National Transportation Safety Board

Accident Case Studies

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Washington, DC

Incident Summary

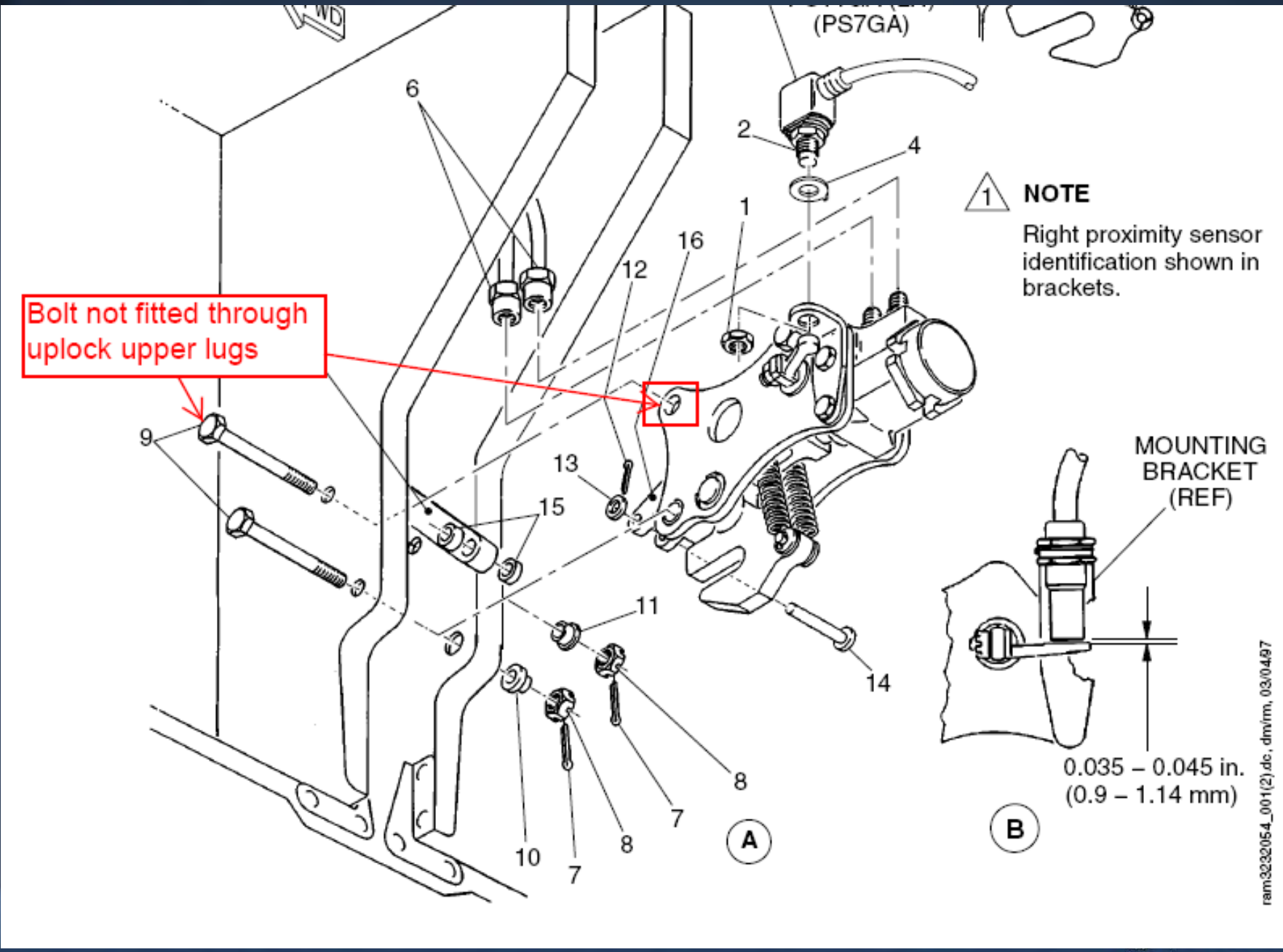
- September 2011
- Bombardier CRJ-200
- Baton Rouge, LA
- Landed with left main landing gear retracted

Incident

- No injuries
- No substantial damage

So why investigate?

- December 2008
- Bombardier CRJ-200
- Philadelphia, PA
- Landed with left main landing gear retracted


(PS7GA)
6
2
4
1
16
12
Bolt not fitted through uplock upper lugs
9
13
15
11
14
8
7
8
7
10
A
1 NOTE
Right proximity sensor identification shown in brackets.
MOUNTING BRACKET (REF)
0.035 – 0.045 in.
(0.9 – 1.14 mm)
B
ram3232054_001(2).dc, dm/rm, 03/04/97

Safety payback

- Airline - “Alert Bulletin”
- Manufacture - “Service Letter”

Installation of Upper/Lower Bolts on MLG Uplock Assembly

ATLANTIC SOUTHEAST AIRLINES | Issue Date: 09/15/11 | Exp. Date: 03/15/12 | ALERT BULLETIN

Applicability	**All Atlantic Southeast Maintenance Personnel**
Purpose	To inform Maintenance Personnel of the possibility of installing the bolts incorrectly in the main landing gear (MLG) uplock.
Synopsis	It has been discovered that the upper bolt of the MLG uplock can be installed improperly.
	Additional Information
	Bombardier released AOM 1307 to notify operators of this event. See the below figure.

#1 - Bolt installed through the Airframe Structure and MLG Uplock.

#2 - Bolt not installed through the MLG Uplock, but Airframe Structure only.

Effective Date	Immediately
Action Required	When installing a MLG uplock assembly, ensure that you follow the AMM TASK 32-32-05-400-801 and/or Bombardier Task Card precisely.
Contact	Contact Technical Support with any questions regarding this bulletin.

11-01 MAINTENANCE 1 of 1

BOMBARDIER

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Mirabel, Quebec J7N 3C6
thd.crj@aero.bombardier.com
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SERVICE LETTER

In-Service Engineering

CRJ100/200/440-SL-32-046

ATA: 3230

DATE: 11 Oct '11

SUBJECT: Main Landing Gear Up-lock installation - “Maintenance Best Practice”

MODEL: CL-600-2B19 (CRJ200)

APPLICABILITY: All CRJ100/200/440/850 aircraft

PURPOSE:

To inform Operators of a recent event that resulted in an aircraft landing with the left Main Landing Gear (MLG) in the retracted position following replacement of the associated up-lock assembly and to recommend steps that can be taken to reduce the potential of reoccurrence. Reference the All Operator Memo (AOM) 1307 for details of the event.

DISCUSSION:

The event flight was the first after maintenance had been carried out on the landing gear up-lock system. Preliminary investigation results revealed that the upper attachment bolt for the left up-lock assembly, which is designed to be attached to both the up-lock assembly and structure, was attached to the structure only, ref fig. 1. The left up-lock assembly had been replaced prior to the flight however AMM task 32-32-05-400-801 was not followed, and as part of this procedure the visual inspection as per Step 8 to make sure the attaching holes of the MLG up-lock assembly align with holes in the adjacent structure and the additional safeguard as per step 16, which instructs to manually move the up-lock up and down had also not been performed by either the Technician or the Inspector.

This was the second occurrence of this type of event with two different Operators and Fig 2 illustrates the proper and improper installation as found on the latest incident aircraft.

CRJ100/200/440 & Challenger 850 – RJ-SL-32-046 Page 1 of 3

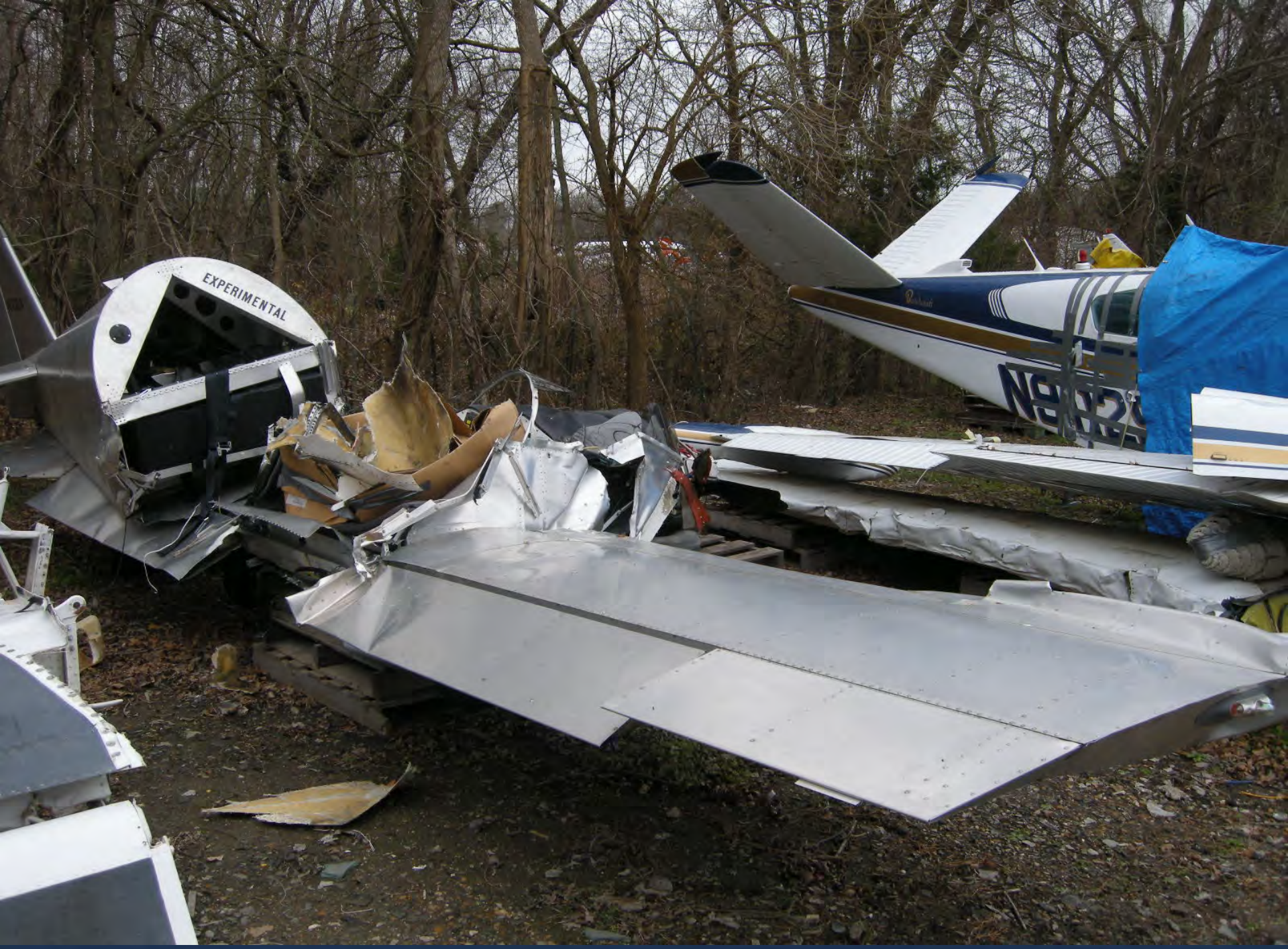
NTSB

Probable Cause

- The improperly installed upper attachment bolt in the left main landing gear uplock assembly, which led to the failure of the left main landing gear to extend before landing. Contributing to the accident was maintenance personnel's lack of training on the installation and inspection of the uplock assembly

Accident Summary

- Nov 2009
- Burnet, TX
- Sonex
- 1 fatal
- Loss of engine power
- Crashed during forced landing


EXPERIMENTAL

TACOMA
TRD
OFF ROAD

Probable Cause

- The pilot’s failure to maintain aircraft control, resulting in an aerodynamic stall. Contributing to the accident was the loss of engine power due to a clogged fuel screen that resulted in fuel starvation caused by the builder's inappropriate use of a fuel tank sealant in a plastic tank

Accident Summary

- March, 2006
- Patterson, LA
- Bell 206
- 2 fatal, 2 minor

Accident Summary

- Takeoff appeared normal and they departed south from the airport at an approximate altitude of 500-700 feet above ground level.
- The helicopter "dropped" several times. Each time the helicopter regained the lost altitude; however, it appeared to do so slowly as if "he, [the pilot], didn't have the power to keep it up."

Accident Summary

- The pilot then made a descending right turn, of approximately 90 degrees, to an open field. As they approached the ground, the pilot brought the nose of the helicopter up as if he was attempting to "slow down." The helicopter impacted the ground on the front left side and came to an abrupt stop in an upright position.

Digital Photo 5, View of wreckage looking south.

Digital Photo 1, Aerial View

Digital Photo 6, View of engine

Digital Photo 7, View of Fuel nozzle "B" nut.

Accident Summary

- Log entry revealed that a 50-hour fuel nozzle inspection had been performed the night before
- The mechanic reinstalled the fuel nozzle into the engine combustion chamber, “torqued it and lockwired it”
- Engine run-up was not performed
- The inspector stated that he performed a visual inspection of the fuel nozzle installation

Probable Cause

- The improper installation of an engine fuel line by maintenance personnel, which resulted in a loss of engine power during cruise flight. Factors associated with the accident are a tailwind, and the lack of a suitable site for a forced landing

Accident Summary

- July, 2006
- Petal, MS
- Cessna 172
- fatal
- Impacted trees on takeoff

Probable Cause

- The pilot's improper use of flaps, which resulted in an impact with trees during takeoff-initial climb

Accident Summary

- Aug, 2004
- Port Angeles, WA
- Cessna 182
- VFR flight
- Dark night conditions
- Rain, clouds and fog
- 1 fatal 2 minor

Probable Cause

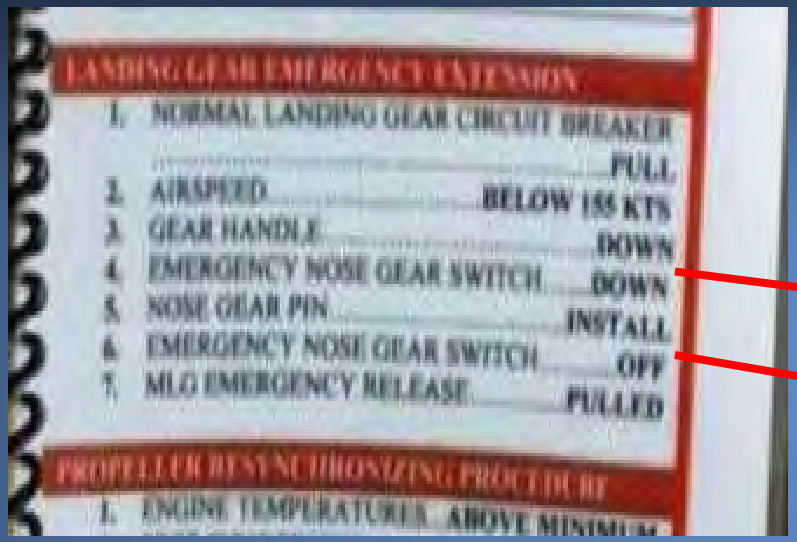
- The pilot's VFR flight into IMC and his failure to maintain clearance from trees. Trees, mountainous terrain, dark night conditions, clouds and VFR flight into IMC were factors

Accident Summary

- June 2010
- Broomfield, CO
- P2V-5 air tanker
- Drop retardant drop on Fire.
- Following retardant drop, crew noticed flaps did not retract

Accident Summary

- Hydraulic systems had lost fluid and pressure
- Pilot declared an emergency and returned to land


LANDING GEAR EMERGENCY EXTENSION
1. NORMAL LANDING GEAR CIRCUIT BREAKER
PULL
2. AIRSPEED
BELOW 155 KTS
3. GEAR HANDLE
DOWN
4. EMERGENCY NOSE GEAR SWITCH
DOWN
5. NOSE GEAR PIN
INSTALL
6. EMERGENCY NOSE GEAR SWITCH
OFF
7. MLG EMERGENCY RELEASE
PULLED


BY
PASS
NOSE
DOWN

NTSB

10154

AIRPORT DIAGRAM

DENVER/ROCKY MOUNTAIN METROPOLITAN (BJC)
AL-5612 (FAA)
DENVER, COLORADO

SW-1, 03 JUN 2010 to 01 JUL 2010

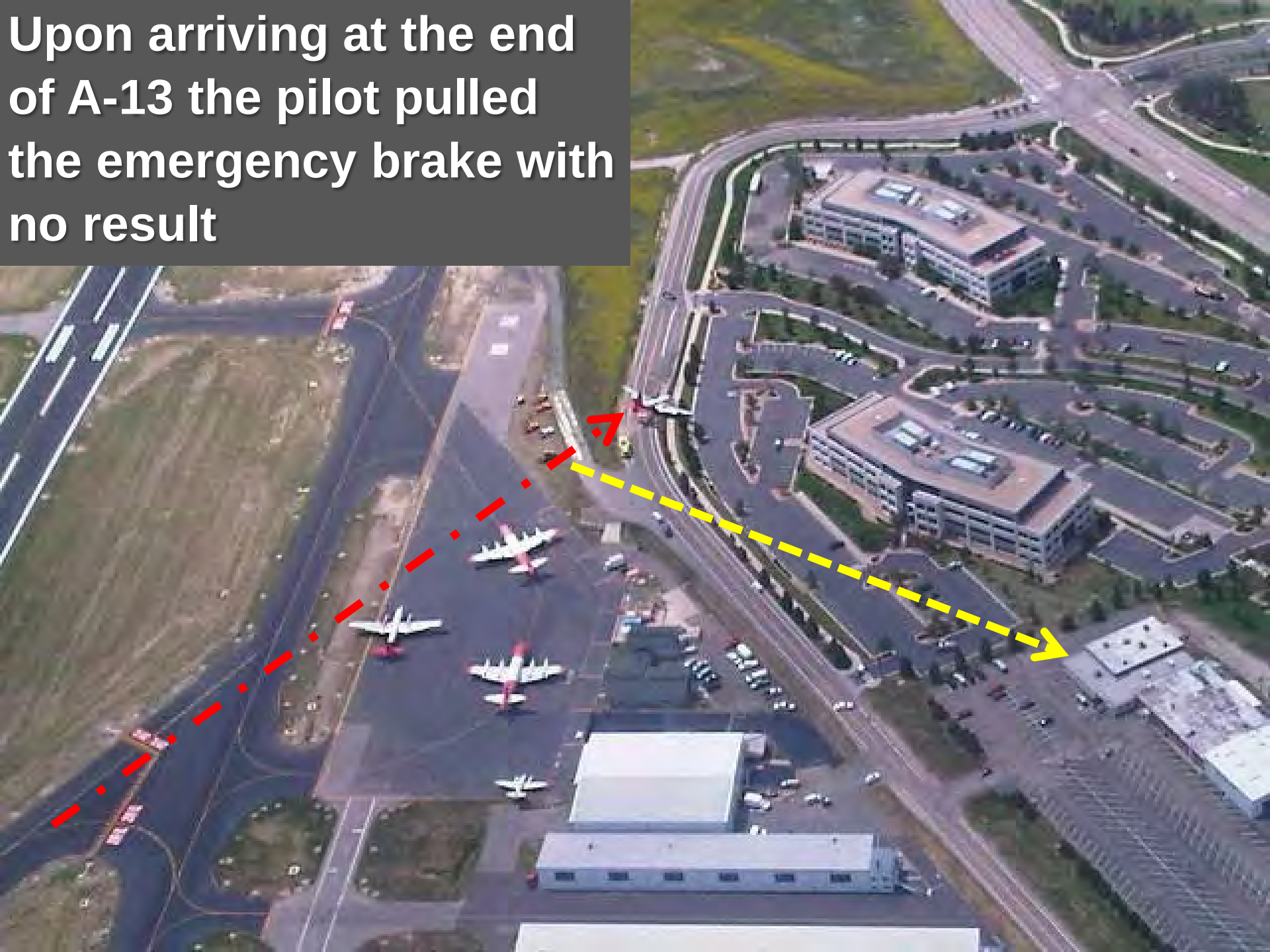
SW-1, 03 JUN 2010 to 01 JUL 2010

AIRPORT DIAGRAM

10154

DENVER, COLORADO
DENVER/ROCKY MOUNTAIN METROPOLITAN (BJC)

Pilot used accumulator brake pressure to slow and turn off the Runway.


Upon arriving at the end of A-13 the pilot pulled the emergency brake with no result

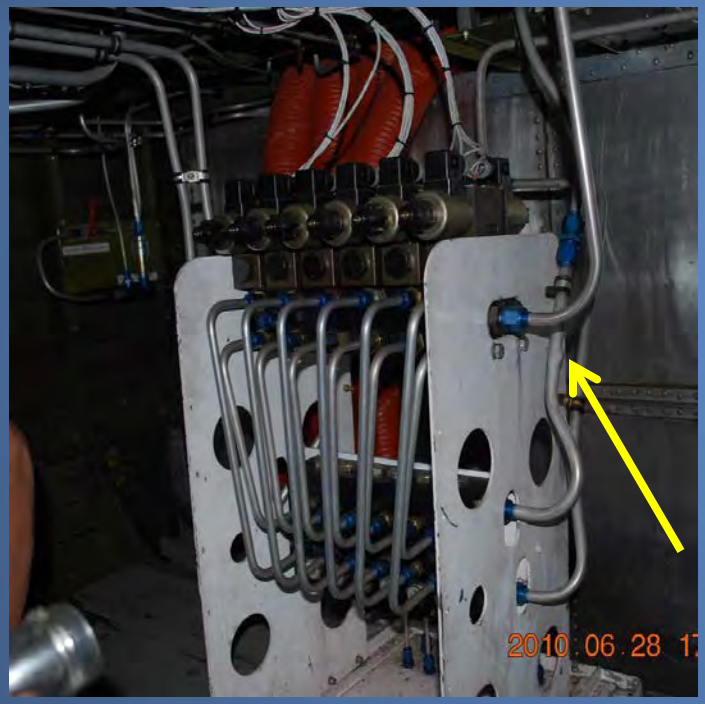
- Checklist was for different model of airplane

NTSB

Findings

- Flight Manual – "Placing the nose gear emergency extension switch in "bypass" will result in loss of hydraulics to the emergency brakes"
- Emergency landing gear selector was placed in "bypass", resulting in loss of pressure to the emergency brakes
- Company policy – Stay on runway until stopped

Loss of Hydraulic Pressure



Probable Cause

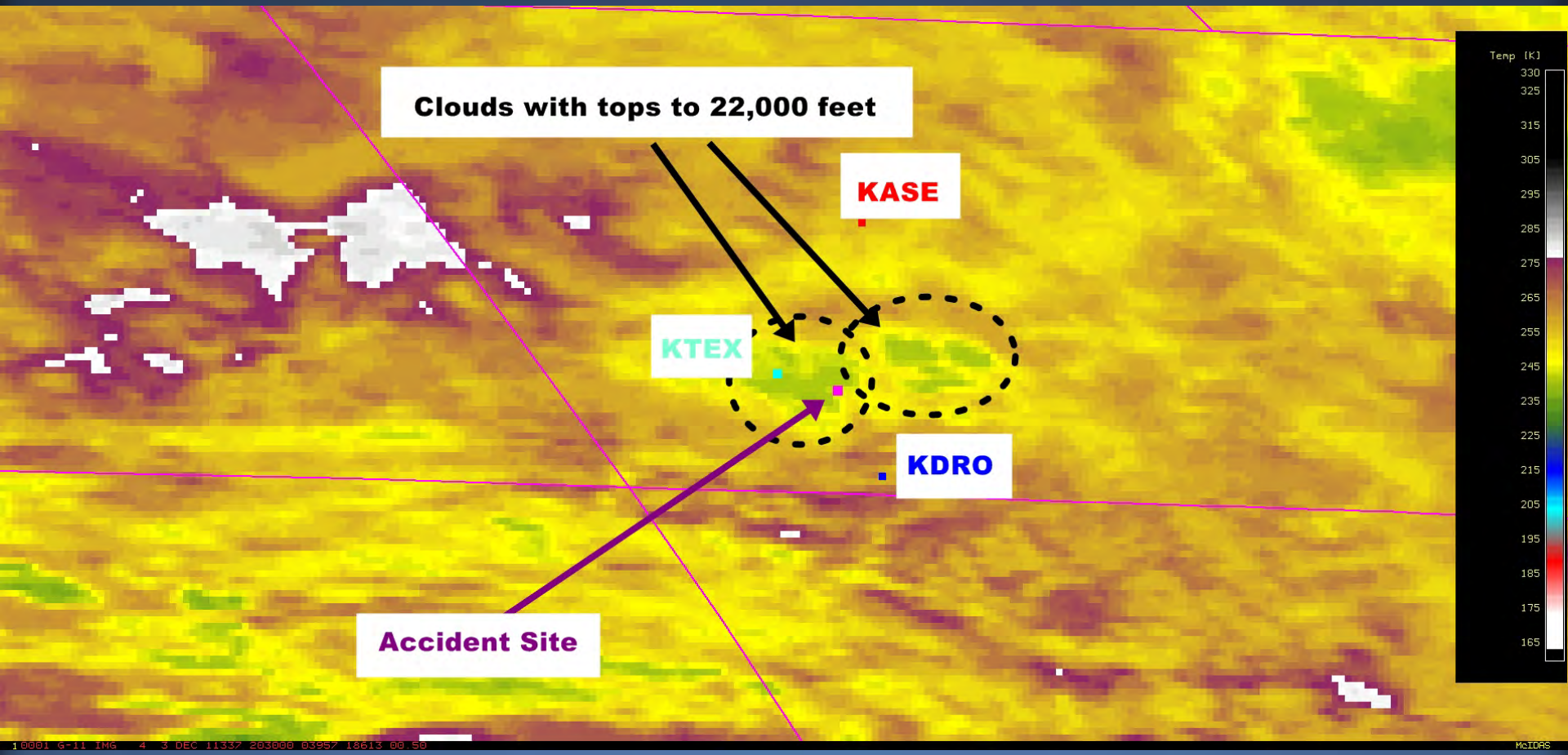
- The pilot's failure to follow published emergency procedures by taxiing to the parking ramp with a known hydraulic system failure. Contributing to the accident was the co-pilot's improper selection of the bypass position on the emergency nose gear extension system, which shut off emergency hydraulic system pressure to the brakes, and a ruptured hydraulic line, which resulted in a total loss of the main hydraulic system pressure.

Accident Summary

- Dec 3, 2011
- Silverton, CO
- Socata TB21
- 4 fatal

Accident Summary

- Pilot contacted ATC while at 20,000 feet requested visual flight rules (VFR) flight following
- Reported that he could not descend below his altitude and maintain VFR.
- Moments later, the airplane disappeared from radar and contact with the pilot was lost


Clouds with tops to 22,000 feet
KASE
KTEX
KDRO
Accident Site
Temp [K]
330
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285
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265
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245
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225
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205
195
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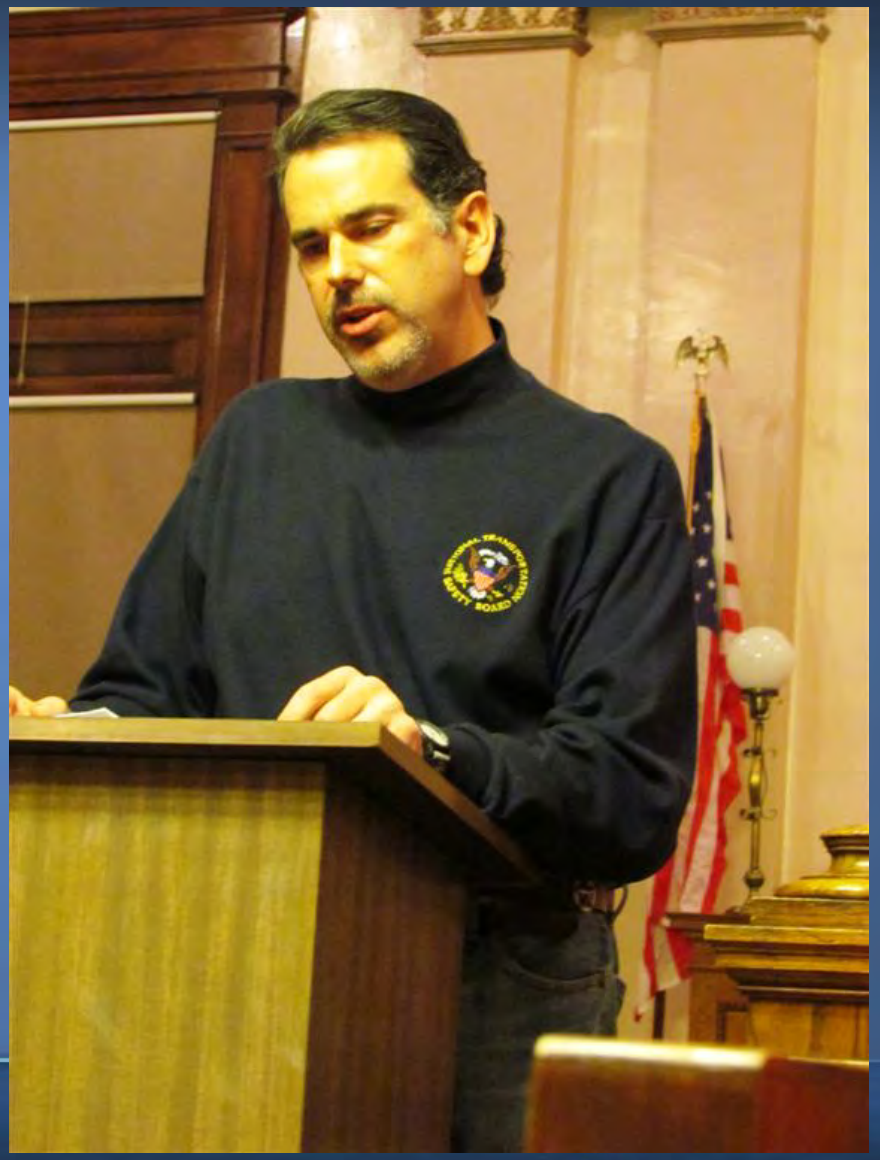
165
1 0001 G-11 IMG 4 3 DEC 11337 203000 03957 18613 00.50
McIDAS

NTSB


Marginal Creek Crossing Andrade
Creek Crossing
Part Of Fuselage
art Of Fuselage And Wing
Frank #1
Part Of Fuselage
Luggage
Seat
Fuselag
Orange Luggage
Frank #2
W107.672°
Wing

Media Briefing

- War Story



Probable Cause

The non-instrument-rated pilot's decision to embark on a flight through forecasted instrument meteorological conditions (IMC), and his subsequent flight into IMC, which resulted in the pilot's spatial disorientation and subsequent maneuvering of the airplane in a manner that exceeded the airplane's structural limits

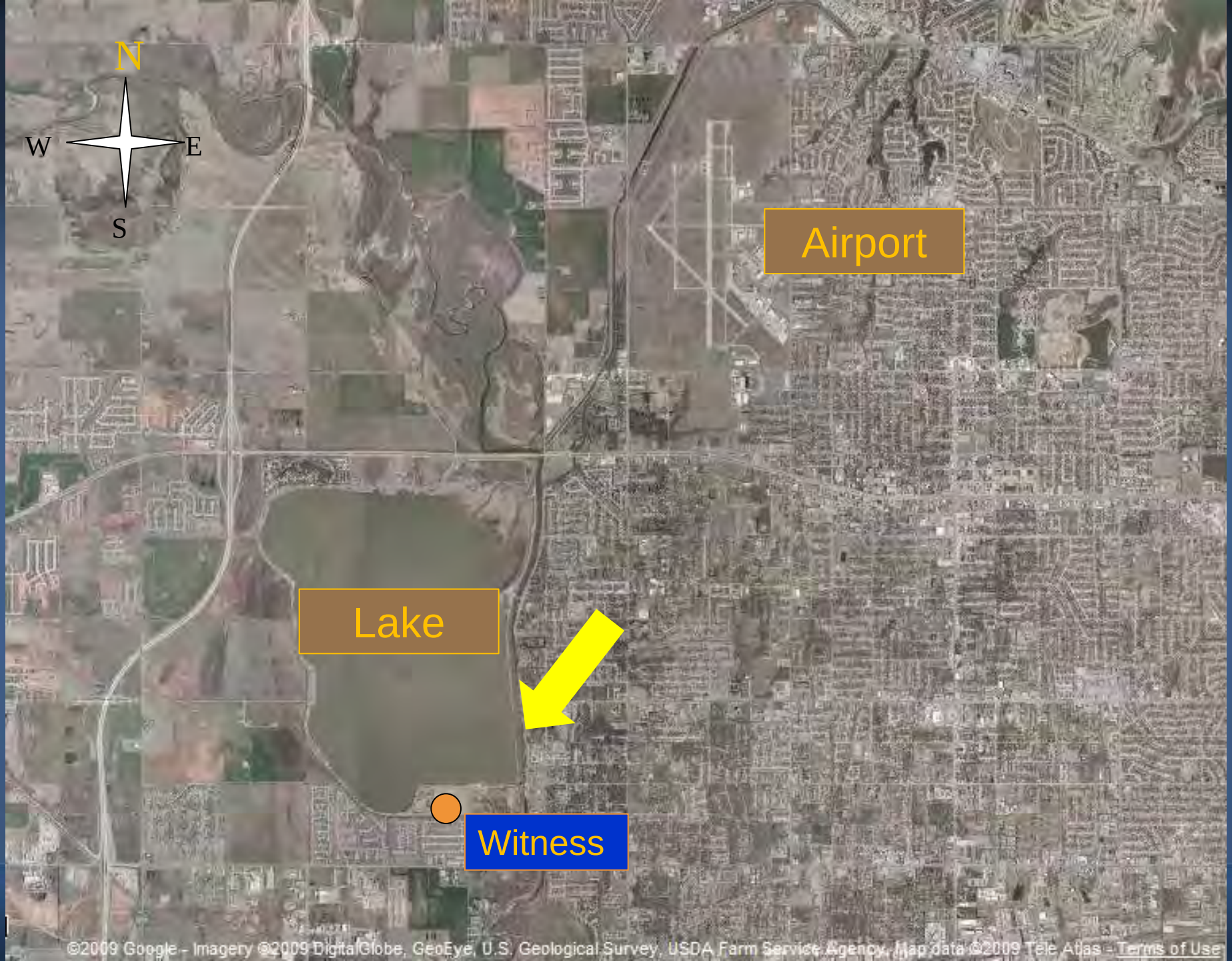
Accident Summary

- March 4, 2008
- Oklahoma City, OK
- Cessna 500
- 5 fatal

NTSB

Flight Sequence

- Cleared for takeoff about 1512
- Crew reported 2,000 for 3,000 feet
- Controller acknowledged, provided further clearance
- No response from flight crew
- Crash reported about 1515


N
W
E
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Airport
Lake
Witness
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NTSB


Splatter
residue

American White Pelicans

NTSB

American White Pelican

- Common in Oklahoma
- Weight: about 8 to 20 lbs
- Length: about 4 to 5 feet
- Wingspan: about 8 to 10 feet

Findings

- Right engine not producing power
- Cockpit voice recorder inoperative
- Airplane wing damage sustained during collision with American white pelicans

Probable Cause

- Airplane wing-structure damage sustained during impact with one or more large birds (American white pelicans), which resulted in a loss of control of the airplane


-500 JT15D-1A
LET DIAMETER

Accident Summary

- March, 2004
- Vail, Washington
- Van’s RV-4
- 1 fatal
- Complete loss of engine power
- Nose over during forced landing


N6596X

Probable Cause

- A loss of engine power due to the pilot's inadequate in-flight decision by failing to refuel while en route, resulting in fuel exhaustion. Contributing factors were the non-operating (vandalized) runway lights, the pilot's delayed departure to his destination, dusk light conditions, rough/uneven terrain and high vegetation.

Accident Summary

- August 2011,
- Alpine, Texas
- Piper Aerostar
- Emergency landing due to a vibration in the tail


08/22/2011

Probable Cause

- The pilot's improper flare which resulted in a hard landing. Contributing to the accident was the pilot's improper decision to fly the airplane with a known mechanical deficiency

Accident Summary

- July 2006
- Owasso, OK
- Cessna 180
- 1 fatal
- 1 serious

Probable Cause

- The pilot's selection of unsuitable terrain, a residential street, for both takeoff and landing, which resulted in a collision with a static wire and terrain during takeoff-initial climb

Short Investigation – No travel

- Landing rollout
- Hard braking
- Airplane nosed over
- Substantial damage
- No injuries
- Known circumstances with little no safety payback

Probable Cause

- The pilot's excessive use of brakes during the landing

National Transportation Safety Board

Questions?