U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Additional Pilot Program for Phase I Flight Test

Date: 9/23/14

Initiated by: AFS-800

AC No: 90-116

Change:

1. PURPOSE. This advisory circular (AC) provides information and guidance on the Additional Pilot Program (APP) for flight testing experimental aircraft. The APP was developed to improve safety by enhancing Builder/Owner Pilot (BP) skills and mitigate risks associated with Phase I flight testing of aircraft built from commercially produced kits through the use of a qualified additional pilot and powerplant testing. The APP is an optional program which provides another pathway to conducting Phase I flight testing. The traditional option for a pilot to test their aircraft solo during Phase I is not covered or affected by this AC, and remains an option for those who choose to do so in accordance with their aircraft's operating limitations.

2. APPLICABILITY. This AC provides information for any person who chooses to utilize an additional pilot on board in accordance with the APP described herein for a Phase I flight test.

3. RELATED CFR PARTS. Listed are the relevant Title 14 of the Code of Federal Regulations (14 CFR) parts and sections.

- Part 21, § 21.191, Experimental Certificates.
- Part 61, § 61.31, Type Rating Requirements, Additional Training, and Authorization Requirements.

- Part 61, § 61.56, Flight Review.
- Part 61, § 61.57, Recent Flight Experience: Pilot in Command.
- Part 61, § 61.317, Is My Sport Pilot Certificate Issued with Aircraft Category and Class Ratings?
- Part 91, § 91.9, Civil Aircraft Flight Manual, Marking, and Placard Requirements.
- Part 91, § 91.319, Aircraft Having Experimental Certificates: Operating Limitations.

4. RELATED READING MATERIAL (current editions).

- AC 60-22, Aeronautical Decision Making.
- AC 90-89, Amateur-Built Aircraft and Ultralight Flight Testing Handbook.
- AC 120-51, Crew Resource Management Training.
- Federal Aviation Administration (FAA) Order 8130.2, Airworthiness Certification of Aircraft and Related Products.
- FAA Order 8900.1, Flight Standards Information Management System (FSIMS).

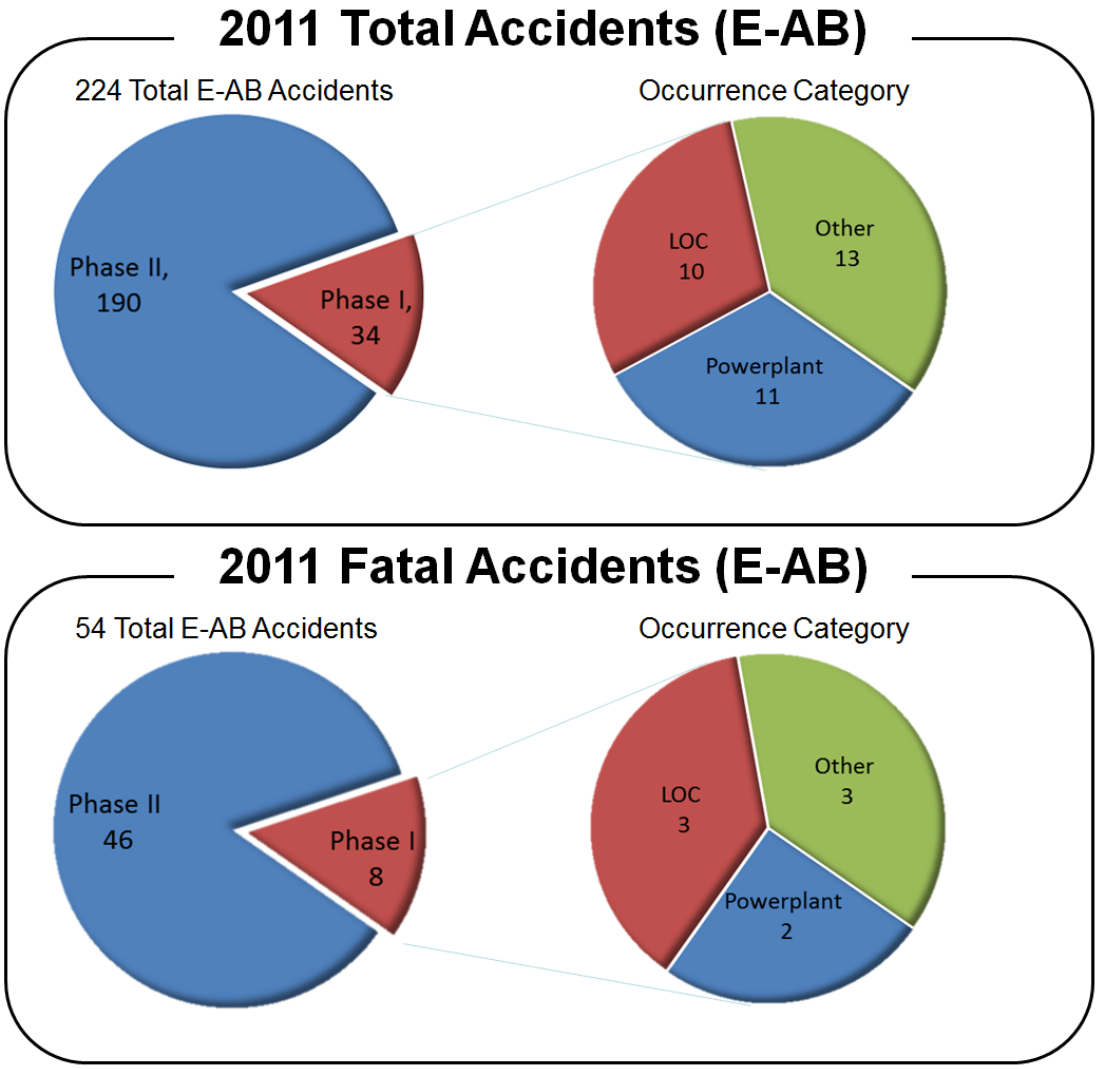
5. BACKGROUND.

a. Current Operations. Currently, experimental amateur-built (E-AB) aircraft and experimental light-sport aircraft (E-LSA) are operated in two phases following issuance of their experimental certificate—Phase I and Phase II. In Phase I operations, the aircraft undergoes flight testing to ensure the proper operations of aircraft systems and to develop the aircraft's flight envelope. At the completion of Phase I, the aircraft enters Phase II, where it will normally reside for the remainder of its operational life. However, after certain modifications, the aircraft is required to reenter Phase I testing. The aircraft then enters Phase II upon completion of that testing. This cycle continues for the life of the aircraft.

b. Increasing Safety. During Phase I testing, the minimum crew for typical E-AB aircraft and all E-LSA is one. Operating limitations issued for Phase I operations currently restrict the number on board an aircraft to minimum flightcrew. In 2012, the National Transportation Safety Board (NTSB) issued Safety Recommendation A-12-31 recommending the FAA "revise FAA Order 8130.2, and related guidance or regulations, as necessary, to clarify those circumstances in which a second qualified pilot could be authorized to assist in the performance of flight tests when specified in the flight test plan and Phase I operating limitations." Today's reality of the ever-increasing complexity and capability of the modern kit aircraft is that Phase I flight testing tests not only the capability of the aircraft, but also the pilot.

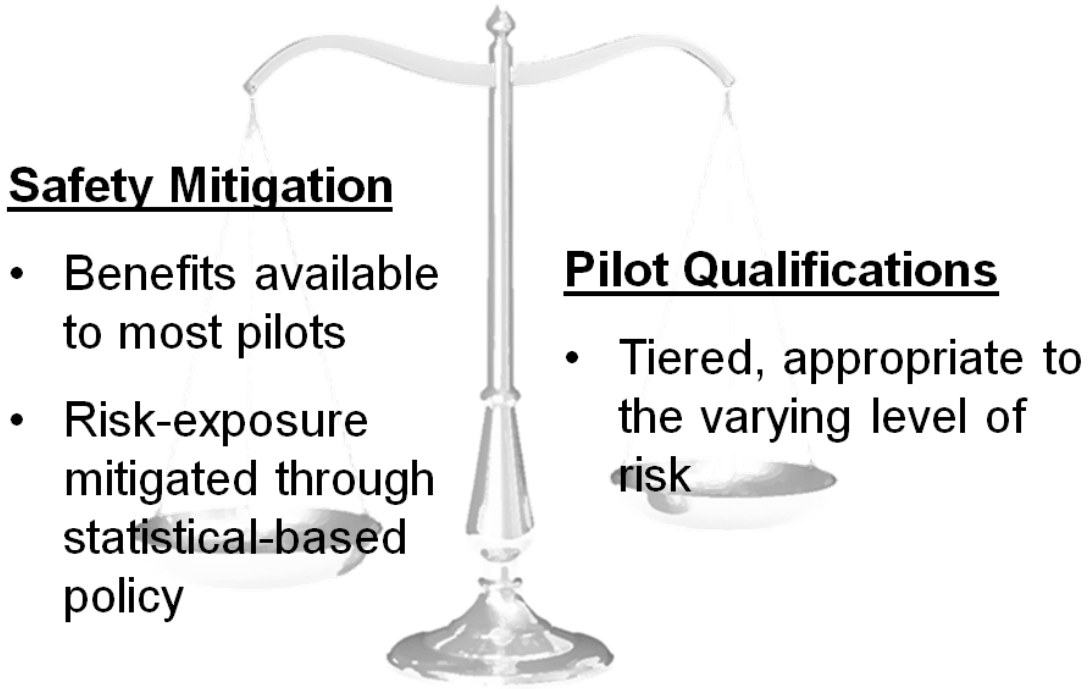
c. Mitigating Risks. With this understanding, the FAA reviewed the causal factors surrounding Phase I accidents using over 10 years of historical data, with a focus on high-fidelity data collected in 2011 found to correlate very well to the historic numbers. The goal was to determine if a second qualified pilot on board could have mitigated the risks that led to 224 accidents in 2011. As shown in Figure 1, Causal Factors for E-AB Accidents in 2011, it was found that approximately one-third of all accidents were related to the powerplant, and a third were related to loss of control (LOC). The remaining third consisted largely of accidents similar to LOC, like hard contact with runway. By first placing mitigations in place to reduce powerplant-related risks, utilizing a qualified additional pilot to mitigate risks associated with LOC in Phase I flight, under controlled circumstances, is appropriate.

FIGURE 1. CAUSAL FACTORS FOR E-AB ACCIDENTS IN 2011



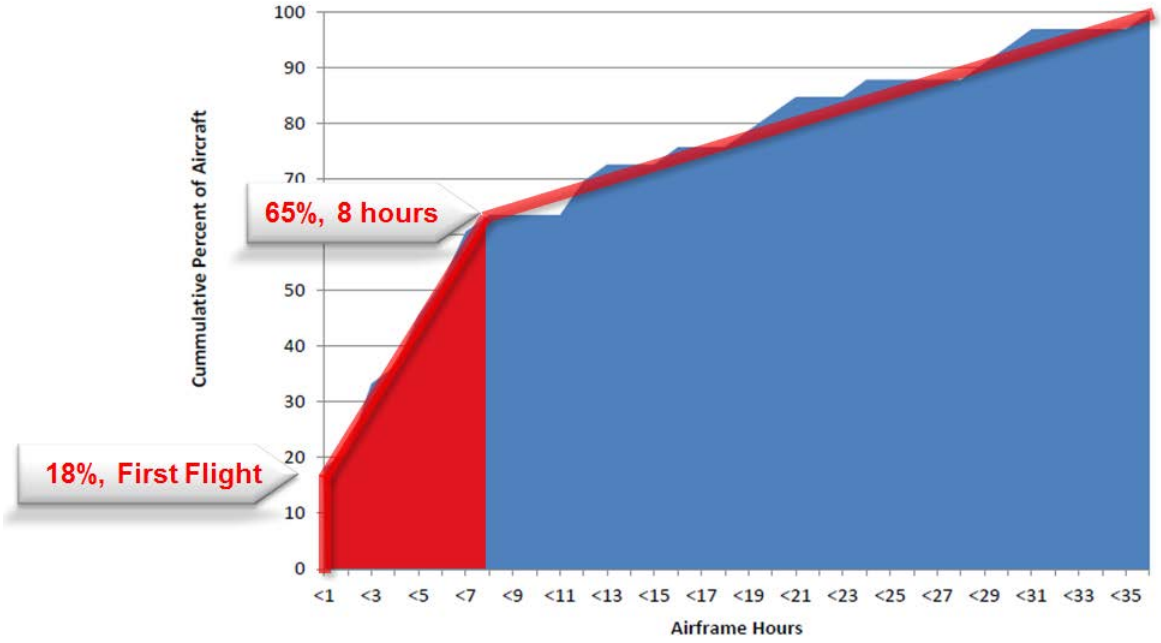
d. Setting Qualifications. The difficulty is determining when an additional pilot should be allowed on board, and what minimum qualifications that additional pilot should possess. The objective is to set the qualifications of the additional pilot high enough to mitigate the risks of LOC, but low enough to yield a useful pilot population as illustrated in Figure 2, Balancing the Pilot Qualifications to Ensure an Acceptable Level of Safety.

FIGURE 2. BALANCING THE PILOT QUALIFICATIONS TO ENSURE AN ACCEPTABLE LEVEL OF SAFETY



e. Examining Phase I. Figure 3, Cumulative Portion of Phase I E-AB Accidents With Less Than 35 Airframe Hours (2011), shows when each of the 2011 Phase I accidents occurred. The first flight encompasses nearly one-fifth of all Phase I accidents. Furthermore, 65 percent of all Phase I accidents occurred within the first 8 hours of testing. This indicates that most benefits of an additional pilot would be realized early in Phase I. It is equally important to note the potential value of an additional pilot for flights occurring after the 8-hour mark of Phase I flights.

FIGURE 3. CUMULATIVE PORTION OF PHASE I E-AB ACCIDENTS WITH LESS THAN 35 AIRFRAME HOURS (2011)



f. Risk-Based Requirements. When looking at the available accident data, it becomes clear that the need for an advanced piloting skill set is necessary up front, until both the builder/owner and the aircraft have performed the required test events and maneuvers. This is accomplished through minimum flight time requirements and a cadre of test flights through the normal speed range and higher-risk maneuvers. Once the initial cadre of tests is accomplished, the advanced skill set for the additional pilot can be reduced with the reduction in risk.

g. Conclusion. It is clear that an additional pilot can help reduce the accident rate during Phase I testing. Based on a review of the data collected, by addressing the risk associated with a powerplant failure through proper means, the additional pilot, if properly suited for the role, could mitigate the potential for LOC as well as a number of the remaining causal factors comprising the last third of the accidents. Therefore, the FAA has created the APP that specifies:

- Applicant, aircraft, and powerplant eligibility.
- The testing requirements necessary to mitigate powerplant issues.
- Qualifications of an additional pilot.
- An initial cadre of tests done early in Phase I that can be used to ensure that the aircraft and builder/owner have reached experience levels that will reduce LOC-related accidents.
- Guidance material describing and emphasizing the importance of Crew Resource Management (CRM), including division of duties and tasks during flight test to enhance safety.

6. DETERMINING APP ELIGIBILITY. Those wanting to utilize the APP must:

a. Meet all eligibility requirements, conditions, and limitations found within this AC.

b. Have aircraft operating limitations that allow operation in accordance with this AC.

7. DETERMINING APPLICANT ELIGIBILITY. A builder or owner of the aircraft being tested who meets the qualification requirements to utilize the APP is known as a BP. This individual(s) must:

a. Own all or some portion of the aircraft being tested.

b. Hold at least a sport, recreational, private, commercial, or Airline Transport Pilot (ATP) Certificate with the appropriate category and class ratings for the test aircraft, and have received all necessary endorsements, as required per § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a Sport Pilot Certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required per § 61.317.

c. Meet the requirements of § 61.56, Flight review.

d. Meet the requirements of § 61.57(a), Recent flight experience: Pilot in command, in the same category and class as the test aircraft.

e. Denote the name of the additional pilot in the pilot logbook for each flight utilizing an additional pilot. See Figure 9, Sample Pilot Logbook Example, for an example of the logbook entry.

8. DETERMINING AIRCRAFT ELIGIBILITY. Eligible aircraft must meet all of the following requirements detailed below:

a. Experimental Certificate. Experimental certificate issued under § 21.191(g), Operating amateur-built aircraft, or § 21.191(i)(2), Operating light-sport aircraft.

b. Kit-Built Aircraft. Currently the FAA is limiting aircraft eligibility to those aircraft built from a kit. These aircraft have the highest population and consistency from aircraft to aircraft. Plans-built aircraft will not be considered at this time. There is currently no intention to consider original designs for this program. Eligible aircraft kits are those that have been evaluated and found eligible to meet the “major portion” requirement of part 21, Certification Procedures for Products and Parts, specifically § 21.191(g), and are listed in the “Revised Listing of Amateur-Built Aircraft Kits.” This list is periodically updated and can be downloaded at: http://www.faa.gov/aircraft/gen_av/ultralights/amateur_built/kits/media/amateur_built_kit_listing.pdf.

c. Fully Functioning Dual Controls. The aircraft must have fully functioning dual controls. This includes, at minimum, power and control of all three flight axes (pitch, roll, and yaw). Central controls, such as power, available to both pilots simultaneously are acceptable.

9. POWERPLANT ELIGIBILITY. Powerplant-related accidents account for one-third of all E-AB accidents, including those with fatalities. Therefore, to mitigate powerplant issues to the extent necessary, powerplant eligibility and minimum initial testing standards are specified.

a. Powerplant Eligibility. Only powerplants recommended, supported, or provided by the kit manufacturer for the kit will be eligible. Regardless, turbine-engine-powered aircraft are not eligible at this time. The eligibility includes engines that have been customized by third parties, to include painting, polishing, porting, and the addition of commercially available accessories such as electronic ignition and commercially available propellers. However, autoconversion engines will only be considered if they are specifically recommended by the kit manufacturer. Except for turbine engines, any engine recommended by the kit manufacturer will automatically be considered as eligible.

b. Powerplant Testing. Powerplant testing is required prior to the initial flight and any time warranted thereafter to help ensure the reliability of the powerplant. Based on the recommendations of AC 90-89 and the industry on testing of the powerplant and fuel system, the following tests, if applicable, are required:

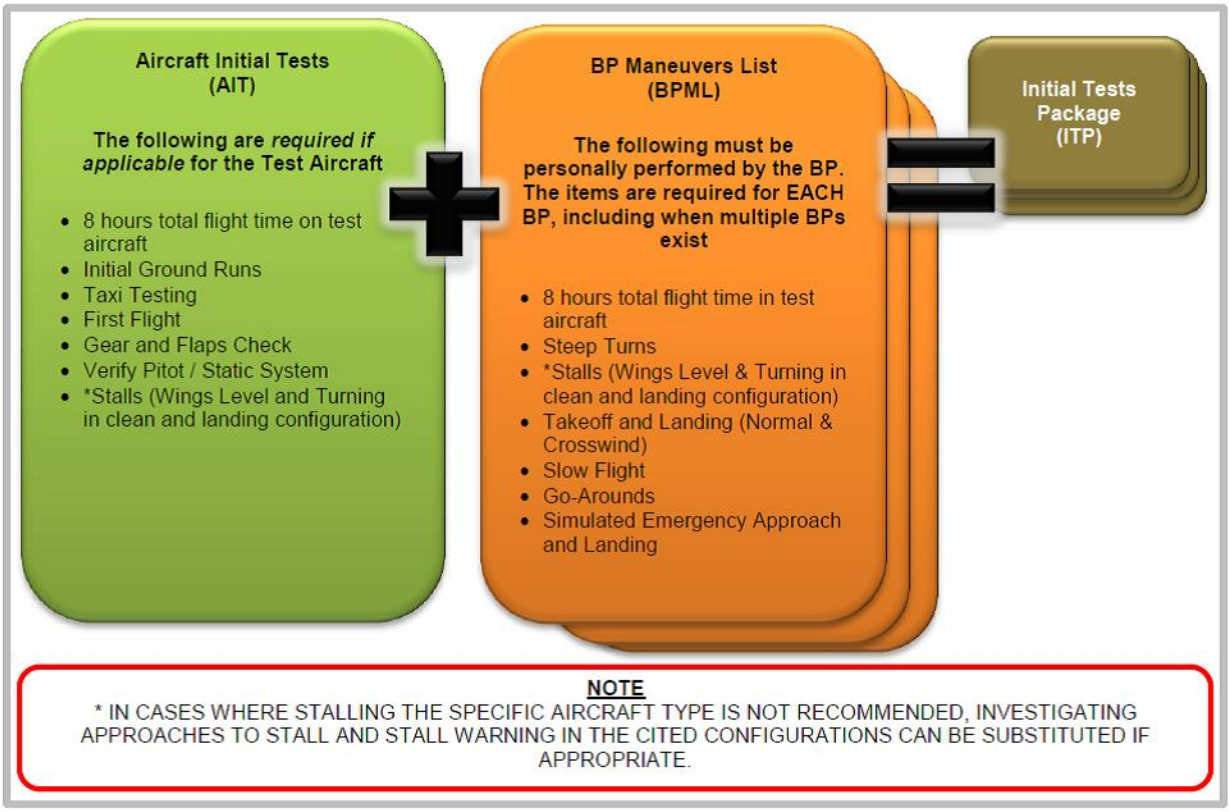
- Mixture and Idle Speed Check,
- Magneto Check,
- Cold Cylinder Check,
- Carburetor Heat Check,
- Fuel Flow Check,
- Unusable Fuel Check, and
- Compression Check.

c. Documented Testing. Documented testing similar to that of the build is required as proof of compliance. This includes appropriate logbook entries with test results. Photographs and diagrams should also be provided for tests where the applicant deems them beneficial or necessary.

d. Changes to Fuel System. Any change to the fuel system after conducting the fuel flow tests, except for normal fuel system/filter maintenance, requires a repeat of the tests prior to additional flight. All tests, including repeated tests, require documentation.

10. INITIAL TESTS PACKAGE (ITP). When looking at a well-created Phase I test plan, it becomes clear that the need for an advanced piloting skill set is necessary until both the BP and the aircraft have performed the required test events and maneuvers. The ITP is a combination of Aircraft Initial Tests (AIT) and a Builder/Pilot Maneuvers List (BPML) that encompasses flight throughout the normal speed range and through the higher risk maneuvers, as shown in Figure 4, Initial Tests Package. The ITP aligns the mitigations provided by a qualified additional pilot to the hazard level of early flight test. Once the AIT is accomplished, the advanced skill set for the additional pilot can be reduced for any BP who has personally performed, in the test aircraft, all items in the BPML, thus completing the ITP for that BP. The ITP requirement is applied to the aircraft and to each BP individually.

FIGURE 4. INITIAL TESTS PACKAGE



11. QUALIFICATIONS FOR AN ADDITIONAL PILOT AT THE QUALIFIED PILOT (QP) LEVEL.

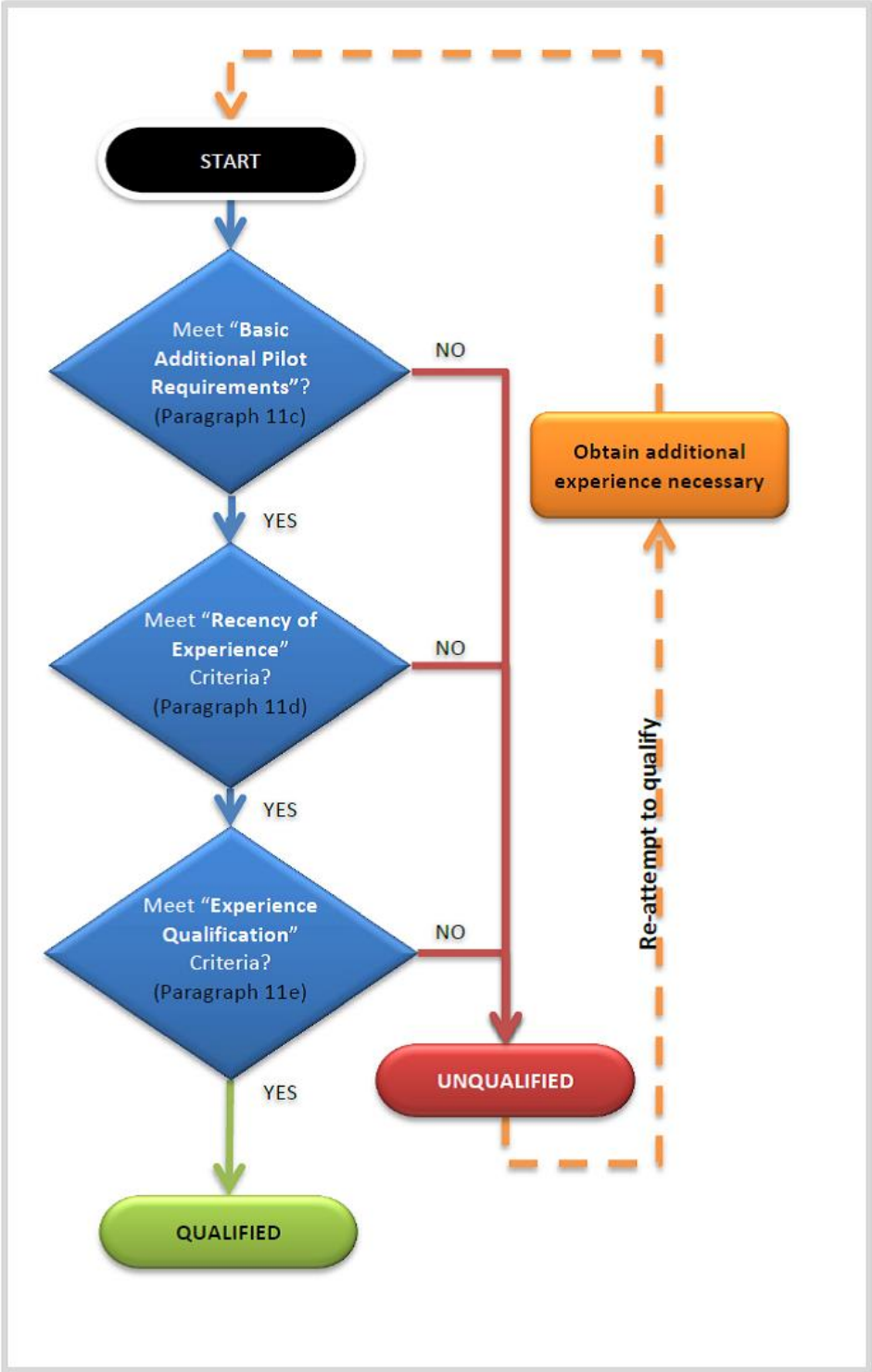
a. Aligning Skill and Risk. A set of additional pilot qualifications is used to ensure necessary skills mitigate the safety risks largely associated with LOC that remain after the powerplant mitigations. This requires higher levels of experience, in alignment with higher risk, for early flights in the test program. A pilot meeting the criteria for this program is known as a Qualified Pilot (QP). The additional pilot criteria at the QP level will remain in place, as illustrated in Figure 5, Qualified Pilot Qualifying Process Overview, until:

(1) The test aircraft has been flown through all of the AITs required by the ITP.

(2) The BP has personally performed, in the test aircraft, all of the required items in the BPML. If multiple BPs exist, the requirement applies to each individual separately.

(3) Airframe logbook entries have been made, in accordance with this program, stating these facts.

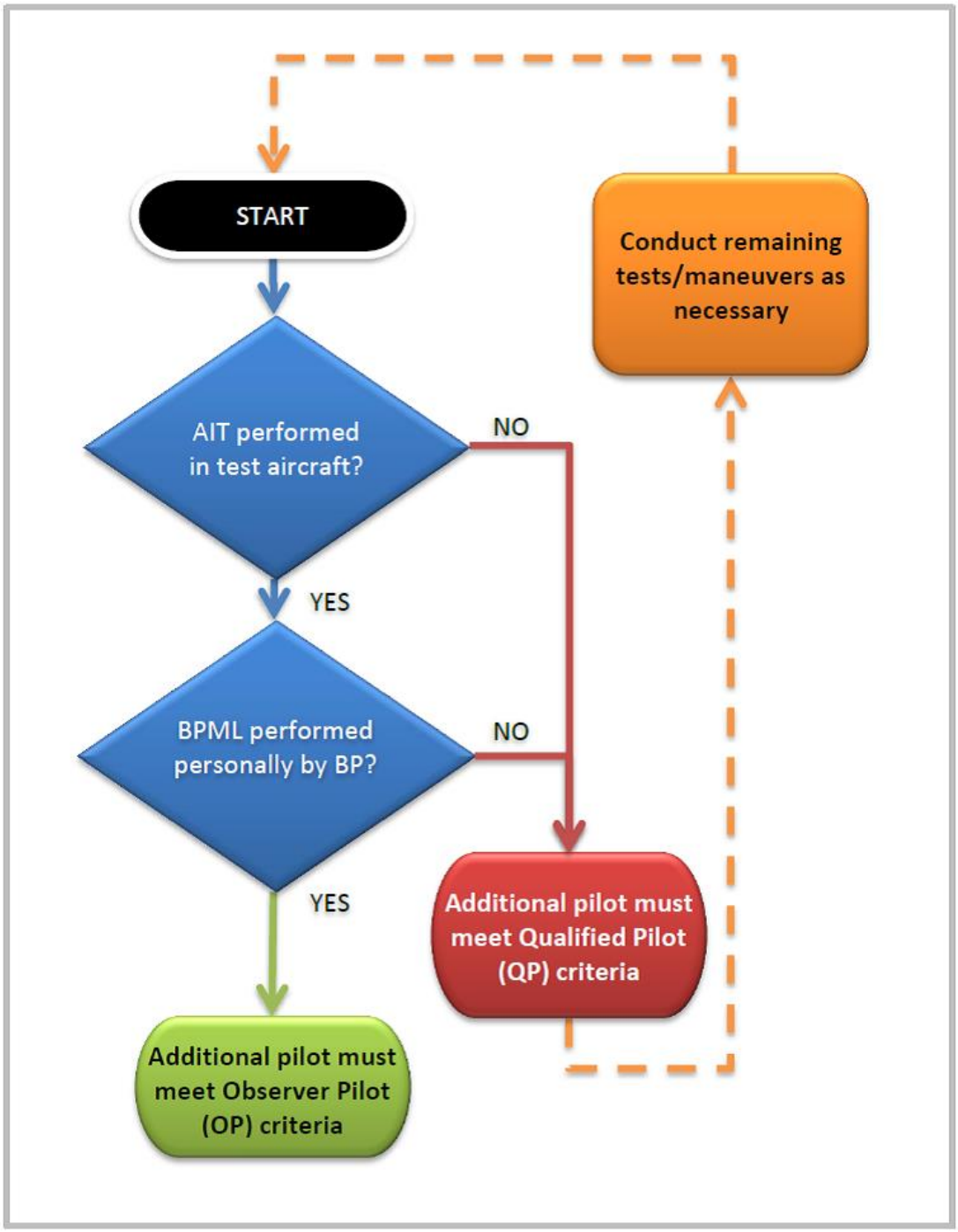
FIGURE 5. QUALIFIED PILOT QUALIFYING PROCESS OVERVIEW



b. Reduction in Criteria. Once both the aircraft and the BP have conducted all of the required items in the ITP, a reduction in the criteria for the additional pilot can be made for that BP as a result of the reducing risk in flight test. A pilot meeting the reduced criteria for this

program is known as an Observer Pilot (OP). This process is illustrated in Figure 6, Determining Additional Pilot Qualification Level Required During Phase I.

FIGURE 6. DETERMINING ADDITIONAL PILOT QUALIFICATION LEVEL REQUIRED DURING PHASE I



c. Basic Additional Pilot Requirements. A Qualified Pilot (QP) must meet the following list of requirements as part of the qualification process:

(1) Hold at least a sport, recreational, private, commercial, or ATP certificate with the appropriate category and class ratings for the test aircraft, and have received all necessary endorsements, as required per § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a Sport Pilot Certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required per § 61.317.

(2) Meet the requirements of § 61.56.

(3) Meet the requirements of § 61.57(a).

(4) Have adequate vision forward and to each side of the aircraft.

(5) Complete the worksheet found in Appendix 1, Additional Pilot Program Guide, prior to initial flight as QP in each test aircraft and attach it to the airframe logbook. When acting as QP for further flights in the test aircraft, prior to each flight the QP must meet the QP criteria, but the checklist need not be attached to the logbook.

d. Recency-of-Experience Scoring Matrix.

(1) Scoring Matrix. The scoring matrix shown in Figure 7, Recency of Experience Scoring Matrix, is used to determine recency of experience. A score of 60 is the minimum value to satisfy recency requirements. A copy of the matrix in worksheet form is found in Appendix 1 for use prior to the initial flight as QP in the test aircraft. Only one selection should be made per question, including those where more than two choices are available. Values or ranges shaded in red indicate a lack of recency and are automatically disqualifying if selected. These areas of deficiencies should be studied and experience obtained for applicants intending to later qualify. An applicant can attempt to qualify any number of times, and may attempt to do so at any time. A qualified applicant might also find, due to a lack of recent experience, that they later do not meet the requirements. These applicants must then obtain the necessary experience to requalify. Because of the recency requirement, this matrix is to be completed prior to each flight when acting as a QP.

(2) Explanation of Criteria: Time in Model or Model Family. A QP must have an understanding of the test aircraft and its expected flight qualities. Having flight experience in the same model or other makes and models that exhibit similar flight characteristics provides the QP with the knowledge necessary to make assumptions and judgments about the test aircraft. This is a vital link in the QP's role of risk mitigation. The determination of similarities between models considered in a model family line should be left to the QP applicant who can then compare flight characteristics from one aircraft to another based on personal experience. In cases in which the QP requires a more detailed examination, the manufacturer(s), if in existence, or, where the manufacturer no longer exists or chooses not to participate, a type-club, industry group, or the FAA could aid in making the determination. Ultimately, an acceptable model family may have slightly differing characteristics between aircraft, but the similarities across the model line would enable a QP with experience in one aircraft to be confident and capable to fly any of the family variations. In cases where model grouping is not able to be accomplished, only experience in the

model of the subject aircraft (though not necessarily the subject aircraft) will be accepted to satisfy “time in model family”.

FIGURE 7. RECENCY OF EXPERIENCE SCORING MATRIX

Scoring System for Recency of Experience		
	Value	**Your Score**
Takeoffs and Landings in previous 90 days:		
0-9	0	DISQUALIFIER
10+	10	
Do you have any time in model or model-family?		
No	0	DISQUALIFIER
Yes	15	
Total flight time in the past 12 calendar months		
0-39	-5	DISQUALIFIER
40-69	10	
70+	15	
Number of hours total flight time		
0-499	0	DISQUALIFIER
500-999	10	
1000+	20	
Subject Aircraft landing gear configuration		
Tricycle (Nosewheel)	10	
If conventional (Tailwheel), number of take takeoffs and landings in tailwheel aircraft in previous 12 calendar months:		
20+	10	
0-19	0	DISQUALIFIER
	Score:	**60** is minimum value, any red item noted as "DISQUALIFIER" is an automatic disqualifier.

e. Experience Qualification Scoring Matrix.

(1) Scoring Matrix. The scoring matrix found in Figure 8, Experience Qualifications Scoring Matrix, is used to determine experience qualifications. This provides a means of scoring a variety of backgrounds and a means by which to judge the overall qualifications of an applicant to act as a QP for the test aircraft. A score of 90 is the minimum value to satisfy the requirements. A copy of the matrix in worksheet form is found in Appendix 1 for use prior to the initial flight as the QP in the test aircraft. Only one selection should be made per question, unless otherwise specified. An applicant can attempt to qualify any number of times, and may attempt to do so at any time. This matrix is to be completed prior to each flight when acting as a QP.

(2) Explanation of Criteria. Nine criteria are used to ensure the applicant's flight skills are applicable to the aircraft being tested. Further explanation for criteria that are not necessarily self-explanatory is provided below.

(a) Criteria: Time in Model Family. See subparagraph 11d(2).

(b) Criteria: Time in Exact Same Model. Due to the freedom of naming experimental aircraft on the application for a special airworthiness issuance certificate, the similar models may have wildly varying model names. Therefore, the Time in Exact Same Model criteria allows for consideration of flight time in aircraft derived from the same kit model.

(c) Criteria: Phase I Experience. Phase I experience is considered experience as a pilot in command (PIC) during Phase I flight testing.

(d) Criteria: Test Pilot Graduate of Test Pilot School. Those pilots who have graduated as test pilots from the qualifying test pilot schools (TPS) indicated have received formal training in the art of the flight test. This credit can only be taken for test pilots who graduated in the same category as the subject test aircraft. (Rotorcraft graduates can only take credit if the test aircraft is a rotorcraft, etc.)

FIGURE 8. EXPERIENCE QUALIFICATIONS SCORING MATRIX

Scoring System for Qualified 2nd Pilot		
	Value	Your Score
Total Time in Same Category and Class		
0-9	-50	
10-99	0	
100-249	5	
250-499	10	
500-999	20	
1000+	35	
Time in Model Family		
1-9	-10	
10-24	0	
25-49	10	
50-99	15	
100-249	50	
250+	75	
Is any of the Time in Type in the exact same model?		
Yes	10	
No	0	
Phase I experience?		
Yes, to include a maiden flight	20	
Yes	10	
No	-75	
More than 20 different make/models flown as PIC?		
Yes	20	
No	0	
Subject Aircraft Configuration (select all applicable)		
Complex	-5	
Canard Airframe Configuration	-5	
High Performance (over 200 HP)	-5	
Pressurized	-15	
Crew Environment or Flight Instructor Experience? (Crew Environment= Type rating in aircraft requiring crew of 2 or more)		
Yes	5	
No	0	
Test Pilot Graduate of Test Pilot School? (Category (Airplane, Rotorcraft, etc.) equivalent to test aircraft)		
Qualifying Schools: (USNTPS) US Naval Test Pilot School (USAFTPS) US Air Force Test Pilot School (ETPS) British Empire Test Pilots' School (EPNER) French Test Pilot School (NTPS) National Test Pilot School		
Yes	35	
No	0	
Highest Certificate/Rating Achieved		
Sport/Recreational Pilot	0	
Private/ SPCFI	5	
Commercial	10	
CFI	15	
	Score:	**90** is the minimum qualifying score

12. QUALIFYING AS AN ADDITIONAL PILOT AT THE OBSERVER PILOT (OP) LEVEL. Pilots wishing to serve as the OP must meet the list of criteria below. An unqualified applicant may increase their experience in the areas determined deficient in order to qualify. There is no minimum time required between attempts, and no maximum allowed number of attempts to qualify. However, each attempt at qualifying must meet the process from start to finish. In order to act as an OP, you must:

a. Have at least a recreational pilot certificate with the appropriate category and class ratings for the test aircraft, and have received all necessary endorsements, as required per § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a Sport Pilot Certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required by § 61.317.

b. Meet the requirements of § 61.56, Flight review.

c. Meet the requirements of § 61.57(a), Recent flight experience: Pilot in command, in the same category and class as the test aircraft.

d. Have adequate vision forward and to each side of the aircraft.

e. Complete the worksheet found in Appendix 1 prior to initial flight as OP in each test aircraft and attach it to the airframe logbook. When acting as OP for further flights in the test aircraft, you must meet the OP criteria prior to each flight, but the checklist need not be attached to the logbook.

13. SCENARIOS TO AID IN UNDERSTANDING. Four of the most likely scenarios for the Additional Pilot Program (APP) are described in detail below to provide a better understanding of the overall process.

a. Scenario 1. The BP and QP fly together for all initial flights, and then an OP replaces the QP. In this scenario, the BP decides to use a QP on board during the first flight of the aircraft and some or all of the flights leading to the completion of the ITP. The BP has personally performed, in the test aircraft, the BPML items outlined in the ITP and makes the appropriate airframe logbook entry. Furthermore, the test aircraft has performed all of the required aircraft items outlined in the AIT and the appropriate airframe logbook entry has been made. At this point, since both the BP and the test aircraft have completed the requirements for the ITP, the qualifications of the additional pilot are reduced to the OP level. For the remainder of Phase I testing, the BP is now free to use an OP as the additional pilot.

b. Scenario 2. Another pilot tests the aircraft, then the QP brings the BP up to speed. In this scenario, the BP decides to have another pilot do all of the aircraft testing required by the ITP. Though highly recommended, this pilot need not be a QP, since the flights will be conducted with a sole occupant on board. Now that the test aircraft has performed all of the required AIT items outlined in the ITP, the appropriate airframe logbook entry is made. Once the AIT items are completed, a QP, who may or may not be the same individual who conducted the initial tests, accompanies the BP in flight. The BP then personally performs, in the test aircraft, all of the required BPML items outlined in the ITP and makes the appropriate airframe logbook entry. At this point, both the BP and the test aircraft have completed the requirements for the ITP, so the

qualifications of the additional pilot are reduced to the OP level. For the remainder of Phase I testing, the BP is now free to use an OP as the additional pilot.

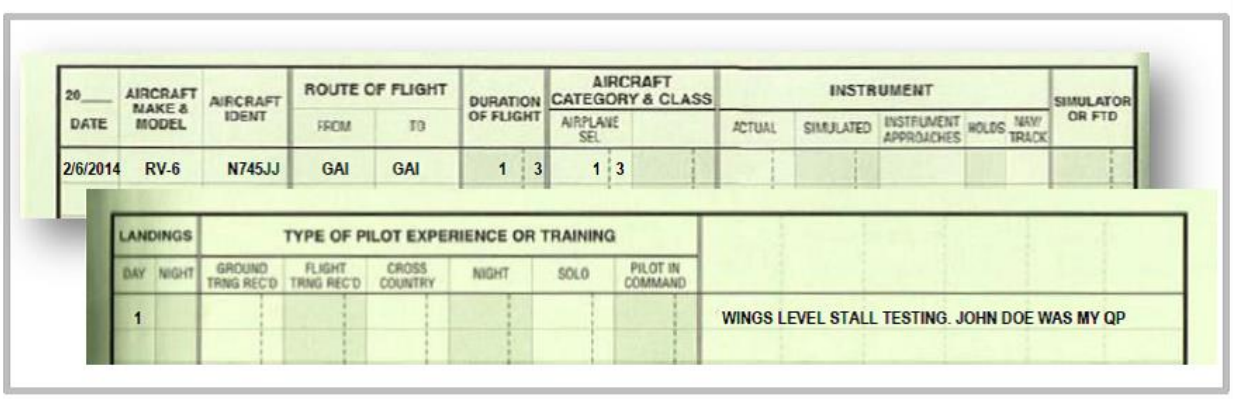
c. Scenario 3. The BP does the initial flight test, then adds an OP. In this scenario, the BP decides to conduct all of the flights leading to the completion of the ITP solo. The BP has personally performed, in the test aircraft, all of the required BPML items outlined in the ITP and makes the appropriate airframe logbook entry. Furthermore, the test aircraft has performed all of the required AIT items outlined in the ITP and the appropriate airframe logbook entry is made. At this point, since both the BP and the test aircraft have completed the requirements for the ITP, the qualifications of the additional pilot are reduced to the OP level. For the remainder of Phase I testing, the BP is now free to use an OP as the additional pilot.

d. Scenario 4. Multiple BPs exist. They decide to use a QP during initial testing of the aircraft for some or all of the flights leading to completion of the AIT portion of the ITP. It is important to note that only one BP and one QP may be on board during any given flight. Therefore, for an aircraft with more than two seats, it would not be appropriate to have two or more BPs on board along with a QP. It is also important to note that a BP who qualifies as a QP, and is serving as the QP for the flight, may indeed fly with another BP. Though it may be perceived as two BPs on board, the importance is the role each individual has qualified for and is acting as for the given flight. Each individual BP is responsible for personally performing, in the test aircraft, all of the required BPML items outlined in the ITP and making the appropriate airframe logbook entry before that individual may utilize an additional pilot at the OP level, assuming the AIT requirements for the ITP have been completed and an airframe logbook entry made. In short, the QP/OP requirement is per individual, not team of individuals.

14. LOGBOOK ENTRIES. The following provides participants assistance in developing entries to meet the requirements of the APP program.

a. Pilot Logbook Entry. Figure 9, Sample Pilot Logbook Example, is an example of the pilot logbook entry made by the BP following a flight utilizing a QP.

FIGURE 9. SAMPLE PILOT LOGBOOK EXAMPLE



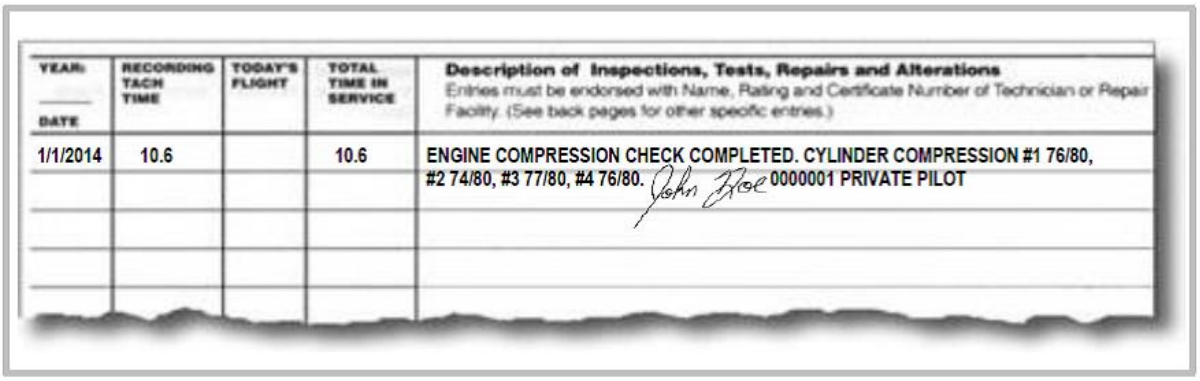
20____ DATE	AIRCRAFT MAKE & MODEL	AIRCRAFT IDENT	ROUTE OF FLIGHT		DURATION OF FLIGHT		AIRCRAFT CATEGORY & CLASS			INSTRUMENT					SIMULATOR OR FTD
			FROM	TO			AIRPLANE SEL			ACTUAL	SIMULATED	INSTRUMENT APPROACHES	HOLDS	NAVI TRACK	
2/6/2014	RV-6	N745JJ	GAI	GAI	1	3	1	3							

LANDINGS		TYPE OF PILOT EXPERIENCE OR TRAINING						
DAY	NIGHT	GROUND TRNG REC'D	FLIGHT TRNG REC'D	CROSS COUNTRY	NIGHT	SOLO	PILOT IN COMMAND	
1								WINGS LEVEL STALL TESTING. JOHN DOE WAS MY QP

b. Aircraft Airframe, Engine, and Propeller Logbook Entries. Each person who performs the required testing of the powerplant and fuel system shall make an entry in the maintenance record of that equipment containing the following information (see Figure 10, Sample Engine Logbook Entry for Compression Test):

- A description of and results of the test performed.
- The date of completion of the test performed.
- The signature, certificate number, and kind of certificate held by the person performing the test.

FIGURE 10. SAMPLE ENGINE LOGBOOK ENTRY FOR COMPRESSION TEST



YEAR: ____ DATE	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)
1/1/2014	10.6		10.6	ENGINE COMPRESSION CHECK COMPLETED. CYLINDER COMPRESSION #1 76/80, #2 74/80, #3 77/80, #4 76/80. John Doe 0000001 PRIVATE PILOT

15. OPERATING LIMITATIONS.

a. Required Limitation. In order to utilize the APP, the operating limitations for the test aircraft need to reference this AC. The limitation that authorizes the use of the APP is worded as, or worded similarly to, the following:

Unless operating in accordance with Advisory Circular (AC) 90-116, Additional Pilot Program for Phase I Flight Test, during Phase I flight testing, only the minimum crew necessary to fly the aircraft during normal operations may be on board.

b. Adding the APP Limitation. Those wishing to use the program but missing the above limitation may schedule an appointment with the local Flight Standards District Office (FSDO) or other qualified FAA representative (e.g., Designated Airworthiness Representative (DAR)) and request to have the aircraft operating limitations amended in accordance with applicable portions of FAA Order 8130.2.

16. COMPENSATION. Compensation for the services of a QP or an OP may only be accepted or provided in accordance with the privileges and limitations specified by certificates held by the individuals.

17. LOGGING OF TIME.

a. Logging of PIC Time. Logging of flight time must be done in accordance with § 61.51(e), Logging pilot-in-command flight time.

b. Logging of Training Time. Logging of training time may only be done in accordance with § 61.51(h), Logging training time.

18. CREW RESOURCE MANAGEMENT (CRM) AND AERONAUTICAL DECISION MAKING (ADM). Because the APP relies on the ability of multiple pilots working together during a flight test, the importance of sound CRM and ADM practices is underscored. The ability to effectively communicate, distribute workload, positively exchange controls, and avoid distraction increases the likelihood that emergencies will be handled effectively. For more detailed information on ADM and CRM, refer to AC 60-22, Aeronautical Decision Making, and AC 120-51, Crew Resource Management Training.

19. DETERMINING THE PIC. A flight test is a challenging environment that requires the flightcrew's full attention in preflight planning, flight briefing, test flight, and debrief. It is critical that all participants are involved in developing a plan that clearly identifies roles and responsibilities for each team member. Most critical of all is determining which pilot will fill the role of PIC. This individual has the final authority and responsibility for the operation and safety of the flight. It is recommended that, prior to each flight, a clear determination is made identifying the expectations of the participating pilots and which pilot will fulfill the role of PIC.

20. LIST OF ACRONYMS.

a. AC. Advisory Circular.

b. ADM. Aeronautical Decision Making.

c. AIT. Aircraft Initial Tests.

d. APP. Additional Pilot Program.

e. BP. Builder/Owner Pilot. A pilot-builder or pilot-owner of the aircraft being tested who meets certain criteria.

f. BPML. Builder/Pilot Maneuvers List.

g. CFR. Code of Federal Regulations.

h. CRM. Crew Resource Management.

i. DAR. Designated Airworthiness Representative.

j. E-AB. Experimental amateur-built.

k. E-LSA. Experimental light-sport aircraft.

l. FAA. Federal Aviation Administration.

m. FSDO. Flight Standards District Office.

n. FSIMS. Flight Standards Information Management System

o. ITP. Initial Tests Package.

p. LOC. Loss of control.

q. NTSB. National Transportation Safety Board.

r. OP. Observer Pilot. A pilot who meets a set of criteria allowing that individual to serve as an additional pilot on board during Phase I flight testing.

s. QP. Qualified Pilot. A pilot who meets a set of criteria allowing that individual to serve as an additional pilot on board during early Phase I flight testing.

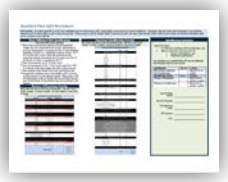
t. TPS. Test Pilot School.

ORIGINAL SIGNED by

/s/ John Barbagallo
Acting Deputy Director, Flight Standards Services

APPENDIX 1. ADDITIONAL PILOT PROGRAM GUIDE

This guide and the worksheets on the following pages have been created to aid in achieving the safety benefits provided through using the Additional Pilot Program (APP).

	1. Become a Builder/Owner Pilot (BP). Complete the Applicant for APP Worksheet to determine if you and your aircraft are eligible for the program. Once you have met all of the applicable requirements, fill in all of the required items, sign and date the worksheet, and attach it to the test aircraft's airframe logbook. This makes you a BP for the program.
	**2. Add a Qualified Pilot (QP).** If you plan on using a QP, have the QP applicant complete the Qualified Pilot Worksheet and sign, date, and attach it to the test aircraft's airframe logbook. This is to be done prior to initial flight as QP in the test aircraft.
	3. Complete the Initial Tests Package (ITP). Complete the Aircraft Initial Tests (AIT) and Builder/Pilot Maneuvers List (BPML) portions of the Initial Tests Package Worksheet and sign, date, and attach it to the test aircraft's airframe logbook. Each BP is individually responsible for signing and dating the applicable sections upon their respective completion.
	4. Utilize an Observer Pilot (OP). Once the AIT portion and BPML are complete for the BP in question, an OP may be used. Any additional BP for the test aircraft who has not personally completed the BPML may continue to use a QP if desired, but may not use an OP until their BPML requirement is met. OP applicants should complete the Observer Pilot Worksheet, sign, date, and attach it to the test aircraft's airframe logbook. This is to be done prior to the initial flight as an OP in the test aircraft.

Applicant for APP Worksheet

Instructions: In order to utilize the Additional Pilot Program (APP), a Builder/Owner Pilot (BP) of the test aircraft must meet all eligibility requirements, conditions, and limitations found within Advisory Circular (AC) 90-116. Complete the following worksheet, sign, and attach it to the airframe logbook.

Applicant Eligibility

Must meet **ALL** of the following

The builder/owner of the experimental amateur-built (E-AB) aircraft being tested must:

☐Own all or some portion of the aircraft being tested.

☐Hold at least a sport, recreational, private, commercial, or airline transport pilot certificate with the appropriate category and class ratings for the test aircraft, and have received all necessary endorsements, as required per 14 CFR part 61, § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a sport pilot certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required by § 61.317.

☐Meet the requirements of § 61.56, Flight review.

☐Meet the requirements of § 61.57(a), Recent flight experience: Pilot in command, in the same category and class as the test aircraft.

☐Denote the name of the additional pilot in the pilot logbook for each flight utilizing an additional pilot.

Aircraft Eligibility

Must meet **ALL** of the following

☐FAA-issued operating limitations allow for operation in accordance with AC 90-116 during Phase I.

☐Kit-built aircraft is listed in the "Revised Listing of Amateur-Built Aircraft Kits."

☐Full-functioning dual controls, including power and all 3 axes (pitch, roll, yaw).

Powerplant Eligibility

Must meet **ONE** of the following

☐Powerplant recommended for kit by kit manufacturer

☐Powerplant provided for kit by kit manufacturer

☐Powerplant supported for kit by kit manufacturer

Powerplant Testing

Must complete **ALL,** if applicable to the test aircraft.

Complete and document all tests contained in AC 90-89, Section 11, Additional Engine Tests, applicable to the test aircraft. If the test is not applicable, place a check in "N/A" column.

Completed & Documented	N/A	Test
☐	☐	Mixture and Idle Speed Check
☐	☐	Magneto Check
☐	☐	Cold Cylinder Check
☐	☐	Carburetor Heat Check
☐	☐	Fuel Flow Check
☐	☐	Unusable Fuel Check
☐	☐	Compression Check

Qualification Statement

I attest that I meet all of the eligibility requirements for:

- Applicant Eligibility;
- Aircraft Eligibility; and
- Powerplant Eligibility, including applicable Powerplant Testing,

thus qualifying as a Builder/Owner Pilot (BP) for the Additional Pilot Program (APP) for this aircraft:

Aircraft Make, Model: _____

Aircraft N-number: _____

BP Applicant's Name: _____

BP Signature: _____

Date: _____

BP Applicant's Name: _____

BP Signature: _____

Date: _____

BP Applicant's Name: _____

BP Signature: _____

Date: _____

Qualified Pilot Worksheet

Instructions: In order to qualify as a QP, this worksheet must be used prior to the QP's initial flight in the test aircraft to ensure eligibility. Complete, sign, and attach this worksheet to the airframe logbook prior to the initial flight as the QP in each test aircraft. When acting as the QP for further flights in the test aircraft, you must meet the QP criteria prior to each flight, but further worksheets need not be attached to the logbook.

Basic Additional Pilot Qualifications

Must meet **ALL** of the following:

- ☐ Have at least a recreational pilot certificate with the appropriate category and class ratings for the test aircraft, and received all necessary endorsements, as required per 14 CFR part 61, § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a sport pilot certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required by § 61.317.
- ☐ Meet the requirements of § 61.56, Flight review.
- ☐ Meet the requirements of § 61.57(a), Recent flight experience: Pilot in command, in the same category and class as the test aircraft.
- ☐ Have adequate vision forward and to each side of the aircraft.
- ☐ Have completed this worksheet prior to the initial flight as the QP in each test aircraft and attach it to the airframe logbook. When acting as the QP for further flights in the test aircraft, prior to each flight you must meet the QP criteria, but the checklist need not be attached to the logbook.

Recency of Experience Scoring

Fill in the score next to your level of experience. Add the "Your Score" column. In order to qualify, you must achieve a score of 60 or higher.

Scoring System for Recency of Experience		
	Value	Your Score
Takeoffs and Landings in previous 90 days:		
0-9	0	DISQUALIFIER
10+	10	
Do you have any time in model or model-family?		
No	0	DISQUALIFIER
Yes	15	
Total flight time in the past 12 calendar months		
0-39	-5	DISQUALIFIER
40-69	10	
70+	15	
Number of hours total flight time		
0-499	0	DISQUALIFIER
500-999	10	
1000+	20	
Subject Aircraft landing gear configuration		
Tricycle (Nosewheel)	10	
If conventional (Tailwheel), number of take takeoffs and landings in tailwheel aircraft in previous 12 calendar months:		
20+	10	
0-19	0	DISQUALIFIER
Score:		**60** is minimum value, any red item noted as "DISQUALIFIER" is an automatic disqualifier.

Experience Qualifications Scoring

Fill in the score next to your qualification levels. Add the "Your Score" column. In order to qualify, you must achieve a score of 90 or higher.

Scoring System for Qualified 2nd Pilot		
	Value	Your Score
Total Time in Same Category and Class		
0-9	-50	
10-99	0	
100-249	5	
250-499	10	
500-999	20	
1000+	35	
Time in Model Family		
1-9	-10	
10-24	0	
25-49	10	
50-99	15	
100-249	50	
250+	75	
Is any of the Time in Type in the exact same model?		
Yes	10	
No	0	
Phase I experience?		
Yes, to include a maiden flight	20	
Yes	10	
No	-75	
More than 20 different make/models flown as PIC?		
Yes	20	
No	0	
Subject Aircraft Configuration (select all applicable)		
Complex	-5	
Canard Airframe Configuration	-5	
High Performance (over 200 HP)	-5	
Pressurized	-15	
Crew Environment or Flight Instructor Experience? (Crew Environment= Type rating in aircraft requiring crew of 2 or more)		
Yes	5	
No	0	
Test Pilot Graduate of Test Pilot School? (Category (Airplane, Rotorcraft, etc.) equivalent to test aircraft)		
Qualifying Schools: (USNTPS) US Naval Test Pilot School (USAFTPS) US Air Force Test Pilot School (ETPS) British Empire Test Pilots' School (EPNER) French Test Pilot School (NTPS) National Test Pilot School		
Yes	35	
No	0	
Highest Certificate/Rating Achieved		
Sport/Recreational Pilot	0	
Private/ SPCFI	5	
Commercial	10	
CFI	15	
Score:		**90** is the minimum qualifying score

Qualification Statement

I attest that I:

- Meet all of the Basic Additional Pilot Qualifications, and
- Meet or exceed the scores necessary for:
  - Recency of Experience and
  - Experience Qualifications,

thus qualifying as a Qualified Pilot (QP) for the Additional Pilot Program (APP) for this aircraft:

Qualification	Yes/No	Criteria
Met all Basic Additional Pilot Qualifications		Must be Yes to qualify
Qualification Matrix	**Score**	**Criteria**
Recency of Experience		Must be 60 or greater to qualify
Experience Qualifications		Must be 90 or greater to qualify

Aircraft Make, Model: _____

Aircraft N-number: _____

QP Applicant's Name: _____

QP Signature: _____

Date: _____

Initial Tests Package Worksheet

Instructions: Complete the Aircraft Initial Tests (AIT) and Builder/Pilot Maneuvers List (BPML) portions of the Initial Tests Package (ITP). Sign and date the appropriate portions of the worksheet as they are completed, and attach it to the test aircraft's airframe logbook. Each BP is individually responsible for signing and dating these sections upon their respective completion.

Aircraft Initial Tests (AIT)

The following are **required** ***if applicable*** for the test aircraft:

☐8 Hours Total Flight Time on Test Aircraft
☐Initial Ground Runs
☐Taxi Testing
☐First Flight
☐Gear and Flaps Check
☐Verify Pitot/Static System
☐*Stalls (Wings Level & Turning in Clean and Landing Configuration)

Builder/Pilot Maneuvers List (BPML)

The following must be **personally demonstrated** by the BP. The items are required for **EACH** BP, including when multiple BPs exist.

☐8 Hours Total Flight Time in the Test Aircraft
☐Flight in Varied Gear and Flap Configurations
☐Approach to Accelerated Stalls
☐Steep Turns
☐*Stalls (Wings Level & Turning in Clean and Landing Configuration)
☐Takeoff & Landing (Normal & Crosswind)
☐Slow Flight
☐Go-Arounds
☐Simulated Emergency Approach and Landing

NOTE
*IN CASES WHERE STALLING THE SPECIFIC AIRCRAFT TYPE IS NOT RECOMMENDED, INVESTIGATING APPROACHES TO STALL AND STALL WARNING IN THE CITED CONFIGURATIONS CAN BE SUBSTITUTED IF APPROPRIATE.

ITP Completion Statement

I attest that:

- The test aircraft has completed all of the applicable items required by the AIT, and
- I have personally demonstrated all of the items required by the BPML,

thus completing the ITP and may now utilize an Observer Pilot (OP).

Aircraft Make, Model: _____

Aircraft N-number: _____

BP Name: _____

BP Signature: _____

Date: _____

BP Name: _____

BP Signature: _____

Date: _____

AIT Completion Statement

I attest that the test aircraft has completed all of the applicable items required by the AIT.

Aircraft Make, Model: _____

Aircraft N-number: _____

BP Name: _____

BP Signature: _____

Date: _____

BP Name: _____

BP Signature: _____

Date: _____

BPML Completion Statement

I attest that I have personally demonstrated all of the items required by the BPML.

Aircraft Make, Model: _____

Aircraft N-number: _____

BP Name: _____

BP Signature: _____

Date: _____

BP Name: _____

BP Signature: _____

Date: _____

Observer Pilot Worksheet

Instructions: In order to qualify as an OP, this worksheet must be used prior to the OP's initial flight in the test aircraft to ensure eligibility. Complete, sign, and attach this worksheet to the airframe logbook prior to the initial flight as the OP in each test aircraft. When acting as the OP for further flights in the test aircraft, you must meet the OP criteria prior to each flight, but further worksheets need not be attached to the logbook.

Observer Pilot Qualifications

Must meet **ALL** of the following:

- ☐ Have at least a recreational pilot certificate with the appropriate category and class ratings for the test aircraft, and have received all necessary endorsements, as required per 14 CFR part 61, § 61.31, appropriate to the test aircraft. For light-sport aircraft, have at least a sport pilot certificate and the appropriate logbook endorsements for the category and class of the aircraft to be flown, as required by § 61.317.
- ☐ Meet the requirements of § 61.56, Flight review.
- ☐ Meet the requirements of § 61.57(a), Recent flight experience: Pilot in command, in the same category and class as the test aircraft.
- ☐ Have adequate vision forward and to each side of the aircraft.
- ☐ Complete this worksheet prior to the initial flight as the OP in each test aircraft and attach it to the airframe logbook. When acting as the OP for further flights in the test aircraft, prior to each flight you must meet the OP criteria, but the checklist need not be attached to the logbook.

Qualification Statement

I attest that I meet all of the Observer Pilot Qualifications thus qualifying as an Observer Pilot (OP) for the Additional Pilot Program (APP) for this aircraft:

Aircraft Make, Model: _____

Aircraft N-number: _____

OP Applicant's Name: _____

OP Signature: _____

Date: _____