A. Flight Test Cards and Scripts

The flight test cards and scripts in this appendix are intended to be a generic plan for the first few flights in a new homebuilt, a newly restored antique/classic/contemporary aircraft, or a new ultralight aircraft or very light plane. As generic cards, they do not have all the details necessary for a specific aircraft. However, they do contain a very good outline to be followed which will minimize the inherent risk of operations such as these and will enable the builder/restorer/test pilot to carefully and professionally expand the envelope of the new machine.

How to Use This Appendix

This appendix is divided into the logical phases that make up a flight test plan, from low speed taxi through the first 10 hours of flight. Later additions to this manual and articles in the Flight Advisor newsletter will expand upon the performance and flying qualities tests that the pilot will perform in the later phases of the flight test period. Each subdivision of the appendix has two parts: 1) A text part in which the objectives, methodology, and maybe some flight test theory or background is laid out for the phase to be accomplished, and 2) The scripts and flight test cards that you, the Flight Advisor/Mission Monitor, and the builder/pilot will use.

The Scripts are for the Mission Monitor

The scripts are laid out along the left side of the script/test card pages for each phase of the flight test. They have all the details to keep in mind during your mission rehearsals. Simply take out the pages from this guide, photocopy them onto (80#) card stock, and cut the photocopied cards in half along the dotted line. Return the originals back to your Flight Advisor Handbook for the next pilot. You keep the script cards. Next, you and the
pilot should go over the scripts in detail, filling in the aircraft-specific information where appropriate. Use the scripts during the test to help you keep up with the conduct of the test.

The Flight Test Cards go to the Pilot
Notice the right side of the script/flight test card pages has a flight test card which is similar to the script. This card is intended for use in the cockpit by the pilot during the actual flight test. The card numbering and step numbering are the same for each corresponding script and flight test card. Notice, however, the type face is much larger, and only key words are included for each step. The pilot will not have time to read a detailed script in flight! But, through the review and rehearsal of the scripts beforehand, the pilot will be able to remember the correct things to do by glancing at the keywords. The pilot can also quickly clue you, as the Mission Monitor, in on where he or she is in the test..."I'm starting card FF-5, step A." "Roger, FF-5, step A."

What If Something Goes Wrong?
Many times a flight test has to be cut short due to some problem. The problem could be as serious as outright engine failure, or as minor as an air leak in the cockpit causing the pilot to get chilly. Either way, you are no longer accomplishing flight test activities but are merely trying to get the aircraft back home. Be sure you have rehearsed inflight emergencies and how to handle them with the pilot before he or she starts flying! The videotape available from EAA on "First Flights in Your Homebuilt Aircraft" has some tips on emergencies which are applicable to all aircraft. Remember, you, as a Mission Monitor, may have 90% of the remaining brain power between the two of you to help safely recover the aircraft. See also Chapter 14 in this handbook, and refer to Flight Advisor newsletters which will have further guidance on this subject.
LOW SPEED TAXI TESTS

The objectives for this first set of tests are to increase pilot familiarity with the cockpit environment, verify the basic operation of engine and fuel systems, and evaluate the directional control and braking at low speeds.

Make Sure the Aircraft is Ready
It's been said many times before, but it bears repeating now: Before starting low speed taxi tests, make sure the aircraft's weight and balance have been computed, and the center-of-gravity (c.g.) is in a known position for the first flight. Also make sure all subsystems are in proper working order. Be especially alert for controls that have excessive friction or freeplay. Have a written checklist for doing the preflight walkaround as well as other operations, just like the certificated airplanes do, and use it. The pilot will no doubt start to have more than a little bit of the first-flight jitters, and the methodical use of checklists and scripts will help calm him or her down. Checklist use also helps prevent mistakes.

There are Three Low-Speed Taxi Script Cards
Follow the cards as listed on the next three pages!
PRE-LOW SPEED TAXI SCRIPT

EQUIPMENT:
- Required - 1. Ground observer
- Desired - 1. A fire extinguisher
  2. VHF radio for your ground observer
  3. Portable video camera

PRIOR TO TAXI

A. Ensure the preflight checklists have been complied with.
B. Review all of the Low Speed Taxi checklists.
C. Notify airport personnel that you’ll be doing taxi testing.
D. Brief your ground observer on the following:
   - What to watch (traffic, parts, smoke, or anything unusual).
   - What to say on the radio ("Stop", "Fire").
   - How to check the brake temperatures (CAREFULLY; watch the prop!).
   - Where the best place to observe is (1/2 way down runway).

NEXT: LOW SPEED TAXI SCRIPT

PRE-LOW SPEED TAXI TEST CARD

REQUIRED/DESIRED EQUIPMENT
AVAILABLE - CHECK

PRIOR TO TAXI:

A. PREFLIGHT CHECKS COMPLETE
B. LOW SPEED TAXI CHECKLISTS-REVIEWED
C. NOTIFY AIRPORT PERSONNEL
D. BRIEF GROUND OBSERVER

NEXT: LOW SPEED TAXI TEST CARD
LOW SPEED TAXI SCRIPT

CAUTION: Terminate testing if the engine gets HOT!

A Slowly taxi down the taxiway/runway.
   — Perform "S" turns

B Evaluate

<table>
<thead>
<tr>
<th></th>
<th>Good</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>Freeplay</td>
<td>None</td>
<td>Lots</td>
</tr>
<tr>
<td>Rudder Forces</td>
<td>Light</td>
<td>Heavy</td>
</tr>
<tr>
<td>Brake Drag</td>
<td>None</td>
<td>Lots</td>
</tr>
<tr>
<td>Binding Controls</td>
<td>None</td>
<td>Lots</td>
</tr>
<tr>
<td>Engine Cooling</td>
<td>Cold</td>
<td>Hot</td>
</tr>
<tr>
<td>Wheel Alignment</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>Field of View</td>
<td>Good</td>
<td>Bad</td>
</tr>
</tbody>
</table>

C Perform a 180° turn at the end of the runway.
   — Alternate directions to avoid brake wear and heating on one side

D Evaluate

<table>
<thead>
<tr>
<th></th>
<th>Easy</th>
<th>Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Easy</td>
<td>Hard</td>
</tr>
<tr>
<td>Turn Radius</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Braking Required</td>
<td>None</td>
<td>Lots</td>
</tr>
</tbody>
</table>

E Have ground crew check brake temperatures.

CAUTION: Terminate testing if brake temperatures are high, or brake "fade" is encountered.

F Repeat steps B-E until you are comfortable with slow speed taxing.

NEXT: POST-LOW SPEED TAXI SCRIPT

LOW SPEED TAXI TEST CARD

CAUTION - TERMINATE TEST IF ENGINE GETS HOT!

A SLOWLY TAXI DOWN TAXIWAY/RUNWAY

B EVALUATE HANDLING & CONTROLS

C TURN 180° AT END OF TAXIWAY/RUNWAY

D EVALUATE CONTROL AND TURN RADIUS

E HAVE GROUND CREW CHECK BRAKE TEMPS

CAUTION - TERMINATE TEST IF BRAKES GET HOT!

F REPEAT STEPS B - E AS NECESSARY

NEXT: POST-LOW SPEED TAXI CARD
### POST-LOW SPEED TAXI SCRIPT

<table>
<thead>
<tr>
<th>A</th>
<th>Remove the engine cowling.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Check for leaks.</td>
</tr>
<tr>
<td></td>
<td>— Look for leaks on the inside of the cowling</td>
</tr>
<tr>
<td>C</td>
<td>Check that all fittings are secure.</td>
</tr>
<tr>
<td>D</td>
<td>Ensure all attach points are tight.</td>
</tr>
<tr>
<td>E</td>
<td>Replace the engine cowling.</td>
</tr>
<tr>
<td>F</td>
<td>Check brakes for security and wear.</td>
</tr>
<tr>
<td>G</td>
<td>Check landing gear struts.</td>
</tr>
<tr>
<td>H</td>
<td><strong>FIX EVERY SQUAWK PRIOR TO NEXT TEST!</strong></td>
</tr>
</tbody>
</table>

**NEXT:** HIGH SPEED TAXI TESTS (HANDBOOK TEXT) | LST3

### POST-LOW SPEED TAXI TEST CARD

<table>
<thead>
<tr>
<th>A</th>
<th>REMOVE ENGINE COWLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>CHECK LEAKS</td>
</tr>
<tr>
<td>C</td>
<td>CHECK FITTINGS</td>
</tr>
<tr>
<td>D</td>
<td>CHECK ATTACH POINTS</td>
</tr>
<tr>
<td>E</td>
<td>REPLACE COWLING</td>
</tr>
<tr>
<td>F</td>
<td>CHECK BRAKES</td>
</tr>
<tr>
<td>G</td>
<td>CHECK LANDING GEAR STRUTS</td>
</tr>
<tr>
<td>H</td>
<td><strong>FIX ALL SQUAWKS</strong></td>
</tr>
</tbody>
</table>

**NEXT:** HIGH SPEED TAXI TESTS (TEXT) | LST3
HIGH-SPEED TAXI TESTS

The objectives for the high-speed taxi phase are to check proper engine operation and governed RPM at full throttle; determine if the current aircraft c.g. is proper for flight; determine the correct takeoff trim setting; determine the correct takeoff flap setting; and check basic flight control power and direction.

Make Really Sure the Aircraft, Pilot and Environment are Ready
Under no circumstances must the pilot proceed into this phase unless the aircraft, the pilot and the flight environment are ready for a first flight! Many high-speed taxi tests have ended up in first flights, and if the pilot has fooled him- or herself into thinking "The weather's not good for flight, but I can do some high-speed taxiing", the potential for an accident is extremely high.

The Key to Staying on the Ground is Power Management and Runway Length
The reason pilots get airborne inadvertently is that they don't realize how far back power must be retarded to maintain a high-speed taxi, and the reason they run off the end of the runway is they don't realize how quickly runway is used up during a high speed taxi!

The Power Must be Retarded Nearly to Idle
That's right. It only takes a small amount of power above idle to maintain a high taxi speed. Remember, the excess horsepower available at takeoff is used to get climb rate. Even at half-throttle, the aircraft should climb a little...which is to say it has more than enough power to keep accelerating to above takeoff speed. A little practice with the high-speed taxi test cards in an airplane that has equivalent power loading (see Appendix C) will do wonders in increasing the pilot's situational awareness during this demanding task. The pilot should throttle up normally, track the centerline precisely,
and reduce power to just above idle when he/she reaches the target speed. Cross-check speed and runway positioning to be sure the aircraft is stabilized, then conduct tests.

The Runway Length Should Be Equal to Six Times the Expected Takeoff Distance
This may seem like a lot, but many of our planes get airborne in under 1,000 feet, so a 6,000-foot runway is adequate. Pilots with hot planes like Glasair IIIIs, Lancair 320s/IVs, and Swearingens need all the runway they can get...10,000 feet if able. Many times such a runway is available only at a tower-controlled airport. That’s OK. Have the pilot talk to the tower folks ahead of time with his/her plan of action. When they see how organized and professional the pilot you are advising is, they will be more than cooperative with what the pilot wants to do.

Plan a Terminate Distance Twice the Normal Landing Distance
That distance will be in the neighborhood of 2,000-3,000 feet. After several high-speed taxi tests, the brakes will start to warm up and lose effectiveness. The pilot will need that extra distance to get stopped. Remember to terminate testing if the brakes get excessively hot. With all this in mind, let’s look at the mission events.

First, Determine if the C.G. is Correct and the Trim is Correct for No Flaps
The tail or nose of the aircraft should be able to be raised and stabilized at about 80% of the computed takeoff speed. An inability to do this indicates several problems...landing gear in the wrong place, c.g. in the wrong place, or insufficient tail control power. Original designs need to worry about all three problems, while known designs usually have to worry only about the c.g. If the tail or nose can be raised, but the forces are excessively high, the aircraft is out of trim. The pilot needs to use his or her powers of observation to determine what is going on during the high-speed taxi and analyze the causes.
Next, Determine the Best Flap Setting for Takeoff

Normally, this will be either no flaps or flaps down half of their travel. There are several test points in the cards with 3/4 and full flaps. One may wonder "Why would I do full-flap, high-speed taxiing?"...and you may not want to. Remember, these are generic cards meant to cover all situations, from a restored contemporary Cessna 172 to a one-off 400hp turbo-intercooled composite X-Wing fighter replica. Full-flap taxi testing may reveal unknown problems in a brand new design, while still close to the ground and relatively slow. If you are the 60th person in your area to build an RV-6, on the other hand, you should be able to get a pretty good handle from other builders and the manufacturer on what the proper flap settings for takeoff will be. If there are steps on the flight cards or scripts that are not applicable to a particular situation, just use a thick black marker and line through those steps on your photocopied cards. Leave the originals intact, however! You never know when your hangar mate will finish that secret project.....

Last, Determine the Best Trim Setting for Your (Pre)Determined Takeoff Flap Setting

The cards give all the details. Note this entire procedure is rather lengthy and may involve far more high-speed taxiing than one would originally think. Keep a close eye on engine temperatures and brake condition. Both can get plenty hot in a hurry. Also, most engine manufacturers caution against excessive low-power engine operation on freshly overhauled engines, especially those with chrome cylinders. If this situation can be avoided at all, do it. Paying the money to have your engine run in on a test stand at an engine rebuilding facility is a lot cheaper than paying for a premature top overhaul.

There are Five High-Speed Taxi Script Cards

Follow the cards as listed on the next five pages!
**PRE-HIGH SPEED TAXI SCRIPT**

**EQUIPMENT:**
- Required: 1. Ground observer
- Desired: 2. A fire extinguisher
- 2. VHF radio for your ground observer
- 3. Portable video camera

**PRIOR TO TAXI**

**A** Ensure the Low Speed Taxi Testing checklists have been complied with completely.

**B** Review all of the High Speed Taxi checklists.
- Fill in all required information prior to test

**C** Notify airport personnel of your taxiing.

**D** Place prominent markers at the terminate point.

**E** Brief your ground observer on the following:
- What to watch (traffic, parts, smoke, or anything unusual).
- What to say on the radio ("Stop", "Fire").
- How to check the brake temperatures (CAREFULLY, watch the prop!).
- Where the best place to observe is (1/2 way down runway).

**F** Review and have a copy of your first flight test cards with you.

**G** Fill gas tank with enough fuel for about 4 times your estimated first flight profile.
(just in case)

**H** Calculate your CG.

**I** Set the trim tabs to their streamlined position.

**K** Sit in the cockpit and have someone raise/lower the tail, to get the takeoff "picture" and check for propeller clearance on taildraggers.

**NEXT:** HIGH SPEED TAXI SCRIPT  |  HST1

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**PRE-HIGH SPEED TAXI TEST CARD**

**REQUIRED/DESIRED EQUIPMENT AVAILABLE - CHECK**

**PRIOR TO TAXI**

**A** LOW SPEED TAXI CHECKS - COMPLETE

**B** HIGH SPEED TAXI CHECKLISTS - REVIEWED

**C** NOTIFY AIRPORT PERSONNEL

**D** MARKERS AT TERMINATE POINT

**E** BRIEF GROUND OBSERVER

**F** FIRST FLIGHT CHECKLISTS - REVIEWED AND ON BOARD

**G,H** REQUIRED FUEL ON BOARD, CG CALCULATED

**I** TRIM TABS - STREAMLINED

**K** OBSERVE TAKEOFF ATTITUDE

**NEXT:** HIGH SPEED TAXI TEST CARD  |  HST1
**HIGH SPEED TAXI SCRIPT**

**No Flap Takeoff Speed Determination**

<table>
<thead>
<tr>
<th>A</th>
<th>Ease the power in to accelerate 5 mph/knots above the last test point (test into the wind)!</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE:</td>
<td>On short runways, you must add power quicker than on long runways.</td>
</tr>
<tr>
<td>B</td>
<td>Evaluate</td>
</tr>
<tr>
<td></td>
<td>Sensitivity</td>
</tr>
<tr>
<td></td>
<td>Freeplay</td>
</tr>
<tr>
<td></td>
<td>Rudder Effectiveness</td>
</tr>
<tr>
<td></td>
<td>Elevator Effectiveness</td>
</tr>
<tr>
<td></td>
<td>Aileron Effectiveness</td>
</tr>
<tr>
<td></td>
<td>Brake Drag</td>
</tr>
<tr>
<td></td>
<td>Binding Controls</td>
</tr>
<tr>
<td></td>
<td>Engine Cooling</td>
</tr>
<tr>
<td></td>
<td>Wheel Alignment</td>
</tr>
<tr>
<td>C</td>
<td>Perform a 180° turn at the end of the runway.  - Alternate directions for even brake wear</td>
</tr>
<tr>
<td>D</td>
<td>Record evaluations made during the test. Note: Raised tail/nose @ mph/knots</td>
</tr>
<tr>
<td></td>
<td>If control force is excessive, adjust trim.</td>
</tr>
<tr>
<td>F</td>
<td>Have ground crew check brake temperature.</td>
</tr>
<tr>
<td>G</td>
<td>Repeat steps A-F until the aircraft begins to feel &quot;light&quot; or you're &quot;forcing&quot; the aircraft to stay on the ground.</td>
</tr>
<tr>
<td></td>
<td>CAUTION: Terminate testing if the engine gets HOT!</td>
</tr>
<tr>
<td>H</td>
<td>Note: Predicted no-flap liftoff @ mph/kts</td>
</tr>
</tbody>
</table>

**NEXT:** Determination of Takeoff flap setting  

**HIGH SPEED TAXI TEST CARD**

**No Flap Takeoff Speed Determination**

<table>
<thead>
<tr>
<th>A</th>
<th>EASE IN POWER - 5 KNOTS HIGHER THAN LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>EVALUATE CONTROLS, ENGINE, BRAKES</td>
</tr>
<tr>
<td>C</td>
<td>180 TURN AT END OF RUNWAY</td>
</tr>
<tr>
<td>D</td>
<td>RECORD EVALUATIONS WITH MONITOR</td>
</tr>
<tr>
<td>E</td>
<td>ADJUST TRIM IF NECESSARY</td>
</tr>
<tr>
<td>F</td>
<td>GROUND CREW CHECK BRAKE TEMPS</td>
</tr>
<tr>
<td>G</td>
<td>REPEAT A-F UNTIL A/C FEELS &quot;LIGHT&quot;</td>
</tr>
<tr>
<td>H</td>
<td>NOTE: PREDICTED NO-FLAP LIFTOFF IS: ----- MPH/KNOTS</td>
</tr>
</tbody>
</table>

**CAUTION - TERMINATE TEST FOR HOT BRAKES OR HOT ENGINE!**

**NEXT:** DETERMINE T/O FLAP SETTING  

HST2
HIGH SPEED TAXI SCRIPT
Takeoff Flap Setting Determination

A Lower flaps to 1/4 of their full travel.
B Start testing at 1/2 your predicted no-flap take-off speed.
C Ease the power in to accelerate 5 mph/knots above the last test point (test into the wind!)

NOTE: On short runways, you must add power quicker than on long runways.

D Evaluate
<table>
<thead>
<tr>
<th>Rudder Effectiveness</th>
<th>Very</th>
<th>Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator Effectiveness</td>
<td>Very</td>
<td>Not</td>
</tr>
<tr>
<td>Aileron Effectiveness</td>
<td>Very</td>
<td>Not</td>
</tr>
<tr>
<td>Binding Controls</td>
<td>None</td>
<td>Lots</td>
</tr>
<tr>
<td>Engine Cooling</td>
<td>Cold</td>
<td>Hot</td>
</tr>
</tbody>
</table>

E Perform a 180° turn at the end of the runway. — Alternate directions for even brake wear
F Record evaluations made during the test.
  Note Raised tail/nose @ mph/knots
G If control force is excessive, adjust trim.
H Have ground crew check brake temperature.

CAUTION: Terminate testing if brake temperatures are high, or brakes start to “fade”.

I Repeat steps C-H until the aircraft begins to feel “light” or you’re “forcing” the aircraft to stay on the ground.

CAUTION: Terminate testing if the engine gets HOT!

J Note

<table>
<thead>
<tr>
<th>Configuration</th>
<th>LIFTOFF</th>
<th>PREDICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPH/KNOTS</td>
<td>FT</td>
</tr>
<tr>
<td>1/4 flaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 flaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 flaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full flaps</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

K Repeat steps B-J using 1/2, 3/4 and full flaps.

NEXT: Determination of takeoff trim setting

HST3

HIGH SPEED TAXI TEST CARD
TAKEOFF FLAP SETTING DETERMINATION

A LOWER FLAPS TO 1/4 TRAVEL
B START SPEED = 1/2 NO FLAP V_{TO}
C EASE IN POWER AS NECESSARY
D EVALUATE CONTROLS & ENGINE
E,F 180 TURN, RECORD EVALUATIONS
G ADJUST TRIM IF NECESSARY
H GROUND CREW CHECK BRAKE TEMPS
I REPEAT C-H UNTIL A/C FEELS “LIGHT”
J PREDICTED SPEEDS & DISTANCES:
  1/4 FLAPS: _____ MPH/KNOTS _____ FT
  1/2 FLAPS: _____ MPH/KNOTS _____ FT
  3/4 FLAPS: _____ MPH/KNOTS _____ FT
  FULL FLAPS: _____ MPH/KNOTS _____ FT

CAUTION - TERMINATE TEST FOR HOT BRAKES OR HOT ENGINE!

K REPEAT B-J USING 1/2, 3/4, AND FULL FLAPS

NEXT: DETERMINE T/O TRIM SETTING

HST3
### HIGH SPEED TAXI SCRIPT
**Takeoff Trim Setting Determination**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Set the flaps at the pre-determined takeoff position:</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Ease the power in to accelerate to the highest speed attained at that flap setting: _____ mph/kts (test into the wind)</td>
</tr>
</tbody>
</table>

**NOTE:** On short runways, you must add power quicker than on long runways.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C</strong></td>
<td>Evaluate Rudder Forces Little Lots</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elevator Forces Little Lots</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aileron Forces Little Lots</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D</strong></td>
<td>Perform a 180° turn at the end of the runway.</td>
</tr>
<tr>
<td></td>
<td>Alternate directions for even brake wear</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Record evaluations made during the test.</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Have ground crew check brake temperature.</td>
</tr>
</tbody>
</table>

**CAUTION:** Terminate testing if brake temperatures are high, or brakes start to "fade".

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G</strong></td>
<td>Repeat steps B-F, make a small adjustment to the trim to relieve control forces at highest speed.</td>
</tr>
</tbody>
</table>

**NOTE:** If you have a fixed rudder/aileron trim you may have to readjust them for cruise.

**CAUTION:** Terminate testing if the engine gets HOT!

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H</strong></td>
<td>Mark the takeoff trim position.</td>
</tr>
</tbody>
</table>

NEXT: Post-High Speed Taxi Script | HST4
<table>
<thead>
<tr>
<th>POST-HIGH SPEED TAXI SCRIPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>NOTES:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POST-HIGH SPEED TAXI TEST CARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>NOTES:</td>
</tr>
</tbody>
</table>

NEXT: First Flight (Handbook Text)  HST5  

NEXT: FIRST FLIGHT (HANDBOOK TEXT)  HST5  

A-14
FIRST FLIGHT LIKE A PRO

The Following Article Should be Read by the Prospective Pilot and the Flight Advisor

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First Flight Like a Pro

Well, there it is. Your brand new homebuilt, new ultralight, or freshly restored classic aircraft is finally ready after months or years of toil and sits there, gleaming on the ramp at your airport. It is time to take her into the air for first flight. But wait! You are about to enter a whole new world...and in this new world there are many dangers. You are about to become a test pilot. Not only that, you are about to become a new test pilot in an unproven air vehicle. And even though the airplane is unproven, the accident records show that the majority of mishaps in sport aviation occur due to pilot-induced factors during the first 10 hours of flight, and that most of those could be prevented if the pilot had taken adequate precautions to minimize the risk associated with the first few flights. This is the goal of flight test preparation – to minimize the risk of a first flight in a new aircraft.

You Must Have Specific Objectives for the Flight

Note that it is impossible to eliminate risk in a first flight. You can minimize risk, however, by a few simple steps. First, you must carefully consider the exact objective of the flight you are about to perform. Your flight objectives must be specific and detailed. For example, it is not adequate to say to yourself, "The objective of the first flight in my new RV-6 is to perform the first flight." Your objectives should naturally drive the
specific maneuvers and actions you will perform before and during the test flight. Try this instead: "The objectives of the first flight in my new RV-6 are to verify the initial handling qualities of the airframe, and to check engine operation, engine cooling and initial function of basic aircraft systems such as flaps and trim." All of your activities in preparation for the first flight should be oriented towards fulfilling these objectives.

Consider the Aircraft, The Pilot and the Flight Environment

Next, you must understand there are three major sub-areas that must be considered during your preparations: 1) The Aircraft, 2) The Pilot and 3) The Flight Environment. Most builders/restorers only look at the first sub-area...they do a beautiful job of building their dream planes; and many unconsciously fulfill the airframe's part in achieving the first flight objective...by carefully rigging the flight controls, doing a clean job in engine installation according to standard aviation practices, making sure the weight and balance is correct, and so on. However, the preparations of the pilot and the role that overall environmental factors play in the first flight are usually overlooked.

Currency Does Not Equal Proficiency

To prepare yourself for the first flight, you must be proficient in your flight skills and have a plan for your first flight. Notice I did not say current...there is a vast gulf between currency and proficiency. You gain proficiency for the task at hand by flying traffic patterns in an aircraft that is the same type as yours (someone else's RV-6 in our example). If the same type of aircraft is unavailable, you should find an aircraft to borrow or rent that has similar handling qualities and layout. In our example case, flying patterns in an AA-1 Yankee would be a very good way to increase your proficiency. You also should look back at your objectives and determine which of them may go unfulfilled...which is a fancy way of saying that something goes wrong. Let's say the test aircraft turns out to have inadequate trim authority, or is way out of rig. To prepare for this, while flying in a friend's RV-6, deliberately mis-trim the aircraft in pitch and perform a landing. If the landing goes well, try mis-trimming the aircraft in roll and dealing with
that. You may have to contend with engine failure and a dead-stick landing on your first flight. Why not get a couple of hours in an aircraft that always has engine failure...a glider! Hands-on experience in several different types of aircraft will help you deal with the unfamiliarity of your new plane.

It's OK to Use a Professional or More Experienced Test Pilot
You may decide that even though you have some recent, substantial flight experience, and are otherwise qualified to make the first flight, you would rather have someone else who is more qualified take the aircraft up on its first flight. There is nothing wrong with that. In fact, making this type of level-headed decision shows you are truly concerned with the overall safety and professional conduct of the flight and don't need to feed your ego.

You Need A Plan
Now we need the plan I talked about a couple of paragraphs ago. To fulfill your objectives, you will need to use the written set of cards following this section as a step-by-step checklist or script of exactly how you will accomplish the flight. The use of test cards is how we conduct flight test in the USAF, so if it's good enough for the B-2, it should be good enough for our RV-6, and good enough for you. We said we wanted to check the initial handling qualities of the airplane and verify engine and basic systems operation. With this in mind, the first flight includes:

Normal Ground Operations, Taxi and Engine Run-up
Obviously, if the engine starts and does not leak hydrocarbons all over the place, you're doing OK. Radio operation can be checked on taxi out with ground control or Unicom. The engine run-up can catch a whole host of problems if you pay close enough attention to the engine. The proper performance of the run-up is a subject unto itself, and has been treated by writer Kas Thomas in many of his books and articles in his magazine, TBO Advisor. Suffice it to say the run-up not only checks the ignition, but
determines the overall readiness of the engine for flight.

**Takeoff and Climb, Staying Within the Glide Cone**
The takeoff and climb portions of the first flight are rather obvious, but many times I have seen people fly out of the glide cone because they were too afraid to turn right away, or they had never even considered what a "glide cone" is. The glide cone is basically an inverted cone of airpace centered on your airport in which you will be able to maneuver back to the airport in the event of engine failure. If you are too low and too far away from the airport, you will not be able to glide back. As I said, people tend to fly out of the glide cone because they are afraid to turn or disturb the airplane's attitude. It has been my experience that the primary problem folks run into on first flight is poor engine cooling, with outright engine failure due to fuel starvation from whatever cause a close second. Flight control problems are generally not a player at typical climb speeds. With all this in mind, you should **climb straight ahead until 400 feet AGL, then execute a climbing turn 180° to downwind.** You are in no-man's-land until you finish the 180° turn, so if the engine quits at this point you should land straight ahead, turning only to avoid obstacles. After the 180 you are home free! Depending on the climb performance of the airplane, you can either set up for a downwind for the runway you just took off from, or turn a modified base leg for opposite direction traffic, if you must land immediately. If something goes wrong, FLY THE AIRPLANE. It's been said before, but people keep on crashing because they quit flying the plane. Remember, you are much more likely to have to land the aircraft with some anomaly on a first flight. Plan for those emergencies, practice them on the ground and during your preparation flights, and be ready and alert.

**Climbout Engine Checks**
We are now within the glide cone and climbing out over the airport on downwind. If the engine quits anywhere, we can make it to the airport. Whew! Now, let's look at the gauges. Oil pressure, oil temperature, fuel pressure and cylinder head temperatures are
what you are interested in. Oil pressure should be steady, but may be falling if the oil
temp is rising. Fuel pressure should be rock-steady and stay that way. Fluctuating fuel
pressure is a warning sign of fuel starvation. CHT will probably be high, but should
settle to some steady value. Everything in the green or yellow? Good. Remember
what's in the yellow, but nothing should explode during the 30 seconds it takes for you
to do the next step...

**Initial Handling Qualities Checks**

Is the aircraft trimmed? You would be amazed how many people have flown a first flight
with the plane way out of trim and not noticed it, because they did not specifically check
for trim and because they had a death grip on the stick anyway. Trim it hands off. If you
can't, note on your card what is wrong or call it out on the radio to your observers. Next,
check the flight controls for proper function. The order is rudder, ailerons, elevator nose
down and elevator nose up. Rudder deflection should be small, and give a linear force
feedback (push further, takes more force) and a little sideslip, followed by a little roll in
the same direction. Aileron deflection should, of course, roll the airplane, and a small
deflection should not cause too much adverse yaw. Again, the force should be positive
and linear. Ailerons sometimes have a force reversal or "snatch", which means you
push harder for the first portion of stick deflection, then easier as the deflection grows. If
you're not ready for it, and the ailerons are messed up enough to have this problem, the
stick can even be pulled out of your hand all the way to the stop. On the good-bad
scale, this is bad. Lastly, put in a small nose-down pitch input, then a small nose-up
pitch input. Forces should be linear and evenly matched in both directions, with the
stick wanting to return to the trimmed position. The aircraft response should be positive
and evenly matched. Look for excessive freeplay and friction during these checks.
Friction in the control system is your worst enemy. Get rid of it no matter how much you
have to spend on bearings. Does the plane fly like a plane? That's really the depth of
what we're checking here. Now check your position relative to the airport, turn if
necessary to stay within the glide cone, and take a look at the engine instruments.
Engine Checks

How is the engine doing? Anything hot? Is the oil pressure still steady or falling very slowly? Good. By now everything should be warmed up plenty! Your task for the next few minutes is to closely monitor the engine, without touching the throttle. It should still be at full power, with the mixture full rich. You want to see the trends in oil pressure, oil temperature, cylinder head temperature, and fuel pressure. Take a glance at the ammeter also, to see that the battery is charging back up. If anything approaches redline or passes, it's time to terminate the mission. Remember, you have been climbing within the glide cone all this time...so if you pull the throttle back and the engine quits, you can glide back for a landing. You are really good at glider landings anyway from your practice before this flight, so a flameout approach is no sweat. See how we anticipate problems and practice likely scenarios before the real thing? This is how we minimize the risk.

Watch for Signs of Engine Break-In

If you have a new engine in your aircraft, expect it to run hot for awhile...especially if it has chrome cylinders. I have found that a new engine runs hot for between 18 and 22 minutes at full power, then there is a sudden drop in CHT of about 30°. A few minutes later, the oil temperature will drop a little, too. Watch for it! Use your ground observer to help you keep track of trends if you can't. We should be up around 5,000 feet AGL by now. Level off, but use a banked turn and a little g-force to help hold the speed down. If you aren't breaking in a new engine, you can reduce throttle and monitor the engine parameters. If you are, keep turning to control speed and maintain full throttle for 30 minutes or until you see the CHT drop as mentioned above. Under no circumstances should you allow the speed to increase above 140 knots, unless you are flying a BD-10! Envelope expansion will come later in the flight program. Right now we want to keep monitoring the engine and get ready for a practice approach and landing. Like everything else in flight test, we build up to this task, as follows:
Power Effects

If your engine is mounted so its thrust line passes well above or below the vertical c.g. of the plane, expect significant pitch trim changes with power changes. We want to find out what the power effects are all by themselves...which is why we don't jerk the throttle to idle and throw the flaps back down all at once. In level medium cruise flight with the aircraft trimmed hands off, slowly reduce the throttle to idle. Did the nose pitch? You will probably see a little yaw or yaw/roll as well, but that is easily controlled. Sudden massive pitch trim changes near the ground due to power will cause big problems. You Buccaneer, Seawind and BD-5 pilots ought to be noticing a pitch up here. Trim it out for the idle power condition and then slowly add full power. Check again for pitch trim changes, and remember what you just learned for the next step.

Near Stall Investigation

This still falls under the "Initial Handling Qualities Checks" portion of our objectives. We're going to slow down incrementally and do the same handling qualities check we did on climbout. We'll start at our medium cruise speed or climb speed (less than 140 knots), reduce power, trim, then check rudder, ailerons, elevator nose down, elevator nose up. Everything OK? Slow down 5 knots and do it again. When you've lost 1,000 feet (i.e., you're down to 4,000 feet AGL) add power and climb back up to 5,000 feet AGL. Drop 5 more knots and do it again. Your end point will be at 1.1 times your calculated V-stall. If anything weird happens or you get prestall warning of some kind, stop there and use that as your go-no-slower-than airspeed for the rest of the flight. Now go back to 5,000 feet AGL, check to be sure you are below flap deployment speed ($V_{fo}$ for you nit-pickers) and slowly extend flaps. Be very observant as to trim change with flaps. Trim it out, and repeat the control checks/drop 5 knots/checks/climb up as required.
Practice Approach and Landing
Now we will start at 5,000 feet AGL, below $V_{so}$, and put out flaps as if we are getting ready to land. Adjust power and trim to maintain 1.3 $V_{stall}$ and 500-feet per minute down on the VVI. This will probably take some time to get the power correctly set. Watch that you don't get too low. Now pretend the runway is coming up and you are starting your roundout. Slowly reduce power and raise the nose to zero out your sink, while going no slower than 1.1 $V_{stall}$ or the speed you determined in the last step. If you can do this way up high like this without any strangeness or surprises, you are ready to return and land. Increase speed for your descent and raise flaps if you want.

Real Approach and Landing
Descend back down to the airport and set up for a straight in or high wide downwind. We still want to stay within the glide cone, so plan accordingly. Next, accomplish your before landing checks to include flap extension, mixture rich, fuel selector on the fullest tank and so on. The approach should look just like the one you practiced, except the power may be a little lower. Remember, we don't want a full-stall landing on this first flight. A touchdown just faster will keep us from expanding the right side of the envelope next to the hard earth. Taildragger? Try a tail-low wheel landing like the P-51s do. Be very alert to what the plane is telling you as you approach and round out. Most new test pilots actually make decent landings on their first flights because they are "gained up". That's a fancy term for high concentration and workload to precisely accomplish a task. The landing shouldn't be too difficult because you also made sure the flight environment was ready, too.

Don't Forget the Flight Environment
Yeah, the flight environment! That's the third factor we mentioned way back at the beginning of this article. Weather, type of airport, traffic, time of day and that crowd of gawkers waiting for you to do your flight are all factors external to the pilot and the aircraft which also must be dealt with. You want to minimize the stress and workload
associated with these factors. Weather is obvious...no crosswind, 5 knots max wind in
any direction, a VFR day with at least a 6,000-foot ceiling and no lower cloud decks are
good guidelines. Do you have a choice of airport? Carefully weigh the alternatives
between a tower-controlled airport with big runways and low traffic versus the podunk
airstrip down the road with a fire department consisting of pigs and chickens. The ideal
airport in my humble opinion would be a tower-controlled airport with light or medium
traffic and a 5,000-foot or longer hard-surface runway. Some folks don't like controlled
fields but if something goes wrong at least they can call out the fire department and the
paramedics. Don't make your first flight a social event. The self-imposed stress of
pleasing a crowd of well-wishers has caused many a pilot to make poor decisions if
other things weren't right.

**Summing Up**
This is how you do a first flight like the pros do it. We have considered all the factors
that enter into the flight, we have adequately prepared the pilot (you!) and we are
approaching the task at hand with a careful, cautious and professional attitude. The
only things you still need are a pack of Beeman's gum and a West Virginia drawl....and
the scripts and flight cards on the following nine pages.
### FIRST FLIGHT PRE-FLIGHT SCRIPT

**EQUIPMENT:**
- Required:
  - 1. RPM, oil pressure and temperature gauges (Manifold pressure for constant speed props)
  - 2. Airspeed indicator and altimeter
- Desired:
  - 1. Parachute, fire resistant gloves and flight suit
  - 2. Two-way radio for you and your ground observer
  - 3. Someone other than yourself to fly the aircraft, per FA-guided pilot self-determination

**PRIOR TO FLIGHT**

**A** Complete all ground testing and FIX all deficiencies before flying

**B** Fly at least 2 similar aircraft within the past 30 days

**NOTE:** If you do not fly any familiarization sorties, your ability to determine aircraft deficiencies is limited by when you flew last and your total experience

**C** Develop a checklist for the following:
- Takeoff, landing, climb, cruise, and descent

**D** Develop a plan for handling emergencies
- Engine: failure, overheat, vibration, smoke and fire
- Flight controls: out-of-rig, binding, flap problem
- Fuel Starvation, Electrical Failure, etc.

**E** Discuss your test plans with pilots who have flown first flights
- Listen to their advice
- Adjust your test plan

**F** Review your first flight test plan (again and again)

**G** Wait for a good weather day
- Clear sky, early in the morning with calm winds

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### NEXT: page 2 of First Flight Pre-Flight Script

**H** Notify airport personnel and emergency crew of your intention to fly a first flight

**I** Place markers on each side of runway at the abort point

**J** Brief ground observer on the following:
- Equipment use: - Radio
  - Frequency and its use
  - Binoculars
- Emergency procedures: - Report anything unusual
  - Smoke, fire
  - Any part falling off
  - Notify emergency crew/fire department
- Takeoff: - Report on radio if not airborne 1/2 way down the runway
  - Record takeoff distance
- Up and Away: - Monitor flight with binoculars
  - Report anything unusual
  - Monitor flight time, remind when it's time to land
  - Monitor radio and give assistance as necessary
- Landing: - Monitor flight path
  - Report anything unusual
  - Report on radio, height above the ground
  - "3 feet", "2 feet", "1 foot", "6 inches"
  - "Touchdown"
  - If touchdown does not occur prior to 1/2 way down the runway, report "Go-Around"
  - Record landing distance
- Thoroughly brief entire flight plan
- Any questions from ground observer?

**K** Ground observer in position, 1/2 way down runway

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**NEXT:** First Flight Scripts and Flight Test Cards
**FIRST FLIGHT CHECKLIST**

<table>
<thead>
<tr>
<th>Pilot:</th>
<th>Winds:</th>
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<table>
<thead>
<tr>
<th>Pressure altitude:</th>
<th>Temperature:</th>
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<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start engine according to checklist.</td>
<td>Accomplish before taxi and taxi checklists.</td>
<td>Trim set at:</td>
<td>Flaps set at:</td>
<td>Review takeoff data: Takeoff speed:</td>
<td>Takeoff distance:</td>
<td>Lineup on the runway, align with a known reference for takeoff distance measurement.</td>
<td>Takeoff using techniques obtained during taxi testing.</td>
<td>DO NOT REPOSITION GEAR OR FLAPS.</td>
<td>Climb at:</td>
<td>Reduce power slowly and level off.</td>
<td>Check Throttle, Prop, Mixture @ level off and check Cowl Flaps Closed</td>
<td>Check engine instruments.</td>
</tr>
</tbody>
</table>

**NEXT:** Control Effectiveness  FF3

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**FIRST FLIGHT TEST CARD**

**TAKEOFF / CLIMB**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<th>I</th>
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</thead>
<tbody>
<tr>
<td>START ENGINE</td>
<td>ACCOMPLISH BEFORE TAXI AND TAXI CHECKLISTS</td>
<td>CONFIRM TRIM SET AT TAKEOFF MARK</td>
<td>REVIEW: TAKEOFF SPEED _________ TAKEOFF DIST _________</td>
<td>LINEUP ON RUNWAY</td>
<td>TAKEOFF - NOTE TAKEOFF SPEED</td>
<td>DO NOT REPOSITION GEAR OR FLAPS</td>
<td>CLIMB 400 FEET, TURN DOWNWIND</td>
<td>LEVEL OFF AT LEAST 2,000 FEET AGL</td>
<td>CHECK ENGINE</td>
<td>CHECK FUEL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NEXT:** CONTROL EFFECTIVENESS  FF3

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*Note:* The image contains printed text and checklists relevant to flight operations, including start engine procedures, reviewing takeoff data, and various takeoff and climb instructions. The text is divided into sections labeled A through M, each detailing specific actions to be taken during the takeoff and climb phases of a flight.
### Control Effectiveness

**Trim aircraft for the following**

**Test Altitude:**

**1.5 Vstall = Test Airspeed:**

<table>
<thead>
<tr>
<th>A</th>
<th>Small rudder input. (test in both directions)</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>Evaluate</td>
</tr>
<tr>
<td></td>
<td>BINDING</td>
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<tr>
<td></td>
<td>FREEPLAY</td>
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<td></td>
<td>CONTROL MOVEMENT</td>
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<td></td>
<td>CONTROL FORCES</td>
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<tr>
<td></td>
<td>AIRSPEED CHANGE</td>
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<tr>
<td></td>
<td>ALTITUDE CHANGE</td>
</tr>
<tr>
<td></td>
<td>AIRCRAFT RESPONSE</td>
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<tr>
<td></td>
<td>LEFT INPUT:</td>
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<td></td>
<td>RIGHT INPUT:</td>
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<table>
<thead>
<tr>
<th>C</th>
<th>Small aileron input. (test in both directions)</th>
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</thead>
<tbody>
<tr>
<td>D</td>
<td>Evaluate</td>
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<tr>
<td></td>
<td>BINDING</td>
</tr>
<tr>
<td></td>
<td>FREEPLAY</td>
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<tr>
<td></td>
<td>CONTROL MOVEMENT</td>
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<td>CONTROL FORCES</td>
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<td></td>
<td>AIRSPEED CHANGE</td>
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<td></td>
<td>ALTITUDE CHANGE</td>
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<td>AIRCRAFT RESPONSE</td>
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<td>LEFT INPUT:</td>
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<td>RIGHT INPUT:</td>
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<table>
<thead>
<tr>
<th>E</th>
<th>Small elevator input. (test in both directions)</th>
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<tr>
<td>F</td>
<td>Evaluate</td>
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<tr>
<td></td>
<td>BINDING</td>
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<tr>
<td></td>
<td>FREEPLAY</td>
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<td></td>
<td>CONTROL MOVEMENT</td>
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<td>CONTROL FORCES</td>
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<td>FORWARD INPUT:</td>
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<td></td>
<td>AFT INPUT:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G</th>
<th>Check engine instruments.</th>
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</thead>
<tbody>
<tr>
<td>H</td>
<td>Check fuel quantity.</td>
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</table>

**Next: Power effects**

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### First Flight Test Card

**Control Effectiveness**

<table>
<thead>
<tr>
<th>A</th>
<th>Small rudder input, one way</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Evaluate rudder control and A/C response - wait - repeat opposite</td>
</tr>
<tr>
<td>C</td>
<td>Small aileron input, one way</td>
</tr>
<tr>
<td>D</td>
<td>Evaluate aileron control and A/C response - wait - repeat opposite</td>
</tr>
<tr>
<td>E</td>
<td>Small elevator input, nose down</td>
</tr>
<tr>
<td>F</td>
<td>Evaluate elevator control and A/C response - wait - repeat nose up</td>
</tr>
<tr>
<td>G</td>
<td>Check engine</td>
</tr>
<tr>
<td>H</td>
<td>Check fuel</td>
</tr>
</tbody>
</table>

**Next: Power effects**
POWER EFFECTS
Trim aircraft for the following
Test Attitude: ___________ Test Airspeed: ___________

A  Slowly reduce the power to idle.
B  Record forces required to maintain attitude
   PITCH  FORWARD  -----------  AFT
   AILERON  LEFT  -----------  RIGHT
   RUDDER  LEFT  -----------  RIGHT
C  Increase the power to maximum allowable.
D  Record forces required to maintain attitude
   PITCH  FORWARD  -----------  AFT
   AILERON  LEFT  -----------  RIGHT
   RUDDER  LEFT  -----------  RIGHT
E  Check engine instruments.
F  Check fuel quantity.

NEXT: Near Stall Investigation  FF5

FIRST FLIGHT TEST CARD
POWER EFFECTS

A  SLOWLY REDUCE POWER TO IDLE
B  EVALUATE CONTROL FORCES TO MAINTAIN ATTITUDE
C  SLOWLY INCREASE POWER TO MAXIMUM
D  EVALUATE CONTROL FORCES TO MAINTAIN ATTITUDE
E  CHECK ENGINE
F  CHECK FUEL

NEXT: NEAR STALL INVESTIGATION  FF5

A-27
NEAR STALL INVESTIGATION
Configuration: (should be the same as T/O)
Trim aircraft for the following:
Test Altitude: ___________ Test Airspeed: ___________

NOTE: Do not descent below _____ during this evaluation, if necessary climb then continue.
A Reduce power to idle and start a slow descent.
   — maintain airspeed
B Note response to left, then right, rudder input
C Note response to left, then right, aileron input
D Note response to small pitch down input, then
   Note response to small pitch up input.
E — Note any unusual responses
F Observe pitch attitude and VVI.
G Note stick forces. Is trim effective?
H Take note of any airframe/control buffet.
I Slowly reduce airspeed by 5 mph/knots.

CAUTION #1: Do not decrease airspeed slower than:
   — _______ mph/knots (1.1VVs1 or Vs1+5,
   — Any increasing buffet whichever is higher)
   — Full aft stick required
   — Any unusual aircraft response
J Monitor engine instruments and clear engine.
K Repeat steps B through I.
   — Until reaching limits found in CAUTION #1
L Check fuel quantity.
M Note final airspeed.

CAUTION #2: PRESTALL BUFFET MAY BE NON-EXISTENT AND STALL MAY BE ABRupt WITH LITTLE/NO WARNING. THE AIR CRAFT MAY DEPART CONTROLLED FLIGHT WITH AN ABRupt ROLLING OR YAWING MOTION
NOTE: To recover the aircraft apply:
   — Smooth, forward stick/yoke
   — Roll wings level (use rudder if effective)
   — Then add power

NEXT: Accelerate/Climb, change Flap setting

FIRST FLIGHT TEST CARD
NEAR STALL INVESTIGATION

A SLOWLY REDUCE POWER TO IDLE - DESCEND TO MAINTAIN AIRSPEED
B RUDDER LEFT - RUDDER RIGHT
C AILERON LEFT - AILERON RIGHT
D,E PITCH DOWN - PITCH UP - RESPONSES?
F,G, &H NOTE ATTITUDE - VVI - TRIM - FORCES
I REDUCE AIRSPEED 5 MPH/KNOTS WITH SLIGHT PITCH UP, AND STABILIZE
   CAUTION: NO SLOWER THAN _____ MPH/KTS OR ANY UNUSUAL A/C REACTION
J CHECK ENGINE & FUEL
K REPEAT B THROUGH I UNTIL LIMITS IN CAUTION, ABOVE
L CHECK FUEL
M NOTE FINAL AIRSPEED

NEXT: ACCELERATE/CLIMB, CHANGE FLAPS
ACCELERATE/CLIMB, CHANGE FLAP SETTING
Trim aircraft for the following (1.4 * Vs1)
Test Altitude:_________ Test Airspeed:_________

CAUTION: If the aircraft starts to roll or yaw or there is insufficient power for level flight; RETURN THE FLAPS TO POSITION WHERE THOSE CHARACTERISTICS WERE NOT PRESENT.

A Slowly lower flaps to:_________ (determine flap setting from taxi test or the manufacturer)
B Note pitch change.
C Note any control force changes.
D Note trim capabilities.
E Check engine instruments.
F Check fuel quantity.

TARGET ALTITUDE:_________
TARGET AIRSPEED:_________

A SLOWLY LOWER FLAPS TO:_________% TRAVEL

B NOTE PITCH CHANGE

C NOTE CONTROL FORCE CHANGES

D NOTE TRIM CHANGES / CAPABILITY

E CHECK ENGINE

F CHECK FUEL

NEXT: Near stall investigation W/ flaps

NEXT: NEAR STALL INVESTIGATION W/FLAPS
NEAR STALL INVESTIGATION WITH FLAPS
Configuration: (flap setting from previous card)
Trim aircraft for the following:
Test Attitude: __________ Test Airspeed: __________

NOTE: Do not descent below __________ during this evaluation, if necessary climb then continue.
A  Reduce power to idle and start a slow descent.
   — maintain airspeed
B  Note response to left, then right, rudder input
C  Note response to left, then right, aileron input
D  Note response to small pitch down input, then
   Note response to small pitch up input.
E  — Note any unusual responses
F  Observe pitch attitude and VVI.
G  Note stick forces. Is trim effective?
H  Take note of any airframe/control buffet.
I  Slowly reduce airspeed by 5 mph/knots.
CAUTION #1: Do not decrease airspeed slower than:
   — ________ mph/knots (1.1*Vs1 or Vs1+5, whichever is higher)
   — Any increasing buffet
   — Full aft stick required
   — Any unusual aircraft response
J  Monitor engine instruments and clear engine
K  Repeat steps B through I.
   — Until reaching limits found in CAUTION #1
L  Check fuel quantity.
M  Note final airspeed.
CAUTION #2: PRESTALL BUFFET MAY BE NON-EXISTENT AND THE STALL MAY BE ABRUPT WITH LITTLE/NO WARNING. THE AIRCRAFT MAY DEPART CONTROLLED FLIGHT WITH AN ABRUPT ROLLING OR YAWING MOTION
NOTE: To recover the aircraft apply:
   — Smooth, forward stick/yoke
   — Roll wings level (use rudder if effective)
   — Then add power

NEXT: Practice Approach/Landing/Go-Around

FIRST FLIGHT TEST CARD
NEAR STALL INVESTIGATION WITH FLAPS

A  SLOWLY REDUCE POWER TO IDLE - DESCEND TO MAINTAIN AIRSPEED
B  RUDDER LEFT - RUDDER RIGHT
C  AILERON LEFT - AILERON RIGHT
D,E  PITCH DOWN - PITCH UP - RESPONSES?
F,G, &H  NOTE ATTITUDE - VVI - TRIM - FORCES
I  REDUCE AIRSPEED 5 MPH/KNOTS WITH SLIGHT PITCH UP, AND STABILIZE
   CAUTION: NO SLOWER THAN _____ MPH/KTS OR ANY UNUSUAL A/C REACTION
J  CHECK ENGINE & FUEL
K  REPEAT B THROUGH I UNTIL LIMITS IN CAUTION, ABOVE
L  CHECK FUEL
M  NOTE FINAL AIRSPEED
### PRACTICE APPROACH/LANDING/GO-AROUND

Trim aircraft for the following:
\[ (1.2 \times V_{s1}) \]

Test Altitude: __________  Test Airspeed: __________

**NOTE:** This is just an operational look at the landing characteristics.

- **A:** Reduce power to establish a 500 ft/min descent.
- **B:** Note power setting, trim setting and pitch.
- **C:** Simulate a flare to no slower than: __________ mph/kts
  \[ (1.1 \times V_{s1}) \]
- **D:** Add power and simulate a Go-Around.
- **E:** Note.
  - ANY ABRUPT AIRCRAFT MOTION?  Y / N
  - CAN YOU CLIMB/ACCELERATE?  Y / N

**NOTE:** If you encounter any adverse characteristics increase airspeed by 5 mph/kts and repeat steps A through E.

- **F:** Check the fuel remaining.
- **G:** Practice approaches at altitude until you are confident in the aircraft and its performance.
- **H:** Accomplish landing checks (GUMP).
- **I:** Inform ground crew that you are going to land.
- **J:** Fly a Straight-In approach to a landing.
  - Use the airspeeds that you just practiced.
  - Don't get slow, especially in landing.

**WARNING:** If the approach doesn't look good, Go-Around. Don't plan on a perfect landing, just a safe one.

**NOTE:** Ground effect will make you float.

- **K:** With a BIG SMILE, taxi to parking.
- **L:** Accomplish shutdown checklist.
- **M:** Thoroughly inspect aircraft.

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### FIRST FLIGHT TEST CARD

**PRACTICE APPROACH / GO AROUND, AND RETURN TO AIRPORT**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>A</td>
<td>AT ALTITUDE, REDUCE POWER FOR 500 FT/MIN DESCENT</td>
</tr>
<tr>
<td>B</td>
<td>NOTE POWER SETTING, TRIM, PITCH</td>
</tr>
<tr>
<td>C</td>
<td>SIMULATE FLARE NO SLOWER THAN __________ MPH/KTS (from previous card)</td>
</tr>
<tr>
<td>D,E</td>
<td>SIMULATE GO AROUND - CHECK CONTROL AND CLimb</td>
</tr>
<tr>
<td>F</td>
<td>CHECK FUEL</td>
</tr>
<tr>
<td>G</td>
<td>PRACTICE A-E UNTIL READY TO RETURN TO AIRPORT</td>
</tr>
<tr>
<td>H</td>
<td>ACCOMPLISH LANDING CHECKS</td>
</tr>
<tr>
<td>I</td>
<td>INFORM MISSION MONITOR OF RTB</td>
</tr>
<tr>
<td>J</td>
<td>FLY STRAIGHT-IN AND LAND JUST LIKE PRACTICE</td>
</tr>
<tr>
<td>K-M</td>
<td>TAXI BACK, SHUTDOWN, INSPECT A/C</td>
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**NEXT: GO TO THE BAR!**