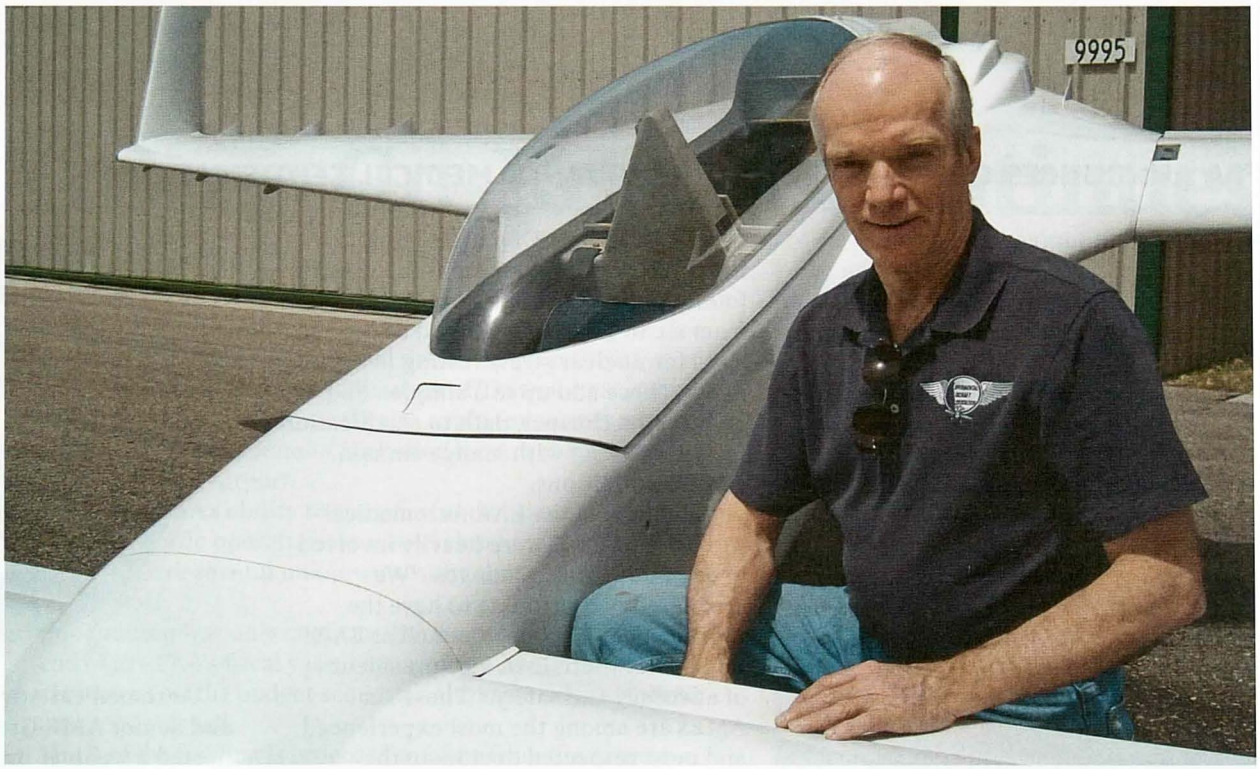

Judgment Call

High-speed taxi and runway flights—good idea?

BY CHARLIE PRECOURT, EAA BOARD OF DIRECTORS, SAFETY COMMITTEE CHAIRMAN

WE ARE CONFRONTED with many choices when planning and executing an aircraft flight-test program. Experience also tells us there is often not a single best way to perform flight tests. Enter the judgment call.

One such choice is whether or not to include high-speed taxi and runway flights prior to the first up-and-away flight. When I first flew my VariEze, I elected to complete high-speed taxi and runway flights, and Hoot Gibson described the same for his modified-wing Cassutt in the April issue. But many will say these maneuvers are high risk and recommend against them, and in many situations they, too, have good rationale. How will you choose the best course for your situation?

As you plan your test program, you should consider the benefits and risks of either choice and seek the lowest exposure to risk—on balance. There's a lot to consider. A high-speed taxi and runway flight is not a maneuver we are trained to do in normal flying. Stabilizing at speeds at or near flying speed requires reducing power so as to not fly away. The maneuver uses significant runway, and we are deliberately extending the time spent in a regime that has limited margin for error if directional control issues arise. Stopping from these maneuvers can also potentially overheat the wheels and brakes.

On the other hand, if we can adequately mitigate these risks, the high-speed taxi and runway flight can help you discover handling qualities issues while still able to stop straight ahead. If you have unexpected, significant out-of-trim conditions, or unexpected flight-control responsiveness, having planned ahead of time to stay on or just above the runway may result in less total risk than fighting the aircraft around the pattern and trying to land with it. Also, if done in an incremental build-up fashion, high-speed taxi and runway flights can give you better feel for the aircraft before the first full approach and landing.

Additionally, if you are flying a common design, you will be able to cross-check your takeoff and stopping distance performance against the published data and potentially

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ıver discrepancies that point to
aft problems before you fly away for
If you're taking a lot more distance
tate, is it a power issue, an elevator
ɔrity or rigging issue, or something
Find it and fix it before you make that
ull up-and-away flight.

simple exercise that is a must for
planning is to calculate expected
ɔff and landing distances and derive
ıimum acceptable runway length for
tests. Using available performance
s (or engineering predictions if
s is a new design), calculate both
istance to take off and the distance
normal landing roll. You must also
ınt for the time/distance you will
l at the target airspeed (at or near
ıkeoff speed) if you perform high-
l taxi and runway flights.

ou're taking a lot more tance to rotate, is it a ver issue, an elevator hority or rigging issue, omething else?

ılculate the distance used at the target
tion by converting the speed to feet
cond (1 knot = 1.69 feet per second). If
arget speed for a test run is 60 knots,
rcraft will be using up just more
00 feet for every second you hold
rget speed. You should plan on 5-10
ds once you get to the target speed, as
be surprised how quickly the seconds
Adding up takeoff roll, distance at
rget speed, and the expected stopping
ce, you can see how much runway
ill be using for the various target
s you plan to fly. Add to this number
ificant margin for safety. This will
y show you if the airport you plan to
m is adequate for early flight tests.
st plan published for the VariEze
for a minimum runway of 4,500 feet
hese tests, with 6,000 feet preferred.
u can think of the high-speed taxi
way flight as a four-part maneuver:
tial acceleration to target speed, a
reduction to hold the target speed, assessing aircraft response, and finally the abort. If you don't take at least a few seconds at the target speed, you will not be able to observe the aircraft's performance and responsiveness—which was the whole purpose for the test point to begin with. If you elect to accept the risk of this maneuver, you need to gain the data that justifies it.

On any early test flight, make sure you have calm winds, smooth air, minimum practical weight, and adequate runway. If you choose to perform the high-speed aborts and runway flights, gain some experience with the maneuver in another aircraft you are already very comfortable in. Even better, do them in more than one type you have experience in so you see variances.

For the high-speed abort and runway flight-test technique, you should choose target speeds that build up gradually to flying speed, say in 5-knot increments. At each target speed, make small control inputs in each axis and observe the response. Allow adequate time for the wheels and brakes to cool before another test—and take off the wheelpants.

If you can perform your tests at a runway with distance-remaining markers, you can also get distance performance data as you perform the test points. Complete the sequence with a brief liftoff to a few feet off the runway to check trim and control response prior to that first up-and-away flight.

The type of aircraft is a final consideration. If you are flying a very common design and can get time in another like it prior to your own first flight, you may have less to benefit from the high-speed taxi and runway flights than someone who has a unique or modified design. Whatever path you choose, plan thoroughly, practice your test sequence in another aircraft, and build up slowly in testing to your new aircraft's full envelope capability.

A special note this month: The NTSB has recognized EAA's efforts at improving the amateur-built fatality rate by classifying one of our initiatives as "exceeds recommended action" since the EAA went beyond the NTSB's recommendation. We have lots more work to do, but we're on the right track!

Fly safely! EAA