



Countdown To Culture Change Mitsui Sumitomo Insurance Group

The Cultural Issues Affecting Decision Making and Communication in Organisations

Space Shuttle Case



**February
1st 2003**



February
19, 2003

January
28th 1986

Challenger



**January 28th
1986**

The Challenger Crew

Mike Smith Dick Scobee Ron McNair

Ellison Onizuka Christa McAuliffe Greg Jarvis Judith Resnik





NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

**Let's go right back
To 1969....**



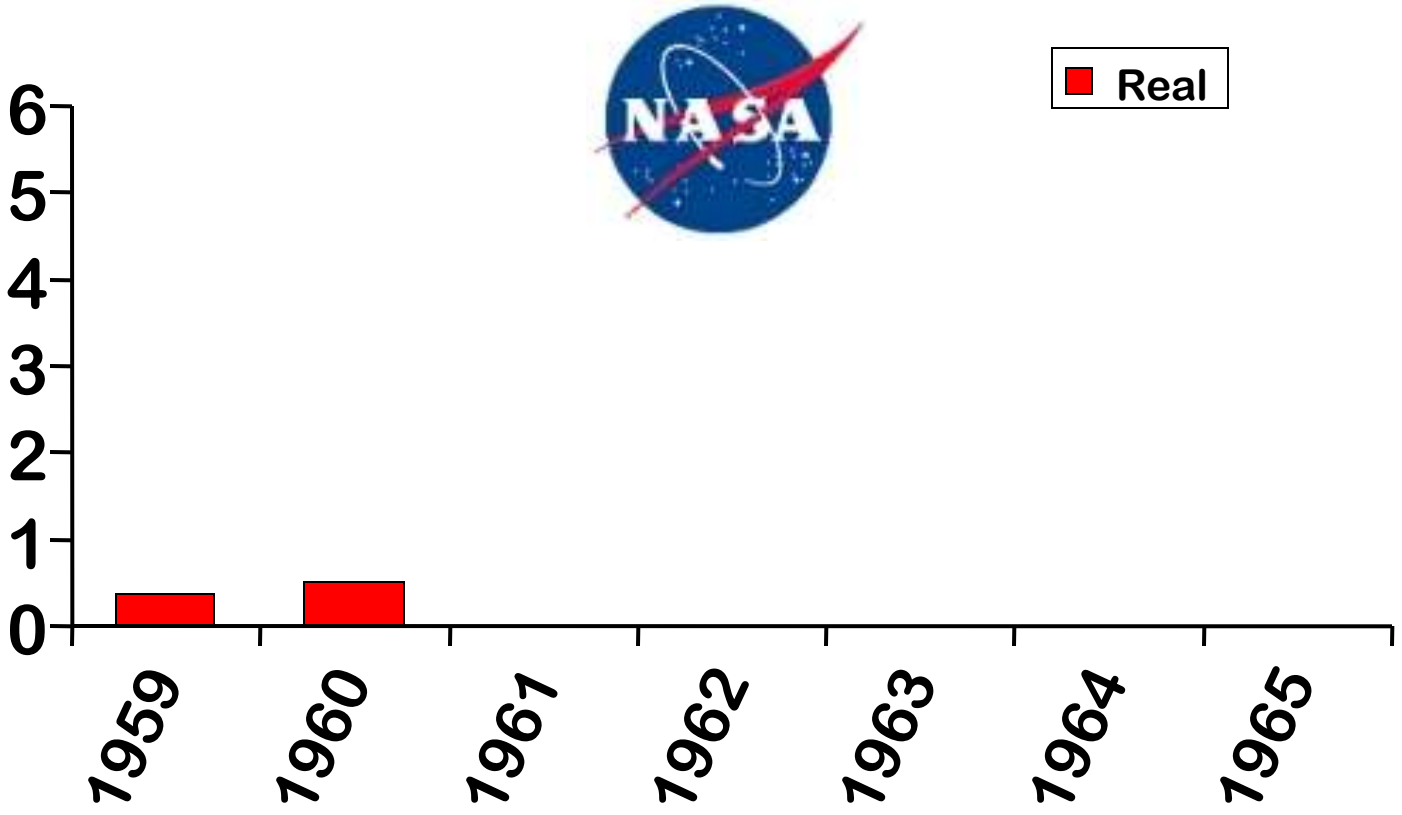
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Who was the Father of the U.S. Space Programme ???



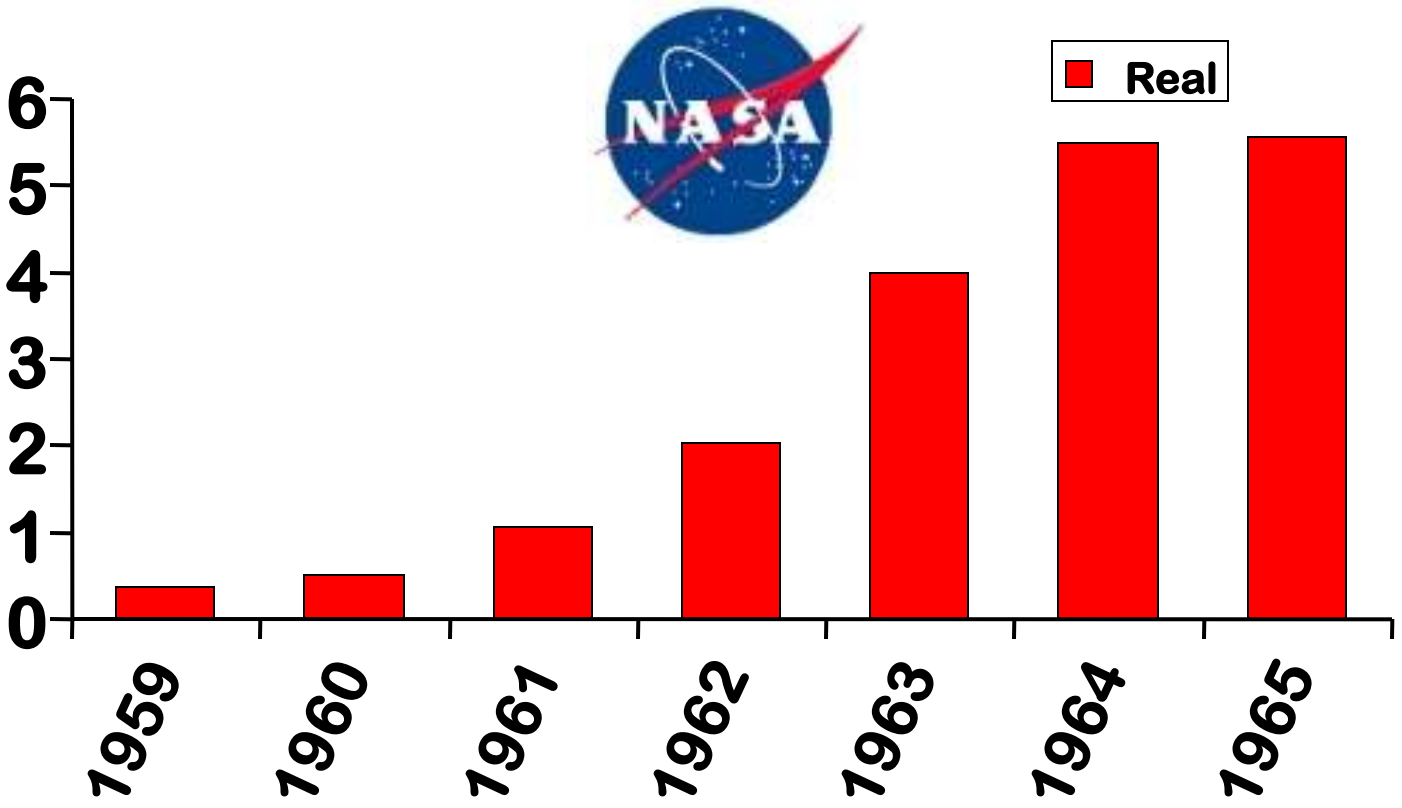
**What would NASA need
to
Make this happen?**

NASA's Budget (in \$ Billions)



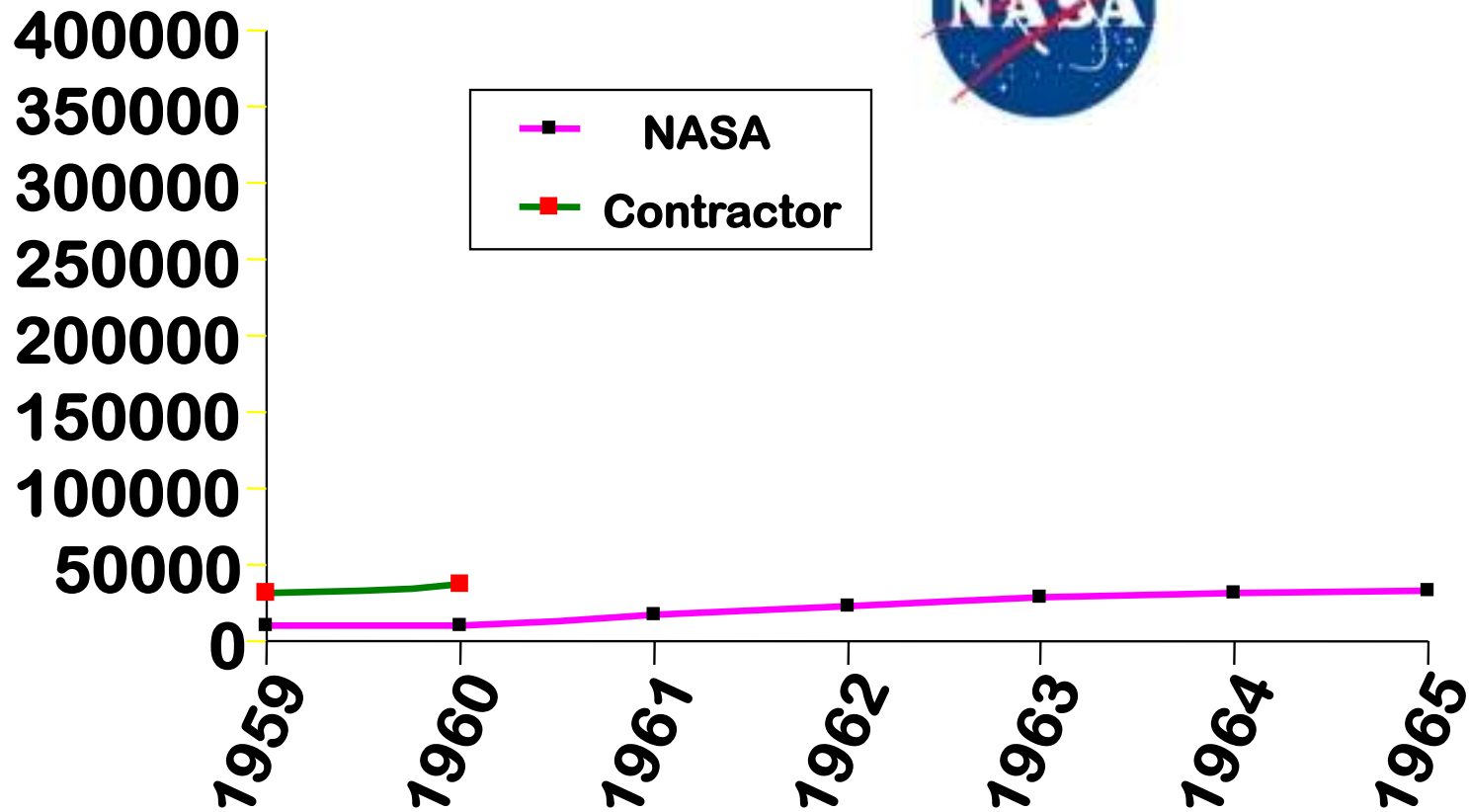
* Adjusted for inflation using the 1967 Consumer Price Index

NASA's Budget (in \$ Billions)

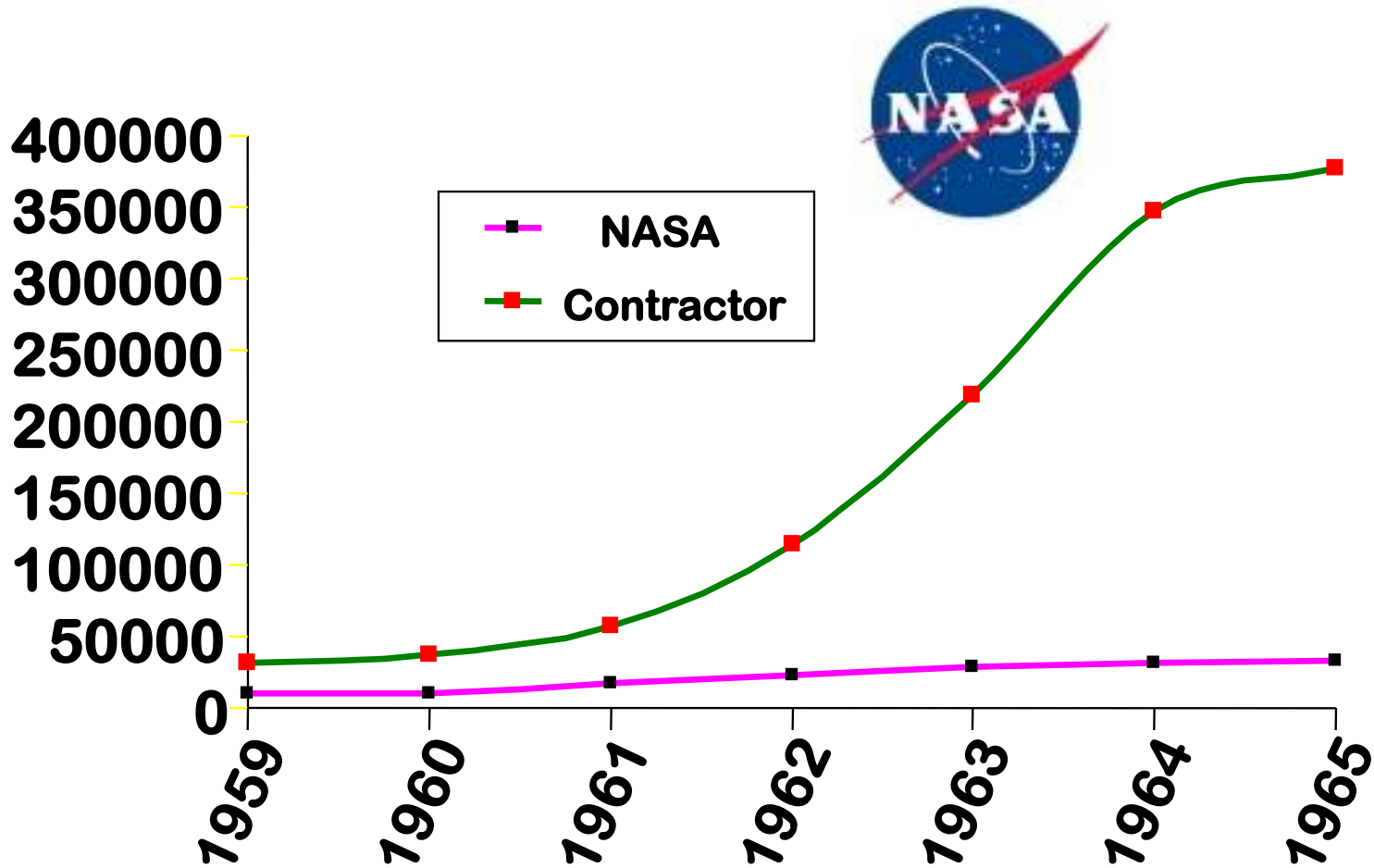


* Adjusted for inflation using the 1967 Consumer Price Index

NASA Outsourcing



NASA Outsourcing



**“When you look at
employment numbers and key
votes, the space program has
an importance out of all
proportion to its budget.”**



**John Ehrlichman
Chief Advisor to Nixon**



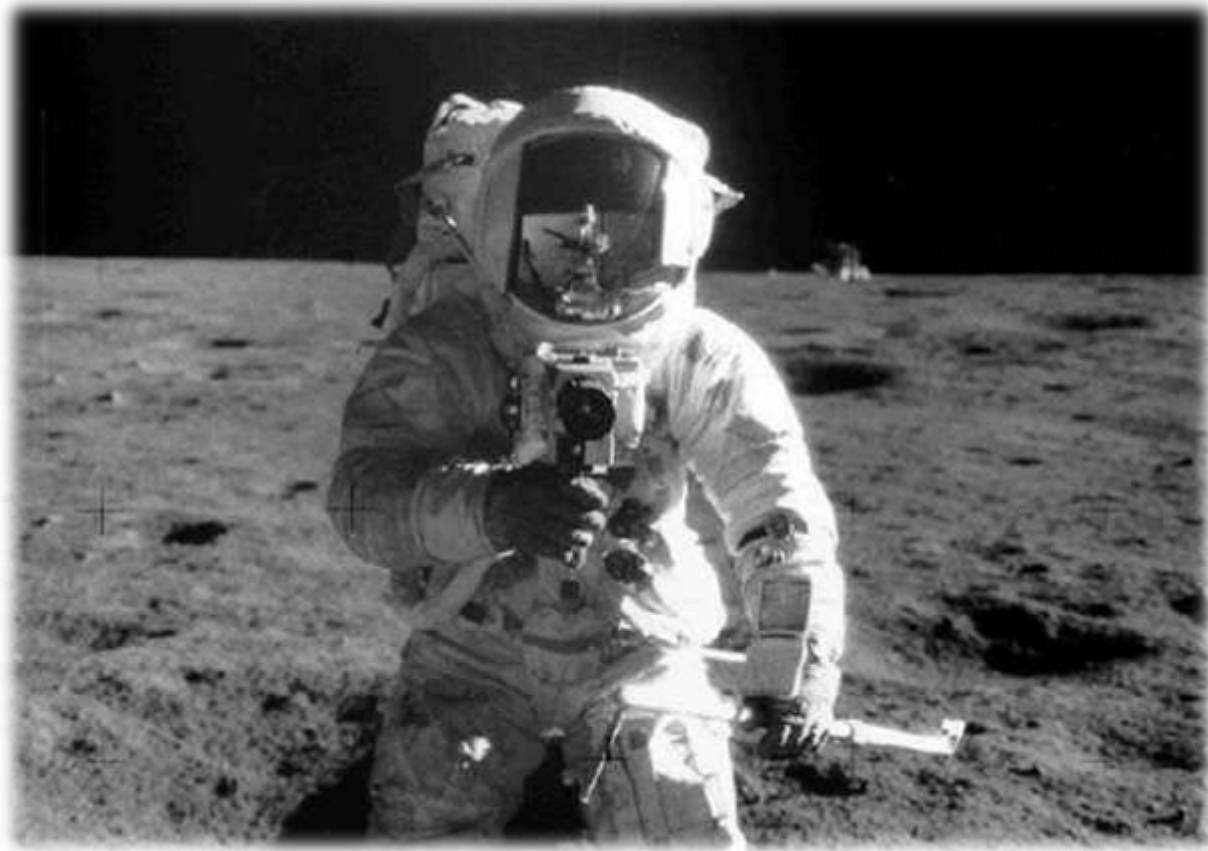
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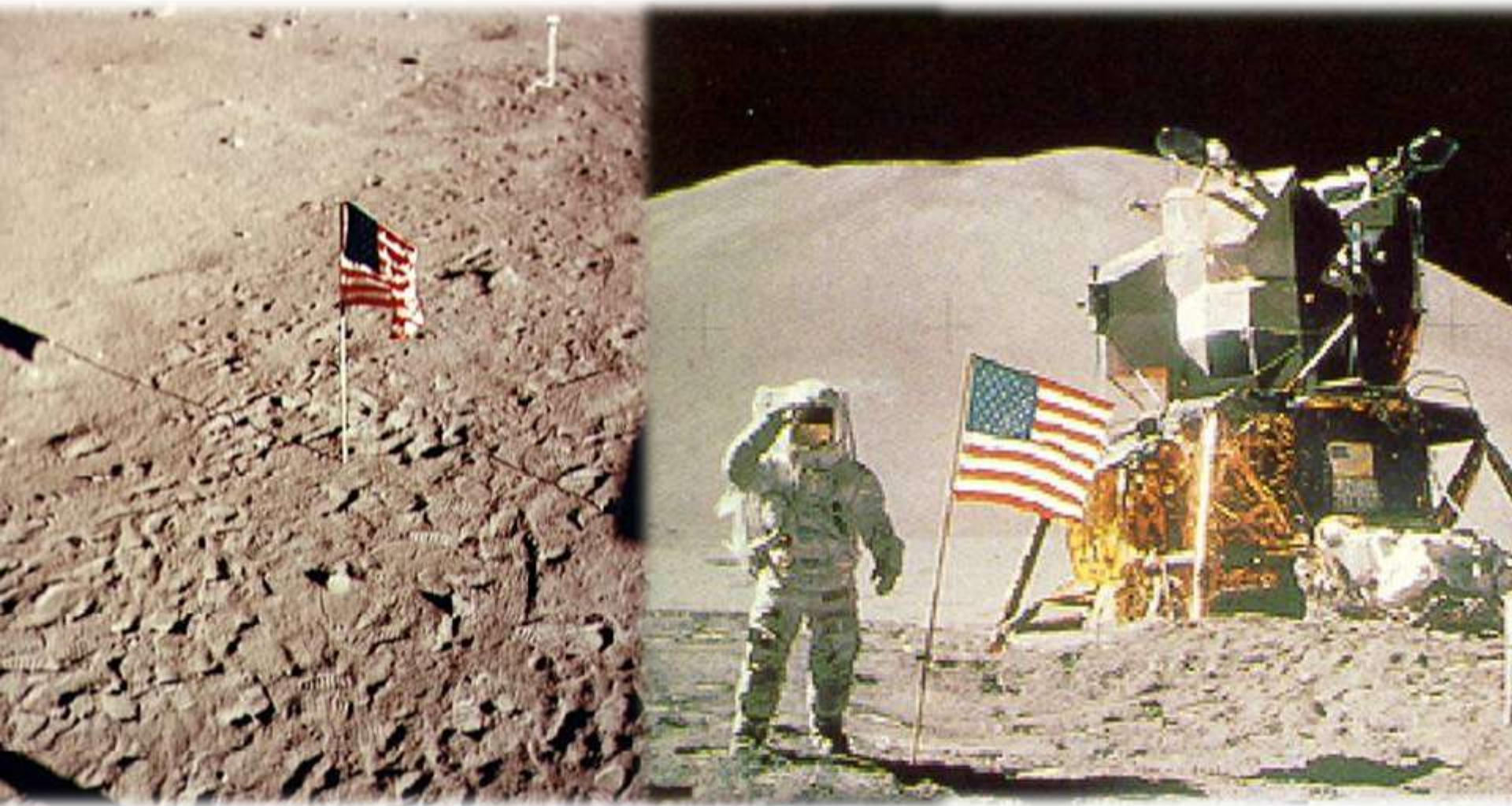
They did it!

And the 3 heroes were?



The most important deliverable was...





Apollo11



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**How could they
keep the Space
Programme going?**



!!!MARS!!!

**But there were
problems**





Marshall



Cape



Washington



Houston



**Why is Marshall So
Secret and Why
Alabama?**



**Werner Von
Braun
Father of The
Apollo Series**



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“The Marshall Space Flight Centre is run by one man, Bill Lucas. As Centre Director, he has established a personal empire where the only criteria for advancement is total loyalty to this man....”

Snr Manager at Marshall



NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION



**“Loyalty to country, NASA,
the space program, mean nothing.....**

**Many a highly skilled manager,
scientist, or engineer has been ‘buried’
in the organisation because they
underestimated the man’s psychopathic
reaction to dissent”.**



Marshall designed a perfect engine for the shuttle but it was too expensive



**So they re-wrote the
safety standards and came
up with a cheap and
cheerful alternative:**

**Meanwhile aerospace
companies
were very, very happy**



**But the contracts were
being dished out on a
political basis in
Washington.....**





Early testing in the desert did not go well.....





**The O-rings went on the
Risk Register as a
“Criticality 1R”
component**



The definition of Criticality 1R is:-

“Loss of mission, vehicle and crew due to metal erosion, burn through, and probable case burst resulting in fire and deflagration.”

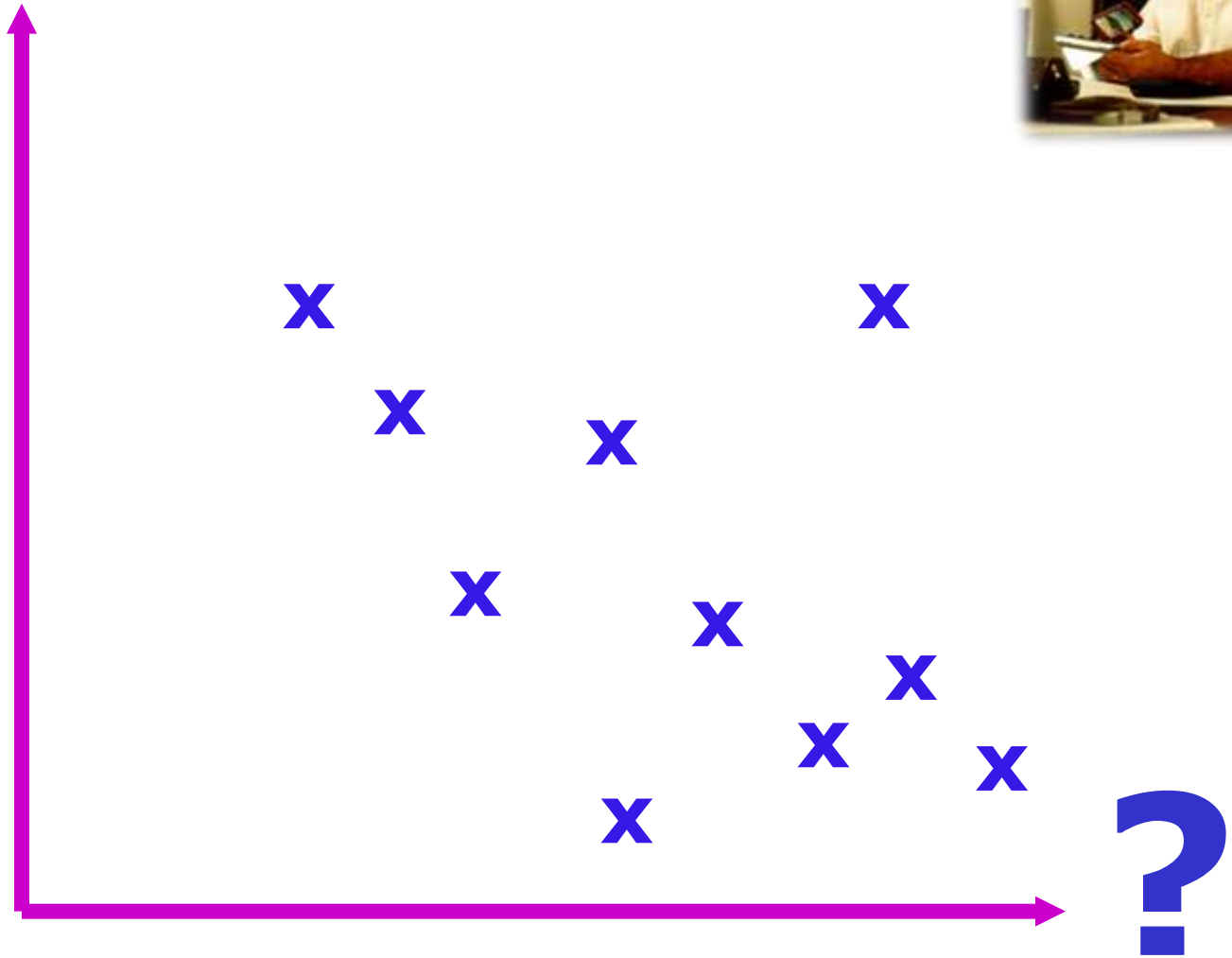
Despite the O-Ring problems (and many others) the first Shuttle was launched in 1981

with baited breath...

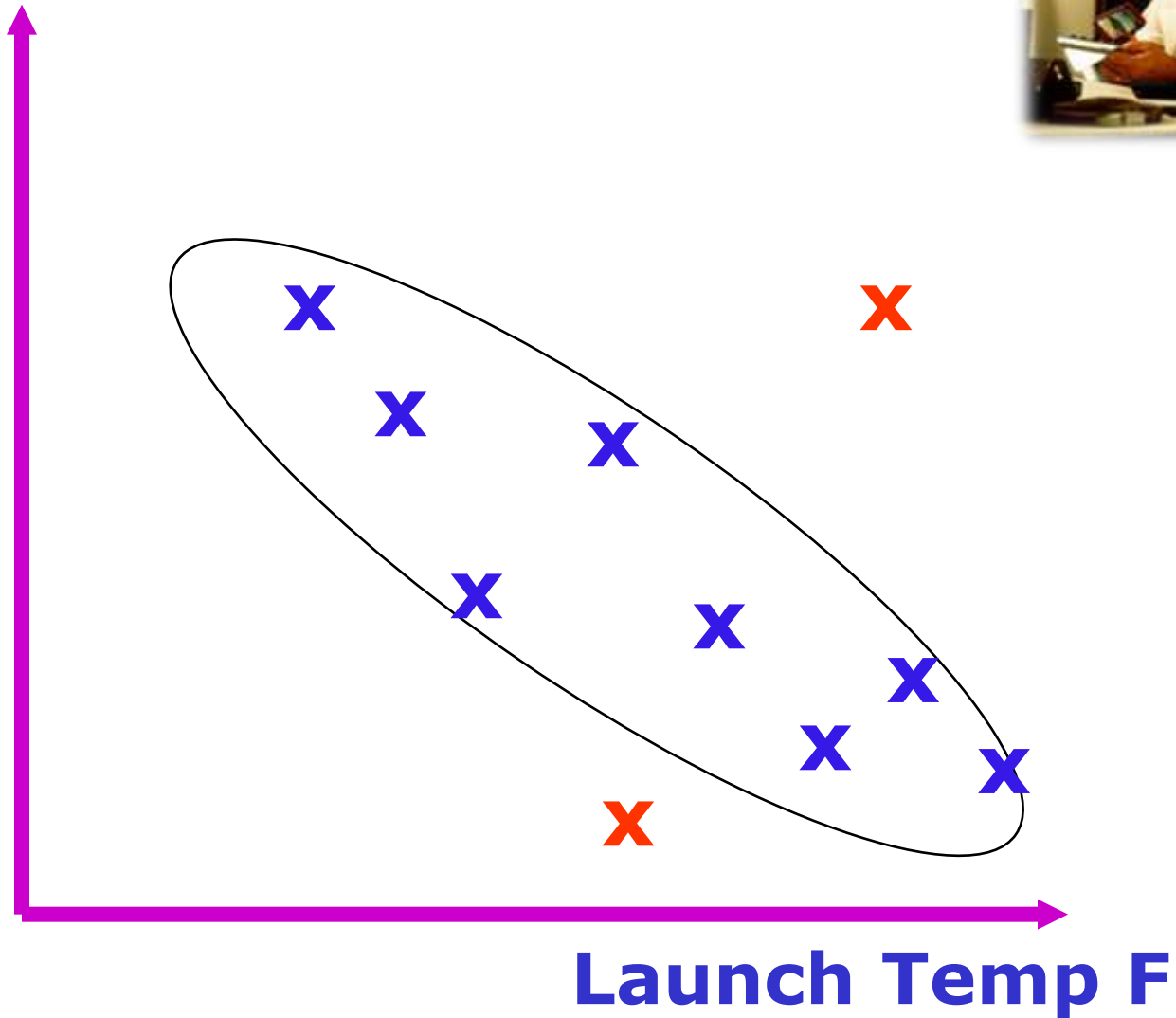


Commander John Young (left) and pilot Robert Crippen get ready for the space shuttle's maiden flight in 1981 - the first US space trip in six years.

Erosion & Blow-by



Erosion & Blow-by





“When people go in front of Dr. Lucas, they know that if they use words like think or feel or judgement to try to explain something, they will be shot down in flames.

**Roger Biosjoly MTI
Chief O Ring Engineer**

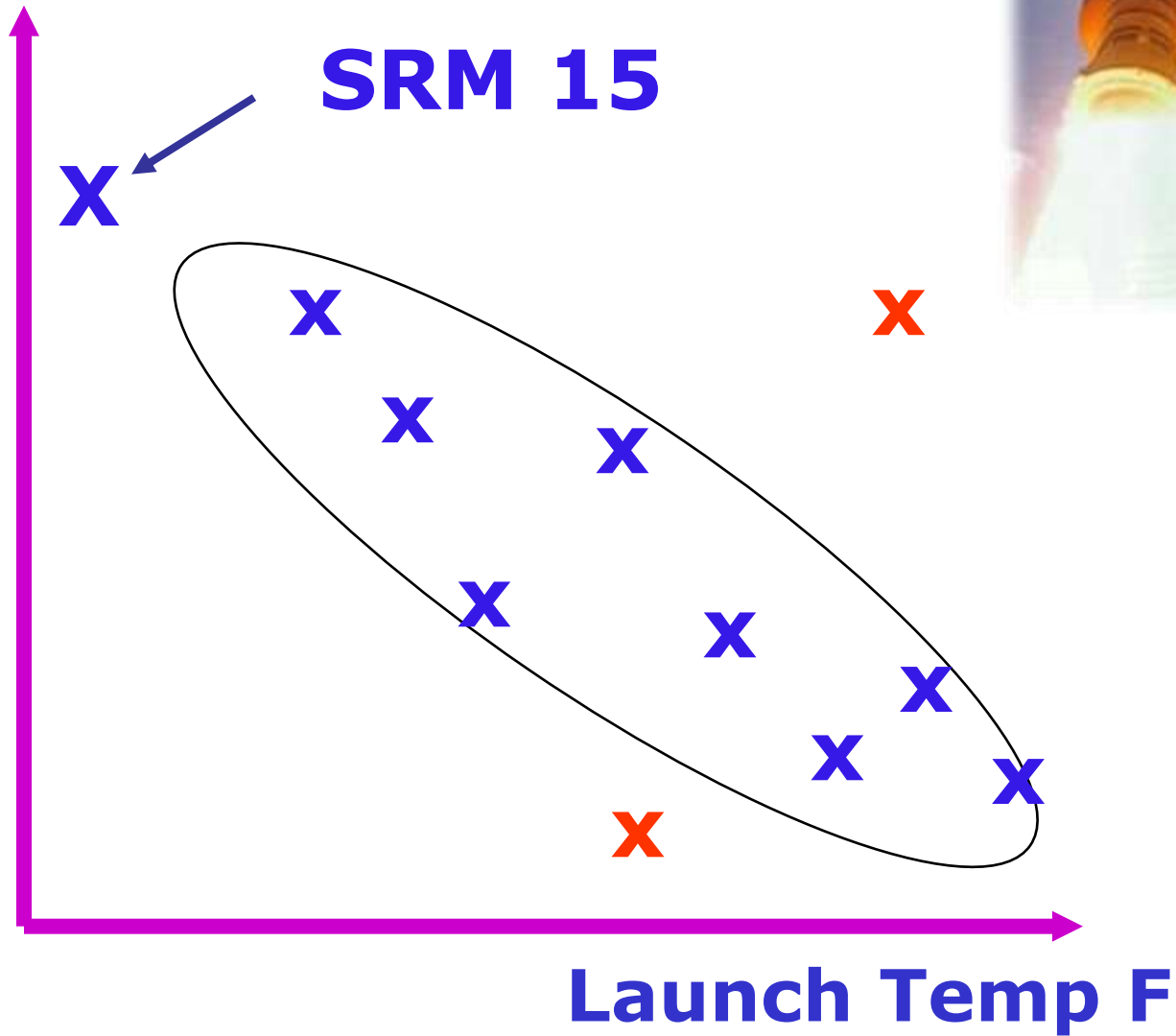


“ ... Lucas made it clear that, under no circumstances was the Marshall Centre to be the cause for delaying a launch....”

SRM15
The coldest
launch
so far



Erosion & Blow-by





**Despite this new evidence,
against a back drop of slipping
schedules, escalating costs and
political pressure, they continued
to launch.....
until Challenger, SRM 25**

**“ If the Challenger
disaster had not halted
flights we would have
been brought to our
knees anyway by the
spring of 86.”**

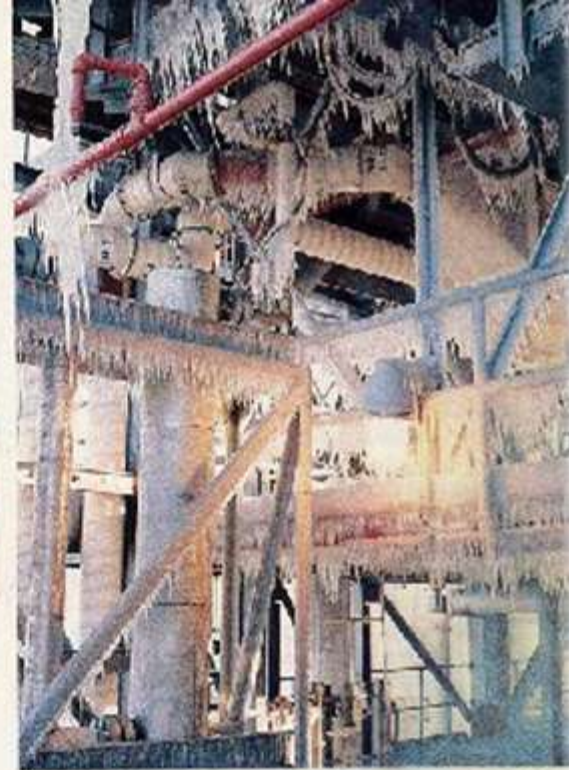


**Horace Lambeth
NASA Director of Engineering**

Icicles hanging off Challenger the day before the fateful launch



Above, long icicles on a lower rail of the Solid Service Structure frame the launch point where the Orbiter is attached to the external tank. Below, icing was even more extensive on upper levels of the service structure (upper right and below). At right, below, is a ground-to-orbit communications box (not used during launch) that was inoperable by heavy ice.



Presidential Report on Challenger



Non Linear Behaviours
Optimism Bias
Complicity
Poor Communication



Optimism Bias In Decision Making

“optimism generates much more enthusiasm than does realism (not to mention pessimism), and it enables people to be resilient when confronting difficult situations or challenging goals”



Delusions of Success
Harvard Business Review
Dan Lovallo and Daniel Kahneman

How Do We Avoid Optimism Bias?

- Take The “Outside View”



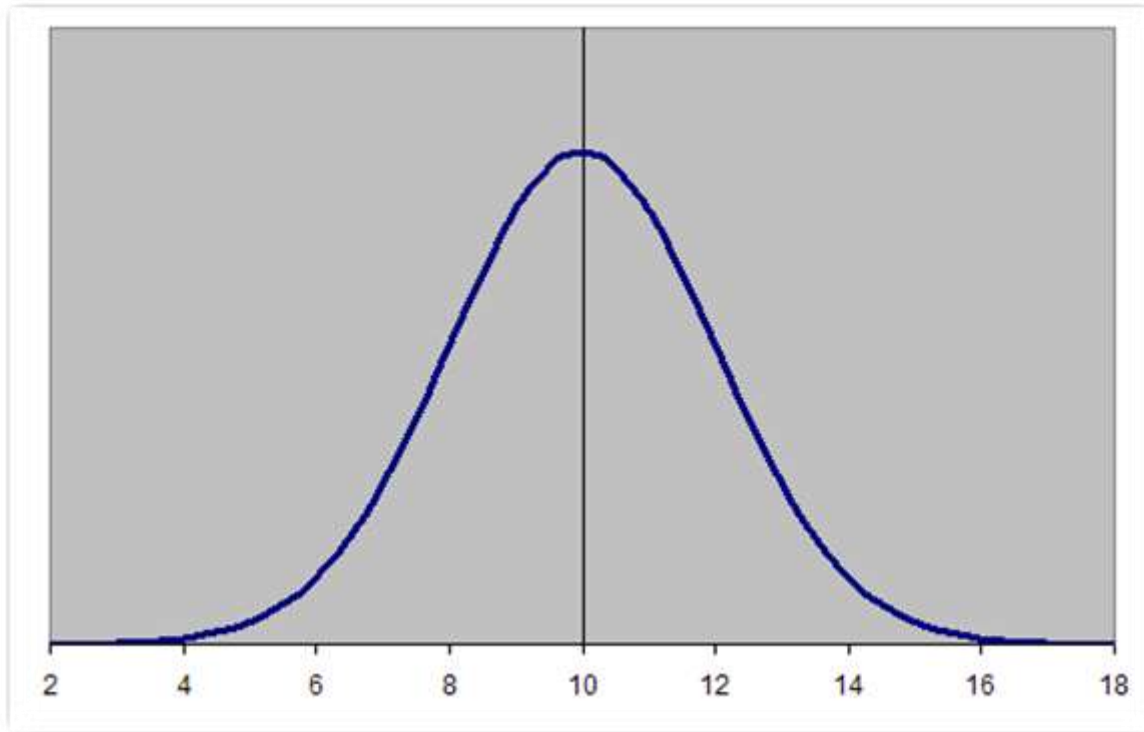
Taking The Outside View

- **Select a Reference Class**



Taking The Outside View

- **Assess The Distribution of Outcomes**



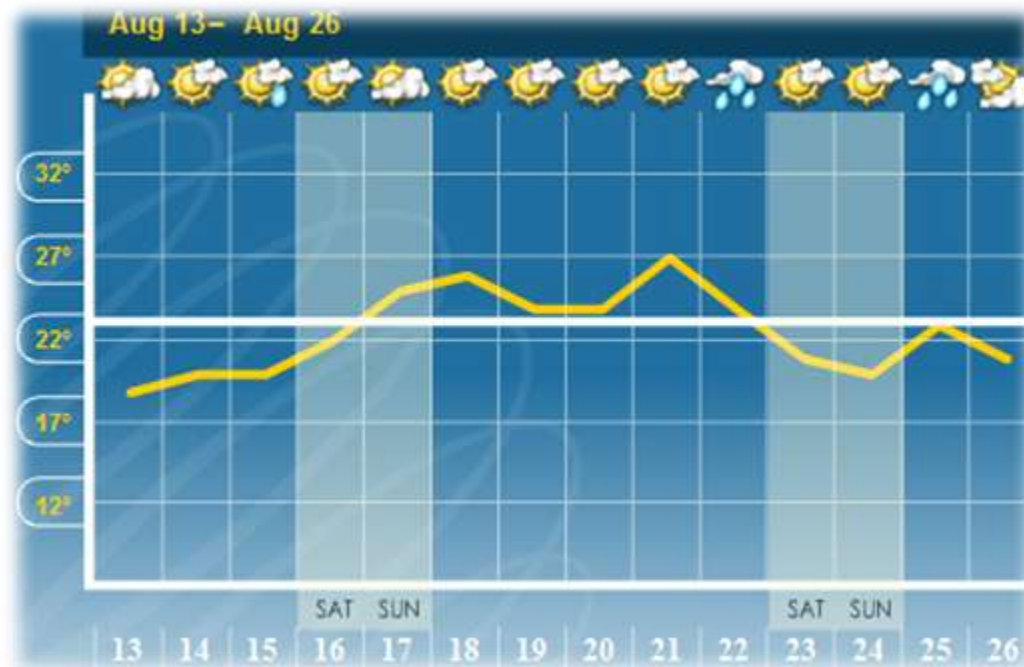
Taking The Outside View

- **Make an intuitive prediction of your position in the distribution**



Taking The Outside View

- **Assess the reliability of your prediction**



Optimism Bias In Decision Making

“More objective forecasting will help you choose your goals wisely and your means prudently...

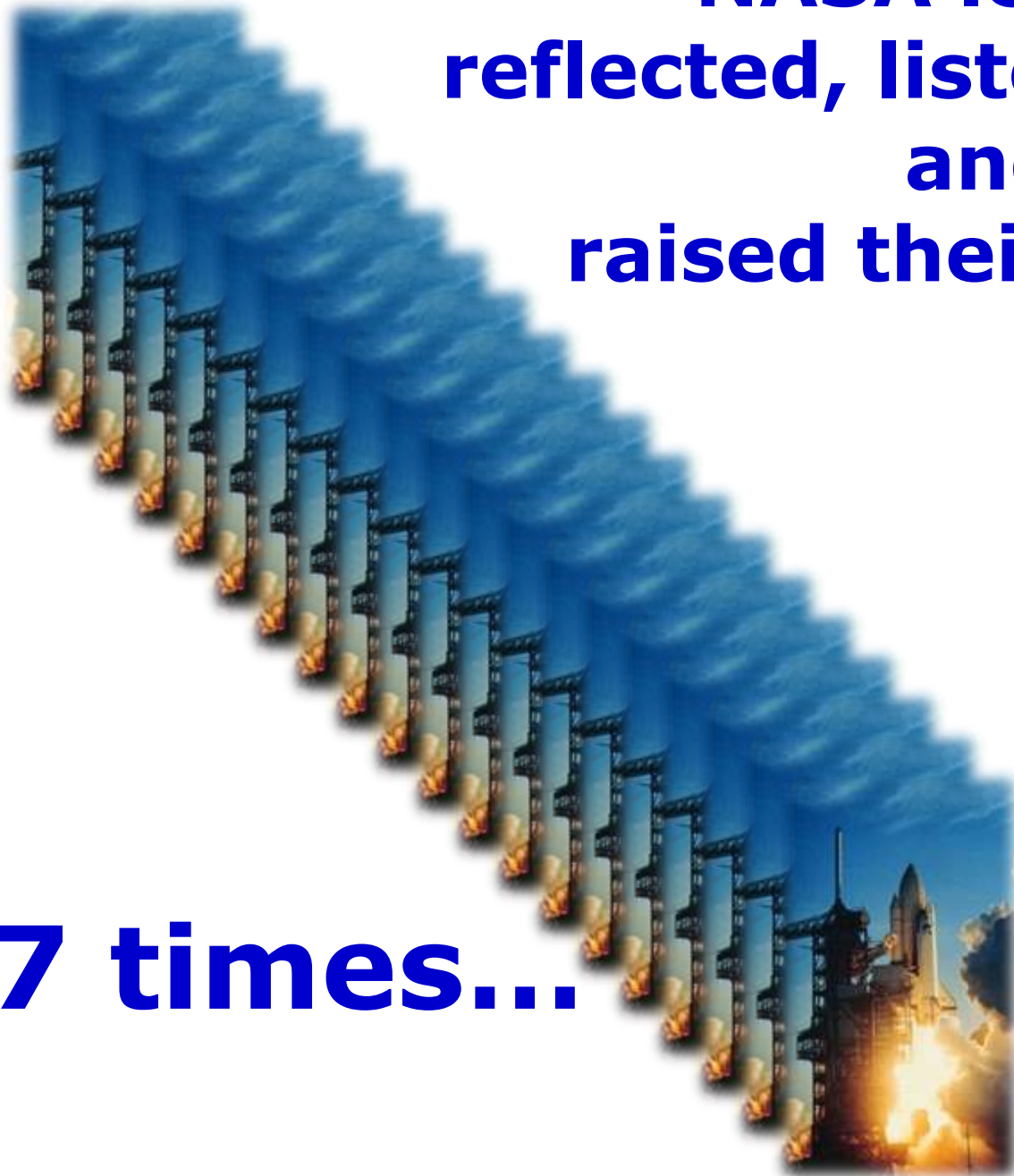
once committed to a course of action, however, constantly revising the odds of success is unlikely to be good for morale or performance.”



**Delusions of Success
Harvard Business Review
Dan Lovallo and Daniel Kahneman**

**NASA leaders
reflected, listened, learnt
and
raised their game...**

87 times...



“Disasters happen when decisions are made by leaders who cannot remember what the consequences were last time”





**Daniel Goldin
Leader of NASA
1992-2001**

“Faster, cheaper & better”

**“ When I ask for a budget to
be cut and I’m told it’s going
to impact on safety – I think
that’s a bunch of**

crap”



Space Shuttle Columbia

Feb 2003





“The foam did it”

Official Report into Columbia Disaster



Non Linear Behaviours
Optimism Bias
Complicity
Poor Communication



CAIB

**Columbia Accident
Investigation Board**



**NASA leaders admit that
despite knowing about
Columbia tile damage they
decided not to inspect for
damage..**



**Ron Dittmore
Columbia Programme Manager
1st Feb 2003**



“We didn’t believe that pictures would be useful to us.... we felt there was nothing that we could have done anyway so, we decided not even to take them”



**Ron Dittmore
Columbia Programme Manager
1st Feb 2003**

Boeing “knew Shuttle was in trouble” Sunday Times 9th March 2003

A Boeing computer simulation carried out while Columbia was still in orbit, showed that up to 15 tiles may have been knocked off during launch.





**February 1st
2003**



**“A rescue mission was challenging
but entirely feasible”**

“Failure is only an opportunity to begin again more intelligently”

**Henry Ford (1863-1947)
American industrialist, inventor**



**NASA
reflected, learnt and
raised their game...**



July 2005

2 Final Questions:

Who decides?

Would you??



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Educators and Inspirationalists

Executive Education
Action Learning Support
Keynote Address
Audit of Capability



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