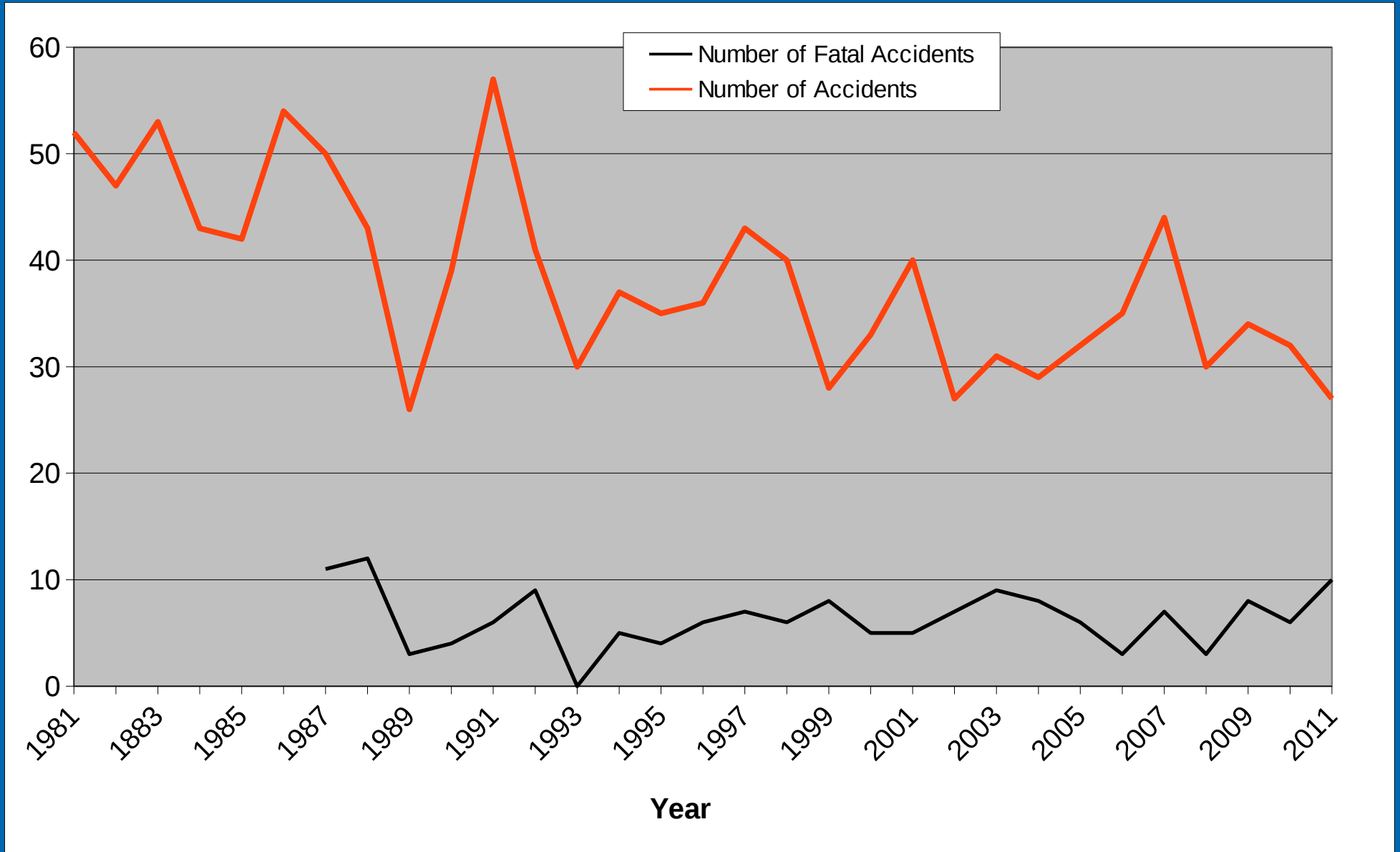




# Why trying to Eliminate All Mistakes can be Deadly

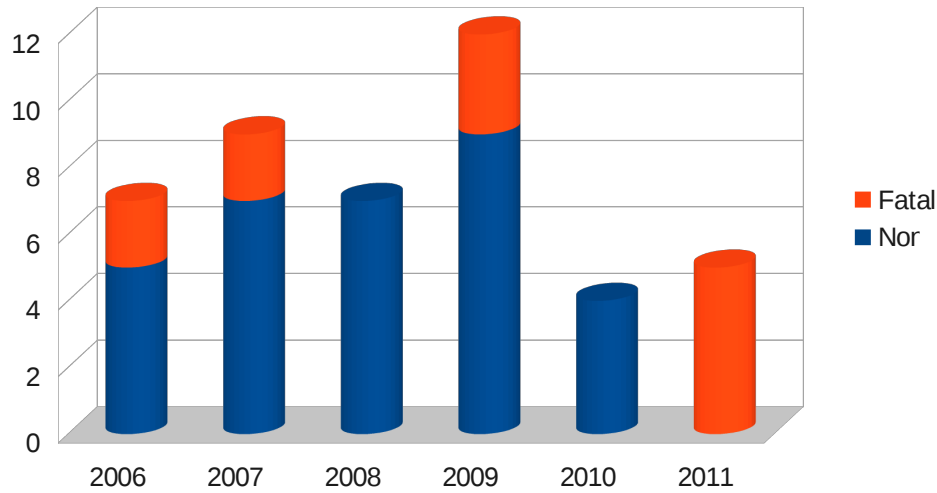
SSA Reno Convention 2012  
OSTIV Track  
Richard Carlson  
SSF Chairman

# Number of Soaring Accidents

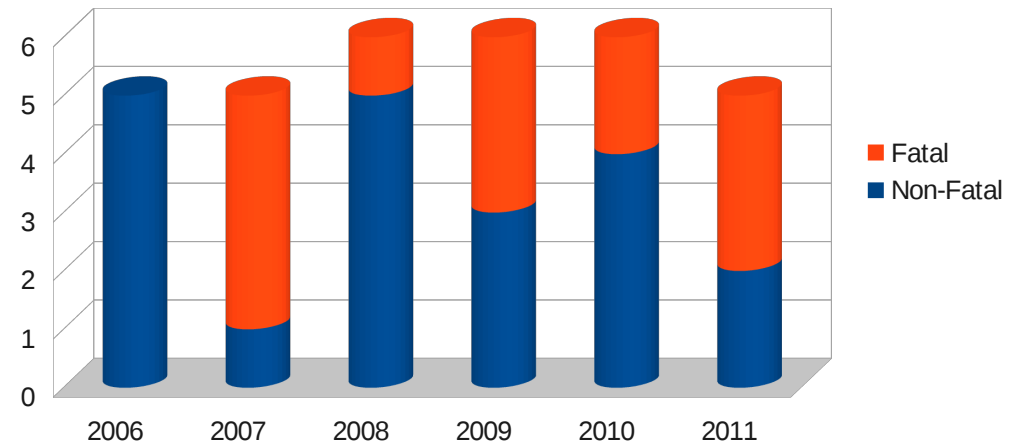


# Soaring Accidents by Phase of Flight

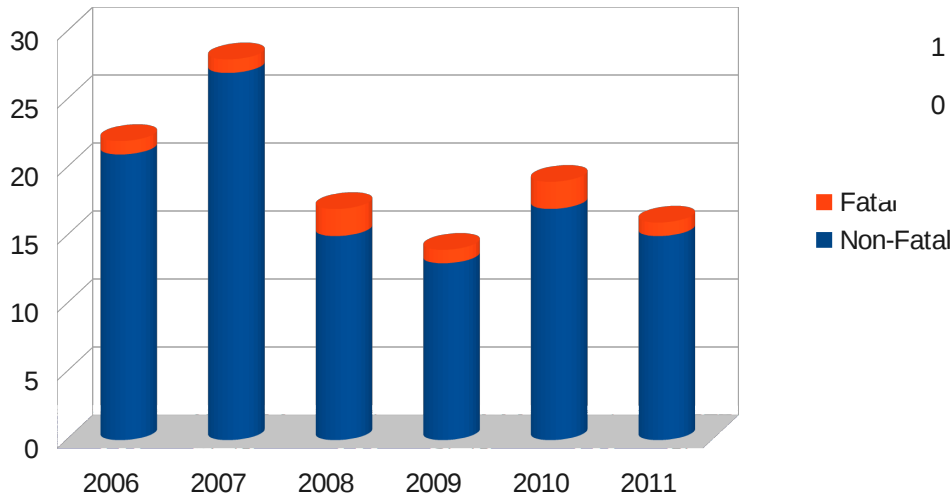
Fatal and Non-Fatal PT3 Accidents



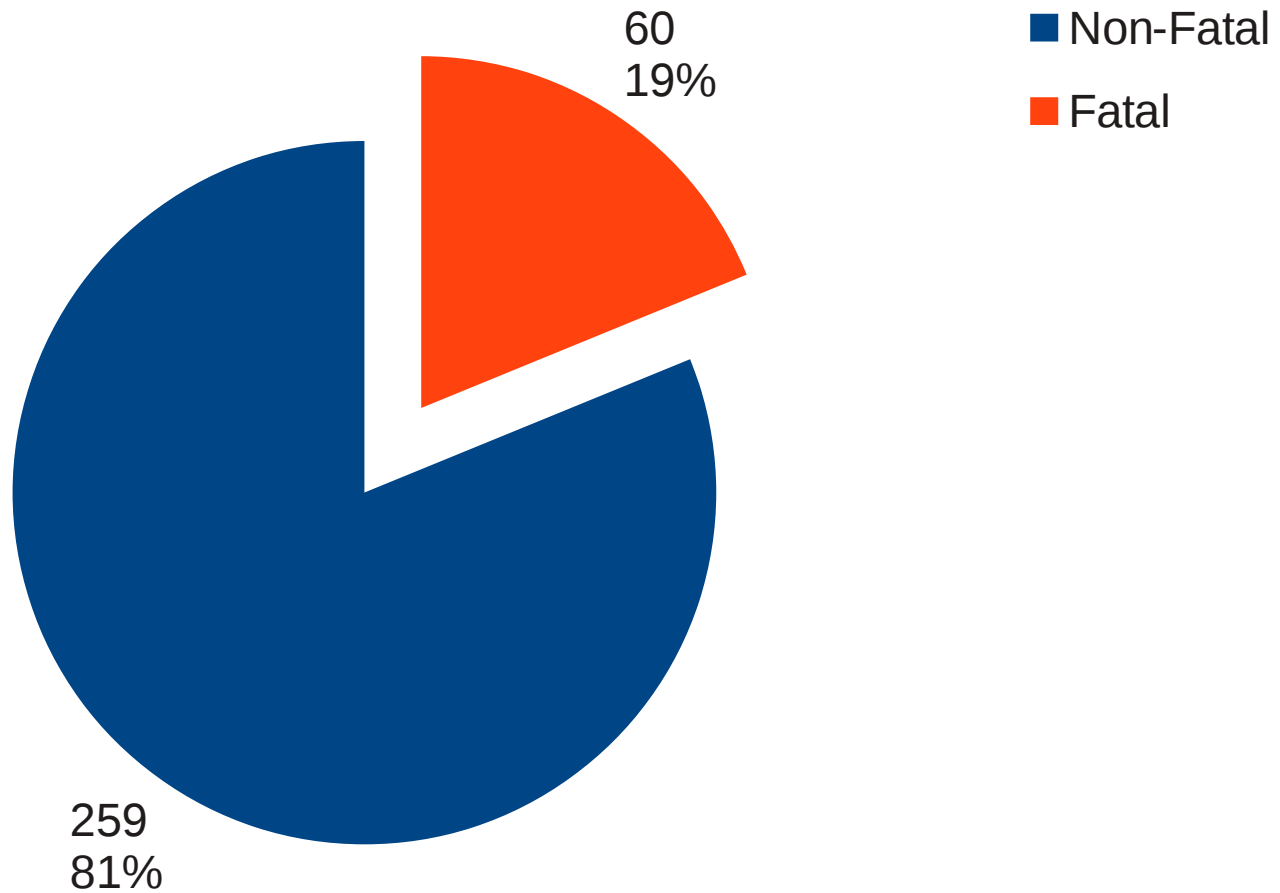
Free Flight Fatal and Non-Fatal Accidents



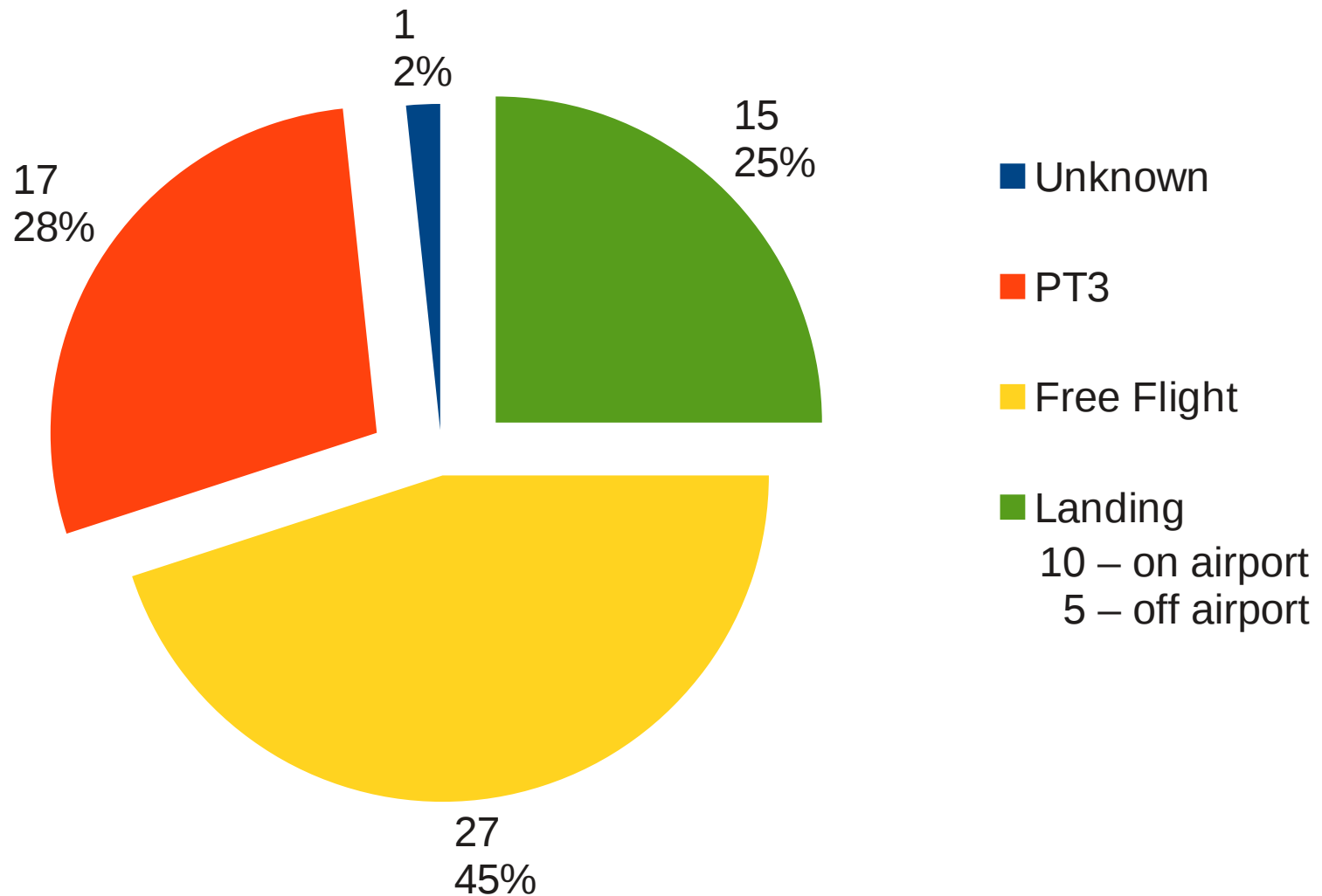
Fatal and Non-Fatal Landing Accidents



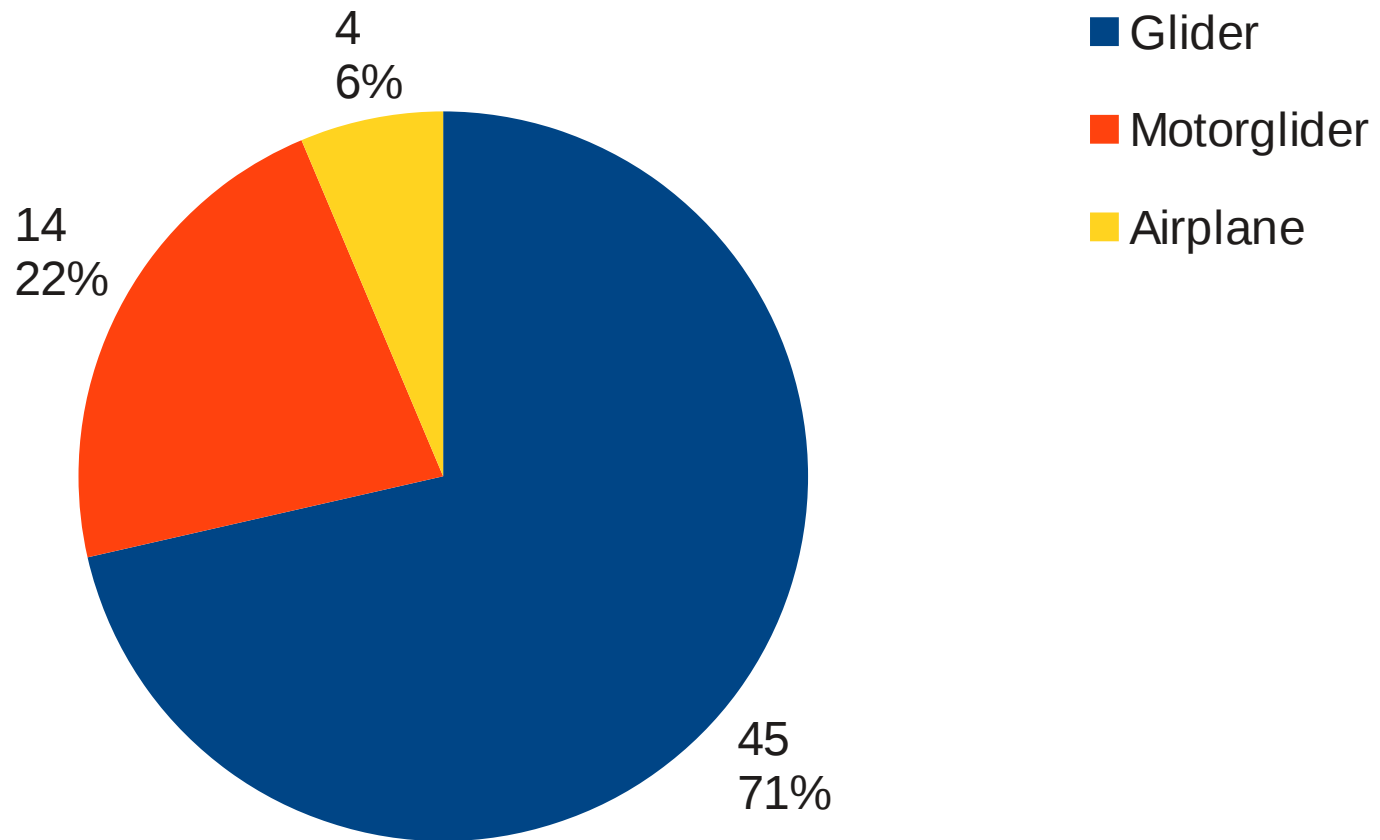
# Soaring Accidents 2002 - 2011



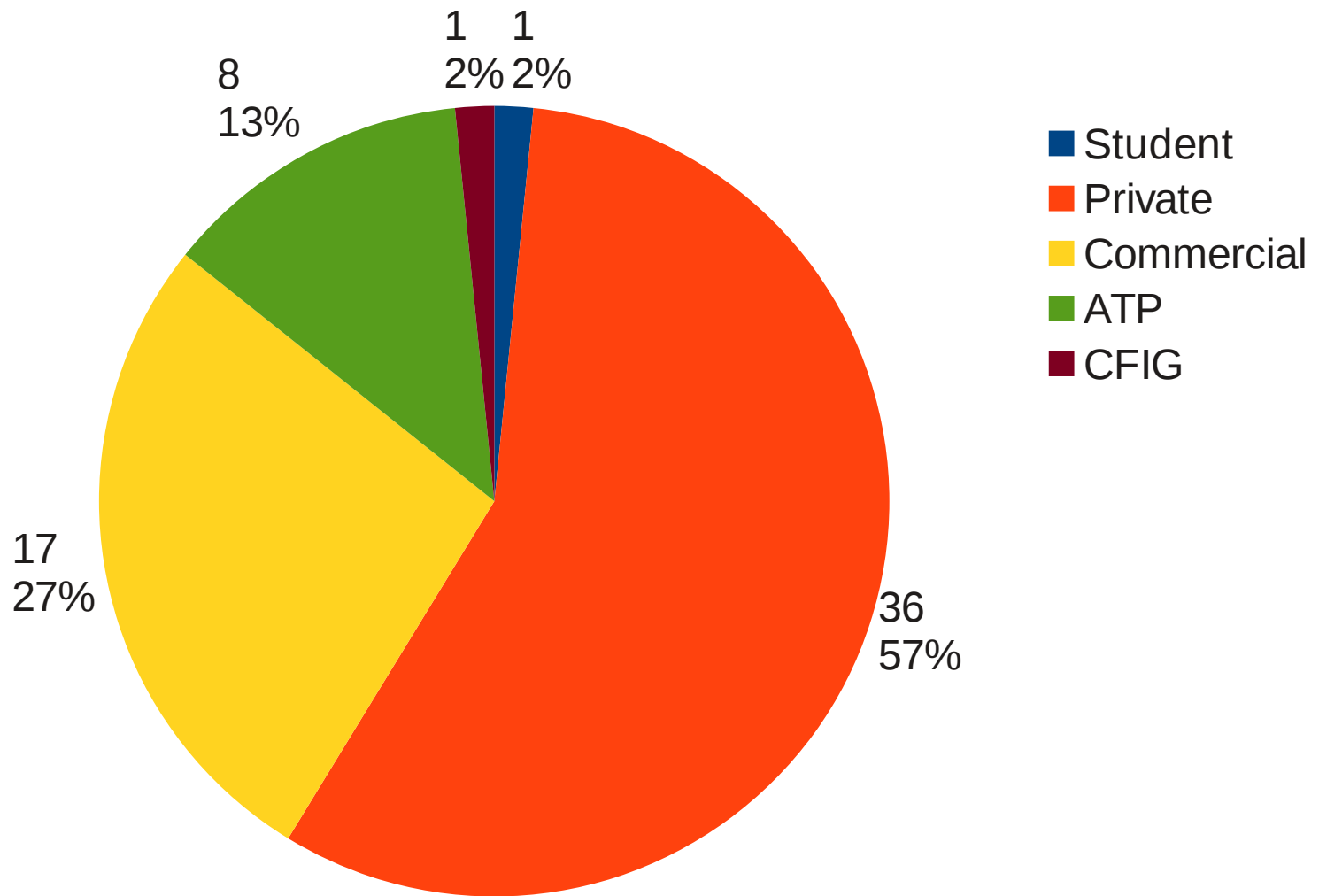
# Fatal Accidents – Phase of Flight



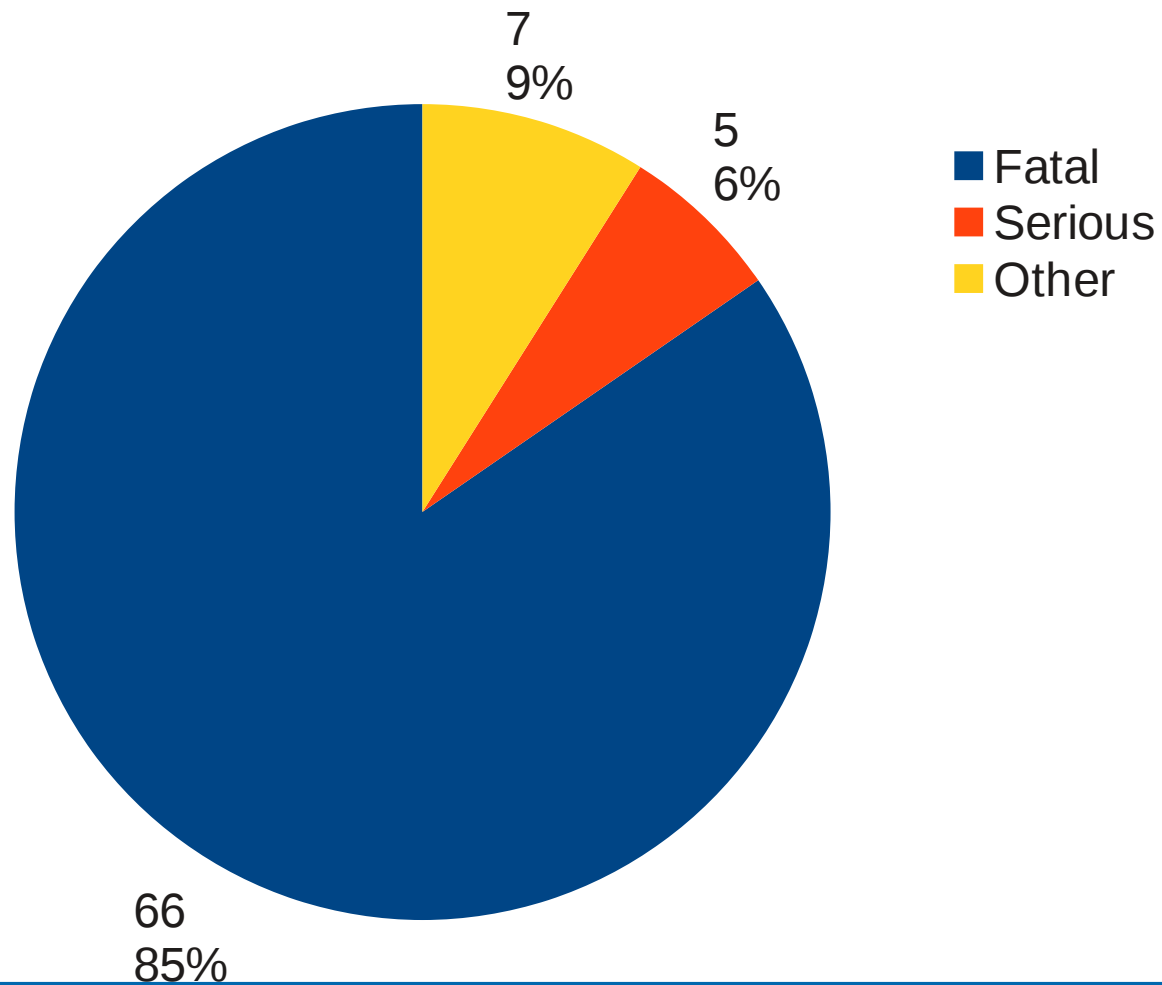
# Type of Aircraft



# Pilot Certificate

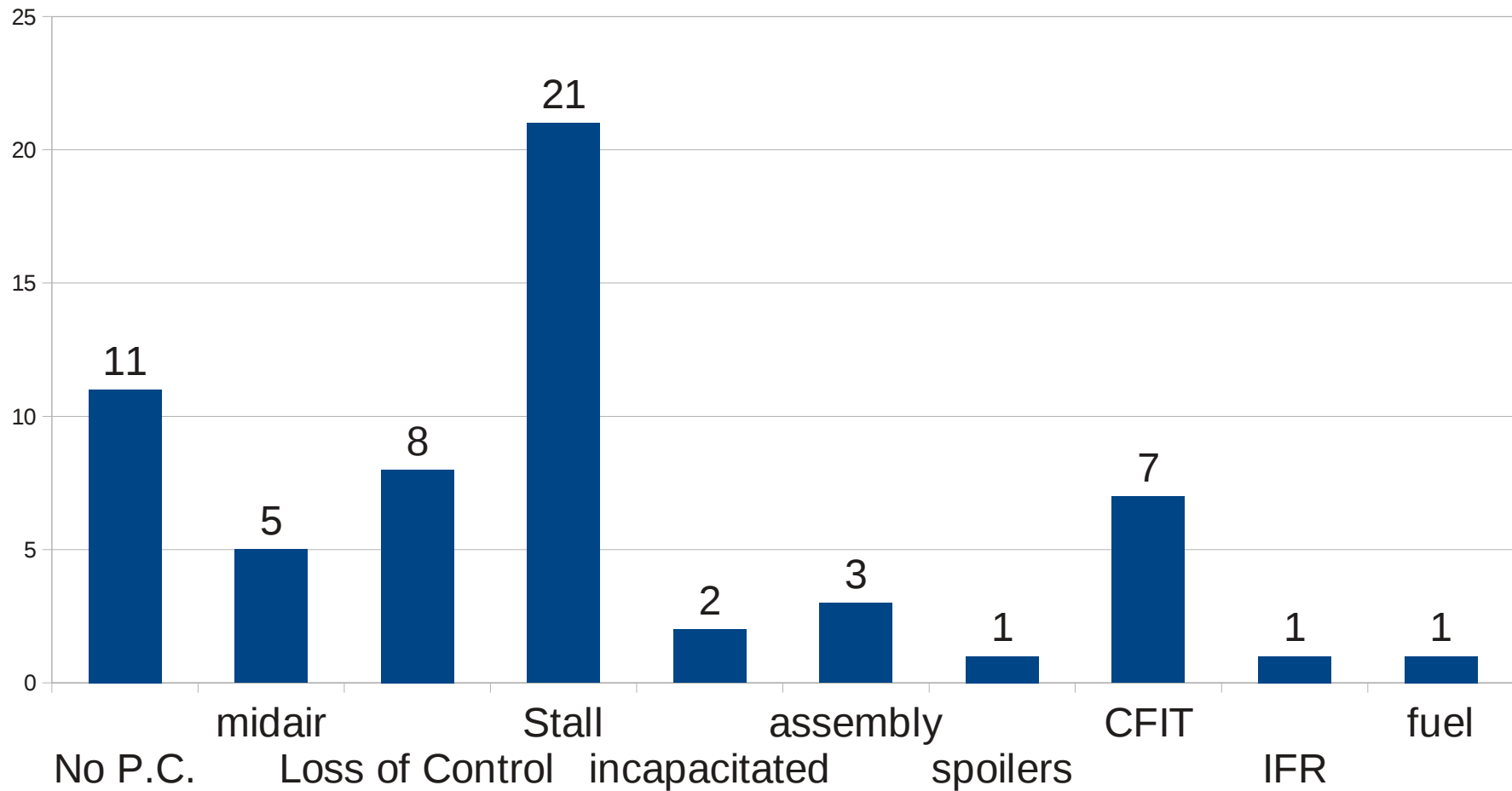


# Pilot / Passenger Injuries





# Fatal Accident Causal Factor



# Observations 2002 - 2011

- 19% of the accidents result in fatal injuries to a pilot or passenger
- 40% of the pilots have commercial or ATP certificates
- 45% of the fatal accidents occur in cruise flight, but the majority of accidents occur while the pilot is trying to land
- 35% of the fatal cruise accidents occur after the glider stalled

# SSF Focus Areas

- Reduce the number of Landing Accidents
  - Goal Oriented Approach
  
- Reduce the number of Fatal Accidents
  - Stall/Spin Recognition Training
  
- Reduce ALL Accidents
  - Risk Management Program



# Eliminate ALL Potential Risks

# STOP FLYING!

# Risk Management

- Pilots must be taught that flight involves Managing Risk
- Potential responses to risk include:
  - Ignore potential risks
  - Eliminate potential risks
  - Mitigate potential risks
- Risk Mitigation framework
  - Pilot, Aircraft, enVironment, External (PAVE) model

# Ignore Potential Risk

Pilot self-launched into poor conditions. The glider suffered an in-flight breakup and the wreckage was observed to fall out of a cloud. The pilot did not wear a parachute due to back pain.

Low time glider pilot with 1st Std Class glider, pilot failed to properly attach the horizontal stabliator, resulting in loss of elevator control during the initial ground roll. No positive control check was performed.

# Eliminate Potential Risk

The pilot purchased the motorglider 1 day before the accident. The selling pilot reported there was 40 minutes of fuel on board when the new owner took possession. The Cambridge GPS recorded 38 minutes of engine run time in the preceding 2 flights. On the 3<sup>rd</sup> launch, the engine quit and the glider stalled when the pilot attempted to return to the airport.

Glider stalled and spun following a rope break. The towrope was worn due to ground handling and it failed during the tow at about 300 ft AGL. The tow-pilot reported entering a left turn and looking back to see the glider also in a left turn when the glider stalled in the turn.

# Mitigate Potential Risks

The commercial pilot was giving a sightseeing ride when he stalled/spun the glider while maneuvering. The pilot had minimal experience having gone from 0 time to a commercial rating in 3 months. A witness flying another glider in the area reported the accident glider entered a left hand spin, rotated twice before transiting into a right hand spin.

The wreckage and ground scaring indicate the glider impacted the terrain in a near vertical attitude (15 deg past vertical). Other pilots familiar with the area indicated that with the observed winds and nearby mountains just upwind of the accident site, the air would have been very turbulent. 4 other gliders terminated their flight early due to poor soaring conditions.



# American vs Swiss Cheese



# Model Comparison

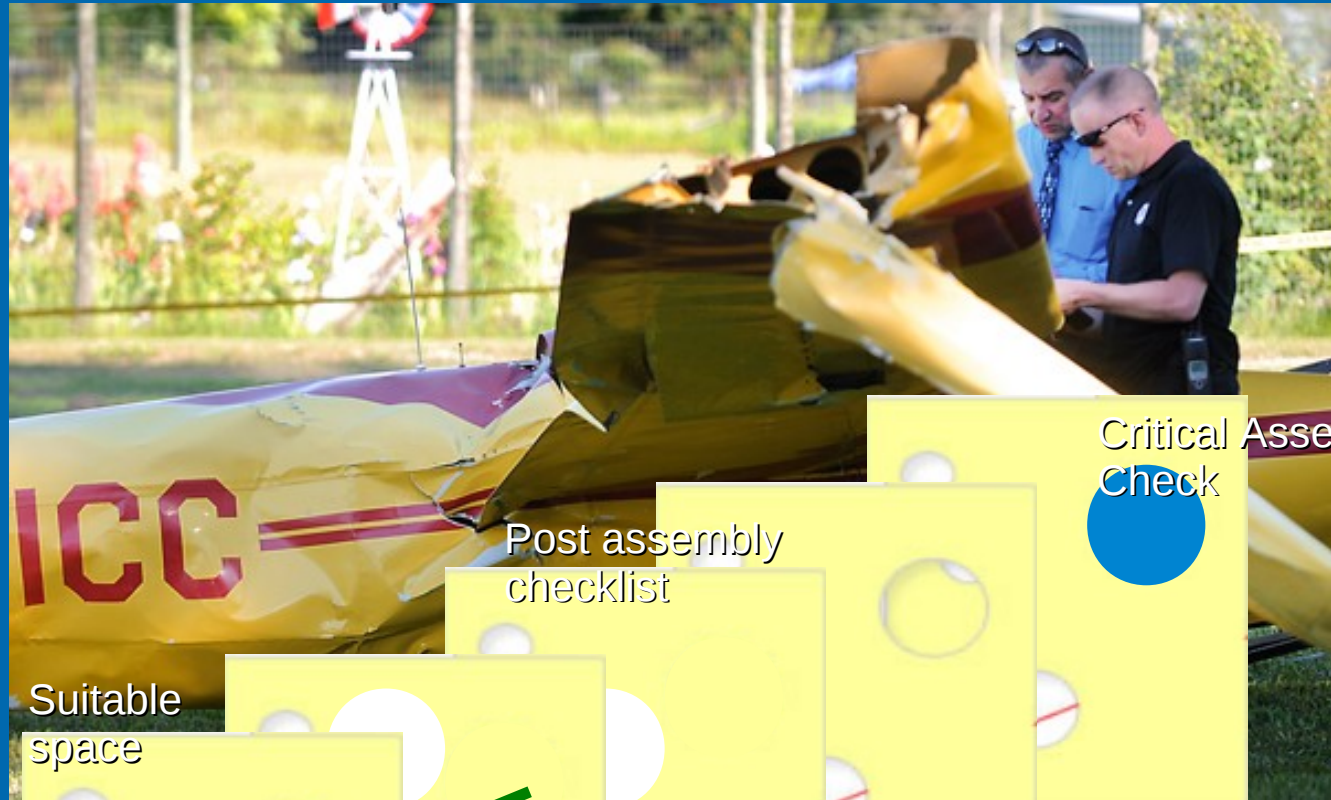
## American Cheese

- Mistakes can be eliminated
  - Checklists
  - Pilot in Command makes decisions
  - New rules and regulations based on causal factors

## Swiss Cheese

- Mistakes must be caught
  - Multiple barriers
  - Multiple personnel involved
  - New barriers created based on causal factors

# Glider Assembly Process



Critical Assembly Check

Post assembly checklist

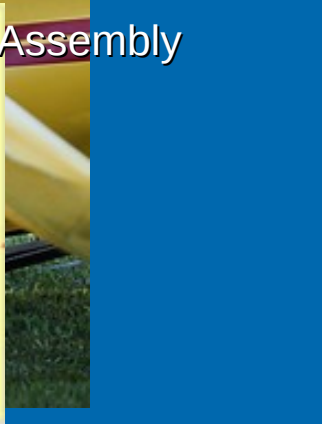
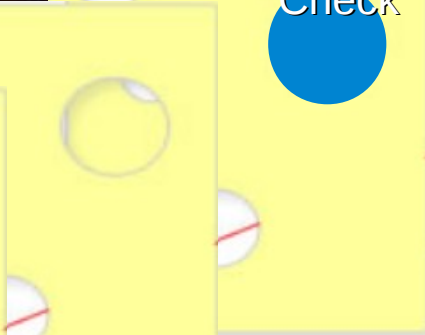
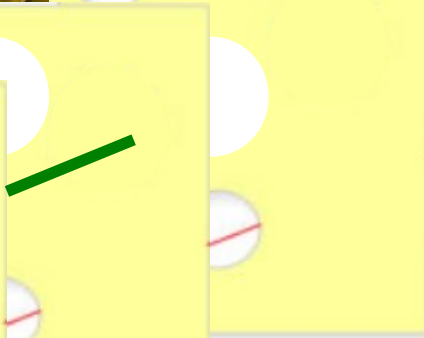
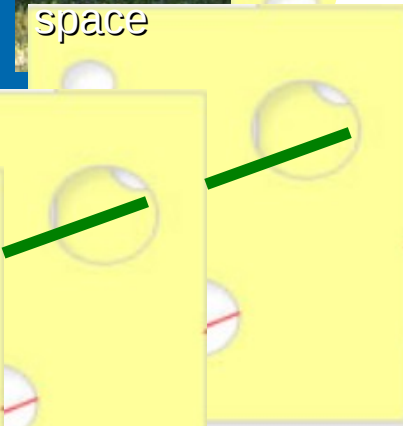
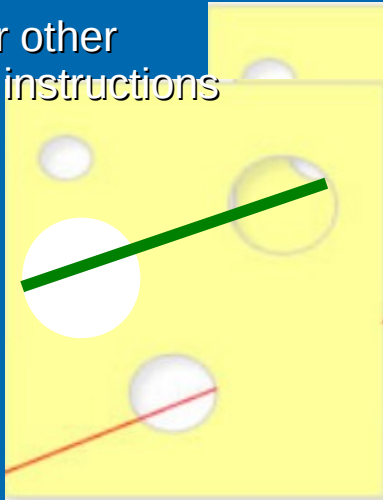
Suitable space

Positive Control Check

Knowledgeable assistant

Limit distractions

POH, or other written, instructions



# RM/ADM Management

- Decisions are based on
  - Experience
  - Knowledge of multiple facts
  - Expected outcome
  - Evaluation of changing events
  - Known or expected risks
  - Known or expected rewards
- Manage Risks instead of trying to completely eliminate them

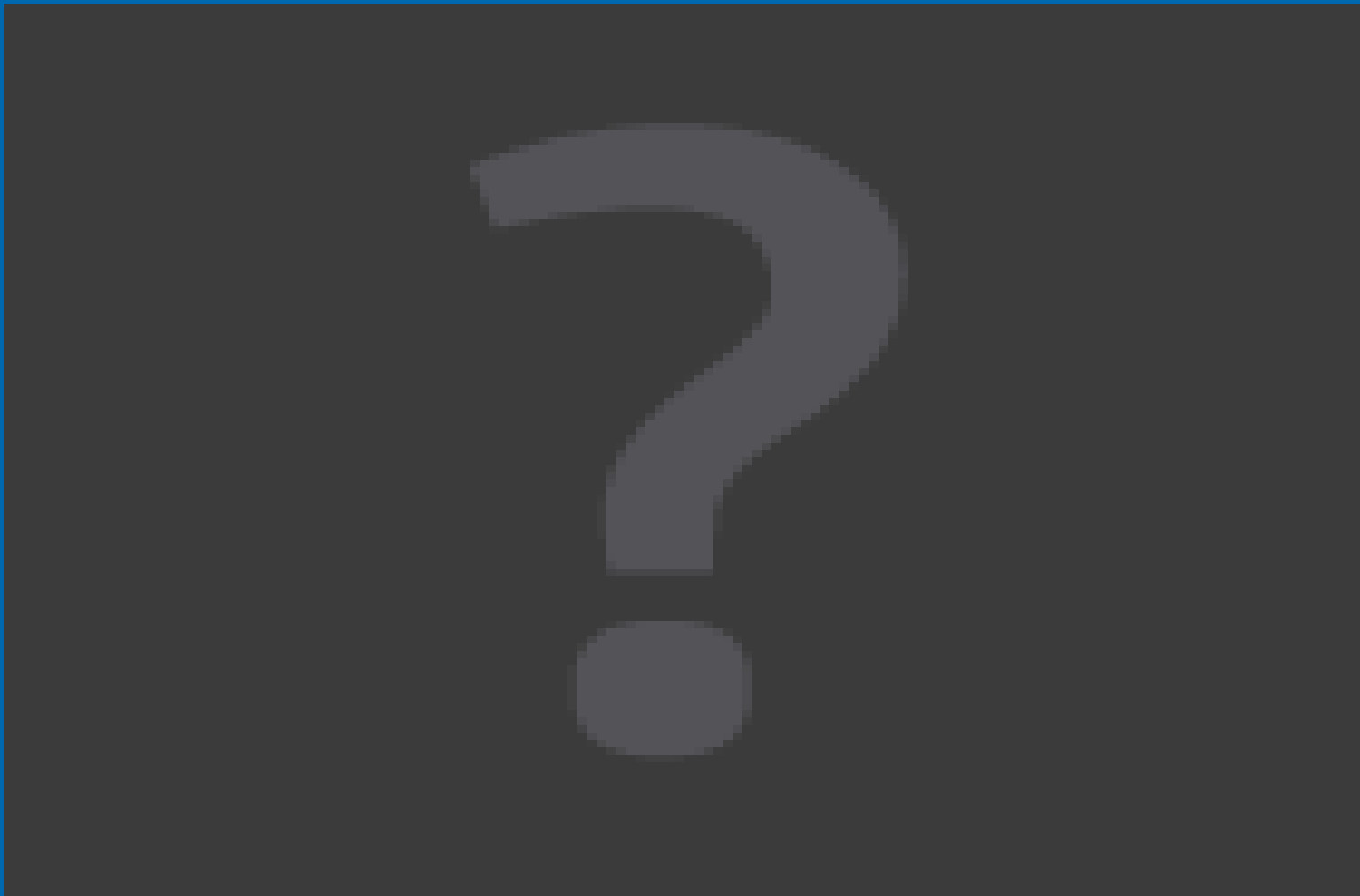
# Underlying Principles

- Risk Management and Decision Making Skills are learned behavior
  - Explicit training using available resources
    - Books, pamphlets, AC's, web sites
  - Implicit training by example
    - what you do vs what you say
    - what do your peers do

# Visual Based Learning



# Video Based Learning



<http://www.youtube.com/watch?v=PpJA53LjarM&feature=endscreen&NR=1>

# Simulator Based Learning

- [You Can't Always Go Back](#)

SSF Identification: CSA11DC002

Aircraft: ASK-13

Injuries: 1 Fatal

The glider pilot was fatally injured and the ASK-13 was substantially damaged following a failed aerotow launch. Witnesses reported that the launch seemed to be progressing normally when the rope broke about 200 ft AGL. The pilot immediately began a right turn to return to the runway. The glider impacted terrain in a vertical descent after the right wing dropped.

Probable Cause: The pilot's improper control inputs resulted in the glider stalling and spinning while attempting to return to the runway following a low altitude rope break.

[Instructor Guide](#)



# Simulation Based Training

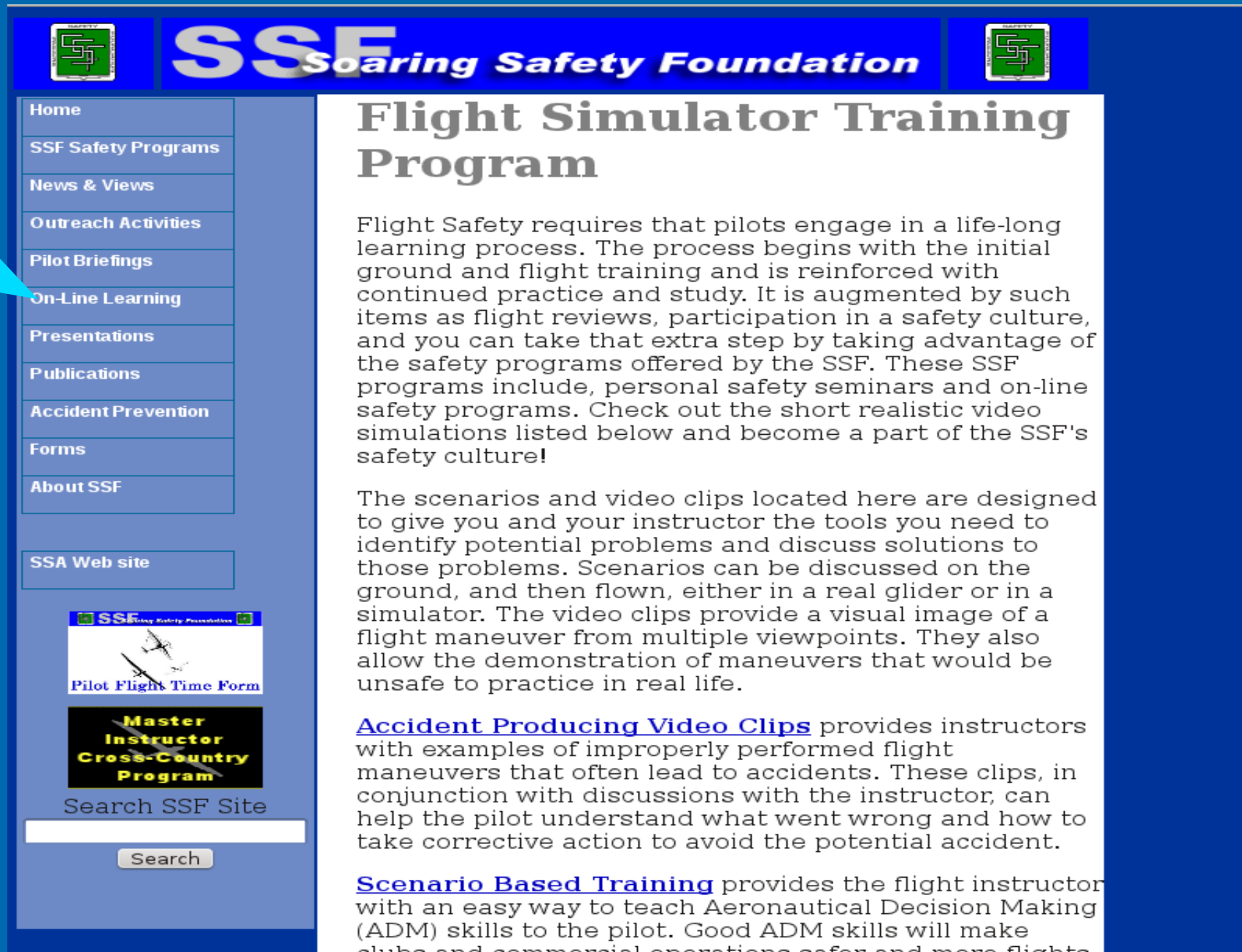


<http://www.soaringsafety.org/school/SSF-2.wmv>

# Text Based Learning

- You are 1400 ft AGL and 2 miles North of the airport heading south with the intention of landing on runway 27. After traveling 0.5 miles you notice the sink rate has steadily increased and the vario is now reading 700 fpm down. What action(s) can you take?

# SSF Web site Resources



**SSF** Soaring Safety Foundation

Home  
SSF Safety Programs  
News & Views  
Outreach Activities  
**On-Line Learning**  
Pilot Briefings  
Presentations  
Publications  
Accident Prevention  
Forms  
About SSF

SSA Web site

**SSF** Soaring Safety Foundation  
Pilot Flight Time Form

**Master Instructor Cross-Country Program**

Search SSF Site  
Search

## Flight Simulator Training Program

Flight Safety requires that pilots engage in a life-long learning process. The process begins with the initial ground and flight training and is reinforced with continued practice and study. It is augmented by such items as flight reviews, participation in a safety culture, and you can take that extra step by taking advantage of the safety programs offered by the SSF. These SSF programs include, personal safety seminars and on-line safety programs. Check out the short realistic video simulations listed below and become a part of the SSF's safety culture!

The scenarios and video clips located here are designed to give you and your instructor the tools you need to identify potential problems and discuss solutions to those problems. Scenarios can be discussed on the ground, and then flown, either in a real glider or in a simulator. The video clips provide a visual image of a flight maneuver from multiple viewpoints. They also allow the demonstration of maneuvers that would be unsafe to practice in real life.

[Accident Producing Video Clips](#) provides instructors with examples of improperly performed flight maneuvers that often lead to accidents. These clips, in conjunction with discussions with the instructor, can help the pilot understand what went wrong and how to take corrective action to avoid the potential accident.

[Scenario Based Training](#) provides the flight instructor with an easy way to teach Aeronautical Decision Making (ADM) skills to the pilot. Good ADM skills will make clubs and commercial operations safer and more flights

# Conclusion

- It has proved impossible to completely eliminate the potential for a mistake
- The solution is to train pilots to detect when they make a mistake
- That training also provides pilots with the skills needed to prevent a mistake from leading to an accident