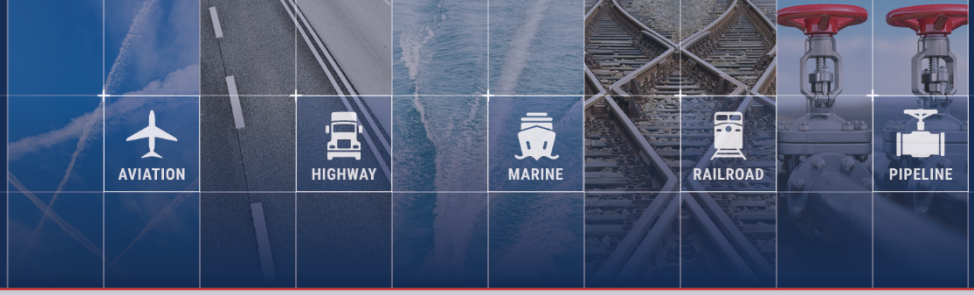


Aviation Investigation Final Report

Location:	Orlando, Florida	**Incident Number:**	OPS11IA428
Date & Time:	March 27, 2011, 17:02 Local	**Registration:**	N1487C
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	None
Defining Event:	Near midair/TCAS alert/loss of separation	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

A loss of separation occurred between a Boeing B737-700 and a Cirrus SR-22. The minimum required instrument flight rules separation between these two aircraft was 1000 feet vertical or 3 nautical miles lateral. The Cirrus had been out of radio contact with air traffic controllers for approximately 90 minutes. Air traffic controllers at the approach control facility requested that the flight crew of the B737 fly as close as safety permits to the Cirrus to look for any visual indications of problems or difficulties. The flight crew of the B737 agreed to the request. The closest point of approach between the two aircraft, both assigned operating altitudes of 11,000 feet mean sea level, was 100 feet vertical and 0.1 mile lateral.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The air traffic controllers' application of inappropriate separation between the B737 and the Cirrus and their inappropriate use of airborne civilian aircraft for observation of other airborne aircraft. Contributing to the incident was the crew of the B737's execution of a clearance that resulted in operation near other aircraft.

Findings

Personnel issues	Decision making/judgment - Flight crew
Personnel issues	Decision making/judgment - ATC personnel

Factual Information

History of Flight

Enroute	Comm system malf/failure
Enroute	Near midair/TCAS alert/loss of separation (Defining event)

A loss of separation occurred between Southwest Airlines (SWA) Flight #821, a Boeing 737-700 and N1487C, a Cirrus SR-22 in the vicinity of Orlando, Florida. The closest point of approach between the two aircraft, both assigned operating altitudes of 11,000 feet mean sea level (MSL), was 100 feet vertical and 0.1 mile lateral. The minimum required IFR separation between these two aircraft was 1000 feet vertical or 3 nautical miles lateral.

N1487C, a Cirrus SR-22

The Cirrus was on a 14 CFR Part 91 IFR planned flight from Picayune Municipal Airport (MJD), Picayune, Mississippi to Kissimmee Gateway Airport (ISM), Orlando, Florida with a pilot and one passenger on board. After departing from MJD, the pilot of the Cirrus obtained an airborne IFR clearance to ISM from Houston Air Route Traffic Control Center (ARTCC) on frequency 127.65 and was assigned a mode 3 transponder code of 7427 and an en route altitude of 11,000 feet MSL. As the Cirrus pilot proceeded toward his destination of ISM, he was directed to contact Pensacola (PNS) Approach on frequency 118.60, and then on frequency 119.0 and was routed via a shortcut over the Gulf of Mexico to the Cross City (CTY) VOR in Florida. The Cirrus pilot stated that PNS then transferred him to Eglin (VPS) Approach on frequency 132.1. The VPS controller acknowledged the Cirrus pilot and inquired about his route. The Cirrus pilot told the VPS controller that the previous controller had given him airborne routing direct to CTY, then direct ISM. As the Cirrus pilot continued en route to ISM he continued to hear pilots talk on the frequency and noticed that the frequency was getting "busier". About 60 to 100 nautical miles from ISM, even though he continued to hear radio communications on frequency 132.1, the pilot stated that he started to get concerned because no one had called him and he needed to start his descent. The Cirrus pilot called VPS approach several times with no contact, so he went back to his previous frequency of 119.0 for PNS but was not able to neither establish communications nor receive any radio transmissions. The Cirrus pilot then attempted to contact Jacksonville ARTCC without success.
The Cirrus pilot stated that he did not attempt to establish contact on the VHF emergency frequency, 121.5, because he was busy trying to find a frequency for Jacksonville ARTCC. Referring to a low altitude navigation chart, the Cirrus pilot noted the frequency 127.55 for Jacksonville ARTCC, dialed it in, and as he was about to call Jacksonville ARTCC, the Skywatch on-board traffic alerting system began giving him "traffic" aural alerts. The Cirrus pilot noticed a large jet coming up close on the left side of his airplane at the same altitude. The Cirrus pilot stated the jet came up on his airplane from behind, and by the time the Cirrus pilot visually

observed the jet, it was "banking to the left" from his 10 o'clock position. The Cirrus pilot stated his airspeed was about 195 knots, and the jet did not pass him quickly. The Cirrus pilot not know what type of airplane the jet was or what airline it was, but "it was pretty close," happened very fast and the sight of the jet and nearly simultaneous aural traffic alerts from the Skywatch on-board traffic alerting system was startling.
As the event was unfolding, the Cirrus pilot established communications with Jacksonville ARTCC who in turn directed the pilot to contact Central Florida terminal radar approach control (TRACON) on frequency 125.55. Central Florida TRACON provided the Cirrus radar vectors to ISM where the Cirrus executed an uneventful landing.

SWA821, a B737-700

The B737 was on a scheduled 14 CFR Part 121 IFR planned flight from Phoenix Sky Harbor International Airport (PHX), Phoenix, Arizona to Orlando International Airport (MCO), Orlando, Florida with a crew of five, one jump seat observer occupying the aft jump seat, and 137 passengers.
The B737 departed PHX at 1338 EST, for a scheduled 3 hour and 55 minute flight to MCO. The crew was on the final day of a three day pairing, and was on their second flight of the day having flown to PHX from the Ontario International Airport (ONT), Ontario, California earlier that morning. The First Officer was the pilot flying (PF) and the Captain was the pilot monitoring (PM) for the PHX to MCO flight.
As the B737 approached MCO, while still under control of Jacksonville ARTCC, the ARTCC air traffic controller asked the pilot to go off frequency to attempt contact a Cirrus SR22 that air traffic control did not have radio communications with on frequency 132.1. The Captain of the B737, as PM, transferred the primary radios to the First Officer and put the frequency 132.1 into the number two radio. The B737 made multiple attempts to contact the Cirrus without success. As the B737 approached the airspace boundary between Jacksonville ARTCC and Central Florida TRACON, Jacksonville ARTCC directed the B737 to contact Central Florida TRACON and advised the pilot that the Central Florida TRACON controller had a request. After establishing communications with Central Florida TRACON, the Captain of the B737 was advised that air traffic control had been out of communications with a Cirrus for about an hour and half prior and requested that the B737 visual inspection the Cirrus to check the condition of the airplane. The Captain agreed to the ATC request. According to the pilots' statements, the Captain and First Officer did not brief the maneuver or contingencies before complying with the ATC request, and there was no briefing made to the flight attendants or passengers. The B737 did not cancel its IFR flight plan. As the B737 approached the Cirrus, contrary to the Southwest Airlines Flight Operations Manual (FOM), the flight crew turned the TCAS transponder from Traffic Advisory/Resolution Advisor (TA/RA) to TA ONLY in anticipation of receiving a resolution advisory due to proximity of the B737 to the Cirrus.
Central Florida TRACON directed the B737 to descend from 11,000 feet to 10,000 feet. The B737 Captain had a visual acquisition of the Cirrus as they were passing 10,500 feet and reported a visual acquisition of the Cirrus to Central Florida TRACON. The Central Florida TRACON controller then instructed the B737 to maintain 11,000, the same altitude as the Cirrus, slow to 190 knots and "navigate on your own as close as you can do safely" and provide

information on what was observed during the flyby. The B737 approached the Cirrus from below and on the left side of the Cirrus. The B737 Captain noticed the Cirrus turning left and after querying Orlando TRACON, was advised that the left turn was in response to Cirrus flight plan. The B737 paralleled the Cirrus' left turn. The B737 Captain reported to Central Florida TRACON that the Cirrus was flying straight and level with no apparent damage and that PM observed a black silhouette in the cockpit of the Cirrus but could not determine if it was male or female. There was no communication between the B737 and the Cirrus.
According to radar data provided by the FAA, the closest point of approach between the B737 and the Cirrus was 0.1 mile lateral and 100 feet vertical. Following the visual inspections of the Cirrus, Central Florida TRACON vectored the B737 to an uneventful landing at MCO.

Air Traffic Control

After departing MJD, the Cirrus pilot communicated with Houston ARTCC on frequency 127.65 and was issued an IFR clearance to ISM. Houston ARTCC transferred communication to Pensacola (PNS) TRACON on frequency 118.60. PNS then transferred communication with the Cirrus to an adjacent PNS sector frequency 119.0. PNS transferred the Cirrus to Eglin TRACON on frequency 132.1. After querying the Cirrus pilot about his route of flight and approaching the boundary of Eglin's airspace, Eglin TRACON directed the pilot to contact Tyndall TRACON on frequency 125.2 at 16:41. The Cirrus pilot did not respond. For the next ten minutes, while the Cirrus was still in Eglin's airspace, the Eglin controller made 12 attempts to contact the Cirrus pilot on frequency 132.1 and VHF Guard frequency, 121.5, without success. The Cirrus exited Eglin's airspace and transited Tyndall's airspace on its filed course and altitude without communicating with ATC. Tyndall TRACON made several attempts to establish communications prior to transferring control to Jacksonville ARTCC sector R28, 20 miles east of the Jacksonville ARTCC/Tyndall TRACON airspace boundary at 15:01. At 15:04 the Jacksonville ARTCC R28 controller accepted the handoff from Tyndall approach and at 15:08 the Cirrus entered Jacksonville ARTCC airspace. At 15:09 the Jacksonville ARTCC watch manager in charge (WMIC) notified the Domestic Events Network (DEN) that the Cirrus was not communicating and was considered a no radio (NORDO) flight.
The Domestic Event Network (DEN) was a 24 hour a day, 7 day a week FAA sponsored recorded telephonic conference call network that includes all of the U.S. air route traffic control centers (ARTCC) and other Governmental agencies. The purpose of the DEN is to provide timely notification to the appropriate authority that there is an emerging air-related problem or incident. Jacksonville ARTCC was the only facility to coordinate with the DEN during this NORDO incident.
The Cirrus transited through Jacksonville ARTCC airspace sectors R28, R14 and R15 before being transferred to Central Florida TRACON. During the 40 minutes in Jacksonville ARTCC airspace, ATC attempted to contact the Cirrus on frequency 132.1 and VHF Guard 121.5 on multiple occasions. Additional efforts to establish communications with the Cirrus included air to air relays by airborne aircraft and a request to St. Petersburg flight service station to broadcast instructions to Cirrus pilot to contact Jacksonville ARTCC on frequency 133.32 via the Ocala VOR.
As the Cirrus was approaching the airspace boundary between Jacksonville ARTCC and

Central Florida TRACON, Jacksonville ARTCC coordinated with the Central Florida TRACON Operations Manager (OM) that a NORDO airplane was inbound. The OM elected to solicit an aircraft of opportunity to perform a visual inspection of the Cirrus to attempt to ascertain the status of the crew aboard. After Jacksonville ARTCC transferred control of the Cirrus to Central Florida TRACON, the OM directed the Central Florida TRACON arrival controller to ask SWA821, a B 737, if they could perform a fly-by of the NORDO aircraft for a visual inspection. The pilot of the B737 agreed to the request and was provided radar vectors to establish visual contact with the Cirrus, which was approximately 20 miles ahead of the B737 at the time. The controllers at Central Florida TRACON considered the Cirrus to be an emergency due to the length of time the airplane was NORDO and considered the Cirrus a potential threat to the Disney World complex and the NASA space center, where a space shuttle was on a launch pad at the Kennedy Space Center. The controllers cited FAA Order 7110.65, paragraph 2-1-1, ATC Service that tasks ATC in part, to provide support for National Security and Homeland Defense. Accordingly, the OM considered the visual inspection a prudent action and had conducted similar actions in the past. The OM set up a terminal control workstation (TCW) and identified a frequency for the operation and directed the front line manager (FLM) to coordinate and control the visual inspection. As the FLM was transferring from a wireless to a wired headset, the OM descended the B737 to 11,000 feet MSL, the same altitude as the Cirrus, provided a relative position of the Cirrus to the B737 at one o'clock position and eight miles, vectored the B737 15 degrees right and directed a speed reduction to 190 knots from 330 knots to match the speed of the Cirrus. The FLM took control of the B737 from the OM and vectored the B737 toward the Cirrus until the pilot of the B737 visually acquired the Cirrus. The FLM initially directed the B737 to maintain 10,000 feet MSL, an altitude 1000 feet below the Cirrus, and stated that the 10,000 foot altitude assignment was to prevent a loss of minimum required separation. Eight seconds later the B737 reported the Cirrus in sight. The B737 was at 10,800 feet MSL and the Cirrus was at 11,000 and the two aircraft were approximately five miles apart. The FLM then directed the B737 to maintain 11,000 feet MSL and to navigate on your own, and as close as safety allowed and to report to ATC what the crew of the B737 observed regarding the Cirrus. The FLM advised the B737 that the pilot could resume normal speed. The B737 climbed back up to 11,000 feet MSL and approached the Cirrus from behind and the left side of the Cirrus. As the B737 approached the Cirrus, the closure rate was between 60 and 94 knots. As the Cirrus began a slight left turn, the B737 asked the FLM if the aircraft was turning. The FLM explained that the left turn by the Cirrus may have been on an autopilot flight plan to intercept airway V537. At 1704, the B737 commenced a slight left turn parallel with the Cirrus and passed with 100 feet vertically and 0.1 mile laterally. According to the FLM, the B737 PM reported two people in the cockpit but no movement by the occupants was noted. After the B737 made the report on the occupants of the Cirrus, the FLM vectored the B737 away from the Cirrus and descended the B737 for an uneventful recovery at MCO. At 1703, the Cirrus reestablished communications with Jacksonville ARTCC on frequency 135.75 and was directed to contact Central Florida TRACON on frequency 125.55. Central Florida TRACON provided services to the Cirrus to an uneventful landing at ISM.

Information

Certificate:	Private	**Age:**	55,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 9, 2009
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	542 hours (Total, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Information

Certificate:		**Age:**	
Airplane Rating(s):		**Seat Occupied:**	
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N1487C
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Unknown	**Serial Number:**	0571
Landing Gear Type:	Unknown	**Seats:**	4
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	CONT MOTOR
ELT:		**Engine Model/Series:**	IO-550 SERIES
Registered Owner:	ROBERT E TOWNSEND LLC	**Rated Power:**	300 Horsepower
Operator:	ROBERT E TOWNSEND LLC	**Operating Certificate(s) Held:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MCO	**Distance from Accident Site:**	
Observation Time:	16:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 5500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	33°C / 13°C
Precipitation and Obscuration:			
Departure Point:	Picayune, MS (MJD)	**Type of Flight Plan Filed:**	IFR
Destination:	Kissimee, FL (ISM)	**Type of Clearance:**	IFR
Departure Time:	14:30 Local	**Type of Airspace:**	Class B

Airport Information

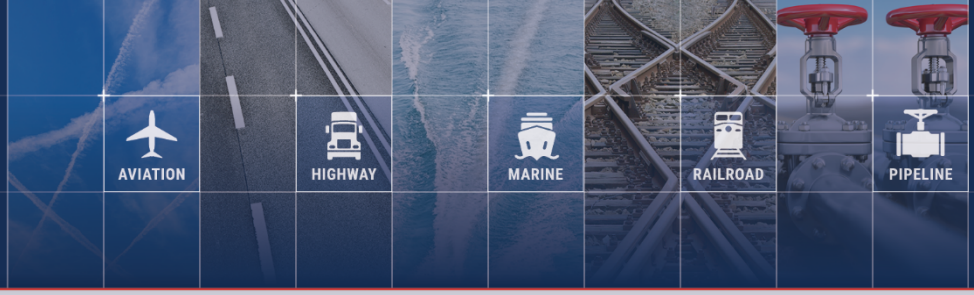
Airport:	Orlando, FL KMCO	**Runway Surface Type:**	
Airport Elevation:	96 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	None
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	28.419742,-81.3003(est)

Administrative Information

Investigator In Charge (IIC):	Bartlett, Daniel
Additional Participating Persons:	Karen Seals-Gridley; Federal Aviation Administration; Washington, DC Gary Miller; Federal Aviation Adminstration; Washington, DC William Shea; Federal Aviation Administration; Dallas, TX Boyd Martin; Federal Avaiton Adminstration; Orlando, FL
Original Publish Date:	October 17, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=78712



Aviation Investigation Final Report

Location:	Orlando, Florida	**Incident Number:**	OPS11IA428
Date & Time:	March 27, 2011, 17:02 Local	**Registration:**	N293WN
Aircraft:	Boeing 737-7H4	**Aircraft Damage:**	None
Defining Event:	Near midair/TCAS alert/loss of separation	**Injuries:**	143 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

A loss of separation occurred between a Boeing B737-700 and a Cirrus SR-22. The minimum required instrument flight rules separation between these two aircraft was 1000 feet vertical or 3 nautical miles lateral. The Cirrus had been out of radio contact with air traffic controllers for approximately 90 minutes. Air traffic controllers at the approach control facility requested that the flight crew of the B737 fly as close as safety permits to the Cirrus to look for any visual indications of problems or difficulties. The flight crew of the B737 agreed to the request. The closest point of approach between the two aircraft, both assigned operating altitudes of 11,000 feet mean sea level, was 100 feet vertical and 0.1 mile lateral.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The air traffic controllers' application of inappropriate separation between the B737 and the Cirrus and their inappropriate use of airborne civilian aircraft for observation of other airborne aircraft. Contributing to the incident was the crew of the B737's execution of a clearance that resulted in operation near other aircraft.

Findings

Personnel issues	Decision making/judgment - ATC personnel
Personnel issues	Decision making/judgment - Flight crew

Factual Information

History of Flight

Enroute	Near midair/TCAS alert/loss of separation

A loss of separation occurred between Southwest Airlines (SWA) Flight #821, a Boeing 737-700 and N1487C, a Cirrus SR-22 in the vicinity of Orlando, Florida. The closest point of approach between the two aircraft, both assigned operating altitudes of 11,000 feet mean sea level (MSL), was 100 feet vertical and 0.1 mile lateral. The minimum required IFR separation between these two aircraft was 1000 feet vertical or 3 nautical miles lateral.

N1487C, a Cirrus SR-22

The Cirrus was on a 14 CFR Part 91 IFR planned flight from Picayune Municipal Airport (MJD), Picayune, Mississippi to Kissimmee Gateway Airport (ISM), Orlando, Florida with a pilot and one passenger on board. After departing from MJD, the pilot of the Cirrus obtained an airborne IFR clearance to ISM from Houston Air Route Traffic Control Center (ARTCC) on frequency 127.65 and was assigned a mode 3 transponder code of 7427 and an en route altitude of 11,000 feet MSL. As the Cirrus pilot proceeded toward his destination of ISM, he was directed to contact Pensacola (PNS) Approach on frequency 118.60, and then on frequency 119.0 and was routed via a shortcut over the Gulf of Mexico to the Cross City (CTY) VOR in Florida. The Cirrus pilot stated that PNS then transferred him to Eglin (VPS) Approach on frequency 132.1. The VPS controller acknowledged the Cirrus pilot and inquired about his route. The Cirrus pilot told the VPS controller that the previous controller had given him airborne routing direct to CTY, then direct ISM. As the Cirrus pilot continued en route to ISM he continued to hear pilots talk on the frequency and noticed that the frequency was getting "busier". About 60 to 100 nautical miles from ISM, even though he continued to hear radio communications on frequency 132.1, the pilot stated that he started to get concerned because no one had called him and he needed to start his descent. The Cirrus pilot called VPS approach several times with no contact, so he went back to his previous frequency of 119.0 for PNS but was not able to neither establish communications nor receive any radio transmissions. The Cirrus pilot then attempted to contact Jacksonville ARTCC without success.
The Cirrus pilot stated that he did not attempt to establish contact on the VHF emergency frequency, 121.5, because he was busy trying to find a frequency for Jacksonville ARTCC. Referring to a low altitude navigation chart, the Cirrus pilot noted the frequency 127.55 for Jacksonville ARTCC, dialed it in, and as he was about to call Jacksonville ARTCC, the Skywatch on-board traffic alerting system began giving him "traffic" aural alerts. The Cirrus pilot noticed a large jet coming up close on the left side of his airplane at the same altitude. The Cirrus pilot stated the jet came up on his airplane from behind, and by the time the Cirrus pilot visually observed the jet, it was "banking to the left" from his 10 o'clock position. The Cirrus pilot stated

his airspeed was about 195 knots, and the jet did not pass him quickly. The Cirrus pilot not know what type of airplane the jet was or what airline it was, but "it was pretty close," happened very fast and the sight of the jet and nearly simultaneous aural traffic alerts from the Skywatch on-board traffic alerting system was startling.
As the event was unfolding, the Cirrus pilot established communications with Jacksonville ARTCC who in turn directed the pilot to contact Central Florida terminal radar approach control (TRACON) on frequency 125.55. Central Florida TRACON provided the Cirrus radar vectors to ISM where the Cirrus executed an uneventful landing.

SWA821, a B737-700

The B737 was on a scheduled 14 CFR Part 121 IFR planned flight from Phoenix Sky Harbor International Airport (PHX), Phoenix, Arizona to Orlando International Airport (MCO), Orlando, Florida with a crew of five, one jump seat observer occupying the aft jump seat, and 137 passengers.
The B737 departed PHX at 1338 EST, for a scheduled 3 hour and 55 minute flight to MCO. The crew was on the final day of a three day pairing, and was on their second flight of the day having flown to PHX from the Ontario International Airport (ONT), Ontario, California earlier that morning. The First Officer was the pilot flying (PF) and the Captain was the pilot monitoring (PM) for the PHX to MCO flight.
As the B737 approached MCO, while still under control of Jacksonville ARTCC, the ARTCC air traffic controller asked the pilot to go off frequency to attempt contact a Cirrus SR22 that air traffic control did not have radio communications with on frequency 132.1. The Captain of the B737, as PM, transferred the primary radios to the First Officer and put the frequency 132.1 into the number two radio. The B737 made multiple attempts to contact the Cirrus without success. As the B737 approached the airspace boundary between Jacksonville ARTCC and Central Florida TRACON, Jacksonville ARTCC directed the B737 to contact Central Florida TRACON and advised the pilot that the Central Florida TRACON controller had a request. After establishing communications with Central Florida TRACON, the Captain of the B737 was advised that air traffic control had been out of communications with a Cirrus for about an hour and half prior and requested that the B737 visual inspection the Cirrus to check the condition of the airplane. The Captain agreed to the ATC request. According to the pilots' statements, the Captain and First Officer did not brief the maneuver or contingencies before complying with the ATC request, and there was no briefing made to the flight attendants or passengers. The B737 did not cancel its IFR flight plan. As the B737 approached the Cirrus, contrary to the Southwest Airlines Flight Operations Manual (FOM), the flight crew turned the TCAS transponder from Traffic Advisory/Resolution Advisor (TA/RA) to TA ONLY in anticipation of receiving a resolution advisory due to proximity of the B737 to the Cirrus.
Central Florida TRACON directed the B737 to descend from 11,000 feet to 10,000 feet. The B737 Captain had a visual acquisition of the Cirrus as they were passing 10,500 feet and reported a visual acquisition of the Cirrus to Central Florida TRACON. The Central Florida TRACON controller then instructed the B737 to maintain 11,000, the same altitude as the Cirrus, slow to 190 knots and "navigate on your own as close as you can do safely" and provide information on what was observed during the flyby. The B737 approached the Cirrus from

below and on the left side of the Cirrus. The B737 Captain noticed the Cirrus turning left and after querying Orlando TRACON, was advised that the left turn was in response to Cirrus flight plan. The B737 paralleled the Cirrus' left turn. The B737 Captain reported to Central Florida TRACON that the Cirrus was flying straight and level with no apparent damage and that PM observed a black silhouette in the cockpit of the Cirrus but could not determine if it was male or female. There was no communication between the B737 and the Cirrus.
According to radar data provided by the FAA, the closest point of approach between the B737 and the Cirrus was 0.1 mile lateral and 100 feet vertical. Following the visual inspections of the Cirrus, Central Florida TRACON vectored the B737 to an uneventful landing at MCO.

Air Traffic Control

After departing MJD, the Cirrus pilot communicated with Houston ARTCC on frequency 127.65 and was issued an IFR clearance to ISM. Houston ARTCC transferred communication to Pensacola (PNS) TRACON on frequency 118.60. PNS then transferred communication with the Cirrus to an adjacent PNS sector frequency 119.0. PNS transferred the Cirrus to Eglin TRACON on frequency 132.1. After querying the Cirrus pilot about his route of flight and approaching the boundary of Eglin's airspace, Eglin TRACON directed the pilot to contact Tyndall TRACON on frequency 125.2 at 16:41. The Cirrus pilot did not respond. For the next ten minutes, while the Cirrus was still in Eglin's airspace, the Eglin controller made 12 attempts to contact the Cirrus pilot on frequency 132.1 and VHF Guard frequency, 121.5, without success. The Cirrus exited Eglin's airspace and transited Tyndall's airspace on its filed course and altitude without communicating with ATC. Tyndall TRACON made several attempts to establish communications prior to transferring control to Jacksonville ARTCC sector R28, 20 miles east of the Jacksonville ARTCC/Tyndall TRACON airspace boundary at 15:01. At 15:04 the Jacksonville ARTCC R28 controller accepted the handoff from Tyndall approach and at 15:08 the Cirrus entered Jacksonville ARTCC airspace. At 15:09 the Jacksonville ARTCC watch manager in charge (WMIC) notified the Domestic Events Network (DEN) that the Cirrus was not communicating and was considered a no radio (NORDO) flight.
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The Cirrus transited through Jacksonville ARTCC airspace sectors R28, R14 and R15 before being transferred to Central Florida TRACON. During the 40 minutes in Jacksonville ARTCC airspace, ATC attempted to contact the Cirrus on frequency 132.1 and VHF Guard 121.5 on multiple occasions. Additional efforts to establish communications with the Cirrus included air to air relays by airborne aircraft and a request to St. Petersburg flight service station to broadcast instructions to Cirrus pilot to contact Jacksonville ARTCC on frequency 133.32 via the Ocala VOR.
As the Cirrus was approaching the airspace boundary between Jacksonville ARTCC and Central Florida TRACON, Jacksonville ARTCC coordinated with the Central Florida TRACON

Operations Manager (OM) that a NORDO airplane was inbound. The OM elected to solicit an aircraft of opportunity to perform a visual inspection of the Cirrus to attempt to ascertain the status of the crew aboard. After Jacksonville ARTCC transferred control of the Cirrus to Central Florida TRACON, the OM directed the Central Florida TRACON arrival controller to ask SWA821, a B 737, if they could perform a fly-by of the NORDO aircraft for a visual inspection. The pilot of the B737 agreed to the request and was provided radar vectors to establish visual contact with the Cirrus, which was approximately 20 miles ahead of the B737 at the time. The controllers at Central Florida TRACON considered the Cirrus to be an emergency due to the length of time the airplane was NORDO and considered the Cirrus a potential threat to the Disney World complex and the NASA space center, where a space shuttle was on a launch pad at the Kennedy Space Center. The controllers cited FAA Order 7110.65, paragraph 2-1-1, ATC Service that tasks ATC in part, to provide support for National Security and Homeland Defense. Accordingly, the OM considered the visual inspection a prudent action and had conducted similar actions in the past. The OM set up a terminal control workstation (TCW) and identified a frequency for the operation and directed the front line manager (FLM) to coordinate and control the visual inspection. As the FLM was transferring from a wireless to a wired headset, the OM descended the B737 to 11,000 feet MSL, the same altitude as the Cirrus, provided a relative position of the Cirrus to the B737 at one o'clock position and eight miles, vectored the B737 15 degrees right and directed a speed reduction to 190 knots from 330 knots to match the speed of the Cirrus. The FLM took control of the B737 from the OM and vectored the B737 toward the Cirrus until the pilot of the B737 visually acquired the Cirrus. The FLM initially directed the B737 to maintain 10,000 feet MSL, an altitude 1000 feet below the Cirrus, and stated that the 10,000 foot altitude assignment was to prevent a loss of minimum required separation. Eight seconds later the B737 reported the Cirrus in sight. The B737 was at 10,800 feet MSL and the Cirrus was at 11,000 and the two aircraft were approximately five miles apart. The FLM then directed the B737 to maintain 11,000 feet MSL and to navigate on your own, and as close as safety allowed and to report to ATC what the crew of the B737 observed regarding the Cirrus. The FLM advised the B737 that the pilot could resume normal speed. The B737 climbed back up to 11,000 feet MSL and approached the Cirrus from behind and the left side of the Cirrus. As the B737 approached the Cirrus, the closure rate was between 60 and 94 knots. As the Cirrus began a slight left turn, the B737 asked the FLM if the aircraft was turning. The FLM explained that the left turn by the Cirrus may have been on an autopilot flight plan to intercept airway V537. At 1704, the B737 commenced a slight left turn parallel with the Cirrus and passed with 100 feet vertically and 0.1 mile laterally. According to the FLM, the B737 PM reported two people in the cockpit but no movement by the occupants was noted. After the B737 made the report on the occupants of the Cirrus, the FLM vectored the B737 away from the Cirrus and descended the B737 for an uneventful recovery at MCO. At 1703, the Cirrus reestablished communications with Jacksonville ARTCC on frequency 135.75 and was directed to contact Central Florida TRACON on frequency 125.55. Central Florida TRACON provided services to the Cirrus to an uneventful landing at ISM.

Information

Certificate:	Airline transport; Private	**Age:**	52
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 2, 2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 14, 2010
Flight Time:	(Estimated) 17000 hours (Total, all aircraft), 15000 hours (Total, this make and model), 10000 hours (Pilot In Command, all aircraft), 132 hours (Last 90 days, all aircraft), 34 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Airline transport; Commercial	**Age:**	40,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Unknown	**Last FAA Medical Exam:**	February 21, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 8, 2011
Flight Time:	(Estimated) 7000 hours (Total, all aircraft), 3000 hours (Pilot In Command, all aircraft), 77 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N293WN
Model/Series:	737-7H4	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:		**Serial Number:**	36612
Landing Gear Type:	Retractable -	**Seats:**	140
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:		**Engine Manufacturer:**	CFM INTL
ELT:		**Engine Model/Series:**	CFM56-7B24
Registered Owner:	SOUTHWEST AIRLINES CO	**Rated Power:**	24200 Lbs thrust
Operator:	SOUTHWEST AIRLINES CO	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:		**Operator Designator Code:**	SWAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MCO	**Distance from Accident Site:**	
Observation Time:	16:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 5500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	33°C / 13°C
Precipitation and Obscuration:			
Departure Point:	Phoenix, AZ (PHX)	**Type of Flight Plan Filed:**	IFR
Destination:	Orlando, FL (MCO)	**Type of Clearance:**	IFR
Departure Time:	13:38 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	Orlando, FL KMCO	**Runway Surface Type:**	
Airport Elevation:	96 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	6 None	**Aircraft Damage:**	None
Passenger Injuries:	137 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	143 None	**Latitude, Longitude:**	28.419742,-81.3003(est)

Administrative Information

Investigator In Charge (IIC):	Bartlett, Daniel
Additional Participating Persons:	Karen Seals-Gridley; Federal Aviation Administration; Washington, DC Gary Miller; Federal Aviation Adminstration; Washington, DC William Shea; Federal Aviation Administration; Dallas, TX Boyd Martin; Federal Avaiton Adminstration; Orlando, FL
Original Publish Date:	October 17, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=78712