National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A	Aircraft Registration Number: N117ER
	Occurrence Date: 09/15/95	Most Critical Injury: FATAL
	Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
NEW SMYRNA BCH	FL	32168	1644	EDT	
Accident Location: On Airport	Distance From Landing Facility: UNK/NA		Direction From Airport: UNK/NA		

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
AEROSPATIALE	TB-9	Airplane

Sightseeing Flight: No **Air Medical Transport Flight:** No

Narrative

Brief narrative statement of facts, conditions, and circumstances pertinent to the accident/incident:

HISTORY OF THE FLIGHT

On September 15, 1995, about 1644 eastern daylight time, an Aerospatiale TB-9, N117ER, operated by Embry-Riddle Aeronautical University (Embry-Riddle) and a Piper PA-38-112, N2351A, operated by Spruce Creek Aviation, collided while on final approach to runway 11 at New Smyrna Beach Municipal Airport, New Smyrna Beach Florida. Both flights were 14 CFR Part 91 instructional flights. Visual meteorological conditions prevailed at the time and neither flight had filed a flight plan. N117ER was destroyed and the commercial-rated flight instructor and two student pilots were fatally injured. N2351A received minor damage and the private-rated pilot was not injured. N117ER originated from Daytona Beach Regional Airport, on September 15, 1995, about 1540. N2351A originated from Spruce Creek Airport, Daytona Beach, Florida, on September 15, 1995, about 1610.

The pilot of N2351A stated he had performed four previous landings on runway 11 at New Smyrna Beach and was on his fifth approach. He reported his position by transmitting on the airport unicom frequency (unicom) while on the downwind leg. He turned base leg, reported his position on unicom, and visually checked for other aircraft on final. He did not hear transmissions from any other pilots who were on final approach or see any other aircraft on final approach. He turned to final and established his airspeed at 70 knots. While on short final he heard someone on unicom say "two planes on final, Tomahawk go around Tomahawk go around." At the same time he heard a noise and felt a bump from the bottom of his aircraft and then saw N117ER nosing down in front of him. His propeller contacted something and his engine began running rough. He proceeded to land on the runway and then turned off onto the taxiway where he stopped.

(Continued on Next Page)

National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Narrative (Continued)

Witnesses reported that N2351A had been in the traffic pattern for runway 11 for several approaches and landings. The pilot was flying a close pattern to the runway and they heard the pilot reporting his position on unicom for each approach. No witness could remember hearing the pilots of N117ER reporting their position on unicom or seeing the aircraft before it was on short final approach. Witnesses stated there were many aircraft with the "echo romeo" call sign on unicom and they just might not have heard the pilots of N117ER reporting their position.

Witnesses saw N117ER on short final approach, and N2351A rolling wings level onto final approach about 30 feet above and just behind N117ER. The pilot in an aircraft on the ground called on unicom that there were two airplanes close together on final. There was no reaction from either aircraft. Another pilot in an aircraft on the ground then called for N2351A to go around. Shortly after this, when the aircraft were about 100 feet above the ground, N117ER was observed to pitch up 10-20 degrees and then immediately nose down to a near vertical descent from which it impacted on the displaced threshold of runway 11. N2351A continued the approach and landed on runway 11.

PERSONNEL INFORMATION

The flight instructor on N117ER had been employed by Embry-Riddle since August 18, 1995. The dual student and observer he was instructing were enrolled in the private pilot flight course and at the time of accident neither had performed solo flight.

The pilot of N2351A held a U.S. private pilot certificate issued on the basis of a Swiss private pilot certificate. He was in the U.S. to build his flight time and obtain flight training so that upon returning to Switzerland he could obtain his commercial pilot certificate.

Additional information on the pilots of N117ER and the pilot of N2351A is contained in this report under First Pilot Information and in Supplement E.

AIRCRAFT INFORMATION

Information on N117ER and N2351A is contained in this report under Aircraft Information.

METEOROLOGICAL INFORMATION

(Continued on Next Page)

National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Narrative (Continued)

Visual meteorological conditions prevailed at the time of the accident. See Weather Information.

WRECKAGE AND IMPACT INFORMATION

N117ER and N2351A collided over the displaced threshold of runway 11 at the New Smyrna Beach Airport. Debris from the vertical stabilizer, rudder, and right stabilator of N117ER and about a 3 inch portion of propeller tip from N2351A were found in the displaced threshold area. After the collision N117ER pitched down and impacted nose first on the displaced threshold, about 300 feet past the point of collision. A post crash fire erupted. N2351A continued and landed.

Post crash examination of N117ER showed that the aircraft impacted at about a 70-80 degree nose down attitude. The post crash fire consumed the fuselage, inboard wings, and tail sections of the aircraft. The outboard portion of the right stabilator had separated from the aircraft and was found forward or southeast of the aircraft wreckage, outside of the fire area. Examination of this portion of right stabilator showed damage and transfer of black paint consistent with it having been contacted by the propeller of N2351A. The propeller of N117ER had damage consistent with it rotating at the time of impact. The engine assembly rotated after the accident. All engine accessories were consumed or damaged by the post crash fire.

Examination of N2351A showed that the 3 inch piece of propeller tip found in the area of the collision had come from its propeller. Small pieces of sheet metal debris with white and blue paint similar to the colors of N117ER were found in the propeller spinner of N2351A. Blue scrape marks similar to the color of N117ER were found on the belly of N2351A, just aft of the engine.

MEDICAL AND PATHOLOGICAL INFORMATION

Post mortem examination of the three occupants of N117ER was performed by Dr. Ronald L. Reeves, Medical Examiner, Volusia County, Florida. The cause of death for each occupant was attributed to multiple blunt force trauma.

Post mortem toxicology studies on specimens obtained from the three occupants of N117ER was performed by the Volusia County Medical Examiners Office. The specimens obtained from the

(Continued on Next Page)

National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Narrative (Continued)

pilot-in-command were negative for ethanol alcohol, basic, acidic, and neutral drugs. The tests were positive for nicotine, caffeine, and 2% carbon monoxide. The tests on specimens obtained from the dual student were negative for ethanol alcohol, basic, acidic, and neutral drugs. The tests were positive for 1% carbon monoxide. See Supplement K and toxicology reports.

Toxicology tests on specimens obtained from the pilot of N2351A were performed by the Florida Department of Law Enforcement Laboratory, Orlando, Florida. The tests were negative for ethanol alcohol, basic, acidic, and neutral drugs.

TESTS AND RESEARCH

An Embry-Riddle flight instructor stated after the accident that they were directed by their Chief Flight Instructor to teach the students to fly a long final approach with a shallow descent angle, similar to an instrument approach. The procedure requires that they extend the downwind leg of a visual approach to 1.6 nm past the end of the runway before turning base leg and final. The aircraft is then placed on the final approach 1.6 nm from the runway at 500 feet agl. This will then require about a 3 degree descent angle to the runway. In the TB-9 this would be flown at an airspeed of 67 knots. See attached diagram and information from the Chief Flight Instructor.

Flight instructors from flight schools at the New Smyrna Beach Airport and the Ormond Beach Airport, where Embry-Riddle aircraft practice takeoff and landings, stated after the accident that the long final approach with a shallow descent angle flown by the Embry-Riddle aircraft conflicts with other aircraft operating at the airports. They stated that they teach their students to fly a downwind leg 3/4 nm from the runway. When they are at a 45 degree angle to the runway approach end they turn on base leg and then final. This places them on final approach about 3/4 nm from the runway at 500 feet. They stated that the Embry-Riddle aircraft are on a much longer final approach at a lower altitude and are not in a position a pilot would expect to see conflicting traffic. There have been cases at the two airports where Embry-Riddle aircraft have been cut off by other aircraft on final approach when the other pilots did not see them on the long, low final approach.

The FAA Aeronautical Information Manual and Flight Training Handbook states that pilots should fly a basic rectangular

(Continued on Next Page)

National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Narrative (Continued)

pattern when making visual approaches to runways. The downwind leg of the pattern should be flown at the established traffic pattern altitude about 1/2 to 1 nm from the runway. The downwind leg continues past the point abeam of the approach end of the runway to where a descending medium bank 90-degree turn is made onto the base leg and then a 90-degree turn is made onto the final approach leg. The turn to final approach should be completed at least 1/4 mile from the runway. See pages from the Flight Training Handbook and Aeronautical Information Manual.

None of the pilots who were operating at the New Smyrna Beach Airport at the time of the accident, including the pilot of N2351A, recalled hearing N117ER make position reports on unicom. Several witnesses stated that there were many Embry-Riddle aircraft operating at the airport using the call sign "echo romeo." Because of this they just might not recall that specific Embry-Riddle aircraft making position reports. The Embry-Riddle Flight Operations Manual does not give instructions as to what radio calls Embry-Riddle pilots should make when performing normal landings at uncontrolled airports. The Aeronautical Information Manual states that pilots should make position reports on downwind, base, and final legs when making approaches at uncontrolled airports.

After the accident the communications radio from N117ER was inspected by FAA and King Radio engineers at the King factory. The purpose of the examination was to determine the communication frequency the radio was set to at the time of the accident. They were unable to determine the frequency do to fire damage to the radio. See FAA inspector statement and King Radio report.

Witnesses reported that several minutes before the accident an unknown aircraft had a microphone stuck in the transmit position on the New Smyrna Beach Airport unicom. This prevented other pilot's transmissions from being heard. Witnesses stated that at the time of the accident, and for a few minutes before, this condition was corrected and normal radio operations were occurring.

The operator of N2351A stated the aircraft did have a sticky microphone switch on the left control wheel several days before the accident. This condition was reported to have been corrected. The aircraft was examined by an FAA Avionics inspector after the accident. The microphone switch on the left pilots control wheel was found to stick in the transmit position on occasion or not go into the transmit position when pushed on occasion. See attached

(Continued on Next Page)

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Narrative (Continued)

FAA Inspector statement.

ADDITIONAL INFORMATION

The wreckage of N117ER was released to Embry-Riddle Aeronautical University, Mr. Agee C. Tacker, on September 16, 1995.

The wreckage of N2351A was released to Spruce Creek Aviation, Mr. Donald E. Seawy, on September 16, 1995.

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Landing Facility/Approach Information

Airport Name	Airport ID	Airport Elevation	Runway Used	Runway Length	Runway Width
NEW SMYRNA BEACH MUNI	34J	12 Ft. MSL	11	4300 Ft.	100 Ft.

Runway Surface Type: Asphalt

Runway Surface Condition :	Dry			
Type Instrument Approach :	None			
VFR Approach/Landing :	Traffic Pattern			

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
AEROSPATIALE	TB-9	1509

Airworthiness Certificate :	Normal	Utility		
Landing Gear Type :	Tricycle-Fixed			

Homebuilt Aircraft? No	Number of Seats: 4	Certified Max Gross Wt.	Number of Engines
Stall Warning System Installed? Yes		2337 LBS	1

Engine Type	Engine Manufacturer	Model/Series	Rated Power
Recip-Carburetor	LYCOMING	O-320-D2A	160 HP

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
Annual	08/08/95	79 Hours	2429 Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?
Yes	No	UNK/NA

Owner/Operator Information

Registered Aircraft Owner	Street Address		
EMBRY-RIDDLE AERONAUTICAL UNV.	600 CLYDE MORRIS BLVD.		
	City	State	Zip Code
	DAYTONA BEACH	FL	32114

Operator of Aircraft	Street Address		
Same As Reg'd Aircraft Owner	Same as Registered Aircraft Owner		
	City	State	Zip Code

Operator Does Business As:	Operator Designator Code:

- Type of Certificate(s) Held: NONE

Air Carrier Operating Certificate :			

Operating Certificate:	Operator Certificate:

Regulation Flight Conducted Under: 14 CFR 91

Type of Flight Operation Conducted: Instructional (Incl Air Carrier Training)

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

First Pilot Information

Name	City	State	Date of Birth	Age
JOSEPH F. MCCOY	DAYTONA BEACH	FL	03/20/69	26

Sex: M	Seat Occupied: Right	Principal Profession: Pilot-Civilian	Certificate Number: 450358101

Certificate(s) :	Commercial	CFI			
Airplane Rating(s) :	SE Land	ME Land			
Rotorcraft/Glider/LTA :	None				
Instrument Rating(s) :	Airplane				
Instructor Rating(s) :	SE Airplane	Instrument			

Type Rating Endorsement for Accident/Incident Aircraft? No	Current Biennial Flight Review? Yes

Months Since Last BFR	BFR Aircraft Make	BFR Aircraft Model	Medical Certificate: Class 1
19	UNK/NA	UNK/NA	Date of Last Medical Exam: 02/13/95

Medical Certificate Status: Valid Medical-No Waivers/Limitations

Source of Pilot Flight Time Information : Pilot Rpt

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	668		507		40					
Pilot In Command (PIC)	566									
Instructor	263									
Last 90 Days										
Last 30 Days	59									
Last 24 Hours										

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Autopsy Performed? Yes	Toxicology Performed? Yes
Person at Controls of Aircraft at Time of Accident/Incident: UNK/NA			Second Pilot? Yes

Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point	State	Airport Identifier	Departure Time	Time Zone
DAYTONA BEACH	FL	DAB	1540	EDT

Destination	State	Airport Identifier
Local Flight		

Type of Clearance :	None		
Type of Airspace :	Class G		

Weather Information

Source of Briefing :	Company			
Method of Briefing :	In Person			

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
DAB	1656	EDT	35 Ft. MSL	10 NM	335 Deg. Mag.

Sky/Lowest Cloud Condition: Scattered 1500 Ft. AGL		Condition of Light: Daylight
Lowest Ceiling: Broken 10000 Ft. AGL	Visibility: 10 SM	Altimeter: 30.09 "Hg
Temperature: 84 F	Dew Point: 73 F	Wind Direction: 100 / Density Altitude: 1500 Ft.
Wind Speed: 9	Gusts: None	Weather Conditions at Accident Site: Visual Conditions
Visibility (RVR): Ft.	Visibility (RVV) SM	Intensity of Precipitation:
Restrictions to Visibility :	None	
Type of Precipitation :	None	

Accident Information

Aircraft Damage: Destroyed	Aircraft Fire: On Ground	Aircraft Explosion: None

Classification: US Registered on US Soil, Territories or Possessions, or Intl Waters

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot					
Dual Student	1				1
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew	1				1
Passengers					
TOTAL ABOARD	3				3
Other Aircraft				1	1
Other Ground					
GRAND TOTAL	3			1	4

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224A Occurrence Date: 09/15/95 Occurrence Type: Accident	

Administrative Information

Investigator-In-Charge (IIC)

JEFFREY L. KENNEDY

Additional Persons Participating in This Accident/Incident Investigation:

RICHARD SHEPPARD FAA FSDO ORLANDO	FL	32827
AGEE C. TACKER EMBRY-RIDDLE AERO. UNV. DAYTONA BEACH	FL	32114
EDWARD ROGALSKI LYCOMING ENGINES BELLEVIEW	FL	34421

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224B	Aircraft Registration Number: N2351A
	Occurrence Date: 09/15/95	Most Critical Injury: FATAL
	Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
NEW SMYRNA BCH	FL	32168	1644	EDT	
Accident Location: On Airport	Distance From Landing Facility: UNK/NA			Direction From Airport: UNK/NA	

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
PIPER	PA-38-112	Airplane

Sightseeing Flight: No **Air Medical Transport Flight:** No

Narrative

Brief narrative statement of facts, conditions, and circumstances pertinent to the accident/incident:

Same as narrative for MIA95FA224A.

National Transportation Safety Board **FACTUAL REPORT AVIATION**	NTSB ID: MIA95FA224B Occurrence Date: 09/15/95 Occurrence Type: Accident	

Landing Facility/Approach Information

Airport Name	Airport ID	Airport Elevation	Runway Used	Runway Length	Runway Width
NEW SMYRNA BEACH MUNI	34J	12 Ft. MSL	11	4300 Ft.	100 Ft.

Runway Surface Type: Asphalt

Runway Surface Condition :	Dry			
Type Instrument Approach :	None			
VFR Approach/Landing :	Traffic Pattern			

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
PIPER	PA-38-112	38-78A0649

Airworthiness Certificate :	Normal	Utility		
Landing Gear Type :	Tricycle-Fixed			

Homebuilt Aircraft? No	Number of Seats: 2	Certified Max Gross Wt.	Number of Engines
Stall Warning System Installed? Yes		1670 LBS	1

Engine Type	Engine Manufacturer	Model/Series	Rated Power
Recip-Carburetor	LYCOMING	O-235-L2C	112 HP

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
Annual	09/11/95	14 Hours	2575 Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?
Yes	No	UNK/NA

Owner/Operator Information

Registered Aircraft Owner	Street Address		
SPRUCE CREEK AVIATION, INC.	1 BEECH BLVD.		
	City: DAYTONA BEACH	State: FL	Zip Code: 32124

Operator of Aircraft	Street Address		
Same As Reg'd Aircraft Owner	Same as Registered Aircraft Owner		
	City	State	Zip Code

Operator Does Business As:	Operator Designator Code:

- Type of Certificate(s) Held: NONE

Air Carrier Operating Certificate :			

Operating Certificate:	Operator Certificate:

Regulation Flight Conducted Under: 14 CFR 91

Type of Flight Operation Conducted: Instructional (Incl Air Carrier Training)

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224B Occurrence Date: 09/15/95 Occurrence Type: Accident	

First Pilot Information

Name	City	State	Date of Birth	Age
GILLES G. GALLEY	FARVAGNY	OF	02/04/73	22

Sex: M	Seat Occupied: Left	Principal Profession: Student	Certificate Number: 2532583
Certificate(s) :	Private		
Airplane Rating(s) :	SE Land		
Rotorcraft/Glider/LTA :	None		
Instrument Rating(s) :	None		
Instructor Rating(s) :	None		
Type Rating Endorsement for Accident/Incident Aircraft? UNK/NA	Current Biennial Flight Review? Yes		
Months Since Last BFR: 10	BFR Aircraft Make: UNK/NA	BFR Aircraft Model: UNK/NA	Medical Certificate: Class 3 Date of Last Medical Exam: 06/14/94
Medical Certificate Status: Valid Medical-With Waivers/Limitations			
Source of Pilot Flight Time Information :	Pilot Rpt		

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	79	13	79		4					
Pilot In Command (PIC)	20	4	20							
Instructor										
Last 90 Days	20	13	20							
Last 30 Days	19	13	19							
Last 24 Hours	2	1	2							

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Autopsy Performed? No	Toxicology Performed? Yes
Person at Controls of Aircraft at Time of Accident/Incident: First Pilot			Second Pilot? No

Flight Plan/Itinerary

Type of Flight Plan Filed: None

	State	Airport Identifier	Departure Time	Time Zone
Departure Point Same as Accident/Incident Location		34J	1640	EDT
Destination Local Flight	State	Airport Identifier		

Type of Clearance :	None		
Type of Airspace :	Class G		

Weather Information

Source of Briefing :	No Record			
Method of Briefing :	UNK/NA			

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224B Occurrence Date: 09/15/95 Occurrence Type: Accident	

Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
DAB	1656	EDT	35 Ft. MSL	10 NM	335 Deg. Mag.

Sky/Lowest Cloud Condition: Scattered 1500 Ft. AGL		Condition of Light: Daylight
Lowest Ceiling: Broken 10000 Ft. AGL	Visibility: 10 SM	Altimeter: 30.09 "Hg
Temperature: 84 F	Dew Point: 73 F	Wind Direction: 100
Density Altitude: 1500 Ft.		
Wind Speed: 9	Gusts: None	Weather Conditions at Accident Site: Visual Conditions
Visibility (RVR): Ft.	Visibility (RVV) SM	Intensity of Precipitation:
Restrictions to Visibility :	None	
Type of Precipitation :	None	

Accident Information

Aircraft Damage: Minor	Aircraft Fire: None	Aircraft Explosion: None

Classification: US Registered on US Soil, Territories or Possessions, or Intl Waters

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot					
Dual Student					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
TOTAL ABOARD				1	1
Other Aircraft	3				3
Other Ground					
GRAND TOTAL	3			1	4

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: MIA95FA224B Occurrence Date: 09/15/95 Occurrence Type: Accident	

Administrative Information

Investigator-In-Charge (IIC)

JEFFREY L. KENNEDY

Additional Persons Participating in This Accident/Incident Investigation:

RICHARD SHEPPARD
FAA FSDO
ORLANDO FL 32827

AGEE C. TACKER
EMBRY-RIDDLE AERO. UNV.
DAYTONA BEACH FL 32114

EDWARD ROGALSKI
LYCOMING ENGINES
BELLEVIEW FL 34421

NTSB File Number MIA95FA224A/B

Item No.	Description of Item	No. of Pages: Doc	No. of Pages: Photo
1	Supporting Documentation File Contents, NTSB Form 6120.3	3	
2	Supplement A: N117ER	2	
3	Supplement B: N117ER	4	
4	Supplement E: N117ER	2	
5	Supplement K: N117ER	10	
6	Supplement S: N117ER	1	
7	Pilot/Operator Aircraft Accident Report, NTSB Form 6120.1/2: N117ER	6	
8	Pilot/Operator Aircraft Accident Report, NTSB Form 6120.1/2: N2351A	11	
9	Witness Statements	28	
10	Maps or Charts of Accident Area, Wreckage Diagrams	1	
11	Reports from Federal Agencies: FAA report concerning transmit switch on N2351A.	1	
12	Reports from Federal Agencies: FAA report concerning communications radio from N117ER.	8	
13	Reports from Federal Agencies: FAA report of radar coverage at crash site.	1	
14	Reports from Local Agencies	26	
15	Reports from Parties to the Investigation: Embry-Riddle Chief Flight Instructor submission.	40	
16	Other Pertinent Forms and Reports	5	
17	Other Pertinent Forms and Reports: Embry-Riddle Airport Pattern Handout	2	

NTSB File Number MIA95FA224A/B

Item No.	Description of Item	No. of Pages: Doc	No. of Pages: Photo
18	Other Pertinent Forms and Reports: FAA Flight Training Handbook and AIM pages.	8	
19	Statement of Party Representatives to NTSB Investigation	4	
20	Release of Aircraft Wreckage, NTSB Form 6120.15: N117ER	1	
21	Release of Aircraft Wreckage, NTSB Form 6120.15: N2351A	1	
22	Toxicological Reports	2	
23	Photograph 1: View of main wreckage of N117ER on threshold of runway 11.		1
24	Photograph 2: View of left wing from N117ER.		1
25	Photograph 3: View of engine and propeller from N117ER		1
26	Photograph 4: View of right wing from N117ER		1
27	Photograph 5: View of right wing and main wreckage of N117ER		1
28	Photograph 6: View of bottom of right stabilizer of N117ER. Note paint transfer.		1
29	Photograph 7: View of top of right stabilizer of N117ER. Note crush damage on the leading edge.		1
30	Photograph 8: Another view of remains of right stabilizer from N117ER. Note paint transfer.		1
31	Photograph 9: View of debris from tail section of N117ER which was found in the area of the collision with N2351A.		1
32	Photograph 10: View of propeller from N2351A. Note damage.		1
33	Photograph 11: View of rotational damage to propeller spinner from N2351A.		1
34	Photograph 12: View of damage to one propeller blade of N2351A.		1

NTSB File Number MIA95FA224A/B

Item No.	Description of Item	No. of Pages: Doc	No. of Pages: Photo
35	Photograph 13: View of damage to other propeller blade of N2351A.		1
36	Photograph 14: View of piece of propeller blade from N2351A which was found on the runway threshold at the point of collision with N117ER.		1
37	Photograph 15: Debris from the tail section of N117ER which was found in the propeller spinner of N2351A.		1
	Total Number of Pages	167	15

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA95FA224

Supplement A —Wreckage Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft

1 Engine #1 Serial No.	2 Engine #2 Serial No.	3 Supercharger Installed	4 Turbocharger Installed	5 Propeller Manufacturer	6 Propeller Model/Series
L-17599-39A	N/A	1 ☐ Yes 2 ☒ No	1 ☐ Yes 2 ☒ No	SENSENICH	74DM6S8-054
A Other	A Other	A Other	A Other	A Other	A Other

7 Propeller Type *(Multiple entry)*
1 ☐ Wood
2 ☒ Metal
3 ☐ Composite
4 ☐ Constant speed-controllable pitch
5 ☐ Ground Adjustable/variable pitch
6 ☐ Reversable
7 ☐ Full automatic feathering
8 ☐ Full manual feathering
A Other

8 Aircraft STOL Modification Installed
1 ☐ Yes
2 ☒ No
A Other

Landing Gear Positions *(If fixed gear, go to block 12)*	9 Nose/Tail	10 Left Main	11 Right Main	*For Rotorcraft or Balloon accidents, go to block 20.*
	1 ☐ Up 2 ☐ Down 3 ☐ Intermediate A Other	1 ☐ Up 2 ☐ Down 3 ☐ Intermediate A Other	1 ☐ Up 2 ☐ Down 3 ☐ Intermediate A Other	

Control Surface Positions	12 Left Trailing Edge Flap	13 Right Trailing Edge Flap	14 Speed Brake	15 Spoiler
	1 ☐ Up A Extended ____ deg. B Other UNK	1 ☐ Up A Extended ____ deg. B Other UNK	1 ☒ Not Installed 2 ☐ Stowed 3 ☐ Deployed A Other	1 ☒ Not Installed 2 ☐ Stowed 3 ☐ Deployed 4 ☐ Deployed Asymetrically A Other

Trim Tab Positions *(Multiple entry)*	16 Left Aileron	17 Right Aileron	18 Rudder	19 Elevator/Stabilator/ Ruddervator
	1 ☒ Not Installed 2 ☐ Neutral 3 ☐ Up 4 ☐ Down A ____ deg. B Other	1 ☒ Not Installed 2 ☐ Neutral 3 ☐ Up 4 ☐ Down A ____ deg. B Other	1 ☒ Not Installed 2 ☐ Neutral 3 ☐ Left 4 ☐ Right A ____ deg. B Other	1 ☐ Neutral 2 ☐ Up 3 ☐ Down A ____ deg. B Other UNK

Cargo Restraint System	20 Cargo Restraint Installed *(Multiple entry)*	21 Cargo Restraint Used *(Multiple entry)*	22 Cargo Restraint Failed *(Multiple entry)*
	1 ☒ None *(Go to block 26)* 2 ☐ Cargo net 3 ☐ Straps/tie down A Other	1 ☐ None *(Go to block 26)* 2 ☐ Cargo net 3 ☐ Straps/tie down A Other	1 ☐ None 2 ☐ Cargo net 3 ☐ Straps/tie down A Other

Computed Weight and Balance Information- *Complete when weight and/or center of gravity limitations are exceeded on accident flight. (Otherwise go to block 32)*

Takeoff

26 Weight	27 Center of Gravity	28 CG Range *(Multiple entry)*
____ Lbs.	A ____ % MAC or B ____ Inches	1 ☐ At takeoff weight 2 ☐ At max gross weight A ____ % MAC to ____ % MAC or B ____ Inches to ____ Inches

Accident

29 Weight	30 Center of Gravity	31 CG Range *(Multiple entry)*	32 Fuel On Board At Accident
____ Lbs.	A ____ % MAC or B ____ Inches	1 ☐ At takeoff weight 2 ☐ At max gross weight A ____ % MAC to ____ % MAC or B ____ Inches to ____ Inches	1 ☒ Estimated 2 ☐ Verified A Total gallons 34 B Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number: MIA915FA214

Supplement A—Wreckage Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft (continued)

Fuel Tanks	Fuel on Board at Accident: A Gallons Estimated	B Gallons Verified	C Other	D Tank Construction: 1 Wet Wing	2 Bladder	3 Metal	E Other	F Spillsafe Fittings: 1 Yes	2 No	G Other	H Fuel Leakage/Rupture: 1 None	2 Line	3 Fitting	4 Tank	I Oth
33 Left Wing	17					X			X			X		X	
34 Right Wing	17					X			X			X		X	
35 Left Tip															
36 Right Tip															
37 Fuselage															
38 (Specify)															

41 Fuel Found In #1 Engine *(Multiple entry)*
1 ☐ None
2 ☒ Lines
3 ☐ Gascolator/strainer
4 ☐ Carburetor/fuel injector
5 ☐ Engine driven pump
6 ☐ Auxiliary fuel pump
7 ☐ Filter(s)
8 ☐ Selector valve
9 ☐ Fuel manifold/spider
10 ☐ Accumulator tank
A Other

42 Fuel Found In #2 Engine *(Multiple entry)*
1 ☐ None
2 ☐ Lines
3 ☐ Gascolator/strainer
4 ☐ Carburetor/fuel injector
5 ☐ Engine driven pump
6 ☐ Auxiliary fuel pump
7 ☐ Filter(s)
8 ☐ Selector valve
9 ☐ Fuel manifold/spider
10 ☐ Accumulator tank
A Other N/A

43 Flight Controls, Evidence or Operational Failure or Malfunction *(Multiple entry)*
1 ☒ None
2 ☐ Pitch control
3 ☐ Roll control
4 ☐ Yaw control
A Other

44 Airframe/Structure, Evidence of In-Flight Separation/Failure *(Multiple entry)*
1 ☐ None
2 ☐ Helicopter *(Complete Supp. G)*
3 ☐ General disintegration
4 ☐ Left wing
5 ☐ Right wing
6 ☐ Left stab/elevator
7 ☒ Right stab/elevator
8 ☒ Vertical fin/rudder
9 ☐ Canard
10 ☐ Powerplant
11 ☐ Cabin/cargo door
A Other

45 Propeller, Evidence of In-Flight Separation/Failure
1 ☐ Yes
2 ☒ No
A Other

46 Powerplant, Evidence of In-Flight Mechanical Malfunction
1 ☐ Yes
2 ☒ No
A Other

47 Fuel, Evidence of Improper Grade or Contamination *(Multiple entry)*
1 ☒ None
2 ☐ Improper grade
3 ☐ Contamination
A Other

48 Oil, Evidence of Improper Grade or Contamination *(Multiple entry)*
1 ☒ None
2 ☐ Improper grade
3 ☐ Contamination
A Other

Emergency Locator Transmitter (ELT) Information

51 ELT Manufacturer: NARCO
A Other

52 ELT Model No.: ELT 910
A Other

53 ELT Battery Type
1 ☒ Alkaline
2 ☐ Cadmium
3 ☐ Nicad
4 ☐ Nickel
5 ☐ Lithium
A Other

54 ELT Battery Expiration Date *(Nos. for M, D, Y)*: 8-30-97
A Other

55 Preimpact ELT Location(s) *(Multiple entry)*
1 ☐ Cockpit
2 ☐ Cabin
3 ☐ Tailcone
4 ☒ Empennage
5 ☐ Raft
6 ☐ Survival Kit
A Other

56 ELT-Reason for Noneffectiveness/Failure *(Multiple entry)*
1 ☐ Operated effectively
2 ☐ Insufficient G's
3 ☐ Improper installation
4 ☐ Battery dead
5 ☐ Battery corroded
6 ☐ Battery installation incorrect
7 ☐ Incorrect battery
8 ☒ Fire damage
9 ☐ Impact damage
10 ☐ Antenna broken/disconnected
11 ☐ Water submersion
12 ☐ Unit not armed
13 ☐ Shielded by wreckage
14 ☐ Shielded by terrain
15 ☐ Internal failure
16 ☐ Test satisfactorily after accident
17 ☐ Signal direction altered by terrain
18 ☐ Packing device still installed
19 ☐ Remote switch off
A Other

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

MIA95FA224

Supplement B—Cockpit Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft

1 Cockpit Secured, Readings Not Pertinent 1 ☐ Yes *(Go to block 3)*

2 Cockpit/Instrument Panel Destroyed 1 ☒ Yes *(Go to block 3)*

Cockpit Instrument Indications—*Enter direct in appropriate category*

Flight Instruments		Engine/System Instruments	
Item	Reading/Setting	Item	Reading/Setting
VERTICAL SPEED	1200 FPM DOWN	HOBBS	2716.7

Comm/Nav Equipment		Miscellaneous	
Item	Frequency/Remark	Item	Remark

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA95FA224

Supplement B—Cockpit Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft (continued)

3 Navigational Equipment/Displays Installed *(Multiple entry)*
- 1 [X] OMNI Head(s)
- 2 [X] Glide slope
- 3 [ ] HSI
- 4 [ ] Flight director
- 5 [ ] RMI
- 6 [ ] RNAV
- 7 [ ] LORAN/Omega/INS
- 8 [ ] DME
- 9 [X] ADF
- 10 [X] Marker beacons
- A Other

4 Autopilot
- 1 [X] Not installed
- 2 [ ] Engaged
- 3 [ ] Not engaged
- A Other

5 Digital Electronic/ Nav/Com Displays
- 1 [ ] Not installed
- 2 [X] Installed
- A Other

6 Primary Altimeter Type
- 1 [ ] Counter-pointer
- 2 [ ] Drum-pointer
- 3 [X] 3-pointer
- 4 [ ] 2-pointer
- A Other

7 Standby Altimeter Installed
- 1 [ ] Yes
- 2 [X] No
- A Other

8 Radar Altimeter Installed
- 1 [ ] Yes
- 2 [X] No
- A Other

9 Transponder
- 1 [ ] Not installed
- 2 [ ] Installed-not used
- 3 [ ] Installed-used
- 4 [X] Installed-used-Altitude encoding
- A Other

10 Attitude Indicator Installed
- 1 [X] Yes
- 2 [ ] No
- A Other

11 Attitude Indicator Power Source *(Multiple entry)*
- 1 [X] Pressure/vacuum system
- 2 [ ] Pressure/vacuum system-with backup power source
- 3 [ ] Electrical
- 4 [ ] Standby indicator with alternate power source
- A Other

12 Type of Stall Warning Indicator
- 1 [ ] None
- 2 [ ] Visual/light
- 3 [ ] Visual/gauge
- 4 [X] Aural
- 5 [ ] Stickshaker
- A Other

13 Weather Radar/Detection Equipment
- 1 [X] Not installed
- 2 [ ] Installed-on
- 3 [ ] Installed-off
- 4 [ ] Installed, on/off unknown
- A Other

14 Type Weather Radar/Detection Equipment *(Multiple entry)*
1 [ ] Storm scope 2 [ ] Black and white radar 3 [ ] Color radar A Other N/A

Electrical/System Switches

18 [X] **Switches Destroyed/Inaccessible** *(Go to block 56)*
19 [ ] **Switch Positions Not Pertinent** *(Go to block 56)*

Switch/Item	1 Not Installed	2 On	3 Off	A Other	Pertinent Setting/Remark
20 Electrical Master					
21 Battery					
22 #1 Gen/Alternator					
23 #2 Gen/Alternator					
24 Inverter					
25 Avionics Master					
28 Pitot Heat					
29 Ice Detection					
30 Propeller Deice/Anti-ice					
31 Windshield Deice					
32 Windshield Anti-ice					
33 Airframe Deice					
36 Cabin Air/Fan					
37 Cabin Heater					
38 Air Conditioning					
39 Cabin Pressure Altitude					
40 Cabin Pressure Temperature					
41 Crew Oxygen					
42 Cabin/Passenger Oxygen					
45 Taxi Lights					
46 Landing Lights					
47 Rotating Beacon					

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA19151FA212414

Supplement B—Cockpit Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft (continued)

Electrical/System Switches (continued)

Switch/Item	1 Not Installed	2 On	3 Off	A Other	Pertinent Setting/Remark
48 Strobes					
49 Navigation Lights					
50 Instrument Panel Lights					
51 Cockpit/Storm Lights					
52 Cabin Lights					
53 ELT Remote					

Engine Controls-No. 1 Engine

56 ☐ Engine Control Positions Not Pertinent *(Go to block 65)*

57 Throttle Position
1 ☐ Not installed
2 ☐ Full forward
3 ☐ Midrange
4 ☐ Idle
A Other UNK

58 Propeller
1 ☒ Not installed
2 ☐ Full increase (Low pitch)
3 ☐ Midrange
4 ☐ Full decrease (High pitch)
5 ☐ Feather
A Other

59 Mixture
1 ☐ Not installed
2 ☐ Full rich
3 ☐ Midrange
4 ☐ Idle cutoff
A Other UNK

60 Carburetor Heat
1 ☐ Not installed
2 ☐ Full on
3 ☐ Partial
4 ☐ Off
A Other UNK

61 Alternate Air
1 ☒ Not installed
2 ☐ Open
3 ☐ Closed
4 ☐ Midrange
A Other

62 Cowl Flaps
1 ☒ Not installed
2 ☐ Open
3 ☐ Closed
4 ☐ Midrange
A Other

63 Magneto Switch Position
1 ☐ Not installed
2 ☐ Both
3 ☐ Left
4 ☐ Right
5 ☐ Off
6 ☐ Start
A Other UNK

64 Throttle Friction
1 ☐ Not installed
2 ☐ Tight
3 ☐ Loose
A Other UNK

Engine Controls-No. 2 Engine

65 ☐ Engine Control Positions Not Pertinent *(Go to block 74)*

66 Throttle Position
1 ☒ Not installed
2 ☐ Full forward
3 ☐ Midrange
4 ☐ Idle
A Other

67 Propeller
1 ☒ Not installed
2 ☐ Full increase (Low pitch)
3 ☐ Midrange
4 ☐ Full decrease (High pitch)
5 ☐ Feather
A Other

68 Mixture
1 ☒ Not installed
2 ☐ Full rich
3 ☐ Midrange
4 ☐ Idle cutoff
A Other

69 Carburetor Heat
1 ☒ Not installed
2 ☐ Full on
3 ☐ Partial
4 ☐ Off
A Other

70 Alternate Air
1 ☒ Not installed
2 ☐ Open
3 ☐ Closed
4 ☐ Midrange
A Other

71 Cowl Flaps
1 ☒ Not installed
2 ☐ Open
3 ☐ Closed
4 ☐ Midrange
A Other

72 Magneto Switch Position
1 ☒ Not installed
2 ☐ Both
3 ☐ Left
4 ☐ Right
5 ☐ Off
6 ☐ Start
A Other

73 Throttle Friction
1 ☒ Not installed
2 ☐ Tight
3 ☐ Loose
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA91SFA121214

Supplement B—Cockpit Documentation, Single and Twin Reciprocating Engine and Unpowered Aircraft (continued)

74 Landing Gear Control
1 [X] Not installed
2 [ ] Up
3 [ ] Down
4 [ ] Off
A Other

75 Landing Gear Indicator
1 [X] Not installed
2 [ ] Up
3 [ ] Down
4 [ ] Transit/unsafe
A Other

76 Trailing Edge Flap System
1 [ ] Not installed
2 [ ] Manual
3 [X] Electric
4 [ ] Hydraulic
A Other

77 Trailing Edge Flap Control
1 [ ] Not installed
2 [ ] Up
A Down _____ deg.
B Other UNK

78 Trailing Edge Flap Indicator
1 [ ] Not installed
2 [ ] Up
A Down _____ deg.
B Other UNK

79 Speed Brake Control
1 [X] Not installed
2 [ ] Stowed
3 [ ] Deployed
A Other

80 Spoiler Control
1 [X] Not installed
2 [ ] Stowed
3 [ ] Deployed
A Other

81 Dual Controls
1 [ ] Not installed
2 [X] Installed
A Other

82 Throwover Control Yoke/Position
1 [X] Not installed
2 [ ] Left
3 [ ] Right
4 [ ] Intermediate
A Other

83 Elev/Stab Trim Control *(Multiple entry)*
1 [ ] Not installed
2 [X] Manual
3 [ ] Electric
A Other

84 Elev/Stab Trim Indicator
1 [ ] Not installed
2 [ ] Up
3 [ ] Down
4 [ ] Neutral
A Other UNK

85 Aileron Trim Control *(Multiple entry)*
1 [X] Not installed
2 [ ] Manual
3 [ ] Electric
A Other

86 Aileron Trim Indicator
1 [X] Not installed
2 [ ] Left
3 [ ] Right
4 [ ] Neutral
A Other

87 Rudder Trim Indicator
1 [X] Not installed
2 [ ] Left
3 [ ] Right
4 [ ] Neutral
A Other

88 Fuel Selector Position(s) *(Multiple entry)*
1 [ ] Left main
2 [ ] Right main
3 [ ] Both
4 [ ] Left auxiliary
5 [ ] Right auxiliary
6 [ ] Center
7 [ ] Forward
8 [ ] Aft
9 [ ] External tank
10 [ ] Between tanks
11 [ ] X-feed left to right
12 [ ] X-feed right to left
13 [ ] On-engine #1
14 [ ] Off-engine #1
15 [ ] On-engine #2
16 [ ] Off-engine #2
A Other UNK

89 Fuel Boost Pump, Engine #1
1 [ ] Not installed
2 [ ] On
3 [ ] High
4 [ ] Low
5 [ ] Off
A Other UNK

90 Fuel Boost Pump, Engine #2
1 [X] Not installed
2 [ ] On
3 [ ] High
4 [ ] Low
5 [ ] Off
A Other

91 Fuel Transfer Pump
1 [X] Not installed
2 [ ] Off
A On (___ tank to ___ tank)
B Other

92 Primer, Engine #1
1 [ ] Not installed
2 [ ] Locked
3 [ ] Unlocked
A Other UNK

93 Primer Engine #2
1 [X] Not installed
2 [ ] Locked
3 [ ] Unlocked
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA95FA224

Supplement E — Second Pilot Information

1 Second Pilot Responsibilities

1 ☐ Copilot 2 ☒ Dual student 3 ☐ Safety pilot 4 ☐ Check pilot 5 ☐ None (Pilot-Rated Passenger) A Other

2 Name (Last, First, Initial)	3 Pilot Certificate No.	4 Street Address
SIN, HYUN C.	EE0720936	P.O. BOX 148875
A Other	A Other	A Other

5 City	6 State	7 Date of Birth (Nos. for M, D, Y)	8 Age	9 Sex
DAYTONA BEACH	FL	7-15-75	20	1 ☒ Male 2 ☐ Female
A Other		A Other	A Other	

10 Seat Occupied (Multiple entry)
1 ☒ Left 4 ☐ Front
2 ☐ Right 5 ☐ Rear
3 ☐ Center A Other

11 Principal Profession
1 ☐ Pilot-civilian 4 ☐ Aircraft mechanic 7 ☐ Doctor/dentist 10 ☐ Clergy 13 ☐ Farmer/Ranch
2 ☐ Pilot-military 5 ☐ Business 8 ☐ Police 11 ☐ Teacher 14 ☐ Retired
3 ☐ Other-military 6 ☐ Lawyer 9 ☒ Student 12 ☐ Engineer A Other

12 Certificate(s) (Multiple entry)
1 ☒ Student 7 ☐ Military
2 ☐ Private 8 ☐ None
3 ☐ Commercial 9 ☐ Foreign
4 ☐ Airline Transport A Other
5 ☐ Flight Instructor
6 ☐ Flight Engineer

13 Ratings—Airplane (Multiple entry)
1 ☒ None
2 ☐ Single engine land
3 ☐ Multiengine land
4 ☐ Single engine sea
5 ☐ Multiengine sea

14 Rotorcraft/Glider/LTA (Multiple entry)
1 ☒ None
2 ☐ Helicopter
3 ☐ Gyroplane
4 ☐ Airship
5 ☐ Free balloon
6 ☐ Glider

15 Instrument Rating (Multiple entry)
1 ☒ None
2 ☐ Airplane
3 ☐ Helicopter

16 Instructor Rating(s) (Multiple entry)
1 ☒ None 5 ☐ Gyroplane
2 ☐ Airplane SE 6 ☐ Glider
3 ☐ Airplane ME 7 ☐ Instrument airplane
4 ☐ Helicopter 8 ☐ Instrument helicopter

17 Ground Instructor
1 ☐ Basic
2 ☐ Advanced
3 ☐ Instrument
4 ☒ None

18 Type Rating/Endorsement This Aircraft
1 ☐ Yes
2 ☒ No (Go to block 20)
A Other

19 Months Since Check/Endorsement This Aircraft
A Other N/A

20 Biennial Flight Review
1 ☐ Yes
2 ☒ No
A Other

21 Months Since Last BFR
____ Months
A Other N/A

22 BFR (or equivalent) **Aircraft Make/Model**
A Make ____
B Model ____
C Other N/A

23 Medical Certificate
1 ☐ None
2 ☒ Class 1
3 ☐ Class 2
4 ☐ Class 3
A Other

24 Medical Certificate Validity
1 ☒ Valid medical-no waivers/limitations 5 ☐ No medical certificate
2 ☐ Valid medical-with waivers/limitations A Other
3 ☐ Non valid medical for this flight
4 ☐ Expired

25 Date of Last Medical (Nos. for D, M, Y)
3-31-95
A Other

26 Medical Limitation
1 ☒ None
2 ☐ Vision
A Specify ____
B Other

27 Medical Waiver
1 ☒ None
2 ☐ Vision
3 ☐ Hearing
A Specify ____
B Other

28 Statement of Demonstrated Ability
1 ☐ Yes
2 ☒ No
A Other

29 Correcting Lenses (Multiple entry)
1 ☒ Not required
2 ☐ Required to be in possession
3 ☐ Required, not in possession
4 ☐ Required to be worn
5 ☐ Required, not worn
6 ☐ Worn at time of accident
A Other

33 Source of Pilot Time
1 ☐ Pilot Log 3 ☐ FAA 5 ☐ Investigator's Estimate 7 ☐ Other Person
2 ☐ Company 4 ☒ Pilot/Operator Report 6 ☐ Relative A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA95FA224

Supplement E — Second Pilot Information (continued)

Flight Time	A All A/C	B This Make & Model	C Airplane Single Engine	D Airplane Multi Engine	E Night	F Instrument Actual	G Instrument Simulated	H Rotorcraft	I Glider	J Lighter Than Air	K Other Code
35 Total Time	7	7	7								
36 Pilot In Command (PIC)											
37 Instructor											
38 This Make/Model											
39 Last 90 Days	7	7	7								
40 Last 30 Days	7	7	7								
41 Last 24 Hours	1	1	1								

42 Landings—Last 90 Days— All Aircraft—Day

A Other UNK

43 Landings—Last 90 Days—All Aircraft—Night

A Other UNK

44 Landings—Last 90 Days—This Make/Model—Day

A Other UNK

45 Landings—Last 90 Days—This Make/Model—Night

A Other UNK

46 Seatbelt Available

1 [X] Yes
2 [ ] No
A Other

47 Seatbelt Used

1 [X] Yes
2 [ ] No
A Other

48 Shoulder Harness Available

1 [X] Yes
2 [ ] No
A Other

49 Shoulder Harness Used

1 [X] Yes
2 [ ] No
A Other

50 Autopsy Performed — *(This Pilot)*

1 [X] Yes
2 [ ] No
A Other

51 Toxicology Performed — *(This Pilot)*

1 [X] Yes
2 [ ] No
A Other

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

01

MIA95FA224

Supplement K—Occupant, Survival and Injury Information

1 Seat No.
A 01
B If Seat Unknown Enter Persons Name
HYUN C. SIN
C Other

2 Position
1 ☐ Pilot in command
2 ☒ Second pilot
3 ☐ Other crewmember
4 ☐ Passenger
A Other

For non-survivable accident, go to block 36

3 Age
A 20 Yrs
B Under 24 mos., enter months ____
C Other

4 Height
62 Inches
A Other

5 Weight
125 Lbs
A Other

6 Injury Index
1 ☐ None
2 ☐ Minor
3 ☐ Serious
4 ☒ Fatal

7 Condition Prior to Accident *(Multiple entry)*
1 ☐ Smoker
2 ☐ Language difficulty
3 ☐ Pre-existing disease
4 ☐ Prothesis
A Other N/A

8 Physically Handicapped *(Multiple entry)*
1 ☒ No
2 ☐ Blind
3 ☐ Mobility impaired
4 ☐ Deaf
A Other

9 Seat Belt Adjustment
1 ☐ Not fastened
2 ☐ Loose
3 ☐ Snug
4 ☐ Tight
5 ☒ Fastened-Tightness Unknown
6 ☐ Not seated
7 ☐ Seat not equipped
A Other

10 Shoulder Harness Adjustment
1 ☐ Not fastened
2 ☐ Loose
3 ☐ Snug
4 ☐ Tight
5 ☒ Fastened-Tightness Unkno
6 ☐ Seat not equippe
A Other

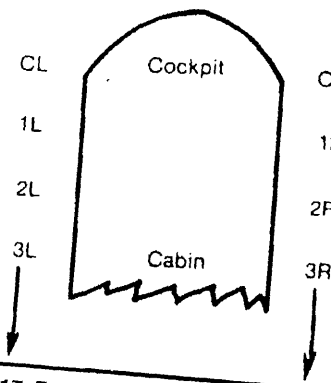
11 Knew Impact/Accident Coming
1 ☐ Yes
2 ☐ No
A Other UNK

12 Braced for Impact
1 ☐ Yes
2 ☐ No
A Other UNK

13 Direction of Movement at Impact *(Multiple entry)*
1 ☒ Forward
2 ☐ Rearward
3 ☒ Upward
4 ☐ Downward
5 ☐ Left
6 ☐ Right
A Other

14 Exit Used
1 ☒ Did not escape
2 ☐ Split in fuselage
A Exit number (use diagram) ____
B Other

Exit Diagram



Use following codes for overhead hatches

Cockpit 99
Cabin 88
Tailcone 77

15 Escape Hampered by *(Multiple entry)*
1 ☐ Not hampered
2 ☐ Smoke
3 ☐ Heat
4 ☒ Injuries
5 ☐ Trapped
6 ☐ Darkness
7 ☐ Debris
8 ☐ Disorientation
9 ☐ Difficulty Using
A Specify ____
B Other

16 Briefed on Emergency Procedures *(Multiple entry)*
1 ☐ No
2 ☒ Before takeoff
3 ☐ Before impact/accident
A Other

17 Evacuation Aided by *(Multiple entry)*
1 ☐ Passenger
2 ☐ Crew
3 ☐ Bystander
4 ☐ CFR personnel
5 ☐ Unaided
A Other N/A

18 Injured During Evacuation
1 ☐ Yes
2 ☐ No
A Other N/A

Complete this section if oxygen was used.

Type of Equipment
☐ Supplemental
☐ Portable

22 Difficulty In Use
1 ☐ Yes
2 ☐ No

23 Type of Oxygen System
1 ☐ Solid

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

Ø1 MIA95FA224

Supplement K—Occupant, Survival and Injury Information (continued)

Complete this section for accidents involving fire.

24 ☐ No fire involved *(Go to block 29)*

25 Fire First Sighted *(Location)*
1 ☐ Inside aircraft
2 ☐ Outside aircraft
3 ☒ Both
A Other

26 Smoke Mask/Goggles Used *(Multiple entry)*
1 ☒ No
2 ☐ Yes
3 ☐ Both
4 ☐ Difficulty in use
A Other

27 Material of Clothes Worn *(Multiple entry)*
1 ☐ Synthetic
2 ☐ Nonsynthetic
3 ☐ Fire resistant
4 ☒ Mix-synthetic and nonsynthetic
A Other

28 Exposure to Heat/Fire *(Multiple entry)*
1 ☒ Head/face
2 ☒ Arm(s)
3 ☒ Hand(s)
4 ☒ Leg(s)
5 ☒ Torso
6 ☒ Feet
A Other

Complete this section for accidents involving ditching/water impact.

29 ☒ No water impact *(Go to block 36)*

Flotation Devices	A Available			C Used			E Familiar With Use			G Problems In Use			I Malfunctioned With Use			K Equipment Damaged		
	1 Yes	2 No	B Other	1 Yes	2 No	D Other	1 Yes	2 No	F Other	1 Yes	2 No	H Other	1 Yes	2 No	J Other	1 Yes	2 No	L Other
30 Liferaft																		
31 Vest-Inflatable																		
32 Vest-Non-Inflatable																		
33 Cushion																		

34 Time in Water
A _____ Hrs.
B _____ Mins.
C Other

35 Rescued by
1 ☐ Boat
2 ☐ Airplane
3 ☐ Helicopter
4 ☐ None
A Other

Occupant Injuries—*Complete applicable parts for survivors and nonsurvivors.*

Items 36 thru 39 apply ONLY to flight crewmembers.

36 Medication Prescribed
1 ☐ No
A Yes *(Specify:* _____*)*
B Other UNK

37 Medication Being Taken
1 ☒ No
A Yes *(Specify:* _____*)*
B Other

38 Medication/Drugs Found
1 ☒ No
A Yes *(Specify:* _____*)*
B Other

39 Pre-existing Disease Found at Autopsy
1 ☐ No autopsy performed
2 ☒ None reported
A Yes *Specify:* _____
B Other

Results of Toxicological Analyses—*Complete as applicable for survivors and nonsurvivors.*

40 Toxicology *(Multiple entry)*
1 ☐ Not ordered
2 ☐ Not ordered—performed
3 ☒ Ordered—performed
4 ☐ Ordered—not performed
5 ☐ Embalmed
6 ☐ Specimen not available/unsuitable for analysis
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

01

MIA95FA224

Supplement K—Occupant, Survival and Injury Information (continued)

Results of Toxicologial Analyses—*(Complete as applicable for survivors and nonsurvivors.) (continued)*

Substances	A Test Results 1 Positive	2 Negative	B Other	C Level of Substances Found
41 Ethanol (Alcohol)		X		Mg %
42 CO (Carbon Monoxide)	X			1 % Saturation
43 hb (Hemoglobin)			UNK	gm %
44 HCN (Hydrogen Cyanide)			UNK	Microgram/ml
45 Acidic and Neutral Drugs		X		
46 Basic Drugs		X		
47 Marijuana		X		
48 (Specify) _____				

List any additional toxicological substances discovered below.

A Substance Code	B Level of Substances Found	A Substance Code	B Level of Substances Found
49		56	
50		57	
51		58	
52		59	
53		60	
54		61 (Specify)	
55		62 (Specify)	

Toxicological Substances/Codes

Acetamenophen	001	Cocaine	018	Imipramine	035	Menthol	052
Acetaldehyde	002	Codeine	019	Isopropanol	036	Morphine	053
Acetone	003	Desipramine	020	Ketamine	037	Medazepam	054
Amoxapine	004	Diazepam	021	Lidocaine	038	Nicotine	055
Amitriptyline	005	Dihydrocodeinone	022	Loxapine	047	Nortriptyline	056
Amobarbital	006	Diphenhydramine	023	Mecloqualone	039	Oxazepam	057
Amphetamine	007	Diphenylhydantoin	024	Meperidine	040	Pentazocine	058
Benzoylecgonine	008	Doxepin	025	Mephentermine	041	Phenobarbital	059
Brompheniramine	009	Desalkylflurazepam	026	Meprobamate	042	Procaine	060
Butalbital	010	Demoxapam	027	Methanol	043	Propoxyphene	061
Butabarbital	011	Ethchlorvynol	028	Methadone	044	Secobarbital	062
Caffene	012	Flunitrazepam	029	Methamphetamine	045	Thioridazine	063
Cannabinoids	013	Flurazepam	030	Methaqualone	046	Temazepam	064
Chlorazepate	014	Fluphenazine	031	Methylprylynol	048	Nordiazepam	065
Chlordiazepoxide	015	Glutethimide	032	Phetamine	049	Pentobarbital	066
Chlorphentermine	016	Haloperidol	033	Methylphenidate	050	Phencyclidine	067
Clonazepam	017	Hexobarbital	034	Methyprylon	051	Quinalbarbitone	068
						Quinalbarbitone	069

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

01

MIA915FA212

Supplement K—Occupant, Survival and Injury Information (continued)

63 ☒ *For multiple extreme traumatic injuries, check box, and go to next applicable supplement.*

Occupant Injury Coding Chart *(Complete for survivors and non survivors as applicable.)*

	A Body Region	B Aspect	C Lesion	D System/Organ	E A.I.S. Severity	F 6 Injury Source	G 7 Source of Da
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							

Body Region - A

01 Head (Skull, scalp, ears)
02 Face (Forehead, nose, eyes, mouth)
03 Neck (Cervical spine, C1-C7)
04 Shoulder (Clavicle, scapula, joint)
05 Upper limb (Whole arm)
06 Arm (Upper)
07 Elbow
08 Forearm
09 Wrist
10 Hand—fingers
11 Chest (Anterior and posterior ribs)
12 Abdomen (Diaphragm and below)
13 Back (Thoracsic spine T1-T12)
14 Back (Lumbar L1-L5)
15 Pelvis—hip
16 Lower limb (Whole leg)
17 Thigh (Femur)
18 Knee
19 Leg (Below knee)
20 Ankle
21 Foot—toes
22 Whole body
88 Injured, unknown region
99 Other

Aspect Of Injury - B

01 Right
02 Left
88 Injured aspect unknown
99 Other

Lesion - C

01 Laceration
02 Contusion
03 Abrasion
04 Fracture
05 Concussion
06 Avulsion
07 Rupture
08 Sprain
09 Dislocation
10 Crush
11 Amputation
12 Burn
13 Fracture and dislocation
14 Severence (Transection)
15 Strain
16 Detachment (Separation)
17 Perforation (Puncture)
88 Injured unknown lesion
99 Other

System/Organ - D

01 Skeletal
02 Vertebrae
03 Joints
04 Digestive
05 Liver
06 Nervous System
07 Brain
08 Spinal cord
09 Ears
10 Arteries veins
11 Heart
12 Spleen
13 Urogenital
14 Kidneys
15 Respiratory
16 Eye
17 Pulmonary/lungs
18 Airway
19 Muscles
20 Integumentary
21 Thyroid (Thyroid or other endocrine gland)
88 Injured, unknown system or organ
99 Other

Abbreviated Injury Scale - E

00 Not injured
01 Minor injury
02 Moderate injury
03 Serious injury (Not life-threatening)
04 Severe injury (Life-threatening survival probable)
05 Critical injury (Survival uncertain)
06 Maximum (untreatable)
07 Injured (Unknown severity)
88 Unknown if injured

Source of Data - G

Official
01 Autopsy records with or without hospital/medical records
02 Hospital/medical records
03 Emergency room records
04 Private or treating physicians

Unofficial
05 Lay coroner
06 E.M.S. personnel
07 Interviewee
08 Police
09 Other source

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

01 MIA95FA224

Supplement K—Occupant, Survival and Injury Information (continued)

Injury Source List - F

01 Windshield
02 Windshield frame
03 Window
04 Window frame
05 Instrument panel
06 Side console
07 Center console
08 Control stick/cyclic stick
09 Collective
10 Control yoke/column
11 Throttle quadrant/levers
12 Rudder pedals
13 Ceiling
14 Sidewall
15 Floor
16 Fuselage framing/structure
17 Table
18 Seat
19 Seatback tray
20 Restraints—seatbelt/tiedown
21 Restraints—shoulder harness
22 Unsecured item(s) in cockpit
23 Unsecured item(s) in cabin
24 Other occupants
25 Ground/runway
26 Unsecured seat(s)
27 Outside object(s) entering aircraft
28 Galley item(s)
29 Food/beverage item(s)
30 Other interior objects
31 Other exterior objects
32 Evacuation slide/slide raft
33 Escape rope/tape
34 Escape inertia device
35 Ejected from aircraft
36 Propeller/rotor blades
37 Exterior aircraft surface
38 Engine
39 Wheel/tires
40 Ground vehicle
41 Toxic/noxious/irritant fumes
42 Fire/radiant heat
43 Flying glass
44 Door/hatches
45 Acceleration forces
46 Exposure
47 Glare Shield
48 Eyeglasses
88 Unknown
99 Other

74 Death Due To Fire/Smoke
1 ☐ Yes
2 ☒ No
A Other

75 Death Due To Drowning
1 ☐ Yes
2 ☒ No
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

02

MIA95FA224

Supplement K—Occupant, Survival and Injury Information

1 Seat No.
A 02
B If Seat Unknown Enter Persons Name
JOSEPH McCOY
C Other

2 Position
1 [X] Pilot in command
2 [ ] Second pilot
3 [ ] Other crewmember
4 [ ] Passenger
A Other

For non-survivable accident, go to block 36

3 Age
A 26 Yrs
B Under 24 mos., enter months ____
C Other

4 Height
67 Inches
A Other

5 Weight
165 Lbs
A Other

6 Injury Index
1 [ ] None
2 [ ] Minor
3 [ ] Serious
4 [X] Fatal

7 Condition Prior to Accident *(Multiple entry)*
1 [X] Smoker
2 [ ] Language difficulty
3 [ ] Pre-existing disease
4 [ ] Prothesis
A Other

8 Physically Handicapped *(Multiple entry)*
1 [X] No
2 [ ] Blind
3 [ ] Mobility impaired
4 [ ] Deaf
A Other

9 Seat Belt Adjustment
1 [ ] Not fastened
2 [ ] Loose
3 [ ] Snug
4 [ ] Tight
5 [X] Fastened-Tightness Unknown
6 [ ] Not seated
7 [ ] Seat not equipped
A Other

10 Shoulder Harness Adjustment
1 [ ] Not fastened
2 [ ] Loose
3 [ ] Snug
4 [ ] Tight
5 [X] Fastened-Tightness Unknown
6 [ ] Seat not equipped
A Other

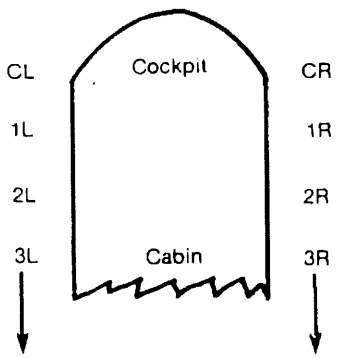
11 Knew Impact/Accident Coming
1 [ ] Yes
2 [ ] No
A Other UNK

12 Braced for Impact
1 [ ] Yes
2 [ ] No
A Other UNK

13 Direction of Movement at Impact *(Multiple entry)*
1 [X] Forward
2 [ ] Rearward
3 [X] Upward
4 [ ] Downward
5 [ ] Left
6 [ ] Right
A Other

14 Exit Used
1 [X] Did not escape
2 [ ] Split in fuselage
A Exit number (use diagram) ____
B Other

Exit Diagram



Use following codes for overhead hatches

Cockpit 99

Cabin 88

Tailcone 77

15 Escape Hampered by *(Multiple entry)*
1 [ ] Not hampered
2 [ ] Smoke
3 [ ] Heat
4 [X] Injuries
5 [ ] Trapped
6 [ ] Darkness
7 [ ] Debris
8 [ ] Disorientation
9 [ ] Difficulty Using Exit
A Specify ____
B Other

16 Briefed on Emergency Procedures *(Multiple entry)*
1 [ ] No
2 [X] Before takeoff
3 [ ] Before impact/accident
A Other

17 Evacuation Aided by *(Multiple entry)*
1 [ ] Passenger
2 [ ] Crew
3 [ ] Bystander
4 [ ] CFR personnel
5 [ ] Unaided
A Other N/A

18 Injured During Evacuation
1 [ ] Yes
2 [ ] No
A Other N/A

Complete this section if oxygen was used.

21 Type of Equipment
1 [ ] Supplemental
2 [ ] Portable
A Other

22 Difficulty In Use
1 [ ] Yes
2 [ ] No
A Other

23 Type of Oxygen System
1 [ ] Solid state
2 [ ] Gaseous
A Specify ____
B Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

02

MIA95FA224

Supplement K—Occupant, Survival and Injury Information (continued)

Complete this section for accidents involving fire.

24 ☐ No fire involved *(Go to block 29)*

25 Fire First Sighted *(Location)*
1 ☐ Inside aircraft
2 ☐ Outside aircraft
3 ☒ Both
A Other

26 Smoke Mask/Goggles Used *(Multiple entry)*
1 ☒ No
2 ☐ Yes
3 ☐ Both
4 ☐ Difficulty in use
A Other

27 Material of Clothes Worn *(Multiple entry)*
1 ☐ Synthetic
2 ☐ Nonsynthetic
3 ☐ Fire resistant
4 ☒ Mix-synthetic and nonsynthetic
A Other

28 Exposure to Heat/Fire *(Multiple entry)*
1 ☒ Head/face
2 ☒ Arm(s)
3 ☒ Hand(s)
4 ☒ Leg(s)
5 ☒ Torso
6 ☒ Feet
A Other

Complete this section for accidents involving ditching/water impact.

29 ☒ No water impact *(Go to block 36)*

Flotation Devices	A Available			C Used			E Familiar With Use			G Problems In Use			I Malfunctioned With Use			K Equipment Damaged		
	1 Yes	2 No	B Other	1 Yes	2 No	D Other	1 Yes	2 No	F Other	1 Yes	2 No	H Other	1 Yes	2 No	J Other	1 Yes	2 No	L Other
30 Liferaft																		
31 Vest-Inflatable																		
32 Vest-Non-Inflatable																		
33 Cushion																		

34 Time in Water
A ____ Hrs.
B ____ Mins. C Other

35 Rescued by
1 ☐ Boat
2 ☐ Airplane
3 ☐ Helicopter
4 ☐ None
A Other

Occupant Injuries—*Complete applicable parts for survivors and nonsurvivors.*

Items 36 thru 39 apply ONLY to flight crewmembers.

36 Medication Prescribed
1 ☐ No
A Yes *(Specify:* _____ *)*
B Other UNK

37 Medication Being Taken
1 ☒ No
A Yes *(Specify:* _____ *)*
B Other

38 Medication/Drugs Found
1 ☒ No
A Yes *(Specify:* _____ *)*
B Other

39 Pre-existing Disease Found at Autopsy
1 ☐ No autopsy performed
2 ☒ None reported
A Yes *Specify:* _____
B Other

Results of Toxicological Analyses—*Complete as applicable for survivors and nonsurvivors.*

40 Toxicology *(Multiple entry)*
1 ☐ Not ordered
2 ☐ Not ordered—performed
3 ☒ Ordered—performed
4 ☐ Ordered—not performed
5 ☐ Embalmed
6 ☐ Specimen not available/unsuitable for analysis
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

02

MIA95FA214

Supplement K—Occupant, Survival and Injury Information (continued)

Results of Toxicologial Analyses—*(Complete as applicable for survivors and nonsurvivors.) (continued)*

Substances	A Test Results 1 Positive	2 Negative	B Other	C Level of Substances Found
41 Ethanol (Alcohol)		X		Mg %
42 CO (Carbon Monoxide)	X			2 % Saturation
43 hb (Hemoglobin)			UNK	gm %
44 HCN (Hydrogen Cyanide)			UNK	Microgram/ml
45 Acidic and Neutral Drugs		X		
46 Basic Drugs		X		
47 Marijuana		X		
48 (Specify) _____				

List any additional toxicological substances discovered below.

A Substance Code	B Level of Substances Found	A Substance Code	B Level of Substances Found
49 012	UNK	56	
50 055	UNK	57	
51		58	
52		59	
53		60	
54		61 (Specify)	
55		62 (Specify)	

Toxicological Substances/Codes

Acetamenophen	001	Cocaine	018	Imipramine	035	Menthol	052
Acetaldehyde	002	Codeine	019	Isopropanol	036	Morphine	053
Acetone	003	Desipramine	020	Ketamine	037	Medazepam	054
Amoxapine	004	Diazepam	021	Lidocaine	038	Nicotine	055
Amitriptyline	005	Dihydrocodeinone	022	Lorazepam	047	Nortriptyline	056
Amobarbital	006	Diphenhydramine	023	Meclogualone	039	Oxazepam	057
Amphetamine	007	Diphenylhydantoin	024	Meperidine	040	Pentazocine	058
Benzoylecgonine	008	Doxepin	025	Mephentermine	041	Phenobarbital	059
Brompheniramine	009	Desalkylflurazepam	026	Meprobamate	042	Procaine	060
Butalbital	010	Demoxapam	027	Methanol	043	Propoxyphene	061
Butabarbital	011	Ethchlorvynol	028	Methadone	044	Secobarbital	062
Caffene	012	Flunitrazepam	029	Methamphetamine	045	Temazepam	063
Cannabinoids	013	Flurazepam	030	Methaqualone	046	Tranylcypromine	064
Chlorazepate	014	Fluphenazine	031	Methylphenidate	048	Nordiazepam	065
Chlordiazepoxide	015	Glutethimide	032	Pentamine	049	Pentobarbital	066
Chlorphentermine	016	Haloperidol	033	Methsuximide	050	Phencyclidine	067
Clonazepam	017	Hexobarbital	034	Methyprylon	051	Propoxyphene	068
						Secobarbital	069

National Transportation Safety Board

FACTUAL REPORT AVIATION

02

NTSB Accident/Incident Number

MIA915FA214

Supplement K—Occupant, Survival and Injury Information (continued)

63 ☒ *For multiple extreme traumatic injuries, check box, and go to next applicable supplement.*

Occupant Injury Coding Chart *(Complete for survivors and non survivors, as applicable.)*

	A Body Region	B Aspect	C Lesion	D System/Organ	E A.I.S. Severity	F 6 Injury Source	G 7 Source of Dat
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							

Body Region - A

01 Head (Skull, scalp, ears)
02 Face (Forehead, nose, eyes, mouth)
03 Neck (Cervical spine, C1-C7)
04 Shoulder (Clavicle, scapula, joint)
05 Upper limb (Whole arm)
06 Arm (Upper)
07 Elbow
08 Forearm
09 Wrist
10 Hand—fingers
11 Chest (Anterior and posterior ribs)
12 Abdomen (Diaphragm and below)
13 Back (Thoracsic spine T1-T12)
14 Back (Lumbar L1-L5)
15 Pelvis—hip
16 Lower limb (Whole leg)
17 Thigh (Femur)
18 Knee
19 Leg (Below knee)
20 Ankle
21 Foot—toes
22 Whole body
88 Injured, unknown region
99 Other

Aspect Of Injury - B

01 Right
02 Left
88 Injured aspect unknown
99 Other

Lesion - C

01 Laceration
02 Contusion
03 Abrasion
04 Fracture
05 Concussion
06 Avulsion
07 Rupture
08 Sprain
09 Dislocation
10 Crush
11 Amputation
12 Burn
13 Fracture and dislocation
14 Severence (Transection)
15 Strain
16 Detachment (Separation)
17 Perforation (Puncture)
88 Injured unknown lesion
99 Other

System/Organ - D

01 Skeletal
02 Vertebrae
03 Joints
04 Digestive
05 Liver
06 Nervous System
07 Brain
08 Spinal cord
09 Ears
10 Arteries veins
11 Heart
12 Spleen
13 Urogenital
14 Kidneys
15 Respiratory
16 Eye
17 Pulmonary/lungs
18 Airway
19 Muscles
20 Integumentary
21 Thyroid (Thyroid or other endocrine gland)
88 Injured, unknown system or organ
99 Other

Abbreviated Injury Scale - E

00 Not injured
01 Minor injury
02 Moderate injury
03 Serious injury (Not life-threatening)
04 Severe injury (Life-threatening survival probable)
05 Critical injury (Survival uncertain)
06 Maximum (Untreatable)
07 Injured (Unknown severity)
88 Unknown if injured

Source of Data - G

Official
01 Autopsy records with or without hospital/medical records
02 Hospital/medical records
03 Emergency room records
04 Private or treating physicians

Unofficial
05 Lay coroner
06 E.M.S. personnel
07 Interviewee
08 Police
09 Other source

National Transportation Safety Board

FACTUAL REPORT
AVIATION

02

NTSB Accident/Incident Number

MIA95FA224

Supplement K—Occupant, Survival and Injury Information (continued)

Injury Source List - F

01 Windshield
02 Windshield frame
03 Window
04 Window frame
05 Instrument panel
06 Side console
07 Center console
08 Control stick/cyclic stick
09 Collective
10 Control yoke/column
11 Throttle quadrant/levers
12 Rudder pedals
13 Ceiling
14 Sidewall
15 Floor
16 Fuselage framing/structure
17 Table
18 Seat
19 Seatback tray
20 Restraints—seatbelt/tiedown
21 Restraints—shoulder harness
22 Unsecured item(s) in cockpit
23 Unsecured item(s) in cabin
24 Other occupants
25 Ground/runway
26 Unsecured seat(s)
27 Outside object(s) entering aircraft
28 Galley item(s)
29 Food/beverage item(s)
30 Other interior objects
31 Other exterior objects
32 Evacuation slide/slide raft
33 Escape rope/tape
34 Escape inertia device
35 Ejected from aircraft
36 Propeller/rotor blades
37 Exterior aircraft surface
38 Engine
39 Wheel/tires
40 Ground vehicle
41 Toxic/noxious/irritant fumes
42 Fire/radiant heat
43 Flying glass
44 Door/hatches
45 Acceleration forces
46 Exposure
47 Glare Shield
48 Eyeglasses
88 Unknown
99 Other

74 Death Due To Fire/Smoke

1 ☐ Yes
2 ☒ No
A Other

75 Death Due To Drowning

1 ☐ Yes
2 ☒ No
A Other

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

MIA95FA214

Supplement S—Aircraft Occupant and Injured Ground Personnel

Other Occupants	B	C	D	E	F	G	H Degree of Injury			
A Name	Seat No.	Address (City & State)	Crew	Passenger	Non-Occupant	FAA	4 Fatal	3 Serious	2 Minor	1 None
1 HYUN CHUL SEN	01	DAYTONA BEACH, FL	X				X			
2 JOHN SCHEITHE	2A	BEACON HILLS, CT		X			X			
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										

FORM APPROVED FOR USE THROUGH 7/31/96 BY OMB NO. 3147-0

NATIONAL TRANSPORTATION SAFETY BOARD
PILOT/OPERATOR AIRCRAFT ACCIDENT REPORT
This Form To Be Used For Reporting Civil Aircraft Accidents Involving Commercial and General Aviation Aircraft

Location

Nearest City/Place, State, Zip Code	Date of Accident	Local Time (24 HOUR CLOCK)	Zone	Elevation At Accident Site
NEW SMYRNA BEACH, FL 32168	09-15-95	1652	EDST	12 Feet MSL

If The Accident Occurred On Approach, Takeoff Or Within 3 Miles Of An Airport, Complete The Following Information

Proximity To Airport:

1. [X] On Airport
2. [ ] Within 1/4 Mile
3. [ ] Within 1/2 Mile
4. [ ] Within 3/4 Mile
5. [ ] Within 1 Mile
6. [ ] Within 2 Miles
7. [ ] Within 3 Miles
8. [ ] Beyond 3 Miles

Airport Name	Airport Ident	Runway/Landing Surface And Conditions:
NEW SMYRNA BEACH	34J	1. Direction: 110° 3. Width: 100' 2. Length: 4300 4. Surface: Asphalt 5. Condition: DRY

Phase Of Operation:

1. [ ] Standing
2. [ ] Taxi
3. [ ] Takeoff
4. [ ] Climb
5. [ ] Cruise
6. [ ] Descent
7. [ ] Approach
8. [X] Landing
9. [ ] Hover/Maneuver
10. [ ] Altitude Of In-Flight Occurrence _____ Feet MS

Aircraft Information

Registration Mark	Aircraft Manufacturer	Aircraft Type/Model	Serial Number	Cert Max Gross W
N117ER	SOCATA	TB-9	1509	2337

Type Of Aircraft

1. [X] Airplane
2. [ ] Helicopter
3. [ ] Glider
4. [ ] Balloon
5. [ ] Blimp/Dirigible
6. [ ] Ultralight
7. [ ] Gyroplane
8. Specify _____

Type Of Airworthiness Certificate

1. [X] Normal
2. [X] Utility
3. [ ] Acrobatic
4. [ ] Transport
5. [ ] Restricted
6. [ ] Limited
7. [ ] Experimental
8. Specify _____

Amateur Built

1. [ ] Yes
2. [X] No

Landing Gear

1. [X] Tricycle—Fixed
2. [ ] Tricycle—Retractable
3. [ ] Tailwheel—Fixed
4. [ ] Tailwheel—Retractable
5. [ ] Tailwheel—Retractable Mains
6. [ ] Amphibian
7. [ ] Skid
8. [ ] Ski/Wheel
9. Specify _____

No. Of Seats

Flight/Cabin Crew 2
Pax 2

Stall Warning System Installed	IFR Equipped	Engine Type
1. [X] Yes 2. [ ] No	1. [X] Yes 2. [ ] No	1. [X] Reciprocating—Carburetor 2. [ ] Reciprocating—Fuel Injected 3. [ ] Turbo Prop 4. [ ] Turbo Jet 5. [ ] Turbo Fan 6. [ ] Turbo Shaft

Engine Manufacturer	Engine Model/Series	Engine Rated Power	Type Of Fire Extinguishing System Used
AVCO LYCOMING	O-320-D2A	1. 160 Horsepower 2. _____ Lbs. Thrust	1. [X] None 2. Specify _____

Engine(s)	Date of Mfg.	Mfg. Serial No.	Total Time	Time Since Inspection	Time Since Overhaul
Engine No. 1	10-26-92	L-1759-39A	2429 Hours	79 Hours	273 Hours
Engine No. 2			Hours	Hours	Hours
Engine No. 3			Hours	Hours	Hours
Engine No. 4			Hours	Hours	Hours

Type Of Maintenance Program

1. [X] Annual
2. [ ] Manufacturer's Inspection Program
3. [ ] Other Approved Inspection Program (AAIP)
4. [ ] Continuous Airworthiness
5. Specify _____

Type Of Last Inspection

1. [X] Annual
2. [ ] 100 Hour
3. [ ] AAIP
4. [ ] Continuous Airworthiness

Date Last Inspection Performed 09-08-95 (M/D/Y)
Time Since Last Inspection 79 Hours
Airframe Total Time 2429 Hours

Emergency Locator Transmitter (ELT)	ELT Manufacturer	Model/Series	Serial Number	Battery Date (M/D/Y)
	NARC	910	13378	03-25-93

Switch 1. [ ] On 2. [ ] Off 3. [ ] Armed
Operated 1. [ ] Yes 2. [ ] No
Aided In Accident Location 1. [ ] Yes 2. [X] No

Registered Aircraft Owner EMBRY-RIDDLE AERONAUTICA UNIVERSITY
Address 600 S. Clyde MORRIS Blvd. DAYTONA BEACH, FL 32114

Operator Of Aircraft

1. [X] Same As Registered Owner
2. Name
3. DBS:

Address

1. [X] Same As Registered Owner
2. _____

Owner/Operator Information (cont.)

Operator (Certificate Number)	Operator Designator (4 Letter Designator)

Purpose Of Flight And Type Of Operation

Regulation Flight Conducted Under
1. [X] FAR 91 (only) 4. [ ] FAR 121 7. [ ] FAR 133
2. [ ] FAR 91D 5. [ ] FAR 125 8. [ ] FAR 135
3. [ ] FAR 103 6. [ ] FAR 129 9. [ ] FAR 137

Purpose Of Flight
1. [ ] Personal 6. [ ] Aerial Observation
2. [ ] Business 7. [ ] Other Work Use
3. [X] Instructional 8. [ ] Public Use
4. [ ] Executive/Corporate 9. [ ] Ferry
5. [ ] Aerial Application 10. [ ] Positioning

Operator Authority
FAR 121
1. [ ] Domestic
2. [ ] Flag
3. [ ] Supplemental

FAR 135
4. [ ] On Demand
5. [ ] Commuter

FAR 133
8. [ ] Rotorcraft External Load

FAR 125
7. [ ] Large Aircraft

FAR 129
8. [ ] Foreign

FAR 121, 125, 127, 129, 135 Revenue Operations
1. [ ] Scheduled
2. [ ] Non Scheduled
3. [ ] Domestic
4. [ ] International
5. [ ] Passenger
6. [ ] Cargo
7. Specify _____

Pilot Information

Pilot Name	Pilot Certificate No.	Address	Nationality
McCOY, JOSEPH FLOYD	450358101	705 S. BEACH ST. Apt-161 DAYTONA BEACH FL 32114	USA

Certificate(s)
1. [ ] Student 3. [X] Commercial 5. [X] Flight Instructor 7. [ ] Military 9. [ ] None
2. [ ] Private 4. [ ] Airline Transport 6. [ ] Flight Engineer 8. [ ] Foreign 10. Specify _____

Rating(s)
1. [ ] None 5. [ ] Helicopter
2. [X] Single-Engine Land 7. [ ] Glider
3. [ ] Single Engine Sea 8. [ ] Free Balloon
4. [X] Multiengine Land 9. [ ] Airship
5. [ ] Multiengine Sea 10. [ ] Gyroplane

Instrument Rating(s)
1. [ ] None
2. [X] Airplane
3. [ ] Helicopter

Instructor Rating(s)
1. [ ] None 6. [X] Instrument Airplane
2. [X] Airplane S.E. 7. [ ] Instrument Helicopter
3. [ ] Airplane M.E. 8. [ ] Ground Instructor
4. [ ] Helicopter 9. Specify _____
5. [ ] Glider

Type Ratings/Student Endorsements: NA

Date Of Biennial Flight Review Or Equivalent (M/D/Y): 02-31-94

BFR Aircraft
1. Make: Not KNOWN
2. Model: _____

Medical Certificate
1. [ ] None 3. [ ] Class 2
2. [X] Class 1 4. [ ] Class 3

Date Of Last Medical (M/D/Y): 02-13-95

Limitations: NONE

Waivers:

Date Of Birth (M/D/Y): 03-20-69

Degree Of Injury
1. [ ] None
2. [ ] Minor
3. [ ] Serious
4. [X] Fatal

Seat Occupied
1. [ ] Left 4. [X] Front
2. [X] Right 5. [ ] Rear
3. [ ] Center

Person At Controls At Time Of Accident
1. [ ] Pilot In Command 3. [ ] Both Pilots 5. [ ] No One
2. [ ] Second Pilot 4. [ ] Non-Pilot

Seat Belt Available
1. [X] Yes
2. [ ] No

Seat Belt Used
1. [X] Yes
2. [ ] No

Shoulder Harness Available
1. [X] Yes
2. [ ] No

Shoulder Harness Used
1. [X] Yes
2. [ ] No

Source Of Pilot Flight Time Information
1. [ ] Pilot Logbook 4. [X] Company
2. [ ] Operators Estimate 5. Specify _____
3. [ ] FAA Records

Flight Time	All A/C	This Make & Model	Airplane Single Engine	Airplane Multiengine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	668		507		40					
Pilot In Command (PIC)	566									
Instructor	063									
This Make/Model										
Last 90 Days										
Last 30 Days	59									
Last 24 Hours										

Second Pilot Information

Second Pilot Responsibilities At The Time Of Accident
1. [ ] Co-Pilot 2. [X] Dual Student 3. [ ] Safety Pilot 4. [ ] Check Pilot 5. [ ] None (Pilot-Rated Passenger)

Pilot Name	Pilot Certificate No.	Address	Nationality
HYUN SIN	E.E07209936	P.O. BOX 148876 DAYTONA BEACH, FL 32114	S. KOREA

Certificate(s)
1. [X] Student 3. [ ] Commercial 5. [ ] Flight Instructor 7. [ ] Military 9. None _____
2. [ ] Private 4. [ ] Airline Transport 6. [ ] Flight Engineer 8. [ ] Foreign 10. Specify _____

SECOND PILOT INFORMATION (cont.)

Rating(s)
1. ☐ None
2. ☐ Single Engine Land
3. ☐ Single Engine Sea
4. ☐ Multiengine Land
5. ☐ Multiengine Sea
6. ☐ Helicopter
7. ☐ Glider
8. ☐ Free Balloon
9. ☐ Airship
10. ☐ Gyroplane

Instrument Rating(s)
1. ☐ None
2. ☐ Airplane
3. ☐ Helicopter

Instructor Rating(s)
1. ☐ None
2. ☐ Airplane S.E.
3. ☐ Airplane M.E.
4. ☐ Helicopter
5. ☐ Glider
6. ☐ Instrument Airplane
7. ☐ Instrument Helicopter
8. ☐ Ground Instructor
9. Specify _____

Type Ratings/Student Endorsements
NONE

Date Of Biennial Flight Review Or Equivalent (M/D/Y)
NA

BFR Aircraft
1. Make NA
2. Model _____

Medical Certificate
1. ☐ None
2. ☒ Class 1
3. ☐ Class 2
4. ☐ Class 3

Date Of Last Medical (M/D/Y)
03-31-95

Limitations
Waivers

Date Of Birth

Degree Of Injury
1. ☐ None
2. ☐ Minor
3. ☐ Serious
4. ☒ Fatal

Seat Occupied
1. ☒ Left
2. ☐ Right
3. ☐ Center
4. ☒ Front
5. ☐ Rear

Seat Belt Available
1. ☒ Yes
2. ☐ No

Seat Belt Used
1. ☒ Yes
2. ☐ No

Shoulder Harness Available
1. ☒ Yes
2. ☐ No

Shoulder Harness Used
1. ☒ Yes
2. ☐ No

Source Of Pilot Flight Time Information
1. ☐ Pilot Logbook
2. ☐ Operators Estimate
3. ☐ FAA Records
4. ☒ Company
5. Specify _____

Flight Time	All A/C	This Make & Model	Airplane Single Engine	Airplane Multiengine	Night	Instrument: Actual	Instrument: Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	6.5									
Pilot In Command (PIC)	0									
Instructor	0									
This Make/Model										
Last 90 Days	0									
Last 30 Days	6.5									
Last 24 Hours	0									

Other Personnel

	Name	Seat	Address (City & State)	Crew	Passenger: Non-Revenue	Passenger: Revenue	Non-Occupant	FAA	Degree Of Injury: Fatal	Serious	Minor	None
1.	SCHEITHE, Robert	REAR	BEARON FALLS CT	X					FATAL			
2.												
3.												
4.												
5.												
6.												

Flight Itinerary Information

Last Departure Point
1. Airport ID DAB
2. City/Place DAYTONA BEACH
3. State FL

Time Of Departure
1. Time 1528
2. Time Zone EDST

Destination
1. Airport ID LOCAL TRAINING
2. City/Place _____
3. State _____

Flight Plan Filed
1. ☐ None
2. ☐ VFR
3. ☐ IFR
4. ☐ VFR/IFR
5. ☒ Company (VFR)
6. ☐ Military (VFR)

If Weather Was Involved, State If Weather Briefing Was Obtained Or If Weather Reports Were Checked And How It Was Accomplished

Fuel On Board At Last Takeoff
41.7 Gallons
41.7 ~~Pounds~~

Fuel Type
1. ☐ 80/87
2. ☒ 100 Low Lead
3. ☐ 100/130
4. ☐ 115/145
5. ☐ Jet A
6. ☐ Automotive
7. Specify _____

Other Services, If Any, Prior To Departure

Weather Information At The Accident Site

Source Of Weather Information (Pilot/Operator, Weather Observation)
OPERATOR. SAME AS DAB

Light Condition
1. ☐ Dawn
2. ☒ Daylight
3. ☐ Dusk
4. ☐ Bright Night
5. ☐ Dark Night

Visibility
10+ Miles

Temp (°F)
87

Weather Information At The Accident Site (cont.)

Dew Point	Altimeter Setting	Sky/Lowest Cloud Condition
74 (°F)	30.09 "Hg	1. [X] Clear; 2. [ ] Scattered ____ Feet AGL; 3. [ ] Broken ____ Feet AGL; 4. [ ] Overcast ____ Feet AGL; 5. [ ] Partial Obscuration; 6. [ ] Obscurred

Wind Information
1. Direction 180
2. Velocity 9 KTS
3. Gusts ____ KTS

Restriction To Visibility	Type Precipitation	Intensity Of Precipitation
NONE	NONE	1. [ ] Light 2. [ ] Moderate 3. [ ] Heavy 4. Specify ____

Turbulence (Multiple entry)
1. [X] None 2. [ ] Light 3. [ ] Moderate 4. [ ] Severe 5. [ ] Extreme 6. [ ] Clear Air 7. [ ] In Clouds

Damage To Aircraft And Other Property

Degree Of Aircraft Damage
1. [ ] None 2. [ ] Minor 3. [ ] Substantial 4. [X] Destroyed

Fire
1. [X] Yes 2. [ ] No 3. [ ] In-Flight 4. [X] On Ground

Description Of Damage To Aircraft And Other Property

Mechanical Malfunction Failure

1. [ ] No
2. [ ] Yes List The Name Of The Part, Manufacturer, Part No., Serial No. And Describe The Failure

Total Time

On Part	At Overhaul
____ Hours	____ Hours

Collision Accident

If Collision Accident Occurred, Complete The Information For Other Aircraft

Registration mark	Aircraft Manufacturer	Aircraft Type/Model	Degree Of Aircraft Damage
N2351A	PIPER	PA-38	1. [ ] Destroyed 2. [ ] Substantial 3. [X] Minor 4. [ ] None

Registered Aircraft Owner	Address

Pilot Name	Address	Pilot Certificate No.

Evacuation Of Aircraft

Assistance Received

1. [ ] Outside Person(s) 3. [ ] Slide 5. [ ] Ladder
2. [ ] Auxiliary Lighting 4. [ ] Rope 6. [ ] Specify ____

Method Of Exit (State Approximate Number Of Persons Using Each Of The Following)
1. Main Door ____ 2. Auxiliary Door ____ 3. Emergency Exit ____

Recommendation (How Could This Accident Have Been Prevented)

Operator/Owner Safety Recommendation (Optional Entry)

Additional Flight Crew Members

For Each Additional Flight Crew Member, Exclusive Of Cabin Attendants Complete The Following Information:

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Accident

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Accident

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Aircraft

I Hereby Certify That The Above Information Is Complete And Accurate To The Best Of My Knowledge

Date Of This Report	Signature Of Pilot/Operator
09-21-95	A C TACKER

Signature Of Person Filing Report Other Than Pilot/Operator

1. Signature _____

2. Type Or Print Name _____

3. Title _____

For NTSB Use Only

NTSB Accident No.	Reviewed By NTSB Office Located At	Name Of Investigator	Date Report Received
MIA95FA224A	MIAMI, FLORIDA	Jeffrey J. Kennedy	9-22-95

FORM APPROVED FOR USE THROUGH 11/30/90 BY OMB NO. 31

NATIONAL TRANSPORTATION SAFETY BOARD
PILOT/OPERATOR AIRCRAFT ACCIDENT REPORT
This Form To Be Used For Reporting Civil Aircraft Accidents Involving Commercial and General Aviation Aircraft

Location

Nearest City/Place, State, Zip Code	Date of Accident	Local Time (24 HOUR CLOCK)	Zone	Elevation At Accident S
NEW SMYRNA Beach, FL 32168	09-15-95	1700		12 Feet MSL _____ Feet MSL

If The Accident Occurred On Approach, Takeoff Or Within 3 Miles Of An Airport, Complete The Following Information

Proximity To Airport:

1. [X] On Airport
2. [ ] Within 1/4 Mile
3. [ ] Within 1/2 Mile
4. [ ] Within 3/4 Mile
5. [ ] Within 1 Mile
6. [ ] Within 2 Miles
7. [ ] Within 3 Miles
8. [ ] Beyond 3 Miles

Airport Name	Airport Ident	Runway/Landing Surface And Conditions: Rwy 11
NEW SMYRNA BEACH MUNICIPLE	34J	1. Direction: 110 3. Width: 100 2. Length: 4300 4. Surface: ASPHALT 5. Condition: GOOD

Phase Of Operation:

1. [ ] Standing
2. [ ] Taxi
3. [ ] Takeoff
4. [ ] Climb
5. [ ] Cruise
6. [ ] Descent
7. [X] Approach
8. [ ] Landing
9. [ ] Hover/Maneuver
10. [ ] Altitude Of In-Flight Occurrence 100 Fee

Aircraft Information

Registration Mark	Aircraft Manufacturer	Aircraft Type/Model	Serial Number	Cert Max Gr
N2351A	Piper	PA38-112	38-78A0649	1670

Type Of Aircraft

1. [X] Airplane
2. [ ] Helicopter
3. [ ] Glider
4. [ ] Balloon
5. [ ] Blimp/Dirigible
6. [ ] Ultralight
7. [ ] Gyroplane
8. Specify _____

Type Of Airworthiness Certificate

1. [ ] Normal
2. [X] Utility
3. [ ] Acrobatic
4. [ ] Transport
5. [ ] Restricted
6. [ ] Limited
7. [ ] Experimental
8. Specify _____

Amateur Bui

1. [ ] Yes
2. [X] No

Landing Gear

1. [X] Tricycle—Fixed
2. [ ] Tricycle—Retractable
3. [ ] Tailwheel—Fixed
4. [ ] Tailwheel—Retractable
5. [ ] Tailwheel—Retractable Mains
6. [ ] Amphibian
7. [ ] Skid
8. [ ] Ski/Wheel
9. Specify _____

No. Of Seats

Flight/Cabin
Crew 2
Pax _____

Stall Warning System Installed

1. [X] Yes
2. [ ] No

IFR Equipped

1. [ ] Yes
2. [X] No

Engine Type

1. [X] Reciprocating—Carburetor
2. [ ] Reciprocating—Fuel Injected
3. [ ] Turbo Prop
4. [ ] Turbo Jet
5. [ ] Turbo Fa
6. [ ] Turbo Sh

Engine Manufacturer	Engine Model/Series	Engine Rated Power	Type Of Fire Extinguishing System Used
Lycoming	O-235-L2C	1. 112 Horsepower 2. _____ Lbs. Thrust	1. [X] None 2. Specify _____

Engine(s)	Date of Mfg.	Mfg. Serial No.	Total Time	Time Since Inspection	Time Since Overhaul
Engine No. 1	10/01/79	L-16981-15	2574.99 Hours	13.99 Hours	1390
Engine No. 2			Hours	Hours	
Engine No. 3			Hours	Hours	
Engine No. 4			Hours	Hours	

Type Of Maintenance Program

1. [X] Annual
2. [ ] Manufacturer's Inspection Program
3. [ ] Other Approved Inspection Program (AAIP)
4. [ ] Continuous Airworthiness
5. Specify _____

Type Of Last Inspection

1. [X] Annual
2. [ ] 100 Hour
3. [ ] AAIP
4. [ ] Continuous Airworthiness

Date Last Inspection Perfo

09-11-95 (M

Time Since Last Inspectior

13.99 H

Airframe Total Time

2574.99 H

Emergency Locator Transmitter (ELT)	ELT Manufacturer	Model/Series	Serial Number	Battery Date (M/D/Y)
	Artex	CIR-11-2	27739	11-15-9

Switch
1. [ ] On 2. [ ] Off 3. [X] Armed

Operated
1. [ ] Yes 2. [X] No

Aided In Accident Location
1. [ ] Yes 2. [X] No

Registered Aircraft Owner
Spruce Creek Aviation

Address
1 Beech Blvd.
Spruce Creek Airport
Daytona Beach, FL 32124

Operator Of Aircraft

1. [X] Same As Registered Owner
2. Name
3. DBS:

Address

1. [X] Same As Registered Owner
2. _____

NTSB Form 6120.1/2 (11/87) This form replaces NTSB Forms 6120.1 (Rev. 10/77) and 6120.2 (Rev. 10/77).

Owner/Operator Information (cont.)

Operator (Certificate Number)	Operator Designator (4 Letter Designator)

Purpose Of Flight And Type Of Operation

Regulation Flight Conductor Under
1. [X] FAR 91 (only) 4. [ ] FAR 121 7. [ ] FAR 133
2. [ ] FAR 91D 5. [ ] FAR 125 8. [ ] FAR 135
3. [ ] FAR 103 6. [ ] FAR 129 9. [ ] FAR 137

Purpose Of Flight
1. [X] Personal 6. [ ] Aerial Observation
2. [ ] Business 7. [ ] Other Work Use
3. [ ] Instructional 8. [ ] Public Use
4. [ ] Executive/Corporate 9. [ ] Ferry
5. [ ] Aerial Application 10. [ ] Positioning

Operator Authority
FAR 121
1. [ ] Domestic
2. [ ] Flag
3. [ ] Supplemental

FAR 135
4. [ ] On Demand
5. [ ] Commuter

FAR 133
6. [ ] Rotorcraft External Load

FAR 125
7. [ ] Large Aircraft

FAR 129
8. [ ] Foreign

FAR 121, 125, 127, 12 Revenue Operations
1. [ ] Scheduled
2. [ ] Non Scheduled
3. [ ] Domestic
4. [ ] International
5. [ ] Passenger
6. [ ] Cargo
7. Specify _____

Pilot Information

Pilot Name	Pilot Certificate No.	Address	Nationality
Gregoire Galley	Pending	Cedarwood Village Cir Daytona Beach, FL 32119	Swiss

Certificate(s)
1. [ ] Student 3. [ ] Commercial 5. [ ] Flight Instructor 7. [ ] Military 9. [ ] None
2. [X] Private 4. [ ] Airline Transport 6. [ ] Flight Engineer 8. [X] Foreign 10. Specify Swiss + U.S

Rating(s)
1. [ ] None 6. [ ] Helicopter
2. [X] Single Engine Land 7. [ ] Glider
3. [ ] Single Engine Sea 8. [ ] Free Balloon
4. [ ] Multiengine Land 9. [ ] Airship
5. [ ] Multiengine Sea 10. [ ] Gyroplane

Instrument Rating(s)
1. [X] None
2. [ ] Airplane
3. [ ] Helicopter

Instructor Rating(s)
1. [X] None 6. [ ] Instrument Airpla
2. [ ] Airplane S.E. 7. [ ] Instrument Helico
3. [ ] Airplane M.E. 8. [ ] Ground Instructo
4. [ ] Helicopter 9. Specify _____
5. [ ] Glider

Type Ratings/Student Endorsements

Date Of Biennial Flight Review Or Equivalent (M/D/Y)
within 2yrs of original issue

BFR Aircraft
1. Make _____
2. Model _____

Medical Certificate Swiss-Pvt
1. [ ] None 3. [ ] Class 2
2. [ ] Class 1 4. [X] Class 3

Date Of Last Medical (M/D/Y)
6/14/94

Limitations
must wear glasses

Waivers

Date Of Birth (M/D/
02/04/73

Degree Of Injury
1. [X] None
2. [ ] Minor
3. [ ] Serious
4. [ ] Fatal

Seat Occupied
1. [X] Left 4. [ ] Front
2. [ ] Right 5. [ ] Rear
3. [ ] Center

Person At Controls At Time Of Accident
1. [X] Pilot In Command 3. [ ] Both Pilots 5. [ ] No One
2. [ ] Second Pilot 4. [ ] Non-Pilot

Seat Belt Avail
1. [X] Yes
2. [ ] No

Seat Belt Used
1. [X] Yes
2. [ ] No

Shoulder Harness Available
1. [X] Yes
2. [ ] No

Shoulder Harness Used
1. [X] Yes
2. [ ] No

Source Of Pilot Flight Time Information
1. [X] Pilot Logbook 4. [ ] Company
2. [ ] Operators Estimate 5. Specify _____
3. [ ] FAA Records

Flight Time	All A/C	This Make & Model	Airplane Single Engine	Airplane Multiengine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Light Than
Total Time	79.2	13.1	79.2		4.2					
Pilot In Command (PIC)	20.3	4.1	20.3							
Instructor	58.9	9.0	58.9		4.7					
This Make/Model										
Last 90 Days	19.2	13.1	19.2							
Last 30 Days	18.8	13.1	18.8							
Last 24 Hours	2.0	1.0	2.0							

Second Pilot Information

Second Pilot Responsibilities At The Time Of Accident
1. [ ] Co-Pilot 2. [ ] Dual Student 3. [ ] Safety Pilot 4. [ ] Check Pilot 5. [ ] None (Pilot-Rated Passenger)

Pilot Name	Pilot Certificate No.	Address	Nationality

Certificate(s)
1 [ ] Student 3. [ ] Commercial 5. [ ] Flight Instructor 7. [ ] Military 9. None _____
2. [ ] Private 4. [ ] Airline Transport 6. [ ] Flight Engineer 8. [ ] Foreign 10. Specify _____

SECOND PILOT INFORMATION (Cont.)

Rating(s)
1. ☐ None
2. ☐ Single Engine Land
3. ☐ Single Engine Sea
4. ☐ Multiengine Land
5. ☐ Multiengine Sea
6. ☐ Helicopter
7. ☐ Glider
8. ☐ Free Balloon
9. ☐ Airship
10. ☐ Gyroplane

Instrument Rating(s)
1. ☐ None
2. ☐ Airplane
3. ☐ Helicopter

Instructor Rating(s)
1. ☐ None
2. ☐ Airplane S.E.
3. ☐ Airplane M.E.
4. ☐ Helicopter
5. ☐ Glider
6. ☐ Instrument Airpla
7. ☐ Instrument Helicc
8. ☐ Ground Instructo
9. Specify _____

Type Ratings/Student Endorsements

Date Of Biennial Flight Review Or Equivalent (M/D/Y)

BFR Aircraft
1. Make _____
2. Model _____

Medical Certificate
1. ☐ None
2. ☐ Class 1
3. ☐ Class 2
4. ☐ Class 3

Date Of Last Medical (M/D/Y)

Limitations

Waivers

Date Of Birth

Degree Of Injury
1. ☐ None
2. ☐ Minor
3. ☐ Serious
4. ☐ Fatal

Seat Occupied
1. ☐ Left
2. ☐ Right
3. ☐ Center
4. ☐ Front
5. ☐ Rear

Seat Belt Availab
1. ☐ Yes
2. ☐ No

Seat Belt Used
1. ☐ Yes
2. ☐ No

Shoulder Harness Available
1. ☐ Yes
2. ☐ No

Shoulder Harness Used
1. ☐ Yes
2. ☐ No

Source Of Pilot Flight Time Information
1. ☐ Pilot Logbook
2. ☐ Operators Estimate
3. ☐ FAA Records
4. ☐ Company
5. Specify _____

Flight Time	All A/C	This Make & Model	Airplane Single Engine	Airplane Multiengine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Ligh Than
Total Time										
Pilot In Command (PIC)										
Instructor										
This Make/Model										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Other Personnel

Name	Seat	Address (City & State)	Crew	Passenger Non-Revenue	Passenger Revenue	Non-Occupant	FAA	Degree Of Injury Fatal	Serious	Minor	N
1.											
2.											
3.											
4.											
5.											
6.											

Flight Itinerary Information

Last Departure Point
1. Airport ID 44J
2. City/Place Spruce Creek Fl
3. State FLORIDA

Time Of Departure
1. Time 16:10
2. Time Zone EASTERN

Destination
1. Airport ID 34J
2. City/Place New Smyrna Beach
3. State FLORIDA

Flight Plan Filed
1. ☒ None
2. ☐ VFR
3. ☐ IFR
4. ☐ VFR/IFR
5. ☐ Company (VI
6. ☐ Military (VFR

If Weather Was Involved, State If Weather Briefing Was Obtained Or If Weather Reports Were Checked And How It Was Accomplished

Daytona ATIS checked on FBO radio

Fuel On Board At Last Takeoff
30 Gallons
or
_____ Pounds

Fuel Type
1. ☐ 80/87
2. ☒ 100 Low Lead
3. ☐ 100/130
4. ☐ 115/145
5. ☐ Jet A
6. ☐ Automotive
7. Specify _____

Other Services, If Any, Prior To Departure

Oil Added - 1 qt.

Weather Information At The Accident Site

Souce Of Weather Infomration (Pilot/Operator, Weather Observation)

DAB ATIS

Light Condition
1. ☐ Dawn
2. ☒ Daylight
3. ☐ Dusk
4. ☐ Bright Night
5. ☐ Dark Night

Visibility
10+ Miles

Temp (°F)
84°

Weather Information At The Accident Site (cont.)

Dew Point	Altimeter Setting
73 (°F)	30.09 Hg

Sky/Lowest Cloud Condition
1. ☐ Clear
2. ☒ Scattered 1500/3000 Feet AGL
3. ☐ Broken 10,000 Feet AGL
4. ☐ Overcast _____ Feet AGL
5. ☐ Partial Obscuration
6. ☐ Obscurred

Wind Information
1. Direction _____
2. Velocity _____ KTS
3. Gusts _____ KTS

Restriction To Visibility: NONE

Type Precipitation: NONE

Intensity Of Precipitation
1. ☐ Light
2. ☐ Moderate
3. ☐ Heavy
4. Specify _____

Turbulence (Multiple entry)
1. ☒ None 2. ☐ Light 3. ☐ Moderate 4. ☐ Severe 5. ☐ Extreme 6. ☐ Clear Air 7. ☐ In Clouds

Damage To Aircraft And Other Property

Degree Of Aircraft Damage
1. ☐ None 2. ☒ Minor 3. ☐ Substantial 4. ☐ Destroyed

Fire
1. ☐ Yes
2. ☒ No
3. ☐ In-Flight
4. ☐ On Ground

Description Of Damage To Aircraft And Other Property

Propeller - tip separation + damage

Mechanical Malfunction Failure

1. ☒ No
2. ☐ Yes List The Name Of The Part, Manufacturer, Part No., Serial No. And Describe The Failure

Total Time

On Part	At Overhaul
_____ Hours	_____ Hours

Collision Accident

If Collison Accident Occurred, Complete The Information For Other Aircraft

Registration mark	Aircraft Manufacturer	Aircraft Type/Model	Degree Of Aircraft Damage
117ER ?	Aerospatal	TAMPICO	1. ☒ Destroyed 2. ☐ Substantial 3. ☐ Minor 4. ☐ None

Registered Aircraft Owner: Embry-Riddle Aeronautical University

Address: Clyde-Morris ave Daytona Beach, Fl

Pilot Name	Address	Pilot Certificate No.
Joseph McCoy	—	—

Evacuation Of Aircraft

Assistance Received
1. ☒ Outside Person(s)
2. ☐ Auxiliary Lighting
3. ☐ Slide
4. ☐ Rope
5. ☐ Ladder
6. ☐ Specify _____

Method Of Exit (State Approximate Number Of Persons Using Each Of The Following)
1. Main Door 2 2. Auxiliary Door _____ 3. Emergency Exit _____

Recommendation (How Could This Accident Have Been Prevented)

Operator/Owner Safety Recommendation (Optional Entry)

1. Pilots should Fly standard size patterns - Downwind to base turn 450 from touchdown point. Training Flights, especially, should concentrate on flying traffic patterns as described in the AIM. One instructor influences the flying habit of dozens - a flight school, thousands.

IF for reasons of congestion, or dissimilar aircraft speed, ect., a pilot must fly a larger/lo pattern, extreme vigilence (visually + aurally) must be maintained for traffic, turning a standard size pattern. Extra scanning + extra communications are necessary! Instead of "25AU base 11 New Smyrna — New Smyrna traffic Tampico 25AU 1½ mile wide base Rwy. 11 Ne Smyrna #2 to land."

 CONTINUED ON BACK

2. Flight Instructors MUST Remember that instruction must not interfere with VFR see + avoid responsibilities. Scanning + collision avoidance procedures are critical in the intensive training atmosphere in this area where inexperienced + unaware pilots are present.

3. Large Flight schools should consider limiting the number of aircraft ~~th~~ dispatch to a particular practice area or airport. Saturation of AIRSPACE TRAFFIC PATTERNS, FREQUENCIES, + ATC FACILITIES occur regularly in this area due to the intense amount of flight training.

1. Airport managers may want to establish local procedures to deal with congestion or pattern size. Limits should also be considered on the number of aircraft practicing in the pattern or the amount of transient aircraft training permitted in general.

Further, Airport management and user groups should conduct regular meetings to encourage the use of and standardize the prescribed local procedures. The pilot population here grows + changes so rapidly that regular meetings should be conducted.

5. The FAA should make additional unicom frequencies available. 122.7 + 122.8 are particularly congested in the Daytona area. The ability to filter extraneous radio communications varies with pilot skill, experience, + language levels. A clearer frequency would result in each transmission at an uncontrolled field having more clarity, emphasis, and validity.

Additional Flight Crew Members

For Each Additional Flight Crew Member, Exclusive Of Cabin Attenents Complete The Following Information:

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Accident

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Accident

Name	FAA Certificate No.	Address	Title

Certificate(s)
1. ☐ Student 3. ☐ Commercial 5. ☐ Flight Instructor 7. ☐ Foreign
2. ☐ Private 4. ☐ Airline Transport 6. ☐ Flight Engineer 8. Specify _____

Ratings/Endorsements	Total Flight Time	Flight Time This Aircraft

Describe What Occurred In Chronological Order, The Circumstances Leading To The Accident And The Nature Of The Accident. Describe T Terrain And Include A Sketch Of Wreckage Distribution If Pertinent. Attach Extra Sheets If More Space Is Needed. State Point Of Departure, Time Of Departure, Intended Destination And Services Obtained.

On September 15th, 1995, my instructor and I flew a Piper Arrow in order to pu our training on that airplane and we made 3 full stop landings at New Smyr Beach Airport. We took off from Spruce Creek at 14:30 and came back at 15:30. At about 16:10 I took off from the Spruce Creek Airport in a Piper Tomahawk (N2351 rented from Spruce Creek Aviation. I was the only person on board. I head South and practised some steep turns and emergency procedures. Then I headed to the New Smyrna Beach Airport and changed the frequency to 122.90 MHz. I heard several planes in the pattern of RWY 11. Then I reported my position intentions on the radio about 4 NM SE of the airport. I made a wide turn the beach and entered downwind 11 at a 45° angle at 800 MSL. I made a call while entering the pattern to report my position and again on downwind 11 Abeam the numbers, I reduced the power to 2000 rpm, checked the speed, and se one notch of flaps. Scanning the approach area I reduced the power again to 170 and turned on base 11. I made another call on the radio on the base leg and trimmed my plane. After scanning the final left and right, I turned on final a reported my position on the radio and did my final checks. I reduced power to 1 back.

I made a total of 5 patterns, all the same way, with standard procedu and flying on a standard pattern. Everything was running smoothly and the quality of my landings gave me real assurance that I was flying well.

On my last pattern when I was abeam the numbers I could see a plane holding short of RWY 11. I could see no one ahead of me. Then I turned on base, scanned again, and went through my normal procedures an made a radio call. I finally turned on final, made another radio call, look at the RWY which was clear and looked at the airplane still holding short

On short final I heard someone on the radio: "Two planes on final, Tomahawk go around, Tomahawk go around" and while I was going through the go aro procedure I felt a bump. I still could not see any aircraft in front of me. T I saw the bottom rear part of the other airplane in front of me

(SEE BACK PLEASE)

I Hereby Certify That The Above Information Is Complete And Accurate To The Best Of My Knowledge

Date Of This Report	Signature Of Pilot/Operator
21st of September, 1995	Wesley Turner

Signature Of Person Filing Report Other Than Pilot/Operator

1. Signature Wesley Turner
2. Type Or Print Name Wesley S. Turner
3. Title Flight Instructor - Spruce Creek Aviation Director - Advanced Flight Training

For NTSB Use Only

NTSB Accident No.	Reviewed By NTSB Office Located At	Name Of Investigator	Date Report Received
MIA95FA224B	MIAMI, FLORIDA	Jeffrey Y. Kennedy	SEP 28 1995

diving to the ground and at the same time my propeller hit something. I could also see unusual color on the tip of the propeller. My engine started to run rough and took the decision to land rapidly because I realized I could still make it on the runway. I maintained my speed, landed and cleared the active to the left and pulled over after my engine quit by itself I shut down the aircraft.

The collision occured at about 17:00, at nearly 100 feet AGL. I never saw nor heard the other airplane involved in the accident

I returned from a 1-hour flight with my instructor at 15:30 from New Smirna where we did 3 landings with an Arrow. Then I flew by myself and took off from Spruce Creek at about 16:10 with a Piper Tomahawk (N2351A) & remained in the area. I approached New Smirna Airport from the South, made a radio call about 4 miles off the airport to tell my intentions. I made a wide turn over the ocean and joined downwind 11 at a 45° an I did 5 patterns at 34J. All my patterns were standard (height/speed/directions) and did all my radio work. I felt really at ease, everything was running smoothly, there w no stressful situations and my landings were safe and soft.

On my 4th pattern I noticed a high-wing plane about 300/400 ft below circuit altitu that was not flying a standard pattern. Another plane joined the downwind while I was ready to turn in downwind myself. I followed the plane and then for some that plane left the plane.

On my 5th pattern, I made a call in mid-downwind 11 and looked at the airplane that just took off (he also made a call). As I was at the end of downwind 11, I went through my checks, retard the throttle a bit (1700 rpm) and turned in base 11 with one notch of flaps. As I made this turn I made a radio call and looked at the base leg, the final leg and the RWY. I saw a plane (a C-150 I believe) that was holding short. For me it was clear that I was "cleared" to land and didn't see nor heard a plane in my path. I trimmed my plane to 70 KIAS. In short final, I made my last check (RWY clear - speed 70 KIAS) and kept my hand on the throttle. Suddenly I heard on the radio: "2 planes in final, Tomahawk, go around, go around" and at the same time I heard a noise from the bottom of my plane and afterwards only I saw a plane tipping over in front of me and my propeller then also hit something. I saw the bottom rear part of the airplane as [redacted] it was just diving to the ground.

Everything happened at the same time. I felt the first bump and pushed the throttle and pulled the colomn but my engine ran rough an the rpms were decreasing. I looked at my speed then, in order not to crash myself. I landed on the other half of the runway and taxied to the left side and my engine quit running by itself. I shut down the plane and went to the scene where a policeman hande me out a report to fill in

Sept. 16th. 1995 Grégoire Galley

Witnessed 9/16/95
Wally Turner

Doug Booker #1139 N189ER

I was doing pattern work with a FA-250 student (Aeon Rosich). When the Accident occured we were holding short of Runway 11. I was set up to demonstrate a soft field takeoff when we checked final for traffic. I saw a tampico on final and a tomahawk in close proximity. It looked to me like the Tomahawk was behind and abox the TAMPICO and getting closer. I heard on the radio someone say, "there are two aircon final." Then I said, "Tomahawk, go around over the radio. A short time elapsed and then the TAMPICO initiated a go-around. The nose went up and then sharply went down and hit the ground. The Aircraft ignited on impact I got out of the mooney and ran to the A Someone in A green uniform was there first. On person was thrown and one was pinned. The person that was thrown was pulled away. We were unable to get to the other person because of the fire and he looked pinned in tight.

Aaron Rusich N189ER

My flight instructor and I were holding short of the active rwy, runway 11. We both, witnessed two aircrafts, a TB-9 and a Tomahawk, on short final. The Tomahawk was slightly higher and behind the TB-9. My flight instructor made call's 2-3 times saying "Tomahawk go around," The TB-9's vertical stabilator appear to be hit by the Tomahawk's prop which resulted in a nosedive of the TB-9.

Brad Morin TB 142ER

I saw 2 planes approaching to land, one was lower than the other The 1st was lower than the last. I heard on the radio "Tomahawk go around, Tomahawk ~~go~~ go around." We landed right before this and we were taking off runway 11. I saw the first plane go nose down right into the ground. We got out of our airplane and ran to the accident scene. Other people were already there.

Harold Knopp #1125

I was riding in the back of N179ER my student: Eric Sumner and Eval Pilot Chip Hough were occupying front seats.
We Just had landed at New Smyrna Runway 11 and were taxiing back for Take off. I observed 2 airplanes very close to each other on final approa A radio call wasmade warning the 2 aircraft of their close proximity. Another radio call was made for a go Arou Several seconds later the two air planes appeared to collide. after which one airplane (TBM) went straight down and burst into flames on impact. I Beli the other aircraft was a Tomohau

Douglas Petersen IP 1024

WE (MYSELF, MIKE MEEHAN, JASON Bongus) were in the process of shutting down N132ER @ Vintage props and jets. There were four transmitions for a tomohawk on final to runway 11 to "go Around, Go Around, Go Around, go around." at which point I shut the aircraft down opened my side door and locked behind me. The aircraft burst into flames at that point I jumped out of a/c and started inventoring those names of people who witnessing them. /.

Tom Story Fall 10 Rm256 McKay Hall #226-7

I was in a TB 9, tail number ER42.
preparing for shut down on the ramp
when I heard on the trafic adv.
approx. 3-4 times "Tomahawk go around,
pull up and go around." I then looked
on final and saw what look to be
a very bad stall of a plane. I did
not know it was an ERAU untill after
the fact. The plane was in a straight
down position (nose down) and impacted
the ground. Flames occured right after
impact. I did not notice that there
was another plane involved, I had
thought the crashed plane was the
tomahawk. My instructor and flight
partner and I then made our way

to the site were there was one male on the ground close to the plane. The plane was pretty much entirely engulfed in flames by the time we got to the site.

A1C Riddle
#
32

Michael Meehan
258-5790

We, myself Jason Burgess and IP Doug Pelissier, were taxiing off runway 11 at U.S. Beach when I saw a tomahawk on downwind. As we proceeded to park I heard a voice over the radio say "Tomahawk pull up, tomahawk pull up!!". About five seconds after the transmission I quickly turned to my left hand side a saw a quick flash and then a huge explosion. After that another voice came over the intercom and radioed for 911.

Ref # RO 44

Jason Borgus N132ER 226-75

As we approached runway 11 on Final I saw the Tomahawk enter downwind. I proceeded to land and taxi off the runway towards the ramp. Over the radio I heard someone say "Tomahawk go-around" 3 or 4 times. Then there was radio silence for a short time. Then I heard some one say to call 911, and I looked back and saw a pillar of black smoke at the end of runway 11.

Eric Sumner 217-06-7793

I was the pilot of TBY NIPPER, also in the aircraft were Harold Knapp and Chip Haugh. We were taxing towards runway 11 and observed two aircraft, a Tampico + a Tomahawk very close on short final. "runway 11" I heard a radio call, made from an aircraft on the ground "Tomahawk go around". The tomahawk was [redacted] behind the Tampico. The tampico went into a straight nose down dive about 150 ft above the ground. The tampico hit nose [redacted] first and exploded on impact. As I was stepped on the taxiway, we all ran towards the aircraft, and myself and two others tried to pull one victim away from the wreckage but we couldn't reach the other two due to an explosion + fire.

Ref. # RIO 44

CHIP HOUGH N179ER

WHILE TAXING BACK ON PARALLEL TAXIWAY TO RUNWAY 11 AT NEW SMYRNA BEACH, I SAW TWO SINGLE ENGINE AIRCRAFT ON FINAL APPROACH IN VERY CLOSE PROXIMITY OF EACH OTHER. I STOPPED ON TAXIWAY AND ANNOUNCED ON RADIO, "THERE ARE TWO AIRCRAFT ON SHORT FINAL AT NEW SMYRNA BEACH RUNWAY 11". NEITHER AIRCRAFT CHANGED FLIGHT PATH AT THAT TIME. ANOTHER RADIO TRANSMISSION (NOT FROM MY AIRCRAFT) WAS HEARD "TOMAHAWK, GO AROUND! TOMAHAWK, GO AROUND!" INITIALLY, NEITHER AIRCRAFT CHANGED FLIGHT PATH. THEN THE LOWER AIRCRAFT PITCHED UP VIOLENTLY, FOLLOWED BY DIVING OVER STRAIGHT INTO GROUND. AIRCRAFT BURST INTO FLAMES UPON IMPACT. IT IS UNKNOWN IF THE AIRCRAFT COLLIDED OR NOT FROM WHERE I WITNESS ACCIDENT. THE AIRCRAFT WERE APPROXIMATELY 100'-150' ABOVE GROUND WHEN THE LOWER AIRCRAFT APPEARED TO PITCH UP AS DISCRIBED ABOVE.

I (1089) had just [redacted] aborted a take off on rwy 11, and was taxiing to Vintage ramp & jets to switch my students for their back to back. As we were shutting down the engine we heard over unicom, "Piper Tomahawk you are too close, there are 2 planes on short final. Go Around Go Around. At that time the (my) engine was off, and my students yelled "Oh Shit!!" As I turned around, I saw a white airplane crash nose first into the approach end of rwy 11. I ran to Vintage and told people to call the ambulance, a plane had crashed. We then started the plane back up and taxied to the crash site. At that time it was too late for us to help.

Mike McElduff ZP 108

N142ER
Instructor - Mike McElduff
Student Pilot - Brad Morris
Observer - Tom Story.

09/15/95

I saw the Tomahawk on downwind for runway 11. He appeared to be just a little low. Then I heard over the radio, twice, "Tomahawk go around, tomahawk go around!!". I then turned to my left and saw a huge explosion. After seeing this a man came over the radio say "call 911, ambulance, and get some help!".

Saw plane approaching downwind while on Final
Landed, taxied to ramp
Heard "Tomahawk go-around" repeated ≥ or 4 times on the radio
Then heard someone say, Call 911.
I looked back and all I saw was flames and black smoke.

Hs w were starting down R23ER

Date : 09-19-95
From : Bill Glaser CFI-ASC
To : Jeff Kennedy ASI
Subj. : Midair 34J

Mr. Kennedy, on 15September95 at approximately 04:50 p.m., I witnessed the midair collision of the Embry-Riddle Tampico and Tomahawk from Spruce Creek which occurred at New Smyrna Bch. (34J). This was the sequence of events as best as I recall.

My student and I had been in the traffic pattern for runway 11 at 34J for approximately 30 minutes. There were not more than 7 additional aircraft in the pattern. Visibility was 7-10 miles and the ceiling around 3000'. I believe all but the Tomahawk were dual training flights. While in the pattern I noticed one aircraft had an intermittent "hot" microphone. I surmised it was the Tomahawk because during the "hot" periods (some which lasted a maximum of one minute) there was no cockpit chatter like one commonly hears during a training flight. My student and I landed just prior to the accident and were on the parallel taxiway to 11 taxiing towards the approach end of the runway. Two Riddle aircraft were in line to depart 11, and I believe it was one of these pilots who first saw what was about to happen and put out a warning call. As I heard the warning telling the Tomahawk to go around, I looked up to see the two aircraft on short final at no higher than 200' AGL. The Tomahawk was directly behind and 30' higher than the Tampico descending at a steeper approach angle. Only a few seconds had elapsed after the warning call was given when it appeared the Tomahawk's propeller struck the Tampico's emmpenage. The Tampico immediately pitched up to a vertical attitude, then snapped forward to a near vertical downline striking the ground from approximately 150' AGL. Upon impact the Tampico burst into flames. At no time did I observe either aircraft attempt to execute an evasive maneuver. The Tomahawk pilot continued his approach and landed uneventfully on 11.

As the collision occurred, I took control of my aircraft, called 34J Unicom and requested a crash truck and ambulance and proceeded rapidly to the crash site. I shut my aircraft down, told my student to stay put and proceeded on foot towards the wreckage. As I approached, I saw two male individuals partially ejected through the front windscreen. Both occupants were obviously critically injured and some of their clothing was on fire. There was slight movement from each, but neither occupant was conscious. The left seat occupant was extracted by me. It was at this time two Riddle pilots arrived and I instructed them to drag him further away from the burning wreckage. I then returned to try and remove the right seat occupant, but he was pinned in his seat from the waist down by the engine. The heat and fire was so intense by this time I could not remain with this individual and I had to retreat to a distance of at least 20'. About 4 minutes had elapsed since impact when the emergency crew arrived and began to contain the blaze. I later learned there was a third occupant which I had not seen due to the fire. With the arrival of the emergency personnel I gave my name to police officer Hoover and returned to Vintage Props & Jet's FBO with my student at 05:15 p.m..

Being a pilot and Aviation Safety Counselor at New Smyrna airport I feel that I should provide you with some insight as to why this accident occurred.

It has been a long standing training practice at Embry-Riddle to fly an excessively long, wide pattern with a shallow (low) final approach. I have asked Riddle instructors and professor's the reasoning behind this practice, and have been given answers ranging from "a stabilized approach" to "training them to fly commercial (airlines)." When it is pointed out that they are not within gliding distance of the airport let alone the runway, their answer is "how often does an engine just quit?"

The wide Riddle pattern leads to daily incidents of aircraft on a "normal" pattern "cutting off" Riddle. Many pilots not familiar with Riddle's pattern get caught by suprise on base or final with a radio call from a angry Riddle pilot. Without prior warning, these uninformed pilots would never look for an aircraft as far out as the majority of Riddle aircraft fly. One would consider them to not be in the pattern at the distances Riddle flies. Not all Riddle planes are flown in this manner. But I can guarantee if the Riddle pilot is flying a "normal" traffic pattern he/she obtained their primary rating outside of Riddle.

I am sure if you inquire at other airports in the area you will hear the same story. I have never formally written the Riddle administration about the subject-but have talked to a few of their professor's. Some professor's have told me they have discussed it with those in a position to change the training but to no avail. I did discuss the matter at a Chief Flight Instructor meeting at FSDO-15 with Mr. Acee Tacker (representing Embry-Riddle) approximately two years ago. It was a brief discussion and Mr. Tacker's answers were similar to those expressed above.

I have two suggestions for Riddle:

1. Return to teaching "power off, abeam the landing spot" patterns.

2. The third person's (Gemini Program) primary job should be scanning for traffic.

In closing, I know this was not the only reason for the accident, but I believe the type of traffic pattern that Embry-Riddle flies was a major factor in how it occurred.

Respectfully submitted,

Bill Glaser
1400 Tatum Blvd.
New Smyrna Bch., FL 32168
(904) 423-0952

FORM APPROVED—OMB No. 004-R-5713

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

STATEMENT OF WITNESS

The purpose of this statement is intended solely for use in determining the facts, conditions and circumstances, and the probable cause of the subject accident.

Date 8-26-95

1. Place of accident NEW SMYRNA BEACH FL Date 9.15.95 Hour 1652 L
2. Type of vehicle TAMPICO (NIITER) & TOMAHAWK
3. Identification of vehicle NIITER
4. What is your name JOSEPH F. CLARK, III Age 42
5. Address 1008 CONRAD DRIVE, NEW SMYRNA BEACH FL 32168
6. Occupation FLIGHT INSTRUCTOR By whom employed ERAU
7. Where were you at the time of the accident DAB
8. Tell in your own words what you saw or heard before and at the time the accident occurred.

I LEFT THE NEW SMYRNA AIRPORT AT 1636. DURING THE PREVIOUS PERIOD, I WAS ONE OF SEVERAL COMPANY AIRCRAFT IN THE PATTERN. WHILE IN THE PATTERN, A TOMAHAWK JOINED THE PATTERN AND SEEMED TO BE HAVING COMMUNICATIONS PROBLEMS. SPECIFICALLY, HE HAD TO BE TOLD MORE THAN ONCE WHAT RUNWAY WAS IN USE.

W - 904-226-6800
H - 904-423-0198

Joseph F. Clark III
(Signature)

NTSB FORM 6120.11 (Rev. 10/77) (Use reverse side of sheet for diagram and additional statement)

Name withheld
7:13 pm
Sept 15, 9

About 5:30 pm, my friend and I were riding our bikes to my house, as we were passing the airport I saw a airplane on approch, I looked away and a second or two later heard a boom then another airplane increased power and went down the runway, and first I thought he might have dropped a banner that hit the runway, but as the same time smoke, and fire rose up over the trees. I relized a plane hit and started paddling as fast as I could, & jumped off the bike, ran though the creek toward the airplane engulfed in flames. I was the first to arrive, and the heat kept me from getting closer. A man in a green jump suit and a man in a blue shirt ran up one gave me a fire exstinisher, I ran to the plane and started spraying around the co-pilot, & pushed his head to the side and relized he didint have a chance, half of his body was in the plane on fire. I then helped pull the pilot away from the plane, he was alive, coughing up blood and his arm was twisted up.

His ~~[illegible]~~ foot was on fire, so I put it out and took off his shoes to keep he from burning any more. I then went back trying to put the front of the plane. The pilot we pulled away landed about 3 feet in front of the plane, I think through the windshield. After about 3 to 5 min the police showed up and told me to get back, I was already far enough back because I thought it might explode again, it was poping and burning very hot, enough to melt the airplane away except the wing tips. I filled out forms and told what happen to the police, ~~[illegible]~~ directors etc. After about 1/2 hour I was told I could go, On my way home the channel 9 news intiveiwed me. I went home after that.

Richard V Grannis

RICHARD V GRANNIS

WITNESS: William C Grannis

WILLIAM C GRANNIS

9-15-95

7:23 P.M 9/15

Me and My freind Richard Granner were riding are bikes back to his house when ~~[redacted]~~ I saw a Embry Riddle airplane get hit by another airplane while on fenal approach. The Embry riddle airplane then went straight toward the ground. The Embry airplane went up into flames as it hit the ground. I then jumped off my bike and ran through a small creek and quickly proceeded toward the embry airplane. My friend Richard and another guy ran up right before me and pulled one guy that flew out of the airplane away. There was one other person that was still in the airplane and hanging out and on fire. I then talked to police officer Paul Andreson and filled out an afidavid. The fire department came and put out the fire. I then saw a third person in the airplane that had been burned to death. After that I left and went on to rick's house.

Aaron Woodard
Aaron Woodard

Continue on page 2

WITNESS William Granner
WILLIAM GRANNER

7:34 P.M 9/15

This is a detailed description of the mid-air contact. I saw one airplane coming in on top of the Embry Riddle aeroplane. The airplane in the back was coming down and the riddle airplane went up. I then heard a tires and saw the Embry Riddle aeroplane go down. The Embry Riddle plane was hit from the rear right before it plemeted to the groend.

Aaron Woodard
Aaron Woodard

WITNESS William Grannis
WILLIAM GRANNIS
9-15-95

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [ ] VISIT [ ] CONFERENCE OR [X] TELEPHONE CALL

Time: 1230

Date: 9-19-95

Name(s) of Person(s) contacted or in conference and location

WES TURNER

SPRUCE CREEK AVIATION

DAYTONA BEACH, FLORIDA

Routing: Symbol / Initials

Subject: N117ER / N2351A

Digest

N2351A DID HAVE A STICKING MICROPHONE SWITCH ON THE CONTROL WHEEL ABOUT 10 DAYS. BEFORE THE ACCIDENT. THE PILOT DID GET A RADIO CHECK PRIOR DEPARTING SPRUCE CREEK.

THEY TEACH THE STUDENTS TO ENTER THE TRAFFIC PATTERN AT 45° TO THE DOWNWIND. AT A POINT 45° FROM THE RUNWAY END THEY TURN BASE LEG. THIS PLACES THE THE AIRCRAFT ¾ TO 1 MILE FROM THE END OF THE RUNWAY WHEN THEY TURN FINAL APPROACH. EMBRY-RIDDLE AIRCRAFT FLY BOEING 747 PATTERNS OR LONG DOWNWIND AND LONG FINAL LEGS.

Conclusions, Action Taken, or Required

FOR REPORT

Date	Title	Signature
9-19-95	ASI	Jeffrey T. Kenney

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [X] VISIT [ ] CONFERENCE OR [ ] TELEPHONE CALL

Time	Date
1100	9-17-95

Name(s) of Person(s) contacted or in conference and location

Routing	
Symbol	Initial

CHIP HOUGH

EMBRY-RIDDLE AERONAUTICAL UNV.

DAYTONA BEACH, FLORIDA 32114

Subject N117ER/N 2351A

Digest

HE WAS THE INSTRUCTOR PILOT ON N179ER WITH 2 STUDENTS. THEY WERE PERFORMING FULL STOP LANDING AT NEW SMYRNA AIRPORT AT THE TIME OF THE ACCID THEY HAD PERFORMED 4 USUAL APPROACHS AND 3 LANDINGS. AFTER THE 3RD LANDING/4TH APPROACH ON RUNWAY 11 THEY CLEARED THE RUNWAY AND WERE TAXING BACK ON THE PARALLEL TAXIWAY TO RWY 11. THEY STOPPED JUST NW OF RWY 2-20. HE LOOKED UP AND SAW 2 AIRCRAFT ON FINAL FOR RWY 11. HE COULD NOT TELL WHAT TYPES BUT THEY APPEARED THE SAME SIZE. THEY WERE WITHIN 50 FEET VERTICALLY. HE ASKED HIS 2 STUDENTS IF THEY SAW IT. HE CALLED ON UNICOM " 2 AIRCRAFT ON FINAL NEW SMYRNA BE CAREFUL

Conclusions, Action Taken, or Required

FOR REPORT

Date	Title	Signature

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [X] VISIT [ ] CONFERENCE OR [ ] TELEPHONE CALL

Time	Date

Name(s) of Person(s) contacted or in conference and location

Routing	
Symbol	Initia

CHIP HOUGH

PAGE 2

Subject N117ER/N2351A

Digest HE DID NOT GIVE THEM SPECIFIC INSTRUCTIONS BOTH AIRCRAFT CONTINUED ON THE SAME FLIGHT PATH. HE THEN HEARD SOMEONE ELSE ON THE RADIO SAY "TOMAHAWK GO AROUND", "GO AROUND", "GO AROUND". THERE WAS NO IMMEDIATE REACTION FROM THE AIRCRAFT. HE THEN SAW THE (N117ER) TAMPICO PITCH UP. HE DID NOT SEE CONTACT BETWEEN THE 2 AIRCRAFT. THIS OCCURRED OVER THE CONCRETE OF THE DISPLACED THRESHOLD FOR RWY 11. N117ER PITCH UP TO HIGHER THAN NORMAL GO-AROUND ATTITUDE, ROLLED TO THE LEFT 20 DEGREES, AND THEN PITCH DOWN TO NEAR VERTICAL NOSE DOWN. IT HIT ON THE RUNWAY AND THE

Conclusions, Action Taken, or Required

FOR REPORT

Date	Title	Signature

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [X] VISIT [ ] CONFERENCE OR [ ] TELEPHONE CALL

Time

Date

Name(s) of Person(s) contacted or in conference and location

Routing: Symbol | Initia

CHIP HOUGH

PAGE 3

Subject N117ER/N2351A

Digest FUEL TANKS EXPLODED. THE WEATHER WAS VFR, IT WAS A PRETTY DAY WITH BETTER. THAN AVERAGE HORIZON. VISIBILITY WAS GOOD WITH CLOUDS 2,000 FEET SCATTERED HE DID HEAR N2351A REPORTING HI POSITION IN THE PATTERN. THE AIRCRAF HAD ENTERED THE PATTERN AT A 45° ANGLE TO THE DOWNWIND AND THEY FOLLOWED HIM. THEY WERE ABOUT 1/4 MILE BEHIND N2351A WHEN THEY COULD NO LONG SEE AIRCRAFT. WHEN THEY TURNED BASE, N2351A WAS ON FINAL. THEY BOTH LANDED AND TAXIED BACK. N2351A TOOK OFF AGAIN AND THEY WAITED FOR AN AIRCRAF

Conclusions, Action Taken, or Required

FOR REPORT

Date	Title	Signature

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [X] VISIT [ ] CONFERENCE OR [ ] TELEPHONE CALL

Time	Date

Name(s) of Person(s) contacted or in conference and location

CHIP HOUGH

PAGE 4

Routing	
Symbol	Initial

Subject N117ER/N2351A

Digest TO LAND BEFORE TAKING OFF. AS THEY WERE ABEAM THE NUMBERS ON 11, N2351A WAS ON FINAL AND THERE WAS A STUCK MICROPHONE ON THE FREQUENCY. THIS LASTED FOR ABOUT 2 MINUTES. AFTER THIS CLEARED THEY DID NOT HEAR ANY MORE STUCK MICROPHO THEY WERE NO LONGER FOLLOWING N2351A AND DID NOT RECALL HEARING PILOTS TRANSM. ON HIS FINAL APPROACH BEFORE THE COLLISION. HE ALSO DOES NOT REMEMB. HEARING N117ER REPORT HIS POSITION. THER WERE ALOT OF "ER" AIRCRAFT ON TAE FREQUENCY AND SPECIFIC AIRCRAFT DO NO REGISTER UNLESS HE IS FOLLOWING THEM.

Conclusions, Action Taken, or Required

FOR REPORT

Date	Title	Signature

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [X] VISIT [ ] CONFERENCE OR [ ] TELEPHONE CALL

Time

Date

Name(s) of Person(s) contacted or in conference and location

CHIP HOUGH

PAGE 5

Routing

Symbol	Initial

Subject N17ER / N2351A

Digest

THE ERAU COMMUNICATIONS PROCEDURE IS TO REPORT DOWNWIND AND FINAL, TIME PERMITTING, IN UNCONTROLLED PATTERN. THEY HAVE BEEN INSTRUCTED BY TOM CURTAIN, THE ERAU CHIEF INSTRUCTOR, TO TEACH STUDENTS TO FLY LONG DOWNWIND LEGS AND TURN ON TO FINAL ABOUT 1.6 MILES FROM THE RUNWAY. THIS SHOULD BE A 500 FEET WHICH WILL GIVE A 3 DEGREE SLOPE TO THE RUNWAY. THIS CAUSES ERAU AIRCRAFT TO FLY A LARGE PATTERN. HE GAVE ME A COPY OF THE HANDOUT CONCERNING THIS PROCEDURE

Conclusions, Action Taken, or Required

FOR REPORT

(END)

Date	Title	Signature
9.17.95	ASI	Jeffrey T. Kenney

NTSB Form 1320.12 (5/70)

NATIONAL TRANSPORTATION SAFETY BOARD

RECORD OF [ ] VISIT [ ] CONFERENCE OR [X] TELEPHONE CALL

Time: 0900

Date: 9-19-95

Name(s) of Person(s) contacted or in conference and location

ADRIAN THOMPSON
ORMOND BEACH AVIATION
ORMOND BEACH, FLORIDA

Routing: Symbol | Initia

Subject: N117ER / N2351A

Digest

HE HAS HAD PROBLEMS WITH EMBRY-RIDDL AIRCRAFT IN THE TRAFFIC PATTERN AT ORMOND BEACH AIRPORT. THEY FLY A CLOSE IN PATTERN BUT THEN FLY A LONG DOWNWIND AND THEN A LONG FINAL APPROACH. THIS PUTS THEM ON A LOW FLAT FINAL APPROACH. OTHER AIRCRAFT WHO FLY A NORMAL PATTE TEND TO TURN ON FINAL IN FRONT OF EMBRY-RIDDLE AIRCRAFT BECAUSE THEY DON'T SEE THEM ON LONG, LOW FINAL APPROACHES.

Conclusions, Action Taken, or Required

Date	Title	Signature

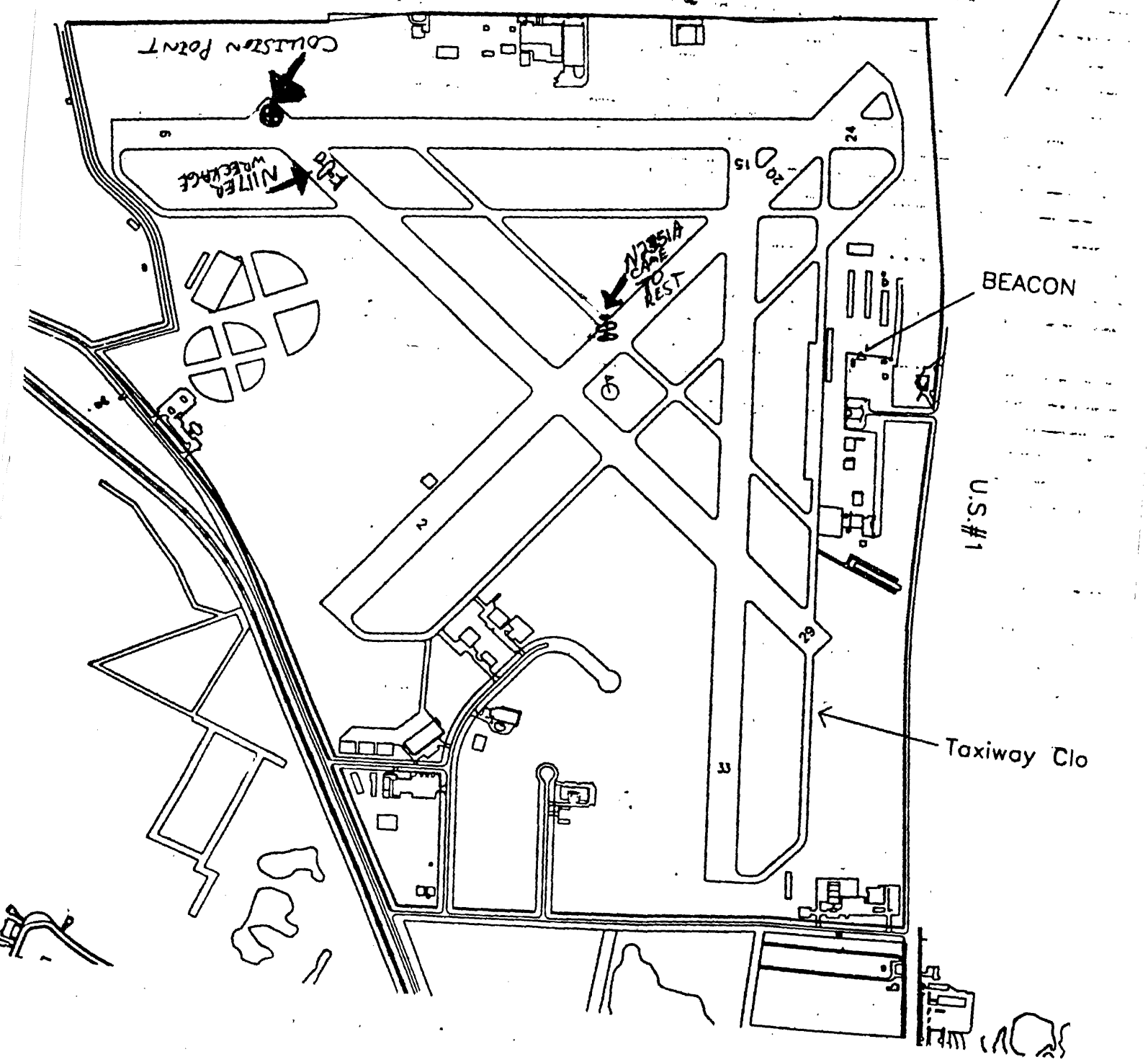
NTSB Form 1320.12 (5/70)

9-15-95

N117ER/N2351A

NEW SMYRNA BEACH MUNICIPAL

(34J)



Verification of radio operation on N2351A a Piper -38-112 aircraft.

On 9-21-95 a ground test of the radio in N2351A, was conducted. It was discovered that a malfunction exists regarding the Pilots push-to-talk switch wiring. The malfunction exhibited itself in the following manner:

1. Uncommanded push-to-talk activation. (Synonymous with a stuck mike)

2. Intermittent push-to-talk activation. (During normal transmission)

Emanuel Sylvia
Aviation Safety Inspector

U.S. Department
of Transportation
Federal Aviation
Administration

FLIGHT STANDARDS DISTRICT OFFICE
10015 North Executive Hills Blvd.
Kansas City, Missouri 64153
(816) 891-2100

October 2, 1995

Mr. Jeff Kennedy
National Transportation Safety Board
Southeast Regional Office
8405 NW 53rd Street
Suite B-103
Miami, Florida 33166

RE: Aircraft Accident - New Smyrna Beach, Fla.
September 15, 1995
Socata TB-9, N117ER
MIA 95 FA 224A

Dear Mr. Kennedy:

I am in receipt of correspondence to you dated September 28, 1995, and laboratory notebook concerning the inspection of the Bendix/King avionics equipment from the above mention aircraft. Both documents were prepared by Phil Goettel of Allied Signal General Aviation Avionics.

I was present when the shipping container was opened, during the inspection of the equipment and when the component was boxed for shipment to Atlanta Air Salvage in Griffin, Georgia after the inspection. I have reviewed the text of both documents and agree with the contents as written.

If you have any questions, you may contact me at (816) 891-2135.

Sincerely,

Gary L. Benson
Aviation Safety Inspector, Avionics

AlliedSignal
AEROSPACE

AlliedSignal Inc.
General Aviation Avionics
400 N. Rogers Road
Olathe, KS 66062-1212

913 782 0400

SEP 29 19[illegible]

September 28, 1995

Mr. Jeff Kennedy
National Transportation Safety Board
Southeast Regional Office
8405 N.W. 53rd Street
Suite B-103
Miami, Fla. 33166

RE: The examination of an aircraft radio removed from Socata TB-9, N117ER, which was involved in a midair accident on September 15, 1995 near New Smyrna Beach, Florida.

Dear Mr. Kennedy,

Enclosed you will find a copy of the laboratory notebook and one set of color photographs generated as the result of the examination of the above mentioned aircraft radio.The unit was brought to our facility by Mr. Gary Benson of the FAA Flight Standards District Office in Kansas City. At the conclusion of the equipment examination, the unit was packed for return shipment under the supervision of Mr. Benson.

The laboratory notebook is self explanatory in its content, but a summary of the findings of the examination follows:

> The unit was removed from the shipping box for examination. Upon visual inspection of the unit, it is believed to be either a KX-155 or KX-165 Nav/Com. The unit was burned beyond any definite recognition. It was discovered that the fire had burned through the unit top and bottom covers and burned and/or melted many of the electronic components on the circuit boards. As I am sure you are aware, heat is one of the worst enemies of solid state devices, overheating will destroy them very quickly. After visually inspecting the unit, it was obvious that the heat had been very intense and prolonged in the vicinity of the radio, and none of the electronic components could have survived. Therefor, no attempt was made to remove the memory I.C. and attempt frequency recovery.

Thank you for inviting me to assist you in your investigation. It is very unfortunate that in this instance we were not able to recover any useable information for you. Please do not hesitate to call if I can be of further assistance in this matter.

Sincerely,

Phil Goettel
Air Safety Investigator

enclosures
cc: Mr. Gary Benson

LABORATORY NOTEBOOK

Notebook No.: 2149

Assigned to: NIITER

Date: SEPTEMBER 28, 1995

Rev. 1993

PROJECT N117ER

Notebook No. 2149

Continued From Page

BOX WAS OPENED AND ONE RADIO UNIT REMOVED. COULD NOT DEFINITELY IDENTIFY UNIT, BUT BELIEVED TO BE EITHER A KX-155 OR KX-165 NAV/COM.

UNIT WAS OBVIOUSLY IN AREA OF INTENSE HEAT FOR PROLONGED PERIOD. FIRE HAS BURNED THROUGH TOP & BOTTOM UNIT COVERS.

COMPONENTS ON P.C. BOARDS BURNED UP OR MELTED. SOME COMPONENTS COMPLETELY GONE.

PHOTO'S

1. OUTSIDE OF SHIPPING BOX
2. UNIT INSIDE OF SHIPPING BOX
3. DEBRIS FROM BAG RADIO WAS WRAPPED IN.
4. FRONT VIEW OF RADIO
5. TOP VIEW OF RADIO
6. REAR VIEW OF RADIO
7. BOTTOM VIEW OF RADIO

THIS UNIT IS SO BADLY DAMAGED BY HEAT/FIRE THAT NONE OF THE SOLID STATE DEVICES COULD HAVE SURVIVED.

NO ATTEMPT WAS MADE TO RECOVER FREQUECIES. NO USEABLE INFORMATION OBTAINED FROM INSPECTION/EXAMINATION OF UNIT.

END OF WRITTEN RECORD

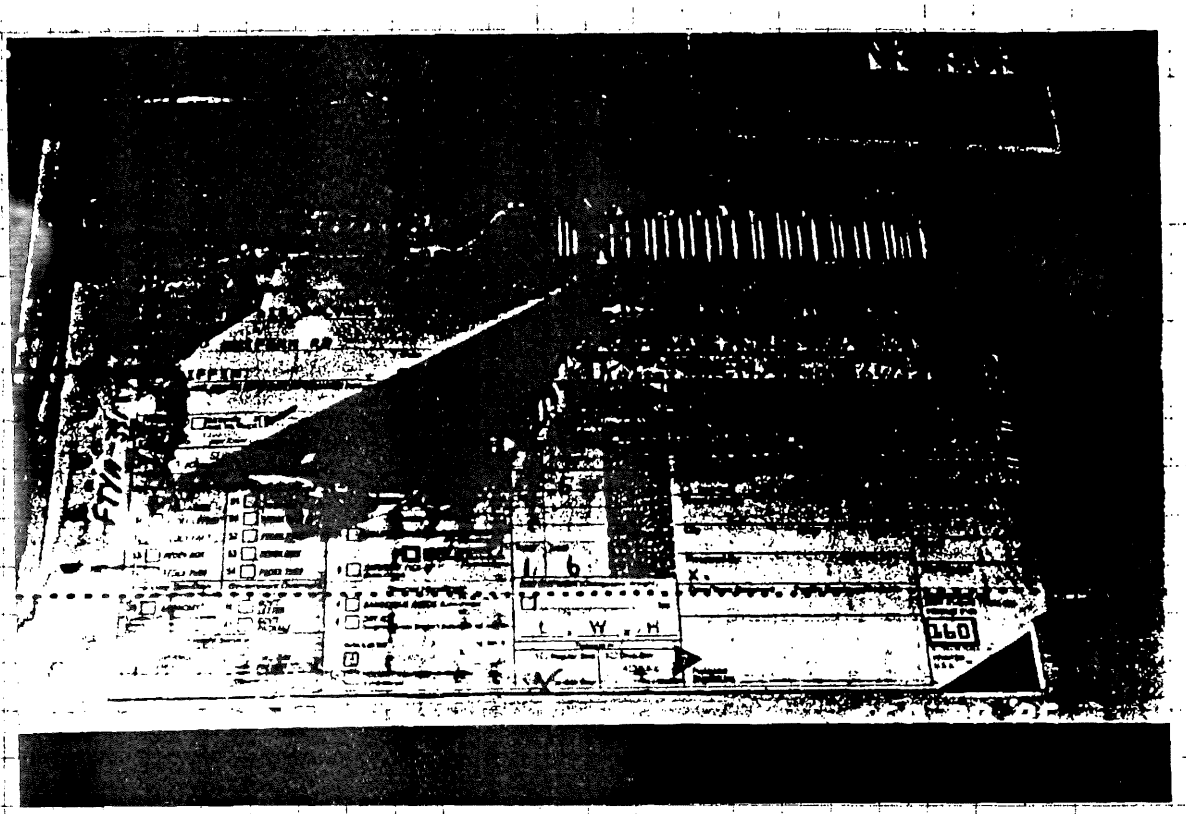
Continued on Page

Read and Understood By

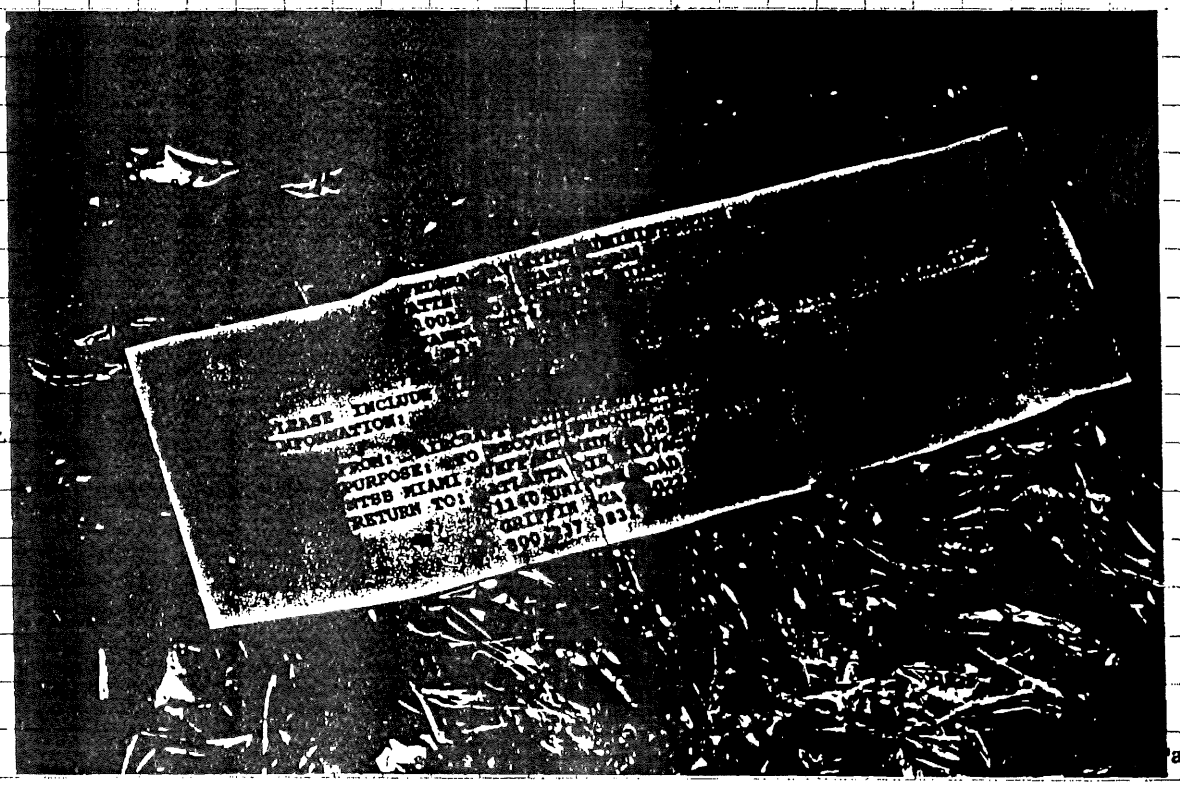
Signed | Date | Signed | Date

PHOTO's

#1



#2



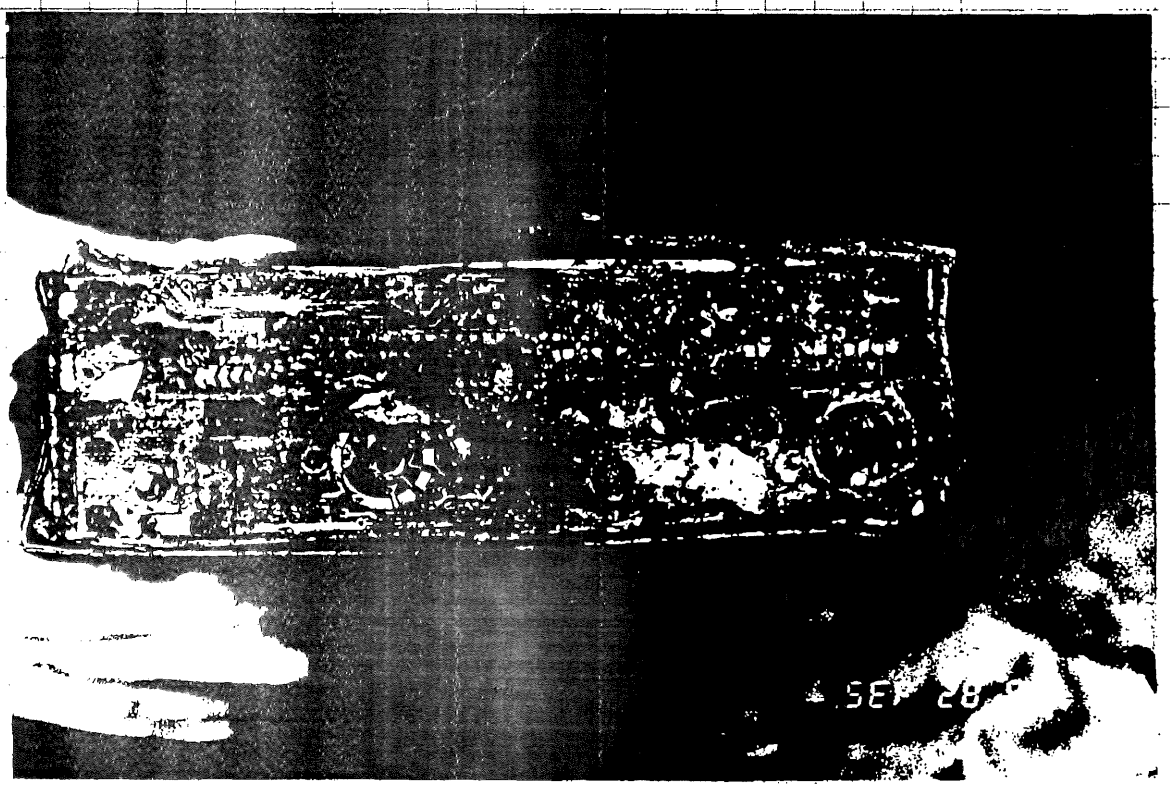
Read and Understood By

Signed Date Signed Date

PHOTO's

#3

#4



Read and Understood By

Signed Date Signed Date

PROJECT N117ER

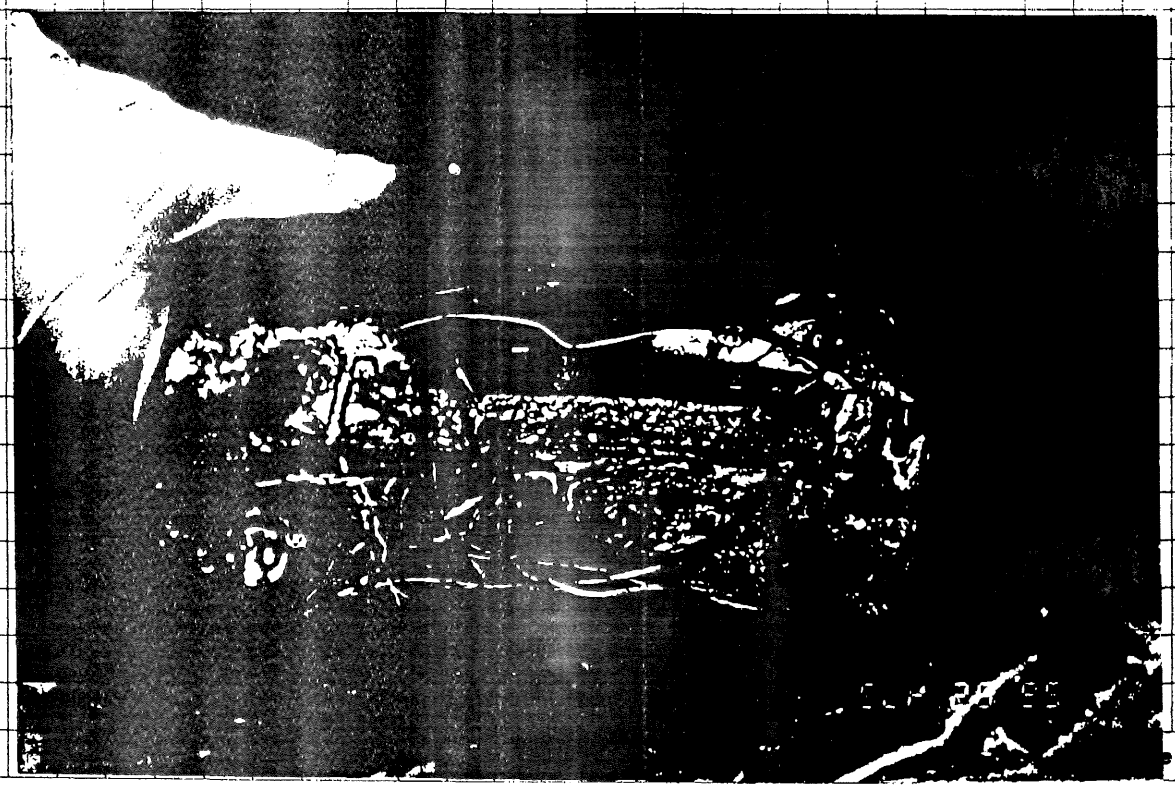
Notebook No. 2149

Continued From Page

PHOTO's

#5

#6



Read and Understood By

Signed	Date	Signed	Date

#7

END

Read and Understood By

Signed | Date | Signed | Date

Memorandum

U.S. Department
of Transportation

**Federal Aviation
Administration**

9399 Airport Boulevard
Orlando, FL 32827

Subject: INFORMATION: Radar Data for 9/15/95 Date: Sept.21, 1995

Reply to
Attn of:

From: Air Traffic Manager
Orlando International ATC Tower

To: Rick Sheppard
North Florida FSDO 15

Per your request, Radar Data for 9/15/95 is not available since our Contineous Data Recording was off line during that time.

Donna Gropper

CC: Jeff Kennedy, NTSB-Miami

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 1

To NTSB- Miami	From McQ, Fowler
Dept./Agency 305 597-4614	Phone #
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

OFFENSE/INCIDENT REPORT

NEW SMYRNA BEACH POLICE DEPARTMENT

1400 North Dixie Freeway
New Smyrna Beach, Florida 32168-9985
904-424-2220

File #

1 CCR # 95 09 0185

2 Day/Date/Time Report Fri/091595/1652

All Others Z.E.

3 Offense/Incident (Plane Crash)

4 Victim Multiple

5 Crime Watch Area None

6 Location of Offense/Incident 601 Skyline Dr. (NSB Airport / Runway #11)

7 Victim's Address City State

8 Day/Date/Time of Occurrence Fri/091595/1652 hrs. 44 Z.E.

9 Employed/School

10 Ph # Home Work

11 Watch	12 Zone	13 UCR Code	14 Weather	15 R/S	16 DOB/AGE	17 Height/Weight	18 Hair/Eyes
2	1		Clear				

19 Complainant (Last Name, First, Middle) New Smyrna Beach Municipal Airport

20 Vehicle Stolen ☐ Recovered ☐ Suspect ☐ Other ☒ N/A ☐

21 Address 601 Skyline Dr.

22 Ph # Home/Work 427-1726

23 Year Make Multiple

24 Model

25 Color

26 License

27 City/State New Smyrna Bch, FL

28 Premise Type

29 Vin# Verified by Officer

30 Towed To / By N/A ☒ Z

31 Point of Entry

32 Point of Exit

33 NCIC Yes ☐ No ☒ FCIC Yes ☐ No ☒ Date/Time Entered N/A ☒

34 Method Used To Gain Entry

35 Dispatcher Bodge #

36. Tool or Weapon Used

37. Arrested Person N/A ☒ Z.E.

38 DOB/AGE

39 H/W R/S

40. Reporting Person/Address Thieman, Donna / SA#19, 21 & 27

41. Address

42 PX

43 Physical Evidence (Description)
1 - Blood Test of Pilot
1 - Swiss Army Watch of Victim
4 - Copies of Pilot License

44 Occupation/Employee

45 Hair Style/Color

46 Unusual Characteristics

47. Delivered To N/A ☐ Evidence/Property Room/Refrigeration

48 Arrest Mode ☐ Not Mode ☒ Pending ☐

49 Charge N/A ☒

50 Stolen A Recovered B Lost C Damaged D

Code	Quan.	Item	Description	Value Lost	Value Recovered
D	1	Aircraft	1992 Scota TB9; VIN# 1509; N117ER	$100,000.00	
D	1	Aircraft	Propeller of aircraft; Tomahawk 235A Mdl. # PA38-112; VIN # 38782A0649	$1,100.00	

51 Synopsis
Dispatched To New Smyrna Beach Municipal Airport In Reference To A Two Aircraft Crash. Upon Arrival NSBFD & EMS Responded To Treat Victims. One Plane Involved Was On Fire, Fire Extinguished By NSBFD And Scene (Including Other Plane Involved) Secured. F.A.A. Notified. Investigation Continues...

52 Reporting Officer [signature] #565

53 Supervisor Sgt. K. M. Evans Badge # Date 091695 Time 1030

54 Refer To Patrol ☐ INV ☐ Records ☒ Z.E. ☐ DYS Other ☒ Z.E. NTSB FAA & ERAU

55 Status Unfounded ☐ Inactive ☒ Z.E. Pending ☐ Cleared ☐

White - Records

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
2	091595	95090185

59. FORMAT: 1. Narrative description of crime scene. 2. Narrative description of ALL suspect(s). 3. Narrative description/information on ALL witnes 4. Narrative description on ALL evidence seized/found. 5. Narrative explanation of investigation. 6. Narrative of interviews of ALL persons interviewed inclu victims and suspects. 7. Narrative description and value of ALL property stolen, recovered, lost or damaged.

60. Details

1.) CRIME SCENE: New Smyrna Beach Municipal Airport
601 Skyline Dr. N.S.B. Runway "11"

2.) Suspect(s): NONE

3.) WITNESSES. Brad Morris 660 S. Clyde Morris Blvd. Daytona Bch. FL
Aaron Woodard 1896 Bayview Dr. N.S.B FL 427-5472
Richard Grannis 2841 Sunset Dr. NSB, FL 423-6933
Aaron Rusich 600 Jimmy Ann Dr. Apt 2017 253-5704
Michael McElwaff 122 C. Blue Heron Dr. 760 3244
Leonard Broker 7395th St Port Orange FL 32119
Tom Story E.R.A.U McKay Hall Rm 256
Eric Sumner 223 Doolittle Hall (E.R.A.U) 226-7325
Chip Hough E.R.A.U. 226-7660
Harold Koopa 505 Sandy Oaks Blvd Ormond Bch. 677-5735
Michael Meehan Jr. E.R.A.U.
Douglas Peterson 1330-G Old Kings Rd Holly Hill, FL.
Jason Borgus 214 McKay Hall E.R.A.U 226-7524
Pilot - Gregoire Gilles Galley 136 Clearwood Village Cir. Daytona Bch, FL
760-2958

4.) EVIDENCE: #1 Blood Test Kit of Pilot Gregoire Gilles Galley
#2 Swiss Army watch of Unk. Victim
#3 4 Misc. Copies of Pilot License Belonging To Mr. Galley

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
[signature]	#565	Sgt. K.D. Evans	500

63. Refer To	S/A	Other		64. STATUS	Unfound	Inactive	Pending	Cleared by Arrest	Cleared by E
	( )	X REC. A.E	NTSB FAA & ERAU		( )	X ( )	( )	( )	

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
3	091595	95090185

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60. Details

5.) INVESTIGATION: Upon Arrival, Observed A White Male - Later Identified As Bill Glasier (Chief Pilot - 600 Skyline Dr. NSB Airport - 423-1773) Who Had Dragged One Victim From The Wreckage. Fire From Plane Extinguished By NSBFD. E.V.A.C. Personel (Along With NSBFD Personel) Attempted Medical Treatment, However Pronounced Victims Deceased. Scene Secured At Which Time Contact Made With Mr. Jack Hawn - Embry Riddle Director of Flight Operations & Maintenence Who Confirmed One Victim As E.R.A.V. Student After Waiver was Obtained By This Officer (Waiver Later Received (Telecopy) #8 To Medical Examiner(s)) Medical Examiners Took Possession of Bodies After Their Investigation At Scene Complete. (* It Should Be Noted That One Victim was Dragged From Wreckage, However Two Other Victims Were Unable To Be Pulled From Plane Due To Fire.) Obtained Several Statement Affidavits From Witnesses And From Pilot of Other Aircraft Involved (As Follows:) Pilot of Tomahawk 2351 A - Gregoire Gilles Galley (See Statement Affidavit For Further Information) Due To Condition of The Crashed Plane, Registration Numbers Could Not Be Obtained To Gather Information On Aircraft. Mr. Galley was Accompanied By Officer Paul Anderson To Voluntarily Perform Blood Test At Fish Memorial Hospital. Blood Test, Watch of One Victim, And Copies of Mr. Galley's Pilot License placed Into Evidence.

Met With Mr. Rick Sheppard of F.A.A. Who was Merely Briefed On Incident.

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
J. Connor	#565	Sgt. L. D. Evans	500

63. Refer To	S/A	Other		64. STATUS	Unfound	Inactive	Pending	Cleared by Arrest	Cleared by Ex
	(X)	DISTRICT ATT.	NTSB FAA & ERAU		( )	(X)	( )	( )	( )

White - Records Canary - Detective

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
4	091595	9509 0185

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60. Details

6) INTERVIEW. SEE STATEMENT AFFIDAVITS & LIMITED TO INVESTIGATION.

7) PROPERTY: SEE PAGES 5 & 6

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
[signature]	585	Sgt. L.D. Evans	20

63. Refer To S/A	Other	64. STATUS Unfound	Inactive	Pending	Cleared by Arrest	Cleared by Ex
( )	X) TCC #6 NJSB FAA & EPAU	( )	( )	X)	( )	( )

White Records Canary Detective

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
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60. Details

VICTIM INFORMATION: 1) ROBERT SCHEITHE
2) HYUN BEN SIN

VICTIM #1 & #2 STUDENTS of E.R.A.U.

3) JOSEPH McCOY
VICTIM # 3 Flight INSTRUCTOR

THE PLANE, THAT THREE VICTIMS LISTED ABOVE WERE IN, IS AS FOLLOWS:

1992 SOCATA TB9 WHITER
VIN # 1509
OWNER E.R.A.U.

INFORMATION OBTAINED ON PLANE FROM A.C. TACKER - AVIATION SAFETY ENGINEER E.R.A.U.

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
Johnson	55	SGT. L. D. Evans	500
63. Refer To: SA ( ) Other X WHITE		64. STATUS Unfound ( ) Inactive X PE ( ) Pending ( ) Cleared by Arrest ( ) Cleared by Ex ( )	

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
6	09/5/95	9509 0185

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60. Details

Surviving Pilot of other Aircraft

Galley, Gregoire Gilles
136 Cedarwood Village Cir. Daytona Bch, FL
760-2858

Plane Description:

1978 Tomahawk N2351-A
Model # PA-38-112
VIN # 3878A0649

owner Spruce Creek Aviation Co.
41 Beech Blvd, Daytona Bch, FL

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
	545	Sgt. L. A. Evans	202

63. Refer To		64. STATUS				
C/A	Other	Unfound	Inactive	Pending	Cleared by Arrest	Cleared by Ex
( )	X rec. L.E.	( )	X Yes ( )	( )	( )	

White - Records Canary - Detective

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
7 of 8	891695	9509 0185

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60. Details

ADDITIONAL INFORMATION

ON THIS DATE, CORONER WAS MADE TO E.R.A.V. TO OBTAIN INFORMATION ON VICTIMS OF CRASH. TO BE ABLE TO NOTIFY NEXT OF KIN, HOWEVER, UPON SPEAKING WITH A MR STEVE SILVA (PRESIDENT E.R.A.V.), HE ADVISED THAT NEXT OF KIN HAS ALREADY BEEN NOTIFIED

61. Reporting Officer	Badge #	62. Supervising Officer	Badge #
[signature]	505	Sgt. L.D. Evans	500

63. Refer To	S/A	Other	64. STATUS	Unfound	Inactive	Pending	Cleared by Arrest	Cleared by E
	( )	X REC. V.E		( )	XXX	( )	( )	( )

NEW SMYRNA BEACH POLICE DEPARTMENT SUPPLEMENT OFFENSE / INCIDENT REPORT

56. Page	57. Date Supplement written	58. C.C.R. #
8	041695	95090185

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60. Details Investigation: At about 1700 hrs. 041595, I heard the dispatch call of a two aircraft accident at the Municipal Airport. I responded and took command of the scene.

I arrived just before the first fi Combat Unit. Approximately a dozen people were already there. Several police officers were there.

I supervised the on-scene investigation and made PX contact with Mr. Jeff Kennedy o the NTSB in Miami. I received and carried out Mr. Kennedy's special instructions. These instructions pertained to the security of the crash site and oth aircraft, witnesses and statements, collection and preservation of evidence, locating of specific pieces of the wreckage (tail section and I.D. fire proof plat photographs of specific detail regarding positioning of victims in the wreckage, and personell access.

After successful completion of these and several other tasks, I again made telephone contact with Mr. Kennedy and reported the progre so far.

I remained on the scene until 2115 hrs. At about 0930 hrs. this date, I returned to the crash site to meet with NTSB and FAA officials and complete follow up investigation. I assisted the NSB Airport Manager and Federal officials.

I have released NSBPD report(s) #95040 and provided Mr. Kennedy with copies.

1. Reporting Officer	Badge #	62. Supervising Officer	Badge #
Sgt. K.D. Ennis	306		

3. Refer To	S/A	Other	64. STATUS	Unfound	Inactive	Pending	Cleared by Arrest	Cleared by Exc
	( )	X rec. ee.		( )	(X)	( )	( )	

White Records Canary Detective

AFFIDAVIT

TATE OF FLORIDA
OUNTY OF VOLUSIA
ITY OF NEW SMYRNA BEACH

DATE 091595
CASE NUMBER 950962462 0185
PAGE NUMBER 1

EFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, GREGOIRE G. GALLEY, 22
FULL NAME AND AGE

136 Cedarwood Village Circle, Daytona Beach, 32119, **WHO BEING DULY SWORN, DEPOSES AND SAYS**
ADDRESS AND TELEPHONE NUMBER

I came from Spruce Creek with a Tomahawk (grey & white) id. N2351A in order to do circuit patterns at New Smyrna Beach. Runway 11 was active and I did 4 circuit patterns at 800 ft; on my last pattern I turned in base with the normal procedures and then final and called my aircraft identification in "Downwind 11" "turn in base 11" and "final 11" The rwy was clear. 1 plane was waiting (a 150 I believe). Suddenly I heard on the radio. "Tomahawk, two planes in final, go around" I pushed full throttle and pulled up, and suddenly my propeller hit the plane that was belowme. As I was in a climb, I called the airplane in order to make an emergency landing

rn to and subscribed before me
undersigned authority, this 15-TH
of SEP **19** 95
ARY PUBLIC #613

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature

GALLEY GREGOIRE
NAME (Printed or Typewritten)

AFFIDAVIT

TATE OF FLORIDA
OUNTY OF VOLUSIA
ITY OF NEW SMYRNA BEACH

DATE SEP 15, 95
CASE NUMBER 9509HFZ018
PAGE NUMBER 1

EFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, RICHARD V GRANNIS 18
FULL NAME AND AGE

541 SONSET DR 423-6933
ADDRESS AND TELEPHONE NUMBER
, WHO BEING DULY SWORN, DEPOSES AND SAYS:

(RIDDLE PLANE)

One airplane looked like it was landing. I looked away. Then I heard boom and saw a lot of smoke. I ran over to the plane and saw a body on the ground and another in the plane, another guy and I pulled him away and I took his shoes off because they were on fire, the other guy already looked dead.

orn to and subscribed before me
undersigned authority, this 15TH
of SEP 19 95
OIC Daniel A High
TARY PUBLIC LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Richard Grannis
Affiant's Signature

RICHARD GRANNIS
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 29595
CASE NUMBER 9509082-018
PAGE NUMBER 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Aaron Lain Woodard I
FULL NAME AND AGE

1896 Bayview Dr. 904-427-5472, **WHO BEING DULY SWORN, DEPOSES AND SAY:**
ADDRESS AND TELEPHONE NUMBER

embry riddle

I saw the ~~Hawk~~ ~~Bonanza~~ airplane about to land when another airplane approached over it. Then the tomahawk took a straight course to the ground. I then proceeded towards the to the airplane that was down. One man was pinned inside the plane and one was laying on the runway. My friend and another gentleman pulled the man on the ground away. I then the cops came.

Sworn to and subscribed before me
the undersigned authority, this 9/15
day of SEP 19 95
OFC Daniel D Hop
NOTARY PUBLIC LED

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Aaron Woodard
Affiant's Signature

Aaron Woodard
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9/15/95
CASE NUMBER 9509046Z01
PAGE NUMBER 1 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Michael McElduff
FULL NAME AND AGE

122 C Blue Heron Drive (904) 760-3244, WHO BEING DULY SWORN, DEPOSES AND SAY
ADDRESS AND TELEPHONE NUMBER

I had just landed on runway 11 at 34J. (New Smyrna) As my students and I were taxiing to Vintage props + Jets over the Unicom frequency we heard "Tonchaut, Go-Around, Tonchaut, Go-Around." At that time I was shutting down my aircraft. My stud so "oh, shit", then I turned around and saw a fgw whis plane impact the end of runway 11 nose first, and then smoke and flames

Sworn to and subscribed before me
the undersigned authority, this 15th
day of September 19 95
NOTARY PUBLIC D. Daniel Hugh LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature
Michael McElduff
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9/15/95
CASE NUMBER 9507G48201
PAGE NUMBER 2 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Michael McElduff 22
FULL NAME AND AGE

122 C Blue Heron Drive, WHO BEING DULY SWORN, DEPOSES AND SAY
ADDRESS AND TELEPHONE NUMBER

Aircraft - N142 ER Aerospatiale TB-9 Tampico Color - Blue, Gold, W
PIC - Michael McElduff Flight Instructor
Student Pilot - Bradley Morris
Observer - Tom Story

I was giving flight instruction to my student.

Sworn to and subscribed before me
the undersigned authority, this 15th
day of September 19 95
[illegible]
NOTARY PUBLIC

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

[signature]
Affiant's Signature

Michael McElduff
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 09/15/95
CASE NUMBER 9509852A
PAGE NUMBER 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, CHIP HOUGH 36
FULL NAME AND AGE
EMBRY RIDDLE AERO UNIV.
600 S. CLYDE MORRIS BLVD. DAYTONA 226-7660, WHO BEING DULY SWORN, DEPOSES AND SAY
ADDRESS AND TELEPHONE NUMBER

WHILE TAXING ON PARALLEL TAXIWAY TO RUNWAY 11, I OBSERVED TWO AIRCRAFT ON FINAL APPROACH TO RUNWAY 11. BOTH WERE APPROXIMATELY THE SAME SIZE VISUALLY. THIS WOULD INDICATE THEY WERE IN CLOSE PROXIMITY TO EACH OTHER. I MADE A RADIO TRANSMISSION TO ADVISE THAT THERE WERE TWO AIRCRAFT ON SHORT FINAL. THERE WAS NO IMMEDIATE RESPONSE (AS FAR AS CHANGING DIRECTION) BY EITHER AIRCRAFT. ANOTHER RADIO TRANSMISSION (NOT FROM MY AIRCRAFT) WAS MADE ADVISI "TOMAHAWK - GO AROUND!", INITIALLY NO RESPONSE, THEN LOWER AIRCRAFT PITCHED UP VIOLENTLY. I AM UNSURE OF AN ACTUAL COLLISION BETWEEN THE TWO AIRCRAFT. THE LOWER AIRCRAFT THEN WENT FROM A VERY HIGH PITCH ATTITUDE TO DIRECTLY NOSE DOWN INTO GROUND. ALL OF THE VIOLENT PITCH CHANGES ON THE LOWER AIRCRAFT OCCURED BELOW 100'-150' ABOVE GROUND. I WAS IN AIRCRAFT N179ER. I DO NOT KNOW THE TAIL NUMBERS OF THE AIRCRAFT INVOLVED. MY AIRCRAFT (N179ER) IS A TB9. [redacted]

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT 19 95
DET. P. 206 N5500
NOTARY PUBLIC

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature

CHIP HOUGH
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9/15/95
CASE NUMBER 9509~~01F~~201
PAGE NUMBER 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Eric Sumner 18
FULL NAME AND AGE
223 Doolittle Hall, Embry Riddle
~~[redacted]~~ ER. (904) 226-7325 **, WHO BEING DULY SWORN, DEPOSES AND SAY**
ADDRESS AND TELEPHONE NUMBER

I was taxing towards the runway, observed two single engine aircraft on short final, one aircraft (Tomahawk) landed, the other went nose down into the ground and burst into flames. Myself and two others pulled a male out ~~of~~ near the wreckage, while the other was pinned in the aircraft.

th aircraft landing runway 11 at New ~~S~~my Smyrna

I was the pilot of aircraft N179ER with Harold Knapp - d.i.h Hough

N179ER is a ~~Aerospa~~ TB9 Tampico

worn to and subscribed before me
ne undersigned authority, this 15
ay of SEPT **19** 95
OTARY PUBLIC L. E. O.

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Eric Summer
Affiant's Signature

Eric Sumner
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 091595
CASE NUMBER 9509OHE0
PAGE NUMBER 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Jason Borgus 18
FULL NAME AND AGE

214 McKay Hall, ERAU 226-7524, WHO BEING DULY SWORN, DEPOSES AND SA'
ADDRESS AND TELEPHONE NUMBER

As we were approaching runway 11 on final I saw the Tomahawk enter down wind approach. I proceeded to land the aircraft and taxi away from th runway towards the ramp. As we reached the ramp I heard someone call over the radio, "Tomahawk go-around" 3 or 4 times. The next thing I heard was for some to call 911. I looked towards the runway and saw flames and black smoke.

'worn to and subscribed before me
ıe undersigned authority, this 15
ay of SEPT 19 95
[signature] #515
IOTARY PUBLIC LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

[signature]
Affiant's Signature
Jason Borgus
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 091595 0115
CASE NUMBER 950904FE
PAGE NUMBER 1 OF 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Michael J. Meehan, Jr. 19
FULL NAME AND AGE

ERAU Box # 14752 Daytona Beach, FL 32114 **, WHO BEING DULY SWORN, DEPOSES AND SAY**
ADDRESS AND TELEPHONE NUMBER

Jason, Mr. Petersen, and myself were taxiing and at saw the Tomahawks on downwind. Soon after I heard a voice yell two/three times "Tomahawk go around. Tomahawk go around!". I quickly turned to my left and saw a huge explosion. Right after that another voice comes on the radio and says "Radio tower help, call 911!!". The we proceeded to tie down in Tampico and go into the New Smyrna Beach 1-60.

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT 19 95
NOTARY PUBLIC LCO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature

Michael J. Meehan, Jr.
NAME (Printed or Typewritten)

AFFIDAVIT

TATE OF FLORIDA
OUNTY OF VOLUSIA
ITY OF NEW SMYRNA BEACH

DATE 9-15-95
CASE NUMBER 9509~~0112~~0185
PAGE NUMBER 1

EFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Tom Story - 21 years
FULL NAME AND AGE

ERAU - McKay Hall Rm 256.
ADDRESS AND TELEPHONE NUMBER, WHO BEING DULY SWORN, DEPOSES AND SAYS:

I was sitting in the observer seat of a TB9 ERAU plane on the Ramp. we were preparing for shut down when on the head set for Airport traffic A warning was said ~3 times for an aircraft on final
If I remember correctly It was "Tomahawk Pull up, go around" again it was said ~3 times, my flight partner said something along the lines of "Holy Shit." at that time, I looked at the final end of the Runway in time to see a plane (High wing I think) flying straight down approx. 50-60 feet in the Air. There were other Planes around - I didn't pay attension to were they were or what they were doing - The plane impacted and initially went to flame with smoke. We/my instructor and flight partner then proceeded to the runway.

rn to and subscribed before me
undersigned authority, this 15th
of Sep 19 95
TC Daniel A Hogan
ARY PUBLIC - LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

T Story
Affiant's Signature
Tom Isa Story
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 09-15-95
CASE NUMBER 9509698
PAGE NUMBER 1 OF 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, X Douglas Petersen 2
FULL NAME AND AGE

X 1330-H OLD KINGS Rd Holly Hill FL 32117 **WHO BEING DULY SWORN, DEPOSES AND SA**
ADDRESS AND TELEPHONE NUMBER

+@ 5mm before 5PM MYSELF, MIKE MEEHAN, JASON BORGUS WERE SHUTTING DOWN RIDDLE 23 (NIZER). WE HAD SEEN A TOMOHAWK ON FINAL BEHIND OUR AIRCRAFT WE TAXIED INTO VINTAGE JETS AND PROPS AND WERE FARING AWAY FROM THE SCENE (APROACH END OF RUNWAY 11) AS WE WERE DOING OUR MAG GROUNDING THERE WERE FOUR OR FIVE TRANSMITIONS ON 122.80. THESE TRANSMITIONS WERE - "TOMOHAWK GO AROUND, TOMOHAWK GO AROUND, TOMOHAWK GO AROUND." "AIRCRAFT CRASHED CALL THE AMBULANCES AND FIRE TRUCK" "WE HAVE AN AIRCRAFT IN FLAMES". EMMEDIATELY ~~PRIOR~~ AF TO THE LAST TOMOHAWK GO AROUND" I OPENED OUR AIRCRAFT DOOR AND SAW FLAMES. I BELEIVE IT TOOK 7 MIN FOR THE FIRE TRUCK TO GET ON THE SCENE AND PROCEDE TO EXTENGUISE THE FLAMES. I TOOK STATEMENTS FROM MY STUDENTS AND GOT THE NAMES AND NUMBERS OF TWO MEN WHO CAME BACK FROM SCENE. MR. DAVE GLASSER AND DAVID GREENE.

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT 19 95
NOTARY PUBLIC LEO #515

I swear all information provided in the above affidavit is true and correct to the best of my ~~knowledge and belief~~.
Affiant's Signature
DOUGLAS PETERSEN
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 09/15/95
CASE NUMBER 950904420 18
PAGE NUMBER 1

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Harold R. Knopp 31
FULL NAME AND AGE
505 Sandy Oaks Blvd.
Ormond Beach, FL 32174 (904) 677-5735, **WHO BEING DULY SWORN, DEPOSES AND SA**
ADDRESS AND TELEPHONE NUMBER

I was the rear passenger of Aircraft # N179ER TB9 Bonanza at New Smyrna Beach Airport. We had just landed and were taxiing back to depart ON Runway 11. I witnessed 2 airplane very close together on Short Final approach to Runway 11. A radio call was made warning the 2 Aircraft of their close proximity. Another radio call was made for a go around. The 2 Airplanes colided and one went straight down to ground and burst into flames Chip Hough and Eric Sumner were occupying the front seats.

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT 19 95
NOTARY PUBLIC C.E.O. N53110

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature
Harold R. Knopp
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 091595
CASE NUMBER 950946C
PAGE NUMBER 1 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, CONSTANTINE BRAD MORRIS, 19, PO BOX
FULL NAME AND AGE

14251, 600 S. Clyde Morris Blvd, Daytona Beach, FL 32114-2977, **WHO BEING DULY SWORN, DEPOSES AND SA**
ADDRESS AND TELEPHONE NUMBER

I was taxiing in my airplane and I looked down the runway and I saw 2 planes in-bound for landing. One was above the other on the same path. I heard on the ~~runway~~ radio "Tomahawk go around Tomahawk go around". Then I saw the 1ST airplane (the lower one) go up and then straight down. I got out of my airplane and ran towards the plane to help. Other people were at the scene at my arrival

Sworn to and subscribed before me
the undersigned authority, this 15TH
day of SEP 19 95
NOTARY PUBLIC Daniel A Hoy
LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.
Bradley C. Morris
Affiant's Signature
BRADLEY C. MORRIS
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9/15/95
CASE NUMBER 950944-010
PAGE NUMBER 2 of 3

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, BRADLEY CONSTANTINE MORRIS, 600 S. Clyde Morris Blvd. PO BOX 144251 Daytona Beach FL 32114-2927 (226-7416) **, WHO BEING DULY SWORN, DEPOSES AND SA**

FULL NAME AND AGE

ADDRESS AND TELEPHONE NUMBER

I was in a Tampico (142ER) tail number taxiing off of runway 11 for parking space.

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT **19** 95
Deb P. Q 206 NSB
NOTARY PUBLIC C & O

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Brad Morris
Affiant's Signature

BRAD MORRIS
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9/15/95
CASE NUMBER 9509-0452-0
PAGE NUMBER 1 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Aaron Rusich 19
FULL NAME AND AGE

600 Jimmy Ann Dr. Apt 2017 253-5704, **WHO BEING DULY SWORN, DEPOSES AND SA**
ADDRESS AND TELEPHONE NUMBER

2 planes, Tomahawk and Tampico were on short final. The Tamp had a final approach established and Tomahawk was just above it. The Tomahawk was notified by other aircrafts in pattern, but nothing was done. The student pilot in the Tampico pulled up and caused the plane to stall whic resulted in crash. The tomahawk then proceeded to land. From what I heard on the radio, it is complete speculation to what caused the Tampico pilot to pull up. The Tomahawk should have realized the Tampico was behind him because he was slightly to the rear of the Tampico

Sworn to and subscribed before me
the undersigned authority, this 15TH
day of SEP 19 95
DEC Daniel Hoover
NOTARY PUBLIC LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature

Aaron Rusich
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9-15-95
CASE NUMBER 950900152
PAGE NUMBER 2 of 2 #

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Aaron Rusich 19
FULL NAME AND AGE

600 Sima, Ana Dr. Apt 2017 253-5704, **WHO BEING DULY SWORN, DEPOSES AND SA**
ADDRESS AND TELEPHONE NUMBER

To add, my flight instructor and I were holding short on the runway. We were waiting for both aircrafts to ~~[illegible]~~ get clear of runway. The aircraft was Mooney N189ER

Sworn to and subscribed before me
the undersigned authority, this 15
day of SEPT 19 95
NOTARY PUBLIC

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

Affiant's Signature

Aaron Rusich
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA
COUNTY OF VOLUSIA
CITY OF NEW SMYRNA BEACH

DATE 9-15-95
CASE NUMBER 9509042 01
PAGE NUMBER 1 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Leonard Douglas Booker
FULL NAME AND AGE

735 5th st Port Orange FL 32119
ADDRESS AND TELEPHONE NUMBER, WHO BEING DULY SWORN, DEPOSES AND SAYS

My student and I were waiting to take off on Runway 11 at New Smyrna Beach Airport. I look at the Final and saw two Aircraft on final in close proximity to one another. They looked like they were getting close. I told the Tornado to go-around on the radio. It then looked like the Piper aircraft went down and then the nose dipped very quickly and hit the runway very deep nose down. One impact the aircraft slid into flames. I got out of my Aircraft to see if the plane to see if I could help. One had all ready flown the Aircraft and the other was pinned inside. The flames were too high to help.

Sworn to and subscribed before me
the undersigned authority, this 15TH
day of SEP 19 95
OIC Daniel [signature]
NOTARY PUBLIC LEO

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

[signature]
Affiant's Signature

L. Douglas Booker
NAME (Printed or Typewritten)

AFFIDAVIT

STATE OF FLORIDA

COUNTY OF VOLUSIA

CITY OF NEW SMYRNA BEACH

DATE 9-15-95

CASE NUMBER 95090H82018S

PAGE NUMBER 2 of 2

2 of 2

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED, Leonard Douglas Booker, [illegible]
FULL NAME AND AGE

734 5th st Port Orange FL 32119, WHO BEING DULY SWORN, DEPOSES AND SAY
ADDRESS AND TELEPHONE NUMBER

Additionally, My student and I were holding short of the Runway 11 waiting to depart. We watched them [illegible] [illegible]. The aircraft was Mooney N1892K.

Sworn to and subscribed before me

the undersigned authority, this 15

day of Sept 1995

[signature] NSBPD

NOTARY PUBLIC [illegible]

I swear all information provided in the above affidavit is true and correct to the best of my knowledge and belief.

[signature]

Affiant's Signature

L. Douglas Booker

NAME (Printed or Typewritten)

EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

MEMORANDUM

FACSIMILE

TO: Jeff Kennedy
FROM: TOM Kirton
DATE: 3-25-96
SUBJECT:

TOTAL NUMBER OF PAGES INCLUDING COVER PAGE 39
****

COMMENTS: _____

Mr. Kennedy

Here are the documents we talked about on the phone this A.M.

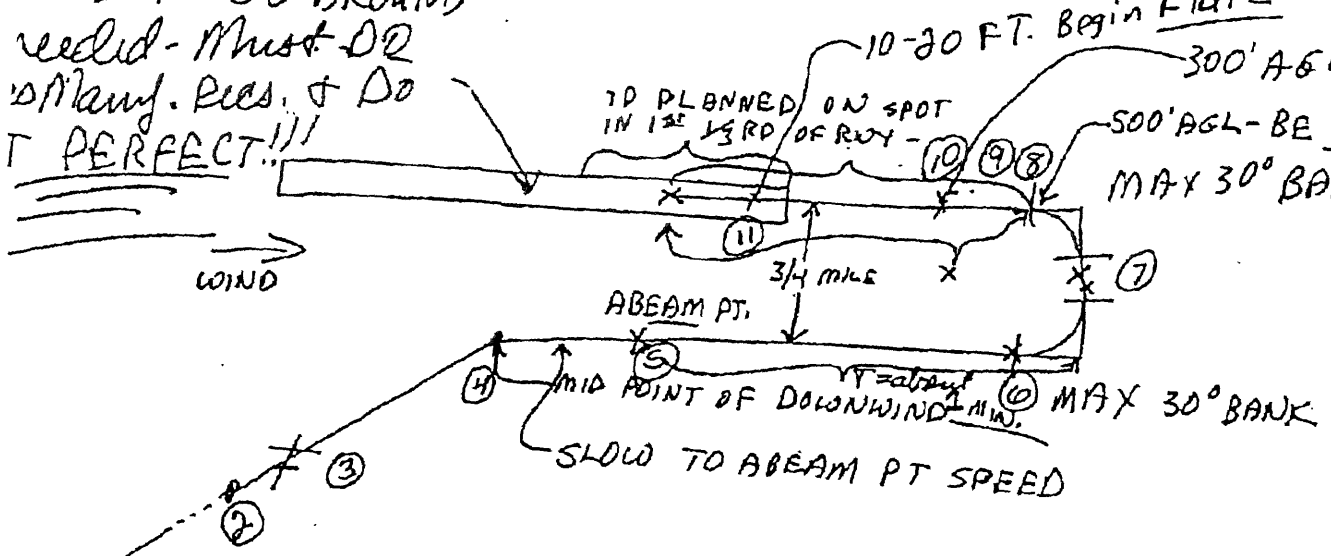
The hand drawn diagram of a traffic pattern is for new students as noted on top of the page. I drew this as a class note to show new instructors a way to help students learn the elements of a traffic pattern. We have used this approach to teach a base line type of pattern that the student can use for a VASI (3°) type of approach, night and day, when nothing is different (Wind, terrain, traffic, ATC, short field etc). We then teach the IP's to vary this pattern and to teach their students to vary this pattern to fit existing situations and conditions.

The other documents are the ones we discussed. If you have any questions please call - 904 226 6993 or 904 226 6837 (receptionist will answer and can beep me).

Thank You,
Tom Kirton

NORMAL LANDING

NOTE: IF GO-AROUND needed - Must DO Many. Recs. & Do T PERFECT!!!



Note: TB-9 3° Glide slope = 67 KIAS (67 Kts. G.S. No. wind)
Full Flaps -
Power approx 1200 RPM
Rate Descent = 350 FPM

① ARRIVAL (DESCENT) ETC
② 45° GND TRACK 2 MILES FR. ENTRY SLOW TO TRAF. PATTERN SPEED
③ Complete Pre-Landing CK LIST
④ Turn Downwind
⑤ ABEAM TD PT. - extend partial Flaps
⑥ Begin descent
⑦ check traffic ALL DIRECTIONS - should be "crabbed"
⑧ Be rolled out Wings level 500' AGL -
⑨ Decide Landing Flap amount and set (Normal = Full Flaps)
⑩ Be stabilized by 300' AGL.
[illegible] TD - Begin Flare -

IF student can't recite this diagram and all actions involved - then student is not ready for landing Practice — also if student does not know exactly how to execute go-around — not ready for Landing Practice

EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

MEMORANDUM

FACSIMILE

TO: Jeff Kennedy
FROM: TOM Kirton
DATE: 3-25-96
SUBJECT:

TOTAL NUMBER OF PAGES INCLUDING COVER PAGE 39
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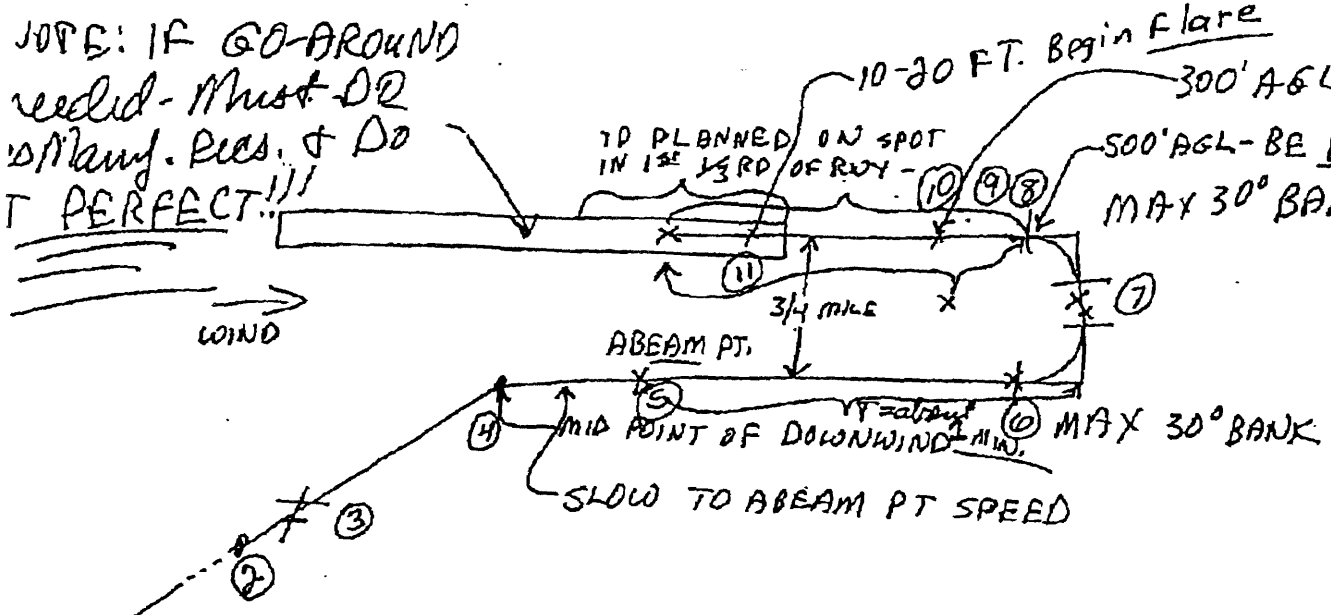
Thank You,
Tom Kirton

NORMAL LANDING



NOTE: If GO-AROUND needed - Must DO Manuv. Recs. & DO IT PERFECT!!!

NOTE: Distance X = about 1.6 N. miles

Note: TB-9 3° Glide slope = 67 KIAS (67 Kts. G.S. No. wind)
Full Flaps -
Power approx 1200 RPM
Rate Descent = 350 FPM

① ARRIVAL (DESCENT) ETC
② 45° GND TRACK 3 MILES FR. ENTRY SLOW TO TRAF. PATTERN SPEED
③ Complete Pre-Landing CK LIST
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⑨ Decide Landing Flap amount and set (Normal = Full Flaps)
⑩ Be stabilized by 300' AGL.
- Begin Flare -

IF student can't recite this diagram and all actions involved - then student is not ready for landing practice — also if student does not know exactly how to execute go-around — NOT ready for LANDING

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

FAX COVER LETTER

TO: BOB KRUSE
Company Operations Standards Development SPEC AFS-63
FAX Phone PO BOX 2-5082
Date 9/6/94

FROM:

Flight Technology Department
FAX: 904/226-6274
TEL: 904/226-6837

MESSAGE:

BOB —
Sorry this took so long — I'll talk to you shortly —
Tom Kinton
Embry-Riddle —

TOTAL NUMBER OF PAGES INCLUDING THIS COVER SHEET:

If you do not receive all pages transmitted, please contact us immediately.

5 Sept. 94

Dear Bob,

I am sorry this letter took so long to produce. I hope you will give these thoughts on landings consideration for including in the new Flight Training Handbook. This letter is an outline of a magazine article I hope to get published soon. Many of the considerations included have come from being involved in training many students from the primary stage to multi-engine piston and turbine levels of training. I have had the privilege of working with many instructors in that I administer many upgrade and final acceptance checkrides for instructors at ERAU. I have also administered stage checks at ERAU for a number of years and have seen a huge number of landings performed by students and instructors. The considerations I have listed in this letter come from seeing many good landings and seeing a very high number of landings that need improvement. I believe that a good landing starts with mastery of certain key maneuvers long before actual approach and landing practice is begun. I also believe two other things. A good landing is usually the end result of a good approach and traffic pattern and students who learn a superb "normal" approach, traffic pattern and landing are able to modify this normal maneuver and accomplish more complicated maneuvers satisfactorily if they master a "baseline" maneuver first.

I have heard instructors say to students to "use judgment" to figure out how to approach and land and to correct errors in the traffic pattern. I do not have a problem with this if the student has been taught the base line normal approach and landing first. I do have a big problem if the student does not have a base line to modify. The following discussion is my recommendation for students. Learn a "base line normal" approach, traffic pattern and landing for normal situations. After mastering the fundamental normal base line, then learn the ways to modify this approach for short fields, turbulence, soft fields and irregular terrain.

The pattern entry begins two miles from the point at which the downwind turn begins. The airplane should be at pattern altitude and should be flown at downwind speed. This speed should allow for flap extension and provide a good margin above stall speed in medium bank turns. Use the medium bank turns in the pattern because they are the easiest for a student to master. Set a maximum limit of 30 degrees of bank so that a student does not inadvertently increase the bank to a steep banked turn requiring opposite control pressures to prevent overbanking. Situations should be contrived to make certain the student will monitor and respect the bank limit as a habit pattern. These situations can be easily set up in practice flying rectangular patterns.

Speed in the pattern should be high enough for a safe margin above stalls in turns and provide good control response and maneuverability but slow enough to extend flaps, fit in with the flow of other traffic and allow for quickly achieving the final approach speed as

soon as the turn to final is completed. 1.3 to 1.4 Vso seems to work well for most small training airplanes.

Pattern width on downwind is determined by deciding what speed to fly during the turns from downwind to base and base to final and the maximum bank angle you are going to allow the student to fly. In order to fly 80 KIAS (assuming GS=80Kts) a 30 degree banked turn requires a turn radius of 1000 feet. 20 degrees of bank requires 1500 feet or radius. Since two turns are required a total radius of turn requires 2000 to 3000 feet. An average bank of 20 degrees is probably required when all is said and done considering that any wind will require reducing the bank angle as the turn progresses downwind to base. It is important to have a base leg that allows for some straight flight so that the final approach can be checked clearly for traffic and a determination can be made as to how well the descent and progress toward the landing is going. This all takes a little time. The pattern width then must be at least 3/4 to 1 mile to allow all of this to happen.

The final approach is flown with some considerations that must be decided ahead of time. Two considerations are of major importance. They are the descent angle you want to fly and the minimum altitude you want the student to complete the turn from base to final. Arguments can be made for 400 or 500 feet. For purposes of this discussion 500 feet is the altitude to arrive at having completed the turn. If you have decided to teach a normal approach at a 3 degree final angle (VASI and ILS) then you have to know how far to be from the touchdown point at the completion of the base to final turn. This distance is 9850 feet or 1.6 nautical miles assuming you are at 500 feet above the touchdown zone. You must know what your groundspeed is at the IAS you have decided to fly on final. For a GS of 65 Knots you need to descend at about 350 fpm. In a Tampico at 65 KIAS the power setting required is about 1500 RPM. This amount of power allows for correcting if you are too high and provides a satisfactory power on approach. Correcting for wind is done by realizing that as the goundspeed decreases with a strong headwind the rate of descent must decrease in order to maintain a 3 degree approach angle. If you fly a predetermined and fixed power setting on final in different wind speeds the approach angle will vary and the length of the final approach will vary.

There is always the argument that students (and others) fly too big a pattern. The width of the pattern is already defined previously and the length of final is determined by your minimum altitude for the base to final turn and the angle of descent you want to have on final. An important consideration for the length of the final is for the student to have adequate time to judge how things are going and to have time to make corrections so that arrival at the flare altitude is as planned.

Flying a predetermined approach angle requires that students be taught how to recognize distances on the ground and to be able to recognize when the approach is not going well. This part of the discussion assumes that the student initially got on the final approach 500 feet above TDZ and 1.6 miles from touchdown. The airplane landing configuration, pitch attitude and power setting must be achieved immediately upon turning final. As soon as everything is stable the student can then (and only then) look for the area of non-

movement to determine the approximate point at which touchdown will occur. This point is approximate because of the need to flare the airplane before touchdown. The approach angle should flatten slightly while the pitch attitude, power, rate of descent and airspeed are being adjusted for touchdown. The point to made is this: if the initial power setting and pitch attitude chosen upon turning final are slightly in error then the touchdown point cannot be reached using the three degree approach angle unless there is a way to visually re-align by intercepting the original desired 3 degree angle. How would you tell a student to do this on a runway not served with a VASI. The only way I can see to do it is to momentarily steepen or flatten the approach angle, as the case may be, to intercept the three degree angle again. This is a guess at this point as to how long to steepen or flatten. Once you think you are back on the glide path set the power and pitch attitude for the airspeed and descent rate you think will achieve the proper descent angle.

I have heard people say to visualize the three degree angle. To date I have found no one that can explain how to do this without a VASI or some other means of aligning the flight path. The area of non-movement is a way to determine the approximate touchdown point on almost any angle of approach. This is the reason you must know the distance from touchdown, the groundspeed and rate of descent needed to fly the pre-determined angle.

The "what controls airspeed and rate of descent" argument is always fun to have. However, I think that somebody should decide what we in general aviation should teach and then say it in plain language. It would be very helpful to state some good reasons for "why" pitch for airspeed, power for flight path or the other way around. We at ERAU teach that in a power variable situation, power controls airspeed and elevator controls flight path. We are careful to point out to a student that if you are low and slow on an approach what do you do first? We teach to lead with power to maintain airspeed because the speed is going to decrease if you raise the pitch attitude and you will probably increase the rate of descent after the momentum change is complete if you don't make provision for maintaining your airspeed first. The important part of our discussion with the student is to point out that rarely does changing one of the two (pitch or power) produce the desired result. Most times you must anticipate the effect of each control change and adjust them both as needed.

A situation that repeatedly occurs until corrected in our students is that they have trouble maintaining airspeed during the base to final turn. Most of the time the tendency is to increase speed. I always ask the student how exactly do you maintain speed in a descending turn. I think we should make this very clear in the new FTH.

When we state how to control airspeed and rate of descent we need to consider the short range and long range training objectives. I have heard and read all kinds of reasons (most of them make a good point) why to use power for airspeed and pitch for flight path and the reverse. An example is the glideslope on the ILS. The reason stated for using elevator for glideslope control is that you get a quicker and more precise reaction from the airplane when making a small change. Also, as long as the airspeed doesn't vary much then it is more important to stay exactly on glide slope than on speed. This is typical of some of the

arguments presented. We need to all come up with something universal and we might even consider giving the student a choice in some situations.

Another example of a situation needing clarification is the extending of flaps during a turn. Is this OK to do or should you wait until the turn is complete? I have heard that it is better to extend them in a turn if you are flying passengers because you can use the turn to mask a big pitch attitude change in order to provide passenger comfort. I don't like to have low time students extending flaps in a turn because I want them concentrating on making a good steady airspeed turn while not exceeding a pre-determined angle of bank.

We need to say more about the use of flaps and come up with a specific guide for students to use. My own feeling is to make up your mind before the approach starts as to the final amount of flaps to use. Extend flaps to an approach setting while on the 45 degree leg. Go to the final flap setting on final as soon as the turn is complete. I teach the students to use flaps to allow a better view of the runway on final. keep a higher power setting on final and provide a slower touchdown speed on landing. I also later on teach them that flaps can be used to steepen your angle of approach. I try not to let the student develop habits that cause them to use flaps to correct other errors in the approach to landing (with the exception of emergency landings). In any case we need some specific discussion in the FTH.

I think we need to come up with some more detailed information for the student and instructor to use on teaching when and how to begin the flare. We flew C-172s at ERAU for a long time and beginning a flare at 10-20 feet produced a lot of float. The instructors all have a tendency to tell the student to start at a much higher altitude. I don't have a problem with this as long as the student is taught that this is a special technique for a special airplane. I think most people do a good job of teaching the beginning of the flare but I think we need some specific words to use. For example, I hear new instructors say begin the flare as soon as you reach "tree top height" above the ground. I don't think this is specific enough. I encourage instructors to start their students on runways that have known height references near the approach end of the runway. One runway in particular we use has a nice 25 foot tall hangar located right next to the touchdown area. This seems to help students master the "how high are you above the runway" question quickly. I also think we must emphasize the need in all of our training to provide a variety of specific different references and experiences designed to help the student cope with other situations. An example is the wide runway vs the narrow runway. I think we should do our best to help a student quickly master the fundamentals of a specific maneuver or procedure and include in the completion standards the requirement to use the fundamentals to accomplish more complex operations.

Teaching a consistent predetermined approach angle may help a student master landings quicker due to the predictability of such things as runway perspective change and rate of closure with the runway. The rate of descent at 350 fpm or so will also help make for an easier flare transition. Seeing the same picture repeatedly until the landings are mastered seems to be a good way to instill the normal approach. Once this is mastered the student

must be lead to other types of landings and different approaches. Having the normal baseline approach clearly understood will help the student make the necessary modifications to successfully accomplish more complex landings.

I will send another letter shortly talking about the short and soft takeoff and landing. I most want to know your feelings on the constant three degree angle approach and the other things we talk about in the traffic pattern. I hope this letter will stimulate more conversation on this subject and help us all develop the most effective and safe approach to teaching our students how to land.

Sincerely,

Thomas M. Kirton

Thomas M. Kirton
Chief Flight Instructor
Embry-Riddle Aeronautical University

Ref "CONTACT" publication –

Please note – There is an error on page 2 that will be corrected in a future edition. The circled "1 mile." in the last paragraph should be "1/4 mile".

Thanks
Tom Kilton

CONTACT

THE AERONAUTICAL SCIENCE NEWSLETTER

Volume 6, Issue 1 — EMBRY-RIDDLE AERONAUTICAL UNIVERSITY — February 1996

Traffic Pattern Operations

by Tom Kirton

There are some instructors and students who have expressed confusion about ERAU policy concerning airport traffic patterns. We are not required to perform a three degree approach angle for all landing approaches. We do advocate using a recognizable and constant approach angle when teaching new flight students approaches and landings. We have also said that IPs should use the VASI (angle about 3 degrees at most locations in the area) with new students to show a constant angle approach, and to help them achieve a "base line" skill level in making approaches and landings.

Simple math (for some of us- not me) shows us that if we want a student to be at 500 feet AGL upon turning final, and if we want a three degree approach angle, then the distance from the 500 AGL point on final to touchdown is about 1.5 to 1.6 nautical miles. We also advocate being stabilized before descending below 300 feet AGL on final. For most primary students this requires that they start the process on final by at least 500 feet AGL or so.

We require that a student learn, before qualifying for solo, how to cope with different kinds and sizes of approaches, pattern sizes, traffic situations, runway changes, etc. We must also teach the student how to recognize the need to change pattern elements such as the approach angle, length of final approach, and other techniques for dealing with traffic, ATC instruction, weather conditions and any other factor that would cause us to vary our pattern size, approach angle, base leg placement, etc.

We have had a few comments made to us about the size of some of our training patterns. Most people are not complaining about a one and a half mile length of final for beginning students or the three degree approach. They do complain when the pattern gets bigger that this. (So do I!) I don't think anyone can dictate a standard pattern for all situations, conditions and skill/proficiency for every pilot, but we must teach our students to not needlessly fly a big pattern, especially when traffic is a consideration.

An element that must be dealt with in any flight operation is the need to maintain awareness as to what action to take in the event of engine failure. All of our IPs and students must plan where to go when the landing runway is out of glide range in a traffic

(Continued on page 2)

Inside This Issue

Rounesville's Corner

DISPATCH

Have you checked your dispatch records lately? Don't get to the last course in the dispatch sequence (AS-410) and then find that your attendance was not satisfactory in the previous classes. Check your records with **Stephan Fitzpatrick** in AW8-123. His hours are posted on the board outside the main office.

SCHEDULE VERIFICATION

Were you one of the students who forgot to verify your schedule this term? No fun if you fell into that category. Remember, if you advance register it is a form of reservation. You must confirm your reservation (so to speak), which is now called schedule verification. The verification dates and locations are printed on the first page of the schedule books each semester/term.

CATALOG

Believe it or not (not Ripley's) there are still some students around that do not know about the areas of concentration which have been incorporated into the Aeronautical Science degree program since the 94-95 catalog went into effect. If you are not in the 94-95 or 95-96 catalog you may want to take a look at the curriculum and determine if there would be an advantage for you by switching into the newer version.

AS-410

For the fall term we will be

(Continued on page 3)

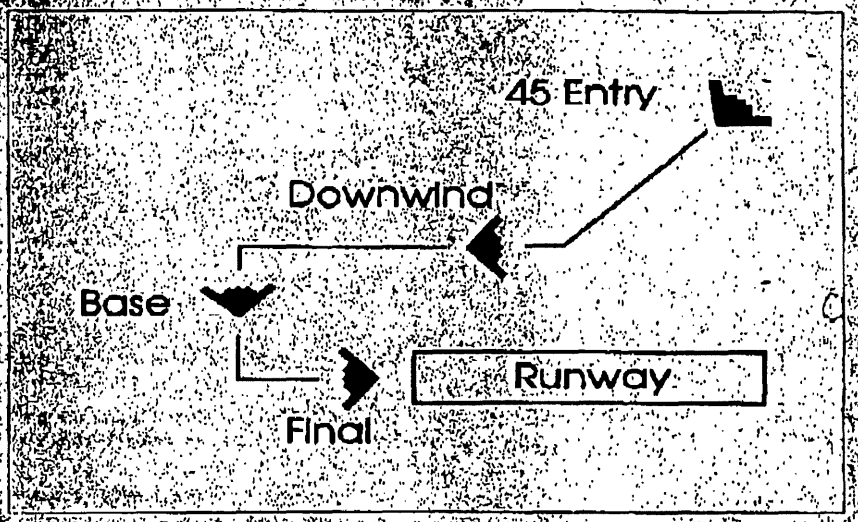
Traffic Pattern Operations

(Continued from page 1)

pattern. We recently flew a TB9 and found the following: power off, full flap, 65 knot GS glide angle = 7 degrees. Distance to touchdown from 500 feet AGL in this situation is approximately 4000 feet in a no-wind situation. You must keep this in mind while you are following anyone in the pattern or doing a VASI type approach. You will probably be out of glide range for part of the downwind, base and final leg. Plan a suitable emergency landing site taking all of this into account.

A big problem in traffic patterns at outlying fields is how to manage our flight path (horizontal, vertical and velocity) when we are working with other traffic. If someone asks me how big a pattern I fly, I answer by saying that the airplane in front of me may well dictate the pattern I have to fly and the techniques I have to use to fly a safe pattern. For example, on turning downwind in a closed pattern with traffic in front of you, slowing down may be the proper way to keep the pattern from getting too big. If someone is entering the pattern as the turn from crosswind to downwind is being completed, we should probably widen out a little to avoid getting too close. If you are number three or four in the pattern you can't begin your descent upon turning base leg because you are probably too far out to do a continuous descent from this point. The point of all of this is that we need to teach our new students a base line pattern that would be the "default" pattern if everything were perfect, and how to change this pattern to meet the current situation.

Each leg of a traffic pattern requires special consideration for collision avoidance. For example, it is not a violation of FARs to enter the pattern from a straight-in approach. We at



Typical left-hand traffic pattern nomenclature. Ref. AIM 4-3-1.

ERAU prohibit this practice in our training. In fact, most people we have talked to do not advocate this kind of entry. The problem is that not everyone adheres to his policy.

Collision avoidance in the vicinity of airports requires that all pilots do at least three things: 1) continually scan for other traffic- see and be seen, 2) do normal traffic pattern maneuvers and don't do the "unexpected" and, 3) expect the unexpected at all times! You cannot count on everyone flying exactly the same size, speed, and profile in the traffic pattern. I have flown with many instructors over the years and we can't even agree most times on exactly where to fly the 45 degree entry leg.

Base leg and final are areas that require special understanding and emphasis in order to ensure a safe operation. Not only do you have to check for traffic above, below, close-in on final, and long final, but you must check that no one is on the opposite base leg. One of the problems in thinking you know the location of all other traffic is that the other pilot may have been taught traffic patterns from a reference source that disagrees with your reference source. The width and length of the base leg and the length of the final approach are not standardized in various accepted aviation reference sources. The AIM recommends that the downwind leg be flown between 1/2 and 1 mile from the runway. Some references advocate turning base leg when the point of touchdown appears 45 degrees behind the wing. This means that a 1 mile wide pattern will produce a 1 mile final and a 1/2 mile wide pattern will produce a 1/2 mile final. Using the 45 degree method with a crosswind on downwind leg will also further complicate this method and make the length of final vary in each wind situation. Another well known aviation authority recommends that the final approach leg be no longer than 1 mile. This is too short a final leg a low-time student trying to do a power-on, stabilized final approach to landing. The Flight Training Handbook (AC

(Continued on page 3)

Traffic Patterns

(Continued from page 2)

61-21A) recommends placing the base leg at various distances from the runway to compensate for varying wind strengths and amount of final that will be used during landing. This part of the FTH does not provide consideration for a student pilot to develop a consistent, same-size pattern. The use of differing references causes each pilot to fly the pattern the way he/she has been taught and will cause airplanes to be in "unexpected" places.

One other important consideration is that simulated engine out approaches are often taught and practiced in traffic patterns. This presents a special problem because many times this maneuver is accomplished with the airplane in a bank from downwind to base and final. Looking for traffic on final approach with a wing up is difficult.

Consider an airport traffic pattern that can be in effect at any time on a given day in the Daytona Beach vicinity training environment. our King Air is in the pattern (TPA= 1500 AGL/ speed on downwind = 120-140 KIAS), a TB9 with a beginning solo student is in the pattern (TPA=800 AGL/speed on downwind = 90 KIAS), a twin from another flight school is in the pattern on a wide, low downwind, simulating a single engine approach, a Piper Cub is in the pattern at 500 AGL flying a very short final approach (no radio), a transient airplane from a low traffic density environment is trying to get into the pattern, and practice instrument approaches are being conducted against the normal flow of upwind traffic. How would you teach and instill proper habit patterns for conducting safe operations in this situation?

Our approach to this challenge at ERAU is to prepare a student to see and be seen, fly the traffic patterns using normal maneuvering and procedures, expect the unexpected, and be able to recognize and fly an appropriate profile considering all other traffic. The key concept we work on at every opportunity is the formation and practice of correct habit patterns. Working together to achieve these training considerations will help us all train our students in as safe an environment as possible.

Rounesville's Corner

(Continued from page 1)

offering two versions of AS-410 (Air Carrier Ops): AS-410 and AS-495. AS-410 will be for all students in the dispatcher program. AS-495 will be for all students in the Airline Pilot Area of Concentration who are not required to take AS-410 for the Dispatch program. If you are interested in a Part 121 operations course, and AS-410 is not required in your catalog or for the dispatch certificate, the AS-495 version will be for you.

DEFERRED FLIGHT STUDENTS

There are still lots of students in the Deferred Flight category. If you have not seen me personally or received correspondence from me specifically addressing your status with regard to deferred flight, see me this term. You will not be taken off Deferred Flight automatically; you must see me to arrange for this.

ADVANCE REGISTRATION

Advance Registration for the summer and fall terms will be here before you realize. Don't fail to advance register. There is no penalty for advance registration if you decide not to return for whatever reason. The penalty for not advance registering is the limited selection of courses that you will have after everyone else has had their pick.

HU-123/HU-142

HU-123 has been changed to HU-142. It is the same course, just a different number. If your catalog specifies 123 you can take 142 and it will count just the same.

DEVELOPMENTAL COURSES
(MA-005/006, HU-006/017/095, etc.)

Grades for developmental courses are calculated into your GPA. You must get a "C" or better in all developmental courses and repeats must be accomplished the following term.

SGA Report

by Shye Gilad, Aero-Sci Representative

The Aero-Sci representatives wish to thank everyone who helped to make last semester's Open Forum a big success. The student input was outstanding. Ken Doucette, Sean Elliott, Jack Hilgenburg, Chip Hough, Tom Kirton, Ken Stackpoole, John O'Keefe, Pete Rounesville, and Frank Wencel are just some of the Faculty/Administration who found the time to support the needs of their AS/Flight students. As a direct result of the forum, the AS department initiated three new SI sessions: Met 1, Met 2, and Aerodynamics. (See *Intercom* for days & times.) We would like to congratulate newly appointed Aero-Sci Rep. Dan Armstrong, and encourage all AS students to take part in the upcoming SGA Elections on Wednesday, March 13th. Please review the Constitution referendum that will be in your mailboxes in early March. Vote YES for a more efficient, effective student government.

A Chance You Can't Afford to Take

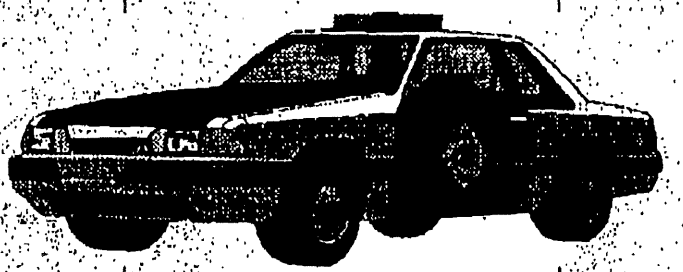
For three years now I've read stories in the Contact of how fellow students have almost ended their careers, and possibly their lives, before they had even begun. Most of these stories were about accidentally becoming stuck in IMC, running out of fuel, engine failures, or busting into controlled airspace, but I rarely read about people who almost ended their flying careers without even being near an aircraft. I never really even stopped to think about it, until it almost happened to me.

It was one of the first cool nights in October, a thursday night to be exact. My roommate and I decided to start the weekend early visiting one of the local bars. I agreed to drive, figuring that we would only be an hour or so and we were just going to play pool and have a beer. An hour passed and more and more of our friends began to show up, the pitchers were flowing freely and everyone was playing pool and having a good time. This went on for another three hours. At last call, ten of us walked out of the bar smelling like cigarette smoke and beer, a prime target for any police officer, but everyone who had driven there agreed that they were "good to drive home", including me.....

The ride home was to be no great challenge, after all, "you pay more attention to your driving when you're drunk" and I didn't feel that I was even drunk in the first place.

As I came up to the construction area on International Speedway Boulevard I noticed an open lane that had been barreled off, we stopped at the light and I further envisioned myself slaloming between these barrels. As the light turned green, I did just that.

Call it Murphy's Law or just plain bad luck, but as I passed through the intersection I heard someone yelling and knocking on my window. As I looked over, I saw a DBPD motorcycle officer running next to my car and screaming for me to pull over. I found another opening between the barrels, stopped, and rolled my window down. For what felt like an hour he just stared at me with a look of utter confusion and anger. The silence was suddenly broken with



words that I will not soon forget. "What the hell was that?," he asked, ringing out against the cool night air. I sat there momentarily dumbfounded, and finally replied, "Oh, ah, I thought that was the turn lane." A lame excuse, but as shocked as I was, surprisingly good. Again there was a long silence and he finally said, "Yeah, well it smells like you've had a little too much to drink tonight. You better park that thing!" With that, I quickly said thanks and drove away. My roommate and I barely said a thing the rest of the way home and I just sat there thinking about what could have happened if that police officer was in even a slightly bad mood.

I began to add up all the money that my family had spent to help me achieve all of my ratings, and all but 15 credits of my degree. I thought about the look of shear disappointment they'd have when I told them that I had wasted three and a half years of my life, and almost guaranteed the fact that I'd be jobless, when I graduated, assuming that the FAA didn't pull my ticket in the first place.

My thoughts then moved on to my fiancee. How could I tell her that I had screwed the plans we've had for six years because I was stupid? This event could change her future just as easily as it could mine, I had just never thought about it until then.

This one incident could very easily have ruined the rest of my life as I have planned it. To say you can still get an airline job with a DUI is ignorant. Let's face it, we all graduate with the same degree, the same flight time, and generally the same GPA. If the airlines can find anything that will give them the excuse to throw your resume in the trash, hey, its just less paperwork for them to file. If you still need more reasons not to drive drunk, think of the money. Compare an eight dollar cab ride to the hundred thousand dollars you'll be making when you finally land a job with the majors.

There are just too many sensible alternatives to driving drunk. You're bound to have at least one friend that will drag himself out of bed to give you a ride home. If not, the school provides this service free. To risk your entire career just because you want to see your car outside the window in the morning is stupid. Think twice before you drive, the rest of your life depends on it.

Preflight Yourself First

It started off as any other flight. I woke at 5:00 am to prepare for my solo cross country to Marathon. I prepared for my early morning departure by getting the current weather, performing the preflight, and grabbing a quick bite to eat, actually a donut and a cup of coffee. Everything checked out to be OK, the plane passed my preflight, the weather was typical of a summer day in Florida, and I was packed and ready for my venture down south.

I figured this would be a typical cross country flight, but it turned out that I was wrong. Being finals week, I had engaged in many late-night study sessions, which was one of the factors which led to a flight that I would never forget. In addition to my poor sleeping schedule, my nutritional habits had also been lacking, consisting of pizza and coffee.

I didn't realize that the energy I received from the donut and cup of coffee would be short lived. Early into the flight, I realized that I was slightly impaired due to a sustained loss of sleep. I was receiving flight following, so I figured that ATC would do most of the work for me. But I later realized that I must have dozed off at some point because I missed a frequency change.

After about an hour, not hearing anything from ATC, I figured that something was wrong. The weather started to downgrade slightly, so I had to alter my route of flight. While changing course, I inadvertently passed into class B airspace. Since I hadn't heard from ATC in some time, I began to worry, since I wasn't familiar with the area. After about twenty minutes, I was finally able to find the correct frequency. After apologizing numerous times, and attempting to explain my "radio silence" as being due to a bad radio, ATC got me back on course and informed me that I had ventured into Class B airspace without a clearance. Needless to say, they were understanding about my predicament.

I was lucky they were understanding and did not report the occurence. After this incident, I gave more thought to my fitness and ability to fly under fatiguing conditions. Most people do not realize that sleep loss is a cumulative process. As little as one or two hours of sleep loss a night can prove to be debilitating. As this period of time accumulates, the body's mental and physical functioning becomes impaired. This process can be thought of like a bank, the body stores up sleep loss and suffers as a direct consequence. A few of the noticeable effects are loss of visual acuity, cognitive functioning, muscular coordination and loss of spatial awareness.

As little as one or two hours of sleep loss a night can prove to be debilitating.

Fatigue is not a matter to be taken lightly. A variety of factors may contribute to the development of fatigue. A few of these include: physical exertion, monotony, medical factors, aging, loss of sleep, and boredom, just to name a few. These causes differ from one person to another and these effects are not always the same.

In conclusion, I've come up with a few recommendations to reduce the possibility of falling victim to the effects of fatigue. The leading cause is maintaining a steady sleep schedule. This ensures that the body doesn't become desynchronized, out of sync from its normal schedule. Second, nutrition is also very important. The human body can experience fatigue when a proper diet is not adhered to. Next, maintaining a steady exercise schedule is necessary. If only for a few minutes a day, the body needs to remain active in order to function properly during long periods of inactivity, i.e. flying long cross countries.

The plane isn't the only item that should be preflighted. Prior to flying, you should set up a checklist, to make sure that you are safe to fly. The acronym IMSAFE adequately sums up the deficiencies that can lead to trouble during flight. Illness weakens the body tremendously, leading to fatigue and general loss of performance. When taking any medication, make sure that it's been approved by a certified medical examiner to be safe to fly with. Stress leads to an increased level of fatigue and mental preoccupation. The brain can only process a few items at a time. Everybody knows that alcohol degrades mental and physical performance. The FAA requires the eight hours bottle to throttle, but sometimes this isn't always adequate. Most flying professionals recommend twenty-four hours between drinking and flying.

Fatigue is the next item on the checklist, these effects have been summed up previously in this paper. Your emotional state is also very important. Worrying, or placing to much emphasis on a problem can lead to distraction, and can prove to be extremely fatiguing.

Before flying, make sure there is nothing that will degrade your flying performance. You have the right not to fly. Don't be afraid to use it if you're not feeling fit to fly.

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INTERCOM

Announcements and points of interest for the Aeronautical Science department, local IFR pilots, and the ERAU community.

Local NOTAMs

(NOTAMs are time-critical!. The intent of this notice is to alert pilots to recent NOTAM activity and does not relieve each pilot from verifying the most current information.)

✈ FDC NOTAM 5/3996 raises circling heights at DAB to 780' MSL, all categories, due to a 480' crane 3100' north of rwy 16 threshold. Remember, circling minimums guarantee 300' obstruction clearance within 1.3, 1.5, 1.7, or 2.3 nm, depending on category. All together now: 480' crane + 300' obstruction clearance = 780' circling minimums. Good.

✈ The glideslope at Sanford (SFB) is out of service 1145 - 2300, Mon. - Sat. Sanford AWOS 125.975 is out of service. Sanford 9L ALS is out of service. Get the picture? If DAB is turned around and you need to shoot an ILS, consider Titusville (TIX) ILS 36.

INPUT?

Submit articles for CONTACT or notices for INTERCOM to Julie Larcher or Jim Palmieri in the Aero Sci office, AWS 123.

Aeronautical Science Supplemental Instruction!

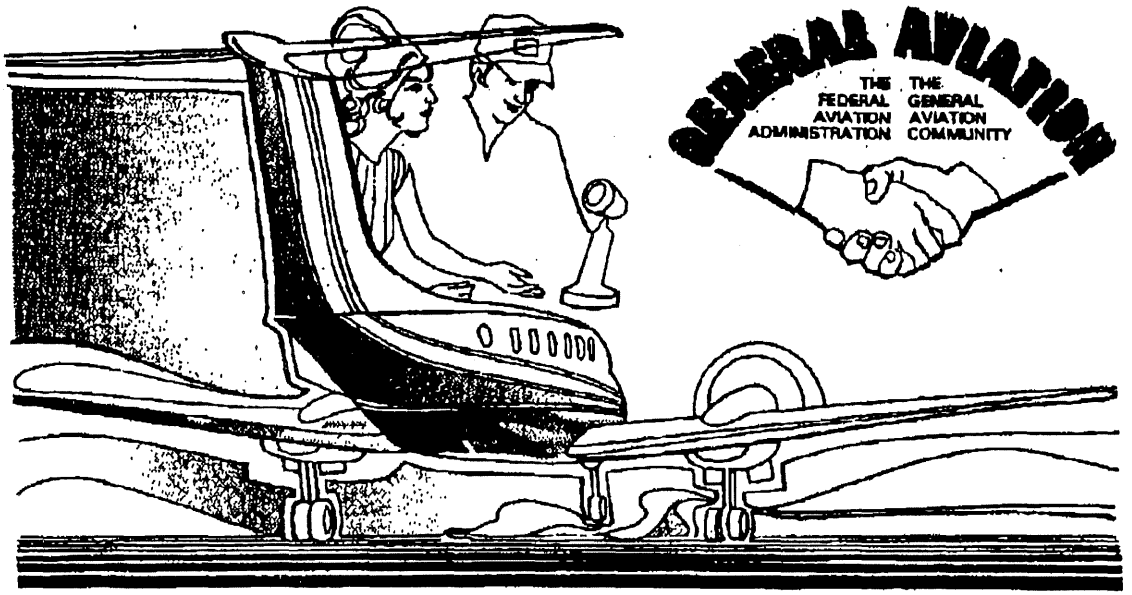
MET 1: AWS 203, Tuesdays 7:00 - 8:00 pm
MET 2: AWS 203, Tuesdays 8:00 - 9:00 pm
Hosted by the Met Lab Staff.

AERODYNAMICS: AWS 205, Monday or Wednesday night, (announced in class) depending on the exam schedule.
Hosted by Professors Byington and Lewis.

VOTE VOTE VOTE VOTE VOTE VOTE VOTE

1600 AERONAUTICAL SCIENCE STUDENTS, and only a total of 500 people made the effort to vote in the SGA election last year. Take a minute on WEDNESDAY, MARCH 13th, to vote in the upcoming SGA elections. Polls will be in the ASSL, Student Union, and AMT building.

FAA-P-8740-48
AFO-800-0686



accident prevention program

ON LANDINGS

PART I

U.S. Department of Transportation
Federal Aviation Administration
Washington D.C.

FOREWORD

The purpose of this series of publications is to provide the flying public with safety information that is handy and easy to review. Many of the publications in this series summarize material contained in FAA General Aviation Accident Prevention Program audio-visual presentations. Each of the three "On Landings" handouts (Part I, Part II, and Part III), contains material intended to supplement the "On Landings" audio-visual presentation.

Comments regarding these publications should be directed to the Department of Transportation, Federal Aviation Administration, General Aviation and Commercial Division, Accident Prevention Program Branch, AFO-810. 800 Independence Avenue, S.W., Washington, D.C. 20591.

Acknowledgement

Handout preparation "thanks" go to William K. Kershner, technical advisor, Drew Steketee and Cassandra John, writing and editing, James Gross, illustrations and graphics, layout and design, Gary S. Livack, overall project coordinator, and Ken Johnson, executive producer. Additional copies of this handout are available from any FAA Flight Standards District Office.

A Cooperative Project by the:

AVCO Lycoming Williamsport Division
Federal Aviation Administration
General Aviation Manufacturers Association
Transport Canada

ON LANDINGS
Part I

Being a safe pilot means combining your working knowledge of aviation with current skills and experience—tempered by good judgment.

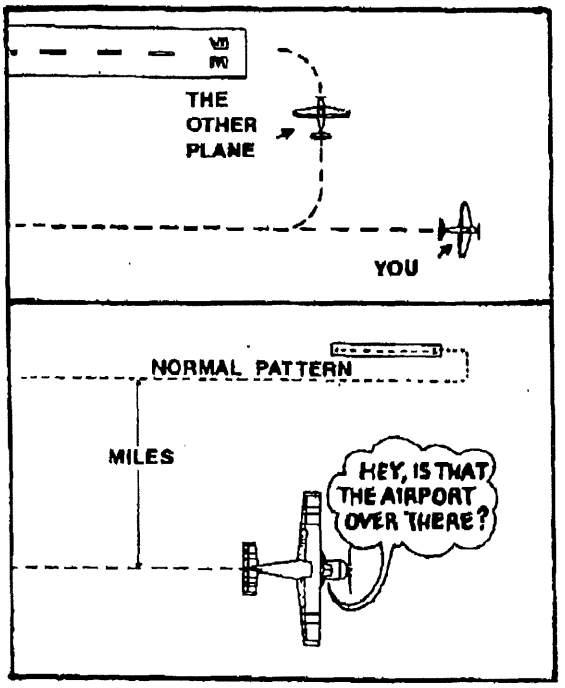
One important phase of flying skill is the landing. Landing phase accidents are responsible for nearly half of all general aviation accidents. By fortifying your knowledge of the "whys" and "wherefores" of approach and landing accidents, you can become a safer pilot.

In this handout we'll look at undershooting and cross-control stalls—the kinds of accidents which can happen *before* you reach the runway. Also, we'll look at hard landings, porpoising, and loss of directional control—problems encountered *after* reaching the runway.

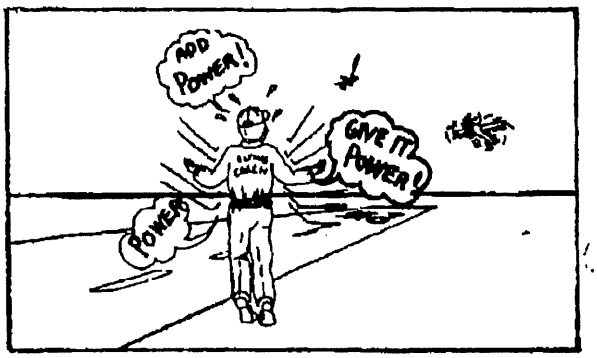
THE UNDERSHOOT

At one time or another every one of us has miscalculated an approach and started to undershoot the runway. It's hard to forget that "sinking" feeling you had when you first realized that the airplane might not make the runway.

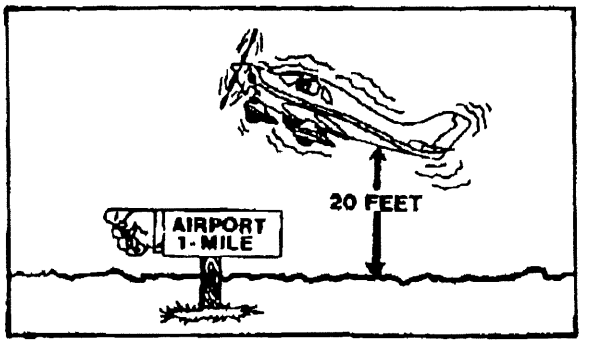
Poor pattern techniques such as flying too wide a pattern on downwind, or making a late turn to base leg are frequent causes of undershooting.



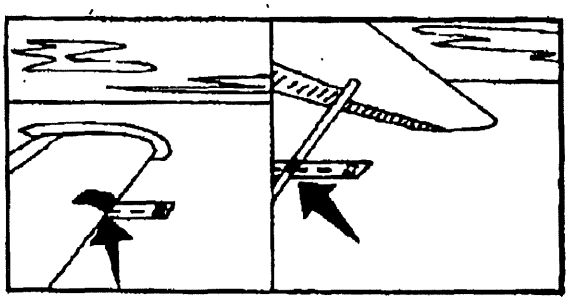
Another cause is failure to maintain adequate power on final.



Some pilots succumb to "runway fixation" and unconsciously try to "carry" the airplane up to the landing spot by easing the nose up without adding power—this doesn't work very well.



You can help set up a proper and constant distance from the runway for *all* airports by placing the runway centerline at a specific point on the leading edge of the wing (low wing airplane) or a point along the strut (high wing airplane). You may even put a mark or piece of tape at the proper wing strut position.

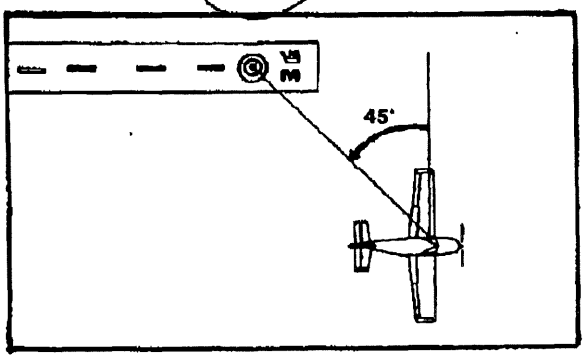


Using the runway centerline as your guide takes care of wide or narrow runways. (Of course, this reference line or point only works when the wings are level.)

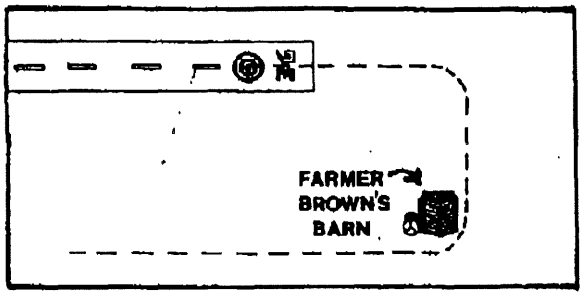
Avoiding Undershoots

How do you avoid undershoots? A good pattern helps.

When traffic isn't a factor, turn base when the point of intended touchdown is 45 degrees behind the wing.



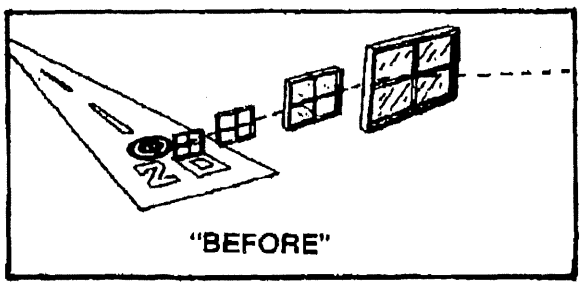
At a familiar airport, you may be able to use the "crutch" of familiar landmarks to determine proper turning points. But at unfamiliar airports you won't have such "hometown" references.

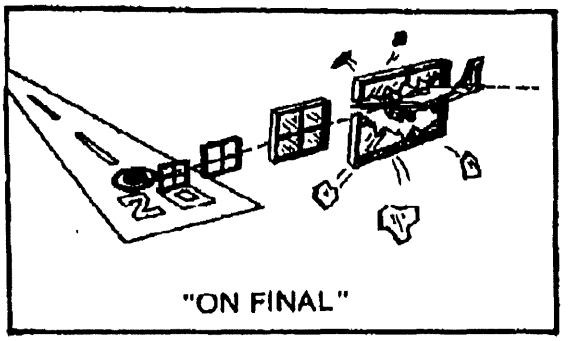


The 45 degree technique will work at *any* airport.

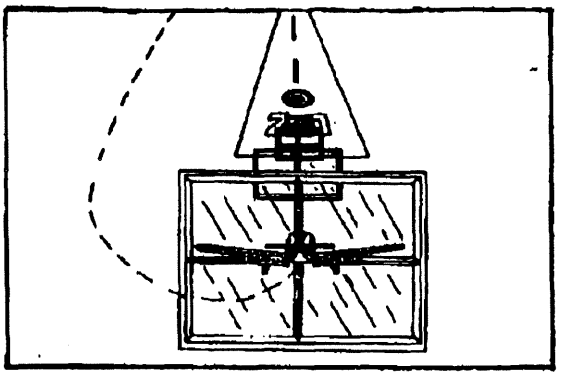
When there is other traffic in the pattern, you can avoid the common problem of the "ever-lengthening downwind" by starting your turn to base just after the airplane you're following turns final and passes behind your wing (assuming that it's not using a much slower approach speed than yours).

Experienced pilots often use a series of imaginary windows on approach. These "reference points in the sky" are great aids in determining whether your approach is within the desired horizontal and vertical limits.

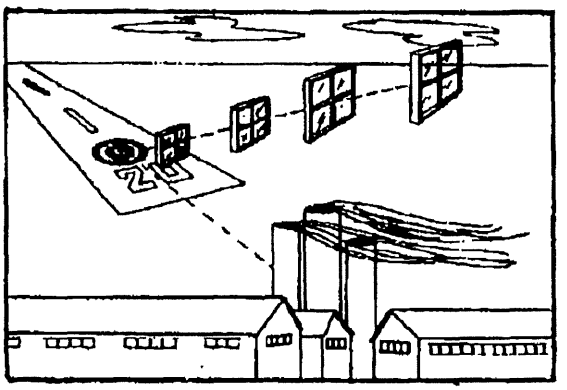




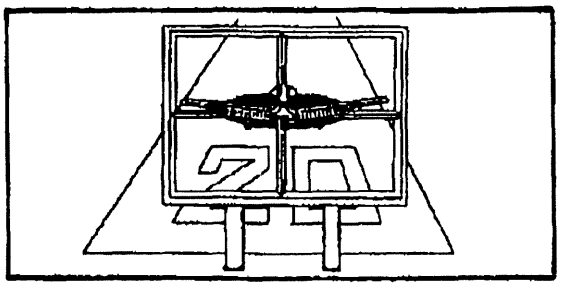
The first window should be encountered just after turning final.



If there are obstacles between your imaginary window and the runway, either raise the "windows" or move them.



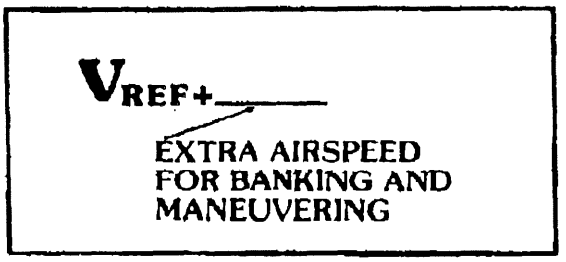
Your last and most important window is the one at the runway threshold. You should be at the required airspeed and height to complete the landing when you pass through this last window.



Flying the Right Airspeed

Pilots of large aircraft always determine what their approach speeds will be in advance. They calculate the aircraft's landing weight, then look at charts for the right "reference speed," or V-ref. The keystone V-ref, although different on almost every approach, is based on the airplane's stall speed and other factors at its estimated landing weight.

Added to V-ref by the pilot is additional airspeed required to maintain an adequate safety margin while maneuvering in the pattern as well as additional airspeed to compensate for wind gusts, turbulence and wind shear.



"Approach segment airspeeds," based on V-ref, assure that the aircraft has just the right amount of extra airspeed margin above V-ref.

Smaller aircraft do not come with V-ref tables. Some manufacturers, however, furnish recommended approach speeds corresponding to different aircraft weights.

Such tables can be developed and it is suggested that you prepare and use your own. We recommend that you use the format in the following table, but before you fill it in, we suggest that you see Part II of "On Landings", and read the accompanying handout for Part II carefully.

(CUT OUT ALONG DOTTED LINE)

V-SPEEDS

LANDING WEIGHT _____

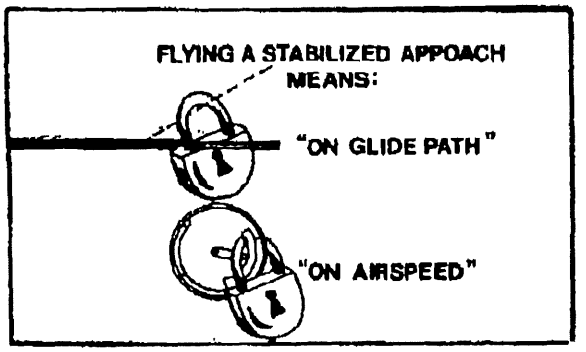
	KNOTS-IAS
PRE-PATTERN	_____
DOWNWIND	_____
BASE	_____
FINAL	_____
SHORT FINAL	_____

(CUT OUT ALONG DOTTED LINE)

There are rules-of-thumb, however:

1. On downwind, fly no faster than the "top of the flap operating range" and no slower than 1.4 times the calibrated stall speed for your airplane at its *actual* landing weight, or 1.4 Vso. (There are exceptions, so please read Part II.)
2. Maintain an airspeed no lower than 1.4 Vso until after turning final.
3. Then, on final, let your airspeed decay to 1.3 Vso as you near the runway.
4. If you encounter any turbulence, wind gusts or wind shear, compensate with additional airspeed on each segment of the approach.

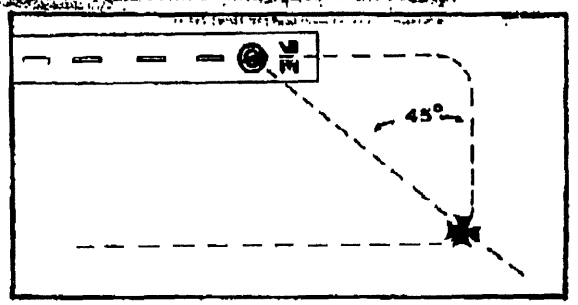
The Stabilized VFR Approach



Make your normal pattern entry and extend your landing gear on downwind, if applicable. Abeam the intended landing point, reduce your power to the predetermined value that works best for your airplane. While holding altitude with pitch, slow the airplane down in preparation for turning base.

Then set partial flaps, if you haven't already done so. If you have reduced power properly, you can now trim the aircraft and set up a descent.

Begin your turn to base when the point of touchdown is 45 degrees behind the wing. Then, final [illegible] bank is 30 degrees or less.



Should you need to increase your rate-of-descent, do so either by reducing power or by further extending flaps to increase drag. If you do extend flaps, remember that you've just modified your approach configu-

ration and that adding power may be necessary to stay on the selected glide path at your targeted speed.

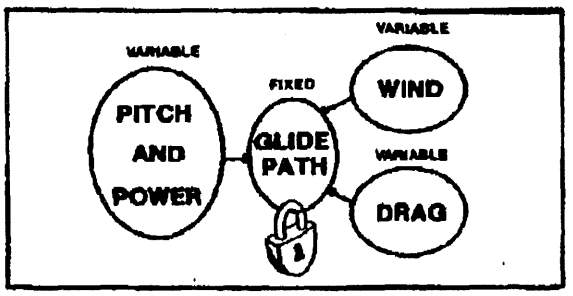
A fundamental key to flying a stabilized approach is the inter-relationship of *pitch* and *power*.

At any targeted airspeed in any configuration, adding *more* power will make the glide path shallower; reducing power will make it steeper.

This inter-relationship means that any changes to one element in the "approach equation" must be compensated for by adjustments in the other.

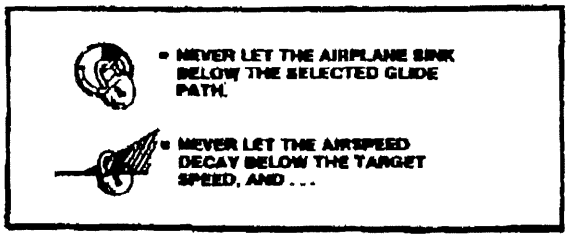
So, after a glide path has been selected, the means of staying on it *and* maintaining your targeted airspeed can only be achieved by adjusting pitch and power together.

Experienced pilots know the power settings and airspeeds for different landing weights, drag configurations and rates-of-descent for their airplanes.

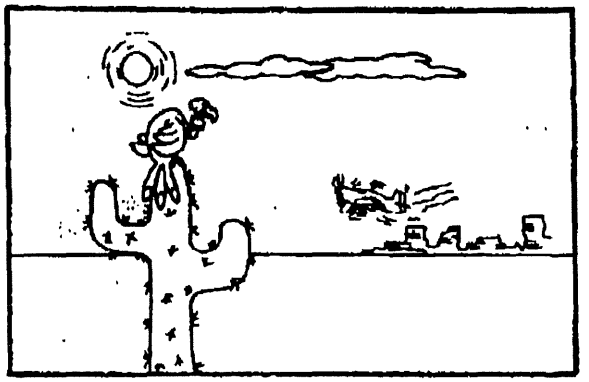


Then, these pilots need only make minor adjustments to pitch and power to maintain the selected glide path and airspeed.

The important (if not basic) point is *never* let your airspeed decay below the targeted airspeed for each segment of the approach and *never* let the airplane sink below its selected glide path.



In any event, never let yourself get behind the power curve while on long final!

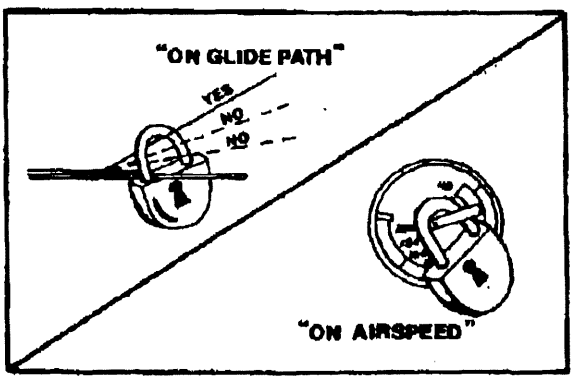


One final point: full flaps should be used for *all* normal landings unless the manufacturer suggests otherwise. And, once flaps have been extended, they should not be retracted. That's why it is always good practice not to go to the final flap setting until your landing is assured.

The Stabilized IFR Approach

The same basic concepts apply to the IFR approach. First, transition the airplane to the approach configuration, that is, slow the airplane and retrim it. Do this well before you intercept the glide slope, unless traffic flow requires otherwise.

Some pilots extend their landing gear to help them slow down, then add flaps after the airspeed drops into the flap operating range. If the gear has not already been used for speed control, extend the gear as you intercept the glide slope or reach the final approach fix. Additional power may be necessary with the gear and flaps extended. Be sure to retrim for each configuration change.



You should now be able to hold the selected airspeed and set up a stabilized rate-of-descent. With the runway in sight, and a landing assured, extend final landing flaps. Retrim again and maintain positive control of the aircraft, since adding flaps without promptly retrimming could possibly cause you to "balloon" back into the clouds.

A RULE-OF-THUMB TO CALCULATE RATE-OF-DESCENT

One Technique:

Glide Slope	Factor × ground speed (knots)	=	Your approximate rate-of-descent (feet per minute)
3°	5 × 105	=	525
4.5°	8 × _____	=	_____
6.0°	10 × _____	=	_____

100 = 500

Example:

3° 5 × 90 knots = 450 feet per minute

(Chart value . . . 480 feet per minute)

4.5° 8 × 90 = 720 feet per minute

(Chart value . . . 715 feet per minute)

Another Technique:

$\frac{\text{Ground speed (in knots)} + \text{"0"}}{2}$ = Your approximate rate-of-descent for a 3° glide slope only.

Example:

$\frac{90 + \text{"0"}}{2} = \frac{900}{2}$ = 450 feet per minute

(Chart value . . . 480 feet per minute)

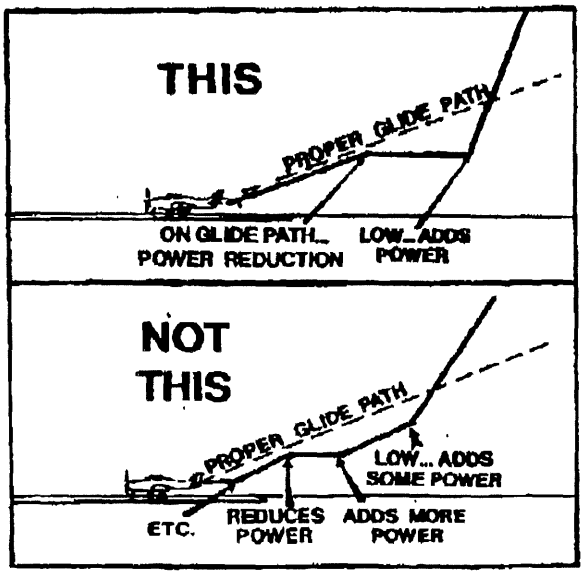
RATE-OF-DESCENT TABLE[1]

INSTRUMENT APPROACH PROCEDURE CHARTS
RATE OF DESCENT TABLE
(ft. per min.)

A rate of descent table is provided for use in planning and executing precision descents under known or approximate ground speed conditions. It will be especially useful for approaches when the localizer only is used for course guidance. A best speed, power, attitude combination can be programmed which will result in a stable glide rate and arrivals favorable for executing a landing if minimums exist upon breakout. Care should always be exercised so that the minimum descent altitude and missed approach point are not exceeded.

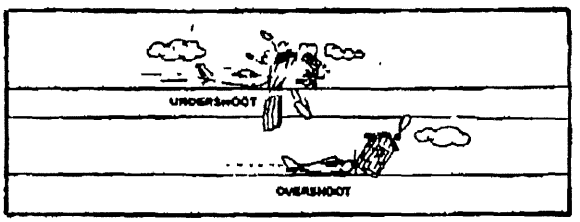
ANGLE OF DESCENT (degrees and tenths)	GROUND SPEED (knots)										
	30	45	60	75	90	105	120	135	150	165	180
2.0	105	160	210	265	320	370	425	475	530	585	635
2.5	130	200	265	330	395	465	530	595	665	730	795
3.0	160	240	320	395	480	555	635	715	795	875	955
3.5	185	280	370	465	555	650	740	835	925	1020	1110
4.0	210	315	425	530	635	740	845	955	1060	1165	1270
4.5	240	355	475	595	715	835	955	1075	1190	1310	1430
5.0	265	395	530	660	795	925	1060	1190	1325	1455	1590
5.5	290	435	580	730	875	1020	1165	1310	1455	1600	1745
		475	635	795	955			1430	1590	1748	
			690	860							

[1] This table has been adopted (for training purposes only) from a similar table published in the United States Government Instrument Approach Procedure Charts, National Ocean Survey, U.S. Department of Commerce.



What if Things go Wrong on the Approach?

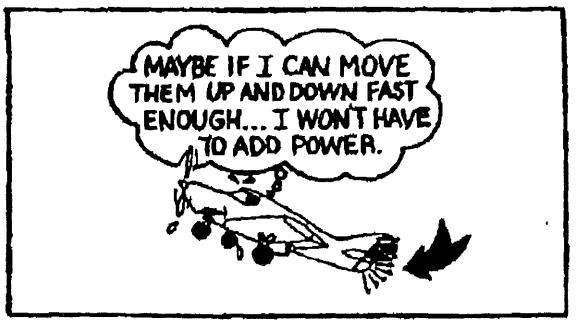
You should be interested to know that accidents involving undershoots are usually much more serious than landing long. Obviously, the energy levels involved in undershoot accidents are much higher.



If ever you're in doubt about making the runway, add enough power to assure a safe landing. And, of course, be sure that power will be available by using your checklist for all pre-landing items! A significant number of landing accidents are caused by loss of power, and many of them are related to some basic step the pilot simply forgot.

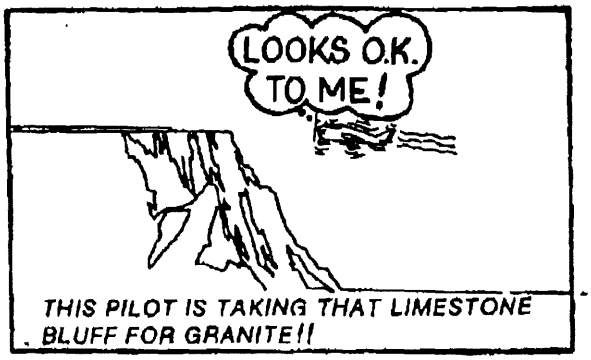
What's the Cause of Most Undershoots?

Often the pilot is unconsciously trying to hold altitude or make the runway using elevator alone.



This sets up a mush or stall, resulting in an undershoot accident, or a hard landing on the runway itself.

A perfect way to sucker yourself into this is to shoot a long, low approach—especially in unstable air or in high density altitude conditions.



What can happen is that you can wind up behind the power curve with the throttle wide open and no more power available to stop the sink rate.

In this case the only thing you can do to save the situation (tough as it is) is to *ease* the nose over and regain airspeed and climb capability—if you've got the altitude, distance, and lack of obstacles ahead to do it. This only reemphasizes the importance of using the proper *combination* of power and pitch throughout the landing approach.

Undershooting—The Key Points

—Know and use the appropriate approach speeds;

—Never allow yourself to get below your targeted approach speed for each segment of the approach;

—Fly the proper glide path;

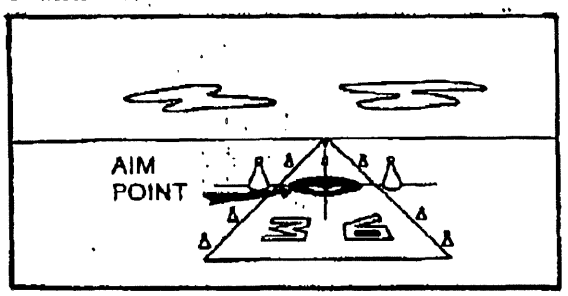
—Add power *anytime* you think you're too low or slow; and

—Remember the inter-relationship between pitch and power.

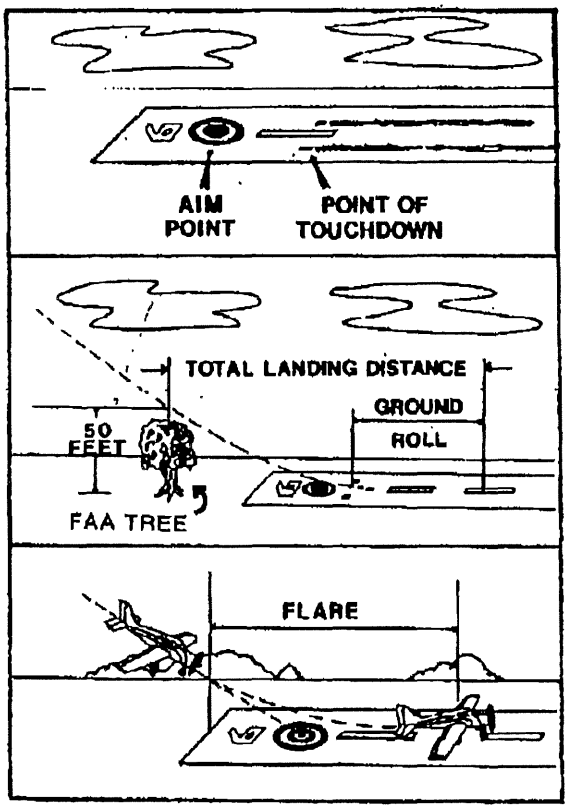
THE AIM POINT

The aim point is something we've all heard about but may not have been using. But it's a great aid in making good, safe landings.

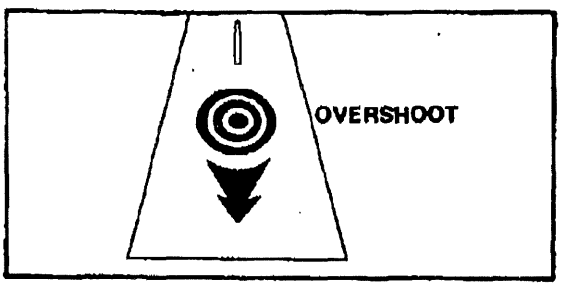
The aim point is your imaginary bulls-eye on the runway. It can be between two particular runway lights, or wherever.



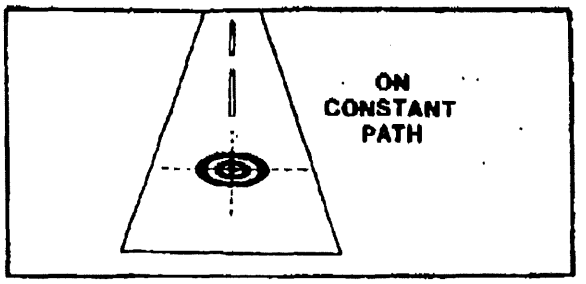
It's the reference point at the end of your selected glide path, *not* the actual touchdown point.



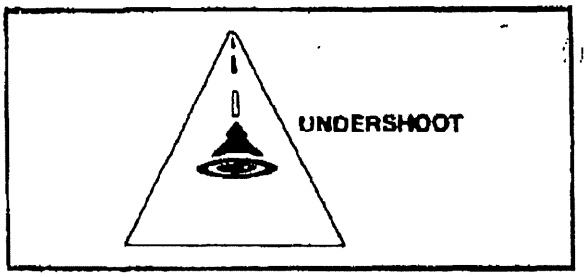
If your aim point appears to be moving *toward* you when you're established on final, you know that your airplane will overshoot that point.



A *constant* position of the aim point in your windshield means things are "right on."

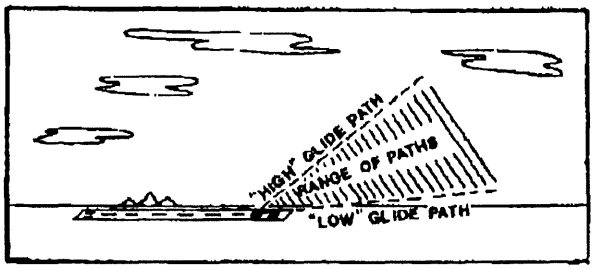


If the aim point appears to be moving *away from* you it's a sure sign of an undershoot.

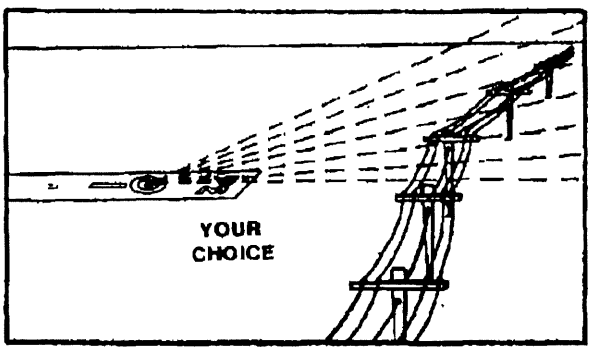


GLIDE PATH SELECTION

Once you've selected your aim point, you must also select the right glide path. Without a Visual Approach Slope Indicator (VASI) or Instrument Landing System (ILS), this becomes a personal decision.



Select a glide path that works best for a particular situation, but make sure it allows for clearance of all obstacles and for a *safe* rate-of-descent.



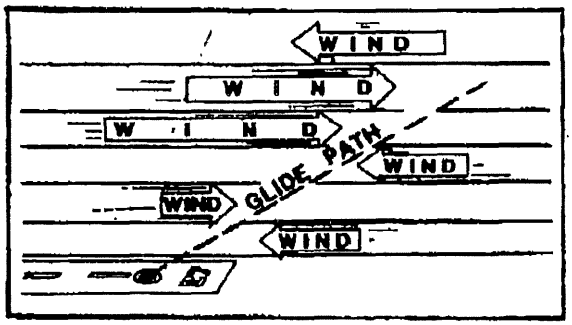
A VASI is a good aid to help establish a safe glide path. Remember, though, that while all VASIs will keep you clear of obstacles, approach angles vary. And some "complex" VASIs provide multiple approach angles to assist everything up to jumbo jets, while many smaller airports may have only non-standard VASI systems. One such non-standard system is nothing more than three plywood (or plastic) panels to be aligned by adjusting your glide path on approach.

The *Airman's Information Manual* provides a detailed description of how standard and non-standard VASIs work. Additionally, the *Airport Facility Directory* provides VASI glide angle information for standard VASIs for each runway where they are installed.

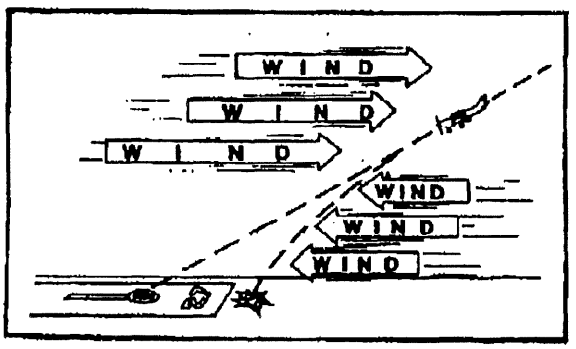
In Canada, comparable references are the *Aeronautical Information Publication-Canada (AIP-Canada)* and the *Canada Flight Supplement*.

WIND AND TURBULENCE CAN AFFECT THE GLIDE PATH

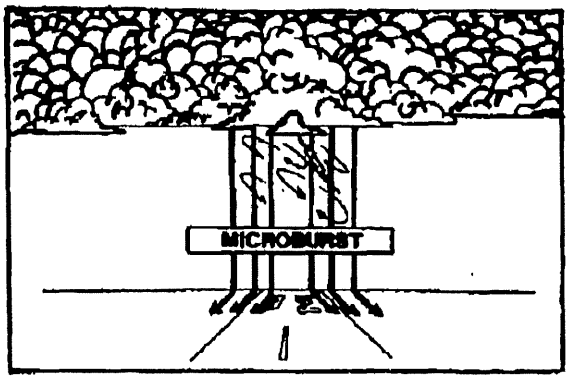
On final, your glide path can be affected by wind, wind shear, microbursts and other turbulence, including wake turbulence.



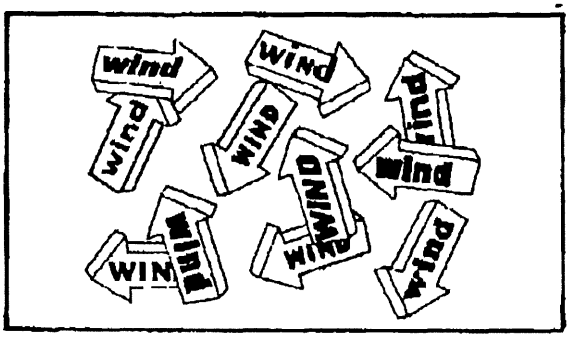
Wind shear is a major variation in wind speed and direction between *horizontal* layers of air.



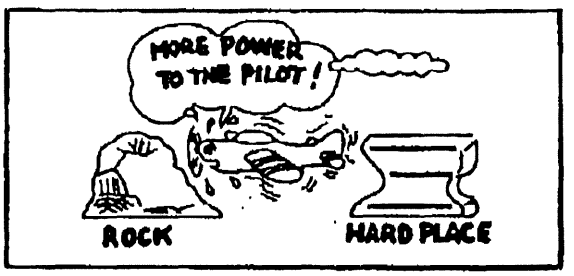
Microbursts are sharp, very strong downdrafts, associated with thunderstorms. Impossible to outmaneuver and usually invisible to the eye, they are good reasons to avoid a landing at any airport with a thunderstorm nearby.



Turbulence also results from airflow over nearby mountains and winds disrupted by nearby woods, hangars or other airport structures.



Always be ready for turbulence and its effect on your approach. When you find it, especially on short final, be prepared to add power and go-around if necessary. The sooner you add power, the less likely you are to wind up between a rock and a hard place.

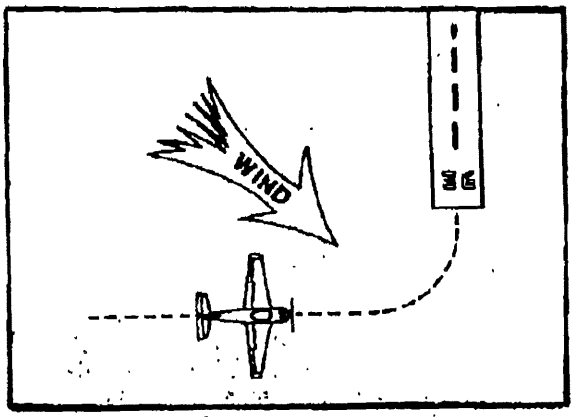


Whenever you operate at an airport served by large aircraft, be alert for wake turbulence. Study the wake turbulence avoidance procedures from time to time. They, too, are published in the *Airman's Information Manual*, the *AIP-Canada*, and in other publications.

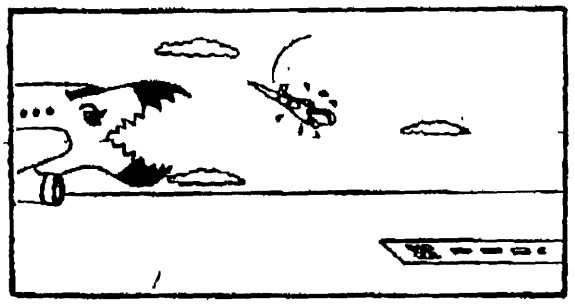
THE CROSS-CONTROL STALL

Stalls are a frequent cause of landing accidents and the deadliest of all is the cross-control stall.

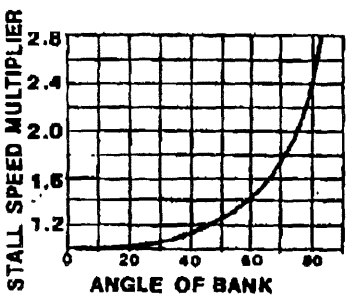
A cross-control stall is usually set up on base and the potential for it becomes greater in the presence of a tailwind on that leg. A tailwind creates greater groundspeed which gives you less time to react.



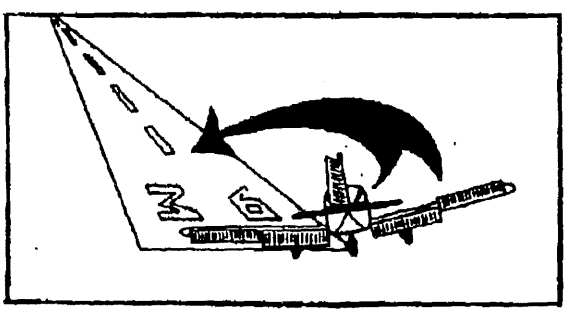
Add a distraction such as conflicting traffic or a problem in the cockpit and you're ripe for a late turn onto final and the potential for a cross-control stall.



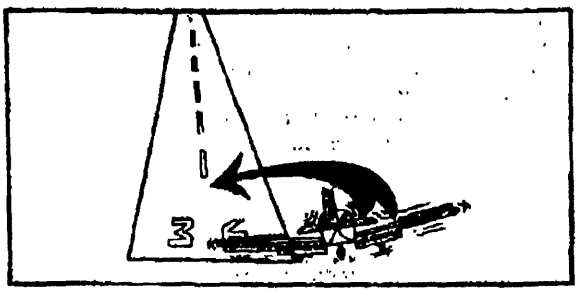
Making that turn to final, you don't want to make a steep banked turn because you know that the stall speed increases with bank angle.



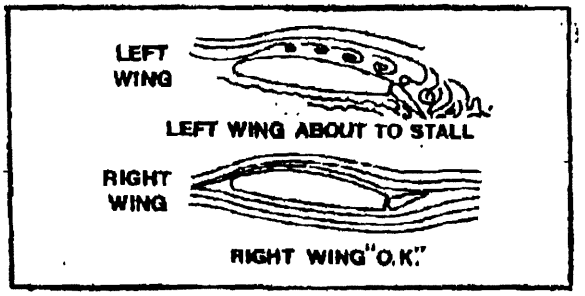
Instead, you try to increase the rate-of-turn with rudder alone, all the while keeping your bank shallow with opposite aileron.

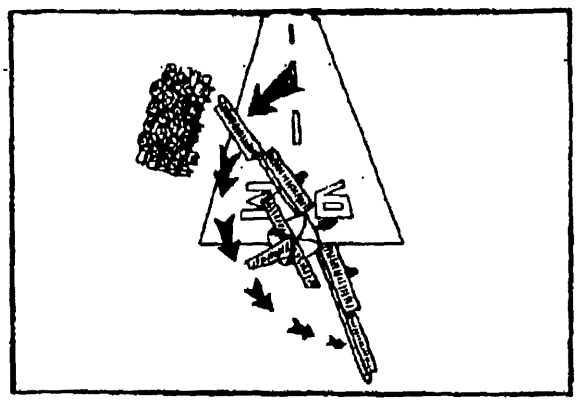


Of course, now you'll need more "up" elevator because the combination of inside rudder and "down" aileron drag makes the nose drop.



As you pull back, you slow down and, bang, there's a stall and a snap roll toward the lower, inside, wing.





This situation can be avoided by good planning, including a properly flown pattern, proper airspeeds, and a timely go-around when things don't feel right.

Some other points:

—Complete as much of your "before landing" checklist as possible before entering the pattern.

—Look outside the cockpit for helpful indications of wind—flags, smoke, and ponds, for example.

—Listen to the radio for UNICOM and ATIS advisories on landing conditions.

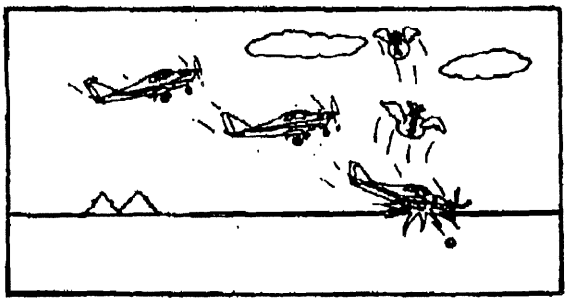
—When you have the option, handle a direct crosswind situation by flying a pattern that gives you a headwind, not a tailwind, on base.

HARD LANDINGS, BOUNCED LANDINGS & LOSS OF DIRECTIONAL CONTROL

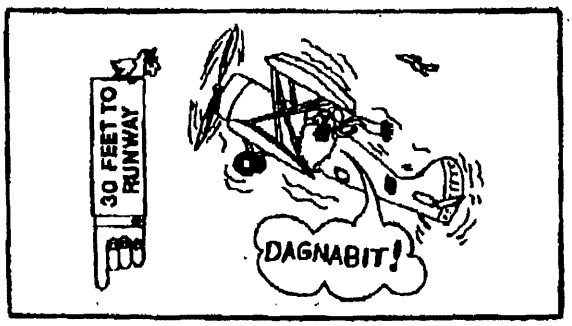
Let's now look at three other types of landing phase accidents: the hard landing, the bounced landing, and loss of directional control on roll-out. These are not killer mishaps like the cross-control stall and the undershoot, but they, too, result in substantial damage, injuries and embarrassment.

Hard Landings

Drop-in or "hard" landings cause a great deal of monetary damage to airplanes each year. These accidents result from several causes:



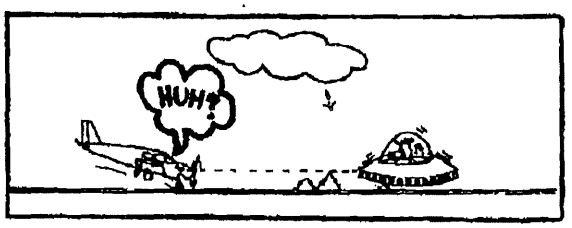
You can set yourself up for a hard landing by not looking out ahead of the airplane and losing your perspective relative to the ground.



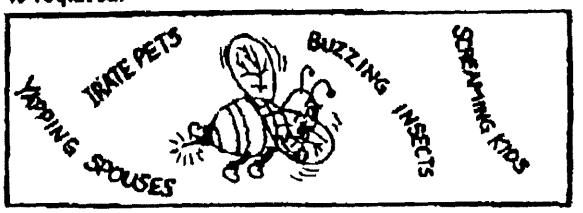
Loss of perspective can also be the result of improper scanning during flare and touchdown.

Remember to look outside the cockpit—way outside. And don't forget to use your peripheral vision as well. It's something you learned way back in pre-solo: to focus your attention *ahead* of the airplane.

Hard landings are also the result of distractions.

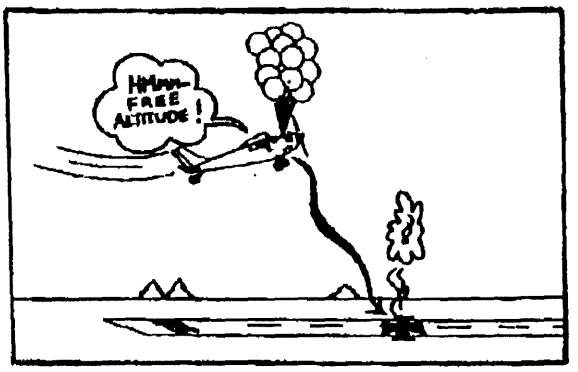


A typical distraction is a disturbance with passengers in the cabin. Don't be distracted! The landing is the last part of the flight, the part where you're the most tired, yet it's the point where the most concentration is required.



To alleviate distractions, airlines have adopted the "sterile cockpit" concept. Below a certain altitude, all conversation is limited only to matters concerning aircraft operations. It's a rule you may want to adopt.

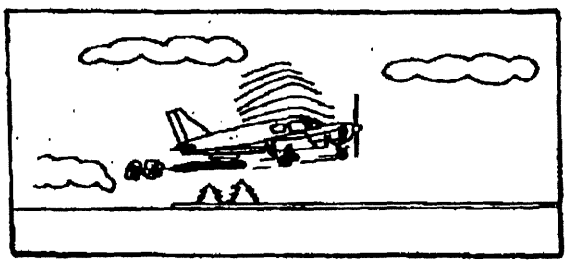
Ballooning is another cause of hard landings.



This often results from excess airspeed combined with poor flare technique. (Yanking back on the controls before touchdown can put you several stories above the runway with airspeed decaying rapidly.)

If this happens, *ease* the nose over gently and add power if necessary.

Remember, too, a full power go-around may be your best bet to avoid a hard landing after ballooning.



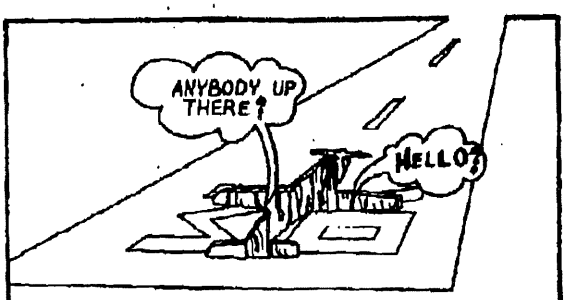
Another cause of hard landings, as discussed earlier, is trying to stretch a final approach by raising the nose without adding power. Also beware of running out of elevator control during flare. A typical example happens when you're too slow with too much weight up front. You may not have the flare power you need. A high descent rate makes these conditions even more serious. Be sure you're OK on CG.

In summary, if you think you're headed for a hard landing:

—Add power to arrest the sink rate;

—Keep your wings level;

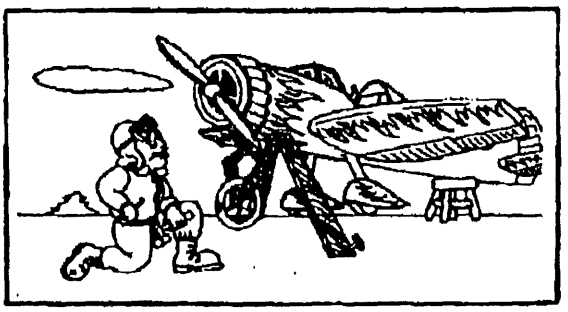
—If you decide to make a go-around, make the decision sooner rather than later.



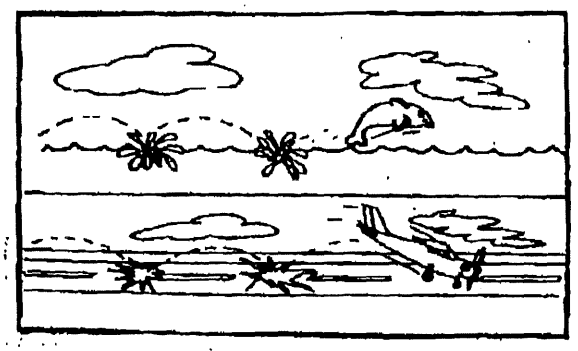
WELL, HE PUT IT ON THE NUMBERS ANYWAY!

The Bounced Landing

The bounced landing, or pilot-induced oscillation (porpoising), was supposed to be cured by the introduction of tricycle landing gear. Not so. Innovative pilots keep discovering new ways to make bad landings.

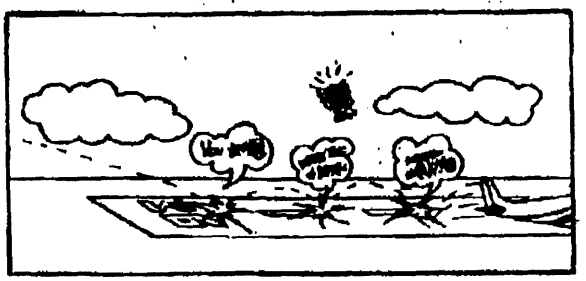


In a bounced landing, the airplane comes in nosewheel first (or for a tail-dragger, main gear first)—setting off a series of motions that imitate the jumps and dives of a porpoise—hence the name.

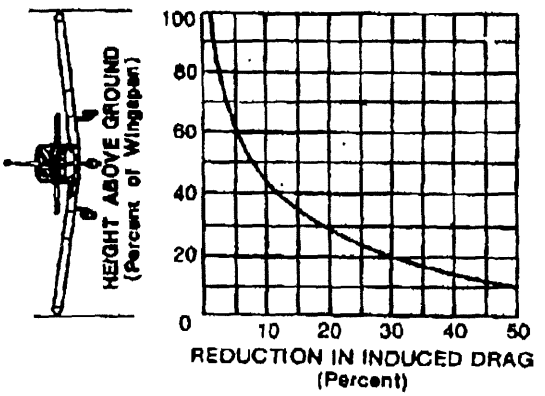


The problem is improper aircraft attitude at touchdown, sometimes caused by inattention, by not knowing where the ground is, by mistrimming, or by trying to force the aircraft onto the runway.

No matter what the cause, the situation must be corrected immediately.

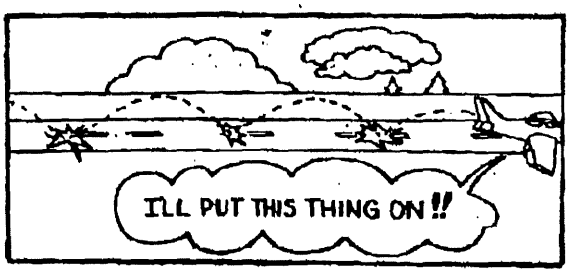


Ground effect, a factor from the surface to a height of about half the plane's wing span, decreases elevator control effectiveness and increases the effort required to raise the nose and hold the airplane off. Not enough elevator (or stabilator) trim can result in a nose-low contact with the runway and a porpoise.

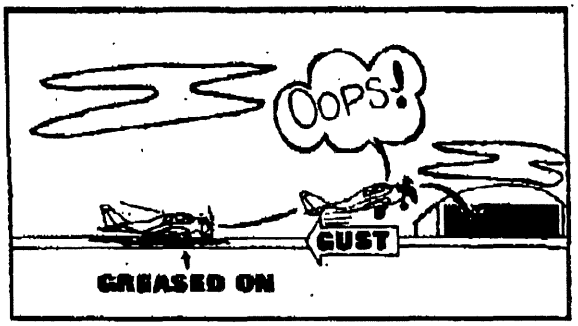


The secret to a good landing is proper aircraft attitude at touchdown. For tricycle gear planes, it's the attitude that assures that the main wheels will touch *before* the nose wheel. You'll need to develop a feel for this attitude in your particular aircraft and stay proficient at it. You'll also need to know what it "feels like" at all combinations of weight and CG.

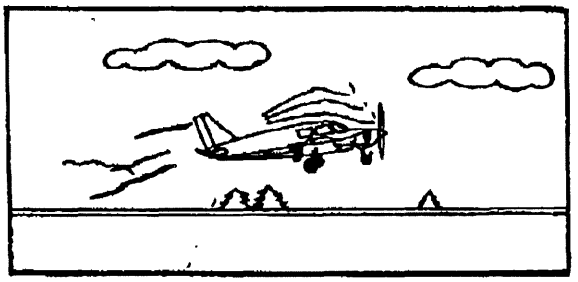
Porpoising can also be caused by improper airspeed control. Usually, if an approach is too fast, the airplane floats and the pilot tries to force it on the runway when the airplane still wants to fly.



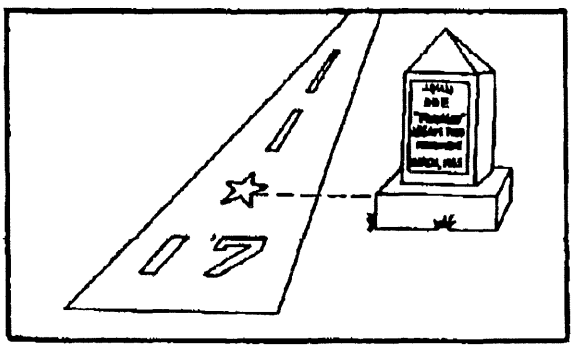
A gust of wind, a bump in the runway, even a slight tug on the wheel will send the aircraft aloft again. What to do?



First, *don't push* the nose over. *Ease* it over and reland, this time holding the proper pitch attitude until the aircraft touches down. Add back pressure continually as the aircraft slows during the flare.



Too many airplanes have been pranged because of the pilot's desire to put the airplane on the ground. A go-around may be the answer in some cases of porpoising.



To avoid porpoising:

—Always trim the airplane for a stabilized approach;

—Avoid excess airspeed and "floating";

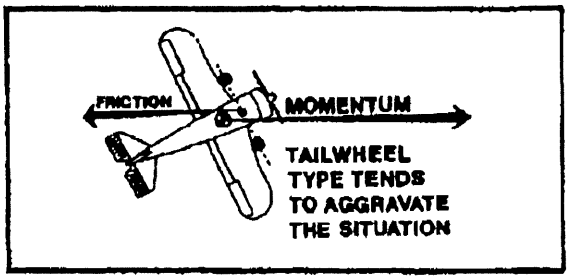
—Don't be distracted;

—Maintain proper pitch attitude; and

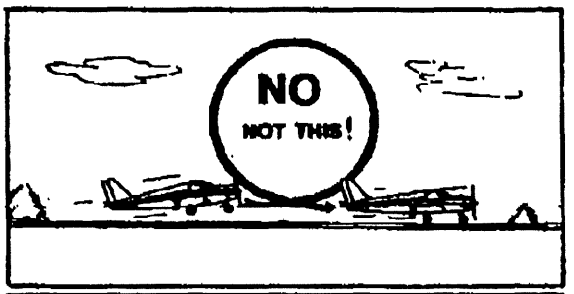
—Stay proficient.

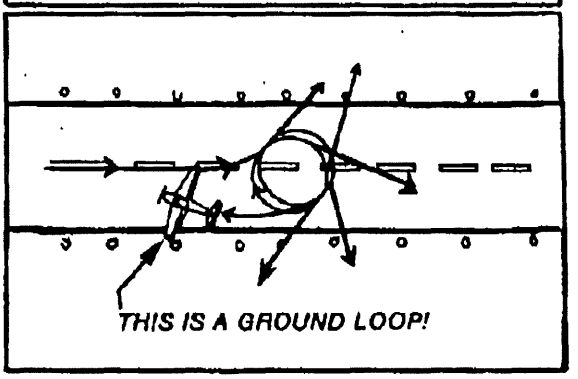
Loss of Directional Control

Engineers also thought tricycle landing gear would eliminate directional control problems and ground looping. Not so.

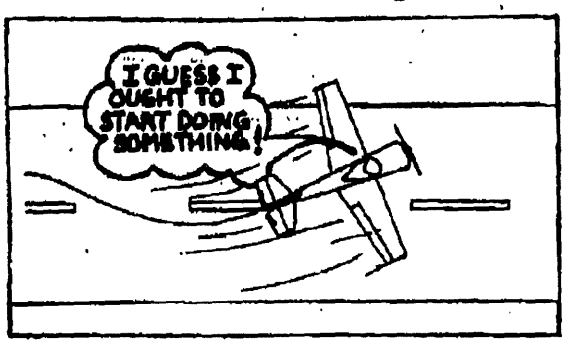


(For those who aren't familiar with this nemesis, a ground loop is an uncontrolled turn-- often violent—usually on landing and roll-out.)

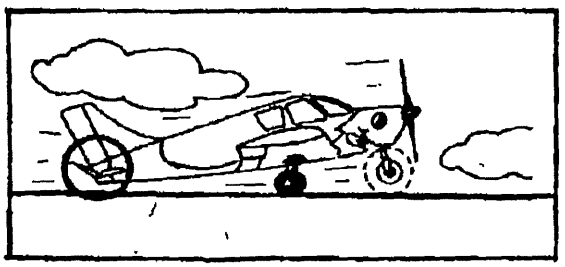




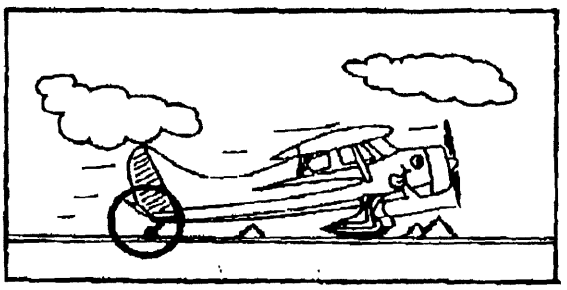
How to avoid loss of directional control? Recognize and correct problems early. Stop any incipient turn or swerve almost before it starts. Get right on it.



Also, use your controls to their best advantage. Keep the weight of tricycle gear aircraft on the mains with elevator back pressure—this also desensitizes the nose-wheel.

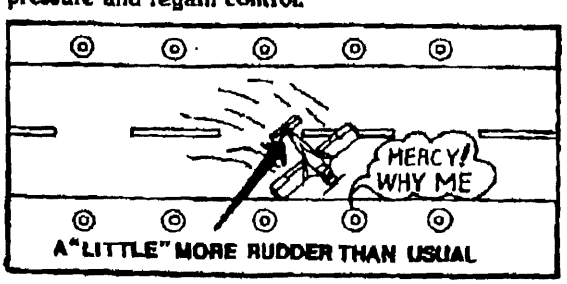


In tail-draggers, full back stick puts more weight on the tail-wheel for better directional control.



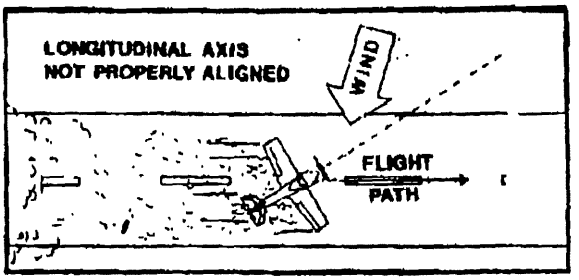
Lack of sufficient back pressure can multiply the effects of small rudder movements (or reactions to crosswinds)—overcorrections that can induce trouble.

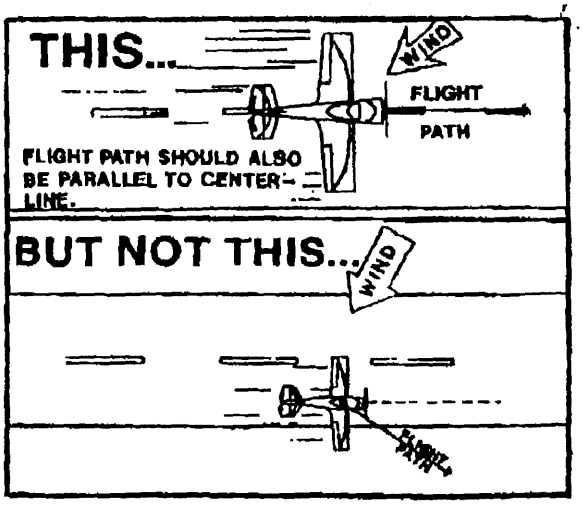
If you get in trouble, close the throttle, apply back pressure and regain control.



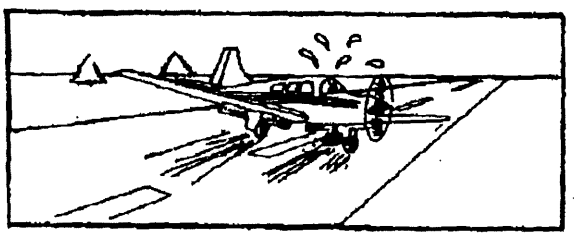
Crosswinds can be a real problem.

Remember, in a crosswind landing, the longitudinal axis of the airplane must remain parallel to the runway centerline as must the flight path of the airplane.





If you don't do both, strong side loads may be exerted on the landing gear, and a ground loop could occur (resulting in even higher side loads).

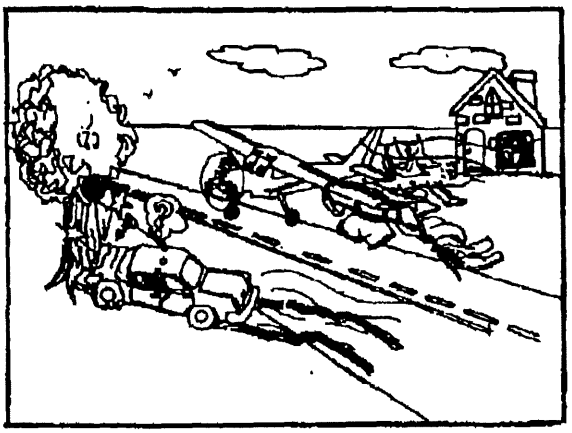


Proper crosswind technique is a must. In the case of a left crosswind, the left wing must be lowered into the wind and this control input countered with right rudder to maintain the proper track down to the runway. Again, the longitudinal axis of the airplane must be aligned with the flight path which, hopefully, is parallel to the runway centerline.

By the way, you should know the crosswind limitations of your airplane *and yourself*. In some cases, it is best to stay on the ground, or, if airborne, to locate another runway more aligned with the wind.

One of the worst ego bruises occurs when the pilot tries to clear the runway before he or she has slowed down enough. This is even more of a problem in some crosswind conditions.

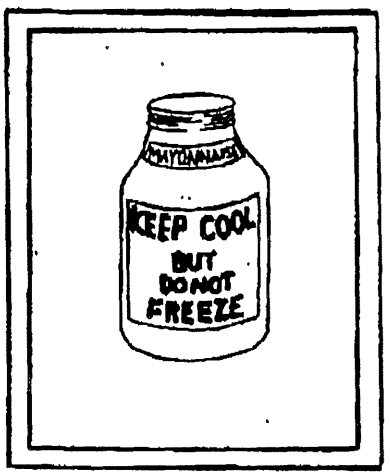
Simply following the yellow exit line may lead to an unplanned cross-country. A much better technique is to stay on the runway centerline until you've slowed down to taxi speed.



Face it, there's only one principal cause for loss of directional control—*pilot error*. It's not only lack of knowledge of the "basics." Recent studies also point to preoccupation, stress, fatigue, or just being on a "mental holiday."

Use the sterile cockpit rule on yourself. Think ahead of the airplane on every approach. Continue to fly the airplane after touchdown. *And stay proficient.*

Worst of all, don't freeze. Remember the saying on the mayonnaise jar, "keep cool but do not freeze." Stay on top of the situation.



Panic can also result in a reversion to "driving response," or trying to steer the aircraft down the runway with the control wheel. That wheel has no purpose in steering on the ground and "driving response" can lead to loss of control.

To summarize, directional control accidents can be greatly reduced if, as pilots, we follow these simple rules:

—Maintain proficiency;

—Stay ahead of the airplane;

—Avoid wheelbarrowing by holding back-pressure on the controls during roll-out;

—Keep your flight path and longitudinal axis parallel to the runway centerline;

—Double check wind conditions on short final;

—Stay within the demonstrated crosswind capabilities for both you *and* the airplane;

—Slow the airplane down before taxiing clear;

—Keep your thoughts on the landing, that is, don't be distracted, and finally:

—"Keep cool but do not freeze."

Note: The suggestions and "rules" given in this handout are intended to be helpful aids only and are not intended to replace or supersede the recommendations of the aircraft manufacturer.

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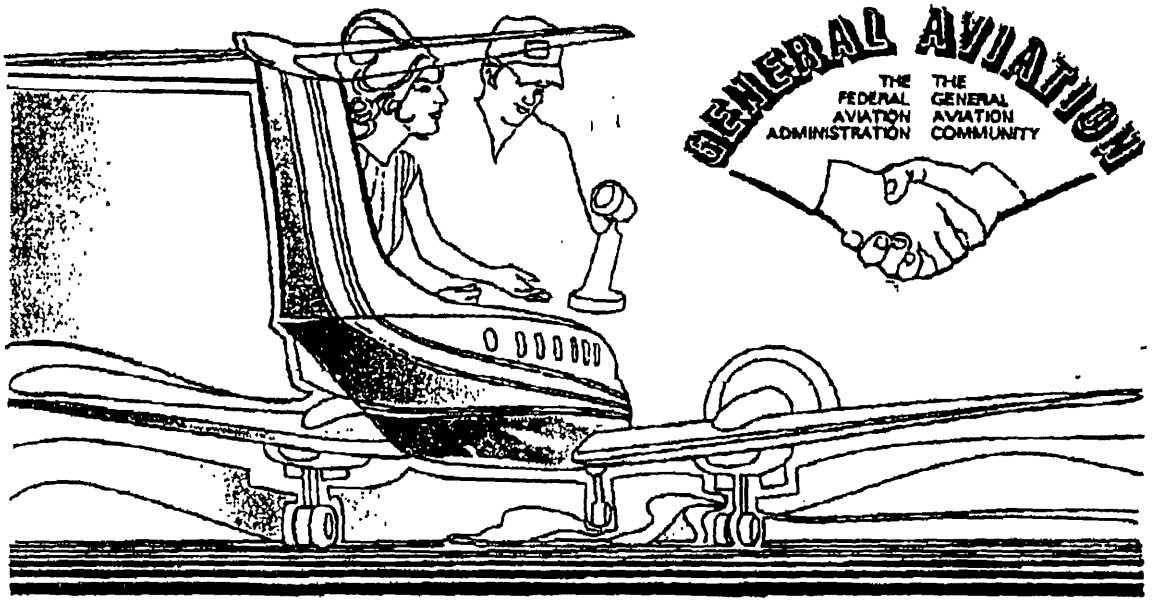

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accident prevention program

Anatomy of a Landing

Cue by Cue

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Washington, D.C.

ANATOMY OF A LANDING—CUE BY CUE

Visual cues—you may not even be conscious of them—are what guide you to a touchdown, and they can be deceptive if you don't know how to read them

by A. Howard Hasbrook

There's an old saying that "a good landing requires a good approach" and conversely a poor approach means a poor landing. . . ." and basically these are correct. The approach *is* the primary key to putting the airplane on the ground where the pilot wants it, at the right speed and in the proper attitude.

What is the "secret" of making a good approach? It's keeping the airplane on a constant-angle descent, with the flight path lined up with the centerline of the runway and intersecting the runway near the desired touchdown point. That path also must be of sufficient length to give the pilot enough time to make the necessary corrections to get "her in the groove" before it's time to flare and to recheck his gear-down-and-locked lights.

To keep the airplane on a straight flight path to the runway requires control of several variables. These are aircraft speed (horizontal and vertical) and heading (usually, control of the latter is complicated by crosswind). The need for speed control cannot be overemphasized. It is absolutely essential, not only from the point of view of making precise landing approaches, but also in relation to providing adequate aircraft performance and control during routine *and* emergency situations.

We have seen more approaches—and subsequent landings—messed up by poor airspeed control than by any other factor. This is because changes in airspeed result in changes in lift, groundspeed, vertical speed, flight path profile, flight path angle and in the subsequent point of touchdown. Changes in airspeed usually occur because the pilot fails to maintain a constant pitch angle for a given thrust condition. Such pitch changes, regardless of whether they're pilot induced or produced by rough air, cause changes in lift, and in vertical speed, resulting in an undulating flight path.

We have also seen excess speed creep into the approach—increasing the chance of overshooting—simply because the pilot failed to realize that a *constant throttle setting* will result in a constant increase in power as the aircraft descends into more dense air . . . a thousand foot decrease in altitude will increase manifold pressure about 1 in., producing a significant increase in thrust. Hence, to maintain constant speed, thrust (not throttle position) should be held constant along with constant pitch attitude.

Once a pilot has the proper airspeed and thrust numbers memorized and nailed down, he can devote the bulk of his attention to anayzing the essential visual cues for maintaining the desired flight path to the runway.

Although most pilots are not consciously aware of these cues, the decreasing distance between the top of the runway and the horizon, the uniform visual widening and lengthening of the runway triangle, the straightness of the runway image—or its lean—and the speed and direction of flow of the intervening terrain toward and past the pilot (as seen in his peripheral vision) are all used to evaluate progress of the approach. And, this evaluation capability can become extraordinarily efficient through practice, so long as the pilot knows what to look for. For example, he can, throught psychological reinforcement during daytime approaches, come to associate decreasing *altitude* with the illusion of increasing ground-speed seen through the sides of his eyes. As the terrain flows past the aircraft, the more rapid the flow, the lower he expects his altitude to be. Conversely, a decrease in flow speed will mean a higher altitude.

Thus, during an approach in a strong headwind, a pilot may inadvertently descend below the proper glide path because of his impression he is too high. (The reverse of this visual illusion can occur during a downwind turn at low altitude. This has caused pilots to pull up—and stall—because the increase in ground speed gave them the impression they were losing altitude.)

Constant widening of the runways outline, as a function of of *decreasing distance* between the aircraft and the runway, is another important cue used by the pilot to assess the correctness of his approach (see Figure 1). However, to be used effectively, it has to be combined with the progressive vertical lengthening of the runway image, as well as with the decrease in the vertical distance between the horizon and the top of the runway. Since these are the only cues available at night, it is probable that the functional relationship of these cues are the ones which the pilot most often used to maintain a straight line descent to the runway.

Unfortunately, not all runways are of the same length and width—varying in length from 1500 to 15,000 ft. and in width from 50 to 200 ft. Since possible combinations of runway width-to-length are many, it becomes apparent that the use of runway outline cues is not a simple task, because of the various ratios involved. For this reason, pilots should be very cautious, and very alert, when making an approach to an unfamiliar airport, particularly at night (see Figure 2).

Expansion theory (illustrated in Figure 5) relates to the apparent outward movement of terrain from the point where the flight path intercepts the runway. The author uses the no-vertical-motion area in the same way to determine the intersection point. Everything above this area appears to move toward the horizon, everything below it toward the aircraft or obliquely downward. The consecutively larger trapezoids illustrate the appearance of the runway as it grows uniformly larger as the aircraft flies nearer on an ideal approach path. The appearance of the runway from consecutive points on an actual oscillatory flight path is illustrated in Figure 1.

As noted before, with constancy of airspeed, pitch attitude and thrust—and of wind—the flight path, and its angle, will remain constant. This, in turn, will also result in a *constant* rate of change in the angular and dimensional relationship of the runway image. This *constancy*, as well as that of increase in *apparent* ground speed, are valuable visual cues.

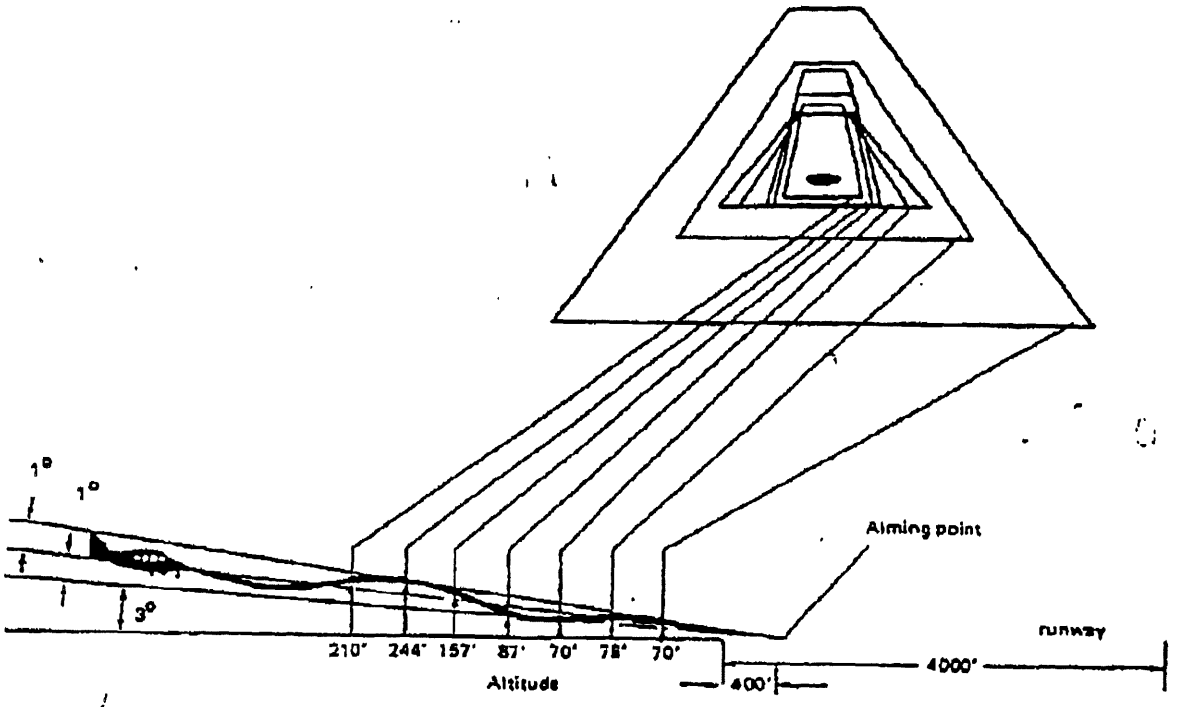


Figure 1

If a pilot has difficulty in flying consistently good approaches, he may need to look more attentively for these cues. One way is by investigating the runway scene visually while a pilot companion flies a series of approaches from the right seat—using straight flight paths as well as others with rather wide vertical and horizontal variations—until the observer becomes visually aware of the rate and size differences in the appearance of the runway during the correct and incorrect types of approaches. Without the distraction and responsibility of flying the airplane himself, the visual variations in rates of change of runway size, and angular spread and changes in ground flow velocity should soon become vividly apparent.

Another problem that some pilots encounter is that of trying to visualize the proper flight path *angle* to the point of intended touchdown. On numerous occasions, we have seen private and commercial pilots start their descents so far from the airport that the flight path—if continued at the same angle—would have intercepted the ground a mile or more short of the runway.

When approaches are made from two or three miles out, an error of only a few degrees in the flight path angle will result in large under or overshoots. As illustrated in Figure 3, if the approach path is begun at about 525 ft. above airport level at a distance of 10,000 ft. from the runway, a 2-deg flight path, if continued without correction, would put the touchdown point almost ½ mi beyond the far end of the runway. On the other hand, a 4-deg flight path angle would put the aircraft into the ground ½ mi short of the runway unless a correction was made soon enough. At night, incidentally, the surrounding terrain cues showing need for such a correction are often quite meager and almost undetectable—which could account for the rather large incidence of VFR night landing approach accidents, in which aircraft hit short of the runway.

Thus, it is obvious that the pilot must be able to determine his flight path to the desired spot without having to make corrections later on in the approach.

Some pilots say they use a spot on the windshield as a form of gunsight to initiate—and then hold—a constant flight path angle. However, if one examines this technique in detail, some of its problems become readily apparent. For example, unless one is operating in extremely smooth air, aircraft pitch angle will *normally* vary a few degrees with average pilot handling. At a 30-in. distance (windshield spot to pilot's eye) only a 2-deg change in aircraft pitch will involve about a ½-in. movement of the spot; a movement that would be most difficult to nail down against the runway in any kind of turbulence—which exists almost constantly near the ground on warm or windy days. In addition, vertical movement of the pilot's head and eyes add error to this method. Thus, using a windshield spot as an aiming device can easily cause the pilot to overshoot or undershoot, since a one degree error can put him half a mile or more on either side of his intended landing spot.

In choosing an approach angle best suited to ordinary conditions, it should be kept in mind that the glide paths in most VASI's and ILS's are set at 2½ deg to 3 deg. Approaches made at these angles with conventional, fixed-wing aircraft result in airspeed and vertical speed envelopes that provide adequate control, reasonable landing gear loads at touchdown and safe rollout distances. Therefore, unless one is contemplating operating into very short strips over high obstructions, it would seem desirable to use about 3 deg flight path angle during visual approaches as a routine matter, so as to develop a *constancy* of visual reinforcement from the cues used during previous landing approaches. However, it should be remembered that all runways are not necessarily level (see Figure 8.)

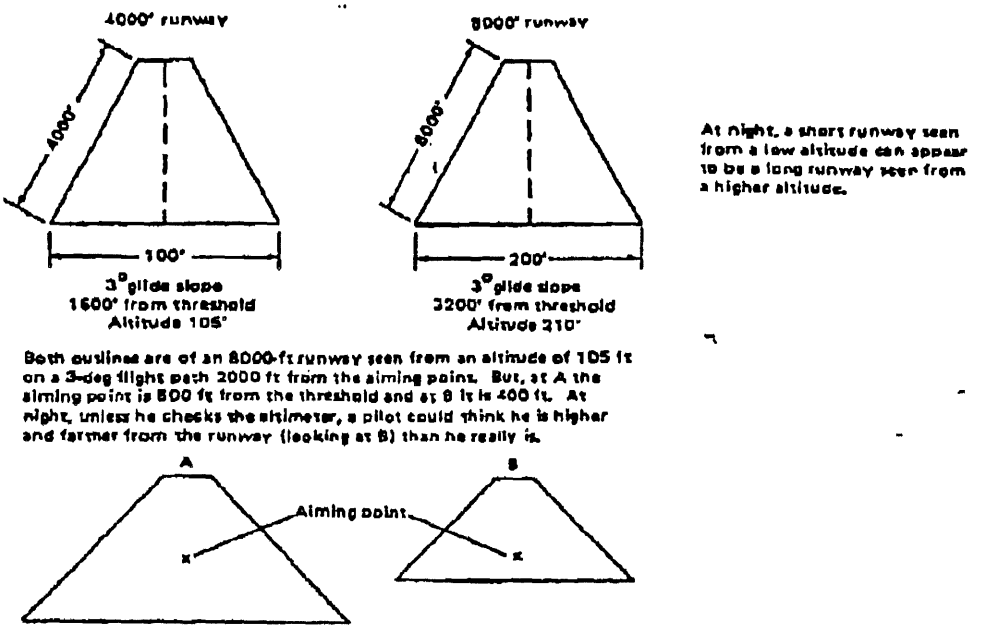
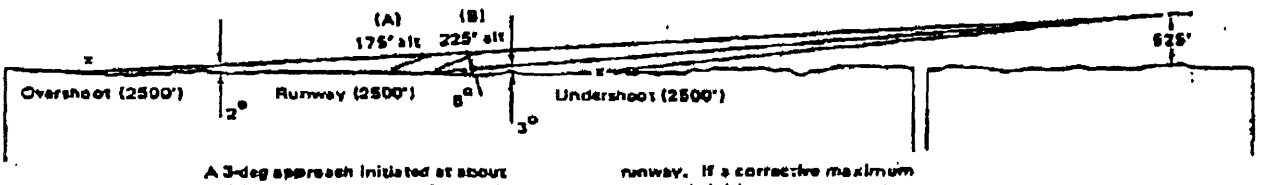


Figure 2

To obtain full value is developing and acquiring such cue reinforcement, it follows that approaches of reasonable length should be employed. Obviously a pilot doesn't need four or five mile long airline type approaches, but neither could he bend her around onto final right over the threshold unless he really knows his plane, the approach terrain, and also wants to scare his passengers. If he uses an approach speed of 90 mph, a 2-mi approach in calm air will provide about 1 min 20 sec to get everything squared away before touchdown—not very much time, particularly at a strange airport, where there are no familiar cues to help unravel the situation. A simple way to set up a 3-deg glide path entry is to start the approach descent 2 mi out, at an altitude of about 550 ft above airport elevation. However, if a 1-mi approach is desired, the pilot can cut the figure in half and line up with the runway at an altitude of about 275 ft; a constant descent rate to touchdown from these altitude points will follow a 3-deg slope.

Another factor that can sabotage the best intended approaches and landings is cross-wind—and crosswind is a fact of life most of the time, regardless of how many runways are available. Crosswind during an approach can be handled by using one or a combination of several methods. One method, of course, is to set in the required crab angle. The difficulty with this type of wind correction is that variations in wind, as altitude diminishes, require constant changes in heading. And changes in heading, take appreciable time, time which may not be available.

Another method is to use sufficient slip (toward the windward side) to compensate for crosswind drift. This requires less time for heading changes but requires a fairly high degree of proficiency in cross-control. This technique is favored by many pilots because it keeps the airplane's longitudinal axis (centerline) lined up with the runway, and requires no last second de-crab maneuver just before touchdown. (The slip method also saves tires and helps keep the windward wing down.)



A 3-deg approach initiated at about 525 ft above airport elevation 2 mi out should put the touchdown within the first 20 percent of the runway. A 1-deg error, if uncorrected, will result in an under- or overshoot of about ½ mi relative to a 2500-ft runway. If a corrective maximum descent is initiated above the threshold (A), almost half the runway will be overflown before touchdown. An 8-deg descent started at (B) would permit use of the whole runway.

Figure 3

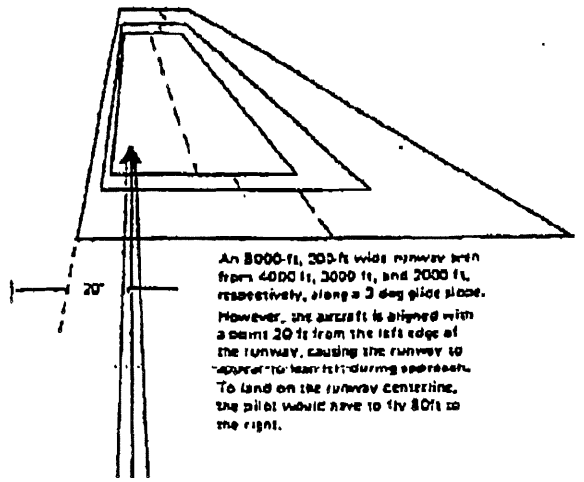


Figure 4

However, regardless of which method is used—and sometimes, in conditions of heavy crosswind, a combination of both must be used—the amount of drift correction required can be detected easily by visually noting whether the aircraft is aligned with the theoretical centerline of the runway. A visual cue that may be used to detect alignment relates to whether the runway image leans (see Figure 4) to either side of vertical, or stands straight up. If the runway leans the approach path is *not* in line with the center of the runway—and sooner or later, an "s" turn will have to be made in order to land on the runway centerline.

Visually determining where the flight path intersects the runway can be difficult unless one knows where and what to look for. Some instructors refer to it as the center of the expansion pattern . . . an area of no movement around which all portions of the terrain and runway expand or move outward (Figure 5); in our study of the subject, the interception point seems to lie in an area above which the runway seems to move vertically toward the horizon and below which it expands toward the approaching aircraft. Essentially, it is an area of the runway that has no apparent vertical motion. Once a pilot has become consciously aware of this visual cue and can use it with some degree of accuracy, the chance of over-or undershooting decreases.

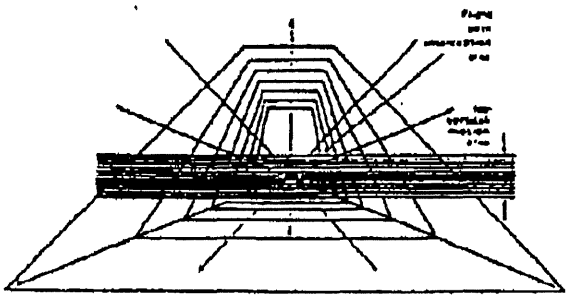


Figure 5

However, for those who have difficulty in seeing this no movement area, the old time-honored technique of noting whether the runway threshold raises or lowers with respect to the aircraft's nose may be used to obtain a rough estimate of whether one is under-or over-shooting. This procedure, of course, requires a constant pitch attitude as well as a constant (fixed) location of the pilot's eyes in relation to whatever portion of the airplane he may be using as a reference point. For example, stretching upward to see over the nose can change the pilot's vertical viewing angle by several degrees, comparable to the visual effect of changing the aircraft's pitch attitude by a like number of degrees.

During poor visibility conditions and particularly during night approaches, a pilot can make doubly sure he doesn't underrun his glide path by checking the altimeter and the vertical speed indicator periodically. He should set his own VFR minimums relative to the airport elevation, making sure he doesn't hit the 50-ft mark until he's over the runway threshold. Also, using a descent rate not in excess of 400 to 500 fpm helps to prevent and inadvertantly steep flight path. Even on clear, but moonless nights, an approach into a black hole airport out in the boondocks can be extremely hazardous unless the flight instruments are scanned systematically until reaching the runway—because of the visual illusions involved.

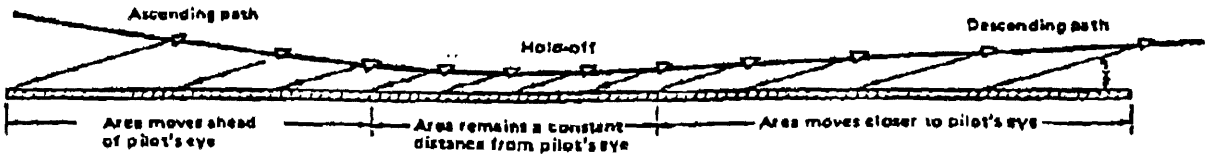
Flaring the airplane (gradually rounding out the flight path to one that is parallel with the runway) is not difficult if the pilot knows where the ground is. If he doesn't, he's in trouble. Some student and private pilots try to overcome this lack of knowledge by driving their plane *into* the runway, which is hard on the nose gear, and eventually on the pocketbook.

Flare cues are primarily dependent on the angle at which the pilot's central vision intersects the ground (or runway) ahead and slightly to the side (see Figure 6). Unfortunately, the why of this intercept angle is not very well understood. However, it's been demonstrated in tests that if a pilot looks constantly at the far end of the runway during his intended flare, he may not flare at all. This is probably because, for example, a vertical distance of 10 ft between his eyes and the ground only subtends an angle of one eighth of a degree, measured at the end of a 5000 ft runway, and his eye has difficulty resolving (seeing) changes in such a small angle. To detect a left variation in vertical distance between his wheels and the runway, would then require his visual detection of one-eightieth of a degree change in angle—an impossible task!

On the other hand, if the pilot looks at the runway at a point too close to his plane, he'll see nothing but a blur of passing runway surface or he'll have the illusion that he's lower than he actually is. In either case the aircraft will probably drop in hard as it runs out of flying speed.

Although many pilots think that flare and landing cues are primarily dependent on two eyed (binocular) depth perception, the cues used most are those related to changes in runway or terrain perspective and to changes in size of familiar objects near the landing area, such as fences, bushes, trees, hangars, and even sod or runway texture.

With a little practice, monocular (one-eyed) vision works just as well as the two eyed variety in putting an airplane down safely—and smoothly. For the disbelieving, it might be interesting to note that—according to current FAA medical records—4005 one-eyed persons hold valid FAA pilot certificates. Of these, 75 had first class medicals, 674 held second class and 3256 held third class (student or private pilot) medical certificates, and their safety record is just as good as that of their two-eyed brethren.



Constant interception angle X between pilot's central vision and runway surface causes distance between interception area and eyes to diminish as the aircraft descends (A). During hold-off, the distance remains equal and moves along with the aircraft (B). If flight path ascends, the area moves forward away from the aircraft.

Figure 6

Many pilots who have good success in flaring at the proper attitude and maintaining their wheels a few inches above the runway until eventual touchdown do so by directing their central vision at a shallow downward angle of from 10 to 15 deg toward the runway. As shown in Figure 7, maintaining the same viewing angle causes the point of visual interception with the runway to more progressively rearward toward the pilot as the airplane loses altitude; this rate of rearward movement may be an important cue in assessing the *rate* of altitude loss. Conversely, forward movement of the visual interception point will indicate an increase in altitude, and would be interpreted to mean the pilot had increased the aircraft's pitch angle to rapidly, resulting in an overflare. Location of this visual interception point in conjunction with assessment of low velocity of nearby off-runway terrain, as well as the similarity of appearance of height above the runway ahead of the aircraft (in comparision to the way it looked when the aircraft was taxied prior to take-off) may also be used to judge when the wheels are just a few inches above the runway.

To recap—consistently good landings require constancy in flight path angle and airspeed. To attain this consistency, keep alert to the *visual cues* that are necessary to the task . . . if a pilot's having trouble with his landings, it's a sure bet he's not looking in the right place at the right time. □

When ready to start his flare, the pilot should look toward the runway at a shallow angle (A) to obtain the necessary visual cues. If he looks too far down the runway (B) he'll probably fly into it. If he looks too close (C), the aircraft may drop in hard.

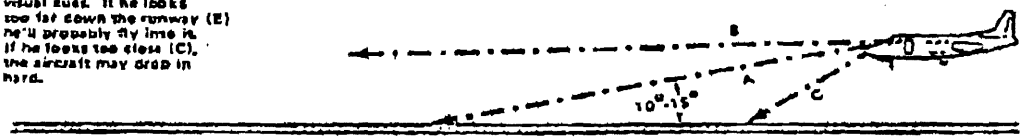


Figure 7

The same 4000-ft long 100-ft wide runway looks different to pilots arriving at night and have many different appearances, depending on the viewing angle. A pilot landing at an unfamiliar strip at night in mountainous country, where runway slope angles are often large, should know ahead of time whether he's landing on an up or downhill plane, what the runway dimensions are and what's between him and the end of the runway. The runway outlines show how the images vary with slope and approach angle.

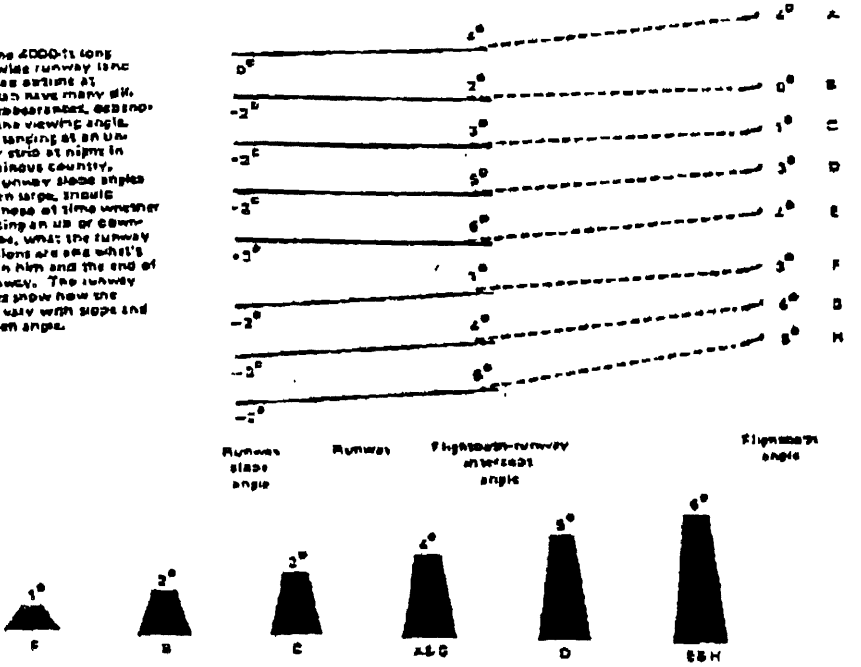


Figure 8

PILOT TECHNIQUE

A PATTERN FOR SAFETY

Help fight wide patternitis

BY ALTON K. MARSH

Ever start to turn a left base at an uncontrolled airport and see another aircraft barreling in from the right on a base of its own? Unknown to you, the offending pilot had been lurking out there all along, flying a downwind leg that was two miles or more from the airport. ■ Or have you followed an aircraft on downwind that passes abeam the approach end, then travels a mile or more before turning base? All of the trailing aircraft are forced to follow along on this mini-cross-country flight. ■ Why do they do that? Better yet, why do *we* do that? Probably all of us have been guilty of flying wide patterns at one time or another. Consider the conscientious pilot who is transitioning to a faster and more complicated aircraft and needs more time to set up for the landing. ■ The need for more time turns out to be the common cause of the malady, by the way. While still in the traffic pattern, a flight instructor in Maryland recently sought a confession from a student who had just completed what looked like a cross-country flight. "I fly a wider pattern to give me more time," the student said. An official at Jackson Hole Aviation in Jackson, Wyoming, said the wide-pattern fliers there use the same excuse, although a sharply rising mountain range near the airport helps control them somewhat. ■ No one objects to pilots' being well prepared for the landing. The problem is that wider patterns not only can slow airport traffic, but they can lead to a midair collision. If you are among those suffering from wide patternitis, the cure is quick and simple: Get a copy of the FAA *Flight Training Handbook*, which suggests that the downwind leg be one-half mile to one mile from the landing runway. And how does one estimate a half-mile or a mile? Use the runway itself. If the runway is 5,000 feet long, for example, then the proper distance from the runway to the downwind leg is one-half to one full length of the runway. (Imagine it turned 90 degrees towards downwind.) After determining that

ILLUSTRATION BY JACK PARDUE

point, see where the runway intersects your wing or wing strut, and you will never have to estimate it again.

Or get the AOPA Air Safety Foundation's booklet, *Nontowered Airports*. The booklet is good medicine for another pattern ill, this one a psychological malady—the belief that since the pattern is uncontrolled, anything goes. While it's true that pilots can do virtually anything they want at an uncontrolled airport, the rest of us have to get out of their way while they do it.

A pilot of a single-engine airplane was in the traffic pattern recently when a twin-engine aircraft charged onto the downwind leg from the opposite side of the airport, coming uncomfortably close. The twin's pilot later demanded to know why the single-engine aircraft was in his way. The single-engine pilot had taken the time to approach from the correct side and enter on a 45-degree angle to downwind. All of this was accomplished prior to the twin's dramatic arrival over the airport. Had the multiengine pilot followed the recommended standard entry, the near-miss would not have happened.

Uncontrolled doesn't mean out of control. The *Aeronautical Information Manual* (formerly the *Airman's Information Manual*) lays out very specific procedures for entering uncontrolled airport patterns. If you ignore them and cause an accident, the FAA may charge you with careless and reckless operation. So, in a way, the recommendations and suggestions in the AIM are covered under the Federal Aviation Regulations.

The AOPA Air Safety Foundation booklet offers these six tips:

(1) Enter the pattern abeam the midpoint of the runway at pattern altitude.

(2) Maintain pattern altitude until abeam the approach end of the runway, then turn base when the runway appears to be about 30 degrees aft of the wing.

(3) Complete the turn to final about a quarter mile from the runway end.

(4) When departing, continue straight ahead until beyond the departure end of the runway.

(5) If remaining in the pattern, commence the turn to crosswind within 300 feet of pattern altitude.

(6) If departing the traffic pattern, continue straight out or exit with a 45-degree turn beyond the departure end, after reaching pattern altitude.

The booklet is available from the AOPA Air Safety Foundation by calling 800/638-3101. □

October 20, 1995

Dear Mr. Kennedy,

My husband, daughter-in-law Ann, and I have read the NTSB preliminary report concerning the September 15, 1995 collision that resulted in the death of our son and husband Joseph, and two Embry-Riddle students: Robert Scheithe and Hyun Chul Sin. Although we realize that the investigation is still in progress and that this report is a preliminary one, we are concerned and confused about several important points.

Before covering those points we would like to clarify that we realize we are emotionally involved; however, we are very focused on bits and pieces of information shared with us by observers of the incidence. We were allowed to talk with some of the witnesses after your interviews with them. We find it confusing that various valid issues are not in the report. We realize that reports are not written subjectively. We hope that no one is offended by this inquiry. The duties of the FAA and NTSB investigative teams are difficult ones. We do not have it in our hearts that Mr. Galley, pilot of the Tomahawk, intentionally did anything and surely his young life and peace of mind have been interrupted by this horrible incidence.

The most difficult thing to deal with as we read the report is that Joe, Ben, and Robert cannot tell their perspective. They cannot speak. We noticed that Mr. Galley was quoted as having reported his position frequently on the unicom. We really have difficulty with this part. For one thing Joe and the students were focused on the basics of landing and taking off. We have no doubt that someone in that plane radioed their position. There were three men in that plane focused on the basics. If the student had failed to do so, Joe would have. And if Joe had failed, the supervisor would have observed that. Two of the observers, Mr. Hough and Mr. Booker, described the afternoon as being filled with radioing and a lot of "crosstalk". We find it confusing that Mr. Galley could have missed the announcements of the Tampico, and if Mr. Galley was announcing his position how all three men in the Tampico could have missed the "frequent" announcements concerning EACH LEG of Mr. Galley's movements. There is something not right about this situation. It is totally incomprehensible. Joe was maticulous about flying even when he was a teenager digging ditches to pay for his flight lessons at his hometown airport.

We are concerned about your conversation with Roy, Joe's father, about complaints of ERAU teaching techniques - specifically a long, low landing pattern. We have been assured repeatedly by the university officials that Joe and the students were using a normal pattern and that the university adheres to FAA guidelines. The delimma presented here is that if you accepted that information by the university, the long, low pattern is a non-issue. However, if

you did not accept the university observers' opinion on this issue you must be accepting the opinion of the people registering complaints. We are wondering what that has to do with the collision that occurred September 15, 1995. Were the people registering the complaints present on Sept. 15 ? Dean Stackpoole of ERAU was not aware of such complaints when we inquired. Also, we were wondering why the people registering the complaints have any more credibility than the other observers present that day. It totally eludes us that a "tight" or "very close" pattern would be anymore desirable considering it leaves very little, if any, time for the pilot executing it or other pilots to react to a crisis situation. Ann posed a valid question. If the three men in the Tampico were flying by FAA regulations (required by ERAU), what regulations was Mr. Galley observing? Also she, and my husband and I, wonder if the witnesses' observations and statements are even taken into account in making a ruling. It would seem to us that the witnesses' observations are all there is to represent the Tampico since the three men cannot speak for themselves. We are hoping that the witnesses observations will be represented later. The preliminary report represents more the statements of Mr. Galley and momentarily we feel that is unfair.

We noticed the report recorded Mr. Galley as having left Spruce Creek at 1610. Flying to New Symrna may have taken 5 or 6 minutes, but to think that Mr. Galley had time from 1615 to 1645 to land and take off five times is truly amazing. We recall Mr. Hough, ERAU supervisor, stating that Mr. Galley had put he and his student in an uncomfortable situation by coming within one quarter mile or less of their craft. He stated that he got to see his student react and that the student took evasive measures. We think this happened on the downwind approach. That is the same day, the same pilot, within a short time before Mr. Galley's plane struck the Tampico.

On October 15, 1995, I asked an airport owner/pilot to take me up in a two-seater Tomahawk with dual controls. I sat in the position Mr. Galley occupied Sept. 15, 1995. I asked Mr. Ball to fly me in a "close" pattern and a normal one. Mr. Ball interpreted the tight to be 1/4 mile, the normal 1/2 mile. The runway was 5000 feet long and we were up 800 feet above ground level. I timed the normal pattern trip (taxiing out to the runway, taking off, circling the airport, landing, and taxiing off) at 8.5 minutes with no interference. The tight pattern was 6 minutes with no interference. The visibility was perfectly clear. It was 3PM in Texas.

On one of the close patterns Mr. Ball pointed out to me that there was a plane 3/4 mile or more out in front of us and to the right. We had just turned downwind and the other plane was all the way at the other end of the runway. The airplane had NOT radioed in at all. Mr. Ball told me that if the plane turned to land that we would have to alter our "close pattern" plans. The plane was clearly visible to us from our total opposit position. We were alongside the runway, out 1/4 mile: the other plane must have been out 1/2 mile from the side of the runway and at least 3/4 mile in

front of us. The first sight of it I could see mostly the left wing, back of the body, and the tail. It was almost totally white. Shortly the plane turned base and at that point I was struck by how clear it was, both wings and the entire body. Mr. Ball continued straight and went out a little further than he had planned. He explained to me that if he had continued the tight pattern he might have ended up in the same situation as the incidence Sept. 15. Mr. Ball emphasized that the plane in the front was first and that it was his (Mr.Ball's) responsibility to watch it. Mr. Ball stated that it didn't matter that the other plane had not radioed, he had to watch out for it. The plane was clearly visible from the beginning of our downwind, it was clear 3/4 to 1 mile out, it was even more clear when it turned base and final.

I noticed in our experiment that in the "close" pattern Mr. Ball never leveled off during the base and final. It was more of a near half-circle movement. During that time the right wing pretty much obscured anything out to the right - either level or down. However as the left wing tilted down, more extreme than the normal pattern, there was greater visibility downward. I could clearly see the shadow of our airplane. The other plane we had been watching had landed, but I wondered if we had not been watching and continued our tight approach possibly ending up above the plane if I could have seen its shadow. There was quite a bit of ground visible around the shadow of our plane and I was really struck with the thought that surely if another craft had been down there it might be possible to see at least a portion of it or its shadow.

Mr. Ball flew me around again in the close pattern and explained "runway fixation". It was clear to me what he was saying - that being that sometimes beginning pilots do not survey the horizon or whatever because they are looking predominantly at the end of that runway. Also Mr. Ball emphasized that in an extremely tight approach it is even more tempting or easier to make that mistake because if one doesn't watch it closely the runway could be missed. Mr. Ball emphatically disagreed with me when I told him that Mr. Galley was referred to by the newspapers as an advanced pilot. Mr. Ball stated that he would have to have 1000s of flight hours and that probably Mr. Galley was somewhat of a beginner and that the choice to fly tight, even on a clear day, was a mistake especially with other planes in the traffic pattern. He said you don't experiment with those things to the exclusion of the safety of others.

What I learned Mr. Kennedy, in my experiment, was really pretty simple. There are numerous times circling an airport to spot other planes. It is simply a matter of being committed to look. I mean there are so very many opportunities to alter one's maneuvers. The tight or close pattern complicates the visibility more on base and final, but still the visibility at all the other points is still good. I can understand though, that if a pilot is fixed on looking more over his or her left shoulder at the runway where a lot of things can be missed. At whatever point that Mr.Galley started his downwind leg, Sept.15, he should have been able to see the Tampico

if he was looking. Even if it was "long" or way out there, on a clear day that other plane is visible. And especially before Mr. Galley's base when he was at the end of the runway he had another opportunity to see another plane (with that plane on base or final it would have then been closer to him and I might add FIRST) which was probably on its final unless he was in sort of a spiral maneuver and never looked before beginning that maneuver.

I would also like to point out that Mr. Galley was landing and taking off rapidly. I have to wonder why. I guess that question will haunt all of us forever. We have discussed this point over and over. We realize any pilot can choose to practice what they wish. We realize that airplanes such as the Tomahawk don't necessarily even have to have a radio in them. The young family Mr. Ball and I came into contact with did not radio their intent. But they were out there in front and Mr. Ball accommodated them for his safety and mine and theirs. I was really struck, tears in my eyes and a lump in my throat, when I saw a man and woman, and two children get out of that plane. I have to wonder if Mr. Galley was flying even tighter than we were. He was on his fifth landing when the collision occurred. I can't help but believe he was selfishly fixed on his own plans, totally oblivious to the safety of others. Mr. Hough and his student encountered this pilot's tight manuevers. So the man's tactics really put more people in danger than the three men who died. I would give my life up to be able to go back and be there that day and be able to radio Mr. Galley or catch him on the ground and tell him - look this is a dangerous situation, can we work something out that is more safe for all of us and yet be able to do what we all need and want to do. So our question is - was Mr. Galley taking the precautions necessary to ensure the safety of himself and other pilots? Was he paying attention to the other planes? We wonder if Mr. Galley is still in the United States?

Mr. Kennedy I hope you will forgive my old homespun philosophy, but if I am driving in the center lane of a 3 lane freeway and I decide to change lanes, it is up to me to look in that other lane. If I broadside another car THAT IS ALREADY THERE it is not acceptable for me to say " sorry you were in my blindspot". It wouldn't even matter if I turned on my blinker properly or if the law required me to announce my intent on a CB radio and I did. If I make the move without clearing the area by looking in my side mirror or turning my head to look over my shoulder, I create the situation. I don't think the Tampico had a blindspot that contributed to the collision until it was imposed by Mr. Galley's tight maneuvers and his position directly over the Tampico. It was strictly coincidence on Oct. 15 when that family was out in front of me, but if Mr. Ball had not been willing to alter his plans we would have been over them. Perhaps the situation would not have been totally identical to the Sept. 15 New Symrna collision, but it would have been a scary situation, a crisis. I am not willing to accept that life can be so random. There is ample opportunity to prevent such occurrences and the first step is a commitment in one's heart and character to be mindful of others. In the country life we have

lived and Joe lived, we were very mindful of the pesticides we used or to avoid stripping tree lines out that held the soil from washing down on our neighbors peach orchard. Some people just don't live by basic relational ethics. That component is just not there. There is no law that requires such ethics per se; however, we believe there is such a thing. People are responsible for their choices and the consequences that affect others. And people must be held accountable for consequences.

It seems to us there is no one to talk for Joe and the students. We realize that you cannot fill reports with subjective data. However the experiences of the people present should be considered and we specifically mean how they felt about Mr. Galley's actions during the afternoon he was flying around the New Symrna Beach airport. It seems like there would have been more information gathered from the people you interviewed at ERAU. We sincerely hope that something can be done in the area of safety to avoid such occurences no matter how infrequent they may occur? We don't accept that this was just some bizarre, random happening in which two planes "accidentally" ended up, one above the other. We believe it could have been avoided. It is so painful to feel as we do, that simple observation techniques could have saved our son and husband. It was, in our opinion, the neglect of something so incredibly simple.

Thank you for your indulgence. I called your office while you were on vacation to ask if it was OK to write to you. I was assured it was acceptable even though you might not be able to address everything we brought up. This wait is incredibly painful. It's like we can't process our loss - everything is frozen in time.

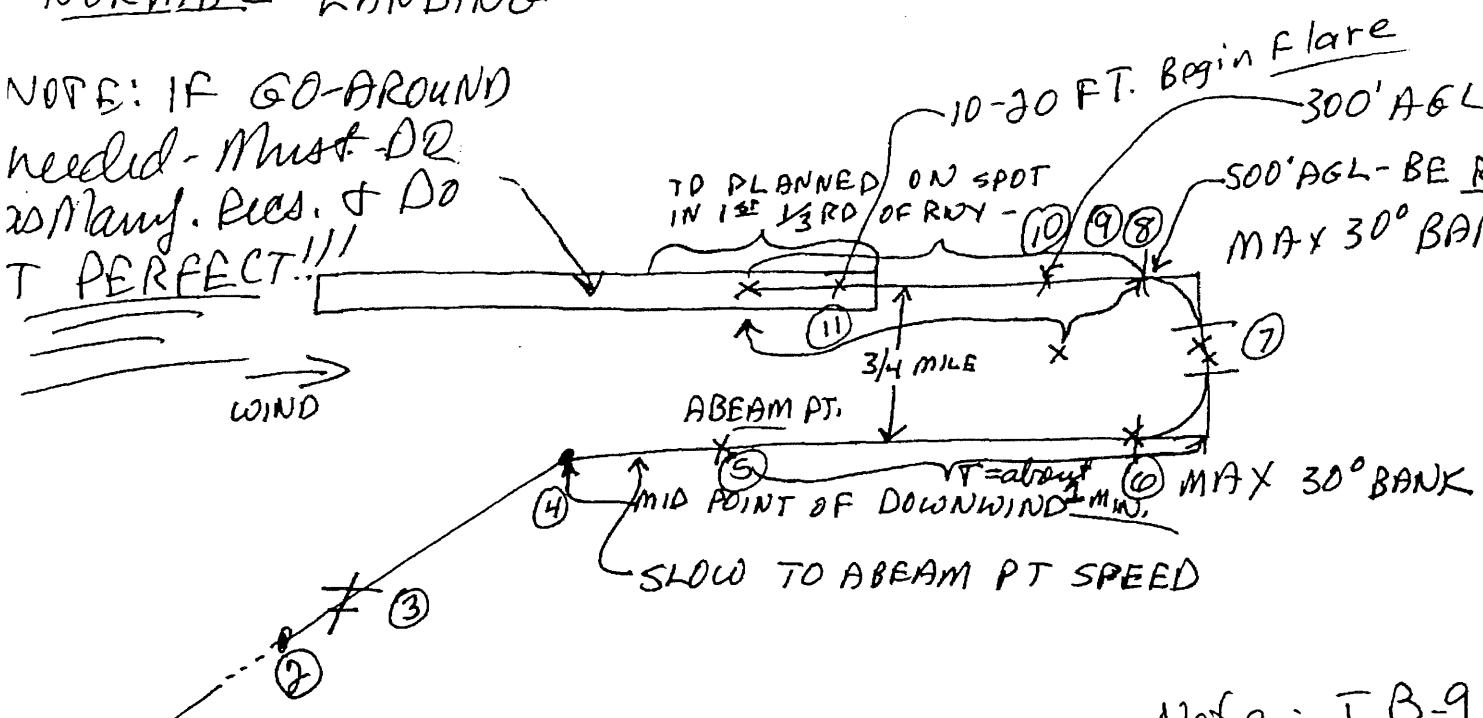
I would like to add one thought and I realize this is just my opinion. I really think there is a double standard among pilots. Some pilots have to adhere to stricter standards while others can do pretty much what they please. It strikes me as ironic that my son and his students had to adhere to a higher code of pilot conduct and they are the ones who are dead.

Sincerly,

Charlotte McCoy, Roy McCoy, and Ann McCoy

Roy McCoy

NORMAL LANDING



Note: TB-9 3° Glide slope
= 67 KIAS (67 Kts. G.S. No. wind)
Full Flaps -
Power approx 1200 RPM
Rate Descent = 350 FPM

① ARRIVAL (DESCENT) ETC
② 45° GND TRACK 2 MILES FR. ENTRY SLOW TO TRAF. PATTERN SPEED
③ Complete Pre-Landing CK LIST
④ Turn Downwind
⑤ ABEAM TO PT. - extend partial flaps
⑥ Begin descent
⑦ check traffic ALL DIRECTIONS - should be "crabbed"
⑧ Be rolled out Wings level 500' AGL -
⑨ Decide Landing Flap amount and set (Normal = Full Flaps)
⑩ Be stabilized by 300' AGL.

IF student can't recite this diagram and all actions involved - then student is not ready for landing practice — also if student does not know exactly how to execute go-around -

PRE REQUISITES FOR LANDING PRACTICE

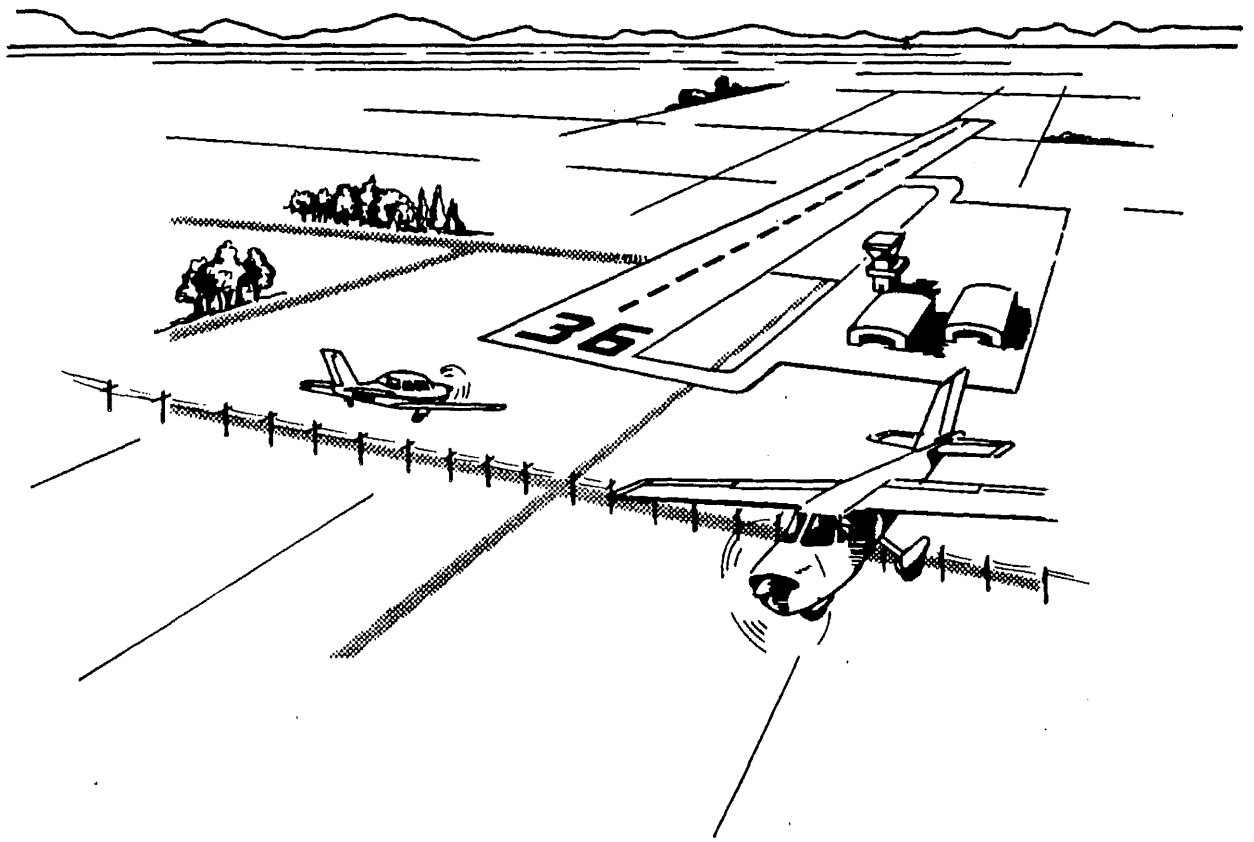
① Does student know by rote memory how to correct common landing errors? (FTH is ref.)

② Can student fly pattern on previous page at altitude and make no mistakes?

③ If you gave student a "blank" diagram with #'s - could student fill in proper actions - speeds - distance etc perfect by from memory? —

④ During altitude practice - did you teach student HOW "exactly" to correct for being above glide path and below glide path?

⑤ CAN STUDENT TELL YOU EXACTLY



CHAPTER 7

Airport Traffic Patterns and Operations

This chapter explains the methods used for safely adjusting the flow of air traffic at and near airports, and discusses the major traffic services and landing approach aids that are available to the pilot at the busier terminal areas. Just as roads and streets are needed in order to utilize automobiles, airports or airstrips are needed to utilize airplanes. Every flight begins and ends at an airport or other suitable landing field. For that reason, it is essential that the pilot learn the traffic rules, traffic control procedures, traffic advisory services, and traffic pattern layouts that may be in use at various airports.

When an automobile is being driven on congested city streets, it can be brought to a stop so as to give way to conflicting traffic. An airplane, however, can only be slowed down. Even then, it may be traveling 60 to 180 miles per hour. Consequently, specific traffic patterns and traffic control procedures have been established at designated airports. The traffic patterns provide specific routes for takeoffs, departures, arrivals, and landings. The exact nature of each airport traffic pattern is dependent on the runway in use, wind conditions, obstructions, and other factors.

Control towers and radar facilities provide a means of adjusting the flow of arriving and departing aircraft, and render assistance to the pilot in busy terminal areas. Airport lighting and runway marking systems are used frequently to alert the pilot to abnormal conditions and hazards, so arrivals and departures can be made safely.

Airports vary in complexity from small grass or sod strips to major terminals having a complex of many paved runways and taxiways (Fig. 7-1). Regardless of the type of airport, the pilot must know and abide by the rules and general operating procedures applicable to the airport being used. These rules and procedures are based not only on logic or common sense, but also on courtesy, and their

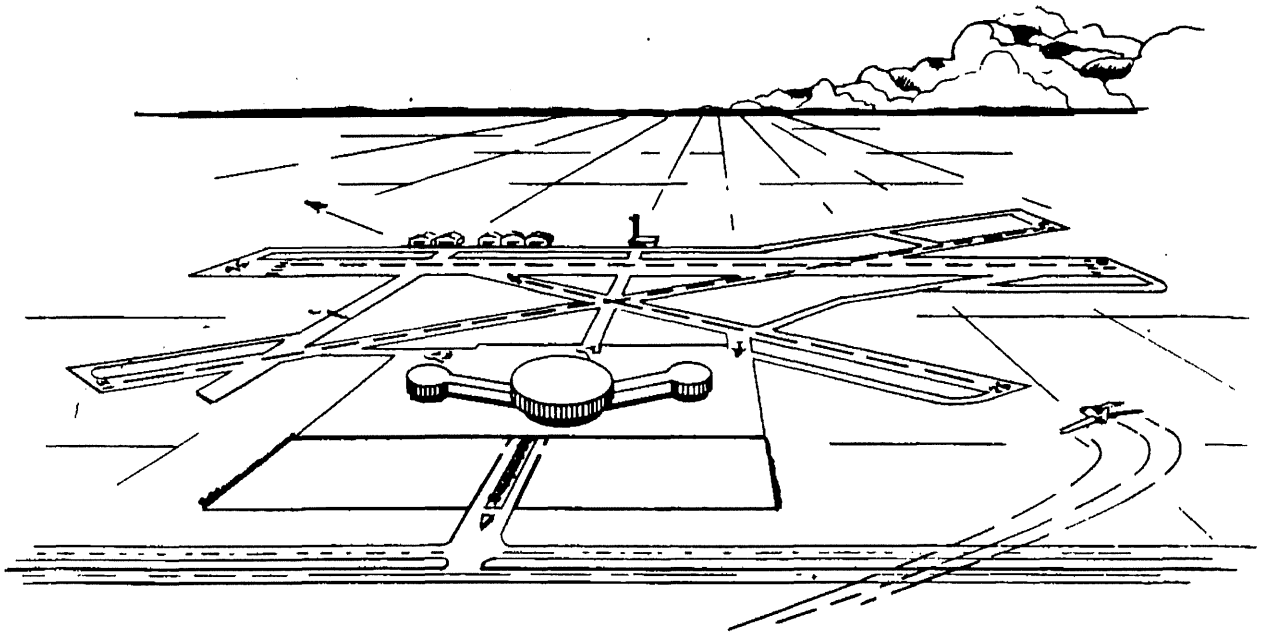


Figure 7-1 Major Airport Terminal Area

objective is to keep air traffic moving with maximum safety and efficiency. The use of any traffic pattern, service, or procedure does not, however, alter the *responsibility of each pilot* to see and avoid other aircraft.

Airport Traffic Patterns

To assure that air traffic flows into and out of an airport in an orderly manner, an airport traffic pattern is established appropriate to the local conditions, including the direction and placement of the pattern, the altitude at which it is to be flown, and the procedures for entering and leaving the pattern. Unless the airport displays approved visual markings indicating that turns should be made to the right, the pilot should make all turns in the pattern to the left.

When operating at an airport with a control tower, the pilot receives, by radio, a clearance to approach or depart as well as pertinent information about the traffic pattern. If there is no control tower, it is the pilot's responsibility to determine the direction of the traffic pattern, to comply with the appropriate traffic rules, and to display common courtesy toward other pilots operating in the area.

The pilot is not expected to have intimate knowledge of all traffic patterns at all airports, but if familiar with the *basic* rectangular pattern, it will be easy to make proper approaches and departures from most airports, regardless of whether they have control towers. At tower-controlled airports, the tower operator may instruct pilots to enter the traffic pattern at any point or to make a straight-in approach without flying the usual rectangular pattern. Many other deviations are possible if the tower operator and the pilot work together in an effort to keep traffic moving smoothly. It must be recognized that jets or large, heavy aircraft will frequently be flying wider and/or higher patterns than lighter aircraft and in many cases will make a straight-in approach for landing.

Compliance with the basic rectangular traffic pattern reduces the possibility of conflicts at airports where air traffic is not being controlled by an FAA control tower. While accident statistics for each year show an improvement over previous years, it is known that the majority of midair collisions occur in the vicinity of nontower airports, under visual flight rules (VFR) weather conditions. It is imperative then, that the pilot form the habit of exercising constant vigilance in the vicinity of airports even though the air traffic appears to be light.

The basic rectangular traffic pattern is illustrated in Fig. 7-2. The traffic pattern altitude

is usually 1,000 feet above the elevation of the airport surface. The use of a common altitude at a given airport is the key factor in minimizing the risk of collisions at nontower airports. At all airports, the direction of traffic flow (in accordance with FAR Part 91) is always to the left, *unless* right turns are indicated by approved light signals or visual markings on the airport, or the control tower specifically directs otherwise.

It is recommended that while operating in the traffic pattern at nontower airports the pilot maintain an airspeed that conforms with the limits established by FAR 91 for tower-controlled airports: no more than 156 knots (180 MPH) for reciprocating engine aircraft or 200 knots (230 MPH) for turbine-powered airplanes. In any case, the speed should be adjusted, when practicable, so that it is compatible with the speed of other aircraft in the pattern.

The basic rectangular traffic pattern consists of four "legs" positioned in relation to the runway in use. In the following discussion, reference is made to a "90° turn" from one leg to the other since the ground track of each leg is perpendicular to the preceding one. The actual change in the airplane's heading during those turns will be more or less than 90° depending on the amount of correction necessary to counteract wind drift.

The *upwind leg* of the rectangular pattern is a straight course aligned with, and leading from, the takeoff runway. This leg begins at the point the airplane leaves the ground and continues until the 90° turn onto the crosswind leg is started.

On the upwind leg after takeoff, the pilot should continue climbing straight ahead until reaching a point beyond the departure end of the runway and within 300 feet of traffic pattern altitude. If leaving the pattern, the pilot should continue straight ahead, or depart by making a 45° left turn (right turn for a right-hand pattern).

The *crosswind leg* is the part of the rectangular pattern that is horizontally perpendicular to the extended centerline of the

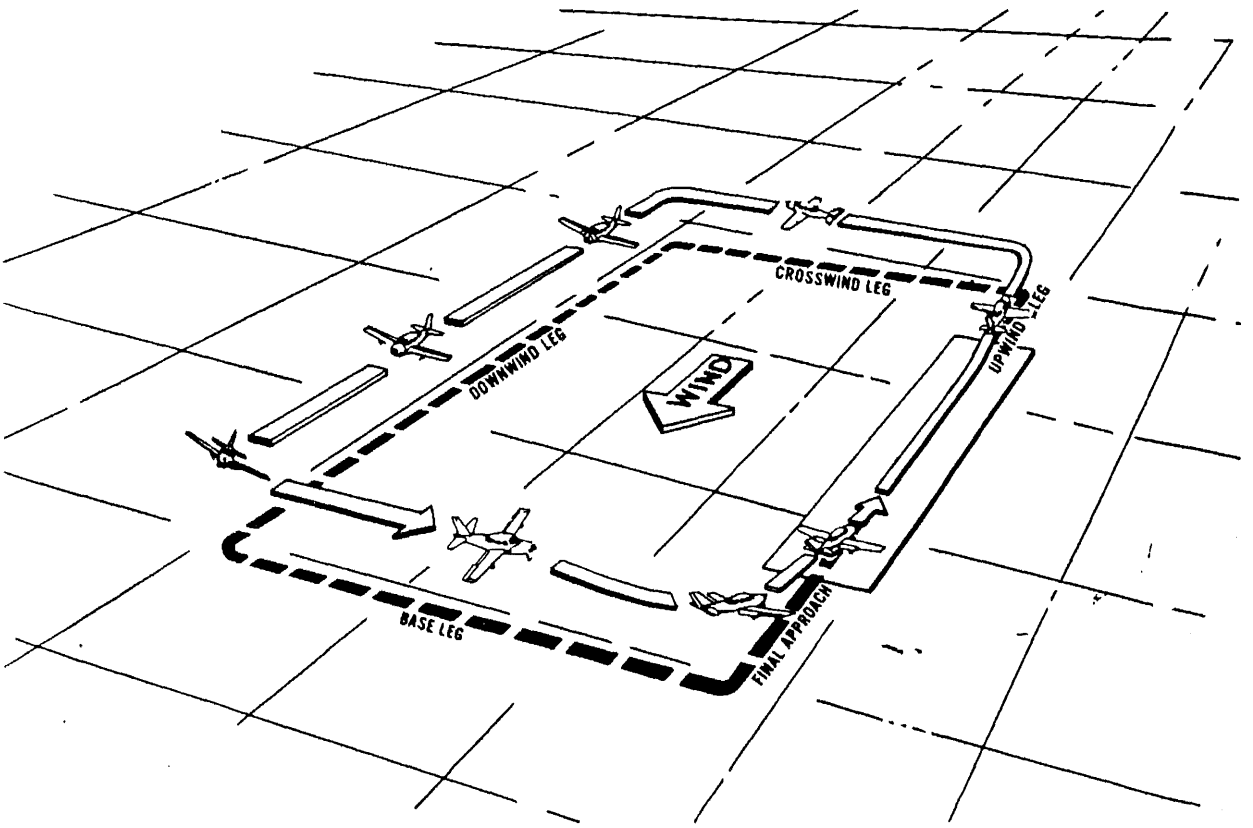


Figure 7–2 Basic Rectangular Traffic Pattern

takeoff runway and is entered by making a 90° turn from the upwind leg. On the crosswind leg the airplane proceeds to the downwind leg position.

Since in most cases the takeoff is made into the wind, the wind now will be approximately perpendicular to the airplane's flightpath. As a result, the airplane will have to be crabbed or headed slightly into the wind while on the crosswind leg to maintain a ground track that is perpendicular to the runway centerline extension. This factor will be further explained in a later chapter covering wind drift and maneuvering by reference to ground objects.

After reaching the prescribed altitude for the traffic pattern and when in the proper position to enter the downwind leg, a level medium bank 90° turn should be made into the downwind leg.

The *downwind leg* is a course flown parallel to the landing runway, but in a direction opposite to the intended landing direction. This leg should be approximately ½ to 1 mile out from the landing runway, and at the specified traffic pattern altitude. During this leg, the prelanding check should be completed and the landing gear extended if retractable. The downwind leg continues past a point abeam of the approach end of the runway to where a medium bank 90° turn is made onto the base leg.

The *base leg* is the transitional part of the traffic pattern between the downwind leg and the final approach leg. Depending on the wind condition, it is established at a sufficient distance from the approach end of the landing runway to permit a gradual descent to the intended touchdown point. The ground track of the airplane while on the base leg should be perpendicular to the extended centerline of the landing runway, although the longitudinal axis of the airplane may not be aligned with the ground track when it is necessary to crab into the wind to counteract drift. (This will be discussed in the chapter on Landing Approaches and Landings.) While on the base leg the pilot must ensure, before turning onto the final approach, that there is no danger of colliding with another aircraft that may be already on the final approach.

As stipulated in Federal Aviation Regulations, aircraft while on final approach to land, or while landing, have the right-of-way over other aircraft in flight or operating on the surface. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land, or to overtake that aircraft.

The *final approach leg* is a descending flightpath starting from the completion of the base-to-final turn and extending to the point of touchdown. This is probably the most important leg of the entire pattern, for here the pilot's judgment and technique must be keenest to accurately control the airspeed and descent angle while approaching the intended touchdown point. The various aspects are thoroughly explained in the chapter on Landing Approaches and Landings.

To enter the traffic pattern at an airport without a control tower, inbound pilots are expected to observe other aircraft already in the pattern and to conform to the traffic pattern in use. If no other aircraft are in the pattern, then traffic indicators on the ground and wind indicators must be checked to determine which runway and traffic pattern direction should be used (Fig. 7–3). Many airports have L-shaped traffic pattern indicators displayed with a segmented circle adjacent to the runway. The short member of the L shows the direction in which the traffic pattern turns should be made when using the runway parallel to the long member. For example, in Fig. 7–4, the airplane should fly a right-hand pattern. These indicators should, of course, be checked while at a distance well away from any pattern

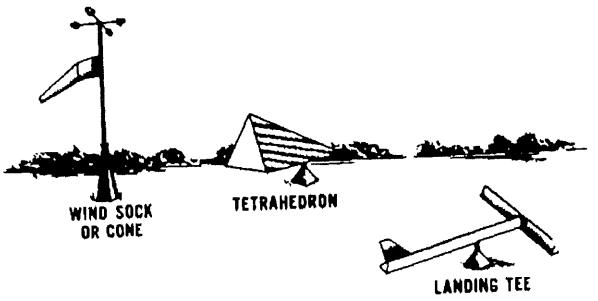


Figure 7–3 Wind and Landing Direction Indicators

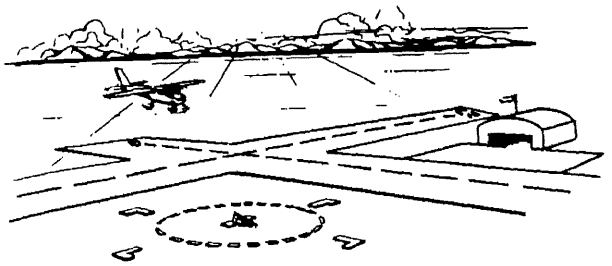


Figure 7–4 Left and Right Traffic Pattern Indicators

that might be in use, or while at a safe height well *above* generally used pattern altitudes. When the proper traffic pattern direction has been determined, the pilot should then proceed to a point well clear of the pattern before descending to the pattern altitude.

Generally, when approaching an airport for landing, the traffic pattern should be entered at a 45° angle to the downwind leg, headed toward a point abeam of the midpoint of the runway to be used for landing. Arriving airplanes should always be at the proper traffic pattern altitude before entering the pattern, and should stay clear of the traffic flow until established on the entry leg. Entries into traffic patterns while descending create specific collision hazards and must be avoided at all times.

The entry leg should be of sufficient length to provide a clear view of the entire traffic pattern, and to allow the pilot adequate time for planning the intended path in the pattern and the landing approach.

Non-controlled Airport Traffic

In addition to flying a basic rectangular traffic pattern, pilots operating at nontower-controlled airports are urged to use the communications radio to announce their positions and intentions to a ground radio station located at those airports or, if none is functioning, to broadcast "in the blind" on an appropriate radio frequency. This alerts other pilots to the presence of your airplane and helps in avoiding midair collisions.

FAA has over 180 Flight Service Stations (FSS) which provide, on a designated radio frequency, advisory information concerning the airport at which they are located. These advisories, when requested, will include the speed and direction of the surface wind and other pertinent airport conditions—as well as the favored runway under the existing wind condition.

In addition, the FSS will advise the pilot if there is observed or reported traffic in the traffic pattern, or in the vicinity, so the pilot can approach or depart the airport in such manner as to avoid disrupting or endangering other aircraft. These FSSs are listed, along with their assigned frequencies, in the Airport/Facility Directory published by the U.S. Department of Commerce.

When there is no FAA facility on the airport, a radio service called UNICOM can be very useful to the pilot. The presence of a UNICOM facility at an airport is indicated in the Airport/Facility Directory and on sectional aeronautical charts; there are approximately 4,000 airports with UNICOM in the United States. This is an informal voluntary advisory service provided by the airport operator for the convenience of pilots. The UNICOM operator will relay information about known traffic in the area, and about the airport conditions.

UNICOM provides convenient air/ground communication, but it should be remembered that the person providing the information may or may not be an experienced observer of air traffic. It may be a veteran pilot, and again it may be someone who has no flying experience at all.

As standard operating practice, all traffic ininbound to an uncontrolled airport should continuously monitor the appropriate radio frequency as indicated on the aeronautical chart or in the Airport/Facility Directory. To avoid radio interference with other air traffic that may be using UNICOM at nearby airports, the arriving pilot should delay the initial call until about 5 miles from the airport, and then listen before making any transmission.

Departing pilots should monitor the proper frequency, broadcasting their position and intentions before taxiing onto the runway for takeoff. To minimize congestion on the communication frequencies, all radio transmissions should be brief and concise as possible.

2. Pilots of aircraft conducting other than arriving or departing operations at altitudes normally used by arriving and departing aircraft should monitor/communicate on the appropriate frequency while within 10 miles of the airport unless required to do otherwise by the FAR's or local procedures. S. operations include parachute jumping/dropping, c route, practicing maneuvers, etc.

REFERENCE–
AIM, Parachute Jump Aircraft Operations, paragraph 3–5–5.

Summary of Recommended Communication Procedures

			COMMUNICATION/BROADCAST PROCEDURES		
	FACILITY AT AIRPORT	*FREQUENCY USE*	*OUTBOUND*	*INBOUND*	*PRACTICE INSTRUMENT APPROACH*
1.	UNICOM (No Tower or FSS)	Communicate with UNICOM station on published CTAF frequency (122.7; 122.8; 122.725; 122.975; or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
2.	No Tower, FSS, or UNICOM	Self-announce on MULTICOM frequency 122.9.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Departing final approach fix (name) or on final approach segment inbound.
3.	No Tower in operation, FSS open	Communicate with FSS on CTAF frequency.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Approach completed/ terminated.
4.	FSS Closed (No Tower)	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
5.	Tower or FSS not in operation	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	

TBL 4–1–1

d. Local Airport Advisory provided by an FSS:

1. Local Airport Advisory (LAA) is a service provided by an FSS physically located on an airport which does not have a control tower or where the tower is operated on a part-time basis. The CTAF for FSS's which provide this service will be disseminated in appropriate aeronautical publications.

2. In communicating with a CTAF FSS, establish two-way communications before transmitting outbound/inbound intentions or information. An inbound aircraft should report approximately 10 miles from the airport, reporting altitude and aircraft type, location relative to the airport, state whether landing or overflight, and request airport advisory. Departing aircraft should state the aircraft type, full identification number, type of flight planned, i.e., VFR or IFR and the planned destination or direction of flight. Report before taxiing and before taxiing on the runway for departure. If communications with a UNICOM are necessary after initial report to FSS, return to FSS frequency for traffic update.

(a) Inbound

EXAMPLE–
VERO BEACH RADIO, CENTURION SIX NINER DELTA DELTA IS TEN MILES SOUTH, TWO THOUSAND, LANDING VERO BEACH. REQUEST AIRPORT ADVISORY.

(b) Outbound

EXAMPLE–
VERO BEACH RADIO, CENTURION SIX NINER DELTA DELTA, READY

designated calm-wind runway. At airports with control towers, the tetrahedron should only be referenced when the control tower is not in operation. Tower instructions supersede tetrahedron indications.

4. ***Landing strip indicators:*** Installed in pairs as shown in the segmented circle diagram and used to show the alignment of landing strips.

5. ***Traffic pattern indicators:*** Arranged in pairs in conjunction with landing strip indicators and used to indicate the direction of turns when there is a variation from the normal left traffic pattern. (If there is no segmented circle installed at the airport, traffic pattern indicators may be installed on or near the end of the runway.)

c. Preparatory to landing at an airport without a control tower, or when the control tower is not in operation, pilots should concern themselves with the indicator for the approach end of the runway to be used. When approaching for landing, all turns must be made to the left unless a traffic pattern indicator indicates that turns should be made to the right. If the pilot will mentally enlarge the indicator for the runway to be used, the base and final approach legs of the traffic pattern to be flown immediately become apparent. Similar treatment of the indicator at the departure end of the runway will clearly indicate the direction of turn after takeoff.

d. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right of way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land, or to overtake that aircraft (FAR Part 91.113(f)).

4–3–4. TRAFFIC PATTERNS

At most airports and military air bases, traffic pattern altitudes for propeller-driven aircraft generally extend from 600 feet to as high as 1,500 feet above the ground. Also, traffic pattern altitudes for military turbojet aircraft sometimes extend up to 2,500 feet above the ground. Therefore, pilots of en route aircraft should be constantly on the alert for other aircraft in traffic patterns and avoid these areas whenever possible. Traffic pattern altitudes should be maintained unless otherwise required by the applicable distance from cloud criteria (FAR Part 91.155). (See FIG 4–3–2 and FIG 4–3–3).

Traffic Pattern Operations
Single Runway

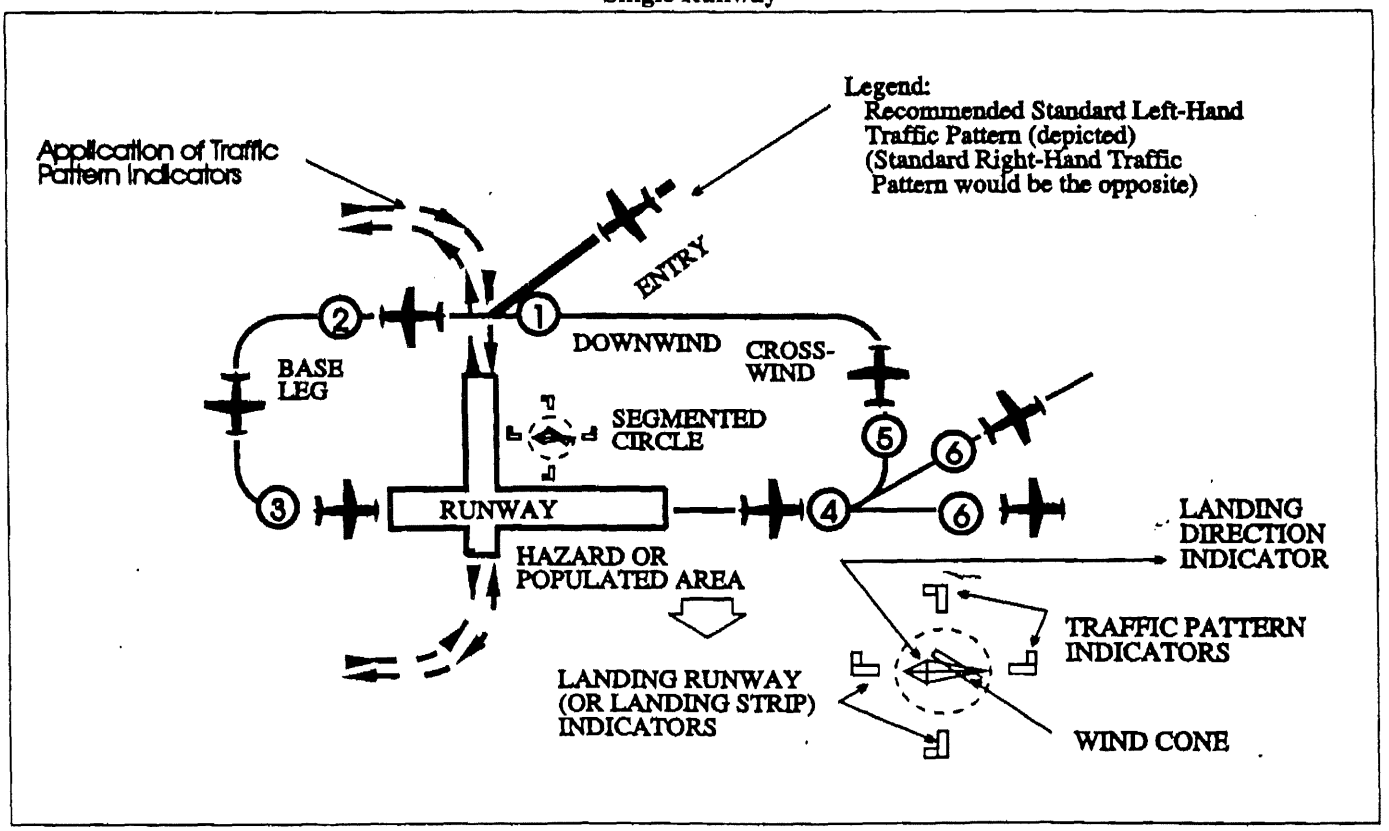


FIG 4–3–2 See Key to Traffic Pattern Operations on next page.

Traffic Pattern Operations
Parallel Runways

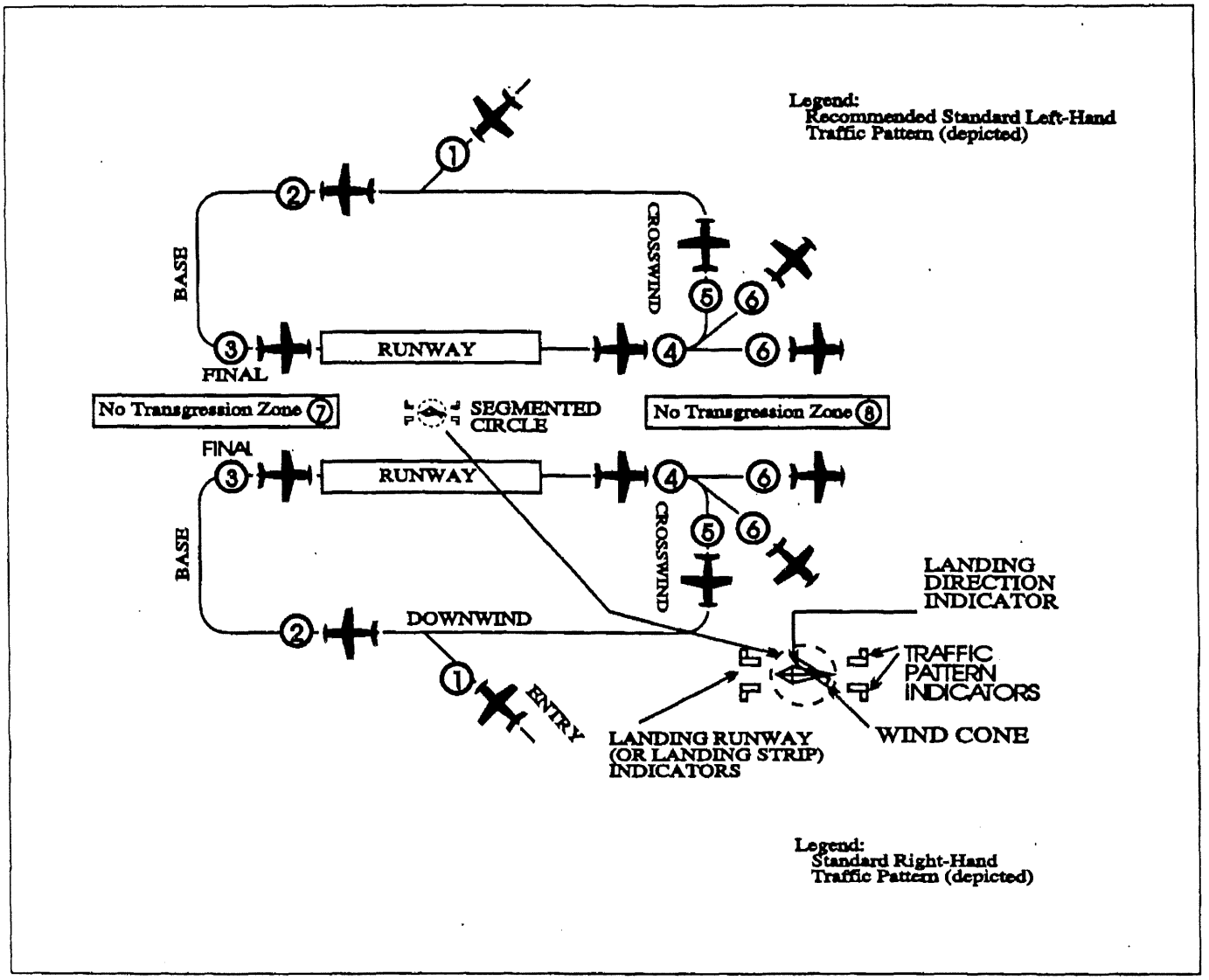


FIG 4–3–3 See Key to Traffic Pattern Operations below.

EXAMPLE–
KEY TO TRAFFIC PATTERN OPERATIONS
① ENTER PATTERN IN LEVEL FLIGHT, ABEAM THE MIDPOINT OF THE RUNWAY, AT PATTERN ALTITUDE. (1,000' AGL IS RECOMMENDED PATTERN ALTITUDE UNLESS ESTABLISHED OTHERWISE...)

② MAINTAIN PATTERN ALTITUDE UNTIL ABEAM APPROACH END OF THE LANDING RUNWAY ON DOWNWIND LEG.

③ COMPLETE TURN TO FINAL AT LEAST 1/4 MILE FROM THE RUNWAY.

④ CONTINUE STRAIGHT AHEAD UNTIL BEYOND DEPARTURE END OF RUNWAY.

⑤ IF REMAINING IN THE TRAFFIC PATTERN, COMMENCE TURN TO CROSSWIND LEG BEYOND THE DEPARTURE END OF THE RUNWAY WITHIN 300 FEET OF PATTERN ALTITUDE.

⑥ IF DEPARTING THE TRAFFIC PATTERN, CONTINUE STRAIGHT OUT, OR EXIT WITH A 45 DEGREE TURN (TO THE LEFT WHEN IN A LEFT–HAND TRAFFIC PATTERN; TO THE RIGHT WHEN IN A RIGHT–HAND TRAFFIC PATTERN) BEYOND THE DEPARTURE END OF THE RUNWAY, AFTER REACHING PATTERN ALTITUDE.

⑦ DO NOT OVERSHOOT FINAL OR CONTINUE ON A TRACK WHICH WILL PENETRATE THE FINAL APPROACH OF THE PARALLEL RUNWAY.

⑧ DO NOT CONTINUE ON A TRACK WHICH WILL PENETRATE THE DEPARTURE PATH OF THE PARALLEL RUNWAY.

4–3–5. UNEXPECTED MANEUVERS IN THE AIRPORT TRAFFIC PATTERN

There have been several incidents in the vicinity of controlled airports that were caused primarily by aircraft executing unexpected maneuvers. ATC service is based upon observed or known traffic and airport conditions. Controllers establish the sequence of

AIM

STATEMENT OF PARTY REPRESENTATIVES TO NTSB INVESTIGATION

Aircraft Identification:
Registration Number N1176L/N2351L
Make and Model AEROSTAR 600 TS-9 PIPER PA31-310
Location NEW SMYRNA, FL.
Date 9-15-95

The undersigned hereby acknowledge that they are participating in the above-referenced aircraft accident field investigation (including any component tests and teardowns or simulator testing) on behalf of the party indicated adjacent to their name, for the purpose of providing technical assistance to the National Transportation Safety Board.

The undersigned further acknowledge that they have read the attached copy of 49 CFR Part 831 and have familiarized themselves with 49 CFR§ 831.11, which governs participation in NTSB investigations and agree to abide by the provisions of this regulation.

It is understood that a party representative to an investigation may not be a person who also represents claimants or insurers. The placement of a signature hereon constitutes a representation that participation in this investigation is not on behalf of either claimants or insurers and that, while any information obtained may ultimately be used in litigation, participation is not for the purposes of preparing for litigation.

By placing their signatures hereon all participants agree that they will neither assert nor permit to be asserted on their behalf, any privilege in litigation, with respect to information or documents obtained during the course of and as a result of participation in the NTSB investigation as described above. It is understood, however, that this form is not intended to prevent the undersigned from participating in litigation arising out of the accident referred to above or to require disclosure of the undersigned's communications with counsel.

SIGNATURE	NAME (Printed)	PARTY	DATE
[signature]	EDWARD ROGALSKI	TEXTRON LYCOMING	9/16/95
[signature]	AGEE C TACKER	EMBRY-RIDDLE	9-16-95

Continued on reverse

SIGNATURE	NAME (Printed)	PARTY	DATE

PART 831—ACCIDENT/INCIDENT INVESTIGATION PROCEDURES

Sec.

Authority. Title VII, Federal Aviation Act of 1958, as amended, 72 Stat. 781, as amended by 76 Stat. 921 (49 U.S.C. 1441 et seq.); and the Independent Safety Board Act of 1974, Pub. L. 93-633, 88 Stat. 2166 et seq., as amended by 95 Stat. 1065 (49 U.S.C. 1901 et seq.).

§ 831.1 Applicability of part.

Unless otherwise specifically ordered by the National Transportation Safety Board (Board), the provisions of this part shall govern all accident or incident investigations, conducted under the authority of title VII of the Federal Aviation Act of 1958, as amended, and the Independent Safety Board Act of 1974. Rules applicable to accident hearings and reports are set forth in Part 845.

§ 831.2 Responsibility of Board.

(a) *Aviation. (1)* The Board is responsible for the organization, conduct and control of all accident investigations involving civil aircraft, or civil and military aircraft, within the United States, its territories and possessions. It is also responsible for investigation of accidents which occur outside the United States, and which involve U.S. civil aircraft or civil and military aircraft, at locations determined to be not in the territory of another state (i.e., in international waters).

(2) Certain aviation field investigations are conducted by the Federal Aviation Administration (FAA), pursuant to a request to the Secretary of the Department of Transportation, effective February 10, 1977 (see appendix to Part 800 of this chapter),[1] but the Board determines the probable cause of such accidents. Under no circumstances shall investigations conducted by the Board be considered joint investigations in the sense of sharing responsibility. However, in the case of an accident or incident involving civil aircraft of U.S. registry or manufacture in a foreign state which is a signator to Annex 13 to the Chicago Convention of the International Civil Aviation Organization, the state of occurrence is responsible for the investigation. If it occurs in a foreign state which is not bound by the provisions of Annex 13 to the Chicago Convention, the conduct of the investigation shall be in consonance with any agreement entered into between the United States and the foreign state.

(b) *Surface.* The Board is responsible for the investigation of railroad accidents in which there is a fatality, substantial property damage, or which involve a passenger train (see Part 840 of this chapter); major marine casualties and marine accidents involving a public and nonpublic vessel or involving Coast Guard functions (see Part 850 of this Chapter); highway accidents, including railroad grade-crossing accidents which it selects in cooperation with the States: and pipeline accidents in which there is a fatality or substantial property damage.

(c) *Other Accident.* The Board is also responsible for the investigation of an accident which occurs in connection with the transportation of people or property which, in the judgment of the Board, is catastrophic, involves problems of a recurring character, or would otherwise carry out the policy of the Independent Safety Board Act of 1974.

§ 831.3 Authority of Directors.

The Director, Bureau of Accident Investigation, or the Director, Bureau of Field Operations, subject to the provisions of § 831.2, may order an investigation into any accident or incident.

§ 831.4 Nature of investigation.

Accident or incident investigations are conducted by the Board in order to determine the facts, conditions, and circumstances relating to each accident or incident and the probable cause thereof and to ascertain measures which will best tend to prevent similar accidents or incidents in the future. The investigation includes the field investigation, report preparation, and, where ordered, the public hearing. Accident investigations are factfinding proceedings with no formal issues and no adverse parties and are not subject to the provisions of the Administrative Procedure Act(Pub. L. 89-554, 80 Stat. 384 (5 U.S.C. 554 *et seq.*)). Such investigations are not conducted for the purpose of determining the rights or liabilities of any person.

§ 831.5 Priority of Board Investigations.

Any investigation of an accident (except marine)[2] conducted by the Safety Board shall have priority over all other investigations of such accident conducted by other Federal agencies. The Safety Board shall provide for the appropriate participation by other Federal agencies in any such investigation, except that such agencies may not participate in the Safety Board's determination of the probable cause of the accident. Nothing in this section impairs the authority of other Federal agencies to conduct investigations of an accident under applicable provisions of law or to obtain information directly from parties involved in, and witnesses to, the transportation accident. The Safety Board and other Federal agencies shall assure that appropriate information obtained or developed in the course of their investigations is exchanged in a timely manner.

§ 831.6 Request to withhold information.

Any person may make written objection to the public disclosure of information contained in any report or document filed, or of information obtained by the Board, stating the grounds for such objection. The Board, on its own initiative or if such objection is made, may order such information withheld from public disclosure when, in its judgment, the information can be withheld under the provisions of an exemption to the Freedom of Information Act (Pub. L. 93-502, amending 5 U.S.C. 552) and its release is not found to be in the public interest (see Part 801).

§ 831.7 Right of representation.

Any person interrogated by an authorized representative of the Board during the field investigation shall be accorded the right to be accompanied, represented, or advised by counsel or by any other duly qualified representative.

§ 831.8 Investigator-in-charge.

The designated investigator-in-charge organizes, conducts, and controls the field phase of investigation. He shall assume responsibility for the supervision and coordination of all resources and of the activities of all personnel, both Board and non-Board, involved in the onsite investigation.

§ 831.9 Authority of Board representatives.

(a) *General.* Any employee of the Board, upon presenting appropriate credentials is authorized to enter any property wherein a transportation accident has occurred or wreckage from any such accident is located and do all things necessary for proper investigation.

[1] The authority of a representative of the Federal Aviation Administration during such field investigations shall be the same as that of a Board investigator under this part

[2] The joint regulations of the Board and Coast Guard for the investigation of marine casualties are set forth in Part 850 of this chapter

Upon demand of an authorized representative of the Board and presentation of credentials issued to such representative, any Government agency, or person having possession or control of any transportation vehicle or component thereof, any facility, equipment, process or controls, relevant to the investigation, or any pertinent records and memoranda, including all files, hospital records, and correspondence now or hereafter existing and kept or required to be kept, shall forthwith permit inspection, photographing, or copying thereof by such authorized representative for the purpose of investigating an aircraft accident/incident, other accident, overdue aircraft, study, or investigation pertaining to safety or the prevention of accidents. Authorized representatives of the Board may interrogate any person having knowledge relevant to an aircraft accident/incident, overdue aircraft, study, or special investigation.

(b) *Aviation.* Any employee of the Board upon presenting appropriate credentials is authorized to examine and test to the extent necessary any civil aircraft, aircraft engine, propeller, appliance, or property aboard an aircraft involved in an accident in air commerce.

(c) *Surface.*(1) Any employee of the Board, upon presenting appropriate credentials, is authorized to test or examine any vehicle, vessel, rolling stock, track pipeline component, or any part of such item when such examination or testing is determined to be required for purposes of such investigation.

(2) Any examination or testing shall be conducted in such a manner so as not to interfere with or obstruct unnecessarily the transportation services provided by the owner or operator of such vehicle, vessel, rolling stock, track, or pipeline component, and shall be conducted in such a manner so as to preserve, to the maximum extent feasible, any evidence relating to the transportation accident, consistent with the needs of the investigation and with the cooperation of such owner or operator.

§ 831.10 Autopsies.

The Board is authorized to obtain with or without reimbursement, a copy of the report of autopsy performed by State or local officials on any person who dies as a result of having been involved in a transportation accident within the jurisdiction of the Board. The investigator-in-charge, on behalf of the Board, may order an autopsy or seek other tests of such persons as may be necessary to the investigation, provided that to the extent consistent with the needs of the accident investigation, provisions of local law protecting religious beliefs with respect to autopsies shall be observed.

§ 831.11 Parties to the field investigation.

(a) The investigator-in-charge may, on behalf of the Director, Bureau of Accident Investigation, or the Director, Bureau of Field Operations, designate parties to participate in the field investigation. Parties to the field investigation shall be limited to those persons, government agencies, companies, and associations whose employees, functions, activities, or products were involved in the accident or incident and who can provide suitable qualified technical personnel to actively assist in the field investigation.

(b) Participants in the field investigation shall be responsive to the direction of the appropriate Board representative and may be relieved from participation if they do not comply with their assigned duties or if they conduct themselves in a manner prejudicial to the investigation.

(c) No party to the field investigation designated under § 831.11(a) shall be represented by any person who also represents claimants or insurers. Failure to comply with this provision shall result in loss of status as a party.

(d) Section 701(g) of the Federal Aviation Act of 1958, as amended, provides for the appropriate participation of the Administrator in Board investigations, and section 304(a) of the Independent Safety Board Act of 1974, as amended, provides for the appropriate participation of other Federal agencies in Board investigations. Thus, components of the Department of Transportation, and, when appropriate, other Federal agencies, will normally be a party to field investigations and will have the same rights and privileges and be subject to the same limitations as other parties.

§ 831.12 Access to and release of wreckage, records, mail, and cargo.

(a) Only the Board's accident investigation personnel and persons authorized by the investigator-in-charge, the Director, Bureau of Accident Investigation, or the Director, Bureau of Field Operations to participate in any particular investigation, examination or testing shall be permitted access to wreckage, records, mail, or cargo which is in the Board's custody.

(b) Wreckage, records, mail, and cargo in the Board's custody shall be released by an authorized representative of the Board when it is determined that the Board has no further need of such wreckage, mail, cargo, or records.

§ 831.13 Flow and dissemination of accident information.

(a) Release of information during the field investigation, particularly at the accident scene, shall be limited to factual developments, and shall be made only through the Board Member present at the accident scene, the representative of the Board's Office of Public Affairs, or the investigator-in-charge.

(b) All information concerning the accident or incident obtained by any personnel participating in the field investigation shall be passed to the investigator-in-charge, through appropriate channels. Upon approval of the investigator-in-charge, parties to the investigation may relay to their respective organization information which is necessary for purposes of prevention or remedial action. Under no circumstances shall accident information be released to, or discussed with, unauthorized persons whose knowledge thereof might adversely affect the investigation.

§ 831.14 Proposed findings.

Any person, Government agency, company, or association whose employees, functions, activities, or products were involved in an accident under investigation may submit to the Board, prior to its consideration of probable cause, proposed findings to be drawn from the evidence produced during the course of the accident investigation, a proposed probable cause, and proposed safety recommendations designed to prevent future accidents.

Signed at Washington DC on this 12th day of April, 1988.

Jim Burnett,

Chairman.

[FR Doc. 88-9870 Filed 5-3-88; 8:45 am]

BILLING CODE 7533-01-M

NATIONAL TRANSPORTATION SAFETY BOARD

RELEASE OF AIRCRAFT WRECKAGE

ACCIDENT IDENTIFICATION NUMBER: MIA95FA2

PART I—RELEASE OF AIRCRAFT WRECKAGE

REGISTERED OWNER (name and address)	REGISTRATION NUMBER—N
EMBRY-RIDDLE AERONAUTICAL UNV. 600 CLYDE MORRIS BLVD. DAYTONA BEACH, FL 32114	N117ER
	MAKE: AEROSPATIALE

MODEL	DATE OF ACCIDENT	LOCATION
TB-9	9-15-95	NEW SYMRNA BEACH, FL.

The National Transportation Safety Board has [X] ~~has not~~ [ ] completed its investigation of the aircraft wreckage described above. All wreckage except that listed on the reverse side is hereby released to the registered owner, or owner's representative, for appropriate disposition. (If no parts are retained, insert NONE.)

NONE

SIGNATURE OF NTSB REPRESENTATIVE	TITLE	DATE
Jeffrey T Kenedy	ASI	9-16-95

(This section may be signed by a person, not the owner or owner's representative, who has knowledge of the disposition of the aircraft wreckage and its parts. Such signature does not place a responsibility for disposition of the wreckage upon that person.)

I HEREBY ACKNOWLEDGE:

[X] Receipt of the above described aircraft wreckage.

[ ] Removal of the parts, if any, listed on the reverse side of this form.

SIGNATURE	TITLE	DATE
R C Kaufman	AVIATION SAFEY ENGINEER AT EMBRY-Riddle	9-16-97

REMARKS:

NTSB FORM 6120.15 (Rev. 5/79)

NATIONAL TRANSPORTATION SAFETY BOARD

RELEASE OF AIRCRAFT WRECKAGE

ACCIDENT IDENTIFICATION NUMBER: MIA95FA2

PART I—RELEASE OF AIRCRAFT WRECKAGE

REGISTERED OWNER (name and address)	REGISTRATION NUMBER—N
SPRUCE CREEK AVIATION, INC 1 BEECH BLVD. DAYTONA BEACH, FL 32124	N2351A
	MAKE: PIPER

MODEL	DATE OF ACCIDENT	LOCATION
PA38-112	9-15 95	NEW SMYRNA BEACH, FL

The National Transportation Safety Board has [X] ~~has not~~ [ ] completed its investigation of the aircraft wreckage described above. All wreckage except that listed on the reverse side is hereby released to the registered owner, or owner's representative, for appropriate disposition. (If no parts are retained, insert NONE.)

NONE

SIGNATURE OF NTSB REPRESENTATIVE	TITLE	DATE
Jeffrey T. Kennedy	ASI	9-16-95

(This section may be signed by a person, not the owner or owner's representative, who has knowledge of the disposition of the aircraft wreckage and its parts. Such signature does not place a responsibility for disposition of the wreckage upon that person.)

I HEREBY ACKNOWLEDGE:

[X] Receipt of the above described aircraft wreckage.

[ ] Removal of the parts, if any, listed on the reverse side of this form.

SIGNATURE	TITLE	DATE
Donald E. Lowry	Employee	9-16-95

REMARKS:

NTSB FORM 6120.15 (Rev. 5/79)

OFFICE OF MEDICAL EXAMINER
FLORIDA, DISTRICT 7
VOLUSIA COUNTY
1501 BELLEVUE AVENUE, DAYTONA BEACH, FL 32114
(904) 239-6421

REPORT OF AUTOPSY

NAME McCOY, JOSEPH ME # 95-526

ADDRESS 705 S. BEACH STREET, #161, DAYTONA BEACH, FL 32114

AGE 26 DOB MARCH 21, 1969 RACE W SEX M SS #

POLICE JURISDICTION NSBPD CASE # 95-090185 COUNTY VOLUSIA

DATE DEATH (FOUND) SEPTEMBER 15, 1995 DATE AUTOPSY SEPTEMBER 18, 1995 TIME 1230 Hrs

GROSS ANATOMIC DIAGNOSES

FINDINGS:
1. Extensive burning and charring of the body, as described in the autopsy protocol.
2. Multiple lacerations of spleen.
3. Fracture of the left humerus.
4. Ecchymoses of the eyelids bilaterally.
5. Multiple rib fractures, as described in the autopsy protocol.
6. Fracture and dislocation of the right sternoclavicular joint.

FINAL DIAGNOSIS

CAUSE OF DEATH: Multiple blunt force trauma.

MANNER OF DEATH: Accident.

SPECIAL STUDIES: POSTMORTEM TOXICOLOGY-

Source	Finding
Urine	TLC for drugs reveals caffeine, nicotine and nicotine metabolite.
	Drug screen analysis by FPIA is negative.
	Salicylate screen is negative.
Blood	TLC for drugs reveals caffeine.
	Drug screen analysis by FPIA is negative.
	GC & enzymatic analysis for volatiles is negative.
	Carbon monoxide level is 2%.

xc: New Smyrna Beach Police Department
State Attorney's Office

DATE 11-9-95

MEDICAL EXAMINER/Ronald L. Reeves, M.D.

OFFICE OF MEDICAL EXAMINER
FLORIDA, DISTRICT 7
VOLUSIA COUNTY
1501 BELLEVUE AVENUE, DAYTONA BEACH, FL 32114
(904) 239-6421

REPORT OF AUTOPSY

NAME SIN, HYUN CHUL AKA SIN, HYUN BEN ME # 95-527

ADDRESS 600 S. CLYDE MORRIS BLVD., DAYTONA BEACH, FL 32114

AGE 20 DOB JULY 15, 1975 RACE O SEX M SS #

POLICE JURISDICTION NSBPD CASE # 95-090185 COUNTY VOLUSIA

DATE DEATH (FOUND) SEPTEMBER 15, 1995 DATE AUTOPSY SEPTEMBER 18, 1995 TIME 1400 Hrs

GROSS ANATOMIC DIAGNOSES

FINDINGS:
1. Severe fourth degree burns of the body, which is in a pugilistic attitude.
2. Bilateral fractures of the lower extremities, as described in the autopsy protocol.
3. Fracture of T3.
4. Multiple basilar skull fractures.
5. Multiple lacerations of the brain.

FINAL DIAGNOSIS

CAUSE OF DEATH: Multiple blunt force trauma.

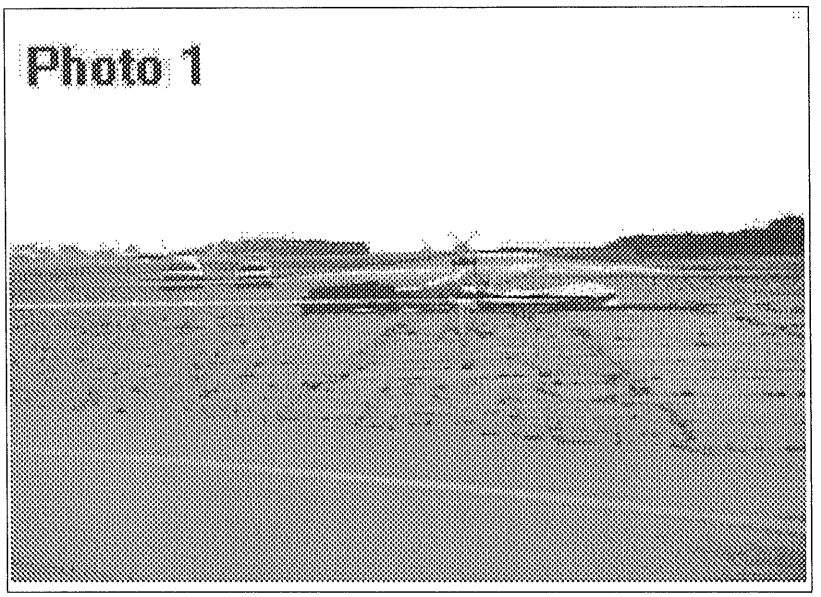
MANNER OF DEATH: Accident.

SPECIAL STUDIES: POSTMORTEM TOXICOLOGY-

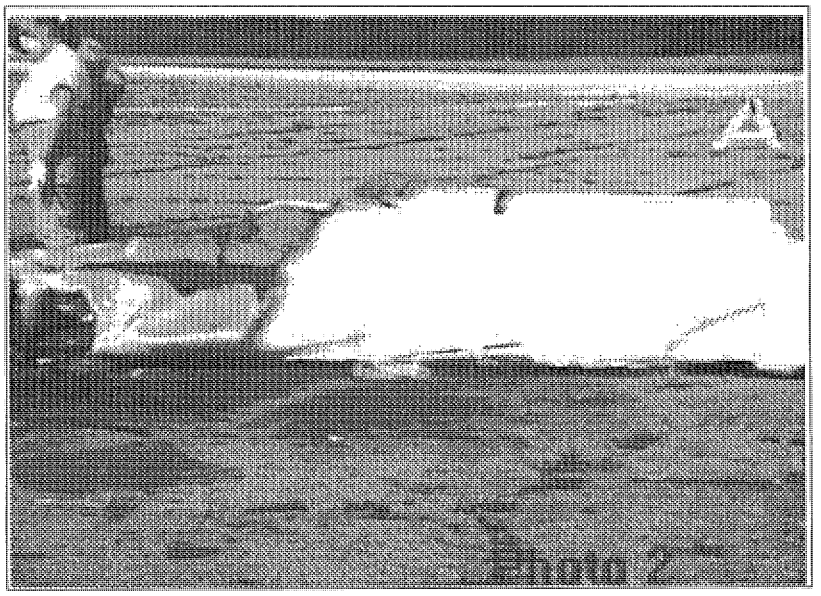
Source	Finding
Urine	TLC for drugs reveals no drugs detected. Drug screen analysis by FPIA is negative. Salicylate screen is negative.
Blood	TLC for drugs reveals no drugs detected. Drug screen analysis by FPIA is negative. GC & enzymatic analysis for volatiles is negative. Carbon monoxide level is 1%.

xc: New Smyrna Beach Police Department
State Attorney's Office

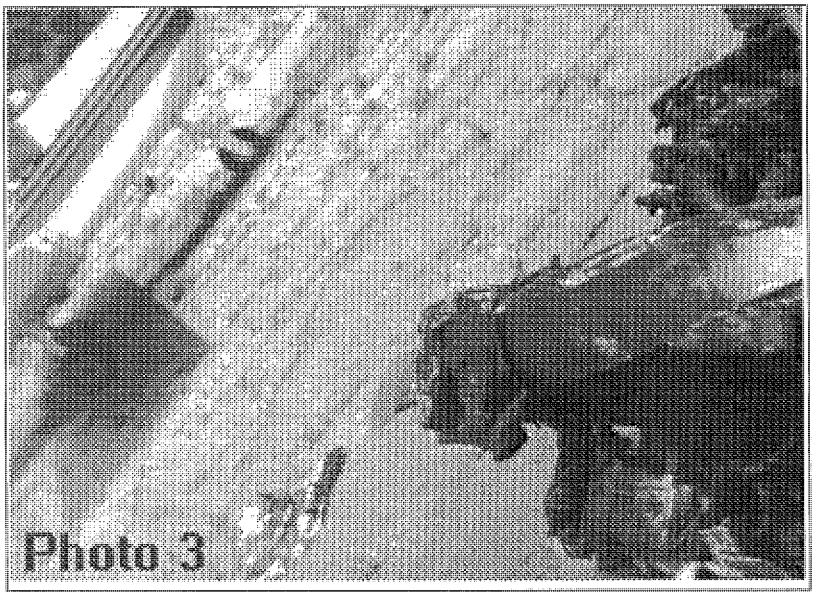
DATE 11-9-95
MEDICAL EXAMINER/Ronald L. Reeves, M.D.



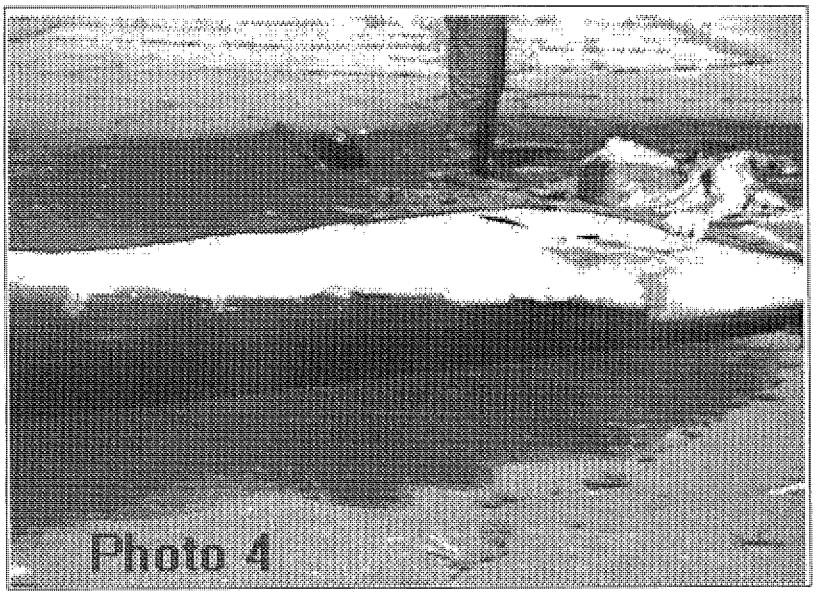
Photograph 1: View of main wreckage of N117ER on threshold of runway 11.



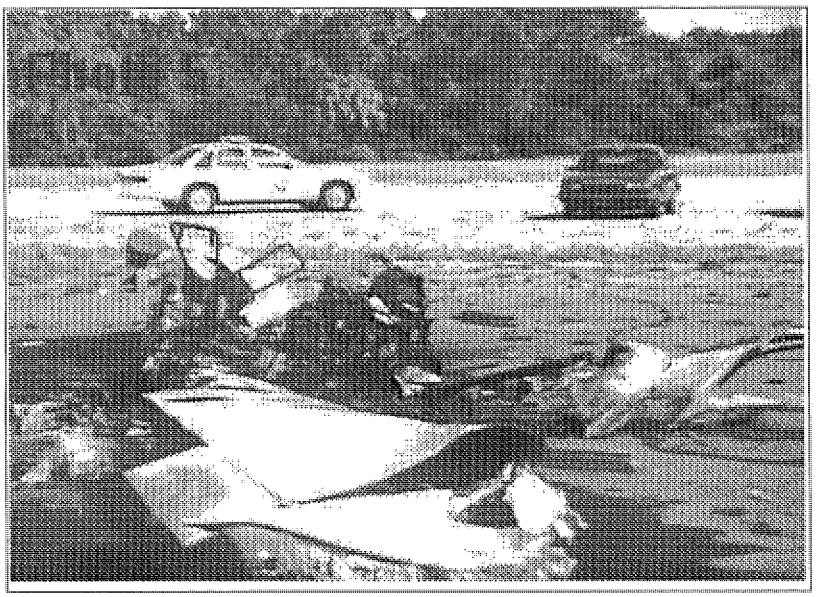
Photograph 2: View of left wing from N117ER.



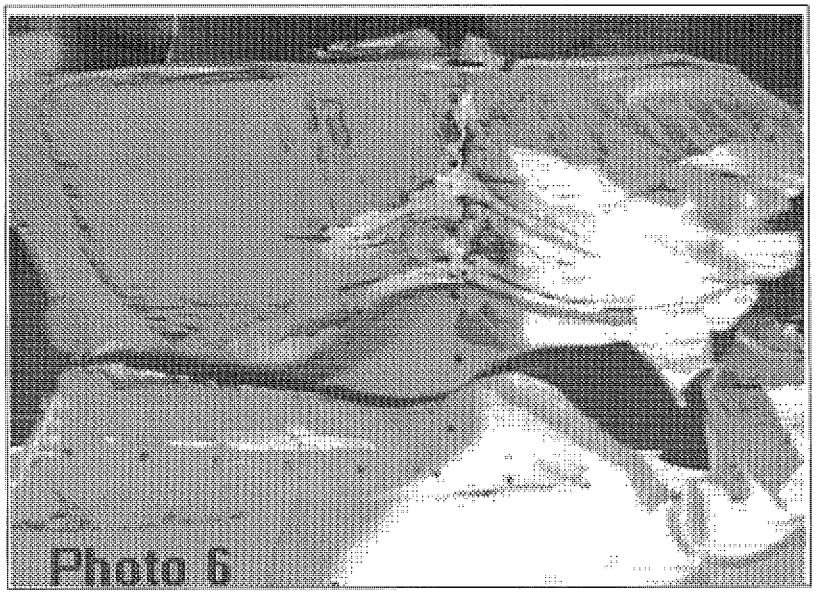
Photograph 3: View of engine and propeller from N117ER



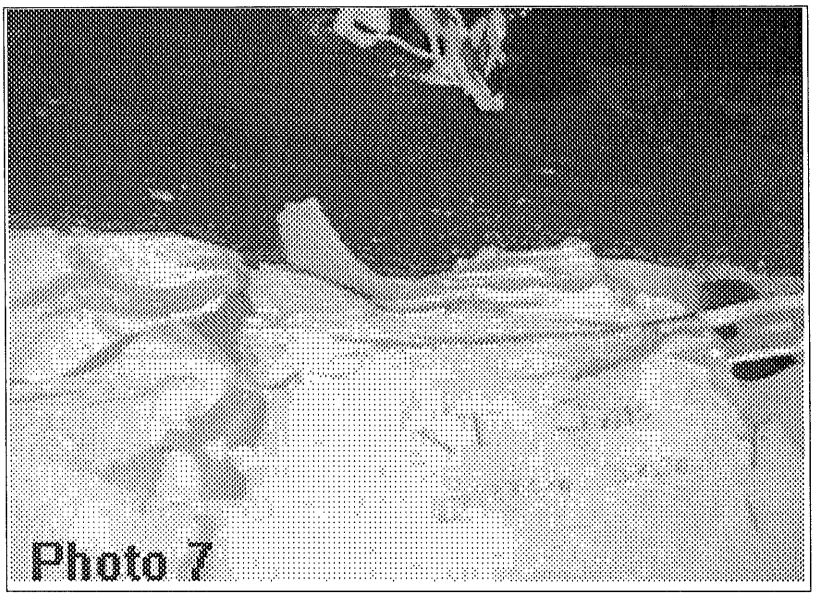
Photograph 4: View of right wing from N117ER



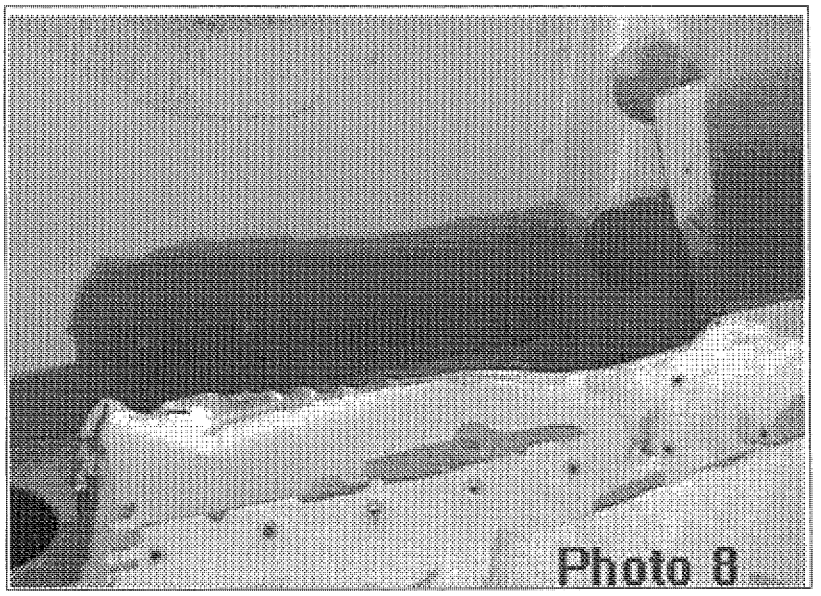
Photograph 5: View of right wing and main wreckage of N117ER



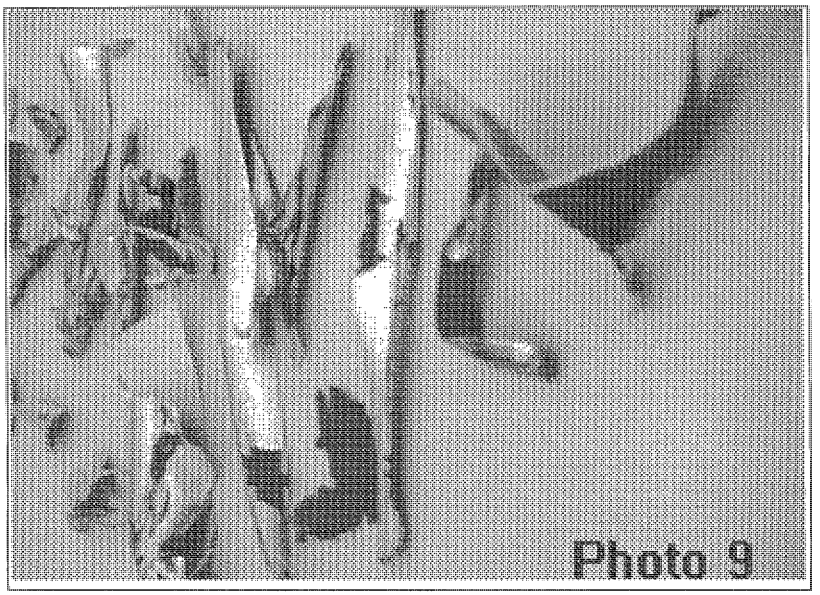
Photograph 6: View of bottom of right stabilizer of N117ER. Note paint transfer



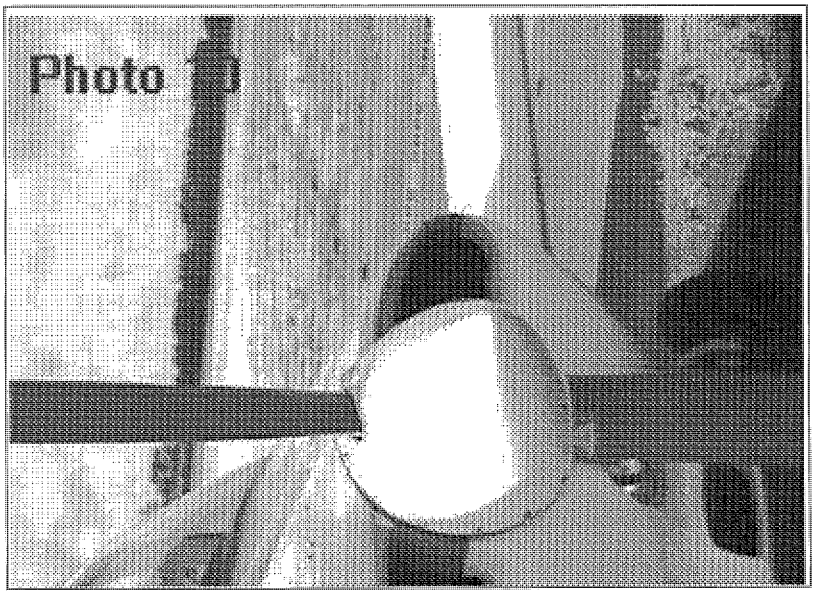
Photograph 7: View of top of right stabilizer of N117ER. Note crush damage on the leading edge



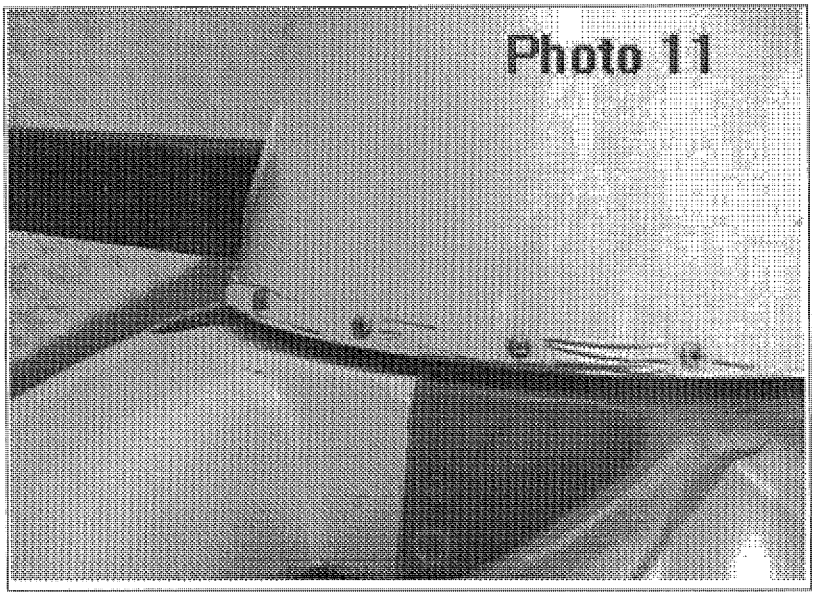
Photograph 8: Another view of remains of right stabilizer from N117ER. Note paint transfer



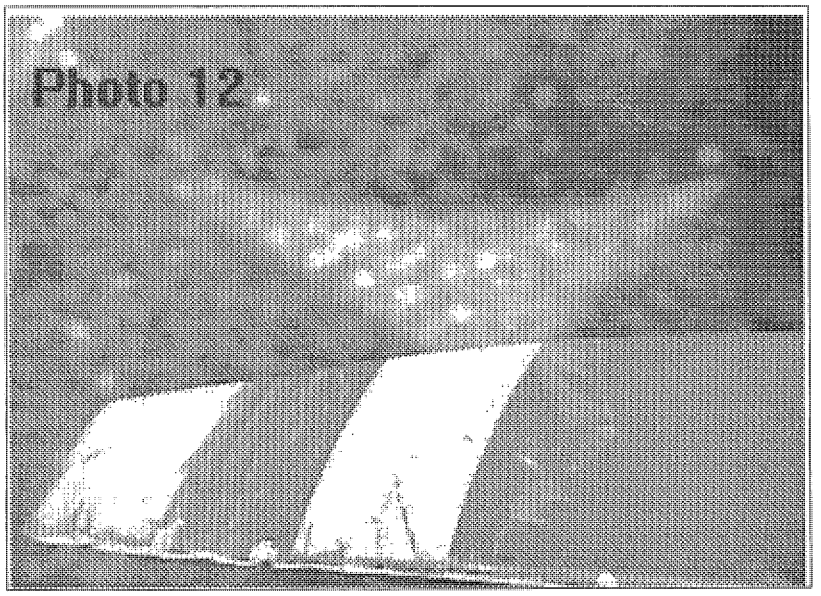
Photograph 9: View of debris from tail section of N117ER which was found in the area of the collision with N2351A



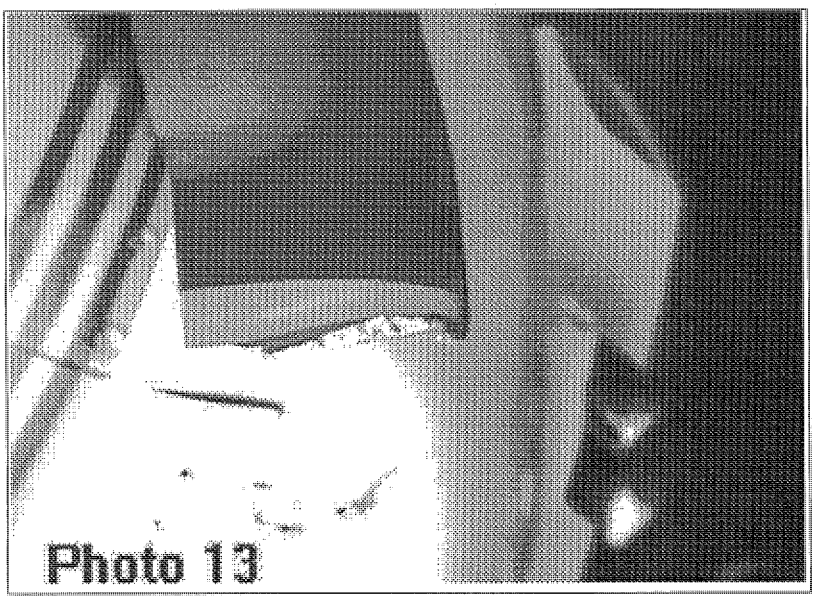
Photograph 10: View of propeller from N2351A. Note damage.



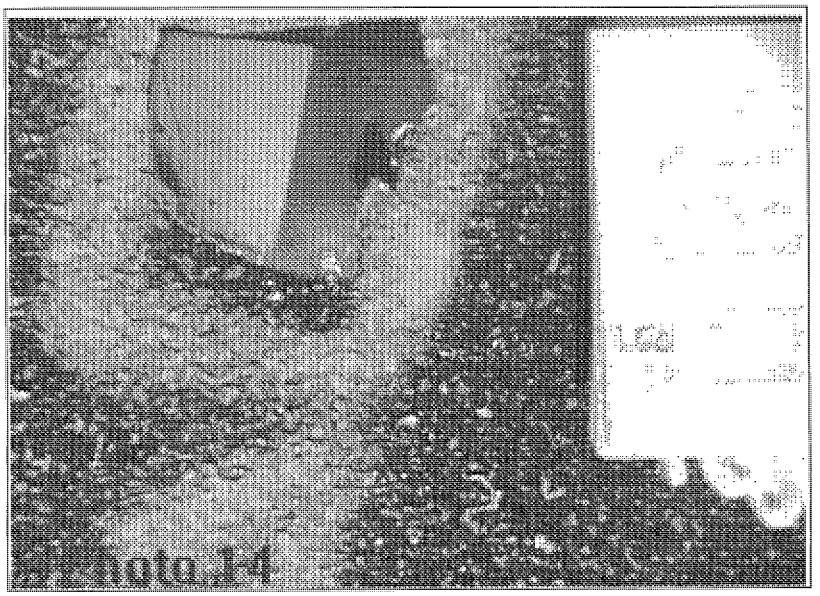
Photograph 11: View of rotational damage to propeller spinner from N2351A.



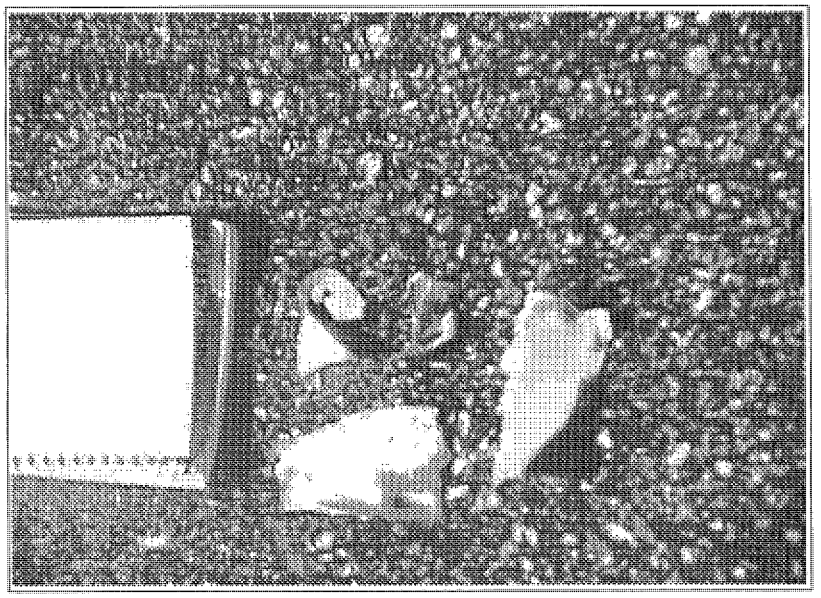
Photograph 12: View of damage to one propeller blade of N2351A.



Photograph 13: View of damage to other propeller blade of N2351A.



Photograph 14: View of piece of propeller blade from N2351A which was found on the runway threshold at the point of collision with N117ER



Photograph 15: Debris from the tail section of N117ER which was found in the propeller spinner of N2351A

National Transportation Safety Board
Washington, D.C. 20594

Brief of Accident

Adopted 05/29/1996

MIA95FA224A
FILE NO. 1758 09/15/95 NEW SMYRNA BCH,FL AIRCRAFT REG. NO. N117ER TIME (LOCAL) - 16:44 EDT

MAKE/MODEL - AEROSPATIALE TB-9
ENGINE MAKE/MODEL - LYCOMING O-320-D2A
AIRCRAFT DAMAGE - Destroyed
NUMBER OF ENGINES - 1

	FATAL	SERIOUS	MINOR/NONE
CREW	3	0	0
PASS	0	0	0
OTHER	0	0	1

OPERATING CERTIFICATES - None
TYPE OF FLIGHT OPERATION - Instructional
REGULATION FLIGHT CONDUCTED UNDER - 14 CFR 91

LAST DEPARTURE POINT - DAYTONA BEACH,FL
DESTINATION - Same as Accident

AIRPORT PROXIMITY - On airport
AIRPORT NAME - NEW SMYRNA BEACH MUNI
RUNWAY IDENTIFICATION - 11
RUNWAY LENGTH/WIDTH (Feet) - 4300/ 100
RUNWAY SURFACE - Asphalt
RUNWAY SURFACE CONDITION - Dry

CONDITION OF LIGHT - Daylight

WEATHER INFO SOURCE- Weather observation facility

BASIC WEATHER - Visual (VMC)
LOWEST CEILING - 10000 FT Broken
VISIBILITY - 0010.000 SM
WIND DIR/SPEED - 100 /009 KTS
TEMPERATURE (F) - 84
OBSTR TO VISION - None
PRECIPITATION - None

PILOT-IN-COMMAND AGE - 26

CERTIFICATES/RATINGS
Commercial, Flight instructor
Single-engine land, Multiengine land
INSTRUMENT RATINGS
Airplane

FLIGHT TIME (Hours)

TOTAL ALL AIRCRAFT - 668
LAST 90 DAYS - Unk/Nr
TOTAL MAKE/MODEL - Unk/Nr
TOTAL INSTRUMENT TIME - Unk/Nr

The Aerospatiale TB-9, N117ER, was observed on short final approach, and the Piper PA-38, N2351A, had turned from base to final just above and behind the TB-9. Two pilots on the ground transmitted warnings to the aircraft but no action was taken. The aircraft collided; the TB-9 sustained stabilator damage and nosed down and crashed. The Piper landed without further incident. Pilots on the ground reported seeing the Piper performing takeoffs and landings, and heard the pilot making position reports. The pilots only observed the TB-9 while on short final approach, and did not recall hearing any position reports from the pilots. They stated there were many aircraft with similar call signs and they might have missed the calls. The operator of the TB-9 teaches their pilots to fly a 1.6 nm final approach at a 3 degree descent angle while making visual approaches. Other pilots stated that this practice conflicts with pilots who fly normal close in approaches with a 3/4 to 1 nm final approach leg. The aircraft flying the long final are at a lower altitude where a pilot making a normal visual approach would not expect to see conflicting traffic.

MIA95FA224A
FILE NO. 1758 09/15/95 NEW SMYRNA BCH,FL AIRCRAFT REG. NO. N117ER TIME (LOCAL) - 16:44 EDT

Occurrence# 1 MIDAIR COLLISION
Phase of Operation APPROACH - VFR PATTERN - FINAL APPROACH

Findings
1. - ALTITUDE - LOW - PILOT-IN-COMMAND(CFI)
2. - DISTANCE - EXCESSIVE - PILOT-IN-COMMAND(CFI)
3. - IMPROPER TRAINING - COMPANY/OPERATOR MANAGEMENT
4. - VISUAL LOOKOUT - INADEQUATE - PILOT-IN-COMMAND(CFI)
5. - VISUAL LOOKOUT - INADEQUATE - PILOT OF OTHER AIRCRAFT

Occurrence# 2 IN-FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation DESCENT - UNCONTROLLED

The National Transportation Safety Board determines that the Probable Cause(s) of this Accident was:
the failure of the pilots of both aircraft to see and avoid each other. Contributing to the accident was the visual approach procedures taught by the operator of the Aerospatiale TB-9, N117ER, which places their aircraft on a long final approach at a low altitude where a pilot making a normal visual approach would not expect to see conflicting traffic.