Aviation Sayings for Drones
Michael Yukish, Head, Manufacturing Systems Division, The Pennsylvania State University

The rise of the (small flying) machines has changed aviation in ways that will echo through the system for years to come. What once took hundreds of hours of training and thousands of dollars of cost to get up into the air, now takes a relatively short training effort with no practical skills training required, a passed exam given by the FAA for the remote pilot license, and a trip to Best Buy to pick up a $500.00 drone. Unmanned air vehicles has democratized flying. Anyone can now play with a low barrier of entry.

What is lost, however, in the lowering of barriers to entry, is the flow of knowledge about aviation and its culture that comes from what amounts to a lengthy apprenticeship in learning to fly full-sized aircraft, as one pursues their manned pilot license under the tutelage of the ‘wise old owls’ who have learned it all and forgotten much, but remembered the really important stuff.

Along with learning the ‘monkey skills’ of operating the flight controls to place the air vehicle at the right point in space and heading the right direction (basic airwork), and all of the procedures to comply safe vehicle operations dictated by the manufacturer and the FAA, a newbie pilot learns the most important thing of all, ‘headwork’. The hard-to-define quality of making smart decisions on the ground and then in the air. More than any other quality, good headwork defines the good pilot.

The superior pilot uses superior headwork to avoid the need for superior airwork.

While there is no substitute for operating an aircraft both with others and solo, to truly learn how to practice good headwork, many of the lessons learned have been captured in short, pithy aviation aphorisms. Easy to remember, and often prone to make one smile, as you ponder on how the lesson was learned.

Aviation rules are ‘written in blood’

This is one of the first and best ones. Rules are not created willy-nilly without rhyme or reason, although it might seem so. They are written as we learn, and we never learn so much as when things go south. In fact, the reason aviation has become as safe as it is, is because there is an ethic of learning from your mistakes that permeates the culture. Every mishap is a tragedy, but also an opportunity to learn. Examples are requirements for crew rest in manned aircraft, created following mishaps directly stemming from tired pilots, and requiring the use of checklists, following many accidents where critical items were missed prior to flight. The real tragedy would be if the opportunity to learn and improve was missed.

Rule number one: no matter what happens, fly the drone

Similarly,

Aviate, Navigate, (Navigate) Communicate

Job one of the pilot is to avoid damage to his own craft and others. Then worry about navigating to where you need, then worry last and least about keeping others informed. If you crash, you’ll have plenty of time to talk about it afterward.
But the saying above has two ‘navigate’ terms, making it unique to drones. With drones, at any time you can lose control of the craft due to radio interference, battery failure, or a million different other possibilities. When you lose comms with the drone, it will typically execute some kind of lost link procedure, depending on the drone and your programming of it. This lost link procedure is the second ‘navigate’, and a remote pilot needs to consider it at all times. What will the craft do if it loses link? Will it return straight back to launch site? What happens when there is a tree between its current position and where it took off? Do you have ladder tall enough to retrieve it from the top branches? As pilot you need to be prepared for when (not if) you lose the link.

The least useful things in aviation are the altitude above you, the runway behind you, and the battery charge you had

Nobody ever collided with the sky

...the only time you have too much fuel is when you’re on fire.

Altitude above you and well charged batteries gives you time and room to make decisions. With them in your hip pocket, you can take your time, examine your options, make the best decision. A flashing low battery warning can turn a mild consternation into an impending disaster. Give up your buffer grudgingly.

Never let a drone take you somewhere your mind didn’t get to five minutes earlier.

An important rule of thumb in aviation is never let the aircraft get ahead of you. Don’t make snap decisions. Plan the flight and fly the plan. In the air, with the motors turning and the battery draining, is not the time to decide what you are going to do next.

The two most dangerous words in aviation are “watch this”

Pilots have egos, and the opportunity to demonstrate their craft to an appreciative audience is a powerful force. Whether it is buzzing a friend’s house with an unauthorized below legal altitude flyover, or zooming a racing drone through a parking garage with moving vehicles, you do it enough and it will end badly.

You start with a bag full of luck and an empty bag of experience. The trick is to fill the bag of experience before you empty the bag of luck.

Good judgment comes from experience. Experience usually comes from bad judgment.

Whether you just signed up to learn to fly a Cessna, or rushed out and bought a DJI Mavic, you will make mistakes. The question is what you do with them. Do you learn and grow, or do you keep repeating them until you run out of money and drones? Because never forget...

Remember: Gravity is not just a good idea, it’s the law.

Fly safe!