



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Transition to Unfamiliar Aircraft

Date: 6/29/15

AC No: 90-109A

Initiated by: AFS-800

Change:

1. PURPOSE. This advisory circular (AC) is intended to help plan the transition to any unfamiliar fixed-wing airplanes, including type-certificated (TC) and/or experimental airplanes. It provides information and guidance to owners and pilots of experimental, simple, complex, high-performance, and/or unfamiliar airplanes. It also provides information to flight instructors who teach in these airplanes. This information and guidance contains recommendations for training experience for pilots of experimental airplanes in a variety of groupings based on performance and handling characteristics. This AC does not address the testing of newly built experimental airplanes. The current edition of AC 90-89, Amateur-Built Aircraft and Ultralight Flight Testing Handbook, provides information on such testing. However, if a pilot is planning to participate in a flight test program in an unfamiliar and/or experimental airplane, this AC should be used to develop the skills and knowledge necessary to safely accomplish the test program utilizing the guidance found in AC 90-89.

2. CANCELLATION. AC 90-109, Airmen Transition to Experimental or Unfamiliar Airplanes, dated March 30, 2011, is canceled.

3. BACKGROUND.

a. Transitioning between Aircraft. The Federal Aviation Administration (FAA) has recognized a need to devote resources to preventing accidents occurring because of inadequate training when transitioning between aircraft types. Specifically, accidents resulting from loss of aircraft control or situational awareness frequently result from pilot unpreparedness for challenges presented by the aircraft. Pilots transitioning to unfamiliar aircraft require specific training in the new aircraft's systems and operating characteristics to include normal, abnormal, and emergency procedures.

b. Experimental Airplanes. The experimental airplane community is an important part of the civil aviation industry in the United States; some of aviation's greatest technological achievements were developed by amateur airplane builders. The amateur builder community is foundational to General Aviation (GA) in the United States. Historically, experimental airplane flight operations represent a small percentage of flight hours, but a significant percentage of GA accidents.

c. High-Performance and Complex Airplanes. Many contemporary and legacy GA aircraft have features such as retractable landing gear, turbocharging, pressurization, sophisticated avionics, autopilots, and turbine powerplants, all of which add operational

Airplane Model (Airplanes may be listed in more than one family of airplanes)	Light Control Forces and/or Rapid Airplane Response (Appendix 3)	Low-Inertia and/or High-Drag (Appendix 4)	High-Inertia and/or Low-Drag (Appendix 5)	Nontraditional Configuration and/or Controls (Appendix 6)	Nontraditional and/or Unfamiliar Airplanes System Operations (Appendix 7)	Nontraditional and/or Unfamiliar System Component Maintenance Requirements (Appendix 8)	Specialty Airplane (Appendix 9)
HARMON ROCKET 2	X		X				
Hornet		X		X			
HUMMEL BIRD					X	X	X
JODEL D-9		X					
KELLY "D" BIPLANE		X					
KitFox					X		
Kolb		X		X			
Lancair 200/300 Series	X		X				
LANCAIR ES			X	X			
LANCAIR IV/IVP			X	X			
Lancair Legacy			X				
Lancair Evolution/ Propjet			X	X	X		X
LIGHTNING			X				X
Marquart Charger		X					
M Squared		X			X		
Murphy Rebel		X					
Murphy Moose		X					
Long EZ			X	X			
One Design DR 107	X						
ONEX	X				X		
PITTS	X	X					

APPENDIX 5. HIGH-INERTIA AND/OR LOW-DRAG

1. DEFINITION. Airplanes that slowly decelerate when power is removed.

2. DISCUSSION.

a. Example Accident from the National Transportation Safety Board (NTSB) Records.

(1) Accident. The homebuilt airplane landed long and could not make a complete stop on the available runway; the airplane bounced three times. On the third bounce, the pilot lowered the tail wheel; the main landing gear came off the ground, indicating too much airspeed. He applied power to go around with 300 feet of runway remaining. To avoid trees, he pulled up abruptly, then pushed over again. The engine quit momentarily during the pushover (likely due to negative G Load), and the airplane crashed on a nearby golf course.

(2) Probable Cause. The pilot's failure to maintain airspeed and his failure to perform a go-around. The pilot's misjudgment of speed and distance during the landing is a contributing factor.

b. Inherent Risks/Hazards.

(1) As stated in Appendix 4, drag reduction was and still is a major objective in airplane design. These airplanes are on the leading edge of this design trait. They are beautiful, sleek, and even sitting on the ground just look fast. Airplanes in this family are generally fast, efficient, and may have significant range; however, the hazard is that unless managed, these airplanes can build excessive speed during critical flight phases such as approach and landing. The risks of unmanaged speed include overshooting final approach, inadvertent stalls, loss of control, wheel barrowing, and runway excursions.

(2) These risks are not inherent to only high-performance airplanes. For example, airplanes resembling motor gliders may experience substantial float and overshoot a substantial amount of runway with only a few knots of extra speed on landing. This family also includes airplanes designed for high-speed cruise. In some cases these airplanes have relatively high stall speed and, consequently, high approach and landing speeds. Airplanes with high landing speeds can be a challenge for pilots experienced only in type-certificated (TC) airplanes. High landing speed can easily translate to long touchdowns, runway overruns, and late go-around decisions. Also challenging for pilots of these airplanes is following a slower airplane into the traffic pattern or a fly-in event such as AirVenture.

3. RECOMMENDED GROUND TRAINING. Pilots transitioning to this family of airplanes should spend some time reviewing the proper power, airspeed operating limits, altitude, and configuration for their specific airplane's approach and landing. Discussion should include configuration and speed control for a stabilized descent and approach. Performance calculations for landing distance and safe margins for runway length should be done so pilots are aware of the runway lengths needed for safe operations. Decisionmaking on when to reject landings and go around should be made before flying.