A CASE STUDY: | Were the Space Shuttle Astronauts Killed by Fog?

In 1961 President John F. Kennedy told a joint session of Congress, "This nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth." As with much grand policymaking, this was easy enough to say. Few believed that the National Aeronautics and Space Administration (NASA), the federal agency created in 1958 to beat the Soviet Union in the Cold War space race, could achieve this "man on the moon" goal in the allotted time.

NASA not only won the space race, but it became the national exemplar of managerial excellence—at least until a clear day in January 1986 when the space shuttle *Challenger* blasted off into the Florida skies to become a now classic example of managerial incompetence. The shuttle, with six astronauts and New Hampshire schoolteacher Christa McAuliffe aboard, blew up 73 seconds after liftoff because an O-ring seal on one of the booster rockets failed. Yet this was not a complete surprise to anyone who followed the shuttle program in the news media. It was widely reported that such seals nearly failed on earlier shuttle flights. They were most likely to fail when the outside air temperature was close to freezing, as it was on the day of the *Challenger* launch. The problem seems so obvious now. NASA managers had more information than they could adequately process. So while the skies were sunny when the *Challenger* last "slipped the surly bonds of Earth," it can be said that the crew truly died from fog—caused by a blinding array of information that led to a faulty decision by public administrators.

The "fog of war" is the wonderfully descriptive phrase for the confusion and uncertainty that is inherent in combat. Prussian General Karl von Clausewitz originated this meteorological metaphor in his 1832 classic on military strategy *On War*. It is as if a literal fog descends on the battlefield and blinds the combatants to what the enemy and even other elements of their own forces are doing. In the days of black powder, the fog was almost as literal as it was proverbial.

Today, wherever far-flung or large-scale operations have to be coordinated, whether military or managerial, fog or uncertainty is a possibility. The field of management information systems has grown up in recent decades to reduce the inevitable fog to manageable proportions. But the reduction mechanisms

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themselves—computer data and memoranda in a seemingly endless stream—often create more problems than the fog they were designed to dispel.

And sometimes the fog is made all the more blinding by political considerations. It was not just that NASA had developed an organizational culture that inhibited bad news from getting to the top in a timely manner. Those who decided to launch that day were under the most exquisitely subtle political pressures as well. If the shuttle had kept its schedule on that ill-fated day, it would have returned in time for Ms. McAuliffe—who had been selected in a highly publicized national search—to sit in the balcony of the chamber of the House of Representatives during the State of the Union speech while President Ronald Reagan pointed her out as an inspiration to the nation and all those desirous of winning lotteries.

Of course, as soon as the accident occurred, all those responsible went into deep denial. Top NASA managers denied having heard of O-ring problems. The White House denied it put any pressure on NASA that would compromise safety. To sort out the denials and gather the facts, the Presidential Commission on the Space Shuttle *Challenger* Accident was promptly appointed. Six months later the commission reported that the failure of the O-ring seals was the physical cause of the *Challenger* explosion. But it also declared that the "decision to launch the *Challenger* was flawed." It further concluded that "if the decision makers had known all the facts, it is highly unlikely that they would have decided to launch." In essence, the commission found that the NASA managers responsible for the launch decision were ignorant—because they were blinded by the fog of competing information.

The commission's report also absolved managers of succumbing to political pressures to prove that shuttle flights were routine and routinely on schedule. It simply denied that there were any political pressures. This was only polite. It certainly would have been unusual for a presidential commission to criticize the president who appointed it. But denial fooled no one and only made them look foolish. According to Barbara Romzek and Melvin Dubnick, writing in *Public Administration Review*, political "pressures existed and came from a variety of sources outside of NASA, including the White House." Charles Peters of *The Washington Monthly* reported that "top NASA officials didn't want to hear the bad news [about the O-rings] because they were determined to launch the next day so that President Reagan could point to this accomplishment in his State of the Union message. They had even written a suggested insert for the speech."

Good managers with the facts before them can make good decisions. However, good managers with an overwhelming volume of data to digest often become unable to make timely or wise decisions; they are reduced to incompetence by the efforts to make them more competent. We live in a

contradictory world when the fog does not come in, as poet Carl Sandburg suggests, "on little cat feet," but rides on the crest of an endless wave of computer printouts. The *Challenger* disaster leads an infinite list of things gone wrong despite the best efforts of highly talented and otherwise able individuals—people who have banded together to create an organization that as a whole is less talented than the sum of its very talented human parts.

And just how did NASA respond to this problem of perceived incompetence? A few weeks after the *Challenger* disaster, NASA awarded bonuses to dozens of its top managers for the excellent work they had done. The media made a big joke of this by pointing out the incongruity of giving $10,000 bonuses to members of a team that couldn't "shuttle straight." NASA managers promptly complained that they shouldn't all be punished for the screwups of a few. True, the O-ring failed, but the other 30,000 parts of the shuttle worked just fine!

Even the best-run organization, of which NASA is still an example, can be befuddled by fog. As with real weather, this kind of fog is a sometimes thing. It can be disrupted by more effective management information systems, by supportive organizational cultures, and by determined top managers. The best managers will use a bout of fog as a learning experience—as an opportunity to change their information system, organization culture, and decisional processes so this particular bad weather can never happen again. That is exactly what NASA has proceeded to do. But then NASA failed again, and for the same reason—fog.

Seventeen years passed and shuttle flights once again seemed to be routine. Then on February 1, 2003, the *Columbia* disintegrated while returning from an otherwise successful mission, killing its seven-member crew. The *Columbia* Accident Investigation Board's August 2003 report stated that while the physical cause of the accident was insulating foam from an external fuel tank that damaged a wing during launch, "the organizational causes of this accident are rooted in the Space Shuttle Program's history and culture." It turned out that, as with the O-ring problem, many people also knew of the insulating foam problem, but the fog created by the culture—once again—prevented that information from getting to the appropriate decision makers. In response to the Accident Investigation Board's findings, NASA set out to change its safety culture in order to avoid the fatal errors associated with the *Challenger* and *Columbia* missions. The results of this overhaul could be seen during the 2005 flight of the shuttle *Discovery*. During the first flight since the *Columbia* failure, *Discovery*'s crew was prepared to make in-flight repairs to the shuttle on damage sustained during the launch.

For Discussion: *Why are all large organizations so susceptible to Clausewitz's fog? Are political pressures for performance a common or an uncommon part of public administration?*