

In 2003 and 2004, the Jet Pilots Organization tracked crash statistics at most jet events in the United States, recording data on over 15,000 flights. A crash was defined as any incident that resulted in damage to the aircraft that could not be fixed at the event, eliminating those incidents that resulted in minor repairs from the counts. The primary goal of this data logging was to prove that speed was not a significant factor in most jet crashes during the time that speed control was a potential rulemaking issue with the Academy of Model Aeronautics. As expected, the data clearly proved that speed was not a factor. What was a surprise, however, was that structural failure, battery problems and radio interference didn't top the list. The leading cause, representing one in five crashes, was simply pilot error landing the aircraft.

As a pilot with average skills, I too have struggled from time to time to put consistently good landings on the runway. Having resolved that I would improve my landing skills, I sought out the advice of two friends who also happen to be Top Gun class competitors, Joe Rafalowski and David Shulman. They both kindly contributed their thoughts to this tutorial. While much of their advice may seem basic, there will hopefully be a reminder or bit of wisdom in this article for everyone.

The very first statement from both David and Joe was simply this: a great landing starts with a stable approach. While David is known for his close-in approaches with the BVM KingCat, his advice is to make a landing pattern that allows for wide turns that won't stall the aircraft, yet keeps the jet easily visible. All drag devices should be deployed on upwind and power set to hold level flight. Joe's primary recommendation to begin the approach is trim, trim, trim - find a comfortably slow speed and trim the aircraft to hold altitude without excessive elevator inputs. Large pitch changes during the approach will lead to variations in speed and make it more difficult to establish a stable descent rate.

As every jet has distinct flight characteristics, the key is spending practice time becoming comfortable with the slow flight capability of the model. Take the plane up high and find stall speed, note stall behavior and look for the warning signs of the stall. Joe points out that most jets will rock the wings as airspeed decays to critical levels. If the plane wants to snap in the stall, check lateral balance or elevator alignment near maximum throw. Find the throttle and trim settings through practice that yield a level pattern with drag devices out. Use Flight Modes or the Flap System on your radio to capture and preset elevator trim. Ultimately, you are seeking the speed that is the slowest the model will fly, allowing for a comfortable margin above absolute stall speed.

Once committed to the approach, look for a stable, consistent glide slope. Altitude and glide slope should be continuously controlled by throttle position. Strive to keep throttle changes gradual. Large variations in thrust will make for large variations in descent rate, pitch and speed. What starts as a stable, constant approach with gradual inputs can become an erratic exercise where nothing is in the groove. Move the throttle a click or two, watch aircraft behavior, and then adjust again as necessary. Maintain elevator input, and as you increase elevator, this will be your sign that the model is slowing down. Compensate with power as necessary. Both Joe and David emphasize that a proper approach with most jets will demand that you carry some power on final, and possibly into the flare.

Power compensation will also be required in turns and for wind. A banked aircraft will lose lift and requires a bit more power. If you are gradually reducing power during the approach, pause during the turns to base and final. Adjustments in throttle may also be necessary to compensate for wind. For instance, if a 10-mph crosswind is blowing at you across the runway the jet will lose relative airspeed when turning downwind to base and bit more power will be required to avoid a stall. When turning base to final into a strong headwind, relative airspeed will actually increase and the jet may level off or even climb a bit. Compensate with a throttle adjustment.

Diving approaches should be avoided, as they require large changes in descent rate and speed. In a diving approach, both speed and descent rate are controlled by the single elevator control input and finding the right balance between these parameters to a precise touchdown point is more difficult. The transition to the flare is greater and less precise, and the chopped throttle that usually accompanies a diving approach will result in greater spool up time if a go around is required.

The landing flare is typically started at 2-3 feet off the ground. If speed has been constant throughout the approach, the flare is entered with minimal elevator input. Elevator throw is gradually increased as the ground is approached. Touchdown should be near full up elevator input if the landing is executed correctly. An early flare will usually result in a ballooned landing - add a little throttle if this happens or the plane will lose lift several feet off the runway and sink rapidly. If the plane sinks as the flare is initiated, speed or power settings were too low.

A bounced landing is the opposite - too much speed, as the wing was not ready to quit flying. If the plane bounces, add throttle immediately to catch the sink rate that will quickly develop. At this point, retard the throttle and land under control if there is enough runway, or go around if need be. By the way, don't hesitate to go around if you aren't comfortable with the approach or the landing is long or bounced - many a plane has been lost when forcing a bad approach on to the ground. If there is any doubt, throttle up early and start over again.

Joe will sometimes preset the brakes for landing to allow a smoother roll out. This can prevent the side to side waggle that some planes exhibit when brakes are first applied.

The last tip is the most obvious - practice, practice, practice. Most of our flight time is spent burning around the sky. For the weekend flyer to become really proficient in landing, a fair amount of stick time needs to be devoted to slow flight, approach and landing.