Title of opinion piece:_____

What was the writer's lede? How did they set the scene?

What was the writer's opinion/argument/big idea?

What evidence did the writer use to support their argument?

What type of expertise did the writer draw upon?

Example of logos:

Example of ethos:

Example of pathos:

From Giant Leaps to Baby Steps

By Eugene F. Kranz

Published in the *New York Times*, August 3, 2005

Houston – To read and listen to the coverage about the space shuttle, you would think NASA's mission team has taken careless risks with the lives of the seven astronauts who went into space on the Discovery last Tuesday. During the launching, foam fell off the external tank. For the risk-averse, the only acceptable thing to do now is retire the shuttle program immediately and wait for the divine arrival of the next generation of spacecraft. I am disgusted at the lack of courage and common sense this attitude shows.

All progress involves risk. Risk is essential to fuel the economic engine of our nation. And risk is essential to renew American's fundamental spirit of discovery so we remain competitive with the rest of the world.

My take on the current mission is very straightforward. The shuttle is in orbit. To a great extent mission managers have given the spacecraft a clean bill of health. Let us remember that this is a test flight. I consider it a remarkably successful test so far.

The technical response to the Columbia accident led to a significant reduction in the amount of debris striking this shuttle during launching. Mission managers have said that the external tank shed 80 percent less foam this time than on previous launchings. Only in the news media, apparently, is an 80 percent improvement considered a failure. Rather than quit, we must now try to reduce even more the amount of foam that comes off the tank.

The instruments and video equipment developed to assess the launching and monitor debris falling from the tank worked superbly. For the first time, the mission team knows what is happening, when it is happening and the flight conditions under which it occurred. This was a major mission objective, and it is an impressive achievement.

Having spent more than three decades working in the space program, I know that all of the flights of the early days involved some levels of risk. Some of those risks, in hindsight, seem incomprehensible by today's timid standards. If we had quit when we had our first difficulties in Project Mercury, we would have never put John Glenn on the Atlas rocket Friendship 7 in 1961. Two of the previous five Atlas rockets test-fired before Friendship 7 had exploded on liftoff.

On Gemini 9, 10 and 11, all in 1966, we had complications with planned spacewalks that placed the astronauts at risk. Rather than cancel the walks, we faced the risks and solved the problems. These set the stage for Gemini 12 later that year, during which Buzz Aldrin spent more than five hours outside the capsule and confirmed to NASA that spacewalks could be considered an operational capability.

Eventually, this ability enabled astronauts to retrieve satellites and repair and maintain the Hubble space telescope; and during the current mission, spacewalks were used to repair a gyroscope on the International Space Station and will allow the crew to fix some of the damage that occurred during the launching. These are the rewards for the risks we took on those early Gemini flights.

I understand the tragedy inherent in risk-taking; I witnessed the fire aboard Apollo 1 in 1967 that killed three crew members. It filled us with anger at ourselves and with the resolve to make it right. After the fire we didn't quit; we redesigned the Apollo command module. During the Apollo missions that followed, we were never perfect. But we were determined and competent and that made these missions successful.

I see the same combination of anger, resolve and determination in the space shuttle program today. These people are professionals who understand risk, how to reduce it and how to make that which remains acceptable. Most important, the current mission has demonstrated the maturity of the shuttle team that endured the Columbia disaster and had the guts to persevere. This is the most important aspect of the recovery from the Columbia accident, and is a credit to the great team NASA now has in place, headed by its administrator, Michael Griffin.

There are many nations that wish to surpass us in space. Does the "quit now" crowd really believe that abandoning the shuttle and International Space Station is the way to keep America the pre-eminent space-faring nation? Do they really believe that a new spacecraft will come without an engineering challenge or a human toll? The path the naysayers suggest is so out of touch with the American character of perseverance, hard work and discovery that they don't even realize the danger in which they are putting future astronauts – not to mention our nation.

Op-Ed Contributor Eugene F. Kranz, author of "Failure Is Not an Option: Mission Control From Mercury to Apollo 13 and Beyond," is a former Apollo flight director.

Correction: August 4, 2005, Thursday An Op-Ed article yesterday about the need to take risks in space exploration misstated the year of John Glenn's flight in the Friendship 7 capsule. It was 1962, not 1961.

On Challenger Anniversary, We Need to do Better Remembering Lessons of Tragic Failures

Challenger and Columbia loom large in our memories. But NASA is not the only organization to forget what it learns from failures.

By Francisco Polidoro Jr.

Published in the *Fort Worth Star Telegram*, February 1, 2016

Wonder turned into horror on Jan. 28, 1986, when flaming debris rained from the skies above Cape Canaveral into the Atlantic Ocean. The space shuttle Challenger exploded soon after liftoff, claiming the lives of seven brave Americans.

On Feb. 1, 2003, Mission Control in Houston lost contact with space shuttle Columbia, and debris fell from the skies above Texas. The Columbia disintegrated during re-entry, taking the lives of all seven crew members. The investigations of both accidents found not only that they were preventable, but they were preventable for similar reasons.

How could an organization employing some of the nation's brightest minds fail to learn? As a researcher who studies why organizations keep making the same big mistakes, I can say it is not uncommon. But there are steps companies can take to learn from failures.

The Rogers Commission Report created by a presidential commission charged with investigating the Challenger disaster attributed the accident to flawed communication and decision-making processes. Although some individuals had concerns about a faulty component (O-rings), the decision to launch the shuttle did not take their views into account.

After the Challenger accident, NASA did take steps to correct flawed organizational processes. For example, it increased both the number and status of safety personnel, and it strengthened safety operating procedures.

We would think that after the Challenger explosion, a similar failure at NASA would not be an option. But learning waned as meeting deadlines and the desire to avoid launch delays became increasingly important.

This gradual forgetting was at the root of the Columbia disintegration. Once again, management started viewing potential problems as acceptable and shifted attention to launch schedules and cost-cutting measures.

Challenger and Columbia loom large in our memories. But NASA is not the only organization to forget what it learns from failures.

You probably remember the Deepwater Horizon drilling rig explosion in the Gulf of Mexico in 2010, an accident that killed 11 workers, injured 16 and caused an oil spill of

epic proportions. What you may not remember is that BP, the company at the center of this accident, had experienced another major failure a few years earlier — the Texas City Refinery explosion in 2005, which claimed 15 lives and injured 170 people.

Despite the recommendation of the Chemical Safety and Hazard Investigation Board for BP to focus on safety, court rulings related to the second explosion pointed to cost cutting despite safety risks.

Why organizations forget what they learn, even when stakes are high, is a complex problem involving many factors. External pressures to correct the situation that led to an accident and maintain safety as a priority lessen over time. The political agenda moves to other pressing issues. Regulators shift attention to another crisis. The media move to the next big news story.

Internally, avoiding new failures for a certain period creates a false sense of security in the organization. What used to be cause for concerns starts to be seen as normal. Attention shifts to other goals, such as launching new products or increasing sales. Cost-cutting measures resume. Employees leave the company, new executives take the helm.

These changes add up, and the organization gradually forgets what it has learned at great expense.

Learning from failures starts outside organizations; it starts with how we react to them. Tragic accidents should not result in a “Here we go again” attitude. Instead, they should instill a “Never again” resolve. Aware of organizations’ tendencies to forget, managers should remain especially vigilant in the promotion of a culture of safety. Communication channels should be open for employees to express safety concerns and help shape decision making.

NASA seems to have learned that a lull in high-visibility failures can cause its attention to shift to other pressing issues, such as costs or schedules. Leadership plays a critical role in keeping the entire organization alert to weak signals of danger. Learning such a lesson is a good way to pay tribute to the memory of the lives claimed by tragic accidents such as the seven Challenger heroes we lost 30 years ago. Let’s not disappoint them.

Francisco Polidoro Jr. is an associate professor of management at the McCombs School of Business at The University of Texas at Austin.

It Is Time to Call the Shuttle Obsolete

By T.A. Heppenheimer

Published in the *Los Angeles Times,* January 29, 1986

"Oh, it's flashing, it's flashing terribly. It's bursting into flames and falling on the mooring mast. Oh, this is one of the worst catastrophes – the flames are leaping 400,000 feet into the sky. It's a terrific crash, ladies and gentlemen, the smoke and the flames. And now it's crashing to the ground, not quite at the mooring mast. Oh, the humanity!"

Those were the words of radio announcer Herb Morrison as he witnessed the explosion of the dirigible Hindenburg in 1937. The explosion of the Challenger will have similar significance. The Hindenburg exposed the flaws in the dirigible as a passenger carrier, showing it to be an obsolete technology that could not compete with its rival, the airplane. The Challenger disaster, in turn, will point to the shuttle as a technology that is not only obsolete but also irrelevant.

Challenger points out the folly that NASA has been pursuing for nearly 30 years: not to provide the nation with the routine and reliable space-launch services that it needs, but to pursue a sequence of showy space spectaculars. The result has been the Apollo and shuttle programs, which have stood largely as monuments to themselves. By contrast, the routine launching of useful satellites has taken a back seat.

Remarkably, NASA has deliberately given itself no alternative to the shuttle for launching satellites. All its satellite launching capability has been in four shuttle orbiters – one of which has now blown up. Inevitably, then, many important satellites will sit on the ground for months, or even years, as investigations and studies take up much of NASA's time.

The Europeans have not been so foolish. They have the Ariane, an unmanned rocket that they have been launching with good success. It has had failures, but those problems have not brought the sort of national grief that we associate with presidential assassinations. NASA used to have a stable of similar unmanned rockets, but it gave them up, putting all its eggs into the shuttle basket. The usefulness of such rockets as well as the folly of using expensive and rare shuttle spacecraft for routine satellite launches now is clear. NASA has said that beyond the shuttle the "next logical step" is the space station. Instead, it should be clear that the next logical step is to face up to the limits of the shuttle as a technology. With its rockets, it can only carry 1 ½% of its takeoff weight to orbit as passengers or cargo.

This highly marginal performance represents the best that can be done with rockets, even in their current advanced state of development. Thus from the Challenger disaster we should gain determination to go beyond the rocket and to build airplane-like craft to fly to orbit.

The Air Force currently is pursuing the development of its advanced aerospace plane, which will fly like an airplane from a runway, breathing oxygen taken from the air. This contrasts with the shuttle, which carries more than 600 tons of liquid oxygen in a fuel tank. The aerospace plane will rely on new engines called scramjets, with up to 10 times better performance than the rocket. With these engines, space flight may in time become as routine as the flight of aircraft. A space launch will no longer be a media event. Its failure will not bring national mourning.

Nevertheless, Challenger's loss will not be in vain if it leads NASA into a major change of course.

NASA must abandon its exclusive reliance on the shuttle, saving those valuable craft for the rare occasions when they are indispensable. NASA must return to the tried and true unmanned rocket, thus assuring the nation that it can launch our satellites reliably and routinely. And NASA must look beyond the rocket, seeking its eventual replacement. Then, like the Hindenburg, Challenger may someday be remembered as having marked the advent of newer and better methods of flight.

T.A. Heppenheimer, who holds a Ph.D. in aerospace engineering, is a science writer in Orange County.

The Seven Died in a Noble Pursuit

By James Carroll

Published in the *Boston Globe*, February 4, 2003

The brave astronauts who lost their lives Saturday were pressing the literal limit of what separates the earth from all else that is. In dying, they remind us of the primordial truth that human beings exist to press such limits, even knowing that the results are often tragic. Space flight has been tamed no more than the human project has itself been purged of risk. When women and men consciously defy that risk for the sake of the universal impulse to know and to find, and when they then die doing so – we, the rest of their kind, rightly respond as one family, honoring them as exemplars of human nobility.

The vast blue in which the Columbia crew died has always drawn the human gaze in the quest for something more. Surely that is why from the beginning, humans have populated the sky with angels, gods, and heroes. In our own time the sky has gone from being the place out of which fire falls – the realm of bombs and missiles – to the place in which the earthly borders over which wars are fought become invisible and therefore meaningless.

That, after all, was the "Earthrise" epiphany, the picture taken by the moon walkers a generation ago of the blue-green ball hanging in the void, our fragile planet as an oasis of life and hope in an indifferent cosmos. Then, marvel of marvels, didn't that borderless dream of one earth become institutionalized in the joint Russian-American space station, which Columbia and other shuttles regarded as an outermost home?

Space exploration defined the Cold War at its most dangerous – from Sputnik in 1957, announcing the Soviet capacity to rain H-bombs on the United States, to JFK's retaliatory race to the moon, which sparked a final American military dominance. Ultimately, a counterimpulse rooted in common humility before the vast unknown led Washington and Moscow to cross an even bolder space frontier – into a realm of cooperation. Transforming "throw weight" and "force projection," the enemies became partners in the very enterprise that had most endangered the earth.

That partnership is enshrined in the space station where even now a Russian and two Americans face perilous uncertainty after the Columbia disaster. Their common plight reminds us that in nothing was the reversal of the Cold War more absolute than the transformation of space from nationalistically demarcated battlefield to transnational field of human investigation. That good tradition was being honored last week by the presence of Israel's lone astronaut aboard the Columbia, a successor to participants from other nations.

One of the things that makes the sky newly dangerous is the resurgent temptation to elevate armed borders into the air and beyond, a reiteration of the ancient trumping of the human with the tribal. That impulse is reflected in initiatives sponsored by Defense

Secretary Donald Rumsfeld toward a militarization of space under the so-called US Space Command.

Defying a nearly unanimous UN consensus, the Pentagon is staking claims on the "high frontier," a corollary of current US strategies toward global military dominance. The Bush administration's missile defense program is the first stage of this expansion. Space-based laser weapons, "sentry satellites," orbiting "kill vehicles," plutonium-powered space probes – all an appalling, if little-noted, coming of age of Star Wars. Nothing would more thoroughly betray the humane spirit of the Columbia astronauts than a retreat from international space partnership for peace in the name of one nation's space-based hegemony. That it would be America's only makes the very thought of such betrayal more grotesque.

Today, in the formal memorial service for the lost Columbia astronauts in Houston, and in the coming days of mourning and reflection, our nation's heart will be full. Again and again, we will see, in the broadcast image, the blue sky cut by the white arc of sudden devastation. We will see the faces of the dead men and women, of their bereaved families. We will see faces of newly stunned Israelis.

And what will all of this prompt in the American heart? Will we come out of this grief more alive to the fragility of all human life, and therefore to its preciousness? Will we recognize in the world outpouring of empathy a signal that international commonality must now transcend every narrow notion of "national security?"

When our eyes drift skyward today, what will we see? What about the refusal of the very air, not to mention outer space, to define itself by anything but the color blue? The dense, deep, endless blue in which, as our noble astronauts keep telling us, the exquisite planet Earth hangs – hangs there without even a thread to hold it up.

All that this lovely sphere hangs by in the otherwise indifferent void is human courage. May those who have just taught us this again rest in peace.

James Carroll's column appears regularly in the Globe.