NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

July 23, 2020

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

OPS17IA014

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A. INCIDENT

Location: San Francisco, California
Date: February 15, 2017
Time: 2000 Pacific daylight time (PDT)[1]
0400 coordinated universal time (UTC)[2], February 16, 2017
Airplanes: Virgin America flight 920 (VRD920), Airbus A320, N627VA
Compass Airlines flight 6081 (CPZ6081), Embraer ERJ170, N214NN

B. AIR TRAFFIC CONTROL GROUP

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C. SUMMARY

On February 15, 2017, about 2000 PST, a runway incursion occurred on runway 28L at San Francisco International Airport (SFO), San Francisco, California when the SFO Airport Traffic Control Tower (ATCT) local controller cleared an Embraer, ERJ170, N214NN, Compass Airlines flight 6081 (CPZ6081) to land on runway 28L, and subsequently instructed an Airbus, A320, N627VA, Virgin America flight 920 (VRD920) to line up and wait (LUAW) on the same runway. The closest proximity between the two airplanes occurred when CPZ6091 executed a tower directed go around and overflew VRD920 in LUAW on runway 28L; radar data indicated CPZ6091 had descended to about 125 feet mean sea level (msl)[3].

Both flights were operated under the provisions of Title 14 *Code of Federal Regulations* Part 121. CPZ6081was a regularly scheduled flight from Los Angeles International Airport (LAX), Los Angeles, California to SFO, and VRD920 was a regularly scheduled flight from SFO to McCarran International Airport (LAS), Las Vegas, Nevada. There were no injuries reported to the crew or passengers of either flight, and no damage to the aircraft. Night visual meteorological conditions prevailed at the time of the incident.

[1] All times are expressed in Pacific daylight time (PDT) unless otherwise noted.
[2] UTC – coordinated universal time – an international time standard using four digits of a 24-hour clock in hours and minutes based on the time in Greenwich, England.
[3] All altitudes are msl unless otherwise indicated.

D. DETAILS OF THE INVESTIGATION

On Tuesday, February 28, 2017, the air traffic control (ATC) group, convened at SFO ATCT. The air traffic manager (ATM) provided a briefing on the sequence of events leading up to the incident, followed by a tour of the control tower. Present at the briefing were representatives from FAA Western Service Area (WSA) quality control group (QCG), WSA runway safety, SFO support specialist, SFO staff specialist, SFO operations manager, SFO NATCA representative and the AJI event investigation managers (EIMs).

The ATC group reviewed facility records, controller training records, audio recordings, associated data related to the incident, and then interviewed[4] the controllers assigned to the combined front line manager (FLM)/local control assist (LCA) position, and the clearance delivery (CD) position at the time of the incident.

On Wednesday, March 1, 2017, the ATC group reconvened at the SFO ATCT. The group reviewed additional data and documents, and then interviewed the controller that had been assigned to the local control (LC) position at the time of the incident. The group completed the on-site portion of the investigation at SFO and traveled to Northern California terminal radar approach control facility (NCT) to commence an on-site investigation.

On Thursday, March 2, 2017, the ATC group reconvened at NCT. The ATM provided a briefing on the sequence of events leading up to the incident, followed by a tour of the radar facility. Present at the briefing were representatives from FAA WSA QCG, WSA runway safety, NCT support manager, NCT quality control staff support specialist, NCT supervisory traffic management coordinator, NCT NATCA representative, and the EIMs.

The ATC group reviewed facility records, controller training records, audio and radar recordings, associated data related to the incident, and then interviewed the controller assigned to the Area B Woodside sector approach control (2W) position.

On Friday, March 3, 2017, the ATC group reconvened at NCT and conducted interviews with the controllers assigned to the Area B Boulder sector approach control (2B) position, and the FLM position at the time of the incident.

The ATC group completed and approved the field notes, which concluded the on-site portion of the investigation.

E. FACTUAL INFORMATION

1.0 History of Flight

The information provided in this report was compiled using data obtained from SFO ATCT, and NCT.[5]

[4] All interviews are included in Attachment 1 – Interview Summaries
[5] Sources are listed in Section F of this report, Attachments 1 to 7.

About 1944, the pilot of CPZ6081 checked in with the NCT Boulder sector approach controller. The controller advised the pilot that automatic terminal information service (ATIS) information was "tango" and to expect a runway 28 left (28L) visual approach to SFO. The pilot acknowledged.

About 1953, the Boulder sector controller instructed the pilot of CPZ6081 to the contact the Woodside approach controller. The pilot contacted the controller, reporting level at 8,000 feet. The controller informed the pilot to expect a lower altitude in about 5 miles, and then issued the pilot a heading toward the airport. The pilot acknowledged.

About 1954, the Woodside controller instructed the pilot of CPZ6081 a heading and descent to 4,000 feet. The pilot read back the instructions.

About 1955, the Woodside controller issued the pilot a heading toward the airport and informed the pilot that SFO Airport was at the aircraft's 10 o'clock and 16 miles. The pilot reported the SFO Airport insight. The controller then cleared the pilot CPZ6081 for a visual approach to runway 28 right (28R). The pilot read back, "Cleared visual approach runway 28 right...."

About 1957, the Woodside controller instructed the pilot of CPZ6081 to contact SFO tower. The pilot acknowledged.

The pilot of CPZ6081 contacted SFO tower reporting, "… visual runway 28 left." The SFO local controller responded, "…runway 28 left, [wind] one-eight-zero at one-three. The pilot acknowledged, "Cleared to left, cleared to land…."

About 1959, the local controller instructed VRD920 to LUAW on runway 28L. The pilot of VRD920 acknowledged the instruction and taxied onto runway 28L.

At 2000:13, the airport surface surveillance capability (ASSC)[6] system display in SFO ATCT generated an aural and visual alert indicating a conflict between CPZ6081 and VRD920. FAA radar and ASSC data indicated that CPZ6081 was about .85 mile from the runway 28L threshold and at 500 feet, and VRD920 was in LUAW runway 28L.

Six seconds after the ASSC alert was generated the local controller instructed the pilot of CPZ6081 to "go around." The pilot acknowledged, "go around, go around.[7]" ASSC data indicated CPZ6081 was approximately .56 mile from the runway threshold and at 300 feet at the time the local controller issued go around instructions. Figure 1 is a screenshot of the ASSC display at the time the local controller issued the go around instructions to CPZ6081.

The local controller subsequently issued climb out instructions to the pilot of CPZ6081. As CPZ6081 executed the go around, radar data indicated that CPZ6081 had descended to about 125 feet as it overflew runway 28L.

[6] ASSC is one of three airport surface detection equipment (ASDE) systems deployed in the national airspace system.
[7] See the Operational Factors Group Factual report in the docket for pilots' interviews.

The local controller instructed the pilot of CPZ608 to contact NCT approach control, and one minute later issued a takeoff clearance to the pilot of VRD920. The remainder of both flights were uneventful.

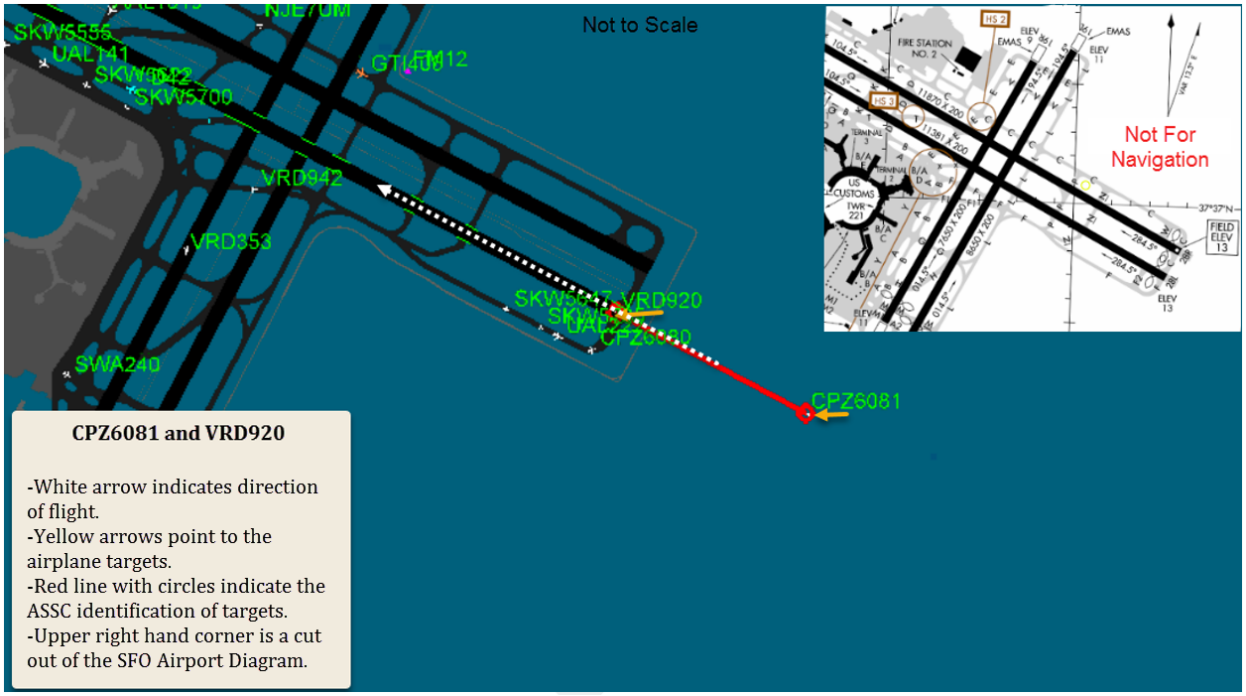

Figure 1. ASSC display screenshot illustrating the position of VRD920 and CPZ6081 when the SFO local controller issued go around instructions.

2.0 Radar Data

ASSC data was provided by SFO and was used as the source data for this report.

3.0 Weather Information

The SFO weather for February 15, 2017 was obtained from the KSFO automated surface observing system (ASOS). The aviation routine weather report (METAR) at the time of the incident was:

METAR KSFO 160356Z 20019KT 10SM FEW100 BKN120 BKN180 16/04 A2999 RMK AO2 SLP155 T01560039=

KSFO routine weather observation at 1956 PST was wind from 200° at 19 knots, 10 statute miles visibility or greater, few clouds at 12,000 ft agl, broken ceiling at 12,000 ft agl, broken skies at 18,000 ft agl, temperature 16° C, dew point temperature 4° C, altimeter 29.99 in Hg. Remarks, station with a precipitation discriminator, sea level pressure 1015.5 hPa, temperature 15.6° C, dew point temperature 3.9° C.

ATIS information "tango"[8] provided information on runway usage at SFO. The recorded information stated in part:

"…landing runway 28 left, 28 right. Departing runway 1left, 1 right…."

4.0 Air Traffic Control Equipment

4.1 Airport Surface Detection Equipment

SFO ATCT was equipped with the ASSC system, which was one of three airport surface detection equipment (ASDE) systems deployed in the national airspace system.

FAA order 7110.65W, *Air Traffic Control*," Pilot/Controller Glossary, "Airport Surface Detection Equipment," defined the use and purpose of ASDE equipment:

> Airport Surface Detection Equipment - Surveillance equipment specifically designed to detect aircraft, vehicular traffic, and other objects, on the surface of an airport, and to present the image on a tower display. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways.

4.2 Tower Display Workstation (TDW)

SFO ATCT was equipped with a standard terminal automation replacement system (STARS) TDW. The intended use and purpose of that equipment, in a non-approach control tower, was described in FAA order JO 7110.65W, *Air Traffic Control*, "Use of Tower Radar Displays," paragraph 3-1-9, which stated in part:

> b. Local controllers may use certified tower radar displays for the following purposes:
>
> 1. To determine an aircraft's identification, exact location, or spatial relationship to other aircraft.
> 2. To provide aircraft with radar traffic advisories.
> 3. To provide a direction or suggested headings to VFR aircraft as a method for radar identification or as an advisory aid to navigation.
> 4. To provide information and instructions to aircraft operating within the surface area for which the tower has responsibility.
>
> NOTE- Unless otherwise authorized, tower radar displays are intended to be an aid to local controllers in meeting their responsibilities to the aircraft operating on the runways or within the surface area. They are not intended to provide radar benefits to pilots except for those accrued through a more efficient and effective local control position. In addition, local controllers at nonapproach control towers must devote the majority of their time to visually scanning the runways and local area; an assurance of continued positive radar identification could place distracting and operationally inefficient requirements upon the local controller.

[8] Complete ATIS information "tango" recording is contained in Attachment 6 – SFO ATIS Audio.

5.0 Air Traffic Control Procedures

5.1.1 Approach Information

Approach information contained in the ATIS broadcast may be omitted by terminal approach controllers if the pilot stated he had the current ATIS information. The detailed requirements were described in FAA order 7110.65W, *Air Traffic Control*, paragraph 4-7-10, "Approach Information," which stated in part:

> a. Both en route and terminal approach control sectors must provide current approach information to aircraft destined to airports for which they provide approach control services. This information must be provided on initial contact or as soon as possible thereafter. Approach information contained in the ATIS (automatic terminal information service) broadcast may be omitted if the pilot states the appropriate ATIS code. For pilots destined to an airport without ATIS, items 3-5 below may be omitted after the pilot advises receipt of the automated weather; otherwise, issue approach information by including the following:
>
> 1. Approach clearance or type approach to be expected if two or more approaches are published and the clearance limit does not indicate which will be used.
> 2. Runway if different from that to which the instrument approach is made.
> 3. Surface wind.
> 4. Ceiling and visibility if the reported ceiling at the airport of intended landing is below1,000 feet or below the highest circling minimum, whichever is greater, or the visibility is less than 3 miles.
> 5. Altimeter setting for the airport of intended landing.

5.1.2 Line up and Wait (LUAW) Operations

The intent of LUAW is to position an aircraft on the runway for an imminent departure. FAA order 7110.65W, *Air Traffic Control*, paragraph 3-9-4, "Line Up and Wait," described the requirements for using this procedure. The paragraph stated in part:

> c. Procedures.
>
> 2. Except when reported weather conditions are less than ceiling 800 feet or visibility less than 2 miles, facilities using the safety logic system in the full core alert mode:
>
> (a) May issue a landing clearance for a full−stop, touch−and−go, stop−and−go, option, or unrestricted low approach to an arriving aircraft with an aircraft holding in position or taxiing to LUAW on the same runway, or
>
> (b) May authorize an aircraft to LUAW when an aircraft has been cleared for a full stop, touch−and−go, stop−and−go, option, or unrestricted low approach on the same runway.

d. When an aircraft is authorized to line up and wait, inform it of the closest traffic within 6−flying miles requesting a full−stop, touch−and−go, stop− and− go, option, or unrestricted low approach to the same runway.

5.1.3 Safety Logic Alert Responses

FAA order JO 7110.65W, *Air Traffic Control*, paragraph 3−6−4, "Safety Logic Alert Responses," described responses a controller must take when the ASDE safety logic alert is generated. The paragraph stated in part:

> When the system generates an alert, the controller must immediately assess the situation visually and as presented on the ASDE system display, then take appropriate action as follows:
>
> a. When an arrival aircraft (still airborne, prior to the landing threshold) activates a warning alert, the controller must issue go−around instructions.
>
> b. When two arrival aircraft, or an arrival aircraft and a departing aircraft activate an alert, the controller will issue go−around instructions or take appropriate action to ensure intersecting runway separation is maintained.

F. ATTACHMENTS

Attachment 1 – Interview Summaries
Attachment 2 – Mandatory Occurrence Report
Attachment 3 – SFO Local Control Audio
Attachment 4 – NCT Woodside Sector Audio
Attachment 5 – NCT Boulder Sector Audio
Attachment 6 – SFO ATIS Audio
Attachment 7 – FAA Radar Data

Submitted by:

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