A photograph of the Space Shuttle Columbia in orbit above Earth. The shuttle is on the left, with its white orbiter and black external tank and solid rocket boosters visible. The Earth's blue and white clouds are on the right. The text is overlaid on the right side of the image.

# *Countdown to Leadership, Teamwork, & Safety*

**by Astronaut Mike Mullane**

**[www.MikeMullane.com](http://www.MikeMullane.com)**

**Author of *'Riding Rockets'***





**T-6 seconds**



**T-0 (zero)**





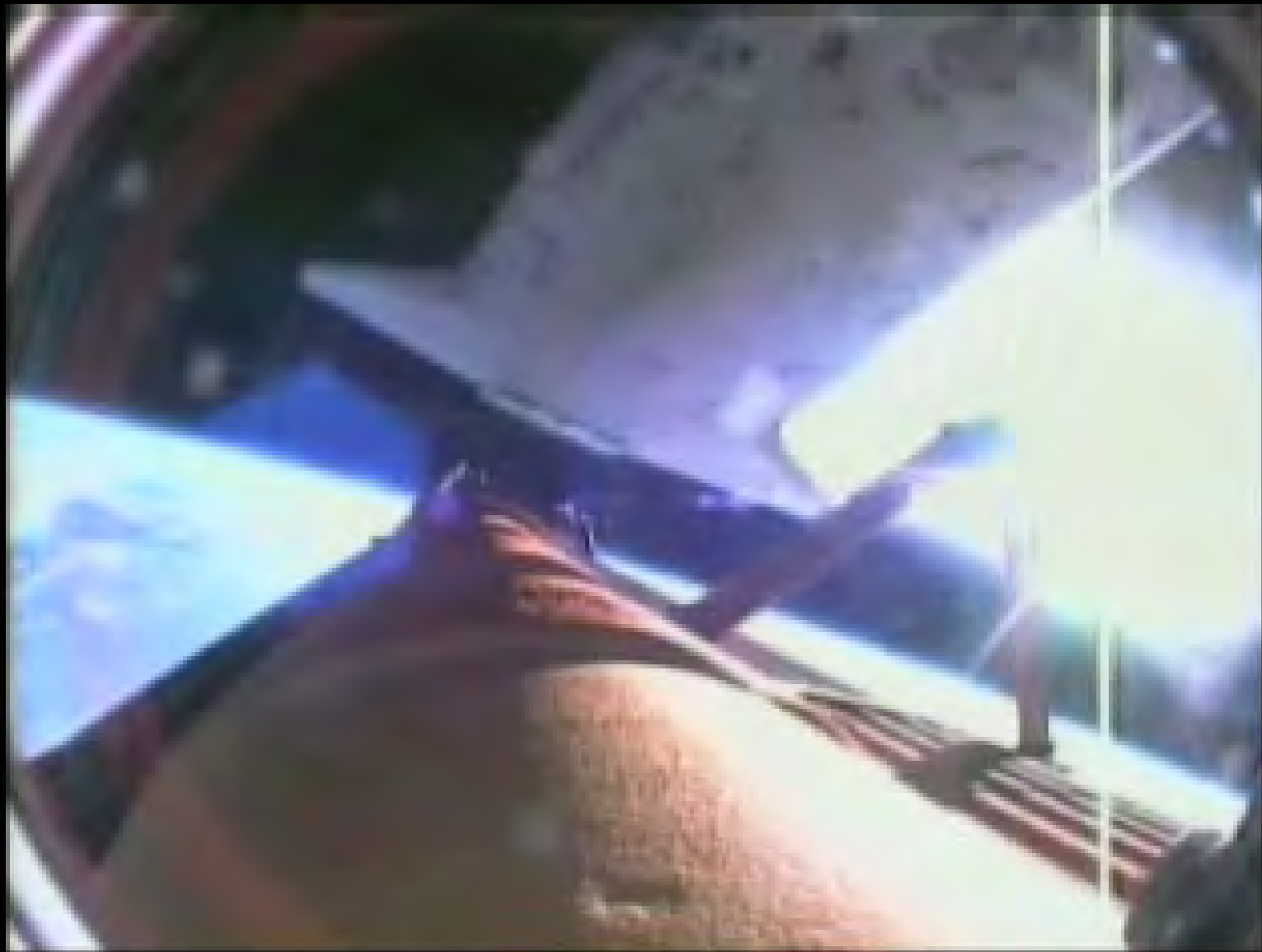
**T + 2 min 12 secs**





**T + 8 min 30 secs**







**Sandra Bullock**

**George Clooney**

A photograph of the Space Shuttle Atlantis in orbit over a tropical island. The shuttle is oriented vertically, with its nose pointing towards the top of the frame. The island below is lush green with a clear turquoise lagoon. The background is the deep blue of Earth's atmosphere with scattered white clouds. Two white text boxes with red text are overlaid on the image. The top box contains the text "World Class in Safety" and the bottom box contains "World Class in Leadership & Teamwork". Both phrases are underlined.

**World Class in Safety**

**World Class in Leadership & Teamwork**

# Safety Values

**Beware of normalization of deviance.**

**Own your responsibilities.**

**Be accountable to the 'good'.**

**Continuous self-improvement.**

A background image of an astronaut in a blue spacesuit floating in space, with the Earth's blue and white clouds visible in the background.

**Values define who we are.**

**We don't live our values  
because we are told to do so.**

**We are fiercely self-motivated to live our values.**

# Safety Values

**Beware of normalization of deviance.**

**Own your responsibilities.**

**Be accountable to the 'good'.**

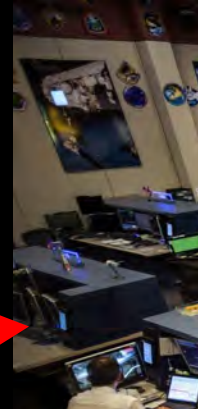
**Continuous self-improvement.**

**This is** **You are more than a team.** **matter.**  
**You are a family.**



**Failure is not an option.**

**The families of your team members.**



**Mission Control**

A background image showing a view of Earth from space, with blue oceans, white clouds, and brownish landmasses. The perspective is from an elevated angle, looking down at the planet's surface.

# Safety Values

**Beware of Normalization of Deviance.**

# Normalization of Deviance

Diane Vaughan, 'The Challenger Launch Decision'

**Repeatedly deviating from best practices until that behavior becomes your new 'normal'.**

## Pressure

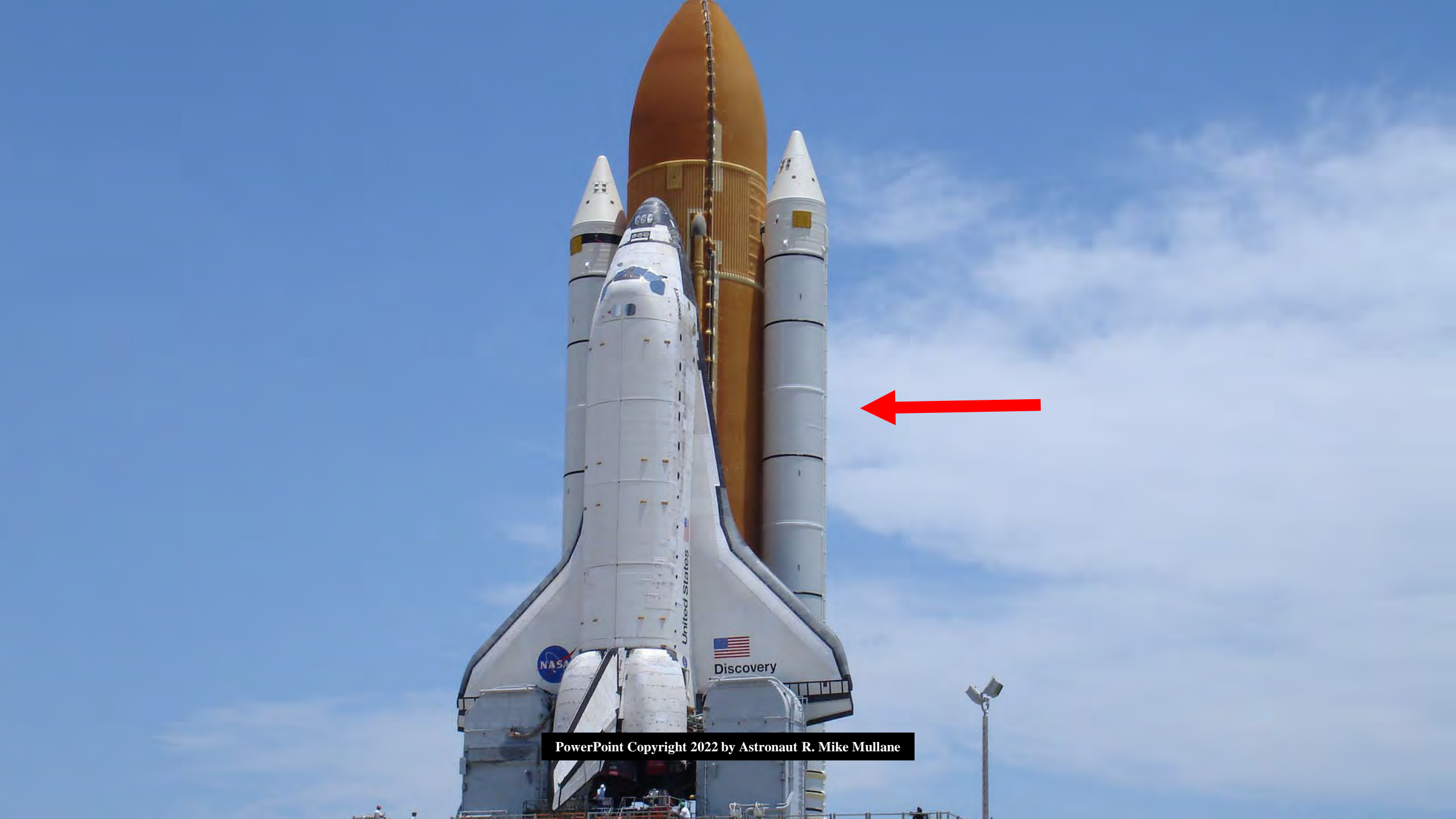
The background of the slide is a dark space scene. A bright, glowing light source, possibly the sun, is positioned in the upper left, creating a wide, diagonal beam of light that stretches across the frame. The light has a soft, ethereal quality with some lens flare effects. In the lower right quadrant, a thin, white crescent moon is visible against the dark background. The overall mood is mysterious and somewhat ominous, fitting the 'Worse Nightmare' theme.

# **P Worse Nightmare e**

A photograph of the Space Shuttle Challenger during its ascent on January 28, 1986. The image shows the massive white plume of smoke and steam trailing behind the orbiter and external tank, set against a clear blue sky. The shuttle is angled upwards, and the plume is dense and billowing.

# **Predictable Surprise**

**Challenger, Jan 28, 1986**

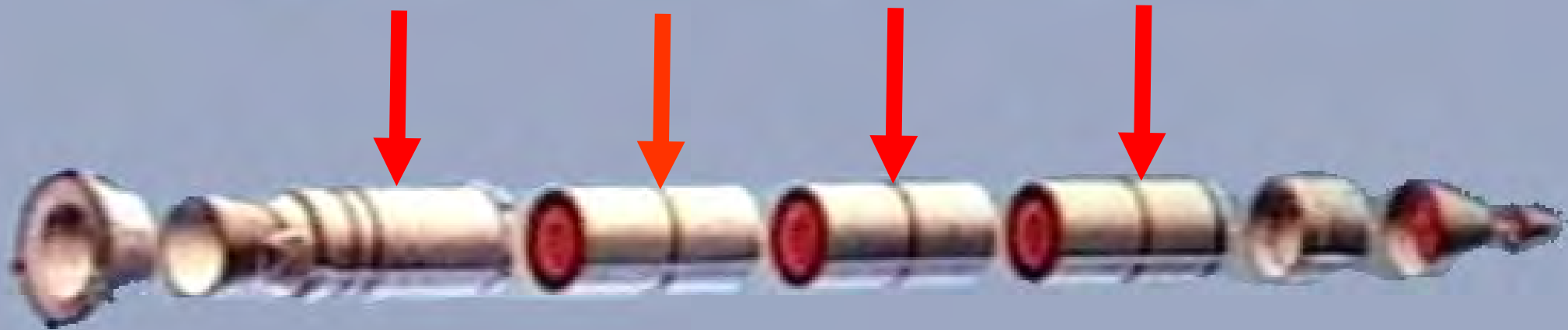


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**150 ft long**

**12 ft diameter**

**1.3 million pounds**



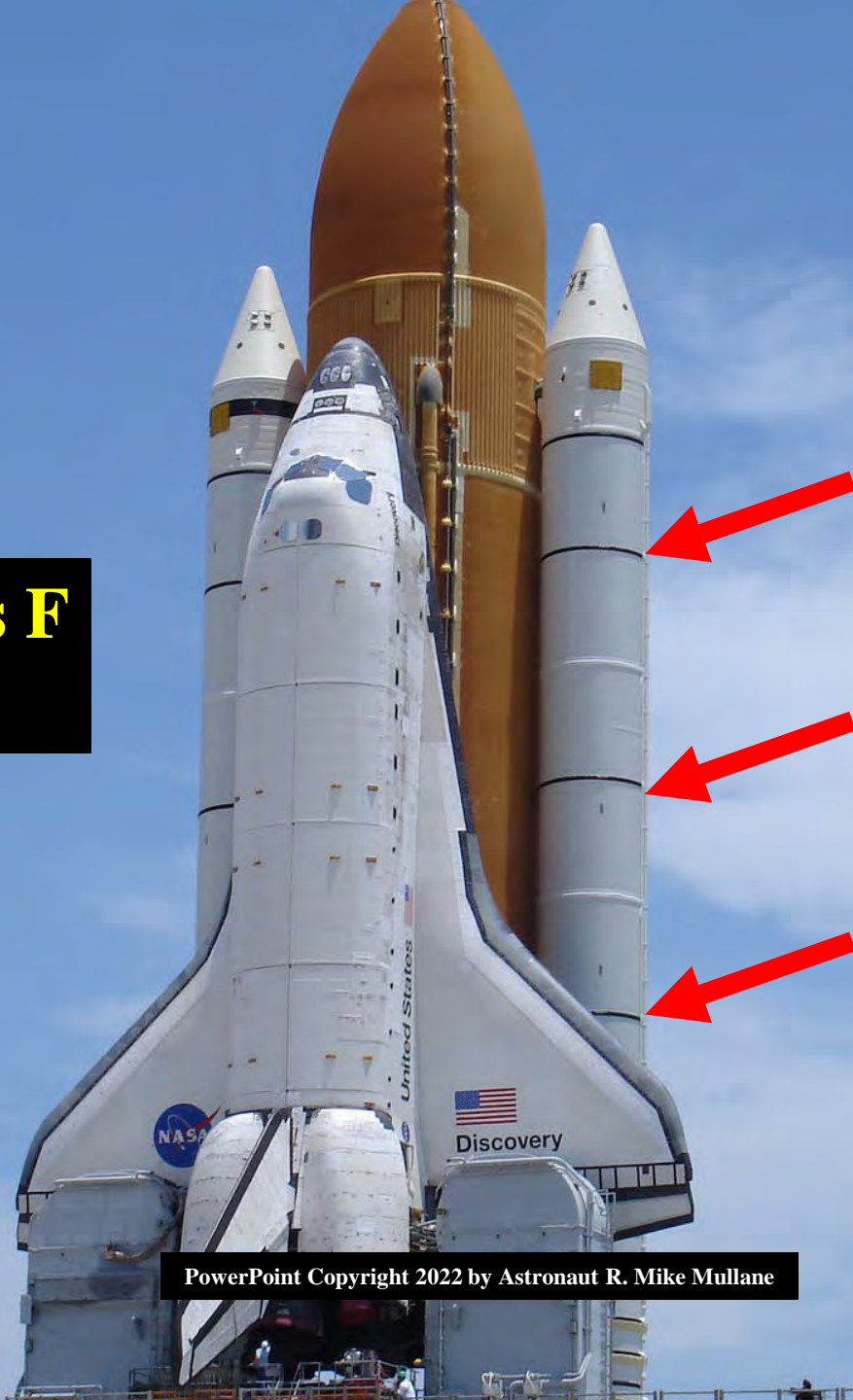




**Bolt Holes**

**Gap filled with fire-proof putty.**

**5000 degrees F**  
**1000 psi**





**Approx .25 inch thick O-ring**

**12 ft diameter**

**Redundant O-rings**







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# **Predi Accident rprise**

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**.053 inch O-ring burn erosion found after STS-2**

**...the first of 9 pre-Challenger missions  
to reveal serious O-ring anomalies.**

**Thiokol memo dated July 31, 1985**  
**(6 months prior to Challenger)**

**“It is my very real fear, if we do not take immediate action to solve the O-ring problem, we stand in jeopardy of losing a flight, a crew, and all the launch pad facilities.”**



# Predictable Surprise

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# O-ring Design Risk Analysis Document

SRB CRITICAL ITEMS LIST		Sheet: 1 of 2
Subsystem: <u>SOLID ROCKET BOOSTER</u>	Criticality Category: <u>1</u>	Reaction Time: <u>immediate to Sec.</u>
Item Code: <u>10-01-01</u>	<b>Criticality 1</b>	
Item Name: <u>*Case, P/N (See Retention Rationale) (Joint Assys, Factory P/N 1U50147 Field: 1U50747)</u>		
No. Required: <u>'...single failure point...'</u>	Date: <u>December 17, 1982</u>	
FATEA Page No.:	Analyst: <u>Garber</u>	
Critical Phases: <u>Boost</u>	Approved: <u>[Signature]</u>	
Failure Mode & Causes: <u>Leakage at case assembly joints due to redundant O-ring seal failures or primary seal and leak check port O-ring failure.</u>		
NOTE: <u>Leakage of the primary O-ring seal is classified as a single failure point due to possibility of loss of sealing at the secondary O-ring because of joint rotation after motor pressurization.</u>		
Failure Effect Summary: <u>Actual Loss - Loss of mission, vehicle, and crew due to metal erosion, burnthrough, and probable case burst resulting in fire and deflagration.</u>		
Case, P/N <u>1U50129, 1U50131, 1U50130, 1U50185, <del>1U501473</del>, 1U50715, 1U50716, 1U50717</u> <u>1U51473</u>		
A. DESIGN		
The SRM case joint design is com... uses having identical dimensions. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside to reduce the total clevis gap for the loss of concentricity due to gathering and to reduce the total clevis gap designed to		

**Loss of mission, vehicle and crew...**

# O-ring Design Risk Analysis Document

## SRB CRITICAL ITEMS LIST

Sheet: 1 of 2

Time to Sec. Immediate

**Define risk RED LINES**

**O-ring Damage is Intolerable**

**Safety Best Practice:  
Flight Suspension**

### RATIONALE FOR RETENTION

Case, P/N 1U50129, 1U50131, 1U50130, 1U50185, ~~1U501473~~, 1U50715, 1U50716, 1U50717  
1U51473

#### A. DESIGN

The SRM case joint design is common to all SRM cases having identical dimensions. The SRM joint uses centering clips which are installed on the tang O.D. and the outside of the case to reduce the total clevis gap and to reduce the loss of concentricity due to gathering and to reduce the total clevis gap designed to



**4-YEARS**

**23 MISSIONS**

**9 missions with O-ring deviances**



**STS-2**  
**Near Miss**

**Identical Failure Mode**

**STS-25**  
**7 Dead**

The background of the slide is a dark space scene. A bright, glowing light source, likely the sun, is positioned in the upper left, creating a wide, diagonal beam of light that stretches across the frame. The light has a soft, ethereal quality with some lens flare effects. In the lower right quadrant, a thin crescent moon is visible against the dark background. The overall color palette is dominated by deep blues, blacks, and the bright white/yellow of the light source.

**Pressure**

**Launch Schedule Pressures**

**President Nixon, 5 January 1972:**

**...reliable and versatile...**

**...replace all present launch vehicles...**

**...cost to taxpayers one-tenth of current rockets...**

# The Reality

**Aircraft-like qualities:**

**Launch rate 24 missions/year.**

**Reuse-ability**

**Reliability**

**Maintain-ability**

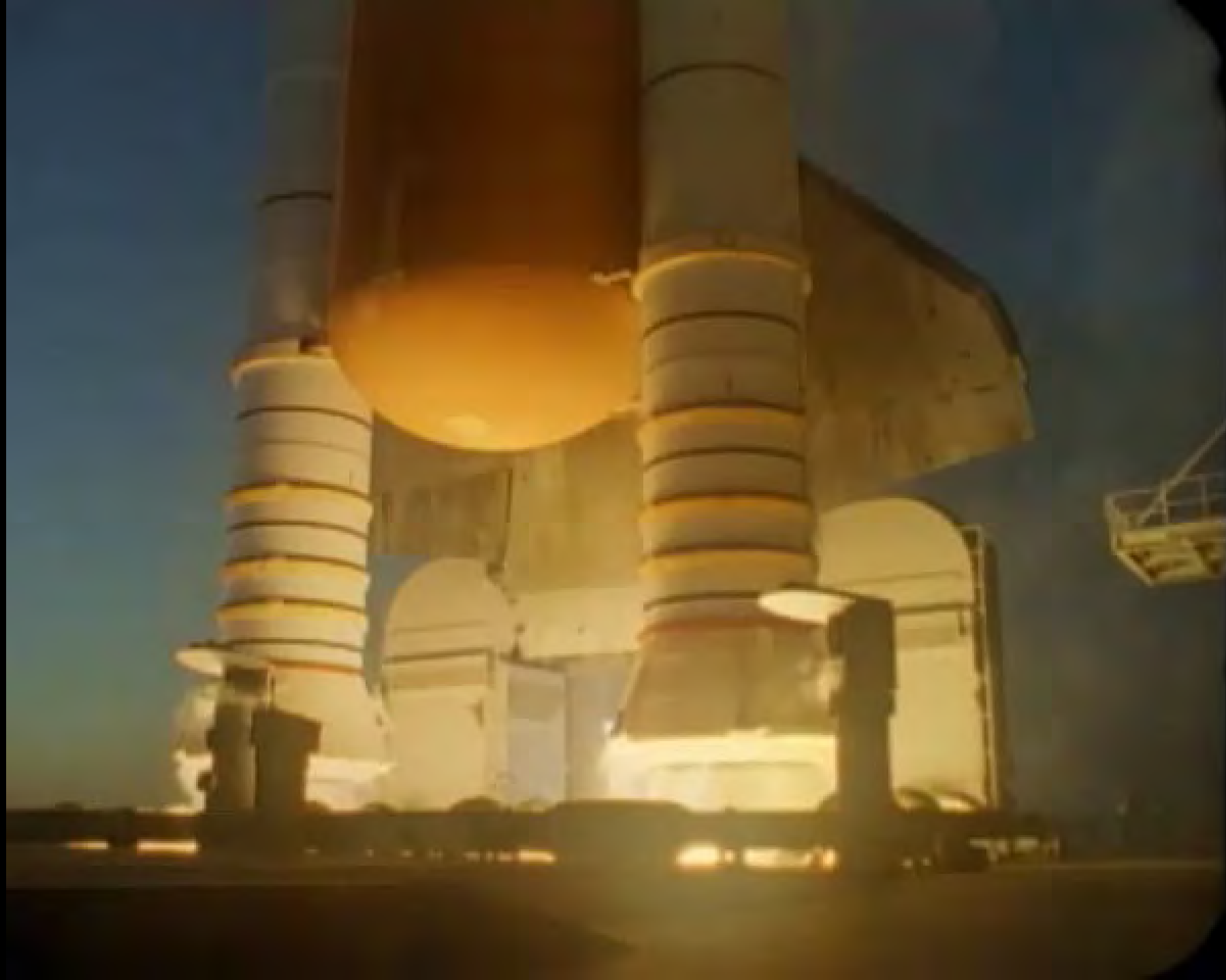
**Turn-ability**

**Affordability**

**Safety**







## **Roger's Commission Contractor Testimony:**

**“The problem was the increasing launch rate. We were just getting buried under all this stuff...The system was about to come down under its own weight...”**

**Max launch rate:  
11 missions in a 12-month period.**

The background of the slide is a dark space scene. A bright, glowing light source, possibly the sun, is positioned in the upper left, creating a wide, diagonal beam of light that stretches across the frame. In the lower right, a thin crescent moon is visible against the dark sky. The overall atmosphere is dramatic and high-contrast.

**You are under intense time-critical pressure.**

**Temptation to shortcut your best practices.**

# What to do?

**Revert to your training.**

**Invoke best practices.**

**Stop at your risk red lines.**

**NASA: Shuttle flight suspension.**

**Accept deviances from best practices to maintain schedule.**

**The pain of a 'Stop Work' call is real and immediate.**

**The disaster that may result by accepting deviance is hypothetical and distant.**

**Teams succumb to pressures and step over risk red lines.**



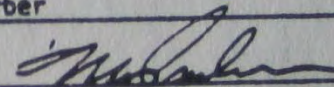
## **Modified Assembly Process**

**Expanded the performance envelope of the O-ring.**

**Damage of less than approx 0.10 inch will not be catastrophic and damage that large will never occur.**

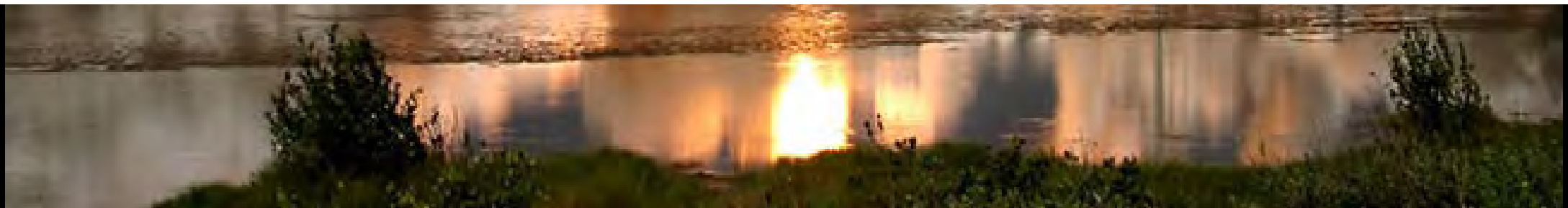
**Implication: There is 'margin' in the performance of the O-rings.**

# O-ring Design Risk Analysis Document

SRB CRITICAL ITEMS LIST		Sheet: <u>1</u> of <u>2</u>
Subsystem <u>SOLID ROCKET BOOSTER</u>	Criticality Category <u>1</u>	Reaction Time <u>Immediate to Sec.</u>
Item Code <u>10-01-01</u>	Page <u>A-6A</u>	Revision: _____
Item Name <u>(Joint Assys, Factory P/N 1U50147 Field: 1U50747)</u>	Date: <u>December 17, 1982</u>	Analyst: <u>Garber</u>
No. Required <u>1 (11 segments, 3 Field joints, 7 plant joints)</u>	Approved: 	
FMEA Page No. <u>A-4 of MSFC-RPT-724</u>		
Critical Phases <u>Boost</u>		
Failure Mode & Causes: <u>Leakage at case assembly joints due to redundant O-ring seal failures or primary seal and leak check port O-ring failure.</u>		
NOTE: <u>Leakage of the primary O-ring seal is classified as a single failure point due to possibility of loss of seating at the secondary O-ring because of joint rotation after motor pressurization.</u>		
Failure Effect Summary <u>Actual Loss - Loss of mission, vehicle, and crew due to metal erosion, burnthrough, and probable case burst resulting in fire and deflagration.</u>		
RATIONALE FOR RETENTION		
Case, P/N 1U50129, 1U50131, 1U50130, 1U50185, <del>1U50147</del> , 1U50715, 1U50716, 1U50717 <u>1U50747</u>		
A. DESIGN		
The SRM case joint design is compared to other SRM cases having identical dimensions. The SRM joint uses centering clips which are installed in the tang O.D. and the outside of the case to reduce the total clevis gap and to reduce the loss of concentricity due to gathering and to reduce the total clevis gap designed to		



**O-ring damage is slowly becoming 'expected'.**



The background of the slide is a dark space scene. A bright, glowing light source, likely the sun, is positioned in the upper left, creating a lens flare effect that streaks across the frame. In the lower right, a thin crescent moon is visible against the blackness of space.

**In April 1984, Contractor manager recommended to NASA managers:**

**“Fly STS-11, accepting the possibility of some O-ring erosion due to hot gas impingement.”**

# **The Challenger Launch Decision**

**by Diane Vaughan**

**“Between 1981 and 1984...Four times, an incident that first was seen as a deviant event was reinterpreted as nondeviant...”**

# Risk Ceiling

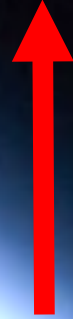
440 APPENDIX B

CRITICAL ITEMS LIST ENTRY, SOLID ROCKET BOOSTER, CRITICALITY 1

SRB CRITICAL ITEMS LIST		Sheet: 1 of 2
Subsystem	SOLID ROCKET BOOSTER	Immediate Action Time to Sec.
Item Code	10-01-01	
Case, P/N (See Retention Rationale)		
Item Name (Joint Assys, Factory P/N IUS0147 Field: )		
No. Required	1 (1) segments, 3 Field joints	17, 1982
FMEA Page No A-4 of MSFC-RPT-724		Garber
Critical Phases	Boost	Approved: <i>[Signature]</i>
Failure Mode & Cause	redundant O-ring seal failures or primary seal and	
Leak check or	classified as a single failure point due to possibility of loss of	
NOTE: Leaking at joint rotation after motor pressurization.	sealing at joint rotation after motor pressurization.	
Failure Effect Summary	loss of mission, vehicle, and crew due to metal erosion, burnthrough, and	
probable case of	in fire and deflagration.	
RATIONALE FOR RETENTION		
Case, P/N	IUS0129, IUS0131, IUS0130, IUS0185, <del>IUS0147</del> , IUS0715, IUS0716, IUS0717 IUS0473	
A. DESIGN	The SRM case joint design is common in the lightweight and regular weight cases having identical dimensions. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside diameter of the clevis. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside diameter of the clevis. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside diameter of the clevis.	

**Best Practices**

**Future Risk Justification**



**Past Success with Risk Taking**

**Experience Base**

**Normalization of Deviance**

# The Costs:

**Seven Families Destroyed**

**A lifetime of agony for those closest to the flawed decision-making.**

**Team failure to comply with  
established safety best practices**

**What do we learn from the Challenger disaster?**

**NASA's Glorious Apollo Reputation Vaporized**

# **LESSON 1:**

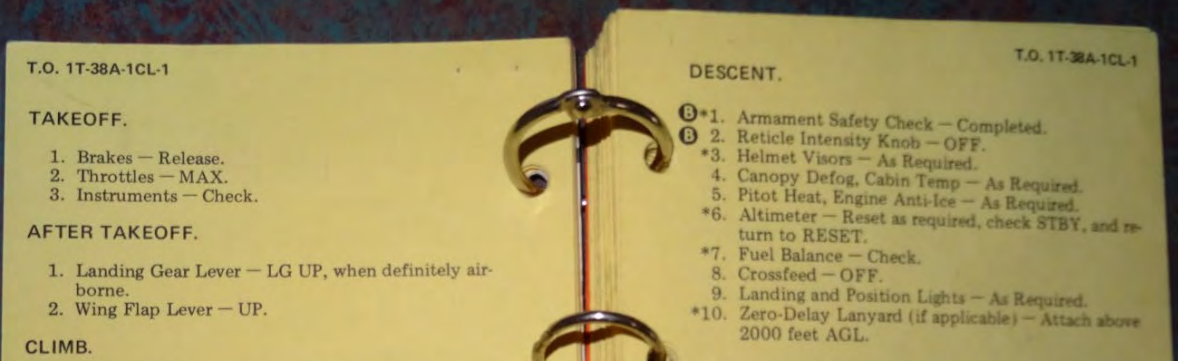
**Risk has no memory.**

**Risk is not diminished as a function of your success in repeatedly taking a risk.**

## **LESSON 2:**

**Procedural compliance should be a religion.**





**Procedures for operations in hazardous environments are figuratively written in blood.**





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**Procedures for your operations  
are figuratively written in blood.**

## **LESSON 3:**

**There is never a 'one-and-done' when it comes to deviance from best practices.**

**You can't 'un-experience' your success at taking a risk.**

# Risk Ceiling

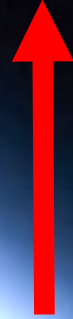
440 APPENDIX B

CRITICAL ITEMS LIST ENTRY, SOLID ROCKET BOOSTER, CRITICALITY 1

SRB CRITICAL ITEMS LIST	
Subsystem	SOLID ROCKET BOOSTER
Item Code	10-01-01
Case, P/N (See Retention Rationale)	
Item Name (Joint Assys, Factory P/N)	1U50147
No. Required	1 (11 segments, 3 Field)
Analysis Date	December 17, 1982
FMEA Page No. A-4 of MSEC-82-001	
Critical Phases	Booster
Failure Mode	Leakage due to redundant O-ring seal failures or primary seal and
Test	Leakage test. This item is classified as a single failure point due to possibility of loss of
Loss	Loss - Loss of mission, vehicle, and crew due to metal erosion, burnthrough, and
Resulting in	resulting in fire and deflagration.
RATIONALE FOR RETENTION	
Case, P/N	1U50129, 1U50131, 1U50130, 1U50185, <del>1U50147</del> , 1U50715, 1U50716, 1U50717 1U50473
A. DESIGN	The SRM case joint design is common in the lightweight and regular weight cases having identical dimensions. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside. The SRM joint uses centering clips which are installed in the gap between the tang O.D. and the outside.

**Your Best Practices**

**Future Risk Justification**



**Past Success with Risk Taking**

**Experience Base**

**Normalization of Deviance**

## **LESSON 4:**

**Capitalize on Near-Misses.**

**Look beyond the obvious.**

**Be curious. Be questioning.**

A photograph of the Space Shuttle Challenger being launched from the Kennedy Space Center. The shuttle is ascending vertically, leaving a long, dark trail of smoke and fire. The launch is taking place at dawn or dusk, with the sun low on the horizon, creating a bright, hazy glow in the sky and reflecting off the water in the foreground. The overall scene is dramatic and captures the power of the launch.

**Look beyond the obvious.**

**Be curious. Be questioning.**

**STS-12 August, Temp 80s**

**STS-12  
1984**

A photograph showing a close-up view of the Space Shuttle Challenger during its flight. The shuttle is oriented vertically, and the external tank and boosters are visible. The most striking feature is the presence of long, thin icicles hanging from the edges of the orbiter and the external tank, indicating extremely cold temperatures. An American flag is visible on the side of the orbiter. The background is a clear blue sky.

**Challenger  
January, Temp 30s**

The background of the slide is a dark space scene. A bright, glowing light source, likely the sun, is positioned in the upper left, creating a wide, diagonal beam of light that stretches across the frame. The light has a soft, ethereal quality with some lens flare effects. In the lower right quadrant, a small, thin crescent moon is visible against the dark background. The overall mood is contemplative and serene.

## **LESSON 5:**

**Maintain a strong sense of vulnerability.**

**The 20-20 clarity that comes in the study of past disasters can erode our sense of vulnerability.**



**It can't happen to me.**

**I'm different.**

**I'm better.**

**I'm smarter.**

**I wouldn't have made these mistakes.**

**I wouldn't have made these decisions.**



**Normalization of Deviance.....  
It can happen to you!**

**13 years**

# My Missions



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# Maiden flight of Orbiter Discovery



**STS-12**  
**1984**

**August 30, 1984**





**STS-27**  
**1988**

**December 2, 1988**











**Billy Joel**



**Christie Brinkley**



**STS-36**  
**1990**

**February 28, 1990**



A black and white photograph showing a large, saucer-shaped object in the sky, viewed from a balcony with a railing. The object is dark and has a distinct, flat, circular appearance. The background shows a cityscape with buildings and a street. The image is framed by a black border.

# UFOs and Aliens

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**200,000,000,000,000,000,000**

**two-hundred billion trillion**

**10,000 stars for every grain of sand on the earth.**

A background image of an astronaut in a white spacesuit floating in space against a blue sky. The astronaut is positioned in the upper right quadrant, with their arms and legs extended. The overall scene is a high-angle view of the astronaut in a weightless environment.

# Safety Values

**Own your responsibilities...**

**...because you will be accountable  
for your ownership.**

**Goose**



  
**Meg Ryan**



  
**Goose**

# 1500 'Goose' hours in F-4 Phantom





**First flight in F-111**

# **‘Bingo Fuel’**









**POSITION**

**LONGEVITY**

**Passenger**



A background image showing a view of Earth from space, with the curvature of the planet and the blue atmosphere visible against the blackness of space.

## LESSON 1:

**Our safety responsibilities are non-transferable.**

**The rank or seniority of other team members does not minimize our own safety responsibilities.**

**Don't be a passenger.**

**See something...Say something...Do something.**

A photograph of Earth from space, showing the curvature of the planet and the blue atmosphere. The text is overlaid on this image.

**“One person with courage forms a majority.”**

**Everybody COUNTS!**

## **LESSON 2:**

**Leaders:**

**Empower your team members so they do count!**

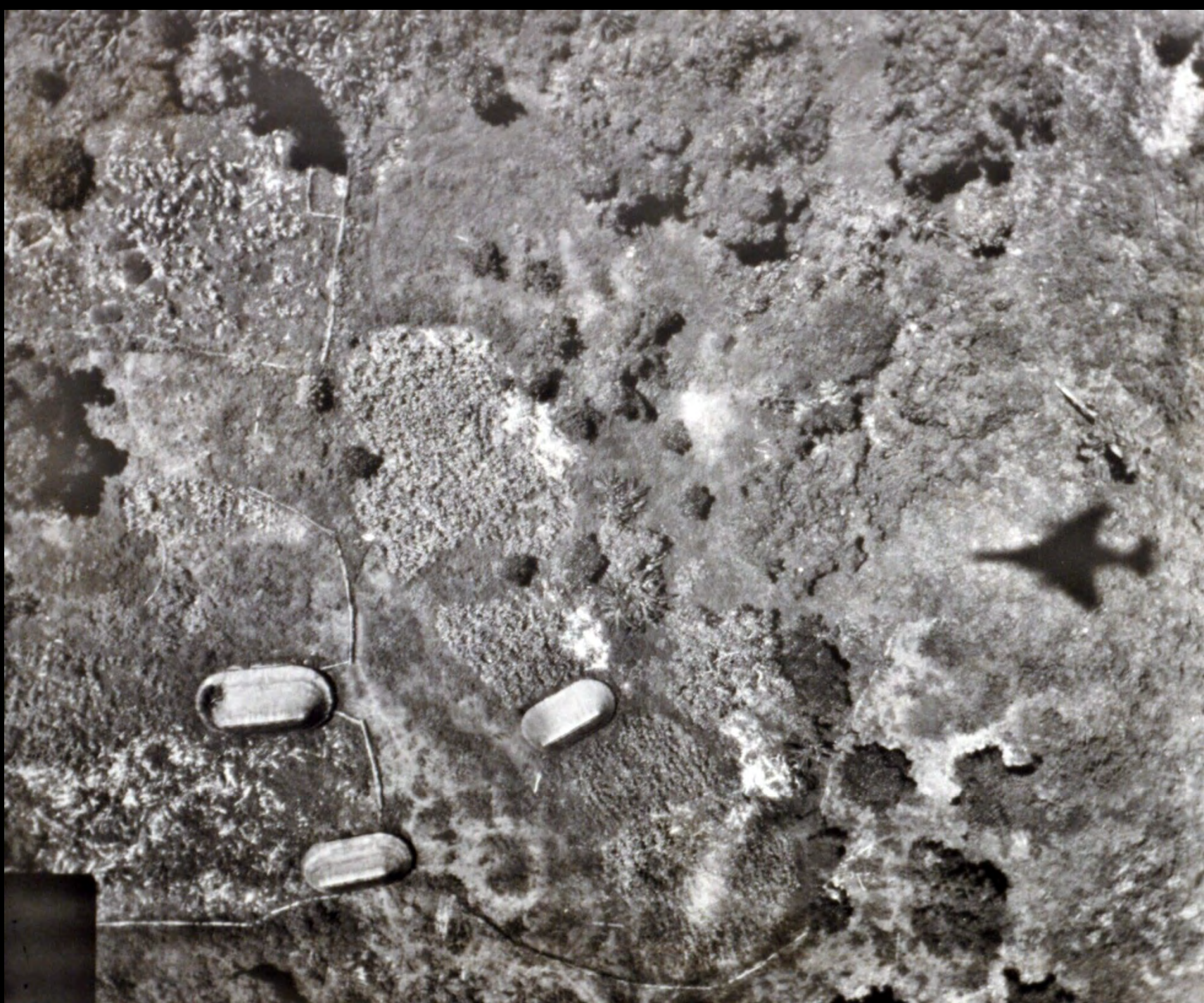
**Foster an environment for ‘Courageous Conversations.’**

A man in a military helmet with the number 5 on it, sitting in the cockpit of a helicopter. The helmet is olive green and has a black number 5 on the side. The man is wearing a dark flight suit and is looking towards the camera with a slight smile. The background shows the interior of the helicopter, including the rotor hub and various mechanical parts.

# Leadership Empowerment



**RF-4C: Reconnaissance version of F-4 Phantom**





**Empowering me to engage in courageous conversations.**



**He wanted me to COUNT!**





# A Lesson in 'Counting'

**Shuttle had no 'bailout' option.**

# Aircraft-like qualities:



**Reuse-ability**

**Reliability**

**Maintain-ability**

**Turn-ability**

**Affordability**

**Safety**

# Christa McAuliffe, school teacher





**ESCAPE ROCKET**





00:00:00 00:00:00 00:00:00 00:00:00 00:00:00 00:00:00



A satellite image of a ship's hull, showing a large, light-colored structure against a dark blue background. A red arrow points from a black box containing the word 'Cockpit' to a small, dark rectangular area on the deck. The image is framed by a thin yellow border.

**Cockpit**









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**That's the way we've always done it.**



# Mock-up of Shuttle Side Hatch









# Flight Surgeon Idea

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**Be curious. Be questioning.**

**See something, say something, do something.**

**Everybody Counts!**

**That's the way we've always done it.**



A background image showing a view of Earth from space, with blue oceans, white clouds, and brownish landmasses. The perspective is from an elevated position, looking down at the planet's surface.

# Safety Values

**Be accountable to the 'good'.**

A high-speed photograph of a single water droplet falling into a pool of water. The droplet is suspended in mid-air, creating a crown-like splash. Concentric ripples spread outwards from the point of impact. The background is a bright, warm yellow, which transitions into a deep blue as the water surface is reached.

**Accountability**

**Safety Culture**

**We own our ripples.**



**Accountability Nightmare**















**You can't take back your ripples.**



**Be accountable to the 'good'.**



# Safety Values

**Continuous self-improvement.**

**A lifetime quest to build a  
better version of ourselves.**

A photograph of Earth from space, showing the curvature of the planet and the thin atmosphere. The sky is a deep blue, and the horizon is a bright orange and yellow, suggesting a sunrise or sunset. The Earth's surface is dark, with some clouds visible.

**Leadership**

**Teamwork**

**Safety**

A photograph of Earth from space, showing the curvature of the planet and the thin atmosphere. The sky is a deep blue, and the Earth's surface is a mix of dark and light colors, possibly representing land and water. The lighting suggests a sunrise or sunset, with a bright orange and yellow glow along the horizon.

**All personal & professional performance metrics.**

A photograph of an astronaut in space, wearing a white spacesuit and a helmet, floating against a background of Earth's blue and white clouds. The astronaut is positioned in the center-right of the frame, looking towards the camera. The Earth's surface is visible on the left and bottom, showing a mix of blue oceans and white clouds. The overall scene is set against the dark, black background of space.

# **MY LIFE STORY**

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**Born 3 weeks after WWII ended.**



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**WWII**

**Dad**



6<sup>TH</sup> E.R.S.

**Hollywood significantly  
influenced my youth.**



**1949**



**1951**



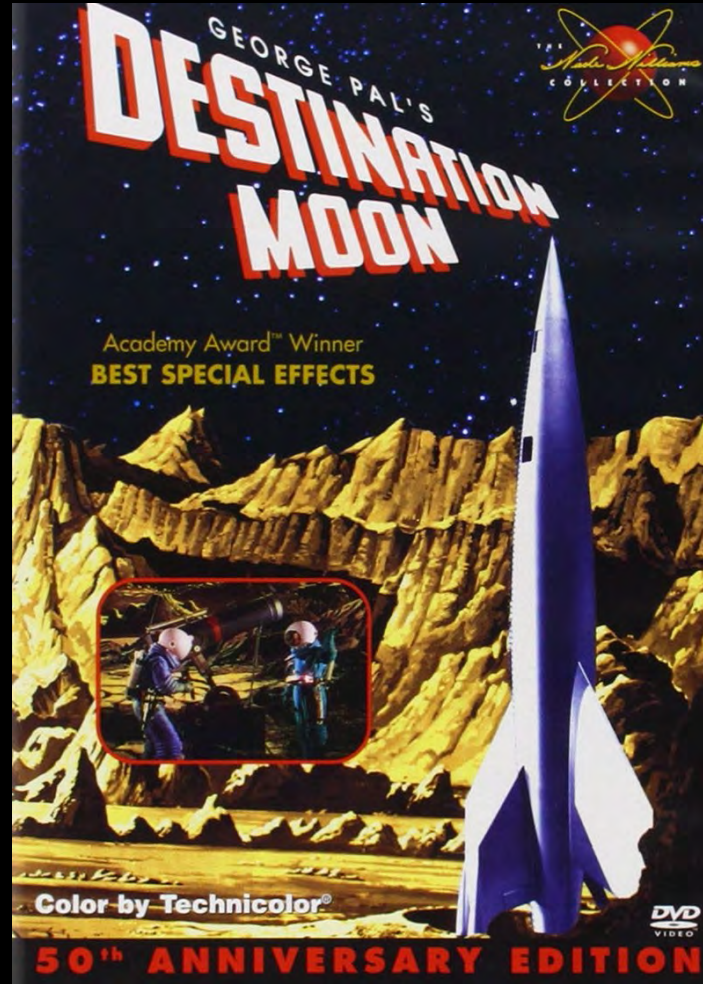
**1952**





**When Worlds Collide**

**1950**



**1951**



**1956**



# **Sputnik I**

**First earth satellite launched October 4, 1957.**



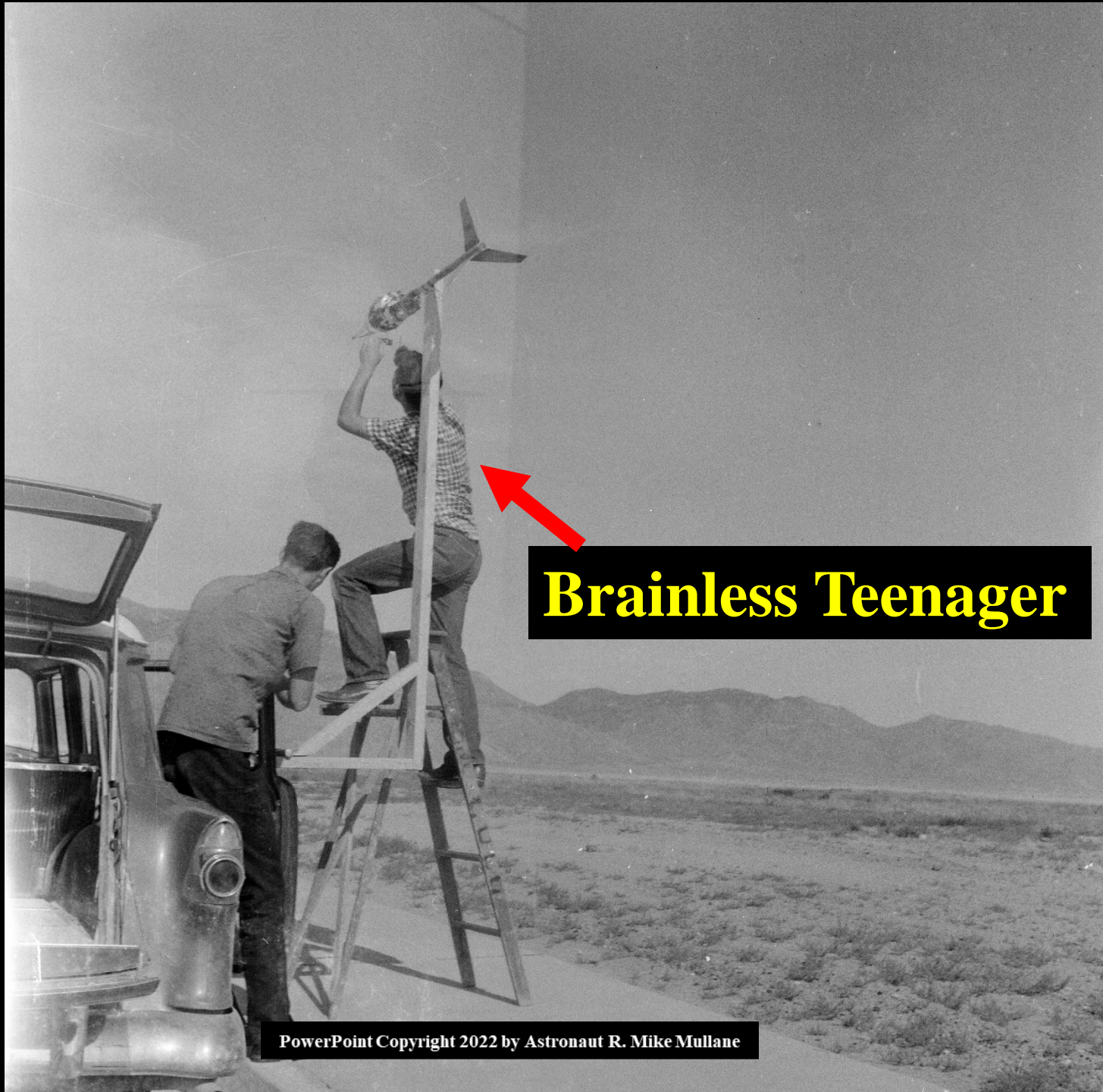


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# 1960 Science Fair Rocket Project.







**Brainless Teenager**



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**Hazard Mitigation..teenager style.**











# 1960 Science Fair Rocket Project.



Preliminary Report  
1960 Science Project  
Development of Biological Rocketsonde

Michael Mullane  
St. Pius X High School

FORWARD

Today, this country and many others throughout the world are steadily working towards the conquest of space. Someday, I also plan to participate in this great undertaking. At present, I am trying to familiarize myself with the basic principles of rocketry and to gain as much knowledge and practical "know-how" in this field as possible. To do this, I have been working on a series of scientific projects. The first of these was the development of a capsule and a reliable recovery system. This project, "Instrument Recovery From High Altitude" was entered in the 1959 Science Fair. With the data collected from this project it is now possible for me to expand my 1960 project into the development of a **PowerPoint Copyright 2022 by Astronaut R. Mike Mullane** a monitoring and telemetry system.

# **FORWARD**

**Today (1960), this country and many others throughout the world, are steadily working toward the conquest of space.**

**Someday, I also plan to participate in this great undertaking.**

**Mike Mullane, age 14**





MICHAEL  
MULLANE  
Nickname: Mike;  
Baseball 2; Science  
Fair 1,3; 1st School;  
1st Regional; 2nd  
State; Physics Club  
4; Ambition; Attend  
Air Force Academy

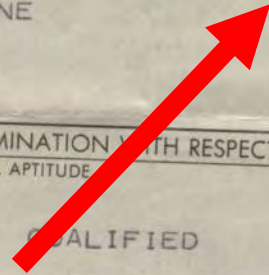
**Attend Air Force Academy**

# West Point



# REPORT OF UNITED STATES MILITARY ACADEMY ENTRANCE EXAMINATION

<b>FROM:</b> The Adjutant General Department of the Army Washington 25, D. C. Attn: Military Academy Section (AGPB-M)	<b>DATE:</b> 22 APRIL 1963
<b>TO:</b> MR RICHARD M MULLANE 8602 LA SALA GRANDE NE ALBUQUERQUE N M	<b>SOURCE AND TYPE OF NOMINATION:</b> THIRD ALTERNATE N M AT LARGE REP MONTOYA



RESULTS OF EXAMINATION WITH RESPECT TO QUALIFICATION		
ACADEMIC	PHYSICAL APTITUDE	MEDICAL
QUALIFIED	QUALIFIED	QUALIFIED

**THIRD ALTERNATE**

YOUR STATUS, WITH RESPECT TO ADMISSION TO THE UNITED STATES MILITARY ACADEMY IS SHOWN BELOW

2. DISQUALIFIED FOR ADMISSION, as shown above (See Note 1 on Reverse Side).
3. QUALIFIED - NO VACANCY. You are fully qualified but there is no vacancy for your admission under the terms of your nomination. If your status changes for any reason, **YOU WILL BE NOTIFIED PROMPTLY.**
4. QUALIFIED - STATUS PENDING. You are fully qualified but your right to admission under the terms of your appointment depends upon the outcome of the presently undetermined status of the candidate, or candidates, ahead of you. **YOU WILL BE NOTIFIED AS SOON AS FINAL DETERMINATION IS MADE.**
5. MEDICAL RE-EXAMINATION AUTHORIZED. (Read Note 2 on Reverse Side) Should you desire a medical re-examination you are authorized to report as early as possible, **AND NOT LATER THAN**

Please fill out and return the attached form. Prior to reporting for re-examination, it is suggested you communicate with the hospital for an early appointment. Present indications of medical condition in paragraph 5 above.

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PLEASE EXHIBIT (BUT DO NOT RELINQUISH) THIS FORM WHEN YOU REPORT FOR RE-EXAMINATION

# Varsity Club







TO RIGHT: Joseph Bowen, treasurer; Sandra Herron, vice-president; Mary L. [unclear], secretary; Ben Jojola, president.

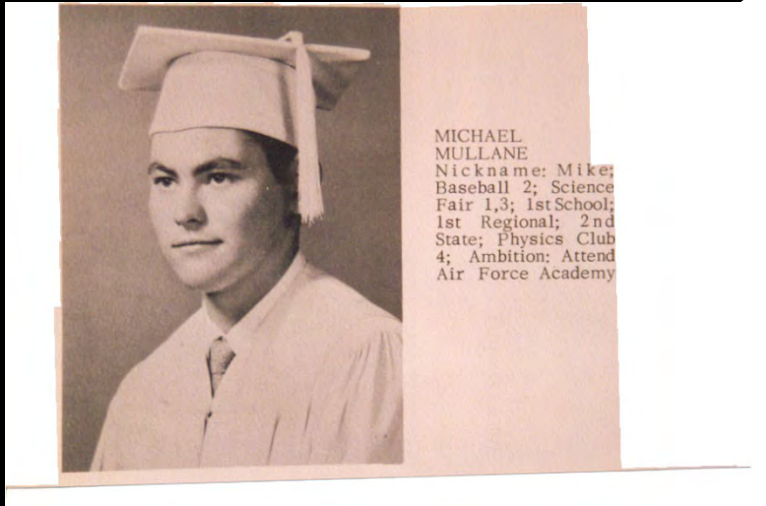
## Senior Class Officers

Autographs

*You missed Korea but  
here's hoping you make  
Vietnam. Mac*

**You missed Korea, but here's  
hoping you make Vietnam.**

?





**From a very early age my interests were laser-focused on aviation & space.**

A photograph of Earth from space, showing the curvature of the planet and the atmosphere. A bright, horizontal light streak, possibly a meteor or satellite trail, cuts across the middle of the frame. The colors range from deep blue at the top to bright orange and red near the horizon.

# Focus

**I had an abundance of tenacity.**



# Polio

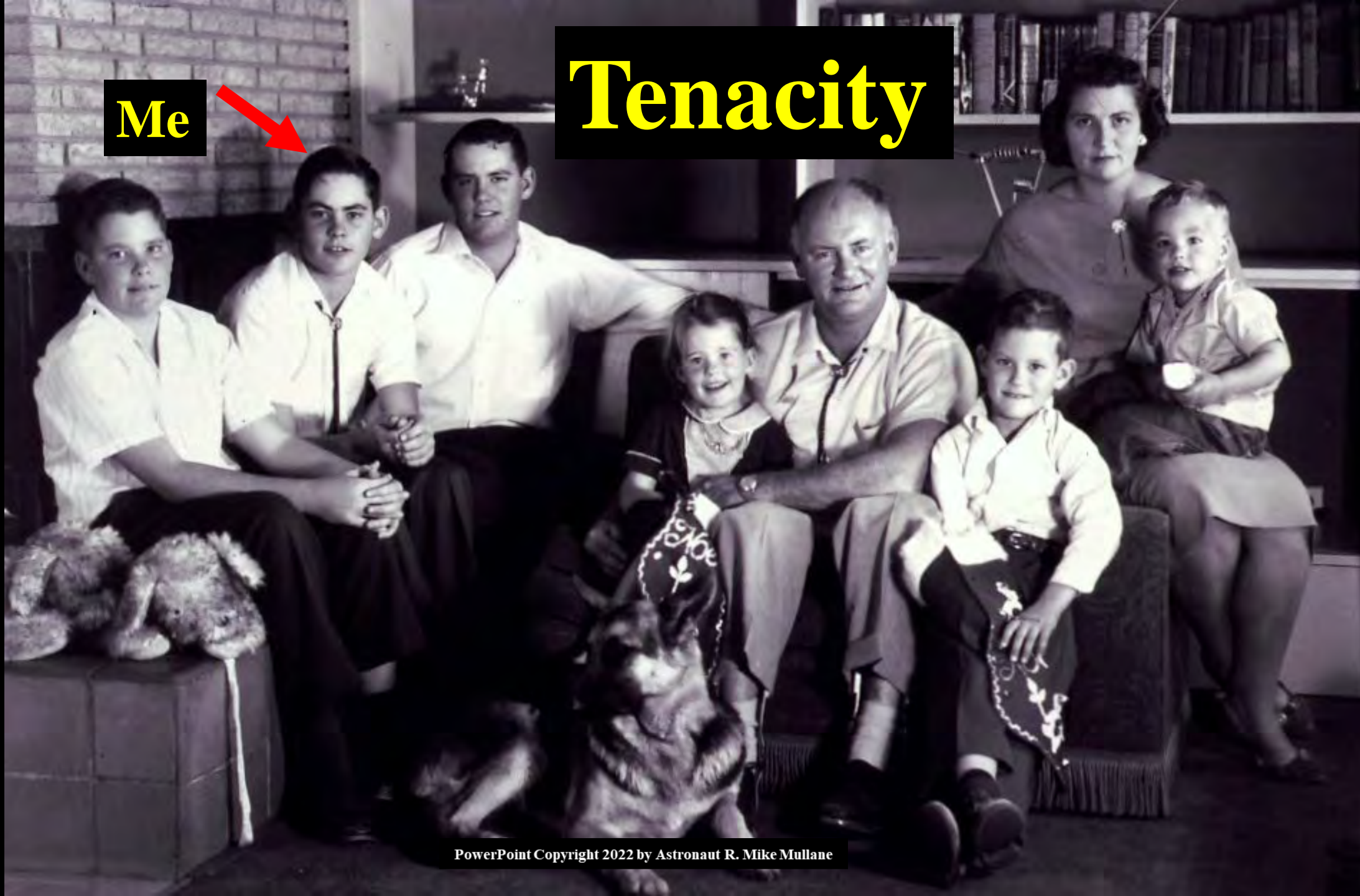


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**Me**



# Tenacity



**FOCUS**

**TENACITY**

**I did not possess this value:**

**A belief in myself.**



TO RIGHT: Joseph Bowen, treasurer; Sandra Herron, vice-president; Mary L...  
ary; Ben Jojola, president.



**Terrified of failure.**



**West Point**

**1963- 1967**

**I can't.**

**I'll fail.**

**It's too hard.**

**I'm afraid.**

**A gift: A knowledge that my limits were far beyond anything I had previously imagined.**



**Focus**



**Tenacity**

**Continuous Self-Improvement.**







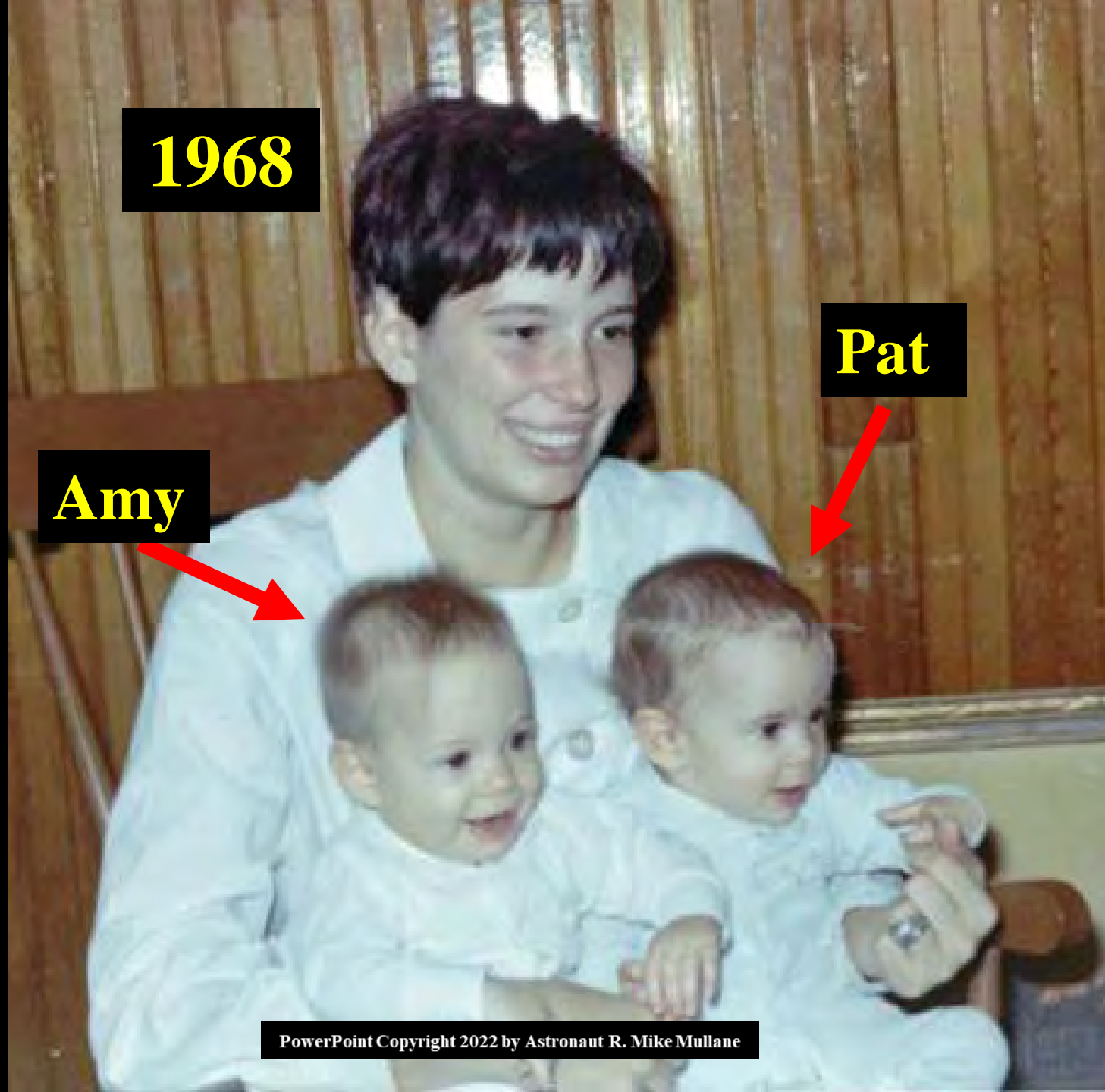
# Strangers getting married.



**1968**

**Pat**

**Amy**



**Laura 1971**



**You are more than a team.**

**You are an extended family.**



# Flight Training 1968





**1969: Vietnam**

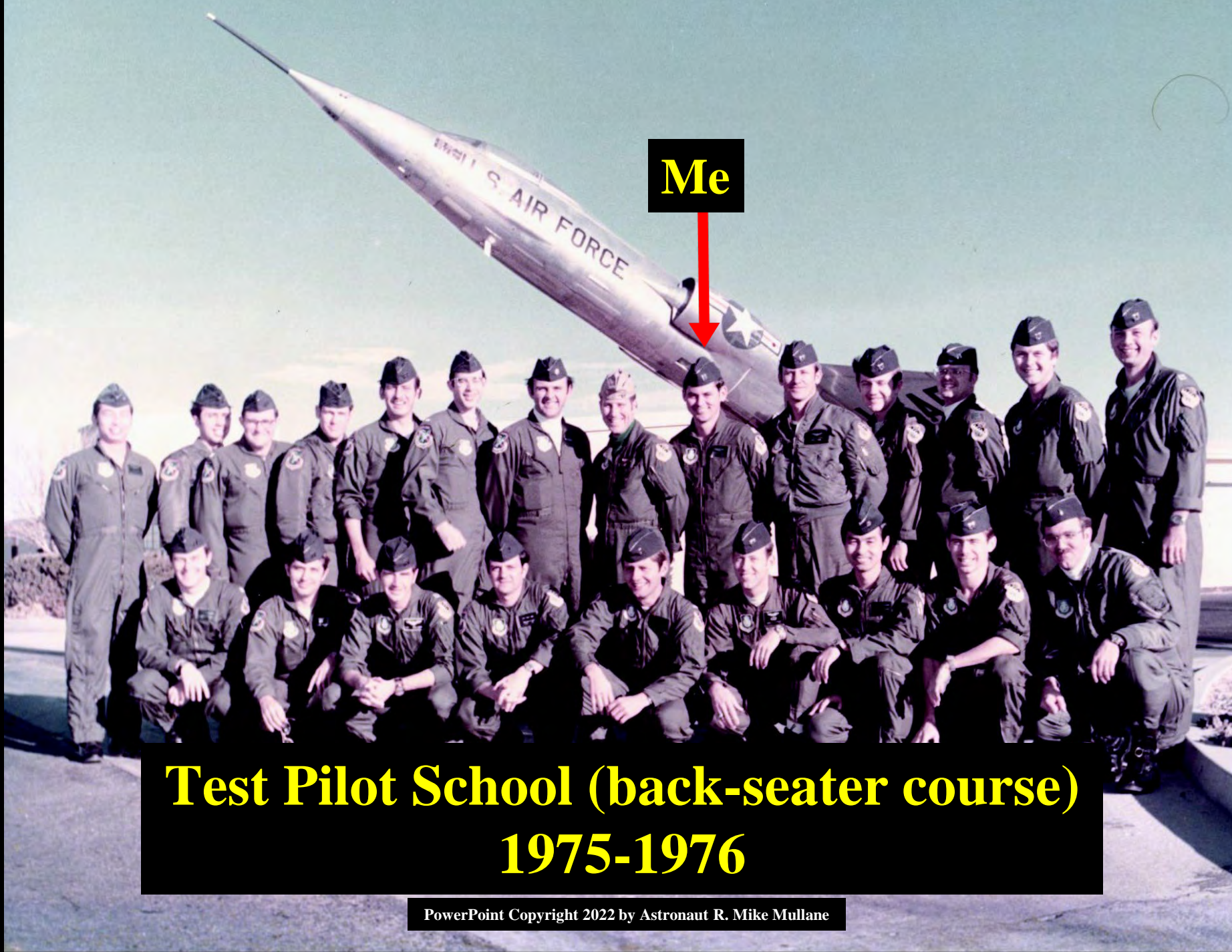
# Cold War NATO forces 1970-1973

Me





## **Graduate School 1974-75**



**Me**

**Test Pilot School (back-seater course)  
1975-1976**

An F-16 fighter jet is shown in flight, banking to the right. The aircraft is painted in a dark green and brown camouflage pattern. It is flying over a vast expanse of white, fluffy clouds that stretch to the horizon. The sky is a clear, pale blue. The jet's wings are swept back, and its canards are visible. The cockpit canopy is clearly visible, showing two seats. The overall scene is a high-angle shot from above and slightly to the side of the aircraft.

**NASA announces opening of Astronaut selection for the Space Shuttle program.**

**Eglin AFB  
1976-1977**

**Mission Specialist crew position does NOT require applicant to be a pilot.**

A photograph of astronaut R. Mike Mullane in space. He is wearing a blue polo shirt with "Atlantis STS-27" printed on it. He is smiling and looking towards the camera. In the background, there is a banner that says "GO ARMY BEAT NAVY" with a logo of a soldier. The setting appears to be the interior of the Space Shuttle Atlantis.

**Focus**

**Tenacity**

**Continuous Self-Improvement**

**Astronaut  
1978-1990**

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## Life Lessons

- Do your best. It always counts.
- Set lofty goals.
- Be tenacious.



- Don't be afraid of failure.



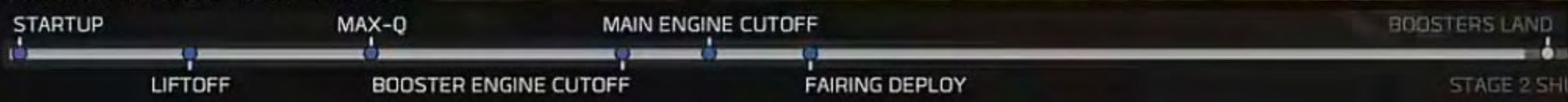
# SpaceX

## FALCON HEAVY TEST FLIGHT





**FALCON HEAVY TEST FLIGHT**









**Fail Fast. Learn Faster.**

## Life Lessons

- Do your best. It always counts.
- Set lofty goals.
- Be tenacious.



- Don't be afraid of failure.
- Advance your education.
- Advance your team and leadership skills.
- Envision mission success.





**Trail**

**Envision Mission Success**



**Education**

**Promotion**

**Start a Business**

**Physical Goal**

**Envision Mission Success**

**Mt. Elbert, 14,440 ft**



## LESSON

**You don't have to be extraordinary to achieve extraordinary personal results.**

# Safety Values

**Beware of normalization of deviance.**

**Own your responsibilities.**

**Be accountable to the 'good'.**

**Continuous self-improvement.**

## Life Lessons

- **Do your best. It always counts.**
- **Set lofty goals.**
- **Be tenacious.**



- **Don't be afraid of failure.**
- **Advance your education.**
- **Advance your team and leadership skills.**
- **Envision mission success.**



**77 years old**

**Geezer's Rule!**

[www.MikeMullane.com](http://www.MikeMullane.com)

Author of *'Riding Rockets'*