

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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AIR TRAFFIC CONTROL

Specialist's Factual Report

February 1, 2023

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A. ACCIDENT

Location: Monterey, California
Date: July 13, 2021
Time: 1042 Pacific daylight time (PDT)¹
1742 coordinated universal time (UTC)²
Airplane: Cessna 421C, N678SW

B. AIR TRAFFIC CONTROL SPECIALIST

Brian Soper
National Transportation Safety Board
Washington, DC

C. SUMMARY

On July 13, 2021, about 1042 Pacific daylight time, a Cessna 421C, N678SW, was destroyed when it was involved in an accident near Monterey, California. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

D. DETAILS OF THE INVESTIGATION

Air traffic control (ATC) services were provided by Monterey Airport Traffic Control Tower (MRY ATCT) located in Monterey, California and Northern California Terminal Radar Approach Control (NCT TRACON) located in Mather, California. The ATC specialist did not travel to either facility or conduct interviews in support of this accident investigation and all work was conducted from the office. Data used in producing this report were provided by the Federal Aviation Administration (FAA).

E. FACTUAL INFORMATION

1.0 Flight Track Surveillance Information

The airplane was equipped with a transponder and was transmitting a discrete beacon code of 4577 as assigned by ATC. The airplane was Automatic Dependent Surveillance-Broadcast (ADS-B) equipped and transmitting.

¹ All times are Pacific daylight time (PDT) unless otherwise noted.

² 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.

1.1 Automatic Dependent Surveillance - Broadcast

ADS-B is 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 transceiver for processing and display at an air traffic control facility. ADS-B data were provided by the FAA and used along with track data provided through L3Harris OpsVue³ to produce figures 1-3 below⁴.



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

³ OpsVue data is track data only. L3Harris' OpsVue uses NextGen Data which includes flight identification and location data for advisory purposes only. This NextGen Data is a multi-sensor system that aggregates and georeferences FAA data sources including data from FAA ASDE-X and ASSC systems, FAA Terminal and En Route Radars, the FAA certified ADS-B Network and Flight Plan data from the En Route Automation Modernization (ERAM) system. The reported altitude is derived from the reported pressure altitude, adjusted for the local pressure reported with the Rapid Update Cycle (RUC) data within the Continental United States (CONUS). Outside of the CONUS, only pressure altitude is reported. The accuracy of altitude data can vary, sometimes up to several hundred feet, however trend information (ie; rates of climb and descent) is considered accurate and reliable.

⁴ ADS-B source data is located in Attachment 1: ADS-B Data and OpsVue source data is located in Attachment 2: OpsVue Track Data.

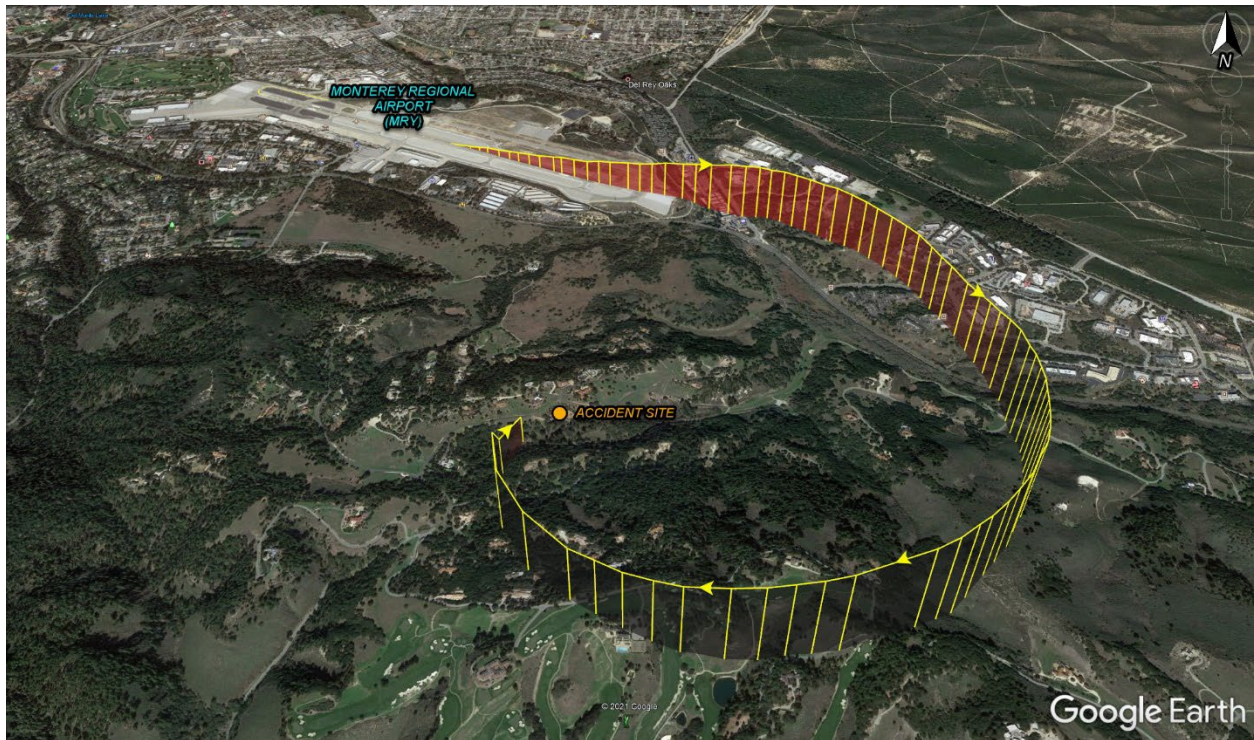


Figure 2. Profile view of accident flight track overlaid onto satellite imagery.

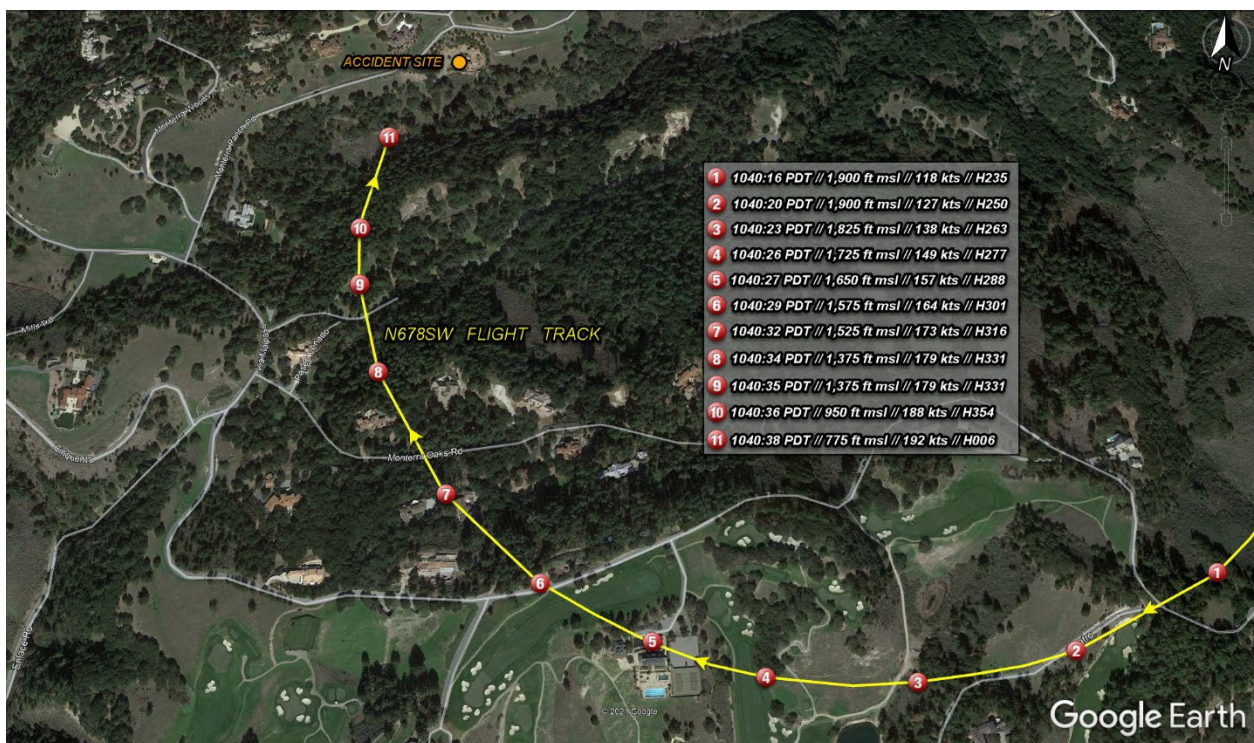


Figure 3. Final segment of accident flight track with time, altitude, ground speed, and heading information extrapolated from OpsVue data.

2.0 History of Flight

The following timeline was produced using the certified data provided by the FAA. Times are rounded to the nearest minute, and altitudes are indicated in feet above mean sea level (msl) unless otherwise indicated⁵.

- 1029 The pilot of N678SW first contacted MYR ATCT, stated she was in receipt of Automatic Terminal Information Service (ATIS) information "Romeo" (R)⁶ and requested an IFR⁷ to VFR⁸-on-top⁹ clearance to Salinas Municipal Airport (SNS).
- 1030 After clarification by the local control (LC) controller, the pilot confirmed that she would like to cancel the previous IFR flight plan she had on file and replace with a VFR-on-top clearance to SNS.
- 1033 The LC controller cleared the pilot of N678SW to the SNS VORTAC¹⁰ via the Monterey Five Departure¹¹ (see figure 3), with climb to VFR-on-top and instructions that if not on-top when reaching 5,000 feet, to maintain 5,000 feet and advise. The LC controller also advised the pilot that the last tops reported were 2,000 feet. The pilot readback the clearance but struggled with the readback of the portion *"if not on top by 5,000 maintain 5,000 and advise."*

⁵ A partial transcript of pilot-controller communications is included in Attachment 3: ATC Audio Transcript - Partial.

⁶ ATIS - Automatic Terminal Information Service - A continuous broadcast of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or specified portion of the day. Each new broadcast is identified by a letter of the alphabet beginning with A and continuing throughout the 24-day. On this day, the current ATIS information was 'R' and the transcribed content of that broadcast is located in the Meteorological Information section of this report.

⁷ IFR - Instrument Flight Rules [ICAO]- A set of rules governing the conduct of flight under instrument meteorological conditions.

⁸ VFR - Visual Flight Rules - Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

⁹ VFR-On-Top - ATC authorization for an IFR aircraft to operate in VFR conditions at any appropriate VFR altitude (as specified in 14 CFR and as restricted by ATC). A pilot receiving this authorization must comply with the VFR visibility, distance from cloud criteria, and the minimum IFR altitudes specified in 14 CFR Part 91.

¹⁰ VORTAC - A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

¹¹ Standard Instrument Departure (SID) - A preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement to expedite traffic flow and to reduce pilot/controller workload. ATC clearance must always be received prior to flying a SID.

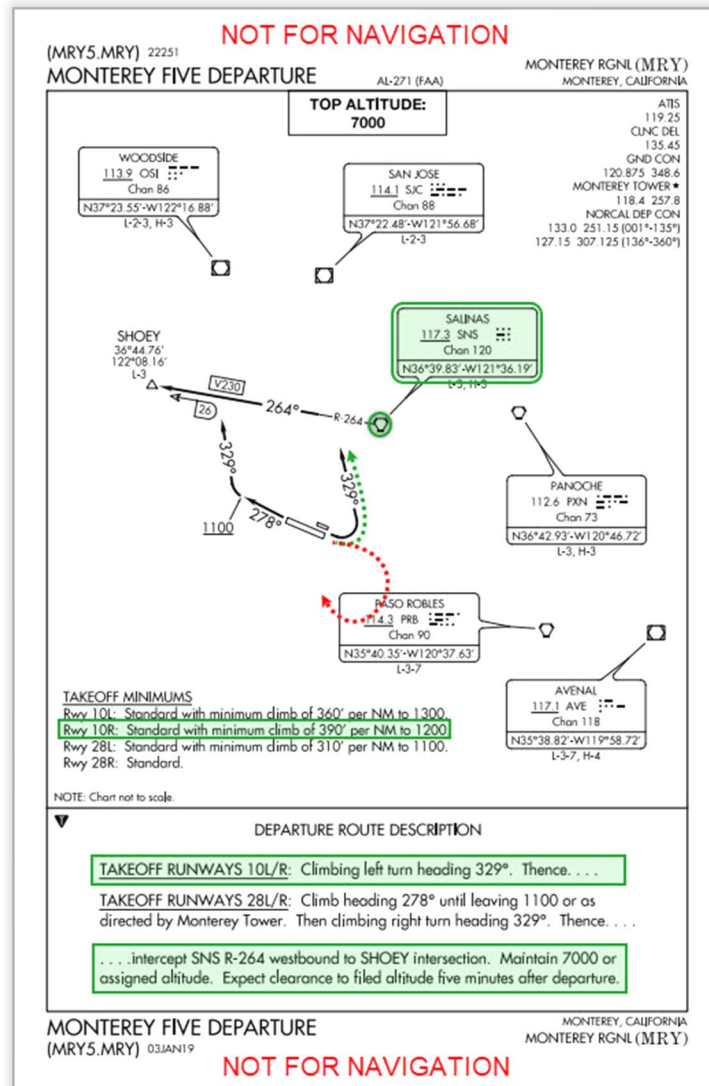


Figure 4. Monterey Five Departure Procedure - NOT FOR NAVIGATION. Pertinent information highlighted green for emphasis, green dotted line indicates published course guidance and red dotted line indicates approximate accident flight track.

- 1034 The pilot of N678SW reported ready to taxi. The LC controller instructed the pilot to taxi to runway 10R and confirmed she had ATIS information R. The pilot acknowledged with a correct readback.
- 1038 The LC controller advised the winds were from 250° at 6 knots and cleared N678SW for takeoff from runway 10R. The pilot acknowledged with a correct readback.
- 1039 The pilot of an uninvolved aircraft (N474PE) that was inbound for landing at MYR reported the bases as "something above two thousand" and said he would advise when he had the bases.
- The LC controller instructed N678SW to contact departure. The

pilot acknowledged.

- 1040 The pilot of N474PA reported the bases between 700-800 feet msl. The pilot of N678SW checked in with the NCT TRACON SECA radar (1S) controller and was instructed to turn right immediately to a heading of 030°. The pilot acknowledged with a correct readback. The 1S controller then issued a low altitude alert to N678SW and advised the minimum vectoring altitude (MVA)¹² in her area was 3,700 feet. There was no response from the pilot.
- 1041 The 1S controller reiterated the low altitude alert and instructed the pilot of N678SW to climb immediately and maintain 5,000 feet (in the audio recording, the low altitude alert audible alarm can be heard in the background). There was no response from the pilot.

The NCT TRACON 1S controller contacted the MYR ATCT LC controller and asked if they were talking to N678SW to which the LC controller responded in the negative. The 1S controller then said the pilot advised she was descending and turning back to the field and was no longer talking to them (this statement was not corroborated by the audio provided, only that the pilot accepted a 030° heading and was issued a low altitude alert twice).

There were no further recorded transmissions from N678SW.

3.0 Meteorological Information

The closest official weather reporting location to the accident site was from MRY, Monterey, California, and was located about one mile northwest of the accident site at an elevation of about 225 feet and had a magnetic variation of about 13° east. The airport had a non-federal Automated Surface Observing System (ASOS)¹³, which was augmented by tower personnel. A review of the NWS products indicated that no SIGMETs, Convective SIGMETs, or CWAs were current over the route of flight surrounding the time of the accident, however there was a valid G-AIRMET and is detailed in section 3.2 below. The following conditions were being reported at the time of the accident.

¹² MVA – Minimum Vectoring Altitude - The lowest msl altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures, and missed approaches. Vectors below the MVA were not authorized at CRG for this procedure.

¹³ 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.

3.1 Surface Observations

At 1054, MRY¹⁴ reported wind from 280° at 7 knots, visibility of 9 statute miles, ceiling overcast at 800 feet above ground level (agl), temperature 15° Celsius (C), dew point temperature 11° C, altimeter setting of 29.99 inches of mercury. Remarks: automated station with a precipitation discriminator, sea level pressure of 1016.6 hectopascals (hPa), hourly temperature of 15.0° C and hourly dew point temperature of 11.1° C, highest temperature during previous 6 hours of 13.3° C, over the previous 3 hours the pressure has increased 1.3 hPa.

The longline¹⁵ observations that were disseminated on weather circuits and general flight categories were as follows (observation closest to incident time is in bold for emphasis):

IFR METAR KMRY 131554Z AUTO 26005KT 10SM OVC005 14/12 A2996
RMK AO2 SLP158 T01390117

IFR METAR KMRY 131654Z AUTO 26006KT 9SM OVC006 14/12 A2997
RMK AO2 SLP161 T01440177

**IFR METAR KMRY 131754Z AUTO 28007KT 9SM OVC008 15/11
A2999 RMK AO2 SLP166 T01500111 10150 20133 51013**

IFR METAR KMRY 131852Z AUTO 26008KT 10SM OVC010 17/11 A3000
RMK AO2

VFR METAR KMRY 131854Z AUTO 27009KT 10SM OVC010 17/11 A3000
RMK AO2 SLP169 T01670111

3.2 Graphical - Airman's Meteorological Information

The National Weather Service (NWS) had issued a G-AIRMET¹⁶ SIERRA advisory for IFR conditions at 0745 and was valid for the accident location at 1100.

¹⁴ The NWS uses the 4-digit International Civil Aviation Organization (ICAO) format for station identifiers (as seen in the body of some formatted weather observations). This report uses the 3-digit International Air Transport Association format for station identification, which does not use the geographic designating digit ("K" for stations in the continental U.S. and "P" for U.S. stations in Alaska and the Pacific region) as found in the ICAO format.

¹⁵ "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.

¹⁶ A G-AIRMET is a graphical advisory of weather that may be hazardous to aircraft but are less severe than SIGMETs. They are only valid at specific time "snapshots". Forecasters create graphical objects depicting the areas and attributes of AIRMET hazards, which are distributed in BUFR file format. G-

4.0 Air Traffic Control Procedures and Guidance

4.1 FAA Order JO 7110.65Y - Air Traffic Control

Chapter 3, section 1, paragraph 3-1-10 *OBSERVED ABNORMALITIES*, discusses what air traffic controllers should do when they observe flight abnormalities and stated in part:

3-1-10. OBSERVED ABNORMALITIES

When requested by a pilot or when you deem it necessary, inform an aircraft of any observed abnormal aircraft condition.

Chapter 7, section 3, paragraph 7-3-1 *VFR-ON-TOP*, prescribes to air traffic controllers when and how to apply VFR-on-top and stated [in part]:

7-3-1. VFR-ON-TOP

a. You may clear an aircraft to maintain "VFR-on-top" of the pilot of an aircraft on an IFR flight plan requests the clearance.

NOTE -

1. When an aircraft has been cleared to maintain "VFR-on-top," the pilot is responsible to fly at an appropriate altitude, comply with VFR visibility and distance from cloud criteria, and to be vigilant so as to see and avoid other aircraft. The pilot is also responsible to comply with instrument flight rules applicable to the flight (e.g., adherence to ATC clearances).

2. Although IFR separation is not applied, controllers must continue to provide traffic advisories and safety alerts, and apply merging target procedures to aircraft operating VFR-on-top.

b. You may clear an aircraft to climb through clouds, smoke, haze, or other meteorological formations and then to maintain "VFR-on-top" if the following conditions are met:

1. The pilot requests the clearance
2. You inform the pilot of the reported height of the tops of the meteorological formation, or
3. You inform the pilot that no top report is available.
4. When necessary, you ensure separation from all other traffic for which you have separation responsibility by issuing an alternative clearance.
5. When an aircraft is climbing to and reports reaching "VFR-on-top,"

AIRMETs are issued at discrete times 3 hours apart for a period of up to 12 hours into the future (00, 03, 06, 09, and 12 hours). They are issued at 03:00, 09:00, 15:00 and 21:00 UTC (with updates issued as necessary). AIRMET are issued by the AWC for the lower 48 states and adjacent coastal waters.

reclear the aircraft to maintain "VFR-on-top."

4.2 FAA Aeronautical Information Manual

Chapter 4, section 4, paragraph 4-4-8 *IFR Clearance VFR-on-top*, prescribes to pilots when and how to request VFR-on-top clearances and stated in part:

4-4-3. IFR CLEARANCE VFR-ON-TOP

- a. A pilot on an IFR flight plan operating in VFR weather conditions, may request VFR-on-top in lieu of an assigned altitude. This permits a pilot to select an altitude or flight level of their choice (subject to any ATC restrictions.)
- b. Pilots desiring to climb through a cloud, haze, smoke, or other meteorological formation and then either cancel their IFR flight plan or operate VFR-on-top may request a climb to VFR-on-top. The ATC authorization must contain either a top report or a statement that no top report is available, and a request to report reaching VFR-on-top. Additionally, the ATC authorization may contain a clearance limit, routing and an alternative clearance if VFR-on-top is not reached by a specified altitude.
- c. A pilot on an IFR flight plan, operating in VFR conditions, may request to climb/descend in VFR conditions.
- d. ATC may not authorize VFR-on-top/VFR conditions unless the pilot requests the VFR operation or a clearance to operate in VFR conditions will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude.
- e. When operating in VFR conditions with an ATC authorization to "maintain VFR-on-top/VFR conditions" pilots on IFR flight plans must:
 - 1. Fly at the appropriate VFR altitude as prescribed in 14 *CFR* Sec 91.159.
 - 2. Comply with the VFR visibility and distance from cloud criteria in 14 *CFR* Sec 91.155 (Basic VFR Weather Minimums).
 - 3. Comply with instrument flight rules that are applicable to this flight; i.e., minimum IFR altitudes, position reporting, radio communications, course to be flown, adherence to ATC clearance, etc.

NOTE - Pilots should advise ATC prior to any altitude change to ensure the exchange of accurate traffic information.
- f. ATC authorization to "maintain VFR-on-top" is not intended to restrict pilots so that they must operate only *above* an obscuring meteorological formation (layer). Instead, it permits operation above, below, between layers, or in areas where there is no meteorological obscuration. It is imperative, however, that pilots understand that clearance to operate "VFR-on-top/VFR conditions" does not imply cancellation of their IFR flight plan.

g. Pilots operating VFR-on-top/VFR conditions may receive traffic information from ATC on other pertinent IFR or VFR aircraft. However, aircraft operating in Class B airspace/TRSAs must be separated as required by FAA Order JO 7110.65, Air Traffic Control.

NOTE - When operating in VFR weather conditions, it is the pilot's responsibility to be vigilant so as to see-and-avoid other aircraft.

h. ATC will not authorize VFR or VFR-on-top operations in Class A airspace.

F. LIST OF ATTACHMENTS

Attachment 1: ADS-B Data

Attachment 2: OpsVue Track Data

Attachment 3: ATC Audio Transcript - Partial

Submitted by:

Brian Soper
Lead ATC Investigator