

ADMIRAL HAROLD W. GEHMAN, JR, USN (RET.)



Admiral Harold (Hal) W. Gehman, Jr, USN (Ret.) completed over 35 years of active duty in the U.S. Navy on November 1, 2000. His last assignment was as NATO's Supreme Allied Commander, Atlantic and as the Commander-in-Chief of the U.S. Joint Forces Command, one of the United States' five regional joint Combatant Commands.

Gehman was born in Norfolk, VA on October 15, 1942, and graduated from the Pennsylvania State University in 1965 with a BS in Industrial Engineering and a commission in the Navy from the NROTC program. A Surface Warfare Officer, he served at all levels of leadership and command, primarily in guided missile destroyers and cruisers. During his career, he was assigned to an unusual five command-at-sea tours in ranks from Lieutenant to Rear Admiral.

Admiral Gehman served in Vietnam as Officer in Charge of a Swift patrol boat and later in Chu Lai, Vietnam as Officer in Charge of a detachment of six Swift boats and their crews.

His staff assignments included a Carrier Battle Group staff, a fleet commander's staff, a Unified Commander's staff, and on the staff of the Chief of Naval Operations in Washington, DC.

Promoted to four-star Admiral in 1996, he became the 29th Vice Chief of Naval Operations. As VCNO, he oversaw the formulation of the Navy's \$70 billion budget and developed and implemented policies governing the 375,000 people in the Navy.

Assigned in September, 1997 as SACLANT and Commander-in-Chief, US Joint Forces Command, he became one of NATO's two military commanders and assumed command of all forces of all four Services in the continental United States. He was responsible for the provision of ready forces to the other Joint Combatant Commanders overseas and for the development of new joint doctrine, training procedures, and joint requirements.

Immediately after retiring in 2000, Gehman was appointed Co-Chairman of the Department of Defense review of the terrorist attack on the USS *Cole* in Aden harbor, Yemen. On February 1, 2003, he was appointed Chairman of the Space Shuttle Columbia Accident Investigation Board, which reported its findings to the nation on August 26, 2003.

**ETHICAL CHALLENGES
FOR ORGANIZATIONS:
LESSONS LEARNED FROM THE USS COLE
AND COLUMBIA TRAGEDIES**

Welcome from Dr. Albert C. Pierce, Director, Center for the
Study of Professional Military Ethics

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Introduction by VADM Rodney P. Rempt, Superintendent,
U.S. Naval Academy

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Lecture by Admiral Harold W. Gehman, Jr, USN (Ret.)

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WELCOME

Dr. Pierce

Good evening, ladies and gentlemen. On behalf of the Superintendent and the Center for the Study of Professional Military Ethics, welcome to the ninth ethics lecture in this series. The inaugural lecture was held in this room five years ago next month, and we now do one each semester. We at the Ethics Center are particularly pleased that we can make this kind of contribution to the study and the practice of ethics here at the Naval Academy. These lectures are open to the entire Naval Academy community, but our primary audience consists of the midshipmen who are currently enrolled in NE-203, and we're delighted to see them here in great strength tonight.

The first couple of these lectures, going back to 1999, focused on moral courage, and then the next several on ethics and the use of military force, issues of the just war. Last spring, we introduced a different approach, and that is to bring former officers here to reflect on ethical challenges they faced, observed, or handled in their careers and in their lives. Tonight's lecture is in that vein—how organizational behavior, technology, human life, risk, and ethics all come together—the issues that this Academy is all about.

To introduce this evening's speaker, I'll turn the podium over to the Superintendent, Vice Admiral Rempt.

INTRODUCTION

Admiral Rempt

It's a pleasure to have you all here tonight to address a serious subject. This is a great opportunity to help us focus on the importance of ethics and what ethics really means in our everyday life. I'll just spend one moment and talk about what ethics is.

Now, I could ask a number of midshipmen here to give me the definition, since you've all been taking the course, and you could spout that back in a second, I'm sure. I'll give you a practical perspective. There are many different definitions, but ethics to me is essentially the foundation for how we live our lives, how we as individuals choose to live and to face the world and face our fellow man in what we do. It's what we believe in our gut, and often it's a value system that we fall back on when the chips are down, or when normal rules don't apply, or the situation has dramatically changed, so that everything we knew before doesn't really fit the new situation. Perhaps we're in a crisis, or perhaps we are at war, or perhaps we're a prisoner of war. The rules that we lived under for all of our life suddenly have no meaning, or we cannot figure out exactly what we're supposed to do. Perhaps we're on the streets of Iraq, faced with a new situation that we have never thought about before, and suddenly we are thrust into deciding the right thing to do.

Well, we're fortunate tonight. Admiral Harold W. Gehman is here to give us some ethical insights and his perspective from his many responsibilities. He has dedicated some 35 years of his life to active service in the Navy. As a surface warfare officer, he completed five different sea tours in command, and he has served aboard guided missile cruisers and destroyers. He has held numerous key leadership positions, including as the 29th Vice Chief of Naval Operations, the Commander-in-Chief of the U.S. Joint Forces Command, and NATO Supreme Allied Commander, Atlantic.

Following his retirement, Admiral Gehman continued serving his country out of uniform. He immediately assumed duties as co-

chairman of the Department of Defense review of the USS *Cole* terrorist attack. In 2003, he became the chairman of the space shuttle Columbia accident investigation board and has led the investigation that resulted in the findings of that board. Truly a remarkable individual.

His integrity and his devotion to service are unwavering examples for us all. We can learn a great deal from the lessons he has learned in his experiences as a senior naval officer and as a retired naval officer heavily involved in critical issues that face the government of the United States. It is my distinct pleasure to introduce Admiral Hal Gehman.

LECTURE

Admiral Gehman

Thank you, Admiral Rempt. It's a pleasure to be here. I'd also like to recognize former Secretary of the Navy John Dalton, who is in the audience; former Chief of Naval Operations Carl Trost, who is in the audience; and also a former next-door neighbor of mine, Vice Admiral Mike Haskins and his wife, who are in the audience. Dr. Pierce, thank you for inviting me.

I am not a graduate of the United States Naval Academy. I am a graduate of Penn State University, and I got an engineering degree there and was in the Navy ROTC program. In 1965, I was handed a diploma in one hand and a set of orders to a destroyer in the other hand, and 35 years later, I retired. However, my high regard for this institution comes honestly from 35 years of dealing with your distinguished graduates, both working for them and having them work for me, and my high regard for this institution also comes from the fact that my father is a 1939 graduate of this institution and served 30 years in the Navy. 1939 was a tough year to graduate. The next six years were tough as well, and he is pretty proud of his 30 years.

My job here tonight is to talk about the challenges of ethical behavior in large, complex organizations. Your job is to listen. My only concern, of course, is that you'll finish your job before I finish mine, but that's a risk I'm willing to take.

I wanted to put your mind at rest that I am not going to give you a theoretical set of remarks about ethics. I'm really here to talk about the practice and the practical aspects as I have witnessed it and some of the adventures that I have been involved in both in the Navy and out of the Navy. It seems like, for one reason or another, I have had a series of experiences wrestling with big organizations such that people continue to give me more jobs to wrestle with big organizations. So you might say that my remarks tonight are entitled or labeled after the current television program, *Big Organizations Behaving Badly*. For some set of reasons, my career has allowed me to experience both the good and the bad of big organizations. My career has also put me in

touch with people senior to me, who took the time to point out when organizations were behaving strangely and allowed me perhaps to see the difference. When I tell you some practical stories, sea stories as we like to say, we'll let you judge whether or not there are lessons to be taken away from this.

It's my goal tonight that, when you leave here, you will be a little bit more aware of how organizations work and act, and how individual ethics and individual standards sometimes bump up against some of the practical challenges of the day. By being a little bit more wise and a little bit more aware of how organizations act, perhaps you will be a little bit more observant and a little bit more conscious of things that are happening around you and thereby, perhaps, contribute to the solution of the problem.

I don't believe that it is the goal of the ethics department, and it's certainly not my goal here tonight, to think that a United States Navy ensign can go out and fix problems, but at the same time, we don't want you to be part of the problem. We want you to be aware when situations are happening [that make it hard to explain] the behavior of the organization. Maybe we can help you explain what's going on. If we succeed tonight, we will both be successful. Also, the mentors who have helped me along the way will have been successful, which I think is the whole point.

Some of the events that I'm going to relate tonight occurred while I was on active duty. Some are taken from the investigation into the terrorist attack on the USS *Cole* in Aden, Yemen in October of 2000, and some are taken from the recently completed investigation into the tragic loss of the space shuttle Columbia on the 1st of February last year [2003] and the loss of the seven crew members on board. The reasons I mention the seven crew members are: first, three of them were naval officers, and second, we're not talking about theory here, folks. We're talking about life and death. People can get hurt if we don't do our jobs right, and I want you to take that aboard.

We're here to talk about organizational culture. Those are the terms that we like to use in the shuttle investigation, and a lot of

what I'm going to talk about relates to engineering, because a lot of it is technical, and engineers have cultures of their own.

I am reminded of the story of a foursome playing golf: a lawyer, a doctor, a dentist, and an engineer. They had played golf together regularly. As they were going around the golf course, they noticed that the foursome in front of them was playing exceedingly slowly, and after a few holes of being delayed, they finally started waving and trying to get the attention of the foursome in front of them to allow them to play through. The foursome in front of them ignored them—didn't even acknowledge that they were back there. Their frustration grew, and finally the marshal came around, and our four golfers complained vociferously about the slow play and the impolite attitude of the foursome in front of them who didn't acknowledge their desire to play through.

The marshal looked at the foursome and said, "You all should be ashamed of yourselves. Those four guys in front of you are blind. It's a miracle they can even play golf at all. They come out here a couple times a year. They have a great time. They're really good golfers. I mean, they're playing almost as fast as you are, and you should really be ashamed of your shortsightedness."

Well, our foursome was quite chagrined at this, and the lawyer said, "You're absolutely right. I'm ashamed of my impatience, and I am going to offer those gentlemen free legal services from my company." The doctor said the same thing: "I'm sorry for our impatience and our criticism of them. I'm glad that they can do what they can do, and I'm going to offer them free medical care." The dentist said, "I'll offer them free dental care." The engineer said, "Why don't they play at night?"

(Laughter.)

Admiral Gehman

How you approach a problem depends on your background and how you have been taught to approach a problem. Tonight, by relating some actual, real-life, no-kidding stories, hopefully, we can come away here with some understanding.

When Dr. Pierce asked me to speak, the first thing I did was look up “ethics” in the Webster’s dictionary. According to Mr. Webster, “ethics” means one, a complex of moral precepts held or rules of conduct followed by an individual. In other words, that’s the definition as it applies to you and me, to an individual. There is a second part to the definition, and that is the body of moral principles or values governing or distinctive of a particular culture or group. In other words, that’s the definition as it applies to groups of people.

Or you might put it this way. Similar to what Admiral Rempt said, it’s the pattern of behavior by individuals or groups of people when the boss isn’t standing over their shoulder. It’s essentially how you act when you are acting on your own without supervision right behind you. It’s how you act instinctively. Now I’m going to get back to this several times tonight, so we’ll be able to connect that dot again.

[Here’s] a little personal philosophy, particularly about large organizations. You belong to a large organization. The Naval Academy is a large organization. The Navy and the Marine Corps are large organizations. It is my firm belief that all large organizations essentially behave like an organic being, that is, an animal or a plant, and these characteristics are fairly predictable and fairly standard.

For example, it is my view that the first and highest priority and the primary goal of every large organization is self-preservation, just like an animal. If the organization feels threatened or challenged, the first thing the organization does is go into a self-preservation mode. Sometimes that means defensive actions. Sometimes it means offensive actions. If you are part of an enterprise that’s threatening another organization or challenging another organization—for example, when they told me as the Commander-in-Chief of Joint Forces Command that my job was to transform the Armed Forces, that was threatening to a lot of people. If you are aware of the reflexive response that all organizations are most likely to respond with when threatened, you will then understand why the organization is behaving the way it does.

Second of all, these responses to threats and challenges by large organizations can be understood and predicted, no matter what the leader says, no matter what the boss says about how open they are to change and how willing they are to accept new ideas. The organization itself is not going to do that. The organization will resist because the rank and file think that they are defending the organization, and they think that their actions are right and just. They aren't criminal. They're not bad. They think that they're protecting their organization. I'm going to get back to that later.

Third point, one of the most common defensive mechanisms of all organizations is what I call trivialization. When a large organization is presented with a challenge, like a new idea or a change or a threat of any kind, one of the most common responses is to trivialize it. What an organization will do is invent a mind-numbing, endless series of studies, committees, analyses, and working groups until it just wears you down. I tell you, I've seen it over and over again.

Fourth, there is such a thing as good culture too, by the way. Not all cultural traits are bad. I'm going to give you a litany here of evil and bad cultural traits that I have seen in practice, but there are good cultural traits, and the good cultural traits need to be nourished, like good communications and openness and honesty and things like that.

And lastly, individuals do make a difference in large organizations. After all, organizations are just collections of people. Generally, it is not possible to change bad organizational culture by simply reorganizing or firing the head. Now, even though sometimes members of Congress or the press or even our bosses want to fire somebody when something goes wrong, if you have an organization which is not working well, firing the head guy, even though it feels good, won't fix the organizational problems. If you do get a new boss into a rotten organization, the new boss is going to have the same problems, and unless that new boss can fix the organizational matters, it won't do him any good.

Okay. I promised you some real-life, no-kidding, practical stories with a little bit of dirt thrown in, and so I'll get started, and I'm

going to refer back to this free philosophical discussion I gave you and try and tie these things up.

The USS *Cole*, DDG67, essentially a brand-new Arleigh Burke-class destroyer, was worked up as part of the *George Washington* battle group, just like all the other destroyers in the battle group, except that the *Cole* was essentially loaded down completely with land-attack Tomahawks, or TLAMs. The *Cole*, even though she worked up as part of the battle group, was probably never going to see the battle group, because the *Cole* was part of a schedule to provide the unified combatant commanders with the hundreds of Tomahawks which the JCS [Joint Chiefs of Staff] said they could have. So the *Cole* did a normal workup with the battle group but then went off to fulfill the Tomahawk numbers.

In the workup, the *Cole* did all of the antiterrorism and force protection training that everybody else in the battle group did. The *Cole* excelled. She was the top ship in the battle group. If you need to have so many graduates of an antiterrorism and force protection school, she had more graduates than was required. She got letters of commendation from Second Fleet for her exercises and training when they were attacked doing terrorist drills.

She went to the Med. She went to the East Med. and fulfilled the TLAM requirements for the East Med., and she was scheduled to transit all by herself through the Suez Canal and the Red Sea to go into CENTCOM [Central Command] to fulfill CENTCOM's TLAM requirements. She transited the Suez Canal on the 10th of October, 2000, transited the Red Sea at 27 knots on the 11th of October, and pulled into Aden, Yemen on the morning of the 12th of October for a brief stop for fuel in the daylight—four hours.

While alongside the fueling dolphin at 12 o'clock noon while the crew was eating lunch, a small, open, flat-bottom Boston Whaler-type skiff, one of many that came alongside the *Cole*, came along the port side at mid-ship, with two men inside who detonated themselves, killing 17 people. Twenty-five others were seriously wounded, enough to be evacuated, and others were slightly wounded.

There were three investigations into the *Cole* attack. The FBI was charged with finding out who did it. The Navy conducted an investigation to determine the performance of the commanding officer and the crew. Secretary of Defense Cohen appointed Army General Bill Crouch and myself to investigate whether or not the system—big organization—whether or not the system did everything that it should have done to help the *Cole* conduct a safe transit by herself. As a matter of fact, the charter to us was not to investigate the *Cole*. Our charter was to investigate all independently transiting units. Even the North Dakota National Guard C141 that stops in Nairobi, Kenya for fuel, who is looking out after them? How about the Military Sealift Command tanker that got oil in Aden, Yemen 13 times in the previous 12 months? So that was our charter: we were looking at the big organization, so the parties to our investigation weren't the CO or the XO or the officer of the deck. The parties to our investigation were the Navy, the Joint Staff, the Central Command, and the DIA [Defense Intelligence Agency]. We like to say that ordinary rank and file people don't have anything to fear from us, but if you've got a secretary and a potted plant outside your office, then you do have something to worry about.

We conducted this review, and we were not happy with what we found. It turned out that the *Cole* was sent off on this mission and forgotten about. The system didn't do the *Cole* any favors. For example, why was the *Cole* going 27 knots through the Red Sea? Why, if she was to conduct an independent transit from one place to another place that's far apart, and there are no oilers in between, why don't you go at your most economical speed—16 or 17 knots?

The *Cole* was going 27 knots because European Command and Central Command could not agree on when the *Cole* should shift OPCON [Operational Control] from one theater to another. The staff officers, the junior officers—schedulers who thought that they were protecting their organization's best interest—they each insisted that the *Cole* should stay in their theater up until the last minute. They squeezed and squeezed and squeezed until the only way the *Cole* could execute the schedule was to go 27

knots. If she goes 27 knots, then she has no chance of making it to the oiler, and she must stop—even if the threat is high.

Now were these people criminal? Were they bad people? No, they weren't bad people. They were protecting the organization, at least they thought they were.

The rules and regulations of all unified commanders and their Navy components for port visits and brief stops are essentially the same. You go to the Op Order, and in the back of the Op Order is an in-port protection plan, and you select from among the measures that are offered back there, according to the THREATCON [Terrorist Threat Condition]. If you are in THREATCON Alpha, there are 25 measures. You pick out which ones apply to you. You send a message to your immediate senior in command that this is what I propose to do for my force protection while I am in this port. If you are in THREATCON Bravo, you have to do everything in Alpha plus Bravo. So the *Cole* did this.

Now the *Cole* worked up in one battle group when she was going to the Persian Gulf. She was going to report into a new battle group. They don't know each other. Never met each other. So the *Cole* sends off a message with its force protection plan, and the message is one sentence. It says, "In accordance with ref. A, I intend to do everything required under THREATCON Alpha and everything under THREATCON Bravo."

Well, of course, they couldn't. Of course, they weren't going to do everything in THREATCON Alpha and Bravo. Some of them didn't apply. Some of them are for nighttime. Some of them are for when you're tied up to a pier, like keeping automobiles off the pier. Some are for when you're at anchor, and of course, they weren't going to do all those things. There was no pier in Aden. They were going to be at a mooring dolphin. They were going to be there in the daytime, and it says post nighttime sentries and things like that. So, of course, they weren't going to do everything.

Well, no problem, right? Sending the message off to an admiral, who is the battle group commander. He'll catch it. The answer

comes back: Your plan is approved, but oh, by the way, you used the wrong reference. Now you see where the priorities are here? The individuals here, nobody was breaking any laws or anything like that, but they were trivializing the process. They had reduced the process down to its lowest common denominator. I send off a message. I get an answer back. Therefore, we are protected from terrorists.

As I indicated, the *Cole* excelled at her force protection and antiterrorism training, but it must not have sunk in, because they posted no useful sentries. They did none of the things that they said they were going to do in their training. Obviously, whatever the training program consisted of, it was filling boxes. It was fulfilling a requirement, and it wasn't sinking in. It wasn't having any kind of an impression on anybody.

Why didn't we get the training result we wanted to from a unit which had excelled? Why didn't we get the result? Well, our investigation found that they essentially had gone through the motions. In other words, they had determined the minimum that needed to be done, and they had trivialized the whole event.

Let me talk about the space shuttle Columbia for a second. The Columbia crashed while trying to reenter the Earth's atmosphere after the 113th shuttle mission. I didn't know there were 113 shuttle missions, with one previously unsuccessful one, Challenger, but the shuttle Columbia was attempting to reenter the Earth's atmosphere over Dallas-Fort Worth, Texas, going 10,000 miles an hour. At 207,000 feet, it broke apart. Left wing came off. Within hours after that, I got a call from the Deputy Administrator of NASA asking me to chair this investigation, and I said I would, and so we went to work.

Well, unlike the Challenger, which happened a few seconds after liftoff with lots of cameras pointing at it, and someone in a few hours saw a little puff of smoke where the two seals or the two segments of the solid rocket booster joined together, and they could tell the O-ring had failed, no one saw what happened to the Columbia. NASA doesn't track shuttles, you might be surprised to learn. There were a couple of amateur

photographers who were taking pictures of this streak going across Texas at sunrise, but there were no witnesses.

So how do we solve this problem? Well, we went to work, and essentially we created a small body of experts, who oversaw NASA doing the work. NASA actually did all the work, but I had 13 board members and 140 full-time investigators who were experts at aerodynamics, thermodynamics, flight dynamics, telemetry, data reduction modeling, simulation, and everything like that. We oversaw NASA doing the work, and we knew this was going to be a tough nut to crack. This was going to take weeks and weeks, if not months.

In the course of working closely with NASA engineers and NASA scientists as we tried to solve what had happened to the Columbia, we became aware of some organizational traits that caused our eyebrows to rise up on our heads. After not very long, we began to realize that some of these organizational traits were serious impediments to good engineering practices and to safe and reliable operations. They were doing things that took our breath away.

Since we had availed ourselves of world-class, Nobel-prizewinning experts in the physics and the science and the engineering side, we went out and got ourselves world-class experts in organizational behavior, risk management, assessment, and reliability. We got ourselves smart in the right way to handle risky enterprises. We also went out and looked at best-business practices, including the Navy's, by the way, in some cases. [We] learned a lot from the Navy. We built a template, applied it to the shuttle program, and were not satisfied with what we found, to say the least.

We concluded and put in our report that the organizational traits, the organizational faults, management faults that we found in the space shuttle program were just as much to blame for the loss of the Columbia as was the famous piece of foam that fell off and broke a hole in the wing. Now, that's pretty strong language, and in our report, we grounded the shuttle until they fixed these organizational faults.

Okay, do you hear an organization being threatened here? Remember what I said about what organizations do when they're threatened? Well, guess what? But now, see, I'm an old, battle-scarred investigator now, and I knew exactly what this organization was going to do. When we started talking about its behavior, it instinctively went into a defensive crouch, as predicted, and it started to trivialize all of the work that had been done.

Well, in order to understand a couple of the examples I'm going to give you, I need to give you the issue from the NASA point of view so you can understand the pressures that they were under. In doing so, I am now going to give you the information you need to award you a master's degree in management.

In a developmental program, any developmental program—whether it's a Joint Strike Fighter [JSF], the Virginia class submarine, or the Comanche helicopter, it doesn't make any difference—the program manager essentially has four areas to trade. The first one is money. Obviously, he can go get more money if he falls behind schedule. If he runs into technical difficulties or something goes wrong, he can go ask for more money.

The second one is quantity. You see the quantity argument quite clearly in the F-22 Raptor program, which started off at 800 airplanes, then went to 550 airplanes, and is now hovering at around 400 airplanes. You just buy fewer of these things.

The third one is performance margin. If you are in trouble with your program, and it isn't working, you shave the performance. You shave the safety margin. You shave the margins. You see that in the vertical-lift JSF right now. It's too heavy.

The fourth one is time. If you are out of money, and you're running into technical problems, or you need more time to solve a margin problem, you spread the program out, take more time. These are the four things that a program manager has.

If you are a program manager for the shuttle, the option of quantity is eliminated. There are only four shuttles. You're not

going to buy any more. What you got is what you got. If money is being held constant, which it is—they're on a fixed budget, and I'll get into that later—then if you run into some kind of problem with your program, you can only trade time and margin. If somebody is making you stick to a rigid time schedule, then you've only got one thing left, and that's margin. By margin, I mean either redundancy—making something 1.5 times stronger than it needs to be instead of 1.7 times stronger than it needs to be—or testing it twice instead of five times. That's what I mean by margin.

You can pick up your diplomas at the door on your way out tonight.

It has always been amazing to me how many members of Congress, officials in the Department of Defense, and program managers in our services forget this little rubric. Any one of them will enforce for one reason or another a rigid standard against one or two of those parameters. They'll either give somebody a fixed budget, or they'll give somebody a fixed time, and they forget that when they do that, it's like pushing on a balloon. You push in one place, and it pushes out the other place, and it's amazing how many smart people forget that.

The space shuttle Columbia was damaged at launch by a fault that had repeated itself in previous launches over and over and over again. Seeing this fault happen repeatedly with no harmful effects convinced NASA that something which was happening in violation of its design specifications must have been okay. Why was it okay? Because we got away with it. It didn't cause a catastrophic failure in the past.

You may think that this is ridiculous. This is hardly good engineering. If something is violating the design specifications of your program and threatening your program, how could you possibly believe that sooner or later it isn't going to catch up with you?

By the way, the solid rocket booster segment O-ring seal that caused the loss of the Challenger also leaked on at least 50 percent of the previous flights. For you and me, we would

translate this in our world into, “We do it this way, because this is the way we’ve always done it.” Have you ever heard that around here? The facts don’t make any difference to these people.

Well, where were the voices of the engineers? Where were the voices that demanded facts and faced reality? What we found was that the organization had other priorities, and I’m going to pull them together for you in a second. Remember the four things that a program manager can trade? This program manager had other priorities, and he was trading all right, and let me tell you how it worked. In the case of the space shuttle, the driving factor was the International Space Station. The first piece of the International Space Station was launched in November 1998 by a Russian Soyuz rocket. In 1999 and 2000, there were four missions each year, or eight missions to assemble the first parts of the International Space Station, so that by November of 2000, two years after the first module went up, the space station was inhabited by its first crew.

In January of 2001, a new administration takes office, and the new administration learns in the spring of 2001 that the International Space Station, after two years of effort, is three years behind schedule and 100 percent over budget. They set about to get this program back under control. An independent study suggested that NASA and the International Space Station program ought to be required to pass through some gates. Now, gates are definite times, definite places, and definite performance factors that you have to meet before you can go on. The White House and the Office of Management and Budget agreed to this procedure, and the first gate that NASA had to meet was called U.S. Core Complete. The name doesn’t make any difference, but essentially it was an intermediate stage in the building of the International Space Station, where if we never did anything more, we could quit then. The space station would be about 60 percent built, but it would have the modules there that the Italian, Japanese, Russian, and Canadian parts could plug into. That’s why it’s called the International Space Station. And the date set for Core Complete was February 2004. Okay, now this is the spring of 2001.

In the summer of 2001, NASA gets a new administrator. The new administrator is the Deputy Director of OMB, the same guy who just agreed to this gate theory. So now if you're a worker at NASA, and somebody is leveling these very strict schedule requirements on you that you are a little concerned about, and now the new administrator of NASA becomes essentially the author of this schedule, to you this schedule looks fairly inviolate.

Okay, so once again, let me ask you a question. Do you hear a threat to your organization here? If you don't meet the gate, the program is shut down. Now, if you were a NASA engineer, this is serious talk. It would be like saying if you don't win the Army-Navy game, we're going to close the Naval Academy. Okay, does that sound like a threat to your organization? Okay, well, they took it as a threat.

So off we go. Remember the options that I told you. If a program manager is faced with problems and shortfalls and challenges, if the schedule cannot be extended, he either needs money, or he needs to cut into margin. There were no other options, so guess what the people at NASA did? They started to cut into margins. No one directed them to do this. No one told them to do this. The organization did it, because the individuals in the organization thought they were defending the organization. They thought they were doing what the organization wanted them to do. There weren't secret meetings in which people found ways to make the shuttle unsafe, but the organization responded the way organizations respond. They get defensive.

We actually found the PowerPoint viewgraphs that were briefed to NASA leadership when the program for good, solid engineering reasons began to slip, and I'll quote some of them. These were the measures that the managers proposed to take to get back on schedule. He's only got four choices, right? There is no more money. There are no more shuttles. He can't sell a shuttle on eBay and get more money or something like that. So the only choice he has is margin.

These are quotes. One, work over the Christmas holidays. Two, add a third shift at Kennedy Shuttle turnaround facility. Three,

do safety checks in parallel rather than sequentially. Four, reduce structural inspection requirements. Five, defer requirements and apply the reserve, and six, reduce testing scope. I know you don't understand what that means about shuttle turnaround stuff, but I think you get the idea. They're going to cut corners. That's what they're going to do. Nevertheless, for very good reasons, good engineering reasons, and to their credit, they stopped operations several times, because they found problems in the shuttle, and they got farther and farther behind schedule.

Now, I'm sorry to make this a long shaggy-dog story, but it has a point. Then they did something which was really extraordinary. There were four shuttles. Three of them are identical, and they're lightweight. One of them, a Columbia, the original shuttle, the first shuttle, was very heavy. Because it was heavy, it could not carry anything to the International Space Station. It could get to the International Space Station. The inclination of the orbit, with respect to the equator, varies with the amount of weight that you can carry. It's easy to put things in orbit in the equator. It's very hard to put things in orbit in high inclinations. The International Space Station has a high inclination. The Columbia could reach the International Space Station, but it couldn't carry anything. Therefore, it had no value in assembling the International Space Station.

Because they were in such dire straits to meet this Core Complete gate, they decided to put the Columbia into the schedule anyway. After this mission, the ill-fated last mission of the Columbia, the Columbia was going to be slammed into an overhaul facility. Columbia wasn't even equipped with a docking port. They were going to put a docking port on it, and they could at least use the Columbia for crew swaps, even though they could not carry anything up.

The reason I tell you this story is because this mission of the Columbia, the one that was lost, had been delayed 13 times over two years, because it was the lowest priority thing that NASA was doing. Missions to the International Space Station were the highest priority. But after this mission is over, the Columbia is going to get modified, and the Columbia is crucial to the

completion of the International Space Station. Now, all of a sudden, if the Columbia has a problem, it becomes a big deal.

Well, two launches before the Columbia's ill-fated flight—it was in October—a large piece of foam came off at launch and hit the solid rocket booster. The solid rocket boosters are recovered from the ocean and brought back and refurbished. They could look at the damage, and it was significant. So here we have a major piece of debris coming off, striking a part of the shuttle assembly. The rules and regulations say that, when that happens, it has to be classified as the highest level of anomaly, requiring serious engineering work to explain it away. It's only happened six or seven times out of the 113 launches, at that time, 111 launches.

But the people at NASA understand that if they classify this event as a serious violation of their flight rules, they're going to have to stop and fix it. So they classify it as essentially a mechanical problem, and they do not classify it as what they call an in-flight anomaly, which is their highest level of deficiency.

Okay, the next flight flies fine. No problem. Then we launch Columbia, and Columbia has a great big piece of foam come off. It hits the shuttle. This has happened two out of three times. Now, we go to these meetings. Columbia is in orbit, hasn't crashed, and we're going to these meetings about what to do about this. The meetings are tape-recorded, so we have been listening to the tape recordings of these meetings, and we listen to these employees as they talk themselves into classifying the fact that foam came off two out of three times as a minor material maintenance problem, not a threat to safety, even though the regulations required them [to do that]. Why did they talk themselves into this? Because they knew that, if they classified this as a serious safety violation, they would have to do all these engineering studies. It would slow down the launch schedule. They could not possibly complete the International Space Station on time, and they would fail to meet the gate. No one told them to do that. The organization came to that conclusion all by itself.

What we have in the tape recordings is a perfect example of Gehman's Axiom Number 3: They trivialized the work. They demanded studies, analyses, reviews, meetings, conferences,

working groups, and more data. They keep everybody working hard, and they avoided the central issue: Were the crew and the shuttle in danger? [This was] a classic case where individuals, well-meaning individuals, were swept along by the institution's overpowering desire to protect itself. The system effectively blocked honest efforts to raise legitimate concerns. The individuals who raised concerns and did complain and tried to get some attention faced personal, emotional reactions from the people who were trying to defend the institution. The organization essentially went into a full defensive crouch, and the individuals who were concerned about safety were not able to overcome.

I would argue, and I've interviewed these people personally, I know who I'm talking about, that if these individuals who were concerned about safety had understood better how organizations naturally react when challenged, that they would have been able to cope with this better, and they would have found a way to get around the issue and get the attention this issue deserved.

I want to close with an event that happened to me, and I asked Admiral Trost's permission to tell this story before we went on the air here. When I wrote this, I didn't realize Admiral Trost was going to be here, but I asked his permission to tell this story, because he knows it's the truth.

When I was a Navy captain, I was the Executive Assistant [EA] to the Vice Chief of Naval Operations in 1989. Admiral Trost was the CNO, and I was the EA to the Vice Chief of Naval Operations, Admiral Bud Edney, and during that time, the investigation into the gun turret explosion on USS *Iowa* came to our desk. Secretary Dalton remembers this story too, even though he wasn't the Secretary at the time. By the time it came to us, I had no official role in this. I was just a paper pusher for the Vice Chief, and it was up there for the CNO to endorse, and the CNO asked the Vice Chief to take a look at it and do all the things that needed to be done.

So Admiral Edney, my boss, says, "You take this home this weekend. You're a surface warfare officer. You read this thing and tell me what you think." About two-thirds of this

investigation by volume was studies, analysis, tests, documents, testimony, and statements by people in the Navy and the Naval Sea Systems Command and the Ordnance Division testifying to the fact that the gunpowder could not possibly go off by itself.

Now, the reason why the system had to say that is because if they said anything else, that the gunpowder could go off by itself, that meant that the 16-inch guns on Navy battleships weren't safe, and the organization wasn't going to do that, now was it? The organization was defending itself, and so since the gunpowder couldn't possibly go off by itself, there could only be one explanation. Somebody did it on purpose.

So these investigators looked around. The whole gun crew, of course, was killed, and they found a person, some poor soul in the gun crew, who was a little bit different, and they said he must have done it, and that's what the report said. Mind you, I'm making a great generalization here. So I take this thing home, and I read it, and I come in the next day. I have no official status in this. My boss just asked me for my opinion, and I said, "Oh, my goodness. Look at all these studies. Look at all this documentation. I think they're right. Powder couldn't possibly have gone off. I think they're right. Somebody must have done something."

So the Navy's endorsement was that we aren't sure what happened, but most likely this poor, unfortunate sailor had done something dastardly and had set the thing off on purpose. Well, that isn't what happened. About a year later, a laboratory got the gunpowder to go off spontaneously, and a couple of lawyers pointed out to us that you couldn't have said that about that individual if he had been alive. You only said it because he was dead, and whether that's right or not, it's still not clear to me that we know what happened on the *Iowa*. I don't know. But [I failed] to recognize that what I was seeing here was the organization defending itself, the organization acting in a very predictable, very understandable way. If only I had been wise enough to realize that, I would have been a little bit more suspicious. That event has been burned into my skull since 1989. So now when people ask me to go inquire into how big

organizations act and what they do, I am scarred, and I'm really suspicious.

So in conclusion, are we doomed then? Are we all helpless because big organizations are going to run all over us and trample us into the earth? Absolutely not. Absolutely not. People do make a difference.

Let me give you a couple of pointers, a couple of observations. First, you need to recognize what is going on around you. Be observant. Watch how your seniors handle tough problems. Try to put yourself in your senior's position, and imagine how you would handle a problem, because some day you're going to have to. Don't think that this is some distant problem that is never going to come to rest on your doorstep. It certainly is.

Second, try and make yourself aware of those very, very few times when your organization really is threatened. You need to know the difference between all the daily little pushing and shoving, all the daily little problems, all the daily little discomforts that all organizations face, and the issues which are really considered to be threatening to the organization. Because on those issues which are truly threatening to the organization, the organization is going to behave in the ways that I've tried to explain to you tonight, and if you can recognize that, you'll be much better off.

Third, learn to be a bureaucratic guerrilla fighter. There is always more than one way to get things done. Like those engineers at NASA who could not get their point made, learn if you get stopped in one direction, you can still do the right thing by finding another way to get it done, even if your organization has become defensive and not interested in helping you out.

Fourth, stick to first principles. By first principles, I mean, essentially the right thing to do, but do the right thing because it's in your organization's best interest to do the right thing, not because you want to get in somebody's face, or you want to score a debating point with somebody. That won't get you anywhere. Use the organization's mission and the organization's principles as your best defense.

Last, never personalize an issue. You can be energetic. That's all right. But do not personalize the issue. Do not personalize the issue yourself, and do not allow the issue to become personalized into someone else. That never succeeds. Sooner or later, the issue is going to get resolved, and if the issue has become personalized, how it gets resolved could make you road kill, and that doesn't do anybody any good.

I don't want you going away from here thinking that all large organizations are evil, that you're doomed if you belong to a large organization, and that they're all going to go out and trample you to death. That certainly is not the case. We found wonderful cultural traits throughout NASA every place we went, a lot of good people trying to do the right thing. But I do hope you go out of here tonight a little bit more aware of the perfectly understandable and predictable way that organizations tend to behave when they are threatened or challenged. By being more aware of what's going on around you and being more aware of how these organizations behave, perhaps you'll be able to recognize the symptoms yourself, become part of the solution, and protect yourself from becoming a victim of it. You'll be able to handle yourself more productively. Perhaps you'll be able to do the right thing and help the organization find the answer to its problems.

I'd like to thank you all for your commitment to the service of your country. Thank you for your attention tonight. I believe we are in good hands. Thank you very much.



