Chapter 2**—THIS JOB IS FOR THE BIRDS**

I'm amazed that I was neither fired nor killed in my first year at GE. That's no exaggeration, for two reasons. First, I ended up reporting to a new person, who turned out to be one of the most ruthless and unscrupulous individuals I would ever encounter at GE. Second, my formal safety training was virtually non-existent, thereby increasing my risk exposure as I was sent to the field Somehow—as you'll see in later chapters—chance, good luck or whatever controls our destiny, was on my side, and the ultimate outcomes of my experiences turned out surprisingly well, but the ride was extremely wild, and the dangers quite real.

Approximately six months before I began my professional GE career, a seemingly completely unrelated event took place that would impact me on my very first day of work. In November 1975, a DC-10 cargo aircraft crashed on takeoff at New York's JFK airport. Luckily, no one was killed in this accident, which later was attributed to bird ingestion in one or more of the DC-10's three giant CF-6 engines, which were manufactured by GE. Ramifications from this accident, and other similar events involving GE's CF-6 equipped aircraft, triggered events leading to my first GE professional assignment.

On the first Monday I reported to GE, I was euphoric. A fantastic opportunity was before me, and I was determined to be successful. Following in the footsteps of

my grandparents, who had struggled in blue collar assignments, here I was, the first person in my family to become a professional employee with the iconic American company. The company, known by two capital letters, was not only recognized in every US household, but virtually everywhere in the modern world. There was no way I could imagine the incredible experiences, wide-ranging travel opportunities, wonderful people nor the magnitude of challenges that would come my way. At almost every step I would be privileged to work with some of the best professionals in the entire company.

Quickly that first morning, I learned of many organizational changes on the Measurement Services team since my earlier assignments. A number of new engineers were now on staff, along with several core members I had previously met. Also, a new manager had been assigned to the Measurement Services engineers. I will refer to him only by his initials, DK, for reasons that will become apparent. I knew absolutely nothing about DK. Certainly, he wasn't the fellow I had planned to work with. He had not interviewed me, nor had he written my offer letter, and he definitely didn't have any first-hand knowledge of my prior work experience at SIS.

This scenario—of hiring managers changing soon after I accepted a new role—would be repeated multiple times throughout my career. Each time, it was uncomfortable and disruptive. I often had difficulty adjusting to these situations, particularly when I had established a strong rapport with the hiring manager, only

to have some type of upheaval in the first weeks or months of a new role disrupt things. In this particular case, I didn't even report to the hiring manager for a single day! There would be absolutely no "adjustment" time here as I was immediately launched on my first unique assignment.

While sitting at my desk and trying to familiarize myself with a myriad of orientation material, forms, and procedures, I was interrupted in the first hours by a supervising engineer. He inquired if I could travel the next morning to New Jersey with another GE employee from GE Global Research on what would become a most unusual multi-month assignment. When I answered in the affirmative, he told me to drop everything and accompany him as I was about to get a crash course on my new assignment. So, before I could even complete any of the benefit forms or sign-in paperwork, without any formal orientation whatsoever, I was taken to a meeting in another building.

As I quickly learned, the project would involve a field acoustic experiment to investigate the impact of jet engine noise, particularly GE's newly launched high bypass ratio[1] CF6 engine, on seagulls. The chosen location was Brigantine National Wildlife Refuge located in Oceanville, New Jersey, about a 30 minute drive north of Atlantic City, New Jersey. The refuge had granted permission for us to conduct our experiments there. Like many assignments that would follow,

[1] High bypass ratio simply means that much of the air entering the large front engine fan actually bypasses the core compressor, combustor and turbine. Most of the engine thrust is created by this fan, which in turn is driven by the core turbine. Prior engines developed most or all of their thrust directly from the core turbine.

this project proved to be extremely interesting and most unusual. Also, like many others that followed, this project would immediately catapult me into work with some of the top experts in the company.

Only in hindsight did I recognize that fate—from the crash of that DC-10 months prior to my start date—once again had intervened in my career, even before it officially started. Somehow my desire to work on gas turbines, particularly aircraft engines, was magically handed to me on my very first professional assignment. How fortunate was that? You just can't script things any better!

As I later learned, the JFK DC-10 incident was one of several caused by bird strikes involving GE's newly introduced CF-6 engine. At the time a theory was circulating that perhaps the new engine had sound emanations that somehow attracted the birds. With GE's reputation at stake, combined with heavy competition from the likes of Pratt & Whitney and Rolls Royce, GE decided to embark on an unusual program to investigate, and hopefully disprove, this theory.

Drawing on some of the top relevant technical experts in the company, a GE team was quickly pulled together. The team included two leading GE acoustic experts, a PhD named Richard from our world-class GE Global Research and a sharp German fellow named Horst Hehmann, who was GE Aircraft Engines' top

noise expert. A leading ornithologist, Dr. Michael S, from a leading East Coast university, would provide avian expertise.

Although completely unknown to me at the time, the group also previously had consulted with one of GE's top statisticians, Dr. Gerald Hahn[2], for advice on how to construct a statistically meaningful series of tests[3] for the given objective. As the team came together, everyone recognized that specialized equipment was needed and, of course, someone to operate this equipment. Enter the Measurement Services group, and one newly hired engineer. Lo and behold, just a couple of hours into my professional career, I was now being called to duty on a very elite team.

After a fairly short initial meeting, I discovered that I had less than 24 hours to assemble equipment, learn how to use it, and then embark on a multi-day trip. During this time, I had a most extraordinary and memorable experience in an anechoic chamber[4] within the Schenectady plant. Briefly, the room was a giant cube, perhaps 10 to 12 feet on a side with only a single, heavy freezer-like acoustic door. Every internal surface inside the chamber was lined with cone-like foam material. When entering the room, I "walked" on suspended steel wire cables arranged to form a mesh with about 2-inch squares. As I stepped inside

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[2] Years later I would again encounter Hahn as an adjunct professor teaching a segment of my graduate program statistics class at Union College.

[3] Later in GE's Six Sigma period, this type of testing was known in statistical nomenclature as Design of Experiments. Hahn later published a paper titled "Practical Considerations in Designing Experiments" by GJ Hahn, Report 82CRD228, September 1982.

[4] An anechoic chamber is a non-reflecting or echo-free room designed to almost completely absorb sound waves. Such a room is also completely isolated from external noise sources.

this chamber, the steel cables had some flex, like walking on a trampoline, and the open mesh created the illusion I was walking on air. Inside was the quietest environment I had ever experienced. Calibrating our sound equipment in this chamber was very surreal.

As plans crystalized, I learned that testing would involve playing a series of jet engine takeoff sounds around a large pond within the wildlife preserve where many wild seagulls would gather. As a control to our experiment, we randomized the jet engine model acoustic sequence and mixed in other “control” type bird calls.

My Measurement Services group supplied the latest battery-powered Nagra reel-to-reel tape player/recorders for this project. Given that I would be operating in the field, an inverter to generate AC power from DC was also required, as the amplifier/speaker system required AC power to broadcast sounds at required decibel levels. Field power was supplied by 12-volt motorcycle batteries, which I recharged when necessary.

On my second day, I loaded the equipment into a car, and along with my new acoustic GE research associate, drove to Atlantic City to meet Dr. Michael and Horst Hehmann. During the trip, I had time to reflect on how interesting this first assignment was going to be. I was going to be working with aircraft engines (or

at least noises from aircraft engines) in a fun setting on the south Jersey shore in early summer. What a cool and unusual start to my career!

When we arrived in Atlantic City, the vintage seaside resort was showing its age and reflecting years of neglect. It would be two more years before the first casino arrived to inject new hope into the place. Meanwhile, Dr. Richard and I met the others on the team. Horst Hehmann was a solid, smart GE technical expert. He was also a very personable guy, and we became quick friends as we both shared a common love of aviation. Our ornithologist Dr. Michael S. was a casual, pipe-smoking academician, who openly shared his ideas with us. I considered myself most fortunate to be working with such a terrific team of experts. These folks were the first of what was to be an incredibly long list of talented and interesting people I would encounter throughout my career.

Not long into our initial meeting, we determined that the jet engine tapes we planned to use were of inferior quality for our needs. I suggested that perhaps we could travel to Philadelphia International Airport, only an hour away, to record new tapes. All the aircraft we were interested in regularly operated out of PHL (the airport code for Philadelphia). Although the team was somewhat reluctant to accept my suggestion, Hehmann immediately nominated me to contact PHL and make an inquiry. Wisely, the team advised me to identify ourselves as being associated with a university study. Technically, our university professor, Dr. Michael S, fulfilled that description, so that was what I did. The thinking here was

that PHL would be more receptive toward helping a university study rather than a corporate endeavor.

So, I made the call to Philadelphia International airport and convinced the security folks there to allow us to make the measurements. We were told to arrive at the airport the next morning, and contact security upon arrival. I can't imagine being given the same privileges in today's world of tightened airport security.

The next day, we all piled into a single car, with equipment loaded in the trunk and headed to PHL. Security, consisting simply of a pickup truck equipped with flashing yellow strobes and two team members escorted us to a grassy area adjacent to the active runway, near the "rotation" point of departing aircraft. Here, we set up to record various aircraft takeoff sound levels.

I became an instant hero on the team for my efforts. And, Hehmann and the team also were impressed that I could identify every one of the various commercial aircraft operating as well as the specific engines on those aircraft. A good portion of my knowledge came from the prior summer, where I had made connections with a Boeing representative at Professor Mittal's energy seminar. Hours of working with the Boeing aircraft and engine manufacturer brochures paid nice dividends. It is just fantastic how seemingly unrelated events all tie together!

Over about two hours or so we obtained excellent data and headed back to New Jersey to edit our new tapes. I can only wonder how many complaints were registered at that hotel that night as we edited the tapes and played them at actual sound levels. Pictures on the wall nearly vibrated off their hooks. In any case, we obtained realistic tapes, so now it was off to the wildlife preserve.

Brigantine National Wildlife preserve had a fairly robust population of laughing, herring and, most importantly, the infamous great black back gulls. The latter gulls were associated with the DC10 incident at JFK airport. Yes, during the summer of 1976, working alongside our expert ornithologist, Dr. Michael S., I learned more about seagulls than I ever imagined.

For the next several weeks, I regularly commuted to work via air, flying from Albany airport (ALB) to Atlantic City through Philadelphia (PHL). From PHL, I took a small commuter flight directly to tiny Bader Field, which was less than a mile from the beach in downtown Atlantic City (AC).

Dr. Michael and I planned each day at the preserve with a randomized sequence of tape sounds. We also varied our broadcast locations. Depending on location, I sometimes operated out of a small pup tent to shade me from the hot sun and give me some relief from the constant annoyance of biting green-headed flies. My job was to operate the tape players, amplifier, speakers and other equipment.

I also assisted the professor with bird activity observations after each broadcast. Everything was dutifully recorded in a detailed test log.

As I recall, we had a sequence of about seven or eight tapes, including sounds of GE's CF-6, as well as competitor engine takeoff sounds. Each individual sequence was played once each hour. During the broadcast of engine takeoffs, the sound was repeatedly played about four times, with each successive play increasing sound levels so we could have some idea of levels that impacted the birds. A couple of "control" tapes actually contained wild bird distress calls, and these always caused the most startling reactions from wild gulls. Whenever we played the very realistic-sounding distress calls, the birds quickly scattered, with some circling high above my speaker to investigate. That reaction provided a level of confirmation that we were broadcasting authentic sound quality. What a way to start my career with GE, chasing seagulls in a wildlife preserve in the heat of summer at a south Jersey resort location[5].

The data was collected and analyzed, and various reports were written. I still have a copy of Dr. Michael's draft summary paper, but GE was very guarded about what, if any, material was ever used in meetings with the FAA. I have to believe that there was sufficient evidence to convince anyone that the CF-6

[5] Dr. Michael S. and I operated out of a beach front motel on Brigantine Island, just north of Atlantic City.

engine did not “attract” gulls[6]. One subsequent finding in the JFK crash investigation was that there was a large trash landfill not far from the runways. The landfill provided an attractive food source that was considered a prime contributor to attracting gulls. I believe the landfill was eventually closed, perhaps partially due to results from the investigation.

Bird and aircraft collisions continue to challenge aviation today. Most folks recall the “Miracle on the Hudson” incident with a US Air jet operating out of LaGuardia airport a few years back. Larger, quieter engines capable of accelerating planes quite rapidly are a challenge to slower flying birds. Constant vigilance is always required, but future collisions do still seem inevitable.

My first professional work experience was a really good one, and I gained tremendous insights working together in a team environment as we solved unusual, challenging problems. I’m very grateful to each of these men for contributing to my overall learning experience.

And learn I did, exposed as I was to many new topics that went well beyond just providing “measurement services.” I certainly didn’t have an awareness or

[6] I doubt anyone really believed that any aircraft engine actually attracts birds. One observation I regularly heard after completing this project was that the newer engines were much quieter, so during takeoff they would get closer to nearby birds before the sound level was perceived to be a threat. By that point the aircraft is moving faster and this, combined with a much larger front fan area (>8 ft. diameter), decreases a bird’s ability to escape.

appreciation back then for the constant learning that would be part of every project and person I met.

It was also quite rewarding for me to be able to contribute in my own way to the project. In addition to solving almost daily equipment issues, my suggestion and follow-on execution to obtain higher quality acoustic recordings at Philadelphia greatly benefited the project. Leveraging my commercial aircraft and engine knowledge was a bonus. It also served as a reminder that you never know when seemingly insignificant learning opportunities pay dividends.

What an interesting, fun and most unusual start to my GE career. Yet even more stimulating, one-of-a-kind assignments were headed my way.