aircraft, vehicles, personnel). A Safety Risk Management Analysis may be required to add explicit guidance to FAA JO 7110.65Z when an aircraft aligns with a wrong runway when there is no imminent threat, but runway/aircraft incompatibility exists.

Runway Awareness and Advisory System (RAAS) (Boeing 737 MAX)

RAAS is a software enhancement hosted within the Enhanced Ground Proximity Warning System (EGPWS) unit to provide aural advisories to assist flight crew awareness of airplane position during ground operations, approach to landing, and go-around. The airports in the RAAS airport database include details for every runway on the airport.

There are significant limitations to the system some of which are detailed below.

When activated, airborne advisories do not ensure that the aircraft will land on the identified runway nor imply that the aircraft can or cannot be safely landed, stopped, or taken off, from a runway. They also do not ensure that the aircraft will, or can be, stopped before hold lines, the runway edges or the runway end.

The absence of advisories does not necessarily imply that the aircraft is approaching a surface other than a runway. The flight crew is responsible for using other means available to ensure correct runway selection and the performance calculations are accurate for the conditions. In the approach environment to PIT, the system, if activated, was designed to annunciate as follows:

Sounds once each time the airplane:

- Approaches within approximately 3 nautical miles of a runway threshold, and
- Is within 20 degrees of the runway heading, and
- Is within approximately 200 feet plus one runway width of the runway extended centerline, and is between 750 feet and 300 feet AFE.

Note: The voice annunciation is delayed and sounds at 450 feet altitude if the voice annunciation would have sounded when the airplane was between 550 feet and 450 feet above field elevation. If the criteria above are not satisfied before the aircraft descends below 300 feet AFE, the advisory is canceled.

RAAS is one of several automated warning systems in modern aircraft. The design of these systems expects the crew to hear an announcement and digest the information to determine if the expected aircraft flight path matches the current flight path. If an announcement indicated an error the crew would be required to resolve the issue. Significant aural and visual indications have been demonstrated to be ignored by crew in high workload environments as part of mitigating task saturation via load shedding. Of significance is the volume of this alert, it is at a decibel level well below other aural alerts. In this case, a runway announcement that differed from the expected annunciation only in the 28 center versus 28 left. Additionally, the system does not annunciate differences in programmed airport and runway from actual airport and runway alignment.

The event aircraft was equipped with Runway Awareness and Advisory System (RAAS). The event aircraft's RAAS system would function for ground operations for crew alerting upon approaching a runway, when on a runway, or during the landing maneuver if in an undesired position (i.e. long landing, runway distance remaining) was encountered.

FINDINGS AND SAFETY RECOMMENDATIONS

Findings

- United Airlines flight 2627 lost both FMC screens during a visual approach.
- After the FMC screens came back online all pre-programmed approach guidance was lost.
- ATC recognized the aircraft lined up to the wrong runway and allowed the aircraft to land on the incorrect runway.
- ATC decided it was the best course of action to let United Airlines flight 2627 continue a visual approach and landing on a wrong runway without issuing a new clearance, be it a go-around or landing clearance.

Safety Recommendations

To FAA

- Reiterate to controllers to issue a new clearance when an aircraft is lined up with a wrong runway – this can either be a landing clearance to the new runway the aircraft is aligned to, or go-around instructions.
- Provide controllers additional training to identify wrong surface alignments and take action accordingly.
- To require installation of aircraft-based systems to alert flight crews when an aircraft is aligned with a runway that differs or conflicts with initial approach or landing clearance.
- Install airport surface safety systems capable of determining the position and identification of aircraft and vehicles on movement areas as well as aircraft flying on final approach corridors to each runway at airports with operational ATC towers.
- Ensure the surface safety system includes safety logic alert algorithms to identify wrong surface landings that includes alignment to taxiways, alignment to runways that ATC has not issued a landing clearance.

ALPA appreciates the chance to participate in this investigation and hopes that the attached Findings and Safety Recommendations will help as the NTSB concludes this investigation.

Captain Steve Demko
ALPA Party Coordinator