

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594

WPR22FA172

AIR TRAFFIC CONTROL

Group Chair's Factual Report

January 21, 2024

TABLE OF CONTENTS

A. ACCIDENT	3
B. AIR TRAFFIC CONTROL GROUP	3
C. SUMMARY	3
D. DETAILS OF THE INVESTIGATION	3
E. FACTUAL INFORMATION	4
1.0 HISTORY OF FLIGHT	4
2.0 FLIGHT TRACK SURVEILLANCE DATA	5
3.0 METEOROLOGICAL INFORMATION	5
3.1 Surface Observations	5
4.0 INTERVIEWED AIR TRAFFIC CONTROL PERSONNEL	6
4.1 Operations Manager - Working	7
4.2 Operations Manager - Relieving	7
4.3 Richmond Radar Controller	8
4.4 Radar Coordinator	8
4.5 Operations Supervisor	9
4.6 Controller In-Charge	9
4.7 Air Traffic Manager	10
5.0 AIR TRAFFIC CONTROL PROCEDURES	10
5.1 FAA Order JO 7110.65Z, Air Traffic Control	10
F. FIGURES	13
G. LIST OF ATTACHMENTS	15

A. ACCIDENT

Location: Sausalito, California
Date: May 6, 2022
Time: 1210 Pacific daylight time (PDT)
1910 coordinated universal time (UTC)
Airplane: Vans RV-10, N54MG

B. AIR TRAFFIC CONTROL GROUP

Group Chair	Brian Soper National Transportation Safety Board (NTSB) Washington, DC
Group Member	Sarah Owens National Air Traffic Controllers Association (NATCA) Olathe, KS
Group Member	Thomas Eggar National Air Traffic Controllers Association (NATCA) Raleigh, NC
Group Member	Josh Coleman Federal Aviation Administration (FAA) Anchorage, AK

C. SUMMARY

On May 6, 2022, about 1210 Pacific daylight time, an experimental amateur-built Vans RV-10, N54MG, was substantially damaged when it was involved in an accident near Sausalito, California. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF THE INVESTIGATION

Air traffic control (ATC) services were provided by Northern California Consolidated Terminal Radar Approach Control (NCT TRACON). The ATC group did not travel in support of this investigation and activities were limited to reviewing pertinent data provided by the FAA and the interviewing of the involved controllers and pertinent staff from NCT TRACON. Interviews took place via Zoom on May 17-19, and June 1, 2022.

E. FACTUAL INFORMATION

1.0 History of Flight

The following is a summary of the communications between the accident pilot and NCT TRACON and was constructed from certified audio re-recordings and data provided by the FAA¹. Times in this summary are in PDT and altitudes are in feet above mean sea level (msl).

- 1151 The pilot of N54MG checked in with the NCT TRACON Richmond Radar (4R) controller, reported he was descending from 4,500 feet to 2,500 feet, and advised he would be conducting the "Bay Tour²" on his way to Half Moon Bay Airport (HAF).

The 4R controller acknowledged and instructed the pilot of N54MG to remain North and West of the Bay Bridge, outside of the San Francisco class B airspace, and to advise when he had the weather at HAF. The pilot acknowledged.

- 1156 A position relief briefing took place on the 4R position, and information on N54MG was provided in the briefing.

- 1204 The pilot of N54MG advised he would like the transition down to HAF. The 4R controller acknowledged, and instructed the pilot to remain outside of the class B.

- 1205 The pilot of N54MG advised "I was gonna go to Half Moon Bay please." The controller again acknowledged, and instructed the pilot to remain outside of the class B. The pilot acknowledged.

[There were no further recorded transmissions with N54MG]

- 1210 The data tag for N54MG dropped from the STARS³ radar display at the 4R position.

[According to information provided in the interview with the 4R controller providing services, she did not notice at the time.]

¹ A partial transcript of the ATC audio is provided in Attachment 1: ATC Audio Partial Transcript.

² The Bay Tour refers to non-specific VFR flight routes in the San Francisco Bay area that allows pilots to view various landmarks in the area, such as the Golden Gate Bridge, Bay Bridge, Alcatraz, Treasure Island, downtown San Francisco, San Francisco International Airport, lighthouses, as well as other attractions.

³ STARS - Standard Terminal Automation Replacement System - A system that receives radar data and flight plan information and presents the information to air traffic controllers on high resolution, 20" x 20" color displays allowing the controller to monitor, control, accept hand-off of air traffic, and assist with weather avoidance.

1244 The pilot of United Airlines flight 901 (UAL901) advised they were receiving an ELT⁴ as they were departing San Francisco.

[This report was approximately coincident with the last known position of N54MG.]

1245 A position relief briefing took place on the 4R position, and information on N54MG was not provided in the briefing.

1315 The NCT TRACON Operations Manager (OM) was notified by the Oakland (ZOA) ARTCC OM that there had been an aircraft accident involving N54MG and that there had been two fatalities.

[According to the Air Traffic Manager (ATM), she was notified immediately by the OM.]

2.0 Flight Track Surveillance Data

Certified ADS-B⁵ data was provided by the FAA⁶. These data were provided in both Comma Separated Value (.csv) and Keyhole Markup Language (.kml) formats. The ADS-B data provided flight track surveillance information for the entire accident flight. The graphics in Figures 1-4 in section F were produced overlaying these data onto satellite imagery in Google Earth⁷.

NOTE: Though altitudes in ADS-B data were rounded to the nearest 25-foot (ft.) increment, all altitudes displayed to ATC were rounded to the nearest 100 ft. increment.

3.0 Meteorological Information

3.1 Surface Observations

The closest official weather reporting station to the accident site was from San Francisco International Airport (KSFO), San Francisco, CA, located approximately 14 miles south of the accident site at an elevation of 13 feet. The airport had an

⁴ ELT - Emergency Locator Transmitter - A radio transmitter attached to the aircraft structure which operates from its own power source on 121.5 MHz and 243.0 MHz. It aids in locating downed aircraft by radiating a downward sweeping audio tone, 2-4 times per second. It is designed to function without human action after an accident.

⁵ ADS-B - Automatic Dependent Surveillance-Broadcast - A surveillance system in which an aircraft or vehicle to be detected is fitted with cooperative equipment in the form of a data link transmitter. The aircraft or vehicle periodically broadcasts its GPS-derived position and other information such as velocity over the data link, which is received by a ground-based transmitter/receiver (transceiver) for processing and display at an air traffic control facility.

⁶ ADS-B source data is provided in Attachment 2: ADS-B Data,

⁷ Google Earth - A web based virtual globe, map and geographical information program that maps the Earth by the superimposition of images obtained from satellite imagery, aerial photography and geographic information system 3D globe.

Automated Surface Observation System (ASOS)⁸ which was augmented by National Weather Service (NWS)/FAA certified weather observers. The following conditions were reported at the approximate time of the accident in plain language. For detailed weather information see the Meteorology Specialist's Factual Report in the docket.

Routine weather observation for KSFO at 1156 PDT, wind from 060° at 5 knots, visibility 10 statute mile or more, a few clouds at 900 feet, ceiling broken at 2,500 feet, broken clouds at 20,000 feet, temperature 19° Celsius (C) (66° F), dew point temperature 13° C (55° F), altimeter setting 30.08 inches of mercury (inHg). Remarks: automated station with a precipitation discriminator, sea-level pressure 1018.4-hPa, temperature 18.9° C, dew point temperature 12.8° C.

The longline⁹ observations that were disseminated on weather circuits and general flight categories were as follows (observation closest to incident time is in bold for emphasis):

MVFR METAR KSFO 061756Z 09005KT 10SM FEW009 BKN021 18/13 A3009
RMK AO2 SLP188 T01830128 10189 20144 58001=

**MVFR METAR KSFO 061856Z 06005KT 10SM FEW009 BKN025 BKN200
19/13 A3008 RMK AO2 SLP184 T01890128=**

MVFR METAR KSFO 061956Z 26012G21KT 10SM FEW009 BKN030 BKN200
21/13 A3007 RMK AO2 SLP183 T02110128=

4.0 Interviewed Air Traffic Control Personnel

The Richmond Radar (R4) controller, Radar Coordinator (CI-1) controller, Operations Supervisor (OS), Controller in-Charge (CIC), and OM that were working in the TRACON at the time of the incident, as well as, the OM relieving (OM-R), and the ATM were interviewed. All interviews were recorded and transcribed by Free State Reporting, Inc.¹⁰

⁸ ASOS - Automated Surface Observing System - Automated sensor suites equipped with meteorological instruments to observe and report wind, visibility, ceiling, temperature, dewpoint, altimeter, and barometric pressure. These systems generally report at hourly intervals, but also report special observations if weather conditions change rapidly and cross aviation operation thresholds.

⁹ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

¹⁰ Certified transcripts of all recorded interviews are included in Attachment 3: Interview Transcripts.

4.1 Operations Manager - Working

The OM was providing oversight of the TRACON at the time of the accident. He was employed by the FAA in January 1992, and after initial training at the FAA Academy, he was certified at Stockton (SCK) ATCT and remained for almost 11 years. After that, he worked at NCT TRACON for about 10 years, Sonoma (STS) ATCT for about two years, Sacramento (SMF) ATCT for about two years, then returned to NCT TRACON in September 2017. He certified as OM in September 2017.

He was 62 years old and did not hold a medical clearance certificate, nor was he required to. Neither post-accident drug nor alcohol testing were conducted. In the terms of excellent, good, fair, or poor; he described his health as good. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Leave	None	None
Sunday	May 1	Off	None	None
Monday	May 2	Off	None	None
Tuesday	May 3	Leave	None	None
Wednesday	May 4	Day	0825-1625	None
Thursday	May 5	Day	1100-1630	None
Friday	May 6	Day	0725-1535	10 minutes

4.2 Operations Manager - Relieving

The OM-R had relieved the involved OM and had not been working the position during the time of the accident. He was employed by the FAA in October 1997 and reported directly to Wichita (ICT) ATCT and worked until September 2004 when he transferred to NCT TRACON. He certified as OM in January 2005.

He was 50 years old and did not hold a medical clearance certificate, nor was he required to. In the terms of excellent, good, fair, or poor; he described his health as good. Neither post-accident alcohol nor drug testing were required. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Day	0530-1411	41 minutes
Sunday	May 1	Off	-----	None
Monday	May 2	Off	-----	None
Tuesday	May 3	Swing	1200-2203	2 hours, 3 minutes
Wednesday	May 4	Swing	1250-2211	1 hour, 21 minutes
Thursday	May 5	Swing	1304-2130	26 minutes
Friday	May 6	Day	0530-1336	6 minutes

4.3 Richmond Radar Controller

The 4R controller was providing services to the accident airplane at the time of the accident. She was employed by the FAA in February 2008, and after completing initial training at the FAA Academy, she was certified at Burbank (BUR) ATCT where she remained for about 4 years. After BUR ATCT, she worked at Portland (PDX) ATCT for about 4 years until transferring to NCT TRACON in January 2016. She certified at the 4R position in May 2017, and was current in accordance with FAA and facility standards on the day of the accident.

She was 36 years old, held a second-class medical clearance certificate, and her last flight physical had been conducted in June 2021. She had a requirement to wear corrective lenses while performing ATC duties and stated that she was wearing her prescribed contact lenses on the day of the accident. She stated that she was taking no medications of any kind on the day of the accident and in the terms of excellent, good, fair, or poor; described her health as good. She had no other waivers or restrictions to her medical clearance. Post-accident drug testing was conducted four days after the event on March 10, 2022, however, post-accident alcohol testing was not conducted. Her working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Leave	None	None
Sunday	May 1	Leave	None	None
Monday	May 2	Off	None	None
Tuesday	May 3	Off	None	None
Wednesday	May 4	Swing	1320-2220	None
Thursday	May 5	Swing	1150-1950	None
Friday	May 6	Day	0745-1545	None

4.4 Radar Coordinator

The CI-1 controller was working at the time of the accident. He was employed by the FAA in March 2006, and after completing initial training at the FAA Academy, he was certified at Seattle Air Route Traffic Control Center (ZSE ARTCC) where he remained for a little over seven years when he transferred to NCT TRACON in September 2013. He certified at the CI-1 position in December 2014, and was current in accordance with FAA and facility standards on the day of the accident.

He was 43 years old, held a second-class medical clearance certificate, and his last flight physical had been conducted in September 2021. He stated that he was taking no medications of any kind on the day of the accident and in the terms of excellent, good, fair, or poor; described his health as good. He had no other waivers or restrictions to his medical clearance. Neither post-accident drug nor alcohol

testing were conducted. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Mid	2152-0552	None
Sunday	May 1	Off	None	None
Monday	May 2	Day	0700-1500	8 hours
Tuesday	May 3	Swing	1345-2145	None
Wednesday	May 4	Swing	1148-1948	None
Thursday	May 5	Day	0850-1650	None
Friday	May 6	Day	0630-1330	None

4.5 Operations Supervisor

The Operations Supervisor (OS) was assigned to the involved area, however, was performing administrative duties at the time of the accident. He was employed by the FAA in August 2006, reported directly to, and certified at Phoenix (P80) TRACON where he remained for a little more than nine years. After P80 TRACON, he worked at Seattle (S46) TRACON for a little less than three years until transferring to NCT TRACON in May 2018. He certified as OS in December 2018, and was current in accordance with FAA and facility standards on the day of the accident.

He was 40 years old, held a second-class medical clearance certificate, and his last flight physical had been conducted in July 2021. He stated that he was prescribed a maintenance medication for a condition documented in his medical record and was taking it as prescribed on the day of the accident. In the terms of excellent, good, fair, or poor; he described his health as excellent. He had no other waivers or restrictions to his medical clearance. Neither post-accident drug nor alcohol testing were conducted. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Leave	None	None
Sunday	May 1	Mid	2130-0545	15 minutes
Monday	May 2	Off	None	None
Tuesday	May 3	Off	None	None
Wednesday	May 4	Swing	1230-2030	None
Thursday	May 5	Day	0600-1215	None
Friday	May 6	Day	0530-1340	10 minutes

4.6 Controller In-Charge

The CIC was providing general oversight of the involved area at the time of the accident. He was employed by the FAA in August 2008, and after completing initial

training at the FAA academy, reported directly to NCT TRACON October 2008. He certified as CIC in May 2013, and was current in accordance with FAA and facility standards on the day of the accident.

He was 37 years old, held a second-class medical clearance certificate, and his last flight physical had been conducted in March 2022. He stated that he was taking no medications of any kind on the day of the accident and in the terms of excellent, good, fair, or poor; described his health as excellent. He had a conditional restriction to his medical clearance for previous DUI and stated that he was in full compliance with the related conditional restriction. He had no other waivers or restrictions to his medical clearance. Neither post-accident drug nor alcohol testing were conducted. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours	Overtime
Saturday	Apr 30	Leave	None	None
Sunday	May 1	Leave	None	None
Monday	May 2	Leave	None	None
Tuesday	May 3	Off	None	None
Wednesday	May 4	Off	None	None
Thursday	May 5	Leave	None	None
Friday	May 6	Swing	1200-2000	None

4.7 Air Traffic Manager

The ATM had been in the position for a little more than three years since January 2019. She started her FAA career certifying and working as a controller at SCK ATCT until moving over to NCT TRACON when it opened in 2001. Prior to becoming ATM, she had worked as a certified professional controller (CPC), front line manager (FLM), training supervisor, and training support manager.

5.0 Air Traffic Control Procedures

5.1 FAA Order JO 7110.65Z, Air Traffic Control

Chapter 2, Section 1, paragraph 2-1-1, ATC Service, 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.*

Chapter 2, Section 1, paragraph 2-1-24, Transfer of Position Responsibility, stated in part:

The transfer of position responsibility must be accomplished in accordance with the "Standard Operating Practice (SOP) for the Transfer of Position Responsibility," and appropriate facility directives each time operational responsibility for a position is transferred from one specialist to another.

Appendix A, Standard Operating Practice (SOP) for the Transfer of Position Responsibility, Section 1, Purpose, stated in part:

The transfer of position responsibility must be accomplished in accordance with the "Standard Operating Practice (SOP) for the Transfer of Position Responsibility," and appropriate facility directives each time operational responsibility for a position is transferred from one specialist to another.

Appendix A, Section 6, Step-by-Step Process, part b., Verbal Briefing, stated in part:

- 4. Brief communication status of all known aircraft except for ERAM facilities using Voice Communication Indicator (VCI).*

Chapter 7, Section 9, paragraph 7-9-2, VFR Aircraft in Class B Airspace, stated in part:

- a. VFR aircraft must obtain an ATC clearance to operate in Class B airspace.*
- b. Approve/deny requests from VFR aircraft to operate in Class B airspace based on workload, operational limitations, and traffic conditions.*
- c. Inform the pilot when to expect further clearance when VFR aircraft are held either inside or outside Class B airspace.*
- d. Inform VFR aircraft when leaving Class B airspace.*

Chapter 10, Section 2, paragraph 10-2-5, Emergency Situations, stated in part:

Consider that an aircraft emergency exists and inform the RCC or ARTCC if:

a. An emergency is declared by any of the following:

- 1. The pilot.*
- 2. Facility personnel.*
- 3. Officials responsible for the operation of the aircraft.*
- 4. A system-generated transmission from an aircraft.*

b. There is unexpected loss of radar contact and radio communications with any IFR or VFR aircraft.

c. Reports indicate it has made a forced landing, is about to do so, or its operating efficiency is so impaired that a forced landing will be necessary.

d. Reports indicate the crew has abandoned the aircraft or is about to do so.

e. An emergency transponder code is displayed or reported.

f. Intercept or escort aircraft services are required.

g. The need for ground rescue appears likely.

h. An Emergency Locator Transmitter (ELT) signal is heard or reported.

F. FIGURES

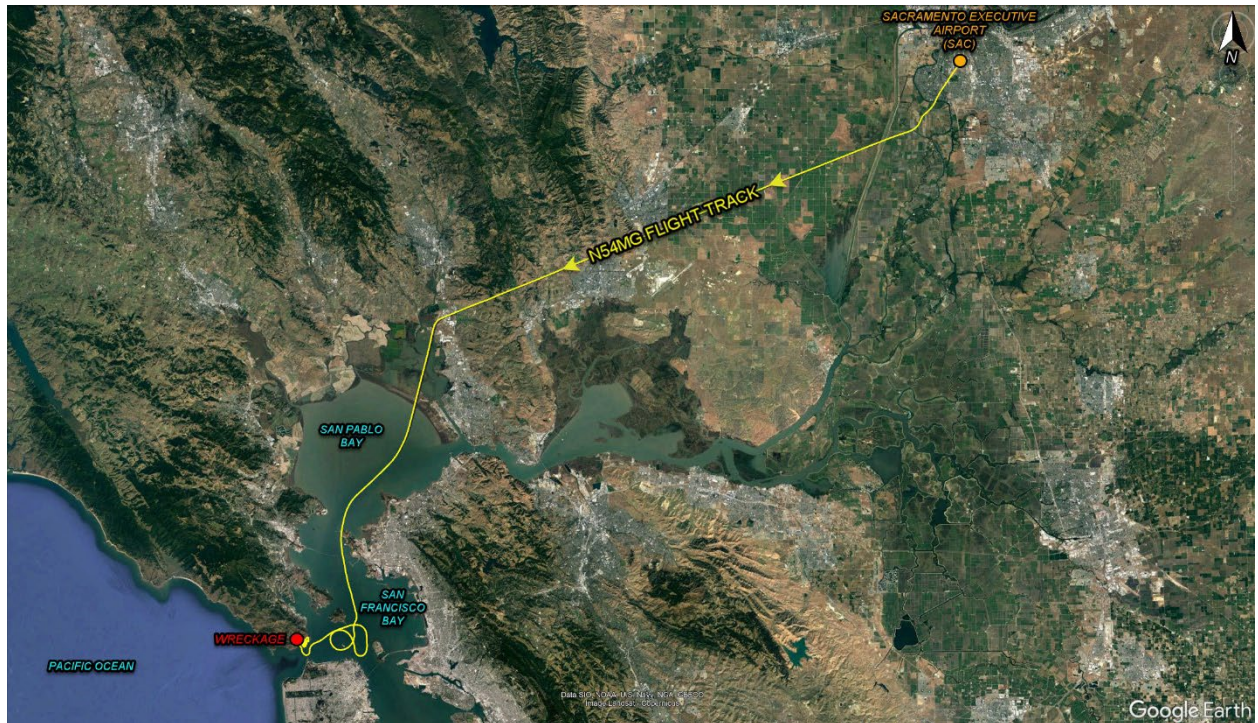


Figure 1. Overhead view of accident flight track overlaid in onto satellite imagery.



Figure 2. Profile view of final segment of the accident flight overlaid onto satellite imagery.



Figure 3. Overhead view of final segment of accident flight with pertinent SFO Class B airspace areas depicted with their corresponding altitudes.



Figure 4. Overhead view of final segment of the accident flight overlaid onto satellite imagery with time, altitude, ground speed, and heading information.

G. LIST OF ATTACHMENTS

Attachment 1: ATC Audio Partial Transcript

Attachment 2: ADS-B Data

Attachment 3: Interview Transcripts

Submitted by:

Brian Soper

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