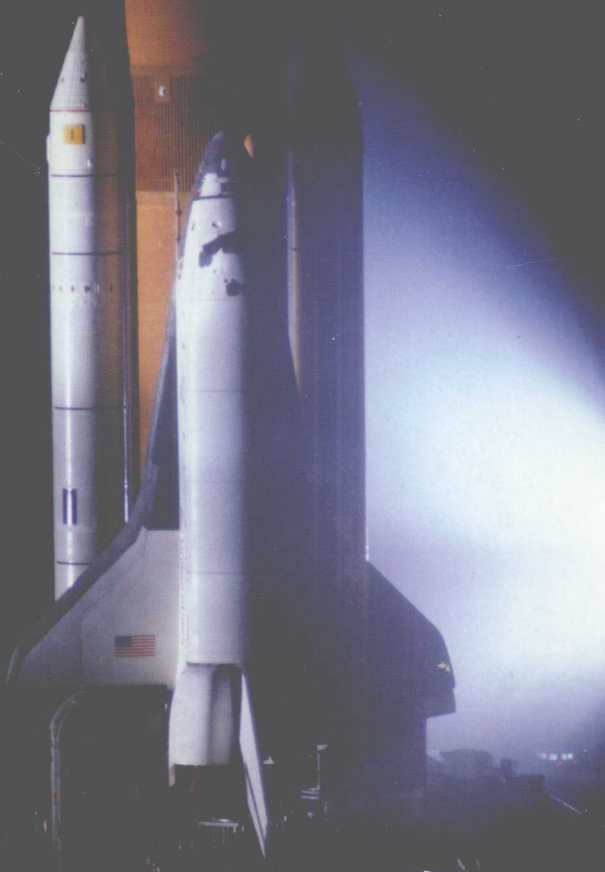
Organization AT THE LIMIT

Lessons from the *Columbia* Disaster



EDITED BY
WILLIAM H. STARBUCK
&
MOSHE FARJOUN

Blackwell Publishing

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Preface

Sean O'Keefe

In each of our lives there are a few events that forever serve as reminders of what was, what is, and what ultimately can be. Those few events and the dates on which they occurred serve as lenses through which we judge the successes of yesterday, gauge the relative importance of decisions facing us today, and ultimately decide the course we set for tomorrow. February 1, 2003 serves as one such date for me; the event was NASA's tragic loss of the space shuttle *Columbia* and her crew.

On that particular day, I expected to welcome home seven courageous individuals who chose as their mission in life to push the boundaries of what is and what can be, explorers of the same ilk and fervor as Lindbergh, Lewis and Clark, Columbus, and the Wright Brothers. But on that particular day I witnessed tragedy. We were reminded that exploration is truly a risky endeavor at best, an endeavor that seven individuals considered worthy of risking the ultimate sacrifice as they pursued the advances in the human condition that always stem from such pursuits.

And there on the shuttle landing strip at the Kennedy Space Center as I stood with the *Columbia* families, I also witnessed extraordinary human courage. Their commitment to the cause of exploration served as inspiration in the agonizing days, weeks, and months that were to come.

For NASA, that date initiated intense soul-searching and in-depth learning. We sought answers for what went wrong. We asked ourselves what we could have done to avoid such a tragedy and we asked what we could do to prevent another such tragedy. We never questioned whether the pursuit of exploration and discovery should continue, as it seems to be an innate desire within the human heart, one that sets humanity apart from other life forms in that we don't simply exist to survive. We did, however, question everything about how we approached the high-risk mission of exploration.

In the final analysis, what we found was somewhat surprising, although in retrospect it should not have been. It was determined that the cause of such tragedy was twofold. The physical cause of the accident was determined to be foam insulation that separated from the external tank and struck the wing's leading edge, creating a fissure in the left, port side of the shuttle orbiter. But we also found the organizational

cause, which proved just as detrimental in the end. The organizational cause was the more difficult for us to grasp because it questioned the very essence of what the NASA family holds so dear: our "can-do" attitude and the pride we take in skills to achieve those things once unimagined. The organizational cause lay in the very culture of NASA, and culture wasn't a scientific topic NASA was accustomed to considering when approaching its mission objectives.

We found that the culture we had created over time allowed us (1) to characterize a certain risk (foam shedding) as normal simply because we hadn't yet encountered such a negative outcome from previous shedding; (2) to grow accustomed to a chain of command that wasn't nearly as clear as we thought was the case; and (3) to more aptly accept the qualified judgments of those in positions of authority rather than seriously considering the engineering judgments of those just outside those positions. In short, we were doing what most of us do at some point in time by trusting what is common and supposedly understood rather than continually probing for deeper understanding. The same thing can happen within any industry or organization over time, and we thus limit what can be by establishing as a boundary what currently is. That happened within NASA. But this tendency is present in most of us.

The more frequently we see events, conditions, and limitations, the more we think of them as normal and simply accept them as a fact of life. Such is human nature. For most Americans, encountering the homeless on any city block in any metropolitan area is unremarkable. Few among us would even recall such an encounter an hour later even if an expansive mood had prompted a modest donation. Sadly, this condition has become a common occurrence in our lives and not particularly notable. And while many of us may have become numb to this condition, it is still a tragedy of great proportions that must be addressed.

But consider the reaction of someone who had never encountered a homeless person forced to live on the streets. Likely, this uninitiated person would come to the aid of the first helpless soul encountered, driven by the desire to do something. Such emotion would be inspired by witnessing the same tragedy most urban dwellers see each and every day. But because it would be the first time, the event would prompt extraordinary action. Indeed, such an encounter would likely force one to wonder how a civilized society could possibly come to accept such a condition for anyone among us. It would be a remarkable event because it had never been witnessed before.

The more we see abnormality, the more dulled our senses become. The frequency of "foam" insulation strikes to the orbiter was sufficiently high to be dismissed as unremarkable and of limited consequence. Why are we surprised when aerospace engineers react just like the rest of us?

But the price for yielding to this human tendency can be horrible tragedy, just as it was on the morning of February 1, 2003. The challenge is to blunt the tendency to react based on frequency of incident and to seek to explain and understand each event. That requires an extraordinary diligence, sensitivity, and awareness uncharacteristic of most humans. It is the rare person who possesses such traits. But the stakes are too high to settle for anything less.

We were offered the rare opportunity to learn from our tragedies just as profoundly as we do from our triumphs. That was certainly true of the *Columbia* tragedy. At NASA, the self-reflection that resulted from that event led us to recalibrate – it revived that natural curiosity within us and served as a lens for gauging the importance of issues facing NASA on a daily basis, such that we continually sought to ask the right questions and to secure the right data before making the important decisions. In the end, NASA will be a stronger organization for having gone through such intense self-examination and public scrutiny.

Those looking at NASA from just outside its gates have the greatest opportunity of all – to learn from the hard lessons of others without experiencing the pain as deeply for themselves. The analyses contained within this book capture the collective work of 35 distinguished individuals representing 12 respected organizations of learning, each serving as an authority in their area of authorship, yet all bound by one common belief, that there is more to be learned from the *Columbia* tragedy than what is already being applied within NASA. Each chapter analyzes the tragedy from a different perspective, and each chapter's ensuing commentary is worthy of careful consideration by many organizations today. To be sure, not all of the commentary endorses the actions taken within NASA, and some comments surely surface issues that merit further thought. Similarly, there are conclusions and critiques herein that I do not necessarily support or concur with. But there is great value in these divergent perspectives and assessments. Our *Columbia* colleagues and their families deserve no less than this rigorous debate. The value of this work for other organizations will be important. While using NASA as a case study, this work, and many of the trenchant observations contained herein, will certainly serve to promote and ensure the success of any organization involved in very complex, high-risk endeavors. It is my belief that this study will serve as one of those lenses by which many organizations chart their course for tomorrow.

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