

Flight Test *Safety* Fact



Published for the Flight Test Safety Committee

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First Things First

Mark Jones Jr

Imagine that you were part of a team designing an aircraft. Before you decide what material to use, before you decide where the airplane will fly, there is a more fundamental question that must be answered: What is this aircraft going to do?

A supersonic aircraft used for passenger transport will have different traits than one used for high altitude, long endurance pseudo-satellite networking. Each aircraft will have to withstand unique environmental conditions, and pilots will place different demands on each aircraft, subjecting them to different maneuvers and forces in flight. Because of these differences in purpose, the design or makeup of each aircraft will differ, and the parts and components of each aircraft will have different characteristics.

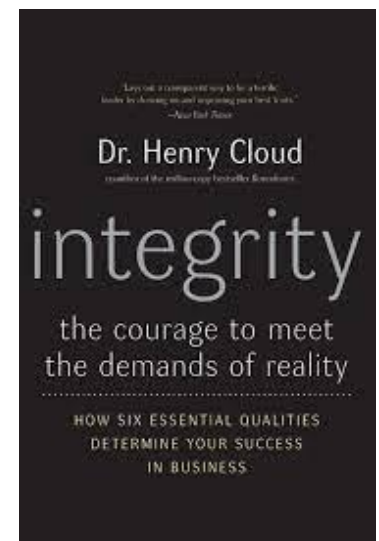
This is the analogy used by Dr. Henry Cloud to make an important point: “In the same way that the realities of torque, weather, temperature, gravity, and other things put demands on [an aircraft] that it has to meet in order to perform and not crash, there are realities that put demands on people that they have to meet in order to perform and not crash as well. The character of a person is what determines his or her ability to meet those demands.”

Each part of the aircraft must have the right traits, like weight, strength, quality, etc., but the aircraft **as a whole, all of the parts integrated together**, must also have the characteristics needed.

The same thing is true for individuals, and the same thing is true for members of a team or organization. When integrated together as something more than the sum of each person, the character traits of the test team must stand up to the demands of reality. This is what Cloud means by integrity.

You can read back over the preceding paragraphs and see certain words: whole, character, integrated, makeup, etc. All of these things are suggestive of the broad meaning of the term integrity, but Cloud defines it in a very helpful way: “Integrity is the courage to face the demands of reality.”

This concept is different, fuller, more comprehensive. In a sense it is a *whole* definition and not just the incomplete thought that many of us think when we encounter the word integrity on a daily basis. The example Cloud gives and the definition fit neatly into our mental model of the world, especially since the anecdote draws from the domain of aerospace with an elegant simplicity.



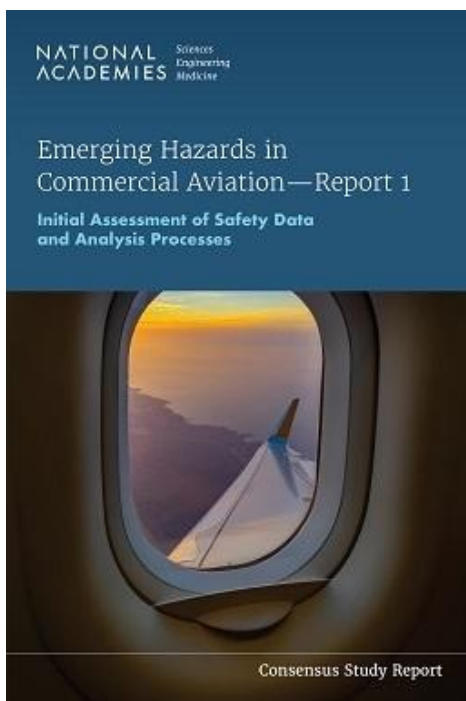
Integrity is a vital personal character trait. It is one of the fundamentals. The word may be something you think of because of a Workshop presentation on Intellectual Virtue, or maybe you don't think of Integrity often because it's such a basic building block, like tables of single digit sums, something we haven't rehearsed since elementary school. But Dr. Cloud defines integrity in a way that makes us reconsider its meaning, and he's written an entire book about this definition.

There is another instance of the word integrity that we should also consider: Formation Integrity. In my mind, formation integrity means that I must be in the right place and do the right thing. Both aspects of this definition are undefined, however, unless they are considered *in relation to other* members of the formation, and this is the new element of the definition that complements Cloud's explanation. This goes along with words like "whole" and phrases like "all of the parts integrated together," and it applies directly to Emerging Hazards in Aviation...

Emerging Hazards in Commercial Aviation

How does integrity relate to safety in complex systems? I am glad you asked.

The Transportation Research Board (a working group organized by the United States government) has published a report on Emerging Hazards in Commercial Aviation (<https://www.trb.org/Main/Blurbs/182796.aspx>), and it focuses on the increasing complexity of systems and technology. (I recommend the summary here: <https://www.urbanairmobilitynews.com/emerging-regulations/new-us-trb-report-highlights-emerging-safety-issues-facing-new-air-space-entrants/>.)



The article discusses the way elements of our systems are *integrated* together. I recommend the report for a variety of reasons—because reading it is an exercise that will strengthen the various aspects of your makeup and help you to grasp or define our current reality and because you are one of the parts of the aviation system. (All of those phrases correlate with the definition of integrity above.) Here is one excerpt: “However, lapses in any part of the system for managing safety can create vulnerabilities.”

I disagree, and I would suggest that an integrated system, one with character, may be far more resilient than the simplification the report concludes. Though I have only quoted one sentence, I am not cherry-picking—the report has a theme consistent with this single quote. This particular conclusion has at least two implicit assumptions. First, it assumes that “any part” of the system is adding value at any given moment. But this may not be true. Some system elements may be in a state of inactivity or rest. A system that does NOT have margin built is a bad system, so in some cases lapses simply reduce available margin. *Just as a human can't operate at peak performance all the time, neither can a system.* Second, it assumes parts of the system don't bring their own vulnerabilities and second order effects. Sometimes adding layers is bad (and if you haven't seen the “sesame allergy” news that's trending...).

In response to the second, I am reminded of a pithy quote: “Perfection is achieved, not when there is nothing left to add, but when there is nothing left to take away” (Antoine de Saint Exupery). This too is probably an over-simplification, but it brings us full circle, back to the basics. We *can* focus on the fundamentals, and we can strengthen our integrity. We must continue to exercise the character trait, whether that means reading a new book on the topic or taking another look at how we relate to others as an integrated whole or talking about it with others as one of the first things you do this new year.

Flight Test Safety Committee - Calendar of Events

Flight Test Safety Workshop

When: 2-4 May 2023

Where: Drury Plaza Hotel Boardview
400 West Douglas Avenue
Wichita, KS 67202

Save the Date! Join us 2-4 May 2023 in Wichita, Kansas. More information on this event will be available soon.

<https://www.flighttestsafety.org/workshops>



Recent Past Events

International Flight Test Safety Workshop in London, England was held October 2022. The following presentations were made, and in many cases, slides are available: <https://www.flighttestsafety.org/2022-london>.

The Evolution of Risk Mitigation in Flight Test for Complex Systems
Jeff Canclini – FTE Fellow Emeritus, Lockheed Martin

Textron Safety Risk Management
Stuart Rogerson - Chief Pilot Safety, Textron Aviation

UK Ship Helicopter Operating Limits Testing
Harry Boden - QinetiQ UK. Jim Horton - TP Royal Navy

Three Point Wheeltug Airliner Landings
Tim Butler - Chief Test Pilot, Nova Systems International

Helicopter Low Airspeed Testing
Adrian Neve - Head of Flight Test Organisation, QinetiQ UK

Safety Domains in Flight Test
Ben Luther - Senior Test and Evaluation Engineer, Nova Systems

NASA Flight Test Risk Management
Glenn Graham - Director, Safety & Mission Assurance, NASA

Flight Test Safety Management in a Small Test Group
Arun Karwal - Research Test Pilot, NLR. Martine Hakkeling – NLR

Gulfstream FTE Aircrew Skills Training
Ben Luther, Andrew Wardle, Eric Tondreau, Gulfstream Aerospace

Vertical Aerospace eVTOL Flight Test
Justin Paines - Chief Test Pilot. Dean Moore - Lead FTE

Sikorsky's Flight Test Safety Risk Management
David Blair - Chief Pilot for Safety, Sikorsky

Turbo Talk**Art “Turbo” Tomassetti**

Happy New Year to all. Many of us probably closed out 2022 watching giant illuminated balls drop, pelicans drop, and enjoying family, friends and of course food. We wrapped up the year singing or humming along with a chorus of “Auld Lang Zyne”. As I mentioned in my last column, the end of the year is kind of like the end of a flight, you think back on what you accomplished and what happened; you Debrief. The beginning of the year is more like what happens prior to flight. You determine what you want to happen and what you want to accomplish; you Brief. Relative to the start of a New Year we could say this is like making resolutions.

Hang on, before we go any further can we just revisit the Auld Lang Zyne thing a minute? Maybe it’s just me but I have no idea what any of those words mean. Fortunately, we live in the 21st century, and I no longer must wait for the library to open to go look it up in an encyclopedia. The words auld lang syne literally mean “old long since”. It’s from the Scots language, and the expression was first recorded in 1660–1680. More practically it means “old times,” especially times fondly remembered. The origins of the song are a little more sketchy. The poet Robert Burns gets the credit for publishing in 1796, but he pulled at least part of it from a folk song he had heard. Why do we hear it every New Year’s Eve? One of the reasons is because of a popular New Year’s Eve broadcast on radio and then television hosted by Guy Lombardo and his band, the Royal Canadians. It ran from 1929 to 1976 and Lombardo came to be known as “Mr. New Year’s Eve” because of the broadcast. Mr. New Year’s Eve himself is responsible for pushing “Auld Lang Syne” to the masses year after year on his annual show. So, we can thank the power of mass media for making an 18th-century Scottish song popular in the modern era. Sorry for dragging you along. I know it has nothing to do with flight test, but I needed to learn that.

Ok, back to our New Years’ resolutions. This being a newsletter intended to promote flight test safety, I should encourage you to, of course, be safe. But we probably all think we are safe, so that isn’t a very powerful resolution. Ok, I’ve got it, be *safer*. Up your game, level up, take it to 11 on the dial. But safer? Really what does that mean? If we all just agreed we are safe? These resolution things are tough. Wait, what about Improve the Safety of Others? Sure, we are all safe, but if I share a lesson with someone that they didn’t know, it may make them aware of a risk they hadn’t considered. Or maybe I could share a resource like, oh I don’t know, a document, a newsletter, a podcast, or something. And what if we could use the power of mass media to share that out to lots of people?

Maybe we could Auld Lang Zyne it. We try to make it easy to share lessons so this might be a simple resolution to accomplish. Definitely easier than more time at the gym, eating healthier, reading more books, etc. So just kick that idea around as you put your 2023 resolutions together.

Until next time: Be Safe, Be Smart and Be Ready.

Turbo

Latest Podcast**Art “Turbo” Tomassetti**

At the end of last year, Turbo published a two-part discussion from London’s FTSW that covered the flight test of ancient flying machines. Congrats on THREE YEARS of podcasts! Here is a summary of episodes from 2022.

Synopsis of 2022 Podcast Episodes	
January	Simulator Mission Rehearsals
February	Rise of the Valkyrie - SETP Oral History Series
March	Comments, Cudas, and Crossing the Ocean
April	Bell V-280 Lessons Learned
May	My Five Safety Lessons from Top Gun
June	How do you do Safety? Columbia Aviation Assoc
July	3Q Part 1 - Cap’n, Vanessa, and Mark at 3d Planet
August	3Q Part 2
September	Trip Report - SETP Annual Symposium
October	Frightful Flights Terrifying Test Points Ghostly...
November	Teaching New Pilots Old Planes Part 1
December	Teaching New Pilots Old Planes Part 2

You can subscribe to the Flight Test Safety Channel podcast in iTunes, Spotify, Podbean, Google Play, and Amazon Music’s FTSCChannel. You can also share the link below with colleagues and friends who may not know about Turbo’s monthly recording and navigate directly to the podcast: <https://flighttestsafety.org/ftsc-news/flight-test-safety-podcast-channel>.

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Website: flighttestsafety.org

Follow Up*Editor*

Safety Survey a huge success - Ben Luther emailed FTSF with copious gratitude. He reported that many of you responded to his request for assistance with the safety survey, enough to satisfy the validity of the research sample.

Orange lore and other safety traditions - Several readers made comments about the Orange edition (<https://flighttestfact.com/flight-test-safety-fact-22-10/>), and I learned something about the United States Navy safety culture from Tom Huff: Aviator helmets must be primarily white in their color. The roots of this regulation seem to have been forgotten by the modern day USN, especially with the advent of helmet-mounted cueing systems (HMCS) and the sophisticated cranium covers that support them. This matches the loss of information about the origins of the Orange lore. I also heard from Tom Imrich who points to early history of the FAA for some orange markings on their aircraft in the 1930s. Whilst I can find mentions of the color orange, it's hard to find deliberate decisions and the first indications of a trend. Another really good example is the earliest airways. The concrete arrows on the ground were outlined in black and yellow paint, which matches the airport markings today like runway and taxiway signs. I think the beacon towers were painted "international orange" and white as well, but that was a 1920s decision and doesn't address orange wire or flight suits.

Add your name to our distro - LT Billy 'Nigel' Hegarty recently joined VX-20 (USN) as the Aviation Safety Officer—his colleague asked us to add him to the FTSF distro. We can add ANYONE to the FTSF email list!

I'll close this section with one more pithy quote from aviation pioneer Eddie Rickenbacker, who said, "I can give you a six word formula for success: 'Think things through then follow through'." "Follow up" is a variation on the phrase "follow through." Ben Luther's email is one of several examples of uncommon follow through, and this new section of the newsletter is my attempt to follow through with the feedback from readers. Thank you for your email. Rickenbacker's six words raise an interesting question. **What is your favorite aviation one liner?**