



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

April 8, 2019

### **Specialist's Report**

# **AIR TRAFFIC CONTROL**

CEN18FA168

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## **A. ACCIDENT**

Location: Lone Tree, Colorado  
Date: May 11, 2018  
Time: 2019 mountain daylight time (MDT)<sup>1</sup>  
0319 coordinated universal time (UTC), May 12, 2018  
Airplane: N507TX, a Cirrus Design Corporation SR22

## **B. AIR TRAFFIC CONTROL INVESTIGATOR**

Betty Koschig  
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National Transportation Safety Board

## **C. SUMMARY**

On May 11, 2018, about 2019 mountain daylight time, a Cirrus Design Corporation SR22 airplane, N507TX, impacted terrain near Lone Tree, Colorado. The private pilot was fatally injured. The airplane was destroyed. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed and no Federal Aviation Administration (FAA) flight plan had been filed for the flight. The airplane had just departed from Centennial Airport (APA), Denver, Colorado, and was en route to Grand Junction Regional Airport (GJT), Grand Junction, Colorado.

## **D. DETAILS OF THE INVESTIGATION**

An onsite investigation was not conducted at APA. The factual information provided in this report was compiled using resources obtained from the FAA, which included but not limited to APA airport traffic control tower (ATCT) certified audio recordings; aircraft accident package #18-001-APA; and certified radar data.

## **E. FACTUAL INFORMATION**

### **1.0 History of Flight**

About 1957 the pilot of N507TX contacted APA ATCT and stated he was ready to taxi. The APA local controller instructed the pilot to verify he had received the automatic terminal information service (ATIS)<sup>2</sup> information and asked what direction of flight he was requesting. The pilot verified he had the ATIS information and stated he would be departing to the south. The controller instructed the pilot to taxi to runway 35 right (35R).

About 2002, the controller cleared N507TX for takeoff. The pilot responded that he needed to do a run-up. The controller canceled takeoff clearance and instructed the pilot to advise when ready to depart.

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<sup>1</sup> All times are mountain daylight time (MDT) unless otherwise noted.

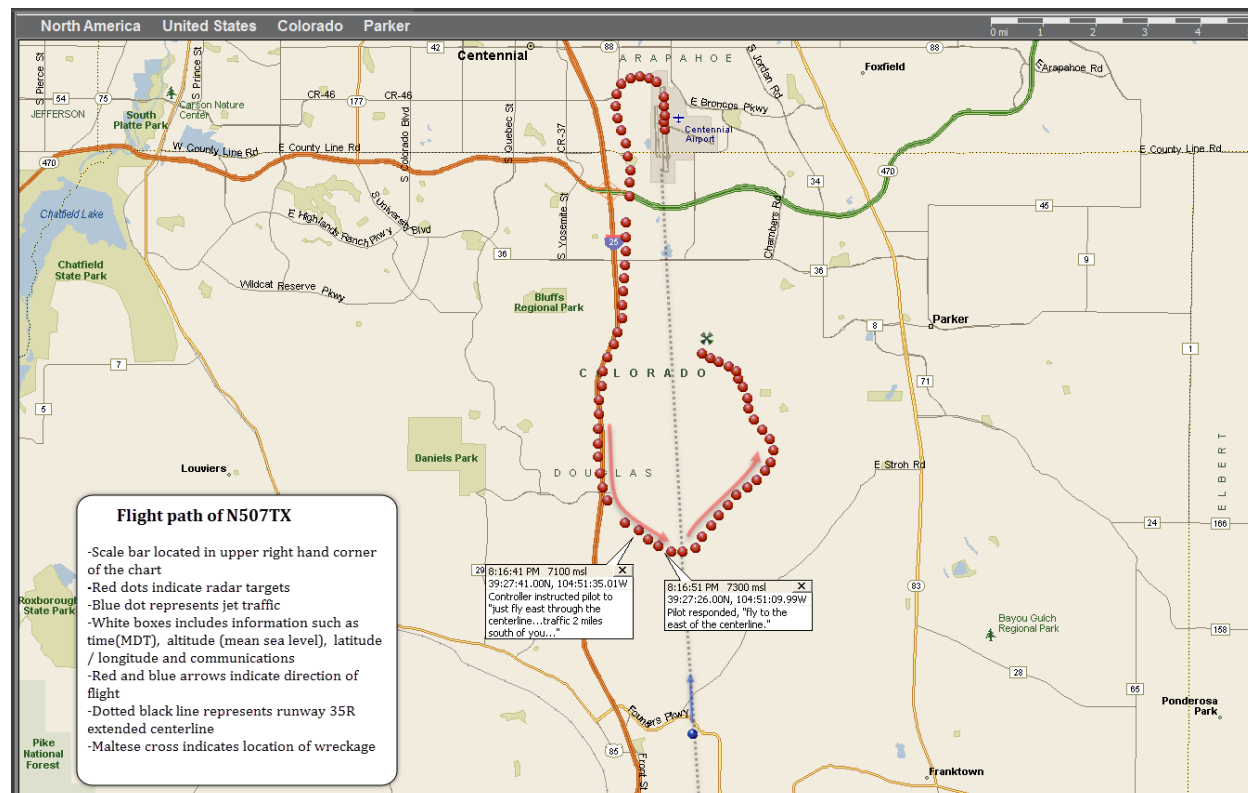
<sup>2</sup> ATIS provides advance noncontrol airport/terminal area and meteorological information to aircraft.

About 2011, the pilot of N507TX informed the controller that he had completed his run-up and was ready for departure. The controller instructed the pilot to make a left downwind departure and cleared the flight for takeoff from runway 35R.

About 2014, the controller instructed the pilot to remain west of the centerline for runway 35R and issued a traffic advisory on a Cirrus that was on final approach to runway 35R. At 2014:40 the pilot responded, "I'll remain west of the centerline of three five right."

At 2015:53, the controller informed the pilot that the Cirrus traffic was no longer a factor and issued a traffic advisory on a military jet trainer<sup>3</sup>, (Hawk94) intercepting the final for runway 35R. The pilot acknowledged with his callsign.

At 0216:06, the controller informed the pilot, "...that hawk is now intercepting a one zero [10] mile final. At 2016:41, the controller instructed the pilot, "...just fly east through the centerline please traffic about two miles south of you descending out of nine thousand [feet]." Ten seconds later the pilot responded, "...fly to the east of the centerline...." Figure 1 is a radar plot that illustrates the position of N507TX relative to the runway 35R extended centerline when the controller instructed the pilot to fly east of the centerline.



**Figure 1.** Radar plot that illustrates the position of N507TX relative to the runway 35R extended centerline when the controller instructed the pilot to fly east of the centerline.

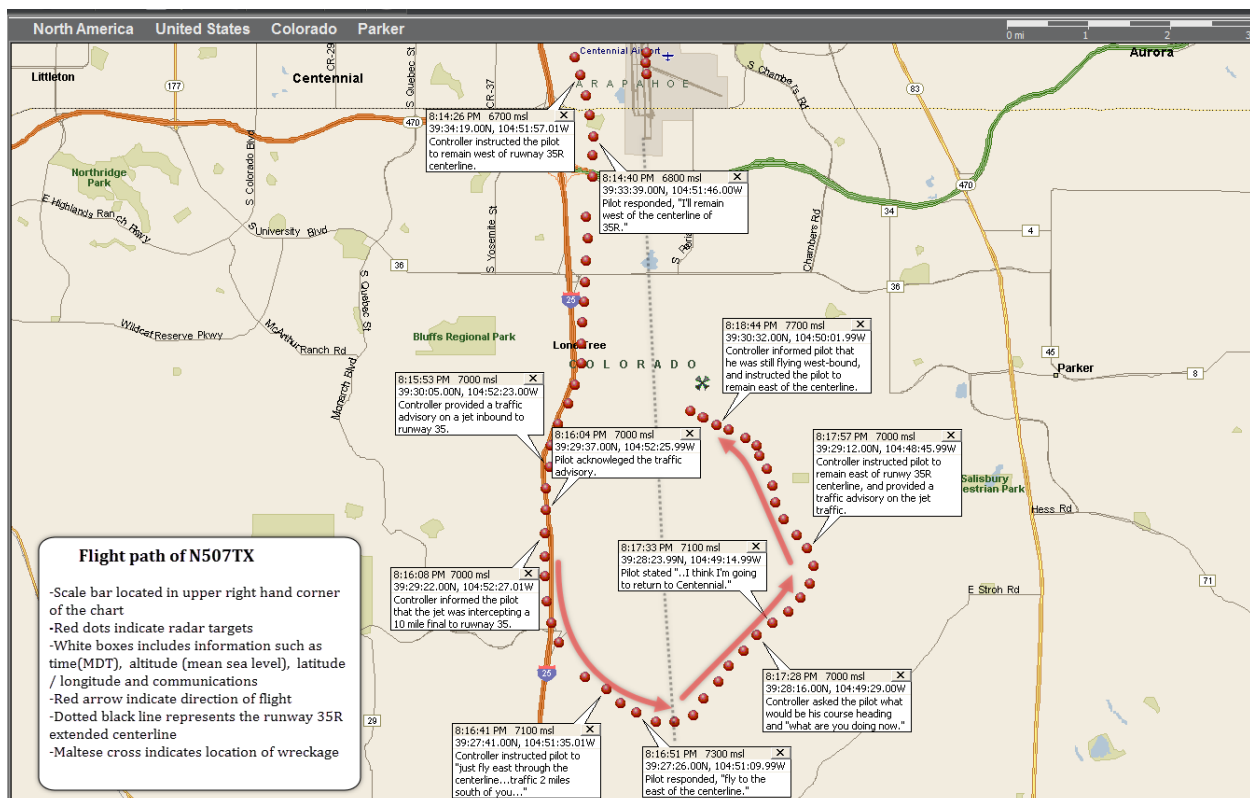
<sup>3</sup> T-45 Goshawk.

At 2017:28, the controller asked the pilot of N507TX, "...what is going to be your on course heading what are you doing now." Three seconds later the pilot responded, "um seven tango x-ray I think I'm going to return to uh return to centennial." The controller asked the pilot if he would like to land on runway 28. The pilot did not respond. At 2017:57, the controller stated, "...remain east of the centerline for runway three five right please I've got a Hawk descending five mile final seven thousand eight hundred indicated I need you to remain east of the centerline." Thirteen seconds later the pilot responded, "I'll stay east."

About 2018, the controller issued the wind information to the pilot and asked if he would like runway 28 or runway 35R. at 2018:38, the pilot responded, "uh seven tango x-ray give me the winds one more time." One second later, the controller transmitted to the pilot, "...you're still flying westbound please I need you east, east of the centerline, please remain east of the centerline." The pilot did not respond.

At 2019:05, the controller transmitted to the pilot of N507TX, "...I need you to do what I'm telling you to do, now fly westbound, continue westbound." The pilot did not respond.

Figure 2 is a radar plot that illustrates the flight path of N507TX from about 1 minute after N507TX took off from runway 35R until the last radar target. The illustration includes text boxes with pertinent communications made by the controller and/or the pilot of N507TX.



**Figure 2.** Radar Plot that illustrates the flight path of N507TX after departing runway 35R.

## **1.1 Radar Data**

The certified radar source data was obtained from the Denver (DEN) airport surveillance radar (ASR-9) antenna located in Denver, Colorado.

## **1.2 APA Airspace**

The dimensions of the APA Class D and Class E airspace were specified in FAA order 7400.9W, *Airspace Designations and Reporting Points*, which described in part:

### **Class D:**

That airspace extending upward from the surface to but not including 8,000 feet mean sea level (msl) within a 4.4-mile radius of the Centennial Airport. This Class D airspace area is effective during the specific dates and times established in advance by a notice to airmen. The effective dates and times will thereafter be continuously published in the airport/facility directory.

### **Class E:**

That airspace extending upward from the surface within 3.2-miles each side of the 178° bearing from the Centennial Airport extending from the 4.4-mile radius to 14.1 miles south of the airport, and within 2.1 miles each side of the 109° bearing from the Centennial Airport extending from the 4.4-mile radius to 5.5 miles southeast of the airport. This Class E airspace area is effective during the specific dates and times established in advance by a notice to airmen. The effective dates and times will thereafter be continuously published in the airport/facility directory.

That airspace extending upward from 700 feet above the surface within a 28-mile radius of the Denver VOR, and within 3.5 miles west and 8.8 miles east of the 178° bearing from the Centennial Airport extending from the 28-mile radius to 17.8 miles south of the Centennial Airport; and that airspace extending upward from 1,200 feet above the surface on the north beginning at lat. 40°30'00"N., long. 106°00'02"W., thence east along lat. 40°30'00"N., thence northeast along V-361, thence east along lat. 41°00'00"N., thence south along the Colorado- Nebraska State boundary, thence southwest along V-8, thence south along V-169, thence west along lat. 39°00'00"N., thence north along long. 106°00'02"W., to the point of beginning, excluding airspace within Federal airways.

## **2.0 Controlled Airspace**

FAA JO 7110.65X, *"Air Traffic Control," Pilot/Controller Glossary*, "Controlled Airspace," defined Class D and Class E controlled airspace and the general requirements when operating in controlled airspace, which stated in part:

Controlled airspace - An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

b. Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in 14 *CFR* Part 91.

c. Controlled airspace in the United States is designated as follows:

**CLASS D**– Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in msl) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.

**CLASS E**– Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also, in this class are Federal airways, airspace beginning at either 700 or 1,200 feet above ground level (agl) used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet msl. Unless designated at a lower altitude, Class E airspace begins at 14,500 msl over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska, up to, but not including 18,000 feet msl, and the airspace above FL 600.

## **2.1 ATC Procedures**

### **2.1.1 ATC Service**

Controllers provide ATC services to aircraft operating in controlled airspace. The primary purposes, functions, and limitations of ATC services were explained in FAA JO 7110.65X, “*Air Traffic Control*,” paragraph 2–1–1, “ATC Service,” which stated in part:

a. The primary purpose of the ATC system is to prevent a collision involving aircraft operating in the system.

b. In addition to its primary purpose, the ATC system also:

1. Provides a safe, orderly, and expeditious flow of air traffic.
2. Supports National Security and Homeland Defense missions.

c. The ATC system must provide certain additional services to the extent permitted. The provision of additional services is not optional on the part of the controller, but rather required when the work situation permits. It is recognized that the provision of these services may be precluded by various factors, including, but not limited to:

1. Volume of traffic.
2. Frequency congestion.
3. Quality of surveillance.
4. Controller workload.

5. Higher priority duties.
6. The physical inability to scan and detect situations falling in this category.

d. Controllers must provide air traffic control service in accordance with the procedures and minima in this order, except when one or more of the following conditions exists:

1. A deviation is necessary to conform with ICAO [International Civil Aviation Organization] Documents, National Rules of the Air, or special agreements where the U.S. provides air traffic control service in airspace outside the U.S. and its possessions or:
2. Other procedures/minima are prescribed in a letter of agreement, FAA directive, or a military document, or:
3. A deviation is necessary to assist an aircraft when an emergency has been declared.

NOTE—Pilots are required to abide by CFRs or other applicable regulations regardless of the application of any procedure or minima in this order.

### **2.1.2 Provide Service**

Guidance for providing ATC services by controllers in the airport traffic control terminal area were described in FAA JO 7110.65X, *Air Traffic Control*, paragraph 3–1–1, “Provide Service,” which stated in part:

Provide airport traffic control service based only upon observed or known traffic and airport conditions.

NOTE—When operating in accordance with CFRs, it is the responsibility of the pilot to avoid collision with other aircraft. However, due to the limited space around terminal locations, traffic information can aid pilots in avoiding collision between aircraft operating within Class B, Class C, or Class D surface areas and the terminal radar service areas, and transiting aircraft operating in proximity to terminal locations.

### **2.1.3 Use of Tower Radar Displays**

APA ATCT was equipped with an operating certified tower radar display (CTRD). The intended use and purpose of that equipment in a non-approach control tower was described in the FAA JO 7110.65X, *Air Traffic Control*, paragraph 3-1-9 (b), “Use of Tower Radar Displays.” Applicable paragraphs 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.

NOTE—This authorization does not alter visual separation procedures.

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.

NOTE—It is important that the pilot be aware of the fact that the directions or headings being provided are suggestions or are advisory in nature. This is to keep the pilot from being inadvertently misled into assuming that radar vectors (and other associated radar services) are being provided when, in fact, they are not.

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....The radar functions prescribed above are not considered to be radar services and pilots should not be advised of being in “radar contact.”

c. Additional functions may be performed provided the procedures have been reviewed and authorized by appropriate management levels.

#### **2.1.4 Traffic Advisories**

The definition of traffic advisories and the guidance for applying traffic advisory services were described in the FAA JO 7110.65X, *Air Traffic Control, Pilot/Controller Glossary*, “Traffic Advisories,” which stated in part:

Traffic Advisories - Advisories issued to alert pilots to other known or observed air traffic, which may be in such proximity to the position or intended route of flight of their aircraft to warrant their attention. Such advisories may be based on:

- a. Visual observation
- b. Observation of radar identified and non-identified aircraft targets on an ATC radar display, or
- c. Verbal reports from pilots or other facilities.

NOTE 1—The word “traffic” followed by additional information, if known, is used to provide such advisories; e.g., “Traffic, 2 o’clock, one zero miles, southbound, eight thousand.”

NOTE 2—Traffic advisory service will be provided to the extent possible depending on higher priority duties of the controller or other limitations; e.g., radar limitations,

volume of traffic, frequency congestion, or controller workload. Radar/nonradar traffic advisories do not relieve the pilot of his/her responsibility to see and avoid other aircraft. Pilots are cautioned that there are many times when the controller is not able to give traffic advisories concerning all traffic in the aircraft's proximity; in other words, when a pilot requests or is receiving traffic advisories, he/she should not assume that all traffic will be issued.

Additional guidance on providing traffic advisory services to aircraft in other than Class A, B, or C airspace was described in FAA JO 7110.65X, *Air Traffic Control*, paragraph 2-1-21 (b), "Traffic Advisories," which stated in part:

Unless an aircraft is operating within Class A airspace or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when, in your judgment, their proximity may diminish to less than the applicable separation minima. Where no separation minima applies, such as for VFR aircraft outside of Class B/Class C airspace, or a TRSA, issue traffic advisories to those aircraft on your frequency when in your judgment their proximity warrants it. Provide this service as follows:

b. To aircraft that are not radar identified:

1. Distance and direction from fix.
2. Direction in which traffic is proceeding.
3. If known, type of aircraft and altitude.
4. ETA [estimated time of arrival] over the fix the aircraft is approaching, if appropriate.

c. For aircraft displaying Mode C, not radar identified, issue indicated altitude.

### **2.1.5 Traffic Information**

General guidance for controllers on providing traffic information was described in FAA JO 7110.65X, *Air Traffic Control*, paragraph 3-1-6, "Traffic Information," which stated in part:

b. Describe the relative position of traffic in an easy to understand manner, such as "to your right" or "ahead of you."

c. When using a CTRD you may issue traffic advisories using the standard radar phraseology prescribed in paragraph 2-1-21, Traffic Advisories.

## **3.0 Code of Federal Regulations (CFRs)**

### **3.1 Compliance with ATC Clearances and Instructions**

The pilot in command's responsibilities for compliance of ATC clearances and instructions were described in 14 *CFR* 91.123. Applicable sections of the regulation stated in part:

a. When an ATC clearance has been obtained, no pilot in command may deviate from that clearance unless an amended clearance is obtained, an emergency exists, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory. When a

pilot is uncertain of an ATC clearance, that pilot shall immediately request clarification from ATC.

b. Except in an emergency, no person may operate an aircraft contrary to an ATC instruction in an area in which air traffic control is exercised.

c. Each pilot in command who, in an emergency, or in response to a traffic alert and collision avoidance system resolution advisory, deviates from an ATC clearance or instruction shall notify ATC of that deviation as soon as possible.

### **3.2 Operations in Class D Airspace**

The pilot in command's responsibilities for compliance of operations in Class D airspace were described in 14 *CFR* 91.129. Applicable sections of the regulation stated in part:

a. General. Unless otherwise authorized or required by the ATC facility having jurisdiction over the Class D airspace area, each person operating an aircraft in Class D airspace must comply with the applicable provisions of this section. In addition, each person must comply with section 91.126 and 91.127. For the purpose of this section, the primary airport is the airport for which the Class D airspace area is designated. A satellite airport is any other airport within the Class D airspace area.

b. Deviations. An operator may deviate from any provision of this section under the provisions of an ATC authorization issued by the ATC facility having jurisdiction over the airspace concerned. ATC may authorize a deviation on a continuing basis or for an individual flight, as appropriate.

c. Communications. Each person operating an aircraft in Class D airspace must meet the following two-way radio communications requirements:

2(i). Departing flight. Each person from the primary airport or satellite airport with an operating control tower must establish and maintain two-way radio communications with the control tower, and thereafter as instructed by ATC while operating in the Class D airspace area

### **3.3 Operating on Or in The Vicinity of An Airport in Class E Airspace**

The pilot in command's responsibilities for compliance of operating on or in the vicinity of an airport in Class E airspace were described in 14 *CFR* 91.127. Applicable sections of the regulation stated in part:

b. Departures. Each pilot of an aircraft must comply with any traffic patterns established for that airport in Part 93 of this chapter.

c. Communications with control towers. Unless otherwise authorized or required by ATC, no person may operate an aircraft to, from, through, or on an airport having an operational control tower unless two-way radio communications are maintained between that aircraft and the control tower. Communications must be established prior to 4 nautical miles from the airport, up to and including 2,500 feet agl.

**F. LIST OF ATTACHMENTS**

Attachment 1 – Radar Data

Submitted by:

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Betty Koschig  
Senior Air Traffic Investigator