NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 7, 2011

OPERATIONS
FACTUAL REPORT

DCA11MA075

CONTENTS

A. ACCIDENT

Operator:	Omega Aerial Refueling Services, Inc.
Location:	Point Mugu Naval Air Station, California
Date:	May 18, 2011
Airplane:	Boeing 707-321B, Registration Number: N707AR

B. OPERATIONS GROUP[1]

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C. SUMMARY

On May 18, 2011, at 5:27 pm Pacific Daylight Time (PDT), a modified Boeing 707, registration N707AR, operated by Omega Aerial Refueling Services as flight 70, crashed on takeoff from runway 21 at the Point Mugu Naval Air Station, California (KNTD). The airplane impacted beyond the departure end of the runway and was destroyed by post-impact fire. The three flight crewmembers received minor injuries.[2]

[1] See Attachment 24: Statement of Party Representatives.
[2] See Attachment 23: NTSB Form 6120.

D. DETAILS OF THE INVESTIGATION

Photo 1: Accident Aircraft N707AR[3]

On May 19, 2011, the NTSB traveled from Washington, DC to Los Angeles, California to the Point Mugu Naval Air Station where the Operations Group (Ops Group) was formed on scene. Initial inspection of the accident site was conducted with the NTSB Ops Group Chairman and IIC, Omega Air Refueling group member, and FAA representative. The Ops Group assisted in cockpit identification, wreckage documentation and recorder location.

On May 20, 2011, the Ops Group reconvened and proceeded with documentation of exemplar B707 (N707MQ). The cockpit, CVR/FDR access, and #2 pylon contact points were documented. Onboard electronic manuals were downloaded and secured, and paper manuals and checklists were reviewed. The Ops Group also assisted in wreckage identification and FDR/CVR location. The Ops Group also conducted a series of witness interviews with Naval ground operations personnel and Omega Air ground operations employees. The NTSB Ops Group Chairman reviewed document and manual requests made to Omega Air Refueling group member and Party Coordinator, and requested personnel and training records for accident crew. Flight crew interviews were also coordinated with Omega Air. Air Traffic Control tapes and communications transcripts were secured.

The Ops group chairman spoke with the Ventura County Medical Center Emergency Room attending doctor for the accident flight crew. The NTSB was advised that the doctor treated the Captain and Flight Engineer after they arrived at Ventura County Hospital, and another doctor treated the First Officer. The attending doctor stated that a company individual in attendance at the hospital requested the crew be drug and alcohol tested, but the doctor stated he was under no

[3] Photo documentation provided by NTSB Ops Group Chairman.

obligation to conduct drug and alcohol screening. At about 1800, the Ops Group Chairman drove to Ventura County Hospital to conduct an interview with the attending doctor and secure documentation attesting to the fact that no testing of the accident crew was conducted. Hospital administration staff refused the NTSB access to the doctor or documents.

On May 21, 2011, members of the Ops Group toured the control tower facilities at the airport.[4] The group also received a security tour of the airport by the Airport Security Director in an effort to locate possible sources of video surveillance that may have captured the accident sequence. Two security cameras with views of the taxiways, ramp area and runway 21 were discovered. Both cameras were operational at the time of the accident, but they were static only, and did not digitally record their images. The cameras were only monitored during the evening hours for ramp security, and unmonitored during daylight hours.

The Ops Group conducted additional witness interviews with the B707 Omega Air flight crew that witnessed the accident sequence from the exemplar aircraft, and requested records and documentation from Omega. Accident crew information was obtained and Blue Ribbon certification and medical information was requested from the FAA. Previously requested ARFF response documentation was also received.

Requested accident aircraft registration and certification, along with the Omega contractual agreement with the Navy was received and reviewed.

The ops group reconvened with the NAS Base CO and ATC AC1 to listen to the ATC tapes of the accident sequence. Certified ATC transcripts were received, and actual audio tapes were requested and await Navy release.

On May 22, 2011, Ops Group members proceeded to the accident site to assist in documentation of the cockpit, and location of the CVR. The Group completed consensus on the final interview summaries, and the Ops Group Field Notes were completed and signed by each group member. The field phase of the investigation for the Ops Group was completed on May 22, 2011, and the NTSB Ops Group Chairman escorted the recovered CVR and FDR recorders back to the NTSB headquarters in Washington, D.C.[5]

1.0 Cockpit Documentation[6]

1.1 Accident Aircraft (N707AR)

[4] For further information, refer to Section 5.1: Air Traffic Control of this report.
[5] The NTSB was unable to extract usable data from either recorder. See CVR/FDR Factual Report.
[6] Photo documentation provided by the NTSB Ops Group Chairman.


Photo 2: Cockpit Photo of N707AR.


Photo 3: Captain Instrument Panel of N707AR.


Photo 4: F/O instrument panel of N707AR.


Photo 5: Throttle Quadrant of N707AR (right side view).

Photo 6: Throttle Quadrant of N707AR (left side view).

1.2 Exemplar Aircraft (N707MQ)

Photo 7: Exemplar Aircraft (N707MQ) - Cockpit

Photo 8: Exemplar Aircraft (N707MQ) - Right side throttle quadrant

Photo 9: Exemplar Aircraft (N707MQ) - Left side of throttle quadrant

E. FOLLOW-UP ACTIVITIES

On June 16, 2011, from 0835 to 1045 EDT, in support of the Omega Air 70 accident investigation, the NTSB Ops Team conducted documentation of the B707 Level A simulator used for recurrent training by the accident crew located at Pan Am International Flight Academy in Miami, Florida. Following documentation of the cockpit and instructor panels in the simulator, the Ops Team members conducted a series of flight profiles to demonstrate the B707 simulator capabilities. For additional information, refer to Attachment 10: B707 Simulator Work.

F. FACTUAL INFORMATION

2.0 History of Flight

On May 18, 2011, at approximately 1727 pm local time (0027 UTC), Omega Air flight 70, a Boeing 707-321B (N707AR), crashed on takeoff at the Point Mugu Naval Air Station[7], Point Mugu, California. The airplane impacted beyond the departure end of runway 21 and was destroyed by post-impact fire. All three flight crewmembers aboard escaped with minor injuries.

The accident occurred on a scheduled flight conducted under contract with the U.S. Navy, and according to interviews with Omega Aerial Refueling Services (OARS) senior management,[8] the flight was operated as a Public Aircraft under the provisions of Title 49 of the United States Code (U.S.C.) Section 40102 and 40125. The flight was scheduled to depart Pt. Mugu NAS (KNTD) at 1730 PDT (0030 UTC), fly to the W-291 Military Warning Area[9] to conduct aerial refueling, then return to KNTD at approximately 2230 PDT (0530 UTC). The Flight Engineer (FE) arrived at KNTD at approximately 1600 PDT (2300 UTC) to provide a B707 briefing to the local airport fire department, who did not show up for the meeting. The Captain and First Officer (FO) arrived to the airport shortly afterwards.

According to crew interviews, a normal preflight of the aircraft cockpit was conduct by all three crew members. The Captain and Flight Engineer separately conducted an exterior visual inspection of the aircraft, including the engine pylon areas, and no abnormalities were noted. According to the flight engineer, there were two deferred maintenance items recorded in the aircraft maintenance logbook.[10] One was the auto pressurization controller, requiring manual control of the pressurization by the flight engineer, and the second was the right Freon pack, which was a deferred maintenance item requiring the main programmer to be bypassed to get the Freon to engage.

According to each crew member, the engine start and taxi out was delayed because the surface winds reported by the Automatic Terminal Information Service (ATIS) exceeded the crosswind capabilities for the B707.[11] The Captain contacted the tower and told investigators he had received a report of “a steady wind out of the southwest at 22.”[12] According to KNTD tower logs, the current ATIS at the time of the accident was information “Yankee” with winds from

[7] Naval Base Ventura County.
[8] See Attachment 1: Interview Summaries.
[9] See Section 6.0 W-291 Warning Area.
[10] The actual aircraft logbook was destroyed by post impact fire.
[11] Winds at 2254Z were reported from 280 degrees at 28 knots, gusting to 36 knots. See Attachment 9: B707 AFM Excerpts for crosswind component chart and Section 5.3.1: B707 Wind Component Chart, of this report.
[12] See Attachment 2: Flight Crew Interview Summaries and Statements.

270 degrees at 22 knots, gusting to 33 knots, visibility 7 miles with a scattered layer of clouds at 4,500 feet.[13]

After a normal engine start, the first officer noticed the captain had to use a slightly larger power input than usual to get the plane moving for taxi. According to the ground mechanic that was marshalling the flight, the aircraft moved about 10 to 20 feet before coming to a stop and each of the flight crewmembers stated they heard a “thud” after the initial taxi. The captain stopped the plane and the flight engineer exited the cockpit and conducted a visual inspection of the outside from inside the cabin. The crew discussed the noise and interpreted it as stuck brake that had popped loose, a normal occurrence according to the flight engineer. They performed several brake and steering checks on the taxi out, and reported no further issues with the brakes.

According to crew interviews, the windsock showed very little change in the wind direction and a slight amount of gust. The crew had calculated a takeoff decision speed (V1) of 141 knots, and a rotation speed (Vr) of 147 knots. The crew elected to add five knots to their rotate speed to compensate for the gusts, and briefed a maximum power takeoff. The first officer stated that he advised the captain about pushing up the power relatively smoothly to avoid a compressor stall with the crosswind, and the captain agreed. The captain was the pilot flying (PF) and the first officer was the pilot monitoring (PM). Takeoff configuration was flaps 14, with a stabilizer trim setting of “5.25-5.5.”[14] At 1723 PDT (0023UTC), Omega Air 70 received takeoff clearance from the tower controller.[15] After the captain applied takeoff thrust, the FO told investigators he applied forward pressure on the yoke and right aileron input to compensate for the right crosswind. According to the crew interviews, the takeoff roll was normal. At rotation speed, the captain rotated the aircraft to an initial target pitch attitude of 11 degrees pitch up.

At approximately 10-30 feet in altitude, all three crewmembers heard a loud noise and observed the number 2 thrust lever retard rapidly. The captain applied full right rudder and near full right aileron to maintain directional control and level the wings, but the aircraft continued to drift to the left. The Captain perceived the aircraft would not continue to climb and elected to “put it back on the ground.”[16]

The aircraft made multiple impacts during the forced landing, and came to rest to the left of the runway overrun area in a marsh area near the departure end of the runway. According to interviews with the crew, they did not have time to perform an engine shutdown or evacuation checklist. The crew had difficulty exiting the cockpit due to mud and debris blocking the cockpit door. All three crewmembers successfully evacuated through the left forward entrance via the escape slide. The aircraft was destroyed by post-impact fire.

[13] This wind was identical to the 2354Z METAR. The local weather observation at 0030Z (approximately 3 minutes after the accident) was winds from 280 at 24 knots, gusting to 35 knots, visibility of 7 miles, and a scattered layer of clouds at 5000 feet. For further information, refer to Section 7.0: Weather, of this report.
[14] See Attachment 1: Interview Summaries. The Center of Gravity for takeoff was calculated at 32.2% of MAC, with a permissible takeoff range of 16.4% and 35.0%. For further information, see Section 4.0: Weight and Balance, of this report.
[15] See Attachment 6: ATC Transcripts and Tower Logs.
[16] See Attachment 2: Flight Crew Interview Summaries and Statements.

3.0 Flight Crew Information

The accident flight crew consisted of a captain, first officer, and flight engineer. The flight crew members had flown with each other many times previously. The accident flight was on a Navy contract aerial refueling mission.

3.1 The Captain

Captain was 41 years old. He was a Navy pilot, having flown in Pensacola, Florida and Corpus Christie, Texas on the B707 and E6A. He also flew King Airs in Europe where he was the head NATOPS instructor on the King Air 200's and was a B707 assistant NATOPS instructor. He was a T45 instructor in Kingsville, Texas, and worked for United Airlines as an A320 first officer based in Chicago before being furloughed in January of 2009. His date of hire with Omega was September of 2008, and he became a Captain on the B707 shortly after being hired. He also flew a "handful" [17] of B707 trips with Principle Air but had not flown for them since October of 2010. He flew both internationally and domestically with Omega, but he was not dual qualified at Omega on the DC10.

The Captain stated he had no major changes in his personal life or financial situation, and he characterized his overall health as "excellent". He said he did not normally take prescription drugs and never had fatigue issues that he felt uncomfortable with.

The Captain had flown with the First Officer and Flight Engineer "many times", and he described both of their flying ability as "very strong".

The Captain was current and qualified under FAA Part 91 and Part 61 requirements. A review of the Accident/Incident Data System and Enforcement Information System revealed no prior accident, incident or enforcement actions.

3.1.1 The Captain's Pilot Certification Record[18]

FAA records of the Captain indicated the following:

Commercial Pilot – Airplane Multi Engine Land Instrument; B-707, B-720 certificate issued June 10, 1999.

Airline Transport Pilot – Airplane Multiengine Land; BE-200, B-707, B-720 certificate issued September 12, 2000.

Airline Transport Pilot – Airplane Multiengine Land; B-707, B-720, BE-200; Commercial Privileges Airplane Single Engine Land certificate issued August 23, 2007.

[17] See Attachment 2: Flight Crew Interview Summaries and Statements.
[18] Pilot Certification Records were provided by the Federal Aviation Administration. See Attachment 4: Omega Air 70 Crew Records Summary.

Airline Transport Pilot – Airplane Multiengine Land; B-707, B-720, BE-200, A-320; Commercial Privileges Airplane Single Engine Land; A-320 Circ. Apch. -VMC Only certificate issued November 26, 2007.

Flight Instructor – Airplane Single and Multiengine, Instrument Airplane certificate issued October 1, 2010.

3.1.2 The Captain's Pilot Certificates and Ratings Held at Time of the Event

AIRLINE TRANSPORT PILOT (issued November 26, 2007).
Airplane Multiengine Land B-707, B-720, BE-200, A-320, Commercial Privileges Airplane Single Land, A-320 Circ. Apch. – VMC Only.

MEDICAL CERTIFICATE FIRST CLASS (issued February 14, 2011).
Limitations: None.

3.1.3 The Captain's Training and Proficiency Checks Completed[19]

Initial Type Rating B-707: June 10, 1999
Last Recurrent Proficiency Check: January 8, 2011
Last Recurrent Ground Training: January 06, 2011

3.1.4 The Captain's Flight Times[20]

The accident Captain's flight times:

Total pilot flying time	5,117 hours
Total Pilot-In-Command (PIC) time	2,504 hours
Total B-707 flying time	2,730 hours
Total B-707 PIC time	1,620 hours
Total flying time last 24 hours	5 hours, 42 minutes[21]
Total flying time last 30 days	58 hours, 24 minutes
Total flying time last 90 days	133 hours, 0 minutes
Total flying time last 12 months	522 hours, 54 minutes

[19] Training and Proficiency records were provided by Pan Am and Omega Aerial Refueling Services. See Attachment 5: Crew Training Records.
[20] Flight times were provided by Omega Aerial Refueling and pilot interviews.
[21] Time includes the accident flight.

3.1.5 The Captain's 72-Hour History

According to an interview with NTSB investigators, the captain stated he did not specifically remember his activities over the two days preceding the accident, but one of those days he had a day mission and the other a night mission. They got plenty of sleep and rest only flying 4 hour missions. On the day of the accident, he rose about 7am and called his wife, then had breakfast. He then went on his computer in his hotel room to catch up on paperwork and emails. He checked out of the hotel at 1430 and went to a nearby restaurant for lunch. He picked up the First Officer at about 1600 and drove to the airbase. They stopped at the mini mart to pick up some items, and then met the Flight Engineer at the airplane.

3.2 The First Officer

The First Officer was 45 years old. He had about 4,000 hours of total flight time with about 2800-3000 hours of that time in the Boeing 707. He was captain qualified with his B707 time split about equally between the left seat and the right. He stated in an interview with NTSB investigators that the majority of the guys at Omega were captain qualified, and so they would take turns flying the right seat.

He started his flight training with the Navy in 1995. He flew the T1 starting in December of 1996. He flew the E6 out of Oklahoma City from October of 1998 until 2001. He then went to Rota where he spent three years flying the C210 Super King Air around Europe. He was a Navy instructor pilot in the E6 and the NATOPS instructor for the C10 in Rota. Upon his return to the States, he was stationed at Stennis for a non-flying tour. He ended his flying in Oklahoma City in April of 2007. He did his first flight with Omega Air Refueling in October of 2008. He was on terminal leave through February and March of 2009, and he retired from the United States Navy in April 2009. He is dual qualified for the DC10 and the B707 at Omega with close to 300 hours in the DC10.

He stated he had flown with both the Captain and the Flight Engineer on numerous occasions. He classified the Captain's flying ability as outstanding, stating that if he had to fly with anybody, it would be this Captain. He said the Flight Engineer was very professional, well grounded, and reasonable and that Omega was very lucky to have the quality of people that they have.

He classified his overall health as outstanding. He did not take any prescription or non prescription drugs. He had no changes in the state of his health in the past year. He had a shoulder problem one year previously, but the shoulder had been better for 8 months, and he was no longer experiencing problems with his shoulder. He had no significant financial or personal changes in the past year. He stated that he had never failed a drug or alcohol screening and had never been treated for drug or alcohol abuse. He had never been fired, terminated or asked to resign from any employment.

The First Officer was current and qualified under FAA Part 91 and Part 61 requirements. A review of the Accident/Incident Data System and Enforcement Information System revealed no prior accident, incident or enforcement actions.

3.2.1 The First Officer's Pilot Certification Record [22]

FAA records of the First Officer indicated that:

Airline Transport Pilot – Airplane Multiengine Land; BE-200 certificate issued April 21, 2003.

Airline Transport Pilot – Airplane Multiengine Land; BE-200, B-707, B-720 certificate issued January 29, 2009.

Airline Transport Pilot – Airplane Multiengine Land; BE-200, B-707, B-720, DC-10 certificate issued April 4, 2009.

3.2.2 The F/O's Pilot Certificates and Ratings Held at Time of the Event

AIRLINE TRANSPORT PILOT (issued October 31, 2005)
Airplane Multiengine Land BE-200, B-707, B-720, DC-10

MEDICAL CERTIFICATE FIRST CLASS (issued January 24, 2011)
Limitations: None.

3.2.3 The F/O's Training and Proficiency Checks Completed[23]

Initial Type Rating B-707: January 29, 1999
Last Recurrent Proficiency Check: January 15, 2010
Last Recurrent Ground Training: January 12, 2010

3.2.4 The F/O's Flight Times[24]

The accident First Officer's flight times:

Total pilot flying time	4,052 hours
Total PIC time	1,781 hours
Total SIC time	2,271 hours
Total flying time in B-707	2,900 hours
Total B-707 second-in-command (SIC) time	1,252 hours
Total flying time last 24 hours	0 hours, 12 minutes[25]

[22] Pilot Certification Records were provided by the Federal Aviation Administration. See Attachment 4: Omega Air 70 Crew Records Summary.
[23] Training and Proficiency records were provided by Pan Am and Omega Aerial Refueling Services. See Attachment 5: Crew Training Records.
[24] Flight times were provided by Omega Aerial Refueling Services and pilot interviews.
[25] Time includes the accident flight.

Total flying time last 30 days	11 hours, 6 minutes
Total flying time last 90 days	92 hours, 30 minutes
Total flying time last 12 months	384 hours, 24 minutes

3.2.5 The F/O's 72-Hour History

In an interview with NTSB investigators, the first officer stated that on the morning of May 18' 2011, he woke up around 8:00 or 9:00am. He ate breakfast, worked out, did laundry, watched the news, and called home. He had no issues with fatigue. He slept well. He was not the type to stay up late. He was in bed by 9:30 or 10:00pm the previous night.

3.3 The Flight Engineer

The Flight Engineer was 50 years old. His flight training began in the United States Air Force. He became a flight engineer in 1983 on the C141B's at Andrews Air Force Base. He flew the B-707's and B-747's from 1992 until his retirement in 2002. He had been working for Omega since November 1, 2002, the day after his retirement from the USAF. He was the chief flight engineer at Omega. He was also the acting assistant facilities security officer and previously the facilities security officer. He did not perform ground or flight training, but he was dual qualified on the B-707 and DC-10. His total time was around 9,000 hours, and 6,500 hours in the B707, and it was all engineer time. He had a private pilot license, single engine with instrument rating. His last DC10 flight was in March of 2010, and he maintained proficiency for both aircraft with simulator training.

In an interview with NTSB investigators, he stated that he had operated out of the Pt. Mugu NAS airport every day except one for the seven days prior to the accident, and he had been there several times a year for many years. He was very familiar with the airport. No special training was required for operations out of the airport, and there were no noise abatement procedures for their takeoff as they were headed out over the water.

His overall health was very good. He did not take any prescription or non-prescription medication. There were no changes to his health in the past year other than his eyes getting a little worse. Financially, there was some fluctuation over the past year but no drastic changes. When asked about his personal life over the past year, he described it as "real good" [26]. He had never been treated for drug or alcohol abuse, and he had never been fired, terminated or asked to resign from employment.

The Flight Engineer was current and qualified under FAA Part 91 and Part 61 requirements. A review of the Accident/Incident Data System and Enforcement Information System revealed no prior accident, incident or enforcement actions.

[26] See Attachment 2: Flight Crew Interview Summaries and Statements.

3.3.1 The Flight Engineer's Pilot Certification Record [27]

FAA records of the Flight Engineer indicated that:

Mechanic – Airframe and Powerplant certificate issued October 9, 1998.[28]

Flight Engineer – Turbojet Powered certificate issued April 20, 1997.

Private Pilot – Airplane Single Engine Land certificate issued September 2, 2004.

Private Pilot – Airplane Single Engine Land Instrument certificate issued October 16, 2005.

3.3.2 The F/E's Pilot Certificates and Ratings Held at Time of the Event

PRIVATE PILOT (issued October 16, 2005)
Airplane Single Engine Land Instrument

FLIGHT ENGINEER (issued April 20, 1997)
Turbojet Powered

MEDICAL CERTIFICATE SECOND CLASS (issued April 19, 2010).
Limitations: Must wear corrective lenses for near and distant vision.

3.3.3 The F/E's Training and Proficiency Checks Completed[29]

Last proficiency check on B-707: October 22, 2010
Last recurrent ground training: October 20, 2010

3.3.4 The F/E's Flight Times[30]

The accident flight engineer's flight times:

Total flight engineer time	9,000 hours
Total flight engineer time in B-707	6,500 hours
Total flying time last 24 hours	0 hours, 12 minutes[31]
Total flying time last 30 days	10 hours, 54 minutes
Total flying time last 90 days	40 hours, 0 minutes
Total flying time last 12 months	168 hours, 30 minutes

[27] Pilot Certification Records were provided by the Federal Aviation Administration. See Attachment 4: Omega Air 70 Crew Records Summary.
[28] On June 3, 2003, the FE passed an oral re-examination for his Mechanic certificate pursuant to 49 U.S.C. Section 44709.
[29] Training and Proficiency records were provided by Pan Am and Omega Aerial Refueling Services. See Attachment 5: Crew Training Records.
[30] Flight times were provided by Omega Aerial Refueling Services and pilot interviews.
[31] Time includes the accident flight.

3.3.5 The F/E's 72-Hour History

The day before the accident he had an afternoon flight (1300-1600). The day before that he was off duty. He was usually in bed by 2200. On the day of the accident they were scheduled for a 1715 engine start and 1730 takeoff. For a 1715 start, he would usually show an hour or so prior, leaving the hotel at least a half an hour before that. During the day, he was doing some homework. He got up that morning around 0800 and had breakfast around 0820. He had no sleep problems or issues. He had never had any problems getting to sleep or resting.

3.4 Medical and Pathological Information[32]

3.4.1 Captain

According to an FAA records review, the Captain held a First Class Medical dated February 14, 2011. The flight times listed on the medical application were 5,275 hours of total time, and 405 hours in the last 6 months. There were no limitations listed on the medical certificate.

According to an interview with NTSB investigators, the captain stated that his overall health was excellent. He had no major changes in his personal life or financial situation, and he did not normally take prescription drugs. He never had any issues with fatigue he felt uncomfortable with.

3.4.2 First Officer

According to an FAA records review, the First Officer held a First Class Medical dated January 24, 2011. The flight times listed on the medical application were 3,717 hours of total time, and 321 hours in the last 6 months. There were no limitations listed on the medical certificate.

According to an interview with NTSB investigators, the First Officer stated that his overall health was outstanding. He did not take any prescription or non prescription drugs. He had no changes in the state of his health in the past year. He had a shoulder problem one year previously, but it had been better for 8 months, and he was no longer experiencing problems with his shoulder. He had no significant financial or personal changes in the past year. He stated that he had never failed a drug or alcohol screening and had never been treated for drug or alcohol abuse. He slept well and he was not the type to stay up late.

3.4.3 Flight Engineer

According to an FAA records review, the Flight Engineer held a Second Class Medical dated April 19, 2010. The flight times listed on the medical application were 12,000 hours of total time, and 165 hours in the last 6 months. The limitations on the medical certificate stated the following: "must wear corrective lenses for near and distant vision".

[32] See Attachment 2: Flight Crew Interview Summaries and Statements.

According to an interview with NTSB investigators, the flight engineer's overall health was very good. He did not take any prescription or non-prescription medication. There were no changes to his health in the past year other than his eyes getting a little worse. Financially, he said there was some fluctuation but no drastic changes. When asked about his personal life over the past year, he described it as "real good"[33]. He had never been treated for drug or alcohol abuse, and he had no sleep problems or issues.

3.4.4 The Flight Crew's Post-Accident Toxicological Testing

The accident flight crew was transported to the Ventura County Hospital following the accident. According to a statement provided by the attending physician, no post-accident drug or alcohol screening was conducted on the flight crew of Omega Air 70.

The Omega Emergency Action Plan[34] page 11 states, in part:

> "An FAA approved or military flight surgeon medical examination is required for those involved in a physiological incident or when a mishap causes injury to the crewmembers or personnel, or causes substantial reportable damage to the aircraft," and;
>
> "OARS crews requiring a medical examination or toxicology screening in connection with an aircraft mishap will report to the nearest military medical facility or civilian emergency room."

3.5 Trip Information

The flight was scheduled to provide aerial refueling of Navy F-18s offshore. Omega Aerial Refueling Services was operating under contract with the U.S. Navy.[35] Below was the intended route of Omega 70 on the day of the accident.

KNTD-SXC-SXC161/010DME-RV-KNTD[36]

Scheduled Engine Start: 1715 PST Scheduled Takeoff: 1730 PST

4.0 Weight and Balance

The weight and balance data for Omega flight 70 was destroyed by post-impact fire. Estimated weight and balance information for the accident was reconstructed by investigators using the onboard computer of an identical B707 (N707MQ) and using the weights associated with the accident aircraft (N707AR).[37]

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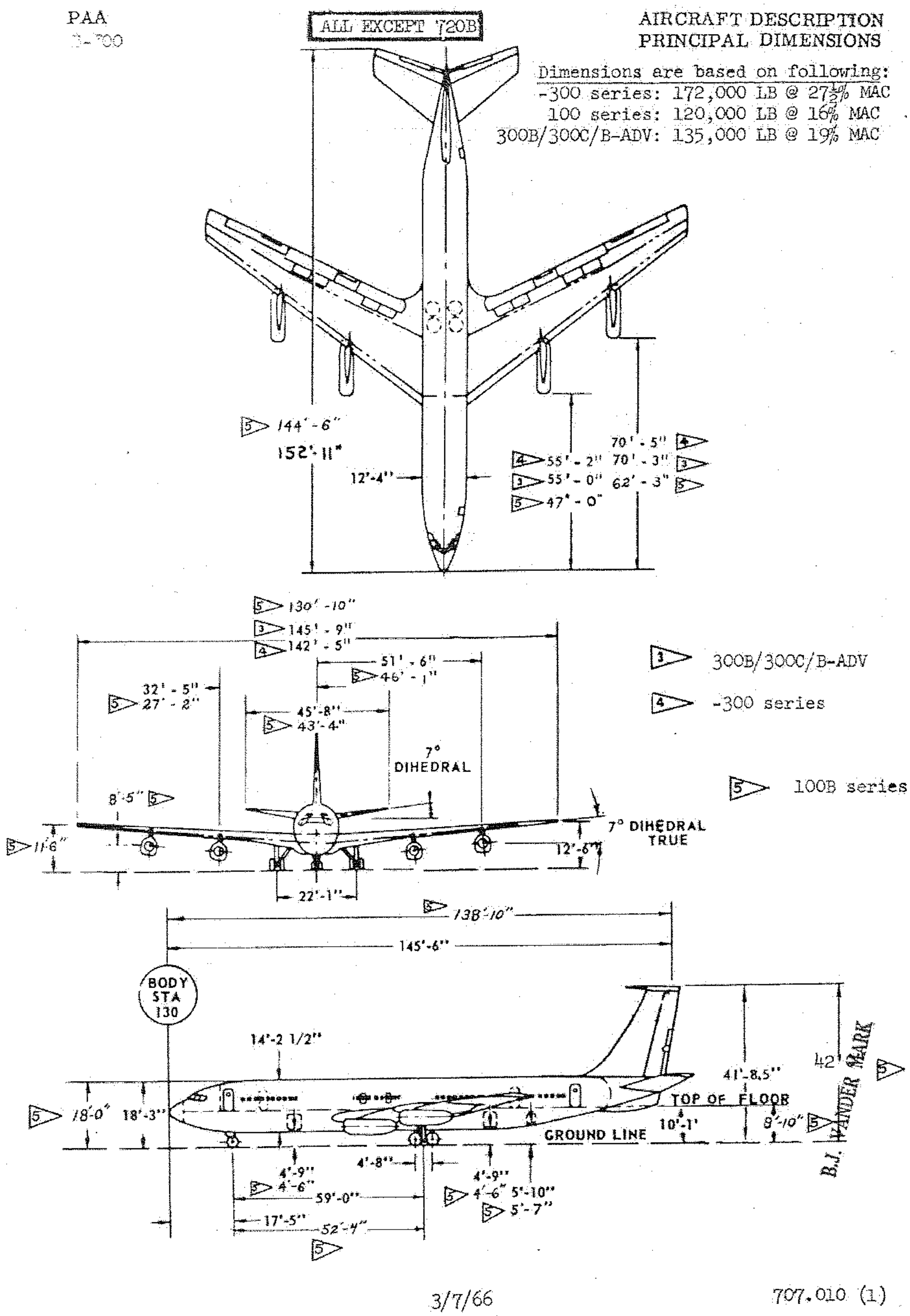
[33] See Attachment 2: Flight Crew Interview Summaries and Statements.
[34] See Attachment 27: OARS EAP Excerpt.
[35] See Attachment 21: Navy Contract.
[36] For further ATC information, see Section 6.0: ATC Information, of this report, and Attachment 6: ATC Transcripts and Tower Logs.
[37] For further information, see Attachment 14: Reconstructed Weight and Balance.

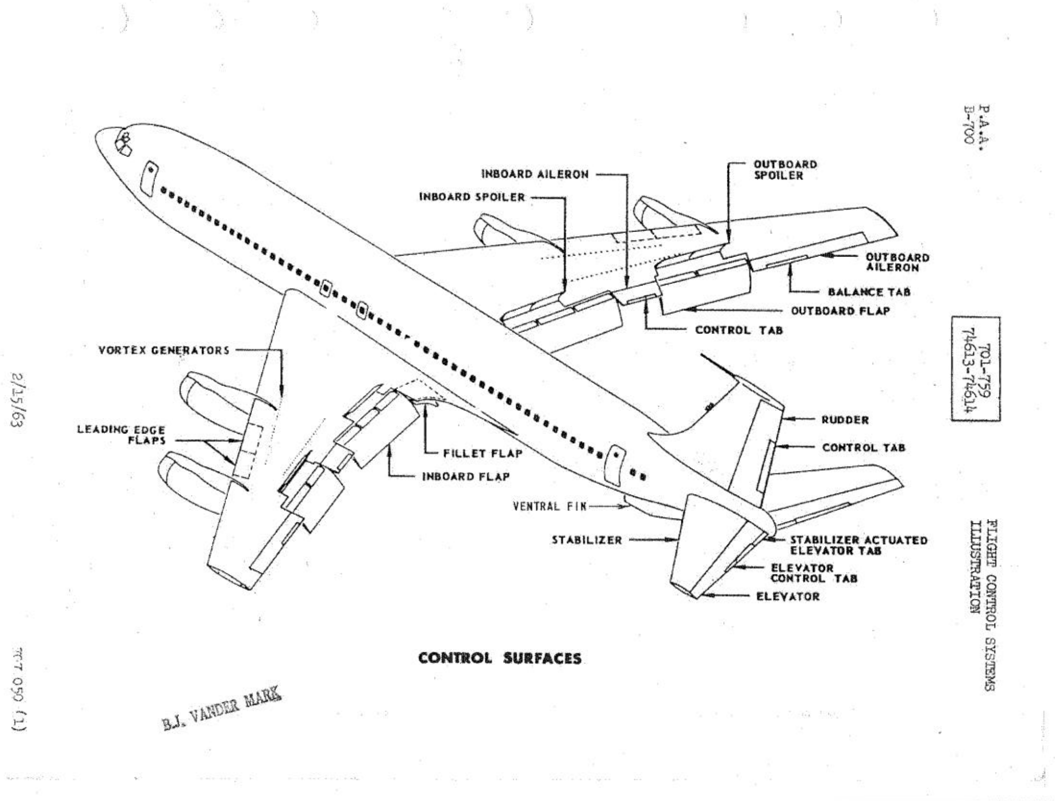
Basic Operating Weight	142, 859 lbs.
Passenger Weight	510 lbs
Baggage & Cargo	4,510 lbs.[38]
Zero Fuel Weight	147, 879 lbs.
Fuel	157,800 lbs.
Taxi Fuel Burn	1,500 lbs.
Takeoff Weight	304,179 lbs.
Maximum Takeoff Weight	331,600 lbs.
Maximum Landing Weight	247,000 lbs.

[38] This figure included 300 lbs. for "lav service", 60 lbs for crew bags, and 4,150 for cargo.

5.0 Accident Airplane[39]



[39] Source: Pan American Aircraft Operating Manual, page 707.010. See Attachment 13: Pan Am B707 Aircraft Operating Manual.



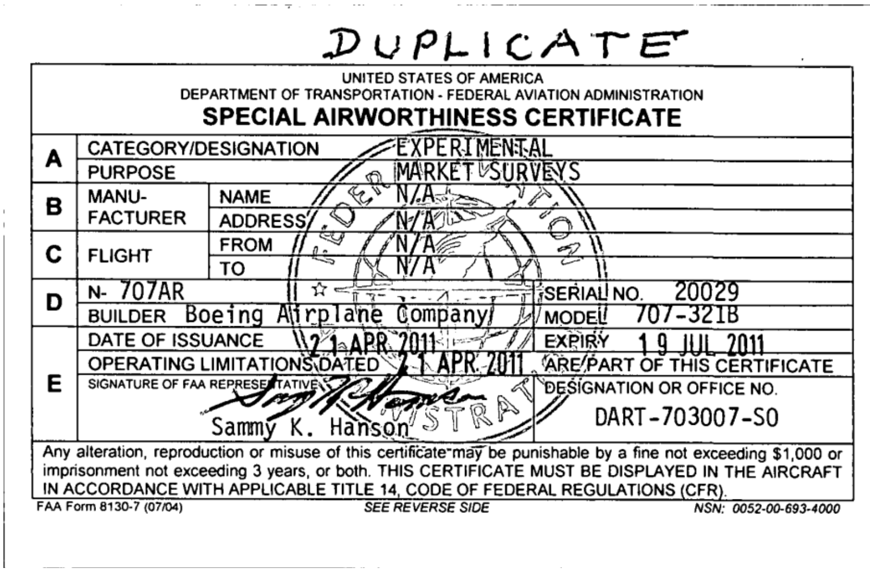
5.1 Airplane Description[40]

The accident airplane was a Boeing 707-321B, registration number N707AR, serial number 20029. It was certificated on July 9, 1996 and registered to Omega Air Inc. in San Antonio, Texas. The airplane held an Experimental/Market Survey certificate dated March 21, 2011. The airplane was powered by four Pratt and Whitney JT3D-3B engines.

5.2 Airworthiness Certificate

Aircraft N707AR was certified under 14 CFR Part 21.195 "Experimental certificates: aircraft to be used for market surveys, sales demonstrations, and customer crew training."[41]

[40] Source: http://registry.faa.gov/aircraftinquiry/NNum_Results.aspx?NNumbertxt=N707AR.
[41] See Section 11.3: 14 CFR Part 21.195, of this report.


DUPLICATE

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION		EXPERIMENTAL
	PURPOSE		MARKET SURVEYS
B	MANU-FACTURER	NAME	N/A
		ADDRESS	N/A
C	FLIGHT	FROM	N/A
		TO	N/A
D	N- 707AR		SERIAL NO. 20029
	BUILDER Boeing Airplane Company		MODEL 707-321B
E	DATE OF ISSUANCE 21 APR 2011		EXPIRY 19 JUL 2011
	OPERATING LIMITATIONS DATED 21 APR 2011		ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE Sammy K. Hanson		DESIGNATION OR OFFICE NO. DART-703007-SO

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

FAA Form 8130-7 (07/04) SEE REVERSE SIDE NSN: 0052-00-693-4000

[42]

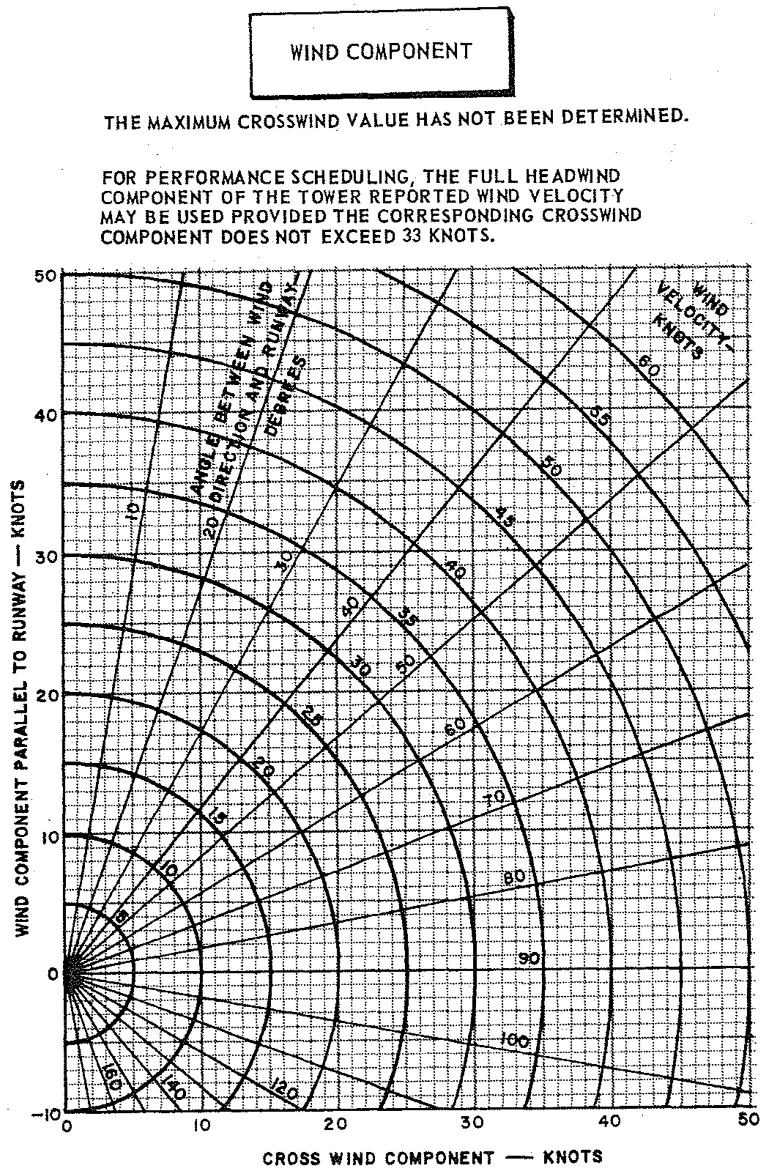
5.3 B707 Crosswind Limitation

According to the B707 Airplane Flight Manual (AFM), no maximum crosswind value had been determined for the B707, however the AFM Wind Component chart included the statement "for performance scheduling, the full headwind component of the tower reported wind velocity may be used provided the corresponding crosswind component does not exceed 33 knots."[43]

The 2354Z weather report valid at the time of the accident (0027Z) showed winds from 270 degrees at 22 knots with gusts to 33 knots[44] resulting in an estimated crosswind component of 29 knots. The same weather report indicated a peak wind gust of 250 degrees at 44 knots, resulting in an estimated crosswind component of 29 knots.

[42] For more information, refer to Maintenance Records Group Report.
[43] See Attachment 9: B707 AFM Excerpts.
[44] For further weather information, see Section 6.2: Weather, of this report.

5.3.1 B707 Wind Component Chart[45]



5.4 B707 Accident History[46]

The first flight of the B707 occurred in 1954. There were 858 B707's produced (-100, -200, -300 and E3 series), and production ended in 1991. There have been 145 hull-loss accidents of the B707 that have resulted in fatalities, and 11 non-fatal hull-loss accidents.

On April 25, 1992, a B707-324C operated by Trans Aeros Mercan Pan Am, crashed shortly after takeoff from Miami International Airport when the #3 engine and pylon separated from the

[45] See Attachment 9: B707 AFM Excerpts.
[46] Source: Flight Safety Foundation, http://aviation-safety.net/database/type/type-general.php?type=104.

airplane as a result of the failure of the pylon inboard midspar support fitting due to fatigue.[47] The three crewmembers survived with minor injuries but the aircraft sustained substantial damage.

On September 22, 1995, a U S. Air Force (USAF) E-3B Airborne Warning and Control Systems (AWACS) airplane crashed after takeoff from Elmendorf Air Force Base (AFB) in Alaska. The airplane was destroyed, and all 24 people on board were killed. The Air Force investigation determined that a flock of Canada geese had flown in front of the airplane as it became airborne and were ingested into two engines, causing both engines to lose power.

The last accident of a B707 prior to the Omega/Point Magu accident, occurred on October, 2009 when a B707-321C aircraft, operated by Safari Airlines, sustained substantial damage to the undercarriage at Mombasa-Moi International Airport (MBA), Kenya after contacting the landing lights to the runway. The right main gear collapsed while taxiing after landing. There were no injuries and no fatalities.

6.0 Air Traffic Control and Navigation

6.1 Air Traffic Control

On May 21, 2011, members of the Ops Group toured the control tower facilities at the airport. KNTD did not have ground surveillance radar, and only used a BRANDS terminal radar display system slaved off of the Airport Surveillance Radar. The control tower was typically staffed with a ground, local controller, flight data specialist and tower supervisor. The tower supervisor and local controller were trained and qualified on all positions. Typical shifts were in 8 hour blocks, 5 days on and 2 days off. The two shifts were 0700 to 1500 and 1500 to 2300 local time. The crash phone was tested daily. There were no security or tower camera installations.

OMEGA70 Heavy was cleared by ATC to W291 via the NTDT60A Stereo Route. ATC transcripts prepared by KNTD personnel indicated the local controller requested an IFR release for OMEGA70 Heavy from the approach controller at 0023:08Z. The release was granted at 0023:17Z with a departure restriction to turn left heading 160 degrees after departure. At 0023:27Z OMEGA70 heavy transmitted that they were approaching the hold short for runway 21 and were ready for takeoff. At 0023:31Z the KNTD local controller issued the departure restriction followed by the wind, and cleared OMEGA70 Heavy for takeoff. At 0026:13Z the transcript revealed a background communication from an unknown source stating “oh (expletive), oh (expletive), crash, crash, crash, crash; what the….” At 0026:59Z another background transmission from an unknown source stated “oh my God, oh no he’s off the (expletive) runway.”[48]

[47] NTSB Case #MIA92FA115, File number 6008.
[48] For further information, see Attachment 6: ATC Transcripts and Tower Logs.

6.1.1 Photos of Accident Runway from Air Traffic Control (ATC) Tower[49]

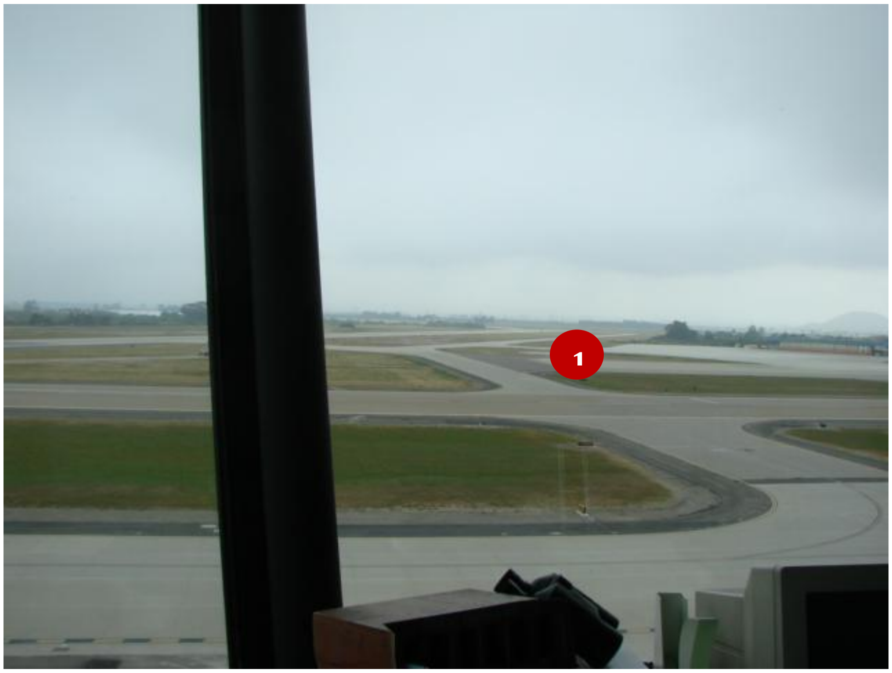


Photo 10: Photo from ATC tower looking toward end of runway 21 (1)

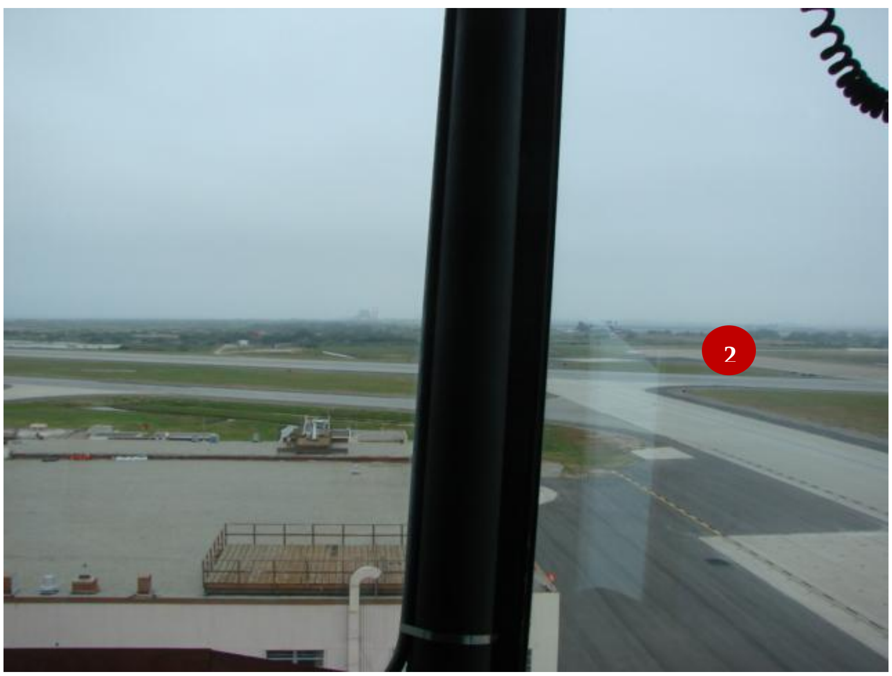


Photo 11: Photo from ATC tower looking at runway intersection (2)

[49] Photo documentation provided by the Ops Group Chairman.

Photo 12: Photo from ATC tower looking at taxiway A2 (3)

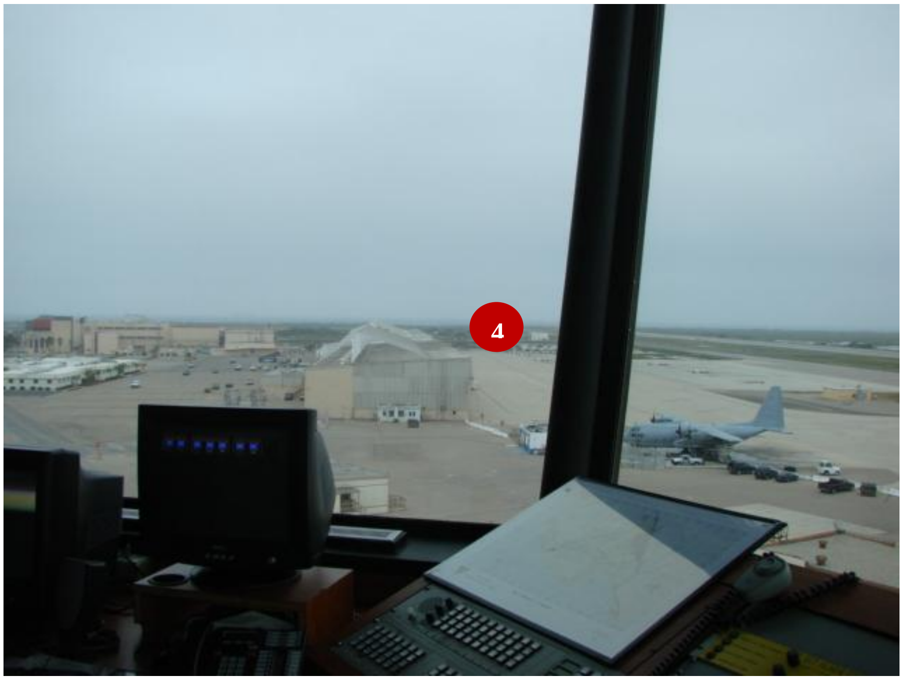
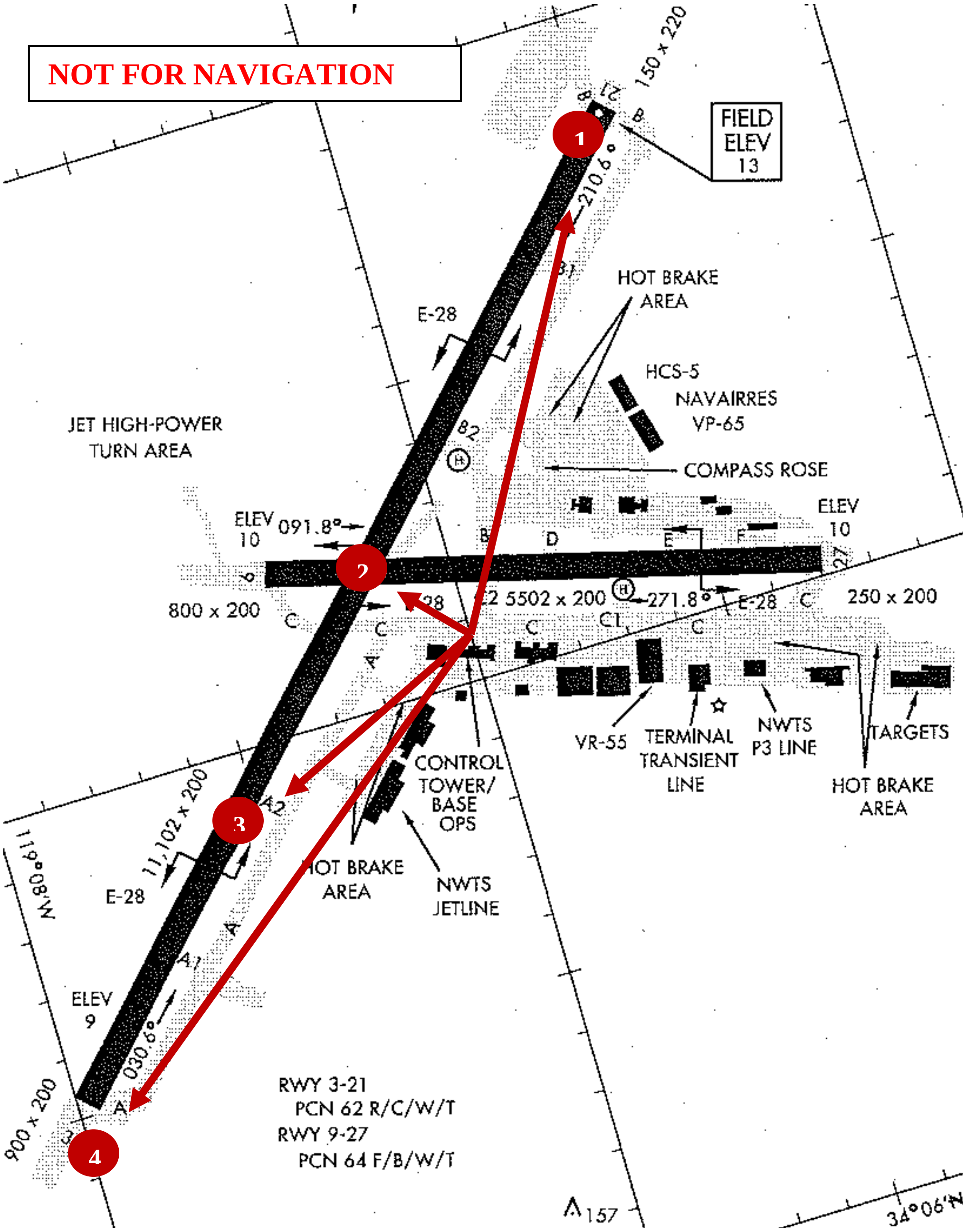


Photo 13: Photo from ATC tower looking toward accident site (4)



50

6.1.2 ATC Filed Flight Plan[51]

NTD..DOYLE7..Direct DOYLE..Direct SXC..Direct SXC 161/10..Direct W291

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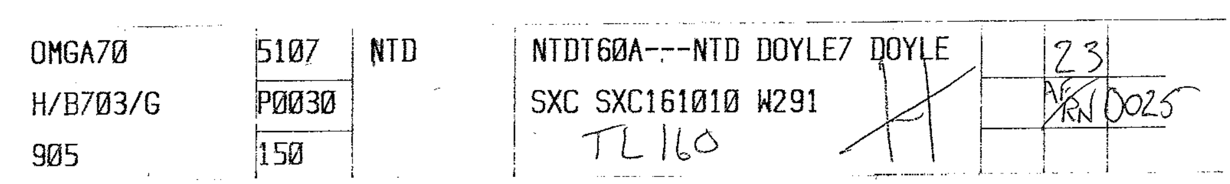
50 Airport Diagram from Attachment 15: Navigational Charts.
51 See Attachment 6: ATC Transcripts and Tower Logs.

6.1.3 ATC Departure Strip[52]



6.2 Navigation[53]

6.2.1 W-291 Warning Area[54]

Omega Air 70's intended route of flight included Navy contract refueling operations within the W-291 warning area off the coast of California. According to the FAA Aeronautical Information Manual (Chapter 3-4-4: Warning Areas), "a warning area is airspace of defined dimensions, extending from three nautical miles outward from the coast of the U.S., that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both."

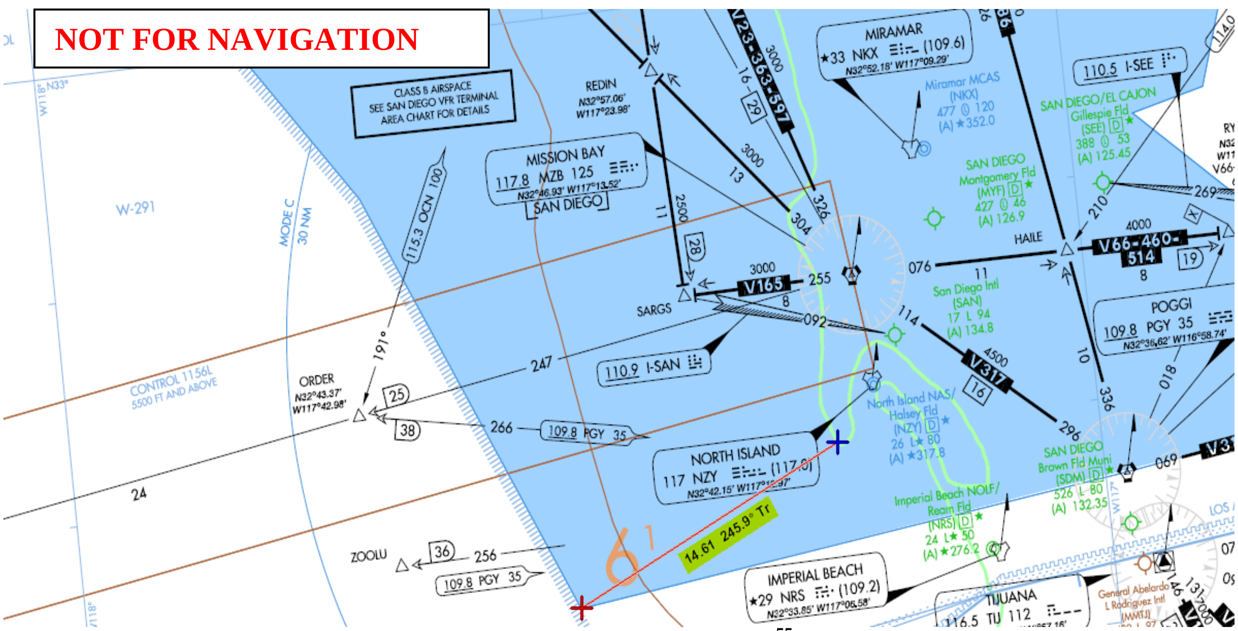


Photo 14: Closest location of W-291 to California coastline (CONUS[55])

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[52] See Attachment 6: ATC Transcripts and Tower Logs.

[53] Note: Charts depicted in this section are for reference only. Omega Air pilots utilized Jeppesen charts during flight operations.

[54] Reference FAA L-4 IFR Enroute Chart. Source: http://aeronav.faa.gov/index.asp?xml=aeronav/applications. For additional information, see Attachment 25: Warning Area Chart.

[55] CONUS: Continental United States.

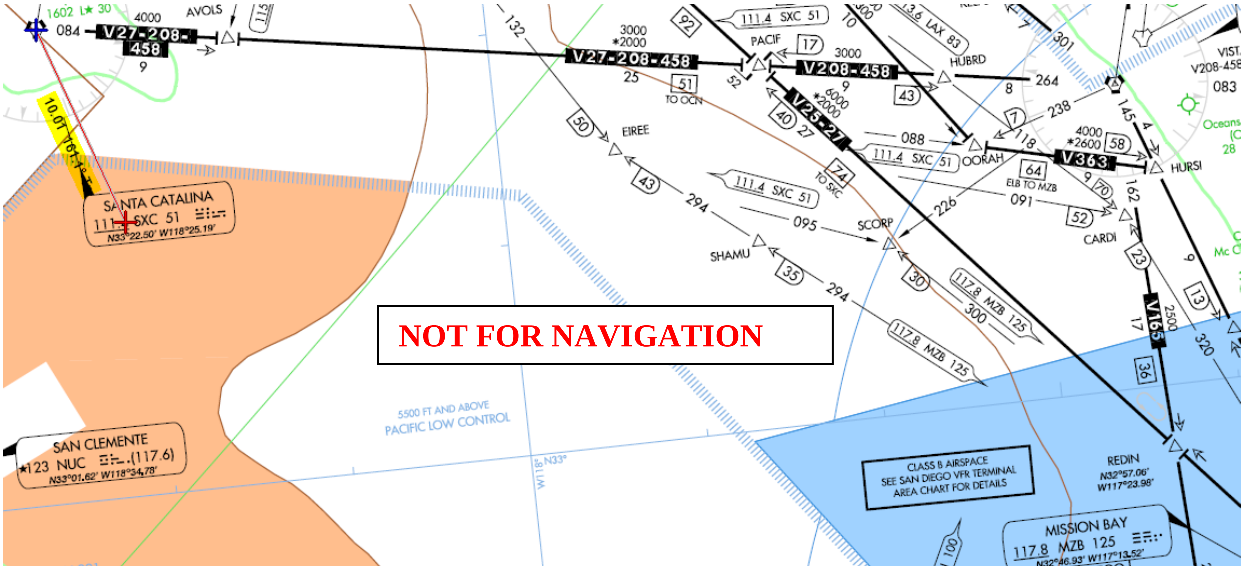


Photo 15: Closest location of W-291 to Santa Catalina (CONUS)

6.2.2 Doyle Seven Departure

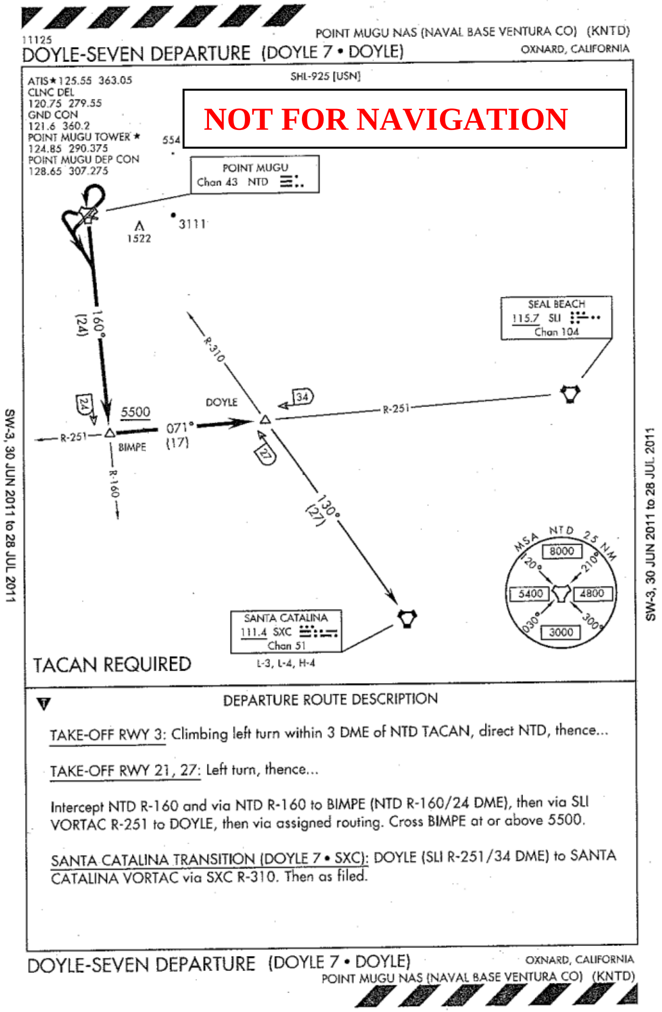


Photo 16: Doyle Seven Departure

7.0 Weather

The official recorded weather at the time of the accident was at 2354Z showing VFR[56] conditions with scattered cloud layers at 4,000 feet and 20,000 feet, and the temperature was 16 degrees Celsius with a dew point of 9 degrees Celsius. The winds were from 270 degrees at 22 knots with gusts to 33 knots, with a peak wind recorded from 250 degrees at 28 knots gusting to 44 knots. At 0030Z (3 minutes after the accident) a special weather report was issued showing the winds from 280 degrees at 24 knots, gusting to 34 knots. The sequence of weather reports before and after the accident was as follows:

METAR KNTD 182154Z 27021G31KT 7SM SCT045 SCT200 16/09 A2979 RMK AO2 PK WND 28037/2130 SLP088 T01610094 PNO $

[56] Visual Flight Rules are defined by 14 CFR 91.155 as a ceiling greater than 1,000 above ground level (agl) with a visibility greater than 3 statute miles. The National Weather Service defines a ceiling as the lowest layer of clouds recorded as broken or overcast.

METAR KNTD 182254Z 28028G36KT 9SM CLR 16/09 A2977 RMK AO2 PK WND 28036/2254 SLP082 T01610094 PNO $
METAR KNTD 182354Z 27022G33KT 7SM SCT040 SCT200 16/09 A2976 RMK AO2 PK WND 28036/2259 SLP079 LA GPK 12/12/25028G44 T01560094 10172 20144 58012 PNO $

(Note: Accident occurred at approximately 0027Z)
SPECI KNTD 190030Z 28024G34KT 7SM SCT050 15/09 A2975 RMK SLP077

METAR KNTD 190054Z 28022G34KT 9SM CLR 15/09 A2976 RMK AO2 PK WND 28035/0024 CIG 002 N SLP077 T01500094 PNO $
SPECI KNTD 190141Z 28019G29KT 8SM FEW002 SCT050 15/09 A2976 RMK AO2 PK WND 28035/0058 FU FEW002 PNO $
METAR KNTD 190154Z 29018G27KT 7SM FEW002 SCT050 16/08 A2977 RMK AO2 PK WND 28035/0058 SLP081 FU FEW002 LAG PK 11/11/26018G36 T01560083 PNO $
METAR KNTD 190254Z 29016G23KT 7SM FEW002 SCT005 14/09 A2979 RMK AO2 PK WND 27031/0227 SLP090 FU FEW002 LAG PK 10/10/27019G30 T01390089 53011 PNO $
METAR KNTD 190354Z 30013G26KT 7SM SCT055 13/09 A2983 RMK AO2 PK WND 29026/0348 SLP101 T01280094 PNO $

8.0 Aerodrome Information[57]

The Point Mugu Naval Air Station (KNTD) is located 3.5 miles west of the Ventura (VTU) VOR[58] (259 radial, 3.5 nautical miles) and 36 miles west of the Los Angeles (LAX) VOR (273 radial, 36.0 nautical miles). It is part of the Naval Base Ventura County (NBVC) that also includes Point Hueneme and San Nicholas Island (60 miles offshore).

Runway 21 was 11,102 feet long and 200 feet wide with an asphalt surface and a 900 foot paved overrun area. The heading for runway 21 was 210 degrees magnetic and 224 degrees true. Runway 21 departures were restricted from turning after departure until reaching an altitude of 500 feet and ½ mile offshore.

[57] Source: http://www.airnav.com/airport/KNTD
[58] VHF: omni-directional radio range.

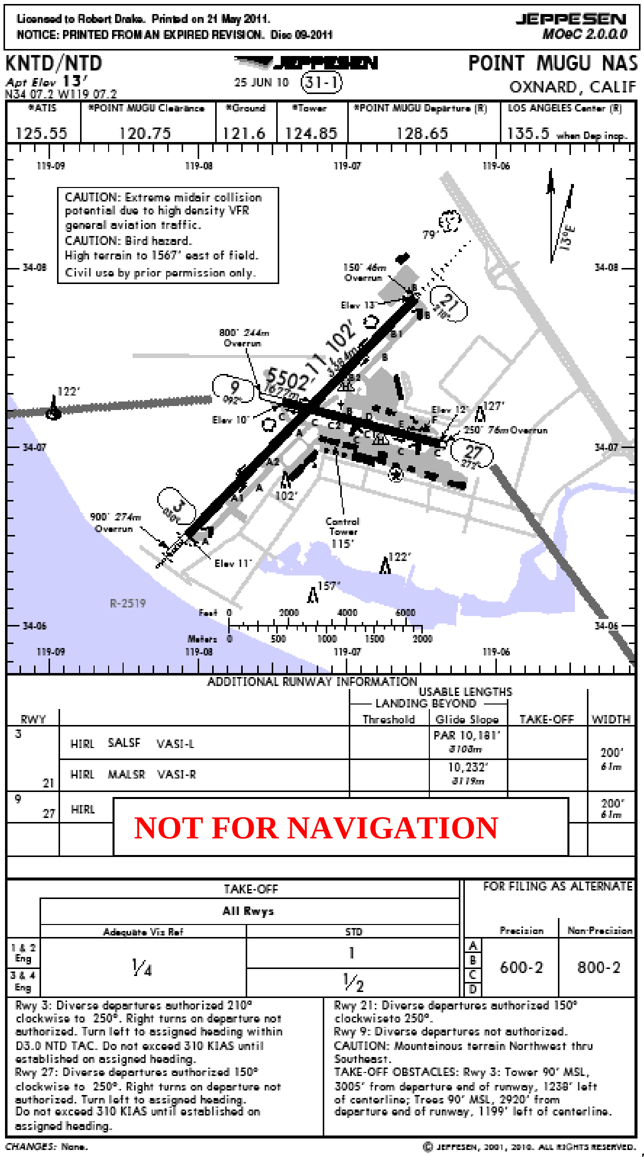


Photo 17: Point Mugu, NAS Jeppesen 10-9 Airport chart[59]

8.1 Airport Security Video

The NTSB Ops Group received a security tour of the airport by Airport Security Director in an effort to locate possible sources of video surveillance that may have captured the accident sequence. Two security cameras with views of the taxiways, ramp area and runway 21 were discovered. Both cameras were operational at the time of the accident, but they were static only, and did not digitally record their images. The cameras were only monitored during the evening hours for ramp security, and unmonitored during daylight hours.

9.0 Aircraft Rescue and Fire Fighting (ARFF) Response

For further information, see Attachment 8: ARFF Response Document.

[59] For further information, see Attachment 15: Navigational Charts.

10.0 Company Overview[60]

Omega Air Refueling Services (OARS) was headquartered in Alexandria, Virginia, and conducted commercial in-flight refueling services for the U.S. Navy as Public Aircraft operated under the provisions of Title 49 of the United States Code (U.S.C.) Section 40102 and 40125. The operation utilized two Boeing 707-300s and a DC-10 specially converted for probe and drogue air to air refueling.

In the late 1990s Omega Air, Inc. (headquartered in Dublin, Ireland), in conjunction with BAE Systems and TRACOR, converted a former Pan American Airlines B-707-300 into a tanker capable of probe and drogue refueling. The aircraft employed a centerline refueling station located in the aft fuselage with dual redundant hoses. N707AR, the first commercial tanker, first flew in 1999. In 2000, the aircraft commenced U.S. Navy certification testing at NAS Patuxent River, MD, and in 2001 it was certified to refuel every type, model, and series of tactical aircraft in the U.S. Navy and U.S. Marine Corps inventory.

From 2001 until 2006 the Omega tankers flew under U.S. Navy contract as a sub-contractor to Flight International/L-3Com, which had an existing contract with the Navy flying Learjets. In 2004, OARS was created to manage most aspects of the program, and to enable future growth in this niche market. Another 707, converted under the same specifications as the original tanker, entered service in 2006 registered as N707MQ. Their converted DC-10 entered service in the spring of 2008. OARS leased the tanker aircraft from Omega Air, while Seven Q Seven (7Q7), another subsidiary of Omega Air, Inc, was responsible for maintaining the aircraft. The U.S Navy and Marine Corps are the main customers for OARS via a Commercial Air Services (CAS) contract managed by Naval Air Systems Command's PMA-207.5. There was no bidding process for this contract as OARS had the only NavAir certified tanker available.

OARS expanded its operations in 2007 to include allied refueling flights by supporting the Royal Australian Air Force's (RAAF) F/A-18 Hornets. In 2008, Omega transported a squadron of RAAF F/A-18s from RAAF Tindal, Australia, to Eielson AFB, Alaska and back again for a USAF Red Flag exercise. In May 2008, OARS supported Britain's Royal Air Force (RAF) to refuel GR-4A Tornadoes from New England to Arizona. Canadian Air Force CF-18s have also used Omega during past joint training.

According to the OARS Chief Operating Officer (COO), OARS did not have operations specifications other than operating under Part 91 standards, and they are always in the public use "from the minute they start the engines," and the Navy had operational control of their flight.[61] OARS had two vice presidents who worked for the COO, one on the east coast and one on the west coast, who scheduled the aircraft and flight crews for the Navy. OARS received

[60] Source: company website, http://www.omegaairrefueling.com/vms/index.php?option=com_content&view=article&id=62&Itemid=70.
[61] See Attachment 27: N707AR Public Aircraft Declaration, and Attachment 1: Interview Summaries.

compensation from the Navy, and private operators like Boeing, in order to lease their services, would have to go through the Navy to keep the flight under public use.[62]

11.0 Engine Fire/Severe Damage or Separation Checklist[63]

According to the Pan Am Training Center Evaluator (TCE)/Instructor and Flight Engineer Instructor and Evaluator, when Omega pilots received recurrent training, they used Pan Am procedures and Pan Am checklists, but used their own Omega checklists when in the aircraft during line operations.

11.1 Omega Aerial Refueling Services checklist

ENGINE FIRE/DAMAGE OR SEPARATION

Thrust Lever	**CLOSED**
Essential Power	**CHECKED**
Start Lever	**CUTOFF**
Transit Light	**MONITOR**
Fire Switch	**PULLED**

Yaw Damper & Autopilot ....OFF

- **If fire warning light on, visible damage, or separation confirmed**:
  Fire Bottle .... DISCHARGE
  Wait at least 30 seconds
- **If fire indication persists:**
  Transfer Switch...TRANSFER
  Fire Bottle .... DISCHARGE
- **If fire still persists,** attempt to blow out the fire:
  Do not lower flaps or use speedbrakes unless landing is imminent.
  Clean Up Airplane ....GEAR AND FLAPS UP
  Accelerate to at least 250 kts (Vmo max).
- **If fire is NOT out,** land as soon as possible.
- **If fire IS out,** complete the following when time permits:
  Fuel Shutoff Valve .... CLOSE
  Engine Ignition..OFF
  Ignition CB, P6 .... PULL
  GB Light ....CHECK ON
  Check Electrical Load:
  Freon ....36 KW MAX ea generator
  ACM ....27 KW MAX ea generator
  Turbos and Bleeds..OFF
  Cabin Altitude and Ventilation ....CHECK
  Fuel Management... As required

[62] See Attachment 1: Interview Summaries.
[63] For complete checklists, refer to Attachment 12: Omega B707 Checklists.

11.2 FAA Airplane Flight Manual (AFM) checklist

ENGINE FIRE, SEVERE ENGINE DAMAGE OR ENGINE SEPARATION

If fire warning light illuminates steadily and bell rings; or severe engine damage or engine separation is indicated:

Recall

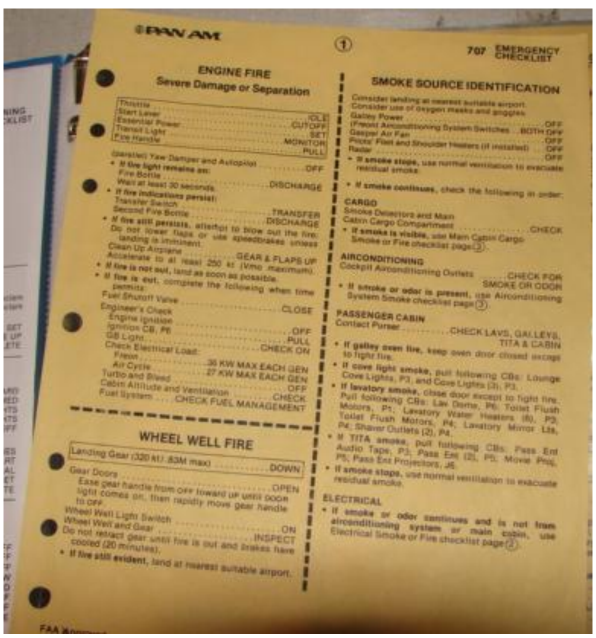
1. Thrust Lever - CLOSE
2. Essential power selector - ON OPERATING GENERATOR
3. Start Lever - CUTOFF
4. Engine fire switch - PULL
   If fire warning light remains illuminated:
5. Fire extinguisher discharge switch - PUSH AND HOLD ONE SECOND

Reference

If after 30 seconds the fire warning light remains illuminated:
1. Fire extinguisher transfer switch - TRANSFER
2. Fire extinguisher discharge switch - PUSH AND HOLD ONE SECOND

If fire warning light remains illuminated:
3. Landing gear - UP
4. Wing flaps - UP
5. Airspeed - AT LEAST 250 KNOTS. DO NOT EXCEED VMO
6. Do not lower flaps or use speed brakes unless emergency landing imminent.
7. Land at the nearest suitable airport.

11.3 Pan Am International Flight Academy checklist[64]



[64] NTSB photo taken June 16, 2010 at the Pan Am International Training Academy in Miami, Florida during simulator work and evaluation. For further information, see Attachment 10: B707 Simulator Work.

12.0 Laws and Regulations[65]

12.1 Select Federal Aviation Regulations (FARs)

12.2 14 CFR Part 61.58

Omega Aerial Refueling services pilots received recurrent B707 training at the Pan Am Flight Training Academy in Miami, Florida.[66] The B707 simulator at Pan Am was a Level A simulator, and not certified for the following maneuvers:[67]

- Taxiing
- Normal and crosswind takeoffs
- Normal and crosswind landings
- Landings from an ILS
- Landings with one or two engines inoperative

14 CFR Part 61.58 states the following, in part:

> “(3) If the flight simulator used pursuant to paragraph (e) of this section is not qualified and approved for landings, the applicant must--
> (i) Hold a type rating in the airplane represented by the simulator; and
> (ii) Have completed within the preceding 90 days at least three takeoffs and three landings (one to a full stop) as the sole manipulator of the flight controls in the type airplane for which the pilot-in-command proficiency check is sought.”

12.2.1 FAA Interpretation of 14 CFR Part 61.58

For information regarding the FAA’s interpretation of 14 CFR Part 61.58, see Attachment 20: FAA Part 61.58 Letter.

12.3 14 CFR Part 21.195

According to aircraft records and OARS personnel interviews, N707AR was certified as an “experimental” aircraft. 14 CFR 21.195 states, in part:

> “Experimental certificates: aircraft to be used for market surveys, sales demonstrations, and customer crew training.
> (a) A manufacturer of aircraft manufactured within the United States may apply for an experimental certificate for an aircraft that is to be used for market surveys, sales demonstrations or customer crew training.
> (b) A manufacturer of aircraft engines who has altered a type certificated aircraft by installing different engines, manufactured by him within the United States, may apply for an experimental certificate for that aircraft to be used for market surveys, sales

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[65] For more information on the experimental certification of N707AR and the “public aircraft” status of Omega Air flight 70, see the Omega Public Aircraft Status Group Factual Report.
[66] See Attachment 19: Pan Am Training Academy Records.
[67] See Attachment 29: PTRS Data.

demonstrations, or customer crew training, if the basic aircraft, before alteration, was type certificated in the normal, acrobatic, commuter, or transport category.
(c) A person who has altered the design of a type certificated aircraft may apply for an experimental certificate for the altered aircraft to be used for market surveys, sales demonstrations, or customer crew training if the basic aircraft, before alteration, was type certificated in the normal, utility, acrobatic, or transport category.
(d) An applicant for an experimental certificate under this section is entitled to that certificate if, in addition to meeting the requirements of Sec. 21.193--
(1) He has established an inspection and maintenance program for the continued airworthiness of the aircraft; and
[(2) The applicant shows that the aircraft has been flown for at least 50 hours, or for at least 5 hours if it is a type certificated aircraft which has been modified. The FAA may reduce these operational requirements if the applicant provides adequate justification.**]"**

12.4 14 CFR Part 91.319

According to aircraft records and OARS personnel interviews, Omega Air flight 70 was operated using an aircraft that was certified as an "experimental" aircraft.[68] 14 CFR 91.319 states, in part:

"(a) No person may operate an aircraft that has an experimental certificate--
(1) For other than the purpose for which the certificate was issued; or
(2) Carrying persons or property for compensation or hire.
(b) No person may operate an aircraft that has an experimental certificate outside of an area assigned by the Administrator until it is shown that--
(1) The aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed; and
(2) The aircraft has no hazardous operating characteristics or design features.
(c) Unless otherwise authorized by the Administrator in special operating limitations, no person may operate an aircraft that has an experimental certificate over a densely populated area or in a congested airway. The Administrator may issue special operating limitations for particular aircraft to permit takeoffs and landings to be conducted over a densely populated area or in a congested airway, in accordance with terms and conditions specified in the authorization in the interest of safety in air commerce.
(d) Each person operating an aircraft that has an experimental certificate shall--
(1) Advise each person carried of the experimental nature of the aircraft;
(2) Operate under VFR, day only, unless otherwise specifically authorized by the Administrator; an and
(3) Notify the control tower of the experimental nature of the aircraft when operating the aircraft into or out of airports with operating control towers.
[(e) **[**(e) No person may operate an aircraft that is issued an experimental certificate under §21.191 (i) of this chapter for compensation or hire, except a person may operate an aircraft issued an experimental certificate under §21.191 (i)(1) for compensation or hire to-
(1) Tow a glider that is a light-sport aircraft or unpowered ultralight vehicle in accordance with §91.309; or
(2) Conduct flight training in an aircraft which that person provides prior to January 31,

[68] See Attachment 18: FAA Letter of Authorization.

2010.
(f) No person may lease an aircraft that is issued an experimental certificate under §21.191 (i) of this chapter, except in accordance with paragraph (e)(1) of this section.
(g) No person may operate an aircraft issued an experimental certificate under §21.191 (i)(1) of this chapter to tow a glider that is a light-sport aircraft or unpowered ultralight vehicle for compensation or hire or to conduct flight training for compensation or hire in an aircraft which that persons provides unless within the preceding 100 hours of time in service the aircraft has-
(1) Been inspected by a certificated repairman (light-sport aircraft) with a maintenance rating, an appropriately rated mechanic, or an appropriately rated repair station in accordance with inspection procedures developed by the aircraft manufacturer or a person acceptable to the FAA; or
(2) Received an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.
(h) The FAA may issue deviation authority providing relief from the provisions of paragraph (a) of this section for the purpose of conducting flight training. The FAA will issue this deviation authority as a letter of deviation authority.
(1) The FAA may cancel or amend a letter of deviation authority at any time.
(2) An applicant must submit a request for deviation authority to the FAA at least 60 days before the date of intended operations. A request for deviation authority must contain a complete description of the proposed operation and justification that establishes a level of safety equivalent to that provided under the regulations for the deviation requested.
(i) The Administrator may prescribe additional limitations that the Administrator considers necessary, including limitations on the persons that may be carried in the aircraft.**]**

12.5 Select Federal Law

12.5.1 49 USC 40102

According to aircraft records and OARS personnel interviews, Omega Air flight 70 was operated as a public aircraft under contract with the United States Navy.[69] 49 USC40102 states, in part:

> “(41) ``public aircraft" means any of the following:
> (A) Except with respect to an aircraft described in subparagraph (E), an aircraft used only for the United States Government, except as provided in section 40125(b).
> (B) An aircraft owned by the Government and operated by any person for purposes related to crew training, equipment development, or demonstration, except as provided in section 40125(b).
> (C) An aircraft owned and operated by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, except as provided in section 40125(b).

[69] See Attachment 21: Navy Contract, and Attachment 16: FAA Briefing Paper on Omega Operations, and Attachment 18: FAA Letter of Authorization.

(D) An aircraft exclusively leased for at least 90 continuous days by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, except as provided in section 40125(b).
(E) An aircraft owned or operated by the armed forces or chartered to provide transportation to the armed forces under the conditions specified by section 40125(c).”

12.5.2 49 USC 40125

According to aircraft records and OARS personnel interviews, Omega Air flight 70 was operated as a public aircraft under contract with the United States Navy.[70] 49 USC40125 states, in part:

“(a) Definitions. - In this section, the following definitions apply:
(1) Commercial purposes. - The term "commercial purposes" means the transportation of persons or property for compensation or hire, but does not include the operation of an aircraft by the armed forces for reimbursement when that reimbursement is required by any Federal statute, regulation, or directive, in effect on November 1, 1999, or by one government on behalf of another government under a cost reimbursement agreement if the government on whose behalf the operation is conducted certifies to the Administrator of the Federal Aviation Administration that the operation is necessary to respond to a significant and imminent threat to life or property (including natural resources) and that no service by a private operator is reasonably available to meet the threat.
(2) Governmental function. - The term "governmental function" means an activity undertaken by a government, such as national defense, intelligence missions, firefighting, search and rescue, law enforcement (including transport of prisoners, detainees, and illegal aliens), aeronautical research, or biological or geological resource management.
(3) Qualified non-crewmember. - The term "qualified non-crewmember" means an individual, other than a member of the crew, aboard an aircraft -
(A) operated by the armed forces or an intelligence agency of the United States Government; or
(B) whose presence is required to perform, or is associated with the performance of, a governmental function.
(4) Armed forces. - The term "armed forces" has the meaning given such term by section 101 of title 10.
(b) Aircraft Owned by Governments. - An aircraft described in subparagraph (A), (B), (C), or (D) of section 40102(a)(37) (!1) does not qualify as a public aircraft under such section when the
aircraft is used for commercial purposes or to carry an individual other than a crewmember or a qualified non-crewmember.
(c) Aircraft Owned or Operated by the Armed Forces. -
(1) In general. - Subject to paragraph (2), an aircraft described in section 40102(a)(37)(E) (!1) qualifies as a public aircraft if -
(A) the aircraft is operated in accordance with title 10;
(B) the aircraft is operated in the performance of a governmental function under title 14, 31, 32, or 50 and the aircraft is not used for commercial purposes; or

[70] Attachment 21: Navy Contract, and Attachment 16: FAA Briefing Paper on Omega Operations.

(C) the aircraft is chartered to provide transportation to the armed forces and the Secretary of Defense (or the Secretary of the department in which the Coast Guard is operating) designates the operation of the aircraft as being required in the national interest.
(2) Limitation. - An aircraft that meets the criteria set forth in paragraph (1) and that is owned or operated by the National Guard of a State, the District of Columbia, or any territory or possession of the United States, qualifies as a public aircraft only to the extent that it is operated under the direct control of the Department of Defense.

Under the provisions of 14 CFR § 21.191(f), market survey aircraft are defined as aircraft that are used for conducting market surveys, sales demonstrations, and customer crew training as provided for in 14 CFR § 21.195."

G. ATTACHMENTS

Attachment 1: Interview Summaries
Attachment 2: Flight Crew Interview Summaries and Statements
Attachment 3: Witness Statements
Attachment 4: Omega Air 70 Crew Records Summary
Attachment 5: Crew Training Records
Attachment 6: ATC Transcripts and Tower Logs
Attachment 7: Boeing 707 ARFF Document
Attachment 8: ARFF Response Document
Attachment 9: B707 AFM Excerpts
Attachment 10: B707 Simulator Work
Attachment 11: Omega Aerial Refueling Services B707 Checklists
Attachment 12: Omega B707 Checklists
Attachment 13: Pan Am B707 Aircraft Operating Manual
Attachment 14: Reconstructed Weight and Balance
Attachment 15: Navigational Charts
Attachment 16: FAA Briefing Paper on Omega Operations
Attachment 17: FAA Form 8130.2G
Attachment 18: FAA Letter of Authorization
Attachment 19: Pan Am Training Academy Records
Attachment 20: FAA Part 61.58 Letter
Attachment 21: Navy Contract
Attachment 22: DOD Letter
Attachment 23: NTSB Form 6120
Attachment 24: Statement of Party Representatives
Attachment 25: N707AR Airworthiness
Attachment 26: N707AR Public Aircraft Declaration
Attachment 27: OARS EAP Excerpt
Attachment 28: PTRS Data

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