A WING AND A PRAYER

The unnerving state of air travel: Rookie controllers, antiquated equipment, and too many near misses.

BY **LINDA MARSA** PHOTOGRAPHY BY **ELYSE BUTLER**

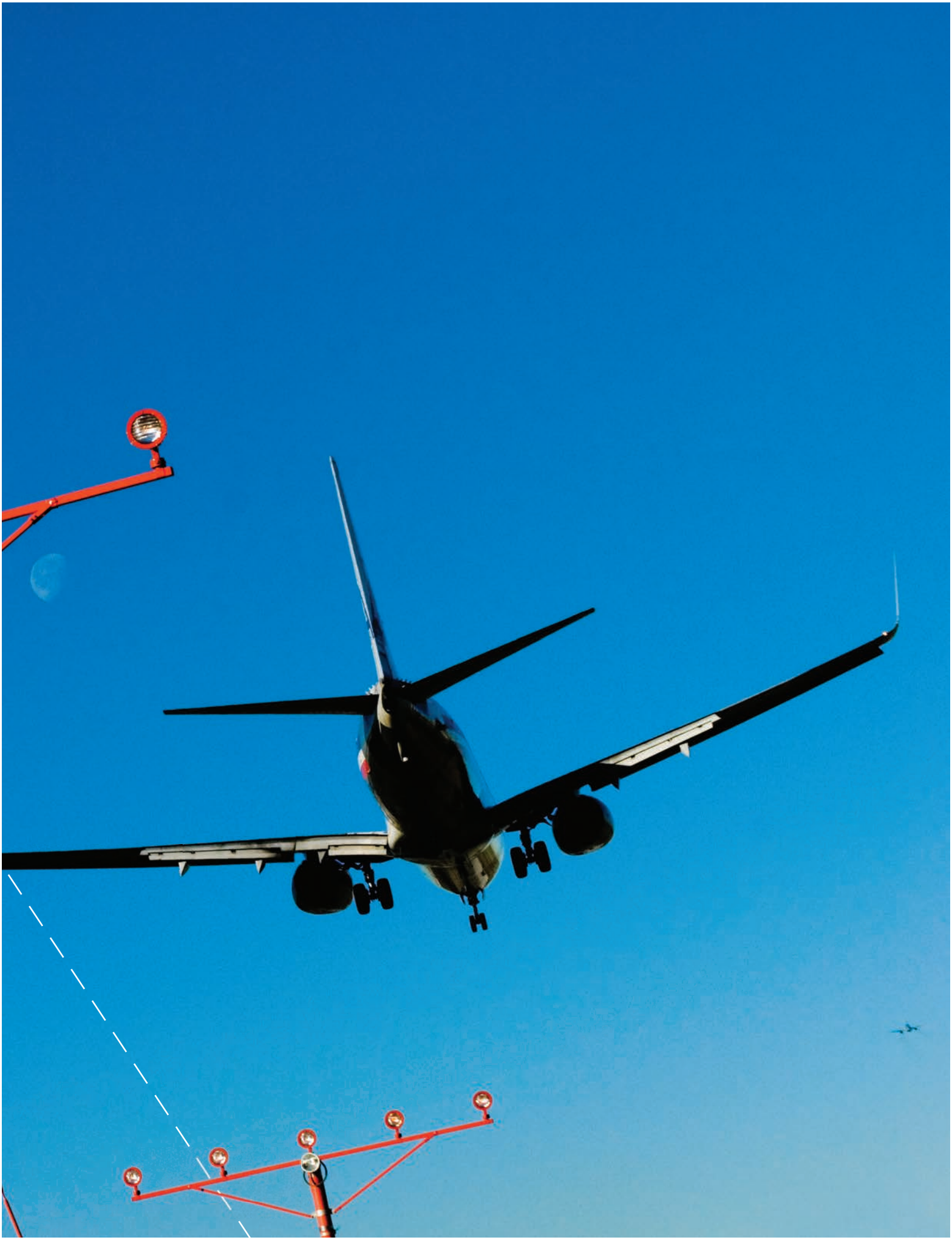
It was a chilly winter evening when disaster nearly struck. A little after 6 p.m. on February 18, 2007, a Northwest Airlink commuter plane was making a routine descent into Memphis International Airport when a cockpit warning light flashed. Something was wrong with the landing gear, and the pilot decided to abort. He radioed the tower to let controllers know he would be executing a "go-around," ascending and then, if the equipment checked out, attempting to land again. There was only one problem: Another plane, a Northwest Airlines DC-9 nearly twice the size of the commuter plane, was heading into the same airspace.

"Stay low, stay low!" a frantic air traffic controller ordered the commuter pilot while instructing the DC-9 to reach for the sky. The smaller aircraft flew down the length of the runway while the pilot of the larger one pulled back the stick and climbed. Horrified controllers watched helplessly as the planes raced along converging paths. They missed colliding by a scant 500 feet.

"I had never seen two airplanes fly that close to each other," says Peter Nesbitt, a controller with more than 20 years of experience who was on duty that night.

The increase of air traffic into the Memphis hub made this a disaster waiting to happen, Nesbitt says. The real problem was the layout of the runways: Three run parallel to one another like neat rows of corn, but a fourth is perpendicular. If everything goes perfectly, an aircraft landing on the fourth runway is already taxiing on the ground as other planes pass overhead. If there is any kind of hitch, though, a flight landing on that last runway could get dangerously close to another plane.

In the two years that he worked in the Memphis control tower, Nesbitt—who had transferred from Austin, Texas—repeatedly complained to his superiors about the dangerous approach pattern. But they assured him they had a special waiver from the Federal Aviation Administration (FAA). When he and other controllers asked to see it, they were told it was kept in Atlanta and



that they need not worry. “They would never give us a copy and would never let us see it,” he recalls. “If you’re insubordinate and question it, then you’ll lose your job.”

The near crash in February 2007 hardened Nesbitt’s resolve to take action. “After witnessing that event, I felt compelled to get to the bottom of this, and if the procedure was illegal, to put an end to it,” he recalls. The minute he got a break later that night, he filled out a NASA aviation safety report. And three days later, he fired off a blistering e-mail to the National Transportation Safety Board (NTSB) about the controversial landing procedure. Many controllers “have recounted horror stories of these aircraft flying through the flight paths of [other] aircraft,” he wrote in his report. But his air traffic manager insisted on using the procedure, he continued, “because it helps the users make money. We are placing profit over safety against the objections of many controllers who are forced to deal with this unsafe situation on a daily basis.”

Nesbitt was not prepared for what happened next. He was branded a troublemaker, his every move was closely monitored, and he was eventually decertified from all but one position in the tower, a job he characterizes as “essentially a secretary,” issuing route clearances to aircraft before they take off. His career was almost derailed because he blew the whistle.

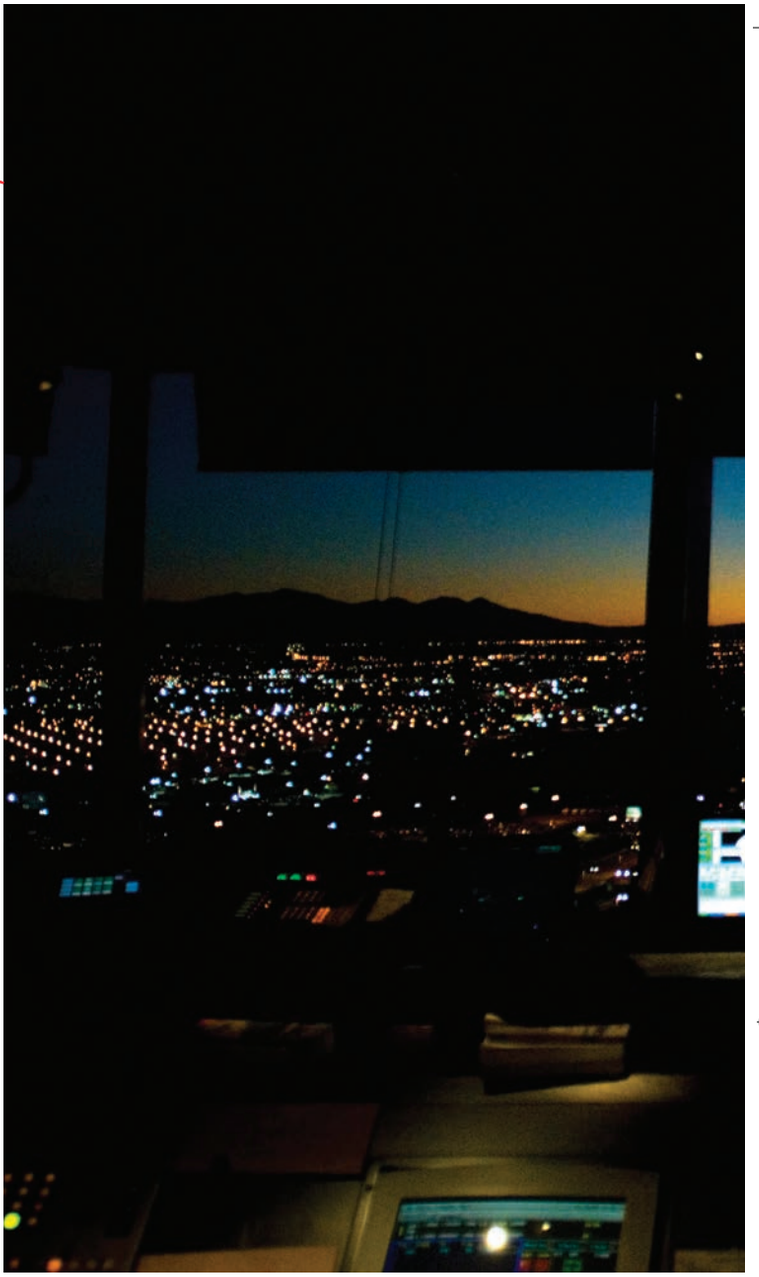
The terrifying incident on the tarmac in Memphis is not a single cautionary event but a snapshot of a disturbing trend. About 30 times a year, on average, aircraft in the United States narrowly miss each other during landing or takeoff. (Overall, runway incidents increased 13 percent from 2007 to 2008.) “When you look at some of the close calls—and in a couple of cases they were literally seconds away from having two planes collide—accidents were avoided only by pilot decision,” says William Waldock, associate director of the Center for Aerospace Safety Education at Embry-Riddle Aeronautical University in Prescott, Arizona. “Eventually, someone will slip up and we will have a catastrophic crash.”

These so-called runway incursions are symptoms of a larger problem: the deterioration of the nation’s air traffic infrastructure. Air traffic guidance systems are antiquated. Some have not been upgraded since Jimmy Carter was president, and others are glued together with technology developed for use in World War II.

Dangerous outages may cut off communication between the tower and the plane. Moreover, like Memphis International, many American airports are old and congested, lacking enough runways to handle current air traffic loads. The system is also burdened by an acute shortage of experienced air traffic controllers, who have been locked in a bitter contract dispute with the FAA and retiring in record numbers, leaving those who remain exhausted and overworked. Despite its many problems, the system still functions remarkably well, but with the FAA predicting that airline passenger traffic could jump from about 757 million in 2008 to 1 billion by 2021, close calls and alarming accidents may soon become the norm.

“The navigation system hasn’t gotten to the point where we have to worry about getting on an airplane,” says John Goglia, an aviation industry analyst and former member of the NTSB. “But there is definitely increased risk.”

In the face of all this, fresh blood in Washington has strategized a technological overhaul of the nation’s airspace system, under the catchall rubric of NextGen, to be phased in over the next decade. The question is this: Will the new technology ramp up and take over before the current infrastructure erodes so far that statistical risk translates into lives lost?

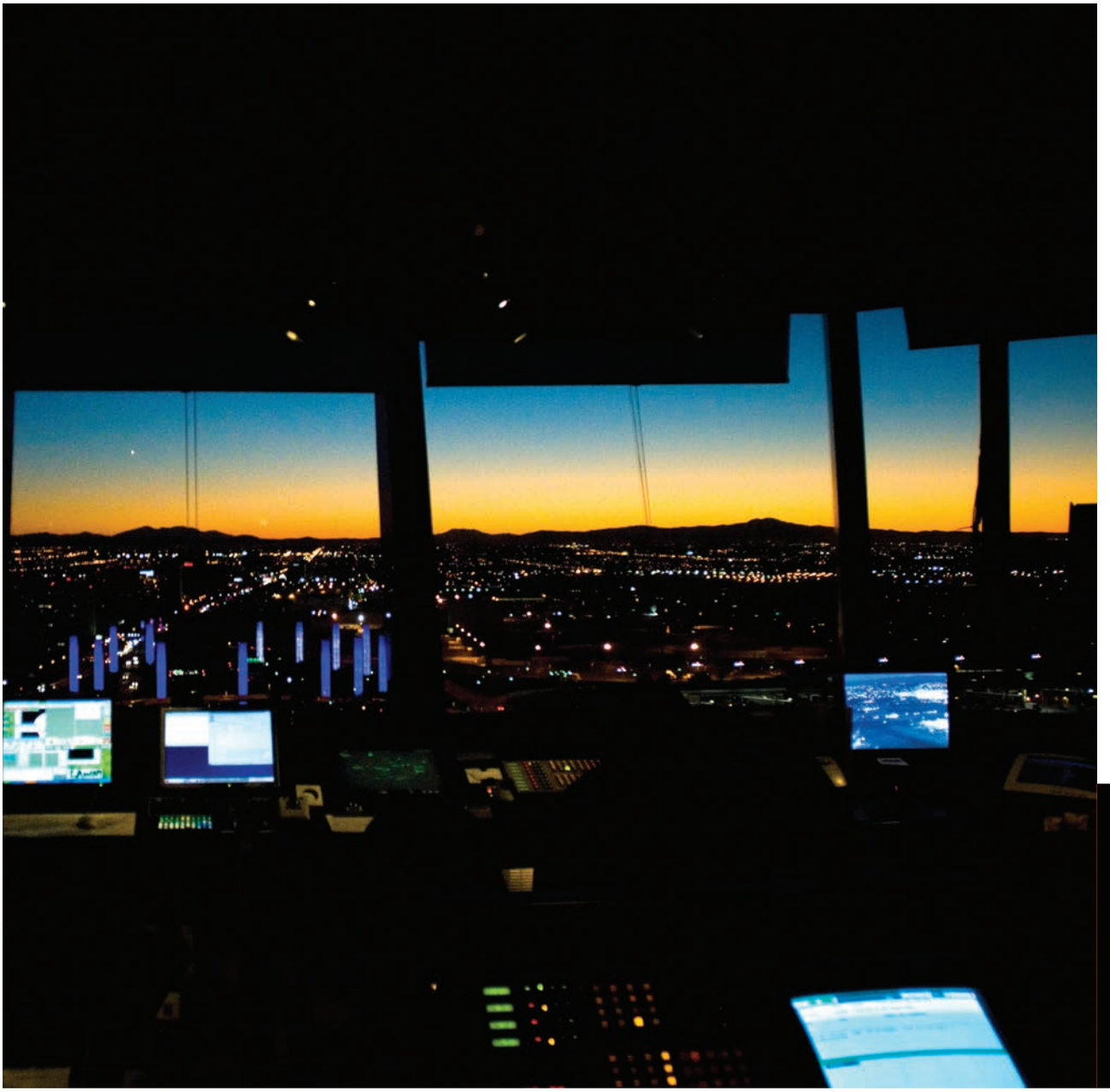


Crumbling Infrastructure in the Skies

At any given moment, some 5,000 planes are cruising in the busy U.S. airspace. Shepherding an aircraft from departure to destination involves an intricately choreographed series of handoffs, starting with local controllers who direct taxiing, takeoff, and initial climb. When planes reach 1,000 feet, another set of eyes takes over in the darkened rooms of Terminal Radar Approach Control (TRACON), which is in charge of air traffic within a 40-mile radius of an airport. Once an aircraft hits an altitude of 10,000 feet or more, it is switched to one of 21 regional air traffic control stations across the country, at which point it is slotted into a series of fixed flight lanes in the sky and passed along from station to station until it is on approach to its arrival airport. There, another local crew orchestrates descent and landing.

Unfortunately, the system that controllers use to talk to pilots is essentially a turbocharged *Smokey and the Bandit*–type CB radio. As a consequence, transmissions can become muddled or even incomprehensible if another pilot gets on the same frequency by mistake. “They’re using a voice communications system that should have been replaced years ago,” Goglia says.

Even worse, the aircraft tracking system is based not on satel-



Sunrise over Los Angeles from the air traffic control tower at LAX, January 15, 2009, belies the potential for chaos. Several months before, a telecommunications outage in Southern California halted air traffic at LAX and elsewhere for nearly an hour.

lite surveillance but on crude, 1950s-style radar technology that gives controllers only an approximate idea of where a plane is at certain times. (For planes within 40 miles of a tower, radar tracking is precise, but when planes head out to sea things get fuzzy.) That means huge safety buffer zones are needed between aircraft. The FAA mandates at least 1,000 feet vertically and three to five miles horizontally in good weather, and up to four times that spacing when conditions are bad. If planes wander outside their assigned airspace, midair collisions could result.

As if that were not enough, radar and radio outages occur with alarming frequency. In at least eight instances last year, malfunctions at several major airports brought operations to a standstill, triggering a cascade of delays and flight cancellations across the country. The most notable of these occurred at an FAA center near Atlanta in August 2008, when the computer system that processes flight plans went down. Elsewhere, in one 24-hour period last summer, equipment failures crippled two of the country's busiest air traffic control facilities—Southern California TRACON and Miami Air Route Traffic Control Center, the latter responsible for 400,000 square miles of airspace and much of the air traffic between the United States, the Caribbean, and Central and South America. In the California facility, part of the FAA's telecommunications infrastructure went down and the backup lines did not kick in, leaving controllers without radar or radio for nearly an hour during the afternoon.

"You lose your eyes and ears," says veteran controller Melvin Davis, a National Air Traffic Controllers Association facility representative for Southern California TRACON, which serves a dozen major airports and 32 smaller ones. "If the outage had occurred during peak flying hours, the damage to the public would have been incalculable," he adds, citing delayed flights at the very least, airport gridlock throughout the region, and heightened risk of crashes.

Finally, nearly 60 percent of the FAA's control towers have surpassed their expected useful lives of 30 years. They are plagued by water leaks, mold, and foggy windows that can make it difficult to see aircraft, according to a December 2008 audit conducted by the Department of Transportation's Office of Inspector General. Outdated heating, ventilation, and air-conditioning systems in some major airports—such as Chicago's O'Hare and Midway, and even Andrews Air Force Base in Maryland, the home of *Air Force One*—cause condensation to form on windows, hampering controllers' ability to look

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Left: Close-up of an air traffic control screen at LAX. Above: From his station in the tower, LAX assistant Lee LeTourneau watches a plane take off.

out at planes on the field. Yet plumbing and electrical repairs often go undone, resulting in a deferred maintenance backlog of $240 million, a tab that is expected to climb to more than $380 million by 2020. Creaky physical conditions at U.S. airports are reminiscent of those in developing nations. Controllers in Atlanta have had to hold umbrellas over radarscopes to see the planes.

Collision warning devices installed aboard aircraft create a cushion of safety against all these insults. But the growth in air traffic, coupled with slipups by pilots and controllers, has sparked a spike in anti-collision warnings aboard the planes, especially in dense traffic areas such as Southern California, where the number of potentially serious controller errors rose 77 percent from 2007 to 2008. In March 2008, for instance, an American Airlines Boeing 757 en route from Mexico to Southern California was mistakenly put on a collision course over the Pacific Ocean with a Southwest Airlines Boeing 737 taking off from John Wayne International Airport in Orange County. In another incident just three months later, an Air Tahiti wide-body jetliner flying out of Los Angeles nearly crashed into a small private plane flying two miles above the ocean.

When aircraft are traveling at 600 miles an hour, every second counts. "It can take 15 seconds to recognize there's a problem, 15 seconds to radio instructions to the pilot, and an additional 15 seconds for them to respond," says Don Brown, who was an air traffic controller in Atlanta for 25 years. "Near midair collisions are like rolling the dice. Once you get within a certain distance, it's in the hands of God—how well you can see and how fast you can act—as to whether the planes will collide."

A series of events leading to catastrophe can easily snowball, with the greatest danger occurring during takeoff and landing, the most hazardous stages of flying. In fact, the world's worst airline disaster happened on a runway in Tenerife, in the Canary Islands, in 1977, when a KLM pilot at the helm of a Boeing 747 mistakenly thought the controller had cleared him for takeoff and his plane slammed into a Pan American 747 taxiing on the same runway. The accident killed 583 people.

Risk during the transition between ground and air is compounded by the sheer volume of traffic: Under optimum conditions, roughly 60 airliners operating one after another can take off or land on a runway in one hour. This kind of pace increases the danger posed by wake turbulence, the violently disturbed air that large aircraft leave behind. Every extra second an aircraft remains on the runway (because of bad weather, waiting for a plane to pass on a crossing runway, or slowing to make a sharp turn) reduces runway capacity. In high-traffic places like New York's three main airports, schedules are relentless, and even minor glitches can trigger maddening delays. "People in aviation—the pilots, the air traffic controllers, and even the CEOs—are under constant pressure to make the airplanes fly and to make sure they fly on time," Brown says. "The pressure to fly in poor weather, to tighten up the spacing between aircraft, and to wring every last drop of efficiency out of the system is incredible."

Pressure and congestion can set in motion what Waldock of Embry-Riddle, who studies how accidents happen, calls a cascade of failures. "They're innocuous by themselves, but they make a couple of other things fail, and then all of a sudden it sets off a chain reaction that cascades to the point where it becomes catastrophic," he says. "Most of the time, the safety system catches them, and something will happen that interrupts the sequence. The pilot intervenes, a controller diverts the plane, or the automated system sounds the alarms. But eventually, subtle failures will sneak through and the statistics will catch up—for every accident we have, there are probably at least 99 very close incidents—and we'll have a disaster."

Stressed-Out Rookies on the Ground

Averting accidents has become increasingly difficult as veteran air traffic controllers move on in greater numbers, leaving more rook-

ies at the helm. In 2006 the FAA imposed a new labor contract on controllers, slashing pay for new hires, freezing earnings for most veterans, and clamping down on job perks. Since then, record numbers of controllers have retired or resigned. More than 1,200 of them did so last year alone in what Brown called a "slow-motion strike." Just over 11,000 fully trained professionals—the smallest number in 16 years—serve the entire country today. (The FAA points out that 4,000 additional controllers are trained for the specific job they perform, even if not trained in full.) In a resignation letter to the FAA, one Albuquerque-based controller summed up the sentiments of many: "I do not feel I can continue to work in an environment that is so vindictive, or for an employer who is more worried about the bottom line rather than safety."

With fewer experienced controllers in place, those remaining are forced to work overtime with fewer and shorter breaks and less time between shifts in order to handle the volume of air traffic. A recent NTSB report revealed that sleep-deprived air traffic controllers played a role in at least four near-fatal incidents on the nation's runways since 2001, and the controller on duty in one of the worst U.S. accidents in five years—the 2006 crash of a Comair flight that killed 49 people in Lexington, Kentucky—was working on only two hours of sleep. "About 60 to 80 percent of controllers report they've caught themselves about to doze off during early-morning or midnight shifts," says the NTSB's Deborah Hersman.

These days, green recruits are going directly from the training academy to high-traffic facilities rather than gaining experience at smaller airports. In the past, open positions at bigger airports, such as Los Angeles's LAX or Atlanta's Hartsfield-Jackson International, were filled with seasoned controllers moving up from smaller operations. But the FAA's imposed work rules removed financial incentives for veterans to move up to more hectic airports; in fact, many would actually take a pay cut upon transfer.

Consequently, scores of newbies are being assigned to some of the most demanding and difficult operations (such as Southern California TRACON, Potomac TRACON, and the towers in Atlanta, Miami, and Orlando) right after completing their classroom training in Oklahoma City. At major facilities like O'Hare, Kennedy, LaGuardia, and the international airports in Tampa, Dallas/Fort Worth, and Orlando, less than 70 percent of the controllers are now fully certified.

As newer, less skilled controllers step up, veterans like Nesbitt find themselves in a bitter fight with higher-ups, who say the skies are safer than ever while downplaying the errors that are mounting nationwide. Controller Davis of Southern California TRACON is not buying it. "The FAA knows there are serious problems and has been suppressing the information," he says. Still, both sides could be seen as correct; it depends on how you define safety. According to Waldock, the number of catastrophic accidents has actually gone down considerably since 2001, but the number of errors and near misses has increased. Potential accidents continue to be prevented at the last minute as crack pilots and controllers intervene.

In April 2008, in response to allegations that air traffic control violations were being covered up, the FAA launched audits of error-tracking practices at radar facilities nationwide. Whistle-blowers charged that air traffic managers at a Dallas/Fort Worth facility routinely and intentionally falsified reports involving planes that flew too close together, often blaming controller errors on pilots. It was the second time in three years that these charges had surfaced at the facility, and the Department of Transportation found that lax FAA oversight had allowed the abuses to flourish undetected for years.

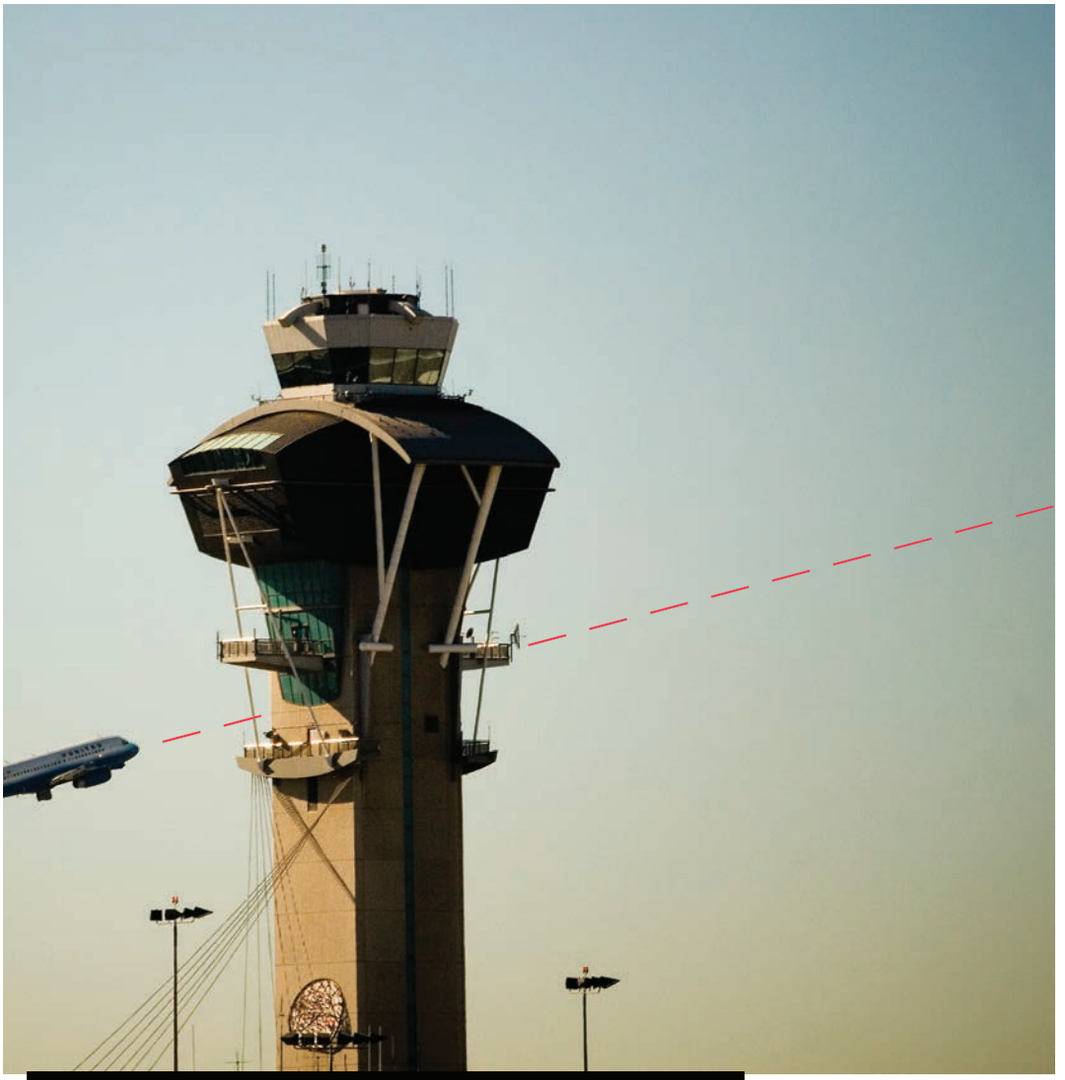
"This ongoing lack of compliance with FAA regulations ...is unacceptable," safety investigators wrote in a sternly worded memo. But the agency was battling fierce institutional headwinds.

Waiting for NextGen

Fortunately, things are starting to change. In the waning days of the Bush administration, Henry Krakowski, a former United Airlines pilot with a reputation as a reformer, was appointed chief operating officer of the FAA's Air Traffic Organization. This year he has started moving to deploy new technologies, new procedures, and updated airport logistics and design. A new runway safety tool called ASDE-X (Airport Surface Detection Equipment, Model X) is now fully operational at 16 major facilities, including O'Hare, Hartsfield-Jackson, and Dulles International outside Washington, D.C. ASDE-X uses radar and remote sensors embedded in runways and taxiways to track the whereabouts of vehicles and aircraft on the ground, providing controllers with an exact and continuously updated map of airport movement. By 2011, 35 of the nation's busiest airports should have this tool up and running.

A new traffic-light system, currently being tested in San Diego, Los Angeles, and Dallas/Fort Worth, should add another layer of protection on the ground once it is widely deployed. Developed at the Lincoln Laboratory at MIT, the system warns pilots of potential runway conflicts. Much like traffic signals at a railroad crossing, red lights embedded in the pavement will warn aircraft to stay clear of occupied lanes; so far the system has reduced runway incursions where it has been deployed. For instance, Dallas has had only three incursions during the two and a half years the system has been up and running, compared with 10 such incidents over the same time span in years past.

But the real safety centerpiece of the future is the next-generation air transportation system, or NextGen. It uses a global positioning



An ascending plane passes behind the air traffic control tower at LAX.

system (called Automatic Dependent Surveillance-Broadcast, or ADS-B) to track the movement of planes. Right now, pilots must navigate through fixed flight lanes set by stationary radar on the ground. Under such restrictions, flight routes are often indirect. Moreover, it takes up to 12 seconds to refresh information on radarscopes, so planes shunted into these unnecessarily constricted lanes cannot fly too close together. Indeed, since pilots cannot see other craft, and since controllers are not certain of the exact position of any given plane, aircraft are forced to make stepped landings: They descend to a given altitude, then level off, and then descend again.

Global positioning technology will get rid of these limitations. Rather than relying on a radar sweep every 6 or 12 seconds, it updates information every second, which will allow for closer spacing between planes. And instead of hitching planes to an umbilical cord of radar-based navigation aids, the satellite system will open routes around the globe, enabling planes to take more direct paths. "By 2013 we'll have all the ground stations in place and have the whole system completed by 2020," says Paul Takemoto, a spokesman for the FAA.

Nesbitt and others claim these advances will fix only some of the problems and cannot address the confounding human factors that continue to play a role in runway and flight risk. Indeed, shortly after Nesbitt filed his aviation safety report in the wake of the Memphis near miss in early 2007, a team of FAA investigators arrived in his city. Eventually they uncovered some troubling information: There was no waiver on the use of the perpendicular runways, and there never had been. The dangerous simultaneous-approach procedure was illegal. In April 2007 the FAA demanded that the practice be halted immediately. "This ongoing lack of compliance with FAA regulations...is unacceptable," safety investigators wrote in a sternly worded memo. But the agency was battling fierce institutional headwinds. For another two weeks, Memphis managers ignored the order, but Nesbitt continued sending letters to the FAA and the NTSB. He will never know for sure whether his intervention or something else finally caused managers to stop using the fourth runway.

In any event, Nesbitt was hardly hailed as a hero. Instead, retaliation was fierce. After missing work due to persistent eye allergies, he says he was accused of abusing sick leave. In late April he was forced to bring his sick dog to work because his boss refused to give him time off to go to the vet. He kept the dog in a kennel in the back of his pickup truck with plenty of food and water and checked on him every hour. Nesbitt says that one of the managers then made an anonymous call to the local Humane Society, which dispatched an animal cruelty investigator. The investigator quickly determined that the animal was well cared for and insisted that Nesbitt be given time off.

In 2007 Nesbitt was ordered to a basement radar replay room where an FAA manager chewed him out about his performance. Nesbitt reports that he left the office because of the supervisor's threatening tone and was then accused of insubordination. After more than two decades of guiding aircraft safely, the then 43-year-old Tennessee native was decertified as a controller, ordered to take remedial training classes, and relegated to low-level work in the clearance delivery division.

Exasperated, Nesbitt finally filed for protection as a federal whistle-blower with the Office of Special Counsel (OSC). "They accepted my case the very next day," he recalls. "They took one look at it and said, 'We're on it.'" After almost a year and a half of haggling, the OSC hammered out an agreement with the FAA in December 2008: Nesbitt would transfer back to Austin and return to air traffic control duties at the same salary.

Nesbitt is relieved to be back in his adopted home state of Texas and encouraged that problems are being addressed—not just his personal ones but the systemic failings of the air traffic infrastructure. Still, the experience has left him disillusioned. "It is very stressful to work in an environment that discourages disclosure of safety concerns," he says. "I've talked to controllers in Memphis who know what I've been through. Not a single one of them would come forward to make safety-related disclosures and jeopardize their career by going head-to-head with the FAA."