James B. Lackey
Senior VP of Parsons

Enduring Lessons from Flight Test: A Conversation with James B. Lackey

Mr. Lackey is senior VP of Parsons and former Executive Director of the Army Aviation Missile Research, Development, and Engineering Center (now the Aviation and Missile Center)

Interviewed by J. Michael Barton, Ph.D., Parsons Corporation

Q: How did you choose aerospace engineering?
A: My interests in aerospace started very early in my childhood. As an impressionable kid who witnessed the historical accomplishments of the NASA Apollo program where our nation landed Neil and Buzz on the Moon, it obviously made a huge impression on me. I decided early I was going to be either: an astronaut, test pilot, or engineer. Engineer, I ended up being, and I am so grateful as it's been an enduring multi-decade ride!

Q: In school did you know you wanted to work in flight testing or did that come about as part of interviewing for jobs?
A: This was an interesting evolution. I did take an elective at Virginia Tech that briefly touched upon flight test. I thought the subject matter was intriguing but just naively assumed (like most other undergraduates in Aerospace) that I was going into a job directly designing and building an entire aircraft on day one! Ha; yeah right… Flight Test came in as an unplanned opportunity as a job opened at the Naval Air Test Center, Patuxent River, Maryland. And wow; upon reflection – that was an incredible blessing! I learned so much early on by being a flight test engineer; it really formed me technically across my career assignments.

Q: Was attending the U.S. Naval Test Pilot School thrilling and possibly intimidating, or did youth filter out everything except excitement?
A: It was super thrilling when I heard I had been assigned an engineering slot in the next Naval Test Pilot School class. As a precursor, I had to "bag some hours" in fixed wing jets to get acclimated. My first ride was in the backseat of a F-4 Phantom out of Pax River. Some may know this, but the visibility level of the F-4 backseat is to say the least limited. Lack of outside external cues can lead to some nauseous effects. Suffice to say, the pilot knew it was also my first hop and he put me thru some aggressive, "high g", air combat maneuvering! Taking off was almost like a rocket (incredible Thrust to Weight ratio; almost 1.0 when the wings were clean of weapons and not fully fueled), we quickly zoomed into near vertical in full afterburner quickly hitting the top of restricted airspace altitude in a matter of seconds. Thrilling first ride to say the least. Yes, because of the backseat limited visibility and aggressive "turn and burn" maneuvers, I did make ready use of my handy "puke bag" early in the fight. After quickly acclimating with additional flights and undergoing aviation survival training at NAS Pensacola, I

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was charged up and ready to be part of USNTPS Class 95. Not many people may appreciate but TPS outside of flying was intense from a classroom instruction standpoint. Everything from calculus refresher to aerodynamics and systems theory was taught by some excellent instructors there. Just recently out of college, the rigorous academics were a breeze for me. At that time (not now!), I could perform integral calculus and partial differential equations in my sleep. I certainly felt sorry, however, for the mid-career operational pilots who had to really struggle in the beginning to re-exercise their brains when it came time for classroom instruction; they all couldn't wait to get out on the flight line and fire up their T-38's, TA-4's and T-2's – with me, call-sign "Jim-Bob" in the backseat ready to work their radios for ground, tower and airspace control (as well as always recording data on my kneeboard chart!). During up and away flight, I routinely "took command" via backseat throttle and stick to revector us into different altitude, attitude, and airspeed setup conditions.

Q: What was your role in the test process initially and how did that change over the years?
A: After my final "DT-2" test project to conduct flight tests operating out of CFB Cold Lake, Alberta, Canada on the CT-114 "Tutor" Canadian Snowbird for its aerobatic maneuvering mission; I proudly graduated from USNTPS and entered the focused flight test world of stability and control. Initially, I was responsible for planning, conducting, and reporting upon various flight control and stability assessments of the F/A-18C/D "Hornet" and subsequently as Test Team Lead for the F/A-18E/F "Super Hornet" developmental effort alongside my T&E counterparts from Boeing. As we expanded the envelope of the F/A-18E/F and continued to field and sustain the F/A-18C/D, weapons integration became a big focus for the Fleet. As such, my role in flight test morphed away from airframe stability and control and into conducting full up air-to-air and air-to-ground weapon airworthiness integration assessments. Structural loads analysis, impacts on stability and control, mission computer data loading to captive carriage weapons, etc. This then subsequently led me down a path to become a Systems Engineer; then Integrated Product Team Leader, and eventually Program Manager. My career always seemed to vector along the Generalist vice Specialist line of activities.

Q: Your career path took you from test engineer to acquisition to technology development and transition. Was technology always an interest of yours?
A: Technology has always been a huge interest for me. The nature of being a flight test engineer MANDATES that you know the entire jet. From soup to nuts; to safely plan, conduct and assess the systems – you must be knowledgeable of how it all interacts. From aerodynamics, propulsion, avionics, weapons, human factors, telemetry, and instrumentation – it's essential that you have an intuitive understanding of the interconnections for sure. Conducting flight tests themselves; you are in a telemetry data room talking to the pilot via radio; manned with your flight test colleagues monitoring (at the time back in the early 1990's) strip charts of data signals sliding across boundaries of measurement like vertical acceleration, Mach Number, engine compression ratio, cockpit temperature, etc. Data is streaming in all simultaneously, pilot is setting up on fight condition, fuel being burned at excessive rates; you had to know how data gave you indications of health, safety of flight, and requirements for test objectives. Incredibly stressful but hugely rewarding. This experience left me with a gigantic appreciation for all things aerospace technology. I still subscribe to a bunch of technology trade

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magazines (and it still drives my wife crazy as they fill our mailbox every week or month). Always reading up on the latest, cool trend in military aviation. My technical curiosity will never cease.

Q: In moving from the Navy to OSD, was there a big adjustment in how you looked at test programs or acquisition in general?

A: For sure! Getting promoted and working in a Senior Executive Service role at the Office of the Secretary of Defense was a big adjustment in the context of how test really fit into the larger acquisition lifecycle framework. Test was a means to an end. Test was the right side of the Systems Engineering "Vee" diagram. Test got your major acquisition program to the next Milestone or fielding decision. Test had HUGE implications on billion-dollar contract awards and most importantly fielding capability for the Warfighter. Test became a facet of the larger picture for me in this regard. But most importantly, as SES for Air Warfare Programs at OSD – I had an intuitive sense of the major weapon system technology baselines because I came from such a technical world itself out of fight test originally. This helped me provide clarity on recommendations to my boss' boss – the Undersecretary of Defense for Acquisition, Technology and Logistics. Politics of the Pentagon certainly swirled around me and my recommended decisions but at the end of the day – I always relied on major test reports, whether they be from the Services themselves or DOT&E to guide me on foundational recommendations for program approvals.

Q: You have seen acquisition from the vantages of the Navy, OSD , and the Army, and now from industry. What lessons learned can you offer future acquisition professionals?

A: For anyone going into defense acquisition, I'd recommend that you build a technical knowledge foundation. Whether one decides to stay on a subject matter expert track or in my case, a generalist path, acquisition is about gaining new capabilities. New capabilities are realized through new materiel solutions which hinge on technology. Technology drives all. Stay on top of latest trends; know how technologies fit into the bigger multi-domain battlespace picture. Get an appreciation for the operational intent of technologies.

Q: What advice do you have for people just entering the T&E career field?

A: Be unyieldingly inquisitive. Volunteer for the next project assignment without hesitation. Never hesitate to make a bold career move that opens doors. T&E by its interdisciplinary nature can open many of these opportunities. Think of your career strategically like a chess game. The next career move is important for sure; but what that immediate move really buys you long term is what matters. Are you moving with long term goal intent or just blindly moving to the next job assignment? Map out where you want to be. Set an end-game outcome you want to achieve. Stay positive. Work well with people in a team environment. Be a smart chess player. T&E is a beautiful beginning of wonderous opportunities!

Q: How did your association with ITEA begin?

A: It's interesting; my participation in ITEA has been in 2 career phases: early on and current. Early on, as a rapid fan of all things technical especially in the flight test arena, ITEA helped foster knowledge growth for me. Becoming aligned to ITEA as a professional organization just really expanded my network and helped support my broader awareness as I grew within the T&E field. Most currently as Senior VP at Parsons; getting back into ITEA was part of me digging back into my roots as a flight test engineer. I'm

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always curious on what is the latest technology or trend in the field. ITEA helps enable my current, unyielding appetite for T&E even in these twilight years of my career.

Q: Do you have any closing remarks or observations?
A: Yes, I recently wrote an article that I posted on LinkedIn. I thought it would be worth republishing here because of the synergy with T&E and as an enduring takeaway for anyone working across their careers:

After decades of working in the field of flight test, I recently rejoined the Society of Flight Test Engineers (SFTE); a well-regarded, global professional society that supports learning and knowledge advancement for a very critical career field. My motivation to rejoin at this senior stage in my career was fundamentally technical curiosity. Inquisitiveness really to see how this field has truly advanced over time since the last time I worked in the role back in the late 1980's.

I may be a little biased on this viewpoint, but I believe anyone entering a career in aerospace and wants to work on air platforms benefits greatly if they start out their career as a flight test engineer.

Flight test engineering by its very nature is an incredible learning experience as it requires complete systems understanding, their makeup and interactions. It drives maturing skills both technical and non-technical. Technical in terms of understanding aviation systems in both detail and their associated interplays (e.g., environmental control systems managed via propulsion bypass airflow), elements like human factors integration with avionics systems design, datalinks and system of systems integration between platforms, sensors and weapon systems. Non-technical in terms of team dynamics and the interesting mix of civilian engineers with military test pilots.

My career as a flight test engineer started at the Naval Air Test Center Patuxent River, Maryland on the Navy's carrier-based F/A-18 fighter attack tactical jet. Transitioning academia as an aerospace engineering undergraduate into the high-risk reality of fighter flight test and also as a graduate of the US Naval Test Pilot School was a both a daunting and simultaneously highly rewarding experience as a young professional.

As I started to explore the technical papers on the SFTE website, I reflected about how far my career has migrated and blossomed to where I am now today at Parsons Corporation. A lot of different progressive assignments since my roots as a flight test engineer, but foundationally I realized there was so much I learned back then that I still put into use today. If I had to summarize these lessons, there are three takeaways:

Plan the Test; Test the Plan: Flight test is all about careful preparation and mission execution optimization as well as knowing your resource limits (fuel state, pilot fatigue, local airspace boundaries, timing of air tanker arrival on station altitude). Lots of moving parts (literally!) to think about before takeoff. This is enduring because on task assignments across my career it's always been about defining the complex work effort at-hand, breaking it down into executable subcomponents, and allocating team

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resources to deliver an end state solution outcome. Rapidly deviate from the plan and you lose focus, and increase performance, schedule, and cost management risk. On the early flight test missions I structured, some were too ambitious, factors such as air traffic deconfliction, real time data analysis were all real-world degrading factors that I learned to appreciate with experience. I learned to be a better planner and as result execution outcomes improved. This "plan the test; test the plan" still rings true today really on any assignment I encounter. Working at Parsons Corporation, this permeates into our business planning and execution rhythms no matter what size of project or customer support effort. The real world does sometimes pop-up unanticipated challenges – that's where Risk Management comes into play.

Risk Is Everywhere; Manage It: Flight test is also all about systematic risk management. Depending on the "plan"; potential risk with catastrophic life endangering consequences. Probably the most stressful experience as a flight test engineer was when I conducted an F/A-18E Super Hornet "VL" dive for flutter testing. Our test pilot throttling the engines to maximum afterburner; fuel state draining at an incredibly rapid rate, the jet approaching airspeed design limits – and now we purposely excited an airfoil structural dynamics device to ensure the wing did not frequency resonate, and rip clean off. That's risk! But you could get the job done with risk managed properly. Risk management is essentially very comprehensive critical thinking. This type of risk identification, monitoring, mitigation, and control thought effort has been very beneficial for me over time. Good risk management involves a team effort. Integrated teaming is indeed an essential practice in my current assignment. In especially complex activities where we deliver key mission solutions offerings, you need to pull-in experts with diverse perspectives, backgrounds, and opinions to ensure we've mapped out the risk landscape. How one goes about doing this entails skills not just on the technical side of assessment, but also the human team interaction as well. Thus, soft skills are the hard skills.

Soft Skills are The Hard Skills: Lastly, being a flight test engineer, you are at the nexus of many human interaction dynamics. How you deal with people. That is, in many respects, more difficult than deriving aerodynamic performance curves and data stochastic analysis. Aggressively ambitious military test pilots who bark about your test plan approach, crusty instrumentation technicians who complain about equipping your jet with unique "orange gear" (strain gauges, data recorders, telemetry antennas), grumpy plane captains who must prep and coordinate fueling your test aircraft on cold winter mornings. It wasn't all that bad in retrospect but as a young engineer, recently graduated from college, it was certainly a shaping experience. It was a set of encounters where I learned more effectively to deal with so many different personalities, cultivate their commitments, and align the team toward the mission and vision of the test event itself; skills which I readily applied across numerous leadership assignments in so many ways and details. Soft skills to learn to deal with human dynamics, difficult people, the art of persuasion, team collaboration, communication. All are important skills I continue to build upon and improve even today, especially managing a widely dispersed team.

These are my early career experience lessons that still reverberate today. Some solid, professional reflections that accompany all the other great, fun memories of the test pilots I teamed with and the unique missions including high angle of attack departure resistance, high-g maneuvering, precision

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weapon employments, and those sweet supersonic runs across the clear, blue Southern Maryland and offshore Atlantic skies.

Fly Navy!

Biographies

James B. Lackey joined Parsons in 2018 and is currently Senior Vice President, Mission Solutions Sector for Parsons Defense and Intelligence Business Unit, a $450M annual profit & loss and 1,000 employee widely geographically dispersed organization. As senior profit & loss leader, he is responsible for the execution and demonstrated growth of business in the areas of: space domain awareness, ground operations / C2 and launch payload integration; multi-domain software architecture and engineering, mission command and control, intelligence, surveillance and reconnaissance applications; directed energy platform productions, electronic warfare test equipment, advanced sensor integration, perimeter protection systems; and weapon system threat intelligence modeling and simulation, and hardware analysis for a variety of Federal customers and Intelligence Community Partners.
James has more than 36 years of weapon systems development and capability experience in program management and engineering in support of a variety of Department of Defense and other national security customers. Serving as a Tier 2 in the Senior Executive Service (SES), James filled key roles such as director for the U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC). In that role, he oversaw a government workforce of 3,000 personnel and a $2.5B annual science and technology and engineering budget. He also served as Tier 2 SES for the Office of the Secretary of Defense (OSD) in the Pentagon for the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics as Director, Air Warfare Programs (tactical fighters, advanced bombers, tankers, mobility aircraft, electronic warfare and precision weapons).

James holds a M.S. in Engineering Management from Florida Tech and a B.S. in Aerospace and Ocean Engineering from Virginia Tech. He is also a graduate of the U.S. Naval Test Pilot School, Fixed Wing curriculum. He is a member of the Board of Directors for the Huntsville Chamber of Commerce, NDIA Tennessee Valley Chapter and the Virginia Tech Aerospace Engineering Department. Based on his career accomplishments, he was recently inducted into the Virginia Tech Academy of Aerospace Engineering Excellence in 2022 as recognition for his career in defense aerospace.

He received an Army Superior Civilian Service Award in 2017 for his leadership of AMRDEC, two Navy Meritorious Civilian Service Awards for his Program Management leadership at the Naval Air Systems Command, and he is the recipient of the Order of Saint Michael Medal for his contributions toward developing next generation future vertical lift Army platforms.

J. Michael Barton, Ph.D., Parsons Fellow, has worked on the Aberdeen Proving Ground since 2001 spending the first 10 years supporting the US Army Developmental Test Command and later the Army Test and Evaluation Command. He joined the Army Research Laboratory Computational and Information Sciences Directorate in April 2015, working in large-scale data analytics, high-performance computing, and outreach to test and evaluation and other ARL stakeholders. Dr. Barton's entire career is in physics-

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based modeling and simulation. He spent 6 years as a consultant in the aerospace industry; 12 years as a contractor supporting the Air Force at the Arnold Engineering Developmental Center in Tennessee and the National Aeronautics and Space Administration Glenn Research Center in Ohio; and the first 4 years of his career with The Boeing Company in Seattle. He has worked for Parsons Corporation for the past 8 years. He received Bachelor of Science and Ph.D. degrees in engineering science and mechanics from the University of Tennessee-Knoxville and a Master of Engineering degree in aeronautics and Astronautics from the University of Washington.

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