

APPENDIX 2. CATEGORIZING DESIGNS OR MODELS

1. AIRPLANE CATEGORIES. The purpose of this appendix is to orient the reader to the aircraft families which are most likely associated with the identified airplane designs or models. This appendix describes a general categorization of common experimental amateur-built airplanes into the families considered in Appendices 3 through 6 of this advisory circular (AC). Significant effort has been made to properly categorize each model; however, any evaluation of this kind is somewhat subjective. Construction variances, installed equipment, and other factors may cause a model to have characteristics of a family not identified in this table. As mentioned in Appendix 1, different airplane models categorized in a family may display varying degrees of the characteristic of that family. The reader is advised to seek additional information from the designer, kit vendor, or type clubs. Another source of information is the Comparative Aircraft Flight Efficiency (CAFE) Foundation, which maintains a Web site at www.cafefoundation.org.

2. RISK MITIGATION. The risk mitigations described in subparagraph 6a(3) apply to all models of airplanes whether listed or not. In addition, if there is an “X” in one or more family columns, see the appropriate appendix or appendices for guidance to develop your specific risk mitigation training. If a model is not listed in this table, you must decide what family or families apply based on airplane characteristics. In the event that a model in this table has no “X” marks indicating categorization to the families considered in Appendices 3 through 9, the subparagraph 6a(3) guidance applies.

NOTE: For the most up-to-date information regarding this appendix, please refer to the General Aviation Operations Branch (AFS-830) Web page at the following address:

http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs800/afs830/. This information will be located in the Resources section. As updated information becomes available this Web site will be updated to reflect the affected changes. The date of the information on the Web site should be compared to the publication date of this AC to determine which is more current.

TABLE 2. AIRPLANE CATEGORIES

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)
ACRODUSTER SA750		X					
AcroSport II		X					
AERO CANARD				X			
Air Camper (Pietenpol)		X			X	X	
AIR-CAM		X		X	X		
ARV 582		X					
AVENTURA II		X		X			
AVID-CATALINA				X			
AVID Flyer		X					
AVID Magnum		X					
BABY ACE D		X					
BAKENG DUCE		X					
BD-4		X					
BD-5	X						X
Bearhawk 4-Place	X						
Bearhawk LSA	X						
Bearhawk Patrol	X						
Breezy		X		X			
Buccaneer 2		X		X			
MIDGET MUSTANG	X		X				
CASSUTT	X		X				

APPENDIX 3. LIGHT CONTROL FORCES AND/OR RAPID AIRPLANE RESPONSE

1. DEFINITION. Light control forces coupled with strong control authority for rapid maneuvering about one or more axis. This section includes airplanes that have substantial disharmony between two or more axes.

2. DISCUSSION.

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

(1) Accident. The pilot had constructed the homebuilt aircraft, and had flown it twice before, totaling 1.2 hours. After rotation and liftoff on his third flight, the aircraft pitched up and down several cycles then settled down. The airplane climbed slowly, and at 200 feet altitude, the pitch oscillation began again. The aircraft climbed another 50 feet, then rolled to the left and impacted the ground.

(2) Probable Cause. The pilot not maintaining aircraft control during the initial climb after takeoff and the inadvertent stall/spin. A factor to the accident was the pilot's total lack of experience in the accident airplane.

b. Analysis and Avoidance.

(1) Unfortunately, it is impossible to understand the exact cause of this accident. One possibility is the pilot's lack of experience with the accident airplane, as stated by the NTSB. Airplanes like the Extra 300 and Pitts are safe airplanes, with some versions holding FAA type certification. However, most pilots would not be safe flying these airplanes without training because they maneuver quickly with low control forces. Of course, most pilots can look at these airplanes and understand that they will probably want additional training in them before trying to fly them solo.

(2) There are many more experimental airplanes that may look more like type-certificated (TC) airplanes, but they actually have light control forces and/or very quick maneuvering response. Lightweight and lightly wing-loaded airplanes can also have the same quick, light response as many aerobatic airplanes. The hazard of light forces and rapid response is that without some level of training, the pilot may over-control the airplane. This can manifest itself during any phase of flight. The risks can vary from frustration to damage during takeoff and landing, to loss of control up to and including overstressing the airframe and structural failure.

(3) Unfortunately, there are control characteristics like these frequently on airplanes with poor stall handling characteristics. This is a deadly combination when aggressively maneuvering close to the ground. Too large a percentage of fatal experimental accidents fit in this category. Pilots considering purchasing an experimental airplane need to appreciate how much effort TC'd airplane manufacturers expend to ensure good handling characteristics. It may take weeks of trial and error flight testing to get an airplane to handle the way the manufacturer desires. This effort may include redesigning parts of the wings and tails, and their control surfaces. The General Aviation (GA) pilot community is very familiar with the handling characteristics of TC'd airplanes that have been around for decades, like the Cessna C-172 and the Piper PA-28. That

same level of widespread familiarity does not exist with the small number of experimental airplanes. Transferring conventional GA handling techniques to aircraft with light control forces and/or rapid maneuver response can result in inadvertent stalls, loss of control, or structural failure.

3. RECOMMENDED FLIGHT TRAINING. Pilots transitioning from any one of the majority of TC'd airplanes may tend to over control an experimental airplane with light controls and quick responses. Design the pilot training needed for an airplane with light control forces and/or rapid maneuvering capability, to tailor control inputs appropriately. This cannot be simulated in an airplane that does not have similar characteristics. There are several avenues that would help to prepare you for your experimental airplane.

a. Best Training. The best training is accomplished in the specific airplane the pilot intends to fly with a well-qualified instructor who has recent experience in the specific make and model.

b. Second Best Training. The second best choice would be in the same model as the one the pilot is planning to fly.

c. Third Best Training. The third best choice is to fly an airplane with similar characteristics.

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.

4. RECOMMENDED FLIGHT TRAINING. A thorough airplane check-out by a qualified instructor, preferably with recent experience in your airplane make and model, is always a good idea. Flight training should include descents from altitude, pattern work, and landing distance awareness. Practice descents to determine distance versus altitude to begin a proper descent profile. A properly planned descent should permit the aircraft to descend without large reductions in power and to avoid over-speeding the aircraft. If the airplane is equipped with speed brakes, incorporate them into the training. Pattern practice should emphasize proper power, altitude, and configuration for the approach and landing phase of flight. Demonstrate the landing distance required under various aircraft configurations and then practice for repeatability. There needs to be an emphasis on control and understanding your airplane's stopping distance.