Hurricane Hunter

While most people are fleeing from a hurricane, Jason Dunion '92 flies toward it.

Thursday, March 20, 2008

I UNDERSTAND WHY JASON DUNION '92 wants to bring me to the military airfield in Tampa, Fla. Yes, it's a four-hour drive from where we are this cumulus big-sky morning in Miami. Yes, it's a hassle to get security clearance at MacDill Air Force Base. And yes, the vaunted "hurricane hunter" planes might not be mobilized. We could get there, and depending on the updated forecast, they could stay in the hangar. But you know, when you are a 37-year-old atmospheric research scientist trying to explain the intricacies of what you do and why you do it, there are things that are helpful to see in person, and among them are the instrument-loaded multimillion-dollar aircraft that get you into and out of brawling Category 5 hurricanes.

"When I first flew in one I wasn't prepared for the feeling," says Dunion, a meteorologist at NOAA's Hurricane Research Division, the agency largely responsible for improving our understanding of and ability to predict Atlantic hurricanes. He's not just talking about the 4 gs, the lung-squashing feeling of blasting through a Cat 5 eye wall, or the "7 bag"

flights (meaning the number of air sickness bags), or even the eerie sensation of being in the eye, where a plush pocket of calm contradicts everything you understand about hurricanes. He's also talking about the feeling that you, yes, you, a kid from Connecticut who liked to play weatherman in grade school, are directing a mission with several planes, including NOAA's $45-million high-altitude G-IV jet at your disposal. That you, Jason Dunion, the guy whose first job after graduating from UNH was as a social worker and who had $40 to spend in any given week when he and his wife first moved to Miami, is working hand-in-hand with combat pilots and a flotilla of NASA "A-train" satellites.

"The president once called when I was up," he says incredulously, "but we were in a blank spot where there was no communication, so we never knew." The environment of a hurricane eye is a strange place, and not just because you can't always get electronic transmissions or because the commander-in-chief sometimes checks in. Those who've been through the eye wall hundreds of times, like the P-3 Orion pilots Dunion sits behind, understand. Those who haven't had the experience simply can't. "It's kind of surreal," Dunion says. "When you're in the eye of a hurricane, there's blue sky and the sun is shining, but you know that just inside those clouds there are winds of 120 miles per hour." The latter is why hurricane hunting ranks, according to Wired magazine, as No. 3 in the category of most dangerous science jobs.

Scientists like Dunion, who are looking for clues as to what's happening with hurricanes—how they form, when they form and when they don't—are trained to survive emergency water landings and receive hazardous pay for each hurricane mission they fly. It's comforting to know that a NOAA hurricane hunter plane has never been lost and he's been spared the worst trauma—no seven-bag flights thus far—but there have been close calls. Like the time during Hugo, when NOAA's aircraft was flung about in a tornado-like updraft, or when colleagues of his flew too low during a New England winter flight and three of the four engines, doused with sea spray, shut down. One working engine does not get you through an eye wall. One working engine doesn't get you above a hurricane, either. So, well, it's grim. "They were seconds away from taking a swim when the pilot got one of the engines started," recalls Dunion.

On the other hand, a hurricane is a great place to do science. "We are curious guys," says Dunion who was nicknamed "whooty owl" as a kid because he asked so many "who, what, where" questions. Every scientist in the Hurricane Research Division is

looking for a missing piece to the hurricane puzzle, and for Dunion the obsession has become Saharan dust storms. "I'm fortunate because there are lots more questions than answers," he says. What he means is that it's a relatively new field that offers scientists many avenues to study. And because the research is promising, he gets to use heavy-duty aircraft like the G-IV jet and the P-3 Orion aircraft, which can probe both the inner and outer surroundings of a hurricane. The sleek G-IV flies above and around the hurricane—the workhorse P-3 through it.

Dunion's dust theory, which he introduced in the American Meteorological Society's journal in 2004, is both complex and elegantly simple. Most big hurricanes originate in Africa—usually in the form of violent thunderstorms born from the combustible mix of super-dry Saharan desert air and moist tropical conditions to the south. As these storms begin to move over the Atlantic and build strength, they are sometimes infiltrated by massive dust plumes pumping out of the summer Sahara. The dust storms, believes Dunion, choke off developing disturbances, retarding their growth into hurricanes. Satellite imagery suggests that when tropical thunderstorms from Africa escape the dust storms, they can more easily reorganize into a hurricane. The implications for hurricane forecasting and perhaps even prevention are huge—can the dust be accelerated and widened to choke off more storms? Can the plumes be accurately tracked and directed? And what to do when, starting in August, the dust storms lessen? The months of September and October can often generate peak hurricanes—in 2006, the two biggest of the season, Helene and Gordon, formed in mid-September.

There are lots of good questions, and Dunion has already probed territory others haven't. Only a decade ago, the Saharan dust storm factor wasn't even a known consideration. Satellite imagery was looking at the moist tropical atmospheric layers, so Dunion is plumbing old data, including 1950s balloon probes, hoping to put together a picture of the interactions retroactively. One of the reasons he needs to get to Tampa today is that a shipment of cylindrical mini weather stations affixed to parachutes, called "dropsondes," have just arrived and need to be inspected. They are, says Dunion, one of the research scientist's best bang-for-your-buck instruments. Dropped out of the belly of an airplane inside the eye of a hurricane, they collect and transmit rivers of data on the storm's path and severity. "They're a good example of government working," he says, meaning the cost-to-benefit ratio of our tax dollars. It's also a big box with cool new stuff in it. So we go to Tampa.

BUT FIRST WE HAVE TO STOP, early in the morning, at the NOAA Laboratory in Key Biscayne, where Dunion and his colleagues conduct their research. I'm eavesdropping on a conference call between hurricane experts in California, Virginia and here in Florida. An intriguing mix of atmospheric activity is occurring off the Florida coast. There's a big plug of moisture—not unlike what Katrina looked like when it was lurking off the Gulf Coast in its pre-Cat 5 days—and an assortment of ingredients that might soon coalesce to produce a hurricane.

SEEKING ANSWERS: JASON DUNION '92 COLLECTS DATA ON HURRICANES

WHILE ABOARD NOAA AIRCRAFT.

From a certain perspective, what we have here isn't so much a disaster in the making as an opportunity. It is shaping up as a prospective "genesis" mission, whispers Dunion in an aside, which is to say, a chance to look at hurricanes before they're hurricanes. As the call continues, Dunion translates, "We're looking at sending a drone in. They're a brand-new technology, with nine-foot wingspans and instruments all over them." Later he tells me the best part—the drones are controlled with joysticks and launched off the top of speeding automobiles. So there are smiles and fun this morning, with big colorful flat-screen pictures to dissect, lingo to sling and teams to organize for a rendezvous sometime on Sunday in Key West. "Could be some weather issues for the drone launch," Dunion says. "Just something to keep in mind, OK? As soon as it passes you can take off."

He's flicking through a bewildering number of screens with swirling colors and gradients and pulsing data. He clicks away like a prodigy playing piano—effortless and calm, but really engaged. Dunion has the telltale characteristics of a scientist of catastrophe—a mix of informality, FM radio calm, sandals and tan Bermuda shorts and Banana Republic T-shirt, while inside bubbles a mild adrenaline rush. He leaves the building without knowing what's going to happen—drones, high altitude planes and a fairly sizable mobilization involving scientists from Monterey and Miami are all in the mix.

This drill encapsulates the 2007 hurricane season, which is still weeks from ending. It has been a season of ominous almost-but-not-quites. Just because there haven't been big news-making hurricanes the last couple of years doesn't mean the place where Dunion and his colleagues are looking—the Atlantic-Caribbean basin—isn't alive and cooking. "Most people think the last couple of years have been quiet," says Dunion, who flew into Helene in 2006, one of the biggest hurricanes of the year. "Trust me, it hasn't been quiet."

DUNION DIRECTED HIS FIRST SAHARAN AIR mission in the midst of Helene. Scientists were confused, says Dunion, because models predicted hurricanes that never came to be, or if they did, they strengthened much later than expected. "The models showed they should have spun up very quickly, but they didn't, and it wasn't clear why," he says.

The Helene mission was developed to produce some answers. A wide swath of Saharan air was hunkered off the southeast edge of the storm. For the first time, scientists knew it was there and could sample it. Once they had collected the data, they could factor in the presence of Saharan air (some of the plumes are thousands of miles across) and plug the numbers into the forecast models that give the National Hurricane Center its reads on where the storm will go and how big it will get.

At Dunion's disposal for the operation were two planes, their crews and hundreds of ocean-bound dropsondes to be released at different levels ranging from 3 to 8 miles high. "It was amazing," recalls Dunion. "In the jet, at about 45,000 feet, the air was so thick with the dust, it looked like San Francisco fog."

The data that accumulated as planes crisscrossed the eye of Helene dozens of times will keep him busy for years. "There's so much to look at," he says, "but I'm satisfied, and I think others are too, that the research is changing how we understand climate in the Caribbean."

TO BE AN EXPERT ON HURRICANES is one thing, but to be one and have Dunion's background is another. Whatever instinct he had in his youth to do weather stuff—which was sizeable since he used to tape his forecasts—got lost somewhere in high school in Norwich, Conn. At UNH, he studied geography. Only at the tail end of college did he realize he wanted to get back to weather, but when he looked at graduate schools, the requirements were daunting. He took social work jobs—something he found himself good at—and enrolled in night courses in Connecticut and later Miami, where his wife, Paige Chesley Dunion '92, was going to grad school. For months, he pursued one of the coveted internships at the nearby National Hurricane Center. "I told them I will change the toilet paper rolls if that's what it takes," he says. "Finally they said, 'OK, we'll take

you.'" With an NHC internship and night school under his belt, he applied to graduate school and, in 1996, enrolled in a graduate program at the University of Wisconsin in Madison, a top school in atmospheric science.

"KILL" DECALS: ORANGE STICKERS ON THE HULL OF A P-3 ORION TURBO

PROP TELL WHICH HURRICANES THE PLANE HAS FLOWN THROUGH.

"We once did a seminar where we looked at the research division and what our occupational skill set was," says Dunion. "The analysis showed that I was good at teaching, like social work, and I was like, 'Geez, I just left that.'" Most of the rest tested out like a conventional scientist who likes to work alone and crunch gobs of data. "I'm not really one of them—if you lock me in a room, I'll melt—but there are advantages to my background," he says. As Dunion's supervisors explain, his ability to draw others out is a big plus when it comes to creating better workplace chemistry. In the middle of a busy hurricane season, it's a stressful place and a good working environment on the ground, like in the air, is critical. "I have to be interacting, I don't really have a choice," Dunion says. "And when I do, that's when I get my ideas."

IT'S MID-AFTERNOON WHEN WE pull into the MacDill Air Force Base in Tampa, which is headquarters for NOAA's Aircraft Operations Center. The 4 p.m. mission launch, we learn, has been cancelled. When we walk into the massive hangar, it is as quiet as a cathedral with three large airplanes, a new G-IV Gulfstream and two P-3 Orion turbo prop behemoths in repose. We touch and tour—the decades-old P-3s have particular character, the interior a lot like old locker rooms, with stickers, mementoes and a talisman or two such as fuzzy dice. On the plane's exterior, there are swirling orange decals with each storm and its date: Katrina, Gilbert, Helene. Inside, the heat is terrific, almost stifling, a five-minute glimpse of what must be a soupy tropical steambath for the six or seven hours of a mission. The slick Gulfstream, which is used for high altitude reconnaissance, logs up to 4,000 miles each flight.

That we can't go is disappointing, but perhaps it's OK. For Dunion, the trip into a hurricane is like a pilgrimage to a sacred place. He says NOAA scientists have incredible difficulty explaining what it's like up there. You have to be there, you have to know and intimately understand the storm creature to fully appreciate the magnificence

of crossing her borders. It's a private space. He takes another long look at the idle planes.

"When I went up for the first time, I really wasn't prepared," he says. "I got here, and everybody was running around on the tarmac like crazy, and it dawned on me that the reason why was because I'd tasked the plane for experiments. It was humbling, like, 'Wow.'"

Computer models predict the coming hurricane season will be a busy one. Each year the batting average of the hurricane scientists gets a little better in anticipating both the occurrence and severity of hurricanes. What keeps a young scientist motivated—especially one whose family lives in the hurricanes' well-traveled south Florida path—is trying to know everything there is to know about deadly storms. Already Dunion deeply understands one thing—that he's just getting started. ~

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