



**National
Transportation
Safety Board**

Technologically Advanced Aircraft Accident Case Studies

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Eastern Region – Aviation

“Where are we?” – AA #965



Definition of TAA

- Moving map
- GPS
- Autopilot



Man vs. Machine

- Human factors
 - Boredom → complacency
 - Confirmation bias



Missions

- Personal/business use
- Longer flights
- IFR
- Single-pilot



Case Studies

Case 1 - IAD05MA006



IAD05MA006

- Departed Concord, NC
- Destination: Martinsville, VA
- IMC prevailed
- MTV non-towered

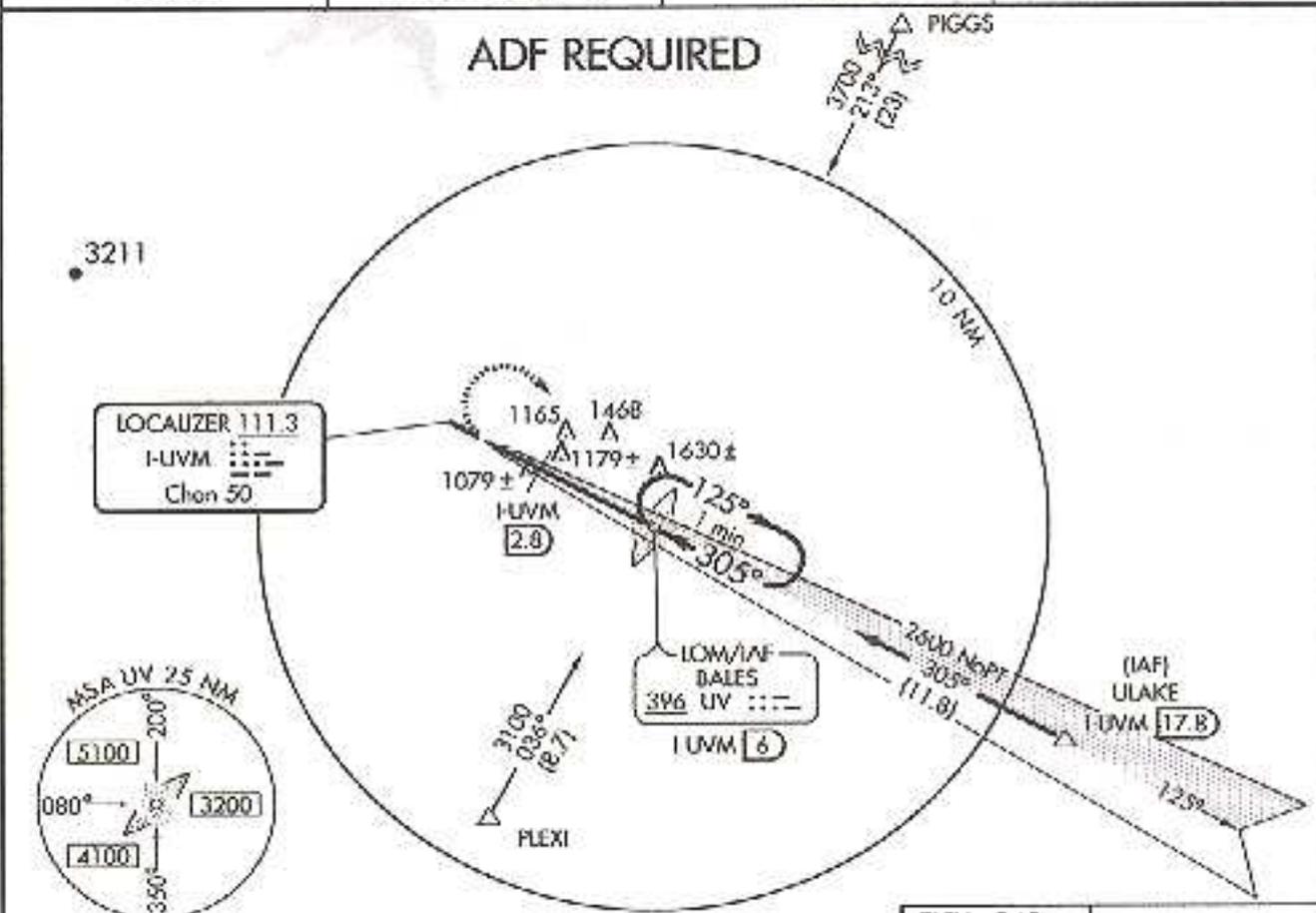
LOC I-LVM	APP CRS	Rwy Idg	5002
111.3	305°	TDZE	925
Chan 50		Apr Elev	942

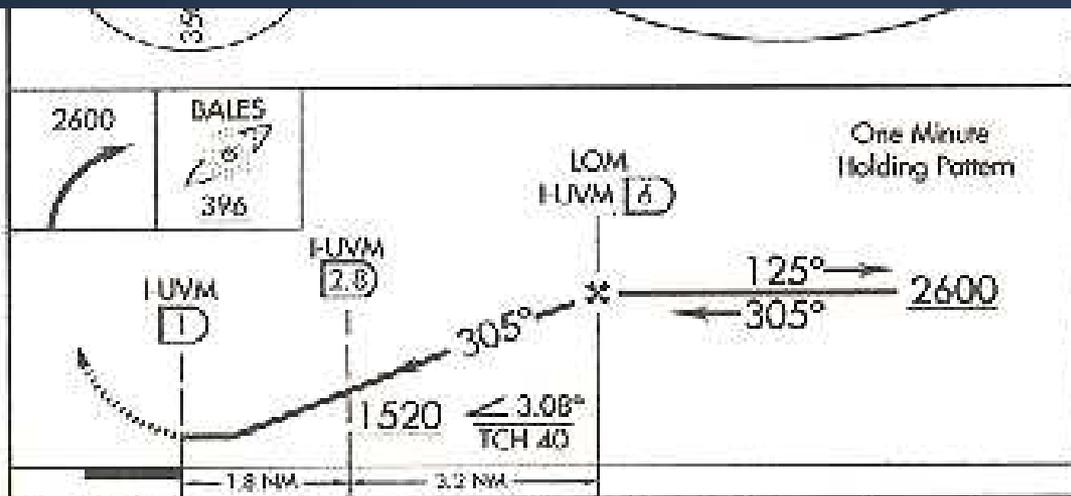
LOC RWY 30

MARTINSVILLE/BLUE RIDGE (MTV)

<p>▽ Inoperative table does not apply to ODALS</p> <p>△ NA Rwy 30.</p>	<p>ODALS</p> <p>MISSED APPROACH: Climbing right turn to 2600 to BALES LOM and hold.</p>
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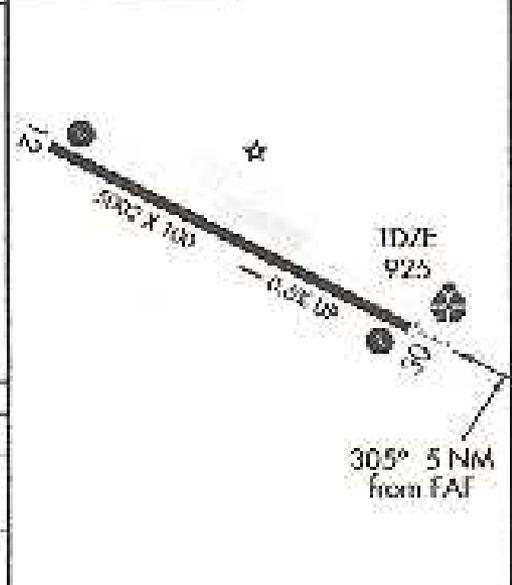
<p>AWOS-3</p> <p>118.45</p>	<p>GREENSBORO APP CON</p> <p>124.36 269.225</p>	<p>CLNC DEL</p> <p>124.85</p>	<p>UNICOM</p> <p>122.7 (CTAF) 0</p>
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CATEGORY	A	B	C	D
S-30	1520-1 595 (600-1)		1520-1½ 595 (600-1½)	1520-1¾ 595 (600-1¾)
CIRCLING	1560-1 618 (700-1)		1560-1¾ 618 (700-1¾)	1560-2 618 (700-2)
DME MINIMUMS				
S-30	1340-1 415 (400-1)		1340-1½ 415 (400-1½)	
CIRCLING	1560-1 618 (700-1)		1560-1¾ 618 (700-1¾)	1560-2 618 (700-2)

ELCV 942



REF: Rwy 12
MIRL Rwy 12-30

FAF to MAP 5 NM

Knots	40	90	120	150	180
Min:Sec	5:00	3:20	2:30	2:00	1:40

MARTINSVILLE, VIRGINIA

Orig 03023

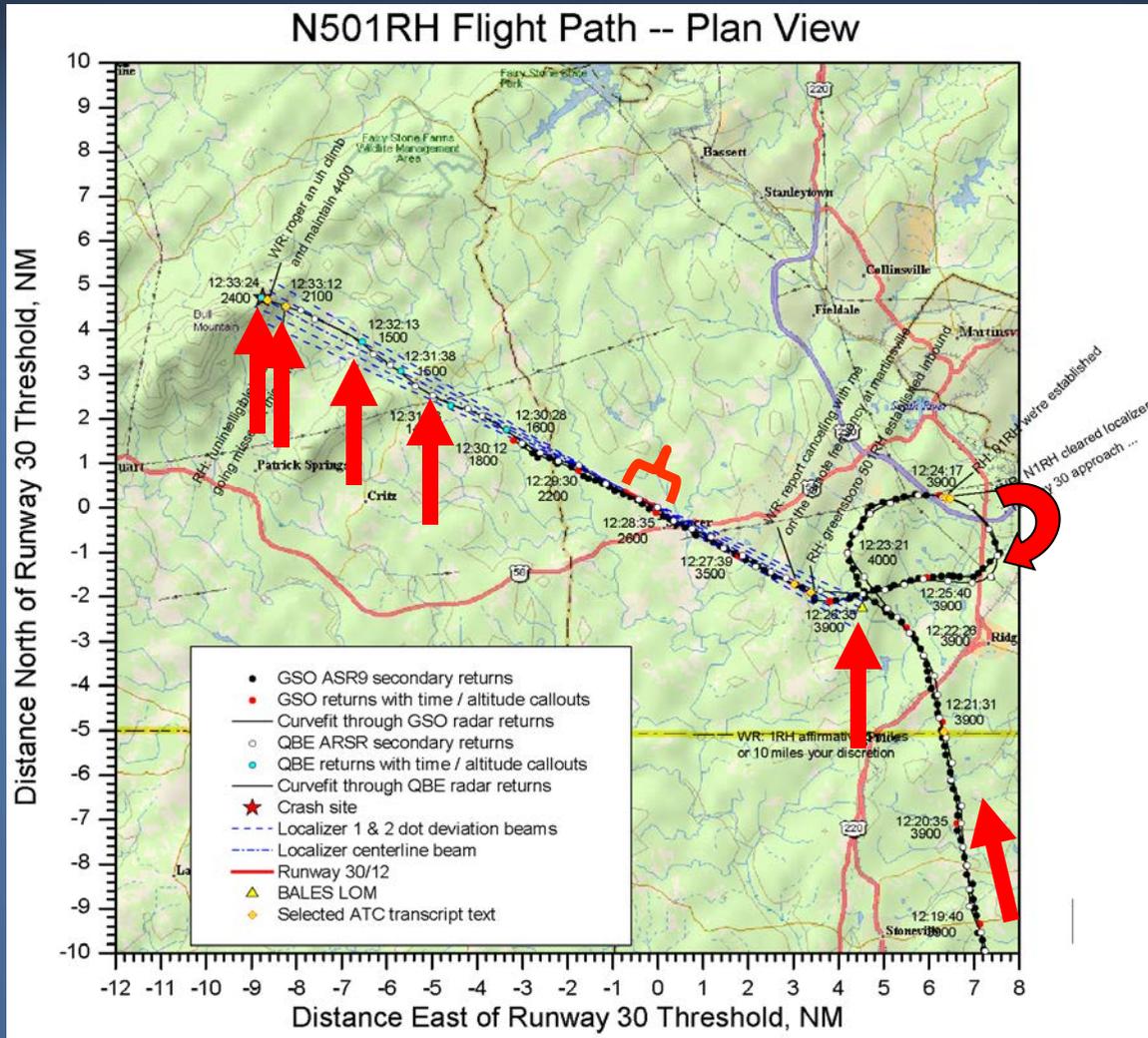
36°38'N-80°01'W

MARTINSVILLE/BLUE RIDGE (MTV)

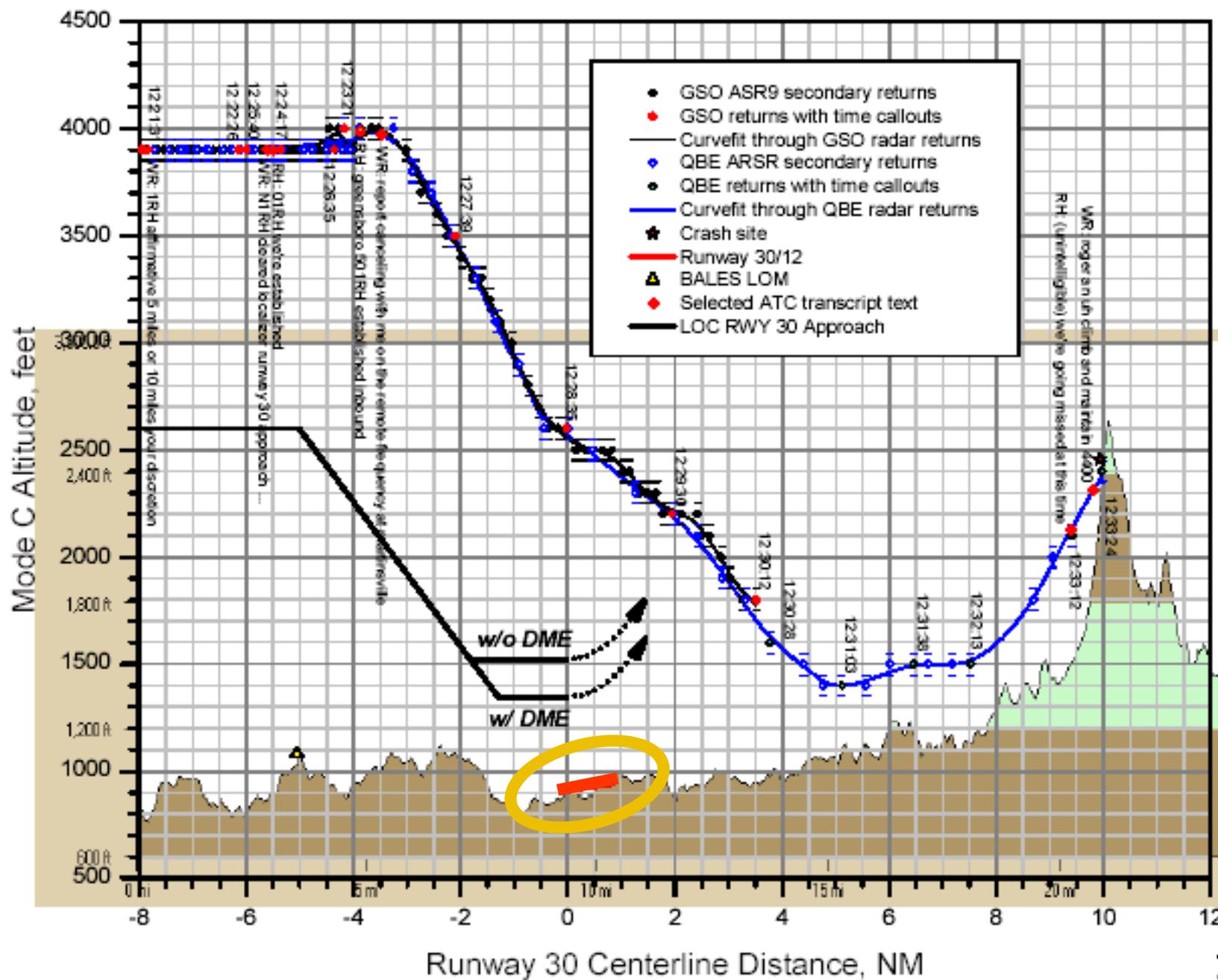
LOC RWY 30

Flight Summary

N501RH Flight Path -- Plan View

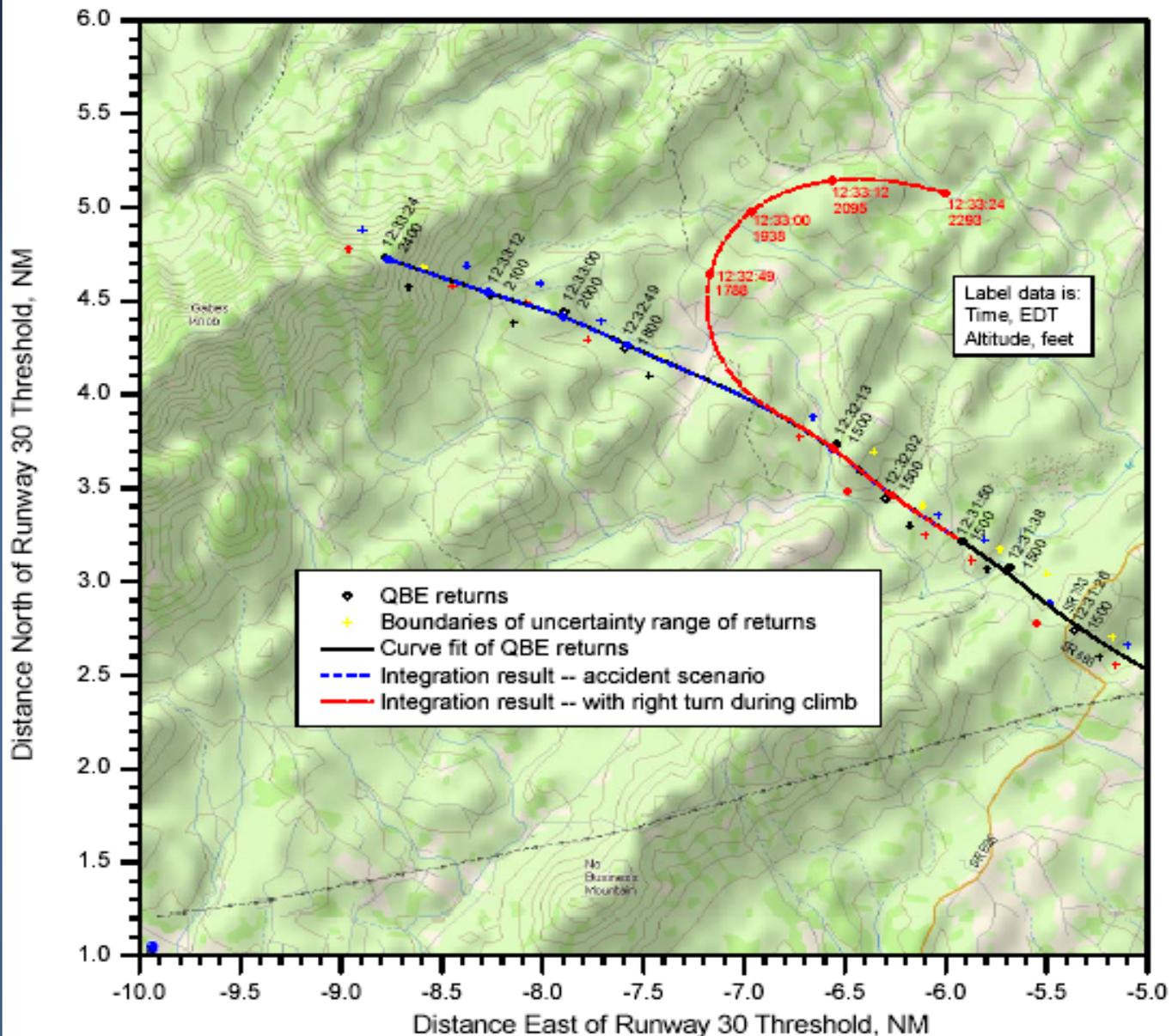


N501RH Flight Path -- Profile View





N501RH Performance: Ground Track



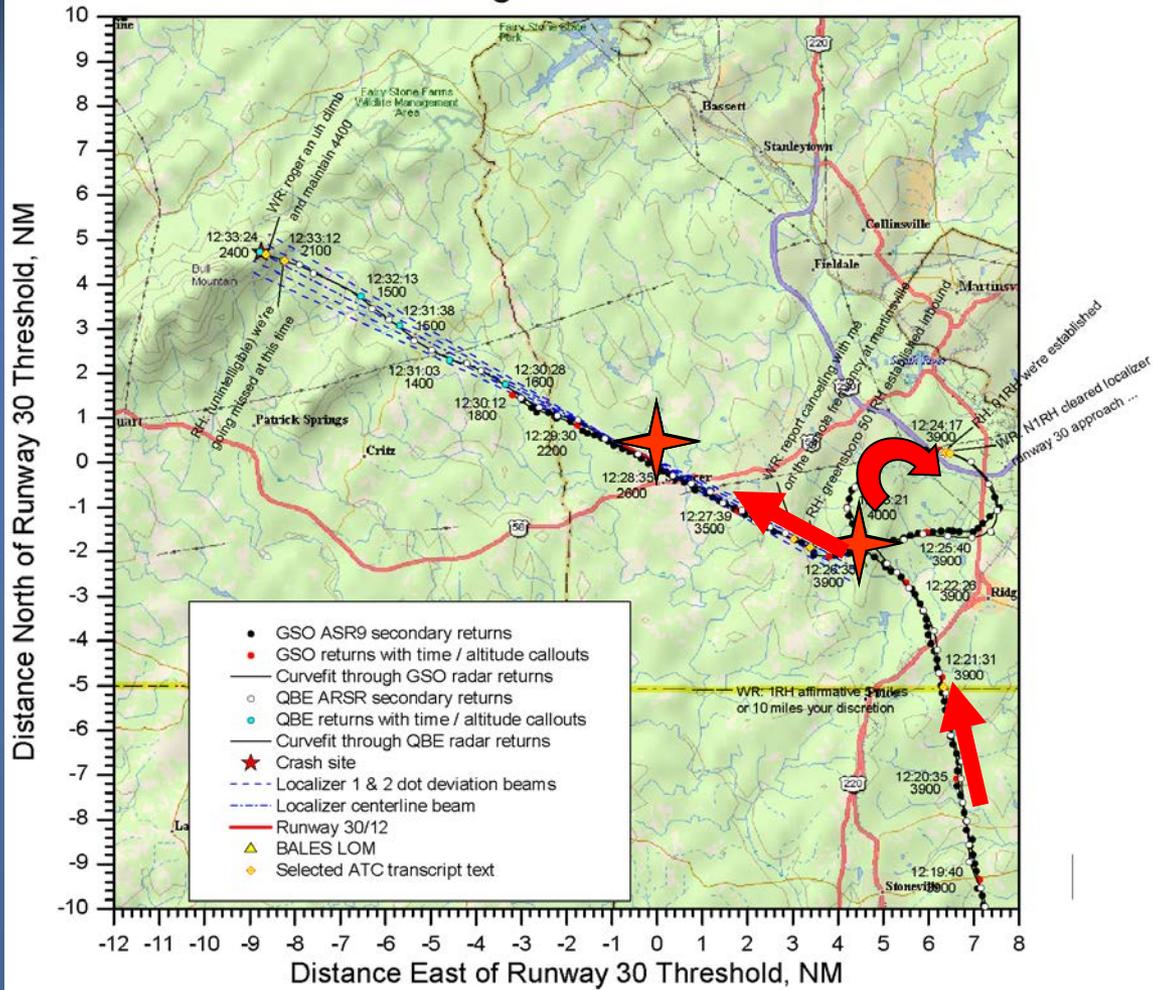
NTSB

Navigation

- KLN 90B
- VFR only
- Waypoints for situational awareness
- HSI - GPS or VLOC



N501RH Flight Path -- Plan View



NTSB

Analysis

- No CVR
- Navigated to BALES
- Failed to notice autosequence to MTV
- Did not cross-check
- Did not execute published MAP



Probable Cause

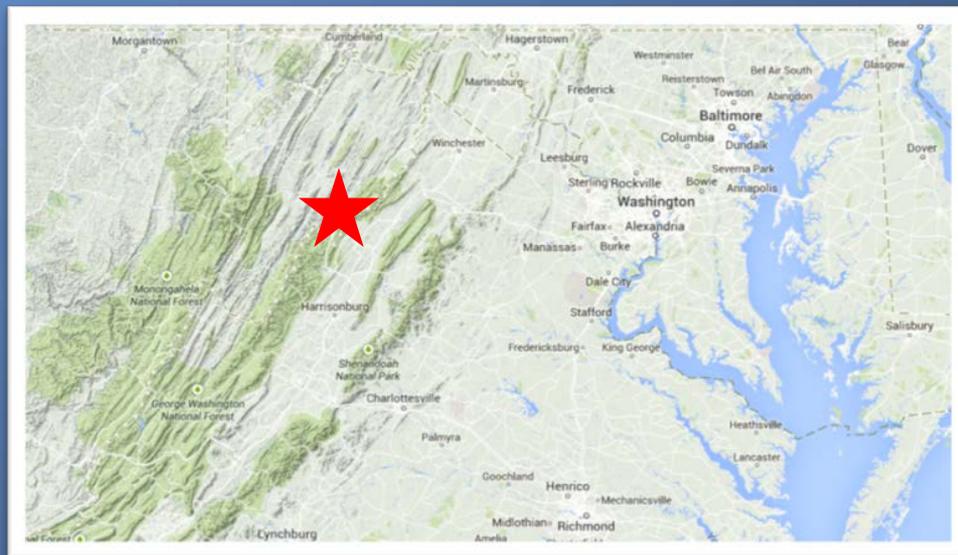
“The flight crew’s failure to properly execute the published instrument approach procedure...which resulted in controlled flight into terrain.

Contributing...was the crew’s failure to use all available navigational aids to confirm and monitor the airplane’s position during the approach.”



Case 2 - ERA10LA506

- Date: September 30, 2010
- Location: Mathias, WV
- Aircraft: Cirrus SR-22
- 1 serious,
1 minor injury



NTSB

ERA10LA506

- Cross-country flight OH-WV
- Weather “not too encouraging...”
- Full glass cockpit
- Satellite weather



Nexrad

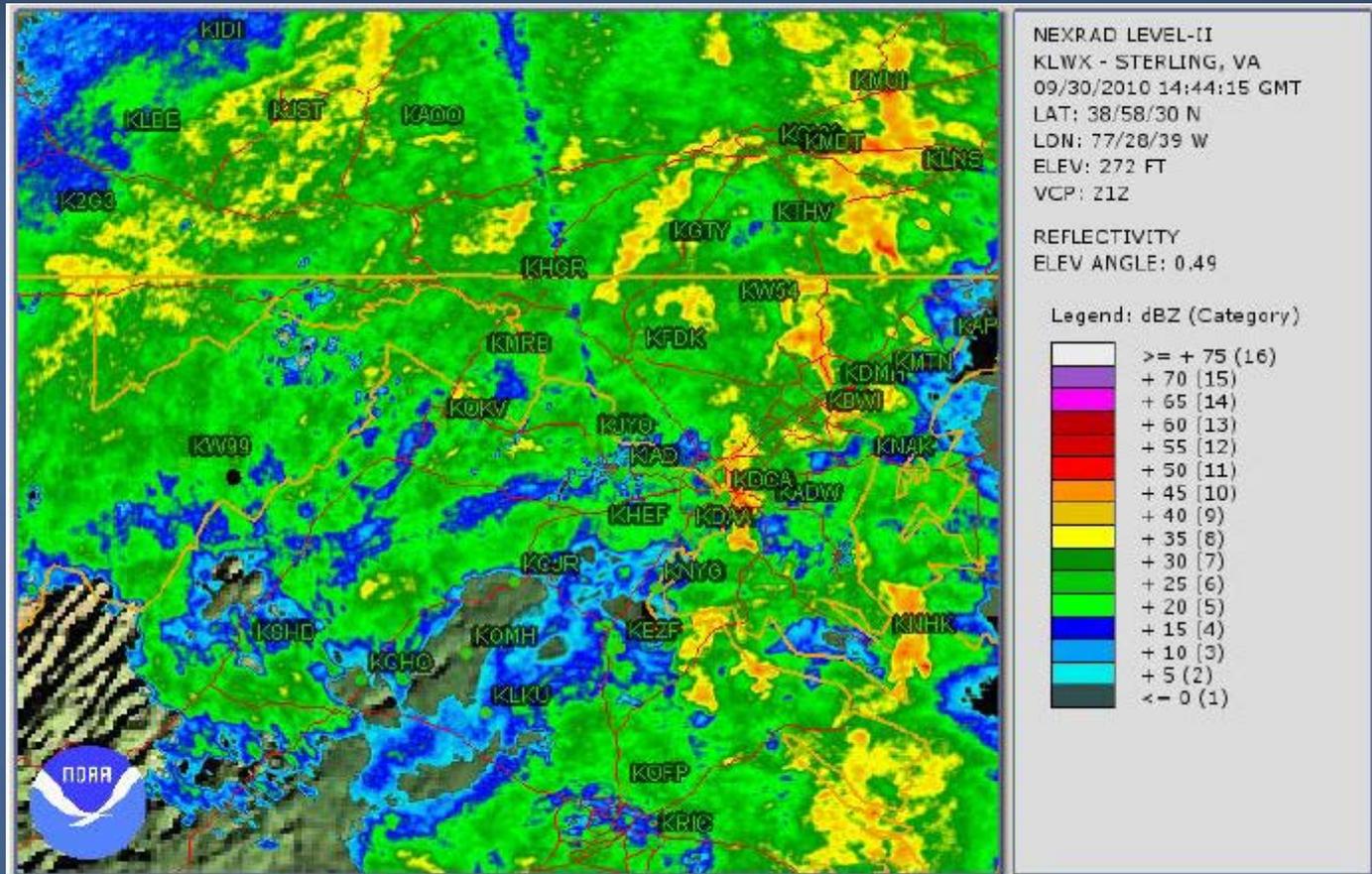


Figure 7 – KIAD WSR-88D 0.5° elevation scan for 1044 EDT



ERA10LA506

- PIREPs – moderate to severe turbulence
- AIRMETs Sierra & Tango
 - IFR
 - Mountain obscuration
 - Moderate turbulence
- Witness: 300' ceiling, < 1/4 mi. vis

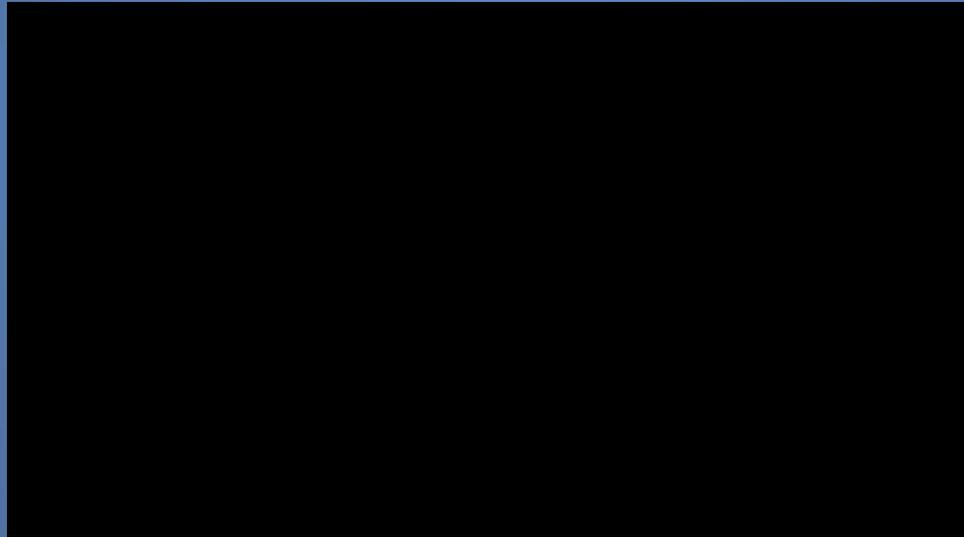


ERA10LA506

- Entered holding pattern
- Calm surface winds
- 40 knots, turbulence aloft
- Below minimums



COPA Animation





NTSB



NTSB

ERA10LA506

- Pilot: PPL, INS
- 700 hours total
- 600 make/model
- 90 hours actual instrument



ERA10LA506

- Reason for a/p disengagement?
 - Activation of stall warning
 - Disconnect switch
 - Takeoff/Go-around button
 - Exceeding +/- 75 deg roll, +/- 30 deg pitch



Probable Cause

“The pilot's loss of control of the airplane during an instrument approach in turbulent weather conditions.”



Case 3 – ERA09FA429

- Date: July 30, 2009
- Location: Ravenswood, WV
- Aircraft: Cirrus SR-22
- 1 Fatality



ERA09FA429

- Owner hired pilot
- Eagle Creek, Indiana (EYE) to York, Nebraska (JYR)
- 521nm
- Lower altitudes EYE-JYR
- FL250 JYR-EYE



ERA09FA429

- Flew owner from EYE-JYR; returning to EYE
- 1840: contacted MSP Center
- 1852: O2 activated at 12,160'



ERA09FA429

- 1925: requested descent
- “Unreadable”
- Several attempts to identify airplane
- Cleared to FL240
- Acknowledged, made autopilot input
- “In distress and out of breath”



ERA09FA429

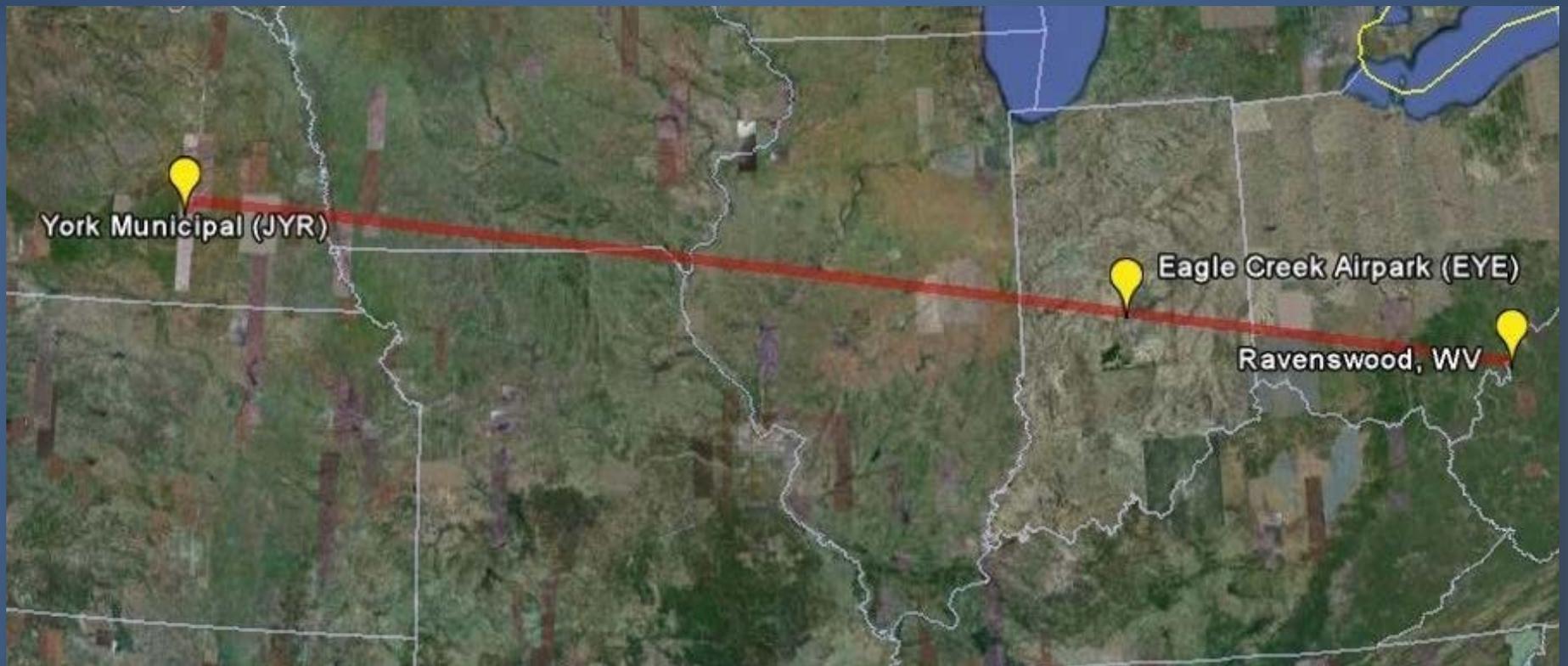
- Cleared 12,000', issued altimeter
- 12,000' in autopilot
- ATC attempted contact for 6 min
- 1934: instructed to descend
- 1935-1937: autopilot incrementally decreased to 9,200'



ERA09FA429

- 1937: “labored breathing”
- Ohio ANG F-16s launched
- “An unresponsive individual who appeared to be unconscious.”





York Municipal (JYR)

Eagle Creek Airpark (EYE)

Ravenswood, WV



NTSB

ERA09FA429

- 2051: overflew EYE at FL250
- Maintained altitude and heading
- 2146: loss of power



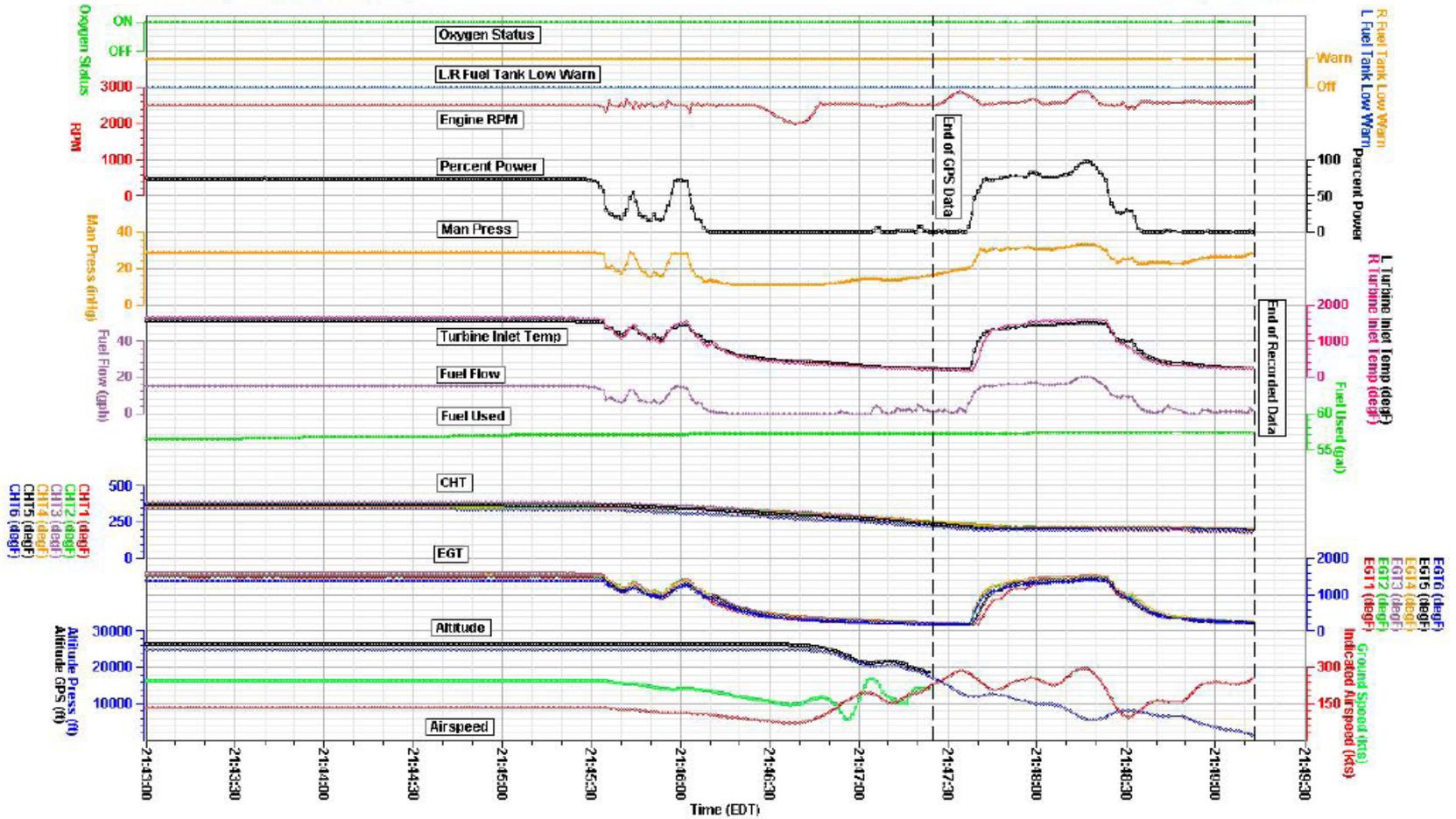


NTSB

Cirrus SR-22, N581DS

Location, Date: Ravenswood, WV, 07/30/09

NTSB No. ERA09FA420



Revised: 27 April 2010

Engine parameters over end of accident flight

National Transportation Safety Board

Figure 5



NTSB

ERA09FA429

- Pilot: ATP, CFI, Commercial
- Fixed-wing and rotorcraft
- Lear type rating
- 18,500 total hours



ERA09FA429

- Equipped with constant-flow O2 system from factory
- Pulse-demand system installed in March 2009 by pilot
- “Plug and play” – in-line regulator
- Pulse-demand masks not equipped with diluter bags



DATE	AIRCRAFT TYPE	AIRCRAFT IDENT	ROUTE OF FLIGHT		NR INST APP	REMARKS AND ENDORSEMENTS	NR T/O	NR LDG	AIRCRAFT CATEGORY				
			FROM	TO					SINGLE-ENGINE LAND	MULTI-ENGINE LAND			
2009 3/11	CIRRAF 5025	58105	EYE	JTA-EYE					5	9			
3/12	CIRRAF 5022	4485R	EYE	MDW-EYE					2	7			
3/14	CIRRAF 5022	58105	EYE	JTA-EYE					5	9			
3/15	PIPER PA34	47347	EYE	464-EYE		[REDACTED]			4	9			
3/15	CIRRAF 5022	57CH	EYE	2R2-EYE		[REDACTED]			1	1			
3/17	CESSNA 172	2249E	UMP	POK-BAL-UMP		[REDACTED]			2	0			
3/19	CIRRAF 5025	58105	EYE	JTA-EYE					5	7			
3/12	CESSNA 172R	9431D	UMP	LOCAL		[REDACTED]			1	7			
3/12	CIRRAF 5025	58105	EYE	JTA-EYE		EPIC!! WEAR PACTIVE SEATBELT RETRACTOR MUST NOT BE TO O2 O2			5	8			
3/14	CESSNA 172	2249E	UMP	BAL-UMP		[REDACTED] BFR+IPC OK			1	9			
3/15	CIRRAF 5022	4485R	EYE	BM6-EYE		[REDACTED]			1	7			
3/16	CIRRAF 5025	58105	EYE	JTA-EYE					6	1			
3/16	CIRRAF 5022	57CH	EYE	PIAZAR-CAT-EYE		[REDACTED] BFR+IPC OK			2	0			
I certify that the entries in this log are true, [REDACTED]						TOTALS THIS PAGE			42	5	4	9	
PILOT SIGNATURE [REDACTED]						AMT. FORWARDED			131	91	4	5422	1
						TOTALS TO DATE			132	33	9	5427	0

★

ERA09FA429

- Known issues with mask fit
- Used pulse oximeter “randomly”
- Attempt to retrofit diluter bag masks





NTSB

ERA09FA429

- Airplane O2 system manual:
“The use of other breathing equipment in conjunction with the built-in portion of the System has not been tested, nor is it FAA-Approved.”



ERA09FA429

- Pulse-demand system manual:
“Use only face masks provided....NOTE:...face masks do not have a dilution bag attached”



Probable Cause

“The pilot’s improper modification of the certified, on-board oxygen system, which resulted in incapacitation due to hypoxia, and the airplane’s subsequent uncontrolled descent into terrain.”



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