A Defining Journey:
My Final Years with Boeing's 777 Test Program

Dave Ingebright

The Opportunity of a Lifetime

In 2002, after 23 years at Boeing, I received some news that would define the height of my career: I was selected to lead the manufacturing team on the first 777-300ER (WD502). In Flight Test Manufacturing, landing a "first of a model" (FOM) airplane assignment was the brass ring that everyone reached for—an opportunity that only came around every 4-6 years in those days.

My boss, Scott Hagen, delivered the news. He was a tall, sandy-haired fly fishing enthusiast with whom I'd worked on and off for twenty years. Scott had sorta been my model for professional success—strong ethics, smart appearance, and the political savvy needed to navigate Boeing's complex power structures. When he sighed in staff meetings and said, "Guys, we've been outmaneuvered," I'd take mental notes. His assignment of WD502 to me wasn't just a job handoff; I think it was a vote of confidence in my readiness to step up.

The 777- 300ER: Engineering Marvel in the Making

The 777-300ER represented Boeing's ambitious push into wide-body extended-range operations, designed for flights up to 7,300 nautical miles. What made this aircraft special wasn't just its size—the biggest 777 variant yet—but its technological advances: increased fuel capacity, a reinforced fuselage, extended wings, modified landing gear, and the crown jewel—GE90-115B turbofan engines, the most powerful commercial jet engines in the world at that time.

The team's excitement was palpable. We were a specialized flight test maintenance shop and we ran three shifts of ten specialists each—mechanics, electricians, and avionics techs—until we went remote, then switched to two twelve-hour shifts. On world tours we were to pare it down even more to the top ten people. The certification road ahead would be grueling, with tests designed to push the aircraft to its absolute limits. This wasn't just maintenance work; we were helping write aviation history.

WD502: From Factory Floor to Flight Line

Our journey began in early 2002 at the Everett factory, where WD502 was barely more than just a collection of parts. The factory management carved out a workspace for us—a screened-off parts crib, lunch tables, and some vacant nearby offices. Our teams worked alongside factory personnel, integrating our test systems as the aircraft took shape. One morning, when I arrived for work, Scott was already there and said, “Hey, when I got here, the third shift was just sitting around!” I’d known Scott since he was an hourly leadman and I reminded him of the times he drank coffee and read the Seattle PI all morning. I think this midnight-to-six team worked for another manager, so I went and found who it was.

Test Flight over the Straits of Juan de Fuca

Progress meetings with factory management became part of our daily routine. It was interesting to sit on the sidelines and watch them sort out troubles as the first of a model went down the assembly line. I had done this before with other planes and always looked forward to getting back to Boeing Field, where things were more relaxed and we "owned" the plane. This wasn't just any aircraft; it was our aircraft, and we felt a personal stake in its success. And it wasn't just the maintenance crew, it extended to our test engineering partners and the pilots.
Usually there was one pilot assigned to our plane and others rotated into the right seat as their training and flight schedules evolved.

Frank Santoni was our project pilot. He was a former naval aviator, tall with close cropped hair, serious, calm and careful but open and friendly with the maintenance crew. After all, we were presenting him with an airworthy and safe airplane every day. Frank later became Boeing’s chief pilot.

The Test Program: Desert Trials and Hair-Raising Challenges

Over the next three years, the test program took us across the country and around the world. Our first major deployment was to Roswell, New Mexico, to prepare for the critical maximum braking test. Roswell was chosen because in the past, occasionally during the initial brake testing, we’d lose tire parts and block the Edwards AFB runway.
Roswell didn't mind at all, it was an old WWII base given back to the county and they loved having 90 people for a few weeks.

When these tire incidents happened in the past, the Air Force at Edwards became upset because they had fighter planes taking off and landing and they absolutely could not suck anything into the engine of the high performance aircraft. We were allowed to do the final big test for credit at Edwards, otherwise, we were told to do all the prep work somewhere else.

Looking over the Brakes and instrumentation wiring at Roswell, N.M.

Roswell itself added a surreal backdrop to our work. The town had fully embraced its UFO heritage, with alien-head streetlights and a detailed UFO museum. Our ramp space was near the hangar where alien remains had supposedly been examined. During night shifts, we explored the unlocked World War II hangar, venturing into back rooms with a mixture of curiosity and unease.

Our work at Edwards Air Force Base was even more challenging. Located in the middle of a vast dry lake bed, it required nearly an hour's drive to the nearest town. Our twelve-hour days consisted of work, meals, some fun, and sleep. I rented a mountain bike from the Air Force Rec Center. The upcoming maximum brake test created intense anticipation.

The concern wasn't just about stopping the aircraft but preventing a potential disaster—the wheels were made of magnesium, which, once ignited, burns with nearly unstoppable intensity. FAA rules required that after the plane stopped, nobody could touch anything for 20 minutes, simulating the time needed for passengers to evacuate.

Perfomance landing testing at Edwards AFB

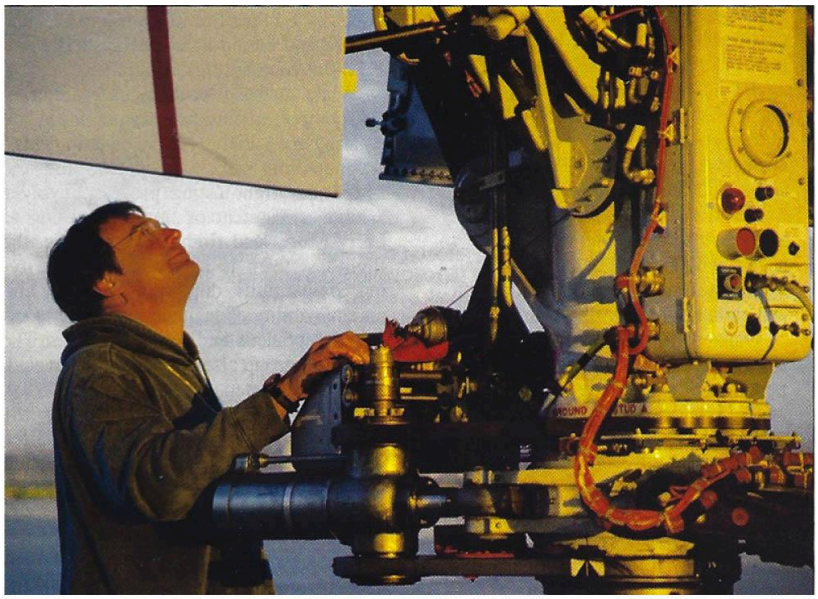
When the moment came, the test was successful—no fires erupted despite the brakes heating to glowing red. The Air Force firefighters hosed down the superheated components while we prepared to get the stricken plane off the runway as fast as possible. As the hours stretched on, I made a run to the on-base Burger King, returning with fifty hamburgers for our hungry crew while our storekeeper supplied coolers stuffed with ice and Gatorade.

We worked through the desert afternoon without stopping to change the twelve half-melted tires

and brakes and clear the runway. A couple of months later, our second Edwards trip stretched from days into weeks due to weather constraints. The takeoff and landing performance tests required completely calm conditions—almost impossible in the high desert where winds typically picked up shortly after sunrise.

We'd ready the aircraft before dawn, sometimes getting a brief window for testing before the wind arrived. The extended downtime led to our crew organizing baseball games and occasionally, some questionable antics, including a practical joke involving one easily irritated mechanic, Leo, that nearly escalated into a police matter.

Some jokers on the crew had been making a quick knock on his motel room door while walking by, and then running around a corner. When he realized what was happening, Leo would jump out of bed and run to the door to catch the culprit. One time he mistakenly grabbed a teenage kid who had the misfortune to be walking past his door. This led our logistics guy, Jim, to quickly try and calm everyone down at the motel office. There was an angry parent, the motel manager, I and Jim. He was able to deescalate the situation and I think it helped that he was over and above friends with the motel lady, having been to Lancaster more times than you could count.



Early morning preflight inspection at Edwards AFB

I had gotten to know one of the test engineers, Carey, who had also spent a lot of time testing at Edwards.He made a hobby of locating old crash sites in his off time. Being a history buff, I was interested in the crash sites too, and I got him to draw me a map to the site of Col. Edward's YB-49 flying wing crash site.

A friend John and I drove up there, off a road north of the base. I think we found it. We did some digging around. There was a lot of lead, and located a beat up piece of weathered aluminum sheet metal about 6"x6" full of rivets on the corners. I showed it to our t pilot, Frank and he said wow. I still have it.

Showcasing to the World: Air Shows

The Paris Air Show had us place our 777-300ER directly across from Airbus's new A340, our chief competitor. I think they wanted to see the largest commercial competitors duke it out in the front row. The experience was unforgettable—hard, long days rewarded with surprisingly

luxurious accommodations at the exclusive Sheraton on the Champs-Élysées.

The crew at the Paris Air Show
Allen Mulally in center

Three moments stand out from Paris: First, an unexpected interaction with Airbus personnel who came to examine our aircraft, particularly interested in our innovative large overhead stowage bin design. During the open house, they began inspecting the mechanism of our large bins and the design very closely. We knew this was coming, and we'd talked about the possibility in one of our briefing meetings with sales. So I reciprocated by asking to see their 737 look-alike, an A-318 Business Jet. I had been involved with Boeing's Business Jet, a 737, about six years earlier and was interested in their version. Though initially denied entry by security, my Airbus escorts overruled them.

During the inside and outside walkaround tour, I noticed my hosts watching my every move, intently following my gaze to see which components captured my attention. I felt a little weird walking back across to the 777. Did they think I was somebody significant?I was just interested, as a competitor, to have my first closeup look at their "737".

Second, a tour of Versailles was organized for our team on the final day—a breathtaking glimpse into French history and opulence. I had suggested this idea to Jeff, our wiry, easygoing, and astute test director. He was my main interface on the trip, and he liked it, and organized a private tour for the Boeing group. And third, daughter Shannon was able to stay with me and see Paris and even visit Versailles with the group, making the experience even more special.

Moai at Easter Island

Our world tour continued with stops in Australia and New Zealand, giving us brief opportunities to explore Sydney and Auckland. But perhaps the most extraordinary stop was Easter Island—a check to verify the "engine-out 90-minute rule". That gave us a day for an

incredible tour of one of the planet's most remote locations. We stayed two nights, touring the island's famous Moai statues and enjoying its sole swimmable beach.

I bought a replica moai about 12 inches tall from a native. There was some sort of cabin pressure test scheduled for the plane to conduct on the way back to Seattle, and it was deemed a minimum crew test. So my team and I had to return home via commercial air. It took 33 hours, and the only good thing was that we were in business class and had good seats.

Postflight and shutdown at Easter Island

The Dubai Airshow in November was another once-in-a-lifetime opportunity. I had been there before on the first 777 in 1996, and I wanted the crew to experience the same wonders. I went to the concierge and arranged a van tour that would take us to the gold and spice souks, followed by a boat tour of Dubai Creek and around the rest of the modern city. The lines of market stalls in the gold souk showcased a myriad of eye-catching gold products.
We were told all merchandise was carefully regulated by the Dubai government to ensure the authenticity of the quality. In addition to gold, there were diamond-encrusted ornaments, strings of pearls, platinum, and silver. It was unbelievable and affordable. I realized that gold and jewelry in the US had a 1000% markup. Vendors were more than happy to offer a bargain and expect you to haggle. At the spice souk, we savored the atmosphere of the past as we walked around the stalls with mounds of aromatic herbs and spices, all spilling from large baskets.

Working with laptop during the world tour

One thing I had never seen was large rolls of cinnamon bark,and I bought a box of Frankincense. I turned around and one of the guys, Mike, had a coconut with a straw sticking out. I asked him what it was, and he replied that he didn't know, but it tasted good. Next, a boat tour of the river called Dubai Creek (it was not a creek), where we saw medium-sized Dhows tied to wharves taking on cargo.

Apparently they make commercial journeys between the Persian Gulf and East Africa. We were told their cargo is mostly dates and fish to East Africa.

One night the crew and I all had dinner on the patio of the Sheridan and it was one of those evenings where everything was perfect, the food, the right temperature and scents of tropical flowers. We sat back and took it all in.
The waiter came by asking about dessert and offered to bring over a hookah.
We all looked at each other and nodded a “why not”, it was an Arab custom to have a smoke after dinner. So this waiter brings over a shisha with six leads. Shisha is the traditional Arab water pipe, sometimes called a hookah (but not by the locals).

Of course, it still counts as smoking, and yes, it's bad for health, but the social and ritualistic aspects of the custom were irresistible. The waiter brought out our shisha and set it down before going off to get a scoop of smouldering charcoal. He then placed two or three coals on top of the perforated foil and took several long draws on our pipe to get it started. Once it was smoking freely, he fitted a new plastic mouthpiece before handing one to me, rather like a wine waiter, for approval. We all guiltily looked at each other as we drew on the faintly tasting apple tobacco.

Smart Bombs on a Fighter

On the final night of the event, Boeing hosted an exclusive, invitation-only party at the Dubai Athletic Club. The gathering took place outdoors on a spacious patio beside a sparkling swimming pool. A smooth jazz band played in the background while an open bar and lavish buffet was set up with an array of food like nothing I had ever seen. There were shrimp as big as your hand, a small pavilion where a chef grilled steaks to order, and even a Northwest Indian-style planked salmon BBQ in one corner, prepared over an alder fire. I couldn’t resist talking to the chef, as my dad used to grill salmon in exactly the same way at his annual Fourth of July office parties. Boeing had flown in this guy, a load of alder firewood and fresh King Salmon from Seattle just for the event, which felt pretty special to me.

As the sun set, I took in the scene—an understated yet elegant party with a phenomenal spread of food, and aviation leaders from airlines around the world mingling. I looked over the crowd, feeling a deep sense of pride and gratitude for the company, the new plane, and the chance to be part of it all.

Though I had to leave soon for an early departure, I just had to take a moment to soak it all in and be part of the experience. We were loading the plane that night and fueling it for an early morning departure, but I just had to go to witness the party and mix in for just an hour minutes.

As I arrived back at the plane, the crew had just finished loading the cargo, and we were waiting for a tow across the field to the fueling depot. Three of us sat in the cockpit, riding the brakes and watching as we crossed a couple of runways en route to the fuel farm. I had been entrusted with the plane's credit card for the fuel payment and handed it over once the fueling was complete. A few minutes later, the attendant returned, saying the card had been declined.

Confused, I thought, *How could that be?* The card had a substantial reserve and was usually kept secure during the trip by the engineering manager

I handed over the backup card, but moments later, he came back with the same response—it was declined as well. Glancing at my watch, I saw it was 2 AM in Seattle. With no other options, I called our Seattle travel contact, Kate, waking her up to explain the situation and asking her to please help resolve it.

Meanwhile, the fuel attendant grew visibly frustrated, pacing and speaking rapidly in Arabic, almost jumping up and down. Though I couldn't understand him, his tone made it clear he wasn't happy, probably throwing in a few choice arab words. We all stood around awkwardly until, finally, I got the call to try the payment again. This time, it went through, and the attendant walked away satisfied. Just another exciting day, I guess.

The Test Labs: A New Direction

The EMI lab was testing a cruise missile and we took a group photo

After the 777-300ER certification, I was temporarily assigned to the test and research labs—a one-month loan that would unexpectedly reshape my career path. The lab's technical touch labor had recently been merged with the flight test manufacturing group and there was some mixing of talents and resources and of course, I got volunteered to go over there and see what was happening and report back.

What I found was that the three-story white building across from the airfield

housed a marvel of scientific innovation: a lightning lab simulating strike effects, antenna and EMI labs, vibration and materials testing facilities, experimental flight simulators, and a full-scale electrical systems lab featuring replicas of every Boeing aircraft model in production.

The lab was going through some management changes and I was assigned to supervise about thirty technicians supporting all the labs in the building. The environment differed markedly from the flight line—higher morale, stronger teamwork, and a different operational rhythm. Working with veterans like Ewayne Hounsell and Perry Rose expanded my understanding of Boeing's laboratory foundations.

When I finally returned to Flight Test, I knew I had found something special—a chance to work with aviation's fundamental building blocks, the technology that precedes aircraft construction.

The 777-200LR: Pushing Range to New Limits

Like many assignments at Boeing, what was supposed to be a three-month loan turned into six. After returning to Flight Test, I received another exciting opportunity—managing the first-shift manufacturing team for the 777-200LR certification program.

This aircraft was built for a unique niche: ultra-long-haul flights exceeding 16 hours, making it the longest-range commercial airliner in the world at the time. Our work began once again on the factory floor in Everett, installing instrumentation wiring as the plane came together. This model included two notable additions: a crew rest module nestled in the aft fuselage ceiling, and an extra fuel tank in the forward cargo compartment.

777-200LR WD001
In flight publicity shot over the Cascade Moutains

The crew rest module was a compact, carpeted six-bunk compartment installed just before the final body join. By moving the crew rest area to the ceiling, carriers gained four to seven revenue passenger seats. I remember watching in awe as it was hoisted into place—it would remain up there for the life of the airplane. Little did I know, I'd later spend a fair amount of time in one of those bunks.

For the sales tour, the aircraft interior was divided into three zones. The first and second zones featured all-business-class seating, with the last few rows of the second zone designed to replicate the slightly narrower contours of the Airbus A340—our main competitor. The

reduced width and height of the window seats were obvious, but standing in the back of the zone, the 777's spaciousness stood out. I'd often linger there, pointing out the difference to curious passengers. We were even asked to stay in the back whenever possible.

After a series of test and certification flights, we prepped for a global sales tour. The team split into two: one handling Europe and the Middle East, and my crew taking the Pacific leg.

I flew to London a week early so my 18-year-old daughter, Shannon, could join me for a bit of sightseeing. Stonehenge and the British Museum were high on our list. When the time came for the crew handover, we met Harry Nelson and his team for dinner and a beer near Gatwick. Harry, a slightly balding former mechanic with experience on our two chase T-38s and our Helio Courier, had been running the European leg. Our crews shared a friendly rivalry, and this meeting had an air of relaxed camaraderie. We both knew this world tour would be much more enjoyable than the grueling testing phases we were used to. With a well-picked team that knew how to work and have fun, things were off to a good start.

John and Dave at Gatwick Airport UK

Our Test Director was Kevin, and our project pilot was Mike. Our departure from London coincided with a terrorist attack on public transportation. My daughter was flying out that same day, and I was a nervous wreck until a British Airways contact confirmed she'd safely boarded her flight.

Part of our mission was to court the Lease-Finance industry, which had grown rapidly over the past few decades. By 2023, leasing accounted for 58% of the global fleet—a significant rise from just 10% in the 1970s.

We flew two special showcase flights: one for European lease bankers from Gatwick to Keflavik, Iceland, and back, and another for U.S. bankers from Trenton, NJ to the Bahamas and back. We loaded a lot of Golf clubs for that one. Each banker received a gift bag, including a Bose noise-cancelling headset with a Boeing logo—some extras of which we quietly claimed at the end.

But soon, we hit a snag. Unbeknownst to us, Harry's team hadn't told us two critical things: where they'd hidden the keys to the toolbox in the forward cargo hold, and the tight

relationship they'd developed with the Boeing flight attendants. That second part became apparent quickly.

There was an unmistakable chill from the flight attendants. We were all Boeing employees, all part of the same mission, yet their cool demeanor made it clear something was off. It became more obvious when we overheard complaints about snoring from the crew rest bunks or noticed we weren't receiving full meals. When I asked about it, I was met with blank stares or denial. Then came the moment that stood out—a full basket of raspberries, my favorite fruit, gifted to the cleaning crew in Bermuda. My team noticed too, asking, "What the heck is going on?"

Still, we carried on. Our route took us from London to Reykjavik and back, then to Hong Kong, Singapore, Mexico City, Trenton, Bermuda, back to Trenton, and finally home to Seattle. Each stop featured open houses and walkthroughs with airline VIPs, and we'd position ourselves around the cabin to answer questions and keep an eye on things. Usually we had time to do some sightseeing and enjoy the local vibe.

But Bermuda brought another unexpected twist. After landing and putting the plane to bed, we got to our hotel and I headed to the beach, eager for a swim at the beach below the hotel. A group of friends waved me over for a Mai Tai at a beach bar, but I was anxious to swim in the alluring blue-green waters. After sitting in the sun on the beach for a while, I walked up to the bar, and they were nearly falling off their stools. Bermuda's famous rum drinks packed more punch than they expected.

Bahamas Beach
I swam at a spot about the middle

The next morning, during preflight, our QA guy approached me with bad news: based on flight hours, we were overdue for a required inspection on a small engine component. Simple enough, except we couldn't get into the toolbox—it was locked, and the keys were nowhere to be found.

I tried calling Harry. No luck. The plane had been flawless so far, and we hadn't needed the tools—until now. Our QA manager refused to budge: without the inspection, we couldn't legally fly.

That's when Mike, our project pilot and a former Navy aviator, stepped onboard. Always professional, he listened as I explained the situation. After some back-and-forth with QA, Mike finally said, "Well hell, we're leaving. I'll take the hit." Five years later, I'd find myself giving Mike bad news again—this time on the 787.

We flew back to Trenton without issue. Once we landed, we cut into the lock, performed the inspection, and got the plane ready for a big celebration in a nearby airline hangar. Three massive A/C units were parked outside to cool the humid summer air. The setup included dramatic lighting, a small stage, catering and bar, and even an NBC satellite truck. But I skipped the party. Instead, our crew caught a train to New York City, visited Ground Zero, walked through Battery Park, and explored Ellis Island. Then it was back to Seattle—and time to start planning for the next stop: the Dubai Airshow and Mumbai.

A Career Crossroads

Upon returning to Seattle, I found myself at a career crossroads: stay with Flight Test or explore what the labs had to offer and do something different, possibly a job closer to home and maybe more upward mobility. It was tough, the 787 was on the horizon, and another trip to Dubai was compelling along with a once in a lifetime chance to see India. I was tired of traveling and wanted to do something different. I chose the labs, setting my career on a new trajectory.

Looking back on these years with Boeing's 777 program, I realize they represented far more than career advancement. They taught me about leadership under pressure, the marriage of technical precision with human factors, and the global impact of American aerospace engineering.
Every takeoff of a 777 today carries a small piece of our team's dedication, unseen by passengers but crucial to their safety.

The lessons from Scott Hagen's mentorship, the camaraderie of late nights in strange places, and the pride of showcasing our work at international airshows shaped not just my professional approach but my understanding of what excellence truly requires. The 777 program wasn't just a job assignment; it was a defining journey that connected me to aviation's grandest traditions while pushing its boundaries forward. And for that opportunity, I remain profoundly grateful.

Back Next Index