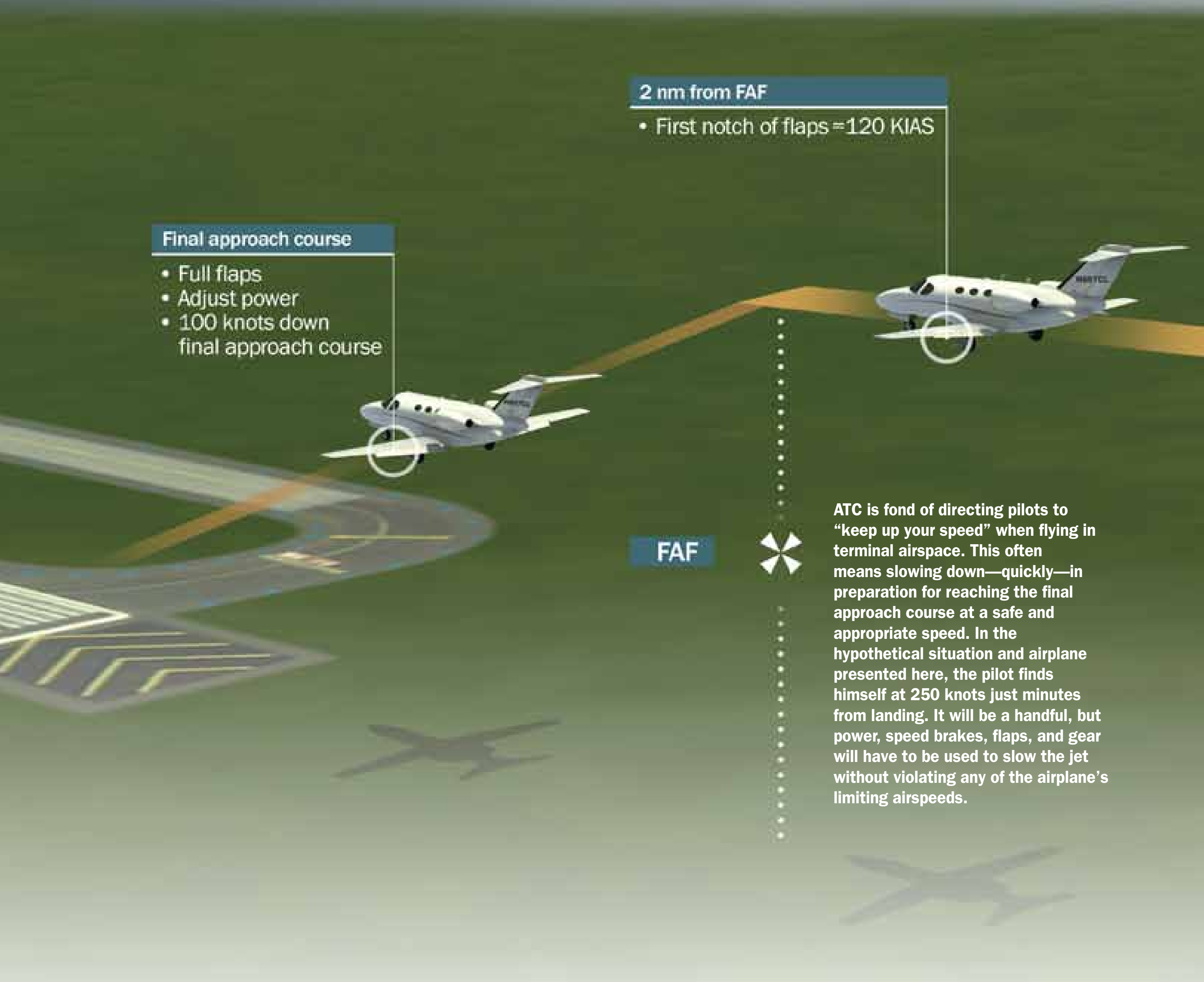
# TURBINEPILOT

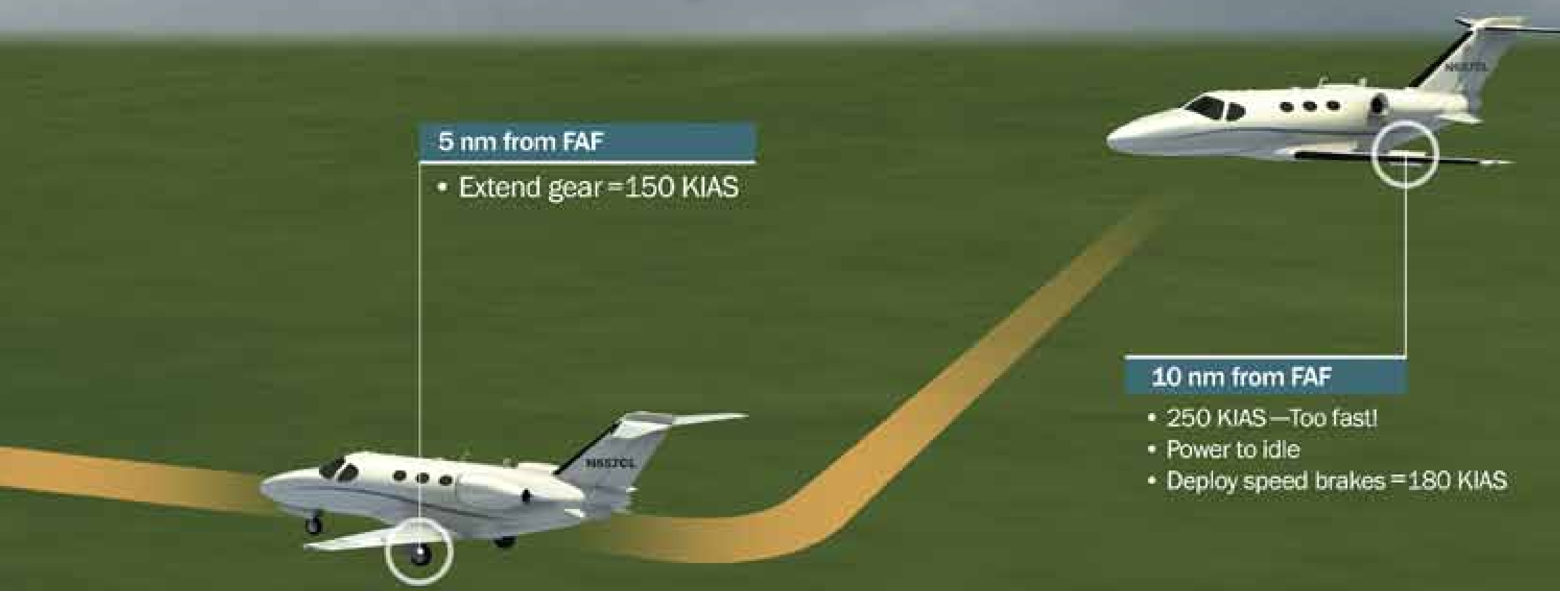
A SPECIAL SECTION FOR THE TURBINE OWNER-PILOT




**ATC is fond of directing pilots to "keep up your speed" when flying in terminal airspace. This often means slowing down—quickly—in preparation for reaching the final approach course at a safe and appropriate speed. In the hypothetical situation and airplane presented here, the pilot finds himself at 250 knots just minutes from landing. It will be a handful, but power, speed brakes, flaps, and gear will have to be used to slow the jet without violating any of the airplane's limiting airspeeds.**

MENTORING MATTERS

# 'Go fast, slow down'




## The difference between ATC and pilot needs on approach

**BY NEIL SINGER**

Jets are built to go fast. This obvious fact is both what makes them so attractive to pilots, and a factor in what makes mastering jet flight a challenge. Without the drag of an idling propeller, a jet aircraft simply won't slow as quickly as a piston or turboprop. In particular, jets really don't like to slow down and go down (descend) at the same time. This truth, combined with the conflicting demands of ATC versus pilot need, can make for challenging times during the last few miles to the airport.

For many common light jets, the profiles used by the airframe manufacturers and simulator training organizations have the jet slowing through around 140 to 120 knots when about seven miles from the runway. For a transitioning jet pilot, getting speed down this far from the airport is critical to staying ahead of the aircraft, and is appropriate in the training environment. Outside of "sim world," from ATC's point of view, this low an airspeed far from the airport turns an aircraft into a huge speed bump.

ILLUSTRATION BY CHARLES FLOYD







Consider a light Cessna Citation Mustang slowed to its final approach speed of 88 knots. With a modest 20-knot headwind aloft, the Mustang is covering only a little more than 1 nm per minute. If the pilot intercepts the final approach course 10 miles from the runway, he will take four and a half minutes simply to get to a five-mile final, where he can be turned over to the tower controller. That same airplane maintaining 180 knots to a five-mile final will tie up the approach for less than two minutes, doubling the approach controller's capacity for a given runway.

In busy airspace, a clearance to maintain a certain speed to a certain point is more common than not. The pilot's job in this is to comply with the ATC clearance while ensuring the airplane will be able to safely slow down and configure in time to meet stabilized approach limits—typically by a two-mile final in VMC, a little more than three miles in IMC.

The idiosyncrasies of the pilot's aircraft will determine how fast a speed can be safely flown to short final. Factors such as gear and flap extension speeds, presence or absence of speed brakes, and the effect of anti-icing equipment on engine idle speed must all be considered. One popular light jet has no speed brakes, and a gear extension speed of 180 knots. A competitor has very effective speed brakes, and a gear extension speed of 250 knots. It's not hard to see that a pilot of the first airplane would need to be much more careful accepting a clearance to "maintain 190 knots to the marker."

Environmental conditions also must be considered; a tailwind on approach, for example, will require a high descent rate to stay on glideslope, complicating any attempt to shed speed. Experimentation with an experienced mentor pilot will give new jet pilots a sense of what their aircraft can do—and when it's more prudent to say "unable." AOPA

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# Disconnecting flight controls

## Dealing with a control jam

**BY THOMAS A. HORNE**

All aircraft designers must kneel at the altar of redundancy when it comes to creating a new airplane. The goal is always fail-safe operations. However, turbine airplanes certified under the more recent provisions of Federal Aviation Regulations Part 25 affecting transport category airplanes weighing more than 12,500 pounds have to go several steps further. Essentially, every conceivable failure of every aircraft system and its components must be designed so that pilots can continue to safely control the airplane. For example, in case of a wing spar failure, multiple load paths must be built into the design so that there's no chance of a wing separation. Windshields and engines must withstand bird strikes and ingestions, respectively—and for test purposes, the size, weight, and number of the FAR-official bird(s) is even published

Another example is the ability to continue controllable flight after a flight control—or controls—jams. Imagine flying along and an aileron, elevator, or rudder jams. Part 25 comes to the rescue by requiring redundant, interconnected control runs. Should a control jam, pilots are provided with handles that, when pulled and locked, disconnect the pilot's controls from the co-pilot's. Now the pilot's controls are connected to the left aileron or elevator, and the co-pilot's are connected to the right aileron or elevator. Similarly, rudder controls are split between the two crewmembers.

Let's say the left aileron jams. Roll control for either pilot is impossible until the ailerons are disconnected, and when that action is carried out the co-pilot has roll control through the right aileron. Ditto with elevator controls. Rudder controls also have a similar means of redundancy. You can roll, pitch and yaw effectively with just one aileron and/or elevator, and a rudder with a single active control run.

What if the right aileron and left elevator, for example, both jam at the same time? The co-pilot ends up flying the left aileron, and the pilot flies using the right elevator. Sound confusing? Perhaps, but simulators help perfect the necessary skills. It would be a tense situation, but splitting the controls is the accepted method for dealing with what must be the rarest of emergencies. AOPA