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The Next Crash: How Short-Term Profit Seeking Trumps Airline Safety

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The Next Crash: How Short-Term Profit Seeking Trumps Airline Safety

Abstract
[Excerpt] This book, written more than a decade after that fateful day in September 2001, attempts to make sense of what happened next within America's airline industry. In particular, my aim is to reconceptualize the idea of risk and safety, drawing parallels between aviation and other risk management professions, particularly finance. The question motivating my analysis is simple: Has profit seeking been allowed to trump safety in the US commercial airline industry? If so, what are the repercussions for risk—should we expect another major airline crash sometime soon?

Keywords
airline industry, safety, profit

Comments
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I remember how clear and blue the sky was as we climbed away from Chicago's O'Hare International Airport. I was a United pilot based in San Francisco flying my leg heading homeward. The crisp fall morning made me reminisce about Septembers from my New England childhood and anticipating the start of school. The captain reached over and tore off the paper message that spit out from the cockpit printer: “SECURITY BREACH. LAND ASAP. DON'T ALARM PASSENGERS.” We weren't too surprised to receive the instructions. We had already heard several Delta airliners diverting. By the time it was our turn, air traffic controllers no longer sounded confused. Everyone was coming out of the sky. We assumed some late-running passenger must have skipped through the airport security checks and we'd be back flying shortly, once things got sorted out on the ground. We couldn't have been more wrong. The world was fragmenting.

I increased the range of my navigation screen and peered into the future, calculating our descent.
“Where would you like to land?” the captain asked.
“Looks like Omaha’s best.”
“Omaha it is then,” he confirmed and set about communicating our request.

We landed, taxied to the gate, and parked, as ill informed about the developing events as we were when airborne. I opened the cockpit door and a passenger wandered up. He shared news headlines about some escalating crisis streaming across his pager. One story claimed an airliner had a navigation failure and had hit a skyscraper in New York.

“That’s ridiculous,” I thought. “What pilot would fly into a building on a morning so clear you could almost see the future from the flight deck at 35,000 feet?”

Nothing made sense.

The captain left the cockpit to investigate. I trailed behind slowly, only then realizing that our 298 passengers and eleven flight attendants had already quickly deplaned. Pausing in the vacant first-class cabin, I snapped my mobile phone open and speed-dialed home. My partner picked up on the first ring.

“Looks like I may be late landing,” I said. “We’ve run into some security problem; don’t know what’s up. But, we should be back in the air soon.”

“Don’t you know what’s happened?”
“Happened?”
“It’s fallen!”
“Fallen—what’s fallen?”
“Everything: the Twin Towers, New York, airplanes. People are jumping out of buildings!”
“What?”
“Are you all right?”
“Yes, yes.”
“Thank God. Check the TV!”

I found a television in the ground crew lounge and joined a group of about fifty other aviation employees crammed into a room designed for about twenty. Pilots, flight attendants, mechanics, customer service reps, baggage handlers, dispatchers, and fuelers from a variety of companies—we were all in this together. The second building, the North Tower, of
New York's World Trade Center had just collapsed. The image played over and over on the television: first one tower, then the other, imploding in a heap of grey dust. One minute it was up, and the next it was down. Ashes to ashes, dust to dust. It was a beacon on the horizon, solid and steady, a place where people worked, dedicated their lives, provided a service, and shared an identity. And now it was hit and falling.

We were in that kind of nightmare place where something horrible is happening and you can't make it stop. Frightened yet fascinated, we kept watching. As if you'll be rewarded with clarity if you just stand watch long enough. We didn't know it then but we were watching the world change irreparably, right before our eyes.

This book, written more than a decade after that fateful day in September 2001, attempts to make sense of what happened next within America's airline industry. In particular, my aim is to reconceptualize the idea of risk and safety, drawing parallels between aviation and other risk management professions, particularly finance. The question motivating my analysis is simple: Has profit seeking been allowed to trump safety in the US commercial airline industry? If so, what are the repercussions for risk—should we expect another major airline crash sometime soon?

If this topic immediately makes you feel uneasy, that is good. Aviation safety is an area that should concern us all. Yet, for reasons discussed in the following chapters, safety has not often been the priority in aviation industry decision making. And perhaps most important for you or your family's next flight, air safety does not concern the right people—namely, airline executives, aviation industry regulators, politicians, watchdog groups, or even the flying public—in the right way often enough. I hope this book will help change that.

Almost two decades ago, light years in the evolution of the aviation industry, several excellent books provided a candid behind-the-scenes look at the long history of troubles within US aviation, noting various flaws within the airline industry.1 Yet, these books became quickly outdated in the post-9/11 aviation business world, as bankruptcy, cost cutting, downsizing, merger, employee layoffs (called furloughs), and increased passenger fees with reduced customer service became the norm. Although none
of these events are individually unusual in commercial aviation, the extent to which they have combined to leverage change during the past ten years has been unprecedented. However, few authors have tried to make sense of the impact of these drastic changes on airline employees and passenger safety until now.

During this same period social science researchers started examining the ways organizations evolved into what is now variously called the “new risk economy,” “new capitalism,” or “flexible capitalism.” The findings of these studies indicate that in many industries employers are providing less skill training, mentoring, job stability, community support, and career advancement while expecting more from employees in terms of experience, flexibility, and loyalty. Some researchers have even claimed employment is now “dead” and that all workers today are essentially “self-employed.” Workers can no longer expect lifetime employment with one firm and must develop a variety of different skills—technical and psychological—to successfully negotiate the new risk economies' flexible market demands. In this book I look at the US airline industry as an addition to research on this “flexible economy” and find ample support for the new economy hypothesis that employers today are providing less while expecting more from America’s workforce. However, my research also expands on this body of literature by evaluating the implications of new economy changes for workers in high-risk professions such as aviation, which have not been extensively examined.

Cutting across several business disciplines including corporate social responsibility, ethics, leadership, sustainability, and organization studies, I adopt a critical theory approach to question the wisdom of accepting the virtue of management as self-evident or unproblematic, and to challenge managers' single-minded pursuit of short-term profits above all else. Critical theory scholars have been criticized for a preoccupation with a cynical rhetoric over practical attempts to bring about real social change in the business world. In this book I aim to bridge the gap between theory and practice by examining the airline worker-management relationship within the framework of the ethical responsibility of airlines, managers, government, and regulators to the wider community. This unique framework moves critical theory forward by providing a comprehensive analysis of potentialities, not just actualities, pushing critique beyond clever descriptions
of existing airline management practices toward an exploration of what management could be.

Instead of seeing management failures as a result of poor behavior by individual managers, this socioanalytic approach draws our attention to how a particular system of government, business, and regulation can create opportunities for abuse. For instance, critical theory scholars have argued that as long as the market is the dominant mechanism for allocating resources, employee and community needs, interests, and knowledge will be subservient to it, further intensifying managers' focus on financial bottom lines and stockholder interests. In this book I document the development of such dangerous dynamics in the US airline industry.

An economic war is occurring within the aviation industry in the post-9/11 period as managerial short-term profit seeking has been allowed to trump long-term safety concerns with little regulatory oversight. One way to redress this imbalance is to recognize the power of what Foucault called "subjugated knowledges," those bodies of knowledge that have been disqualified as inadequate, naïve, unqualified, low ranking, or unscientific. By reconceptualizing the idea of risk and safety from the vantage point of the disenfranchised, I hope to shift the responsibility for safe flight operations away from employees—already stressed, fatigued, and working more while earning less—back to the airline industry, its regulators, and US society as a whole. As one pilot I interviewed succinctly noted, "The way the company puts pressure on the employees, it's just a matter of time [before there's an airline accident.] Something's got to give." Until the substance of these subjugated knowledges held by employees can be brought more into focus, questions about the escalating risks will remain in the shadows, and short-term profit seeking will continue to take precedence over safety in increasingly dangerous ways.

To examine this issue, I draw historical parallels with other industry crises. I show how airline executives' fixation on maximizing short-term profits at the expense of long-term safety—and government regulators' inability to stop them—has resulted in a period of arrogant optimism, willful blindness, and entitled insularity in commercial aviation, not unlike Wall Street in the years prior to the 2008 financial crisis. I show how industry risk management processes have not kept pace with the
escalating risk in aviation, just as it didn’t on Wall Street before the crash. And as several researchers warned about the looming US financial crisis, I identify similar hidden fractures in the aviation safety system as well. With no government intervention or regulatory supervision on the horizon, the only question left to ask is if Wall Street could crash, can’t the airline industry crash too?
Awareness about what is happening in the post–September 11, 2001, airline industry comes to each of us in different ways with varying intensity. One thing is certain: aviation in the United States changed forever after 9/11. Only now, over a decade later, is it becoming apparent how much. And I don't just mean increased security measures during the flight check-in process. The entire aviation industry has changed radically over the past decade with serious risk and safety implications, and certain sectors continue to hope no one will “alarm the passengers.”

We know what happened on 9/11. And we also know about the economic instability of the aviation industry that followed. But what is less frequently discussed is why that instability really occurred and where the decisions made to address it are taking us now. Commercial airline executives want us to believe that the terrorist attacks caused the post-9/11 aviation industry downturn thus creating the current hypercompetitive environment. They use that logic to justify charging fees for everything from soft drinks and pillows to ticket changes and checked baggage.
It's a lucrative strategy. In 2011, the top airlines at the time (United, Delta, American, Southwest, US Airways, and Alaska) generated $3.4 billion in revenue from checked bags, up from $464 million in 2007, the year most airlines began the practice. These airlines also collected $2.4 billion from passenger penalty fees for rebooking nonrefundable reservations. Add in other incidentals and we find passengers paid an astonishing $12.4 billion in extra fees in 2011 alone—and this revenue is not taxed like traditional airfares.¹

Yet, well before that crisp fall day in New York, informed insiders considered the aviation industry overdue for an adjustment. September 11 simply handed the already struggling airlines a popularly accepted excuse to downsize and adopt other changes executives had long wanted to implement. Major airlines used the event as an excuse to slash jobs, eliminating over two hundred thousand employees in the post-9/11 period, all the while eliciting sympathy and government support as one of the most visible images of America's struggle against terrorism. As of 2010, airline employees continued to give up more than $12 billion a year in wages, benefits, pensions, and other work rules, while over 10,000 pilot jobs had disappeared at major air carriers.² (Table 1 reflects total layoffs and hiring 2000–2012.)

Like a clever magic trick, industry leaders used 9/11 as a foil, distracting the public by blaming the airlines' financial slump on war, recession, terrorism, and travel scares such as SARS (severe acute respiratory syndrome), while pointing to rising fuel costs, greedy employees, aggressive labor groups, and frugal consumers' bargain shopping online to explain airline insolvencies. Meanwhile, US air carriers quietly pocketed over $2 trillion in revenue between 2000 and 2012,³ and airline executives earned millions of dollars for themselves (fig. 1). Consider Jeffrey A. Smisek, president and CEO of United Continental Holdings, the company created after the United-Continental merger in 2010. Number 123 on the list of America's highest-paid CEOs, Smisek earned $13.3 million in compensation in 2011, falling just behind Wall Street executives such as Jamie Dimon of JP Morgan Chase, Lloyd C. Blankfein of Goldman Sachs, and Vikram S. Pandit of Citigroup.⁴

You might think that staying out of bankruptcy was the primary job of an airline executive. However, in an odd twist of the bankruptcy process, on exiting Chapter 11 airline management teams typically keep between
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<td>United</td>
<td>11,278</td>
<td>9,968</td>
<td>7,992</td>
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<td>6,374</td>
<td>6,133</td>
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<td>6,350</td>
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<td>5,515</td>
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<td>Northwest</td>
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<td>6,103</td>
<td>5,534</td>
<td>5,112</td>
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<td>4,995</td>
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<td>8,103</td>
<td>8,074</td>
<td>7,155</td>
<td>6,786</td>
<td>6,181</td>
<td>5,706</td>
<td>5,904</td>
<td>6,391</td>
<td>6,581</td>
<td>10,701</td>
<td>10,708</td>
<td>10,606</td>
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<td>5,330</td>
<td>4,649</td>
<td>3,743</td>
<td>3,147</td>
<td>2,967</td>
<td>2,599</td>
<td>3,132</td>
<td>4,278</td>
<td>4,234</td>
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<td>10,586</td>
<td>12,297</td>
<td>10,857</td>
<td>9,929</td>
<td>9,074</td>
<td>8,572</td>
<td>8,343</td>
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<td>4,571</td>
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<td>4,184</td>
<td>4,408</td>
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<td>4,022</td>
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<td>4,535</td>
<td>4,845</td>
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<td>5,564</td>
<td>5,676</td>
<td>8,866</td>
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<td>JetBlue</td>
<td>75</td>
<td>236</td>
<td>371</td>
<td>591</td>
<td>809</td>
<td>1,059</td>
<td>1,451</td>
<td>1,707</td>
<td>1,794</td>
<td>1,795</td>
<td>1,828</td>
<td>2,021</td>
<td>2,183</td>
<td>2,811</td>
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<td>Total</td>
<td>50,167</td>
<td>47,941</td>
<td>46,186</td>
<td>42,424</td>
<td>39,947</td>
<td>38,760</td>
<td>38,922</td>
<td>40,825</td>
<td>41,586</td>
<td>39,401</td>
<td>39,708</td>
<td>40,066</td>
<td>43,326</td>
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* US Airways merged with America West in 2005; Delta acquired Northwest in 2008; United and Continental merged in 2010; Southwest acquired AirTran in 2011. Numbers reflect these changes.
5 and 10 percent of the company's shares. CEOs often keep 1 percent just for themselves. That means managers are handsomely rewarded for getting their company out of financial messes they created in the first place. It is a nice payoff for stiffing creditors, wiping out shareholders, furloughing employees, and alienating passengers. Over the last several decades, this is where airline CEOs have gotten rich. United's CEO Glenn Tilton received a pay package worth nearly $40 million in new shares and other compensation after the airline emerged from bankruptcy in 2005. Northwest's CEO Doug Steenland received a package worth some $26.6 million when the company emerged from Chapter 11 in 2007. And the process continues to this day, unregulated.6

In 2012, American Airlines and US Airways were negotiating a merger as well. Most industry analysts agree that American, the third-largest US airline, and US Airways, the fourth-largest, will eventually have to merge if they are to stand a chance of competing against the United-Continental and Delta-Northwest conglomerates. However, American's CEO, Tom Horton, and his management team will profit more if American emerges from bankruptcy first, earning them somewhere between $300 and $600 million. Meanwhile, US Airways' CEO Doug Parker's contract has a
change-of-control provision that could earn him more than $20 million if his airline is bought by another company and he is forced out.\(^7\)

During this same period, when airline executives like Tilton, Smisek, Steenland, and their management teams were collecting record compensation, thousands of their airlines' employees remained out of work. When challenged about this inequity, airline executives defended their managerial decisions and compensation strategies. Like the financial industry's defensiveness about Wall Street's executive bonuses paid just months after the $700 billion government bailout of the Street's "troubled assets" in 2008, airlines justified the post-9/11 executive rewards as appropriate and necessary to attract and retain top performers.\(^8\) Are these high-priced, short-term managerial strategies—and the shady deals and organizational culture they foster—mere coincidence, or are there identifiable patterns between the business practices of these two boom-or-bust American industries?

Both finance and aviation have long histories of secret deals and political gamesmanship behind exorbitant financial wins and losses. As both industries became increasingly deregulated over the past few decades, a new type of manager took over the executive suites, and troubling evidence emerged of a managerial fixation on maximizing short-term profits for themselves at the expense of long-term company sustainability while disregarding the resultant systemic risks. The following chapters unpack the details of this confluence of events. For now, let us consider that if this pattern of risk taking brought Wall Street to the brink of collapse in 2008, might growing cracks in the airline industry related to self-serving risk taking be threatening air safety as well?

My review of government documents and accident reports, along with interviews with hundreds of aviation industry professionals, provides evidence that hidden fractures have been widening in the aviation industry in ways alarmingly resonant with patterns preceding the financial crisis of 2008.\(^9\) Contrary to the Federal Aviation Administration's (FAA) claim that "this is the golden age of safety, the safest period in the safest mode, in the history of the world,"\(^10\) we seem to be entering a period of unprecedented global risk. Perhaps US Airways Captain Chesley "Sully" Sullenberger, the pilot who landed his Airbus-turned-glider on the icy surface of the Hudson River, said it best when he spoke to Congress in 2009.\(^11\) Voicing
concerns held by most veteran airline employees, he testified, “While I love my profession, I do not like what has happened to it.” US airline employees “have been hit by an economic tsunami.” Citing bankruptcies, layoffs, pension loss, pay cuts, mergers, and “revolving door management teams who have used airline employees as an ATM” as causes for the turmoil, Captain Sullenberger confided that he was “deeply worried” about safety and the industry’s future, claiming, “I do not know a single professional airline pilot who wants his or her children to follow in their footsteps.” With airlines no longer able to “attract the best and the brightest” to aviation careers, he worried that “future pilots” will be “less experienced and less skilled” with “negative consequences to the flying public—and to our country.” To avoid this, he insisted that “airline companies must refocus their attention—and their resources—on the recruitment and retention of highly experienced, well trained pilots,” making that a priority “at least equal to their financial bottom line.”

Captain Sullenberger is not alone in expressing these concerns. The chaotic state of the post-9/11 aviation industry generated such widespread attention in Congress that the Government Accounting Office (GAO) was asked to investigate the implications of airline bankruptcies, mergers, loss of pension plans, and high fuel prices, and even consider re-regulating the struggling industry. One study claimed that “the airline bankruptcy process is well developed and understood” and went on to document the liquidation of employee pension plans, offering examples of the significant loss of benefits senior airline employees, such as Captain Sullenberger, will experience when they retire. Yet it nonetheless contended there is “no evidence” that bankruptcy “harms the industry.” Another report noted, “The historically high number of airline bankruptcies and liquidations is a reflection of the industry’s inherent instability.” However, the GAO failed to investigate the implications of this instability for employees or passengers. In fact, not one of the government’s reports considered the impact of this tumultuous climate of outsourcing, mergers, downsizing, furloughs, and changing work rules on employees, their job performance, risk, or airline safety.

What do I mean when I talk about risk and safety? Risk is commonly understood as a situation involving exposure to danger, harm, or loss. And
safety is the process of controlling situations to minimize exposure to these hazards. How can managing risk and safety be a profitable process? In the nineteenth century, commercial trade in risk emerged as a commodity much like the exchange of timber, cotton, and tobacco. Marine insurance became the first form of risk management when merchants insured their cargo against “perils of the sea” and insurers sold these policies to each other for financial gain. Since then, shifting risk has become a lucrative business strategy.

As corporations began to amass extraordinary wealth, questions soon followed about whether industrial profit making should come from assuming risk, as with marine insurance, or from reducing it through better work practices. In response, three risk-related roles emerged in the corporate industrial economy: the entrepreneurial “risk-maker” who jumpstarts the industrial process, the financial “risk-taker” who invests in corporations and their stock, and the managerial “risk-reducer” who rationally supervises economic production. Over time, neoliberalism, and the increasingly deregulated marketplace associated with it, blurred the boundaries between these risk management roles, as executives, previously risk-reducers, now adopted risk-maker strategies throughout corporate America. I will return to this important managerial shift and its implications for risk and safety.

Obviously, no airline flight, business decision, or financial investment is 100 percent risk free. So what then are acceptable levels of risk? It depends. To determine which air safety regulations to adopt and which situations to risk, the FAA, nicknamed the “tombstone agency” for basing their decisions on body counts, conducts a cost-benefit analysis. “The basic approach taken to value an avoided fatality,” the FAA explained, “is to determine how much an individual or group of individuals is willing to pay for a small reduction in risk.” For instance, the FAA might weigh the risk of a fatal accident occurring every year by considering the loss of the aircraft ($100 million) and the death of its one hundred passengers, each life valued at $3 million ($300 million) versus the cost to airlines to fix a reoccurring mechanical flaw ($10 million) in every airplane of this type in service (1,000). In this example, the aviation industry would accept the risk of $400 million—and, more important, the risk of an airplane crash annually and the death of one hundred people as a result of this mechanical
failure—rather than adopt a regulation that forces airlines to fix the problem at a cost of $10 billion. This may sound reminiscent of the Ford Pinto fiasco from the 1970s.

At that time, in an effort to compete in the burgeoning yet lucrative small-car market, the Ford Motor Company introduced a new subcompact car called the Pinto. It was rushed to market to capitalize on America’s new desire for cheap, fuel-efficient vehicles, “The Little Carefree Car,” as the Pinto was advertised, became everything but untroubled. During preproduction crash tests, Ford engineers discovered that the car’s fuel tank was vulnerable to explosion during rear-end collisions.22 Yet Ford executives reportedly conducted a cost-benefit analysis, comparing the cost to reinforce the Pinto’s rear end ($121 million) against the chance of collision and cost of lawsuits ($50 million).23 They decided it was cheaper to accept the risk. For eight years Ford lobbied against increased safety standards and paid millions to crash victims out of court rather than fixing the $11 per-car problem.24 Twenty-seven people died as a result.25

Although the Ford Pinto became a famous business school case study in shoddy ethics and helped spawn the field of corporate social responsibility, there is still more we can take away from the case than just a lesson in bad management. What this case, and others I discuss in this book, exemplify is how corporate leaders have quietly shifted their role from risk-reducers to risk-makers over the last few decades, forcing American consumers to become the ultimate risk-takers, in ways often unknown to them.

Are there safeguards within the system designed to address these concerns about escalating risk and diminishing safety? Aren’t government regulators, airline management, employee labor unions, and consumer watchdog groups monitoring aviation industry developments and, perhaps most important, long-term passenger safety? The simple answer is that the required oversight is either not happening at all or not fast enough to keep pace with the rate of aviation industry changes over the past decade.

Like Wall Street before the crash, airlines have been free to pursue economically driven agendas with little regulation or incentive to consider the wider risks. In part, the reason is that cost-benefit analyses have
become so prevalent and fatal aviation accidents seem to have become so rare. It is commonly believed that the chance of being killed on a commercial flight is about 8 million to 1—far safer than other forms of transportation. For example, the US Bureau of Transportation Statistics' 2008 study (the most recent) reported fewer than 600 airline fatalities annually, while almost 38,000 people died in motor vehicles and nearly 800 on railroads.

Massachusetts Institute of Technology professor Arnold Barnett has made a career out of consulting to airlines and studying aviation fatalities. He uses applied probabilistic and statistical modeling, a risk assessment method similarly adopted by Wall Street quantitative analysts, or "quants," before the 2008 financial industry crash. How this occurred on Wall Street will be discussed further in chapter 5. Through these mathematical models Barnett and his team of aviation quants concluded that the chance of dying in a US airline jet crash is 1 in 22.8 million commercial flights. "A traveler would have to fly every day for more than 64,000 years before dying in an accident," he contends. "Fatal accidents are on the verge of extinction."

Yet, fatality data, like cost-benefit analyses, can be deceiving as a measure of overall risk and safety. Captain Sullenberger notes, "It's important not to define safety as the absence of accidents," and most pilots I interviewed for this book agreed. They worried that the apparent rarity of aviation deaths has caused passengers to become indifferent, regulators lackadaisical, and airlines complacent about air safety. Like another magic trick, contradictory evidence is there to see for those who know where to look. In fact, 70 percent of the pilots I surveyed believe post-9/11 cost cutting has made it likely that a major airline accident will occur in the coming years. It is not a matter of if—only a matter of when (fig. 2).

Nonetheless, in 2013 the front page of the New York Times proclaimed that "flying on a commercial jetliner has never been safer." What has led to this disparity of opinion? Captain Sullenberger has noted how airline employees have, in some ways, contributed to this illusion, a victim of their own success. "We make it look too easy," he argued. When "it's possible to go several calendar years without a single fatality" in a jet crash at a major US airline, the public starts to see airlines as "ultrasafe," and it becomes "easy to forget what's really at stake" when flying on a commercial
Figure 2. US airline pilots' rating of likeliness of airline accident. Source: "How likely do you feel it is that a major airline accident will occur in the coming years due to post-9/11 airline cost cutting?" Author's survey data, no. 10.

Echoing pilots' concerns, Mike Ambrose, director of the European Regions Airline Association, expressed alarm as well. Today's airline managers have no experience with aviation accidents, he argued. They "tend to believe this level of safety is a given, so will more easily pass responsibility for safety down the authority chain," making it less of a financial and managerial priority.

Former inspector general of the US Department of Transportation (DOT) Mary Schiavo agrees, noting how aviation industry leaders have become adept at manipulating the illusion of safety without making any substantive changes:

When a plane goes down in flames and dozens or hundreds of lives are lost, what the public most wants is reassurance—reassurance that the accident was a fluke, that flying is statistically the safest way to travel and that someone is watching over aviation to guarantee it is safe. FAA officials and members of Congress automatically take to the airwaves, vying to outdo themselves with sound bites about oversight and safety. . . . [However] once the media scrutiny passes, the safety problem will be gone too.
In addition, the random nature of accidents and the way federal agencies quantify safety makes the apparently low aviation fatality rate, particularly when compared with other modes of transportation, attributable to luck and data manipulation.

For instance, aviation quants' statistical models often only consider fatal jet crashes, ignoring all other kinds of aviation accidents such as general aviation aircraft, cargo carriers, and turbo-propeller (turboprop) airplanes. This oversight is particularly problematic because regional air carriers and their turboprops now provide over half of domestic air service in the United States. Eliminating their operations from the mathematical model significantly skews the findings. When challenged about the selective nature of this data set, aviation quants admit the occurrence of just one accident would sway their results. For example, they concede including Air France Flight 447, which crashed into the Atlantic Ocean in 2009 killing all 216 passengers and 12 aircrew, in the data would drop fatality statistics from 1 in 22.8 million to about 1 in 14 million flights—a 37 percent decline.

Other experts have voiced similar concerns about over-relying on statistical modeling. John Breit, former head of market-risk oversight at Merrill Lynch and one of the first to build value-at-risk (VaR) financial models for Wall Street, notes that mathematical models like these often disguise risk, not reveal it. Instead of fixating on statistics, Breit recommends that risk managers develop what spies call *humint*—“human intelligence from flesh and blood sources”—a network of frontline people who will report when things don’t seem right before a major problem occurs.

With so many questions surrounding the reliability of applied probabilistic and statistical modeling to assess real-world risk, whether in finance or aviation, why then do these quantitative models remain attractive? As Breit observes, their popularity “is all in the interests of senior management and regulators to avoid blame. They may not think they can prevent the next crisis, but they can blame the statistics” for informing their decisions after the fact.

Besides disguising risk and creating a false sense of security, there is a third problem with aviation quants’ probabilistic and statistical modeling risk assessment methods. Researchers who study organizational decision making agree that disasters rarely spontaneously occur out of nowhere, as mathematical models imply. Instead, problems often “incubate.”
sometimes for years, as organizations slowly "drift towards failure,"\textsuperscript{43} until one day factors align in a "window of accident opportunity."\textsuperscript{44} These disasters are so inevitable, and the warning signs that precede them are often so clear, scholars have taken to calling them "normal accidents,"\textsuperscript{45} not because of their frequency, but because they are the normal consequence of increasingly complex operating systems that challenge human sense making in unanticipated ways.\textsuperscript{46} Yet, they are nonetheless disasters that, with a little bit of awareness and imagination, we could have seen coming.

In their thought-provoking book \textit{Predictable Surprises: The Disasters You Should Have Seen Coming and How to Prevent Them}, Max Bazerman and Michael Watkins offered several generalizable characteristics as signs of impending disaster.\textsuperscript{47} First, leaders are aware that there is a problem and many people recognize the problem is escalating, yet fixing the problem would incur significant short-term costs with questionable long-term return on this investment. Next, since there is a natural human tendency to maintain the status quo, resistance to change is allowed to dominate. Finally, this resistance is fueled by a small yet vocal minority who benefit from inaction and are motivated to subvert leadership efforts for their own private benefit. As a result of these pressures, decision makers are reluctant to risk taking action in the present in order to prevent a potential disaster in the future, particularly if they are unlikely to receive credit for averting it and have mathematical models to back them up.\textsuperscript{48}

The history of aviation disasters is replete with examples of this type of flawed thinking. For instance, in the early 1990s, safety analysts predicted that even if aviation industry accident rates remained constant, the anticipated 3–4 percent annual industry growth would result in a near doubling of US air crashes by the turn of the twenty-first century. Alarmed by these statistics and prompted by two seemingly mysterious 1996 aviation accidents and the corresponding 340 fatalities—the midair explosion of TWA Flight 800 and the inflight fire aboard ValuJet Flight 592—President Bill Clinton created the White House Commission on Aviation Safety and Security led by Vice President Al Gore.\textsuperscript{49}

Initially, the commission recognized that there were escalating problems in the US commercial airline industry and held both airline executives and the FAA responsible for repairing the broken aviation system. They
laudably recommended a reduction in accidents by a "factor of five within a decade" and a re-engineering of the FAA's regulatory and certification programs. That was, until resistance to change was allowed to dominate, just as the Bazerman and Watkins model predicted. The airlines flexed their political clout, lobbyists mobilized, the FAA stonewalled, and the price of change became too high in the government’s cost-benefit analysis. Politicians, reluctant to risk a decline in popularity or donations during an election year over a questionable long-term gain on issues they would likely not get credit for, waffled on key points.

As a result, the final report moved from a tough call to action for the aviation industry as a whole to a watered-down version condoning business as usual. Airline executives, who presumably had the most to gain by improving air safety, did everything possible to block meaningful reform, and in doing so denied the very real possibility that a predictable surprise was likely to occur. Since then predictable surprises have occurred in the form of several aviation accidents and near misses that airlines would rather not discuss (detailed in chapters 5 and 6).

One shining moment on Gore’s White House Commission was when Commissioner M. Victoria Cummock stubbornly refused to endorse the committee's final report because it “contains no specific call to action, no commitments to address aviation safety and security system-wide,” and “no deadlines.” She suggested “that all recommendations be re-written for specific actions by specific agencies,” otherwise, “once again, we will allow the airlines to lead and the government to follow.” In conclusion, she stated, “I cannot sign a report that blatantly allows the American flying public to be placed regularly at ‘unnecessary risk.’”

As validation of Commissioner Cummock’s concerns, one predictable surprise that might have been averted had her recommendations regarding a systemwide commitment to improving airline safety and security been adopted was the terrorist event of 9/11. Instead, airlines were once again allowed to prioritize short-term profits at the expense of long-term safety, disregarding the resultant systemic risks.

Who should we believe? Is the US airline industry heading for a predictable surprise, or is this the golden age of safety and stability in which fatal aviation accidents and other dangerous situations are on the verge of
extinction? The spectrum of expert opinion makes the issue of air safety confusing and assessing real risks difficult. Yet an opportunity to explore this question in the post-9/11 period came about when the National Aeronautics and Space Administration (NASA) sponsored a study called the National Aviation Operations Monitoring System (NAOMS), which examined everyday aviation operations before an accident occurs for clues to systemic vulnerabilities.

Over 24,000 pilots had been interviewed between 2001 and 2004—almost one third of the US commercial airline pilot population—when the study was suddenly terminated. The data remained unused for two years until an anonymous NASA whistleblower informed the Associated Press, which filed a Freedom of Information Act request. Initially denied access because, NASA noted, the data “could materially affect the public confidence in, and the commercial welfare of, the air carriers,” a Congressional inquiry finally forced release of the data in 2007. Yet the data produced was in a format that made it nearly impossible for outsiders to analyze. When asked about this, NASA administrator Michael Griffin replied, “We were asked to release the data and I said that we would, and I’ve done that.”

What was so troubling in the study’s findings that NASA risked accusations it was prioritizing airlines’ financial interests over public safety concerns in order to hide it? A review of the NAOMS data produced some clues. Numerous inconsistencies with other governmental statistical reports emerged, potentially tarnishing the FAA’s “golden age of safety” image and aviation quants’ predictions that accidents are on the verge of extinction. For instance, NAOMS data showed four times the number of engine failures and twice the number of bird strikes and near midair collisions than did other government monitoring systems, which called into question the ways aviation safety was measured. When pressed about these inconsistencies, Griffin criticized the NAOMS “reporting mechanism,” calling the project “poorly organized” and the data “not properly peer reviewed” and likening it to “hangar talk.”

NAOMS researchers Jon Krosnick, Stanford University professor, and Robert Dodd, principal investigator, defended their work. Their defense, the $11.5 million NASA spent sponsoring this study, and the high response rate from pilots raises suspicions about the motivations behind NASA’s abrupt decision to abandon the project. As Congressman Brad
Miller noted, "If 80% of the pilots [asked agreed] to sit still for a half-hour survey, voluntarily, my conclusion is the pilots had something they wanted others to know about." Why don’t some people want to hear what they had to say?

The NOAMS study was not the only inquiry into aviation safety issues that required whistleblowers to force government to take action over the past decade. Two FAA aviation safety inspectors testified before the 2008 House Committee on Transportation and Infrastructure on the regulatory relationship between the FAA and the airline industry; they claimed that the FAA knowingly allowed Southwest Airlines to operate unsafe aircraft over a period of several years. The inspectors tried to raise warnings for years about this problem, yet they were repeatedly undermined by FAA managers in their efforts to increase surveillance of airline maintenance.

The committee found that these were common employee complaints at the FAA. Several aviation safety inspectors reported “that they found it difficult to bring enforcement action against airlines because FAA management appeared to be ‘too close to airline management.’” They reported feeling “pressure from management to not identify too many problems with an airline” or else they might face “retribution.” A typical confession was, “I often don’t even bother” bringing airline violations forward “because I know FAA management won’t do anything with it.” As a result, the committee found “extensive evidence,” that “points toward a systemic pattern of FAA failure to exercise the required regulatory oversight” over US airlines.

Although these results were identified in 2008, little seems to have changed since then. Similar to criticisms of Wall Street before the financial crisis, many aviation insiders believe the government’s regulatory system, established over five decades ago, is just too antiquated to keep up with today’s technologically complex, globalized airline industry. Of the pilots I interviewed, only 5 percent reported aviation regulators as “competent” in supervising safety in the US commercial airline industry; 66 percent rated regulators as either “incompetent” or “very incompetent” (fig. 3). Similarly, Stuart Matthews, president of Flight Safety Foundation, succinctly noted, “The FAA was simply never created to deal with the environment that has been produced by deregulation of the air transport industry.” And, in many ways, regulators agree.
A 2005 internal FAA management memo entitled "A Time for Change" expressed with concern how the FAA had "retreated from the proper exertion of our influence and authority" and relaxed "into a level of coziness" with airlines, settling "for winks, nods, verbals, and emails" instead of proper business protocol. Yet, with only about 3,600 aviation-safety inspectors, the FAA knows its personnel is inadequate to oversee all aspects of flight operations and aircraft maintenance under its jurisdiction. To offset this shortage, the FAA developed "partnership programs" in the 1990s to encourage a more collaborative relationship with airlines as "customers." Although civil-penalty programs were a priority in the past, and often resulted in substantial fines and negative airline publicity, the FAA revised its focus, instituting several "voluntary programs" to encourage airlines, pilots, and mechanics to "self-disclose" noncompliance in a collaborative effort to share important safety information.

This collaborative approach sounds good in theory, but not everyone is convinced this type of self-monitoring regulatory strategy can work. It didn't work on Wall Street before the 2008 crash. Prior to the 1990s, the FAA was a "cop on the beat," inspecting "everything from the nuts and bolts in your tool kit to the paperwork in the cockpit" and handing out
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hefty penalties to those who broke the rules. After 9/11, critics noted, the FAA’s more collaborative approach “went too far” in “coddling the airlines” and drifting too far “toward over-closeness and coziness between regulator and regulated.” The history of the Boeing 787 Dreamliner is an example of the risks of this cozy relationship.

Although the Dreamliner was initially touted as a revolution in aerospace design and manufacturing, production of the 787 quickly became an engineering nightmare. The project was fraught with delays and overruns, and delivery only occurred in 2011—three years behind schedule and billions of dollars over budget—the worst production record in Boeing’s history. Much of the 787’s problems were a direct result of the complexity of its new, more collaborative manufacturing and certification process. In order to save money, only 40 percent of the plane was built by Boeing in house; the rest was outsourced to over fifty different subcontractors around the world, which created ample opportunity for errors. When mechanics finally assembled the first plane in 2007, they found a gap of nearly half an inch between the cockpit section and the body of the airplane. This was just the beginning of the problems.

A little over a year after release, the Dreamliner was grounded again when battery fires erupted in two planes. In one case, the fire burned so intensely it took Boston firefighters forty minutes to put the blaze out. Although the danger inherent in using lithium batteries in airplanes was well known, in the spirit of collaboration, the FAA let Boeing develop its own inspection protocol, establish the safety standards, perform the tests, and certificate its own work.

The final frightening fact is that only three months after the grounding, the FAA recertified the 787 for flight carrying the same lithium batteries that had ignited without ever determining the root cause of the battery fires. Japanese pilots, who flew twenty-seven of the fifty-seven Dreamliners then in service, worried that Boeing hadn’t done enough to address the danger. “Boeing says that any battery fire will now go out on its own, so there’s no safety issue,” Japanese pilots’ union spokesperson Toshikazu Nagasawa said. He added, “But that’s on paper. No pilot would ever want to keep flying with a fire on board.” Yet, regulators and airline executives in Japan and the US seem unconcerned. Once again, short-term profit seeking has trumped employees’ safety concerns and the best interests of the flying public.
Meanwhile, Congress has largely stayed on the periphery of the 787 safety debate. This unusual bipartisan silence reflects Boeing’s political clout, a position sustained by hefty political campaign contributions and $83 million spent on lobbying between 2008 and 2013. The bottom line is industry regulators have put aviation industry leaders in control of air safety while employees and passengers are strapped in for the ride.
Even before there was a commercial airline industry, the fledgling field of aviation was already a risky and competitive business where major players, struggling to outdo one another, were not beyond pilfering a profitable idea. For instance, while most any schoolchild can credit Orville and Wilbur Wright for the invention of powered flight in 1903, it is more accurate to say that the Ohio bicycle manufacturers synthesized the best aspects of many inventors' experimentation and innovation—such as Sir George Cayley, Otto Lilienthal, and Percy Pilcher—to build their Wright Flyer.

In the early 1800s, Sir George Cayley built a "flying parachute," itself a knockoff of Chinese kites built around 1,000 BC, to study lift, drag, and flight controllability, while other inventors such as Samuel Henson were still fascinated with steam power. Henson proposed an "aerial steam carriage" that included many elements of modern-day airplanes. Yet, the steam engine was too heavy to get airborne. Several other researchers, such as machine gun inventor Sir Hiram Maxim, focused on this power issue as well. "Give us a motor," Maxim wrote, "and we will