

Chapter 5

From Tech Guy to Flight Line Manager

Dave Ingebright

It had been a fast eight years at Boeing Flight Test. I'd been glued to wire diagrams, squeezed into electronics compartments, and twisting cockpit radio knobs on the flight-test ramp at Boeing Field. I started as an hourly avionics tech and worked my way into a job working with the flight crew on test flights. It was a fascinating and prestigious position.

The Flight Analyst job wasn't heavy on "analyzing," but maybe it was: I was the guy on board to make sure small failures didn't turn into big ones.

I thrived in that world of on/off logic and troubleshooting. Most days, I sat in the back of the aircraft, looking out the window and listening to the steady flow of communications between the pilots, air traffic control, the test director, and the console operators reading and recording the test data. I knew I was out of my league, but nobody knew but me.



Dave getting ready to board a 737-300 test flight

Oftentimes I'd be called up front to troubleshoot a glitch, or an amber light or sent below deck through a hatch and down a ladder to swap out a computer or take a reading, or sometimes smell for smoke. The electronics bay was like a second home.

It was a good gig: working with the latest avionics, rubbing shoulders with world-class people, and getting a free box lunch. I loved watching the Boeing pilots in jeans and baseball caps maneuver these big flying machines with effortless skill, though now and then I caught glimpses of white knuckles on the yoke. One time, we even had a couple of well-known astronauts on board to fly the new plane for a bit. We usually landed right around the end of the workday.

One crisp autumn morning, my boss Jim Hay—wirly built, perpetually curious, with glasses always sliding down his nose and a shock of white hair half out of control—popped his head into my cubicle. Jim had hired me eight years earlier,

and I respected him for his easy leadership style and his habit of sharing the latest gadgets.



737-300 Flight Deck with analog instruments

We are testing the new digital Flight Management Computer

“Interested in management?” he asked.

It wasn’t the first time the topic had come up. When I’d pitched new ideas and test tools before, guys would say, “You should be in management if you want to get things done.”

I hesitated. Technical skills didn’t automatically translate into people skills, and I wasn’t sure I wanted to find out what kind of manager I’d be.

Before I said yes, I enrolled in a three-month evening seminar to

sample the basics of leadership. It seemed manageable, and I even met a good-looking brunette. When Jim officially offered me the promotion, I accepted and was sent to another four-week off-site course. About fifty of us studied the nuts and bolts of corporate life: budgeting, performance reviews, security, conflict resolution, and how to get things done through people. I was ready.

My new role involved managing, along with three others, a team of about fifty avionics techs and support staff. I was the youngest manager in the group. Our shop operated around the clock, maintaining and modifying a test fleet of a dozen planes. Each aircraft flew nearly every day.

The ninety-day rotating shifts were brutal. Day shift had me home by 3 p.m., swing shift was tolerable, but graveyard shift—midnight to 6 a.m.—was pure misery. I remembered doing nights once as a tech and waking up in a panic, completely disoriented about what day it was. From then on, I steered clear of the graveyard whenever possible, staying on good terms with the manager who liked working nights. Mostly, there was a three-month rotation between the swing shift and the day shift.

Managing people was a whole different ballgame. Electronics were simple: true or false, one or zero, but people were fifty shades of gray. Some workers thrived with encouragement; others secretly (or openly) resented management and looked for ways to trip you up. I learned quickly that you couldn’t always be the

nice guy. But the job paid better, and I saw maybe a path for advancement, but first, I had to develop a management style that worked for me.

At Boeing, hourly workers were represented by the Machinists Union. Day-to-day direction came from leadmen; managers coordinated the big picture. I had to learn to tailor my approach to each person's motivations, even when delivering bad news. My leadman was a guy named Neil. A few years older than me, he'd been around awhile. Medium height with intense eyes, he ran a tight crew and was also a union steward, so we ran things by the book.

My first major challenge came with the arrival of the 747-400s for the test and certification program. Right away, we hit problems: missing parts, engineering delays, planes that refused to cooperate. It was a mess.

I was loaned to the Everett factory to lead a wiring update crew. I still remember crouching in an electronics bay with two new techs. When I checked their paperwork, I realized they were working on the same wire—one installing it, the other



**#1 747-400 Final Approach into Boeing Field
First Flight**

removing it! That's when I realized engineering had completely lost track of the configuration. In a new plane with miles of wiring, it was a major problem.

Another painful lesson came a month later in a big status meeting. Senior managers were running through a long list of rejection tags. When they hit one of mine, I reported it as "held for engineering." A liaison engineer named George challenged my status in front of the room.



Avionics Shop crew on the #1 747-400

I fought back—and continued the argument afterward in the hallway.

George had a smirk that said he thought he was smarter than everyone. From then on, I made it a point to verify every detail before I stepped into a meeting. Even 25 years later, whenever I passed George in the hallway, I remembered that day—and I'm sure he did too.

Around that time, PCs began appearing in offices—probably Compaq 286s. Fascinated, I bought a used IBM 8088 for home and started teaching myself. The office PCs weren't much at first, just basic network connections and the first word processors I'd ever seen. But I immediately saw their potential. It would be another seven years before we had the internet at work.

The avionics techs didn't need much management. They preferred that I not show up at the plane more than once a day. Looking for ways to stay involved and add value, I started writing a monthly newsletter for the shop. I didn't ask permission—I just did it.

It was a [two-sided newsletter](#) packed with test updates, deep dives into avionics, fun facts, and a historical column on my favorite subject: electronic countermeasures. It kept our shop informed, gave me a creative outlet, and raised my visibility. Eventually, Jim approved desktop-publishing software, and the newsletter took off.

Community service was encouraged, too. I got involved with Junior Achievement, mentoring a private middle-school class. We brainstormed a product idea, sold stock, manufactured the product, sold it, and returned profits to shareholders. Watching young people think, plan, and execute was energizing, and it showed my bosses I was serious about leadership.



When the 777-200 program launched, its modular fly-by-wire systems were poised to revolutionize aviation. They were complex and intimidating to the test community, so I used the

newsletter to break them down into plain language.

Meanwhile, we got wind of a clever idea from the Renton flightline: techs had rigged a remote control for the cumbersome system we used for airspeed and altitude testing using an HP-71 hand calculator, eliminating the need for a guy sitting bored in a metal "ADT test box" on wheels on the tarmac. They earned a \$10,000 suggestion award.

Jim knew of an internal fund with dollars available for research and development of new manufacturing ideas. He applied to Boeing's Manufacturing, Research and Development (MR&D) team, and soon a couple of engineers helped us design our system, centered around an HP 9845 computer. A couple of guys and I went to a two-week school to learn HP BASIC. Jim bought a milk truck-style step van, installed racks, and we worked with MR&D to turn it into a fully functional flightline test platform: the SAFT Van (Semi-Automatic Flightline Test).

I had to cajole test engineering to get authorized test time on the planes so that MR&D and the avionics techs could test the software and add more features to the remote control system. It wasn't always without difficulty, as some of the engineering operations people were uneasy about removing parts of the plane and putting them back together. The van drew attention inside Boeing, and we kept at it, seeing where it would go. I worked with them, made suggestions, got them access to a plan, and enjoyed being the intermediary. It became a key development platform to improve flightline testing and take it to the next level.

We developed "pancake adapters" and test plugs to monitor the different data busses on the plane, and with those, we could monitor the pilot control inputs, the resulting control surface movement,s and a ton of other information, including the throttle positions. The implications for simulation and advanced testing were far-reaching, and this brought the idea of "why can't we fly the plane on the ground?" The R&D guys and the avionics group were electrified at the idea, and maybe this could be done.



In the van were the tools to command a bunch of test gear, and now a small HP 1000 UNIX computer. R&D Engineers obtained the actual flight simulator algorithms for the 777 and other Boeing planes and figured out how to run the van's

test instruments using “closed-loop feedback”. In other words, you could command turns and banks using the cockpit controls, and the van equipment would “stimulate” the plane’s sensors, and the cockpit instruments reacted just the way they would when the plane was flying.

MR&D guys assigned to the project kept tweaking and improving the code and uploading it to the van. We wrote an engineering work authorization (EWA), so airplane hookups and test time were sanctioned instead of asking for favors from test operations. The thing worked well enough that the pilots and test operations people began to take notice and to think that maybe here was another tool to safely try out new, upgraded flight control software before it was actually flown. We knew we were onto something, but it was still too complicated of a setup to just plug and play. But the MR&D guys kept at it and later trusted enough to become a legitimate tool in finalizing new flight control software. I think my interest, promotion of, and access to the budget helped keep it moving to the next level.

Next, in my spare time, I started fooling around with writing articles on avionics subjects and about our SAFT Van in an industry trade magazine. I corresponded with editors and got a couple of things published. Surprisingly, the articles generated enough interest that a couple of the editors from Avionics Magazine wanted to come out and do a tour of the flight line. I got them passes, and it was fun getting to know them. A few weeks later, they sent me a note asking if I would give a speech at an industry convention. I knew my written skills were better than my speaking skills, and I had a boss at the time who wanted to tone me down, and he gave it to someone in customer support to do. I was fine with it.

By the early 90s, “Continuous Quality Improvement” swept through Boeing. Managers were sent to weeklong training sessions on lean processes and people skills. We learned to map workflows, identify bottlenecks, and eliminate non-value-added steps.

Monthly crew meetings on the subject became mandatory, and most workers appreciated the opportunity to shape their own processes.

When the internet arrived around 1994, I became interested in HTML. Without asking, I built an intranet website for our 350-person organization, complete with fast links, a rotating “Picture of the Month,” and a “Troubleshooter” form that privately emailed questions or problems directly to me.

I'd do some poking around and would post the answer in a table that kept getting bigger and bigger. People would whisper Who is running this website? I kept mum. The site ran for a decade before a sensitive query finally caused a stir, but by then, I had a ton of fun with it and learned web design along the way.

Then came a big reorganization. The avionics shop was merged with the two main flightline maintenance shops. Overnight, I traded avionics crews for real aircraft responsibility. My first assignment: a 767 AWACS destined for Japan. I was assigned a ten-man crew of electrical, mechanical, and avionics specialists. My friend Gary taught me how to do the final inspection—a detailed final walkaround of the whole plane, inside and outside. Cargo doors, brake lines, and every place trouble could hide.

Four of us signed the "release for flight" form after each had done his walkaround. It was very formal, me, the pilot, the QA supervisor, and the test engineer. The crew would then be called to come out, and after they were settled in their seats, my job was to walk through the plane and make a final count of people to make sure it matched the manifest in my hand. After that, I'd smile at the ops guy at the door, wish him a good flight, and walk down the stairs.

The door would close, and we'd pull the stand away. A designated mechanic would lay all of the landing gear lock safety pins on the ground where the pilot could see them, proof that the plane was fully ready to go. The pilot would signal with a thumbs-up. The engines would start, and we'd wave it out of the stall for the day's flight. I'd take the manifest paper and drop it in a box in the engineering building, as this was the actual verified list of the people on board.



**The Japan 767 AWACS crew
Test Engineering, Manufacturing and QA**

When I signed that first release-for-flight form, it hit me: I'd come full circle. From troubleshooting a single bad radio to ensuring an entire aircraft was airworthy, I was no longer just the tech guy. I was the trustee of every wheel, brake, panel, hose, and bolt under my watch.

Looking back now, the details blur—model numbers, program names, lean initiatives that came and went. But the thrill of innovation, the challenge of leading people, and the responsibility of flight readiness? Those are vivid still.

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