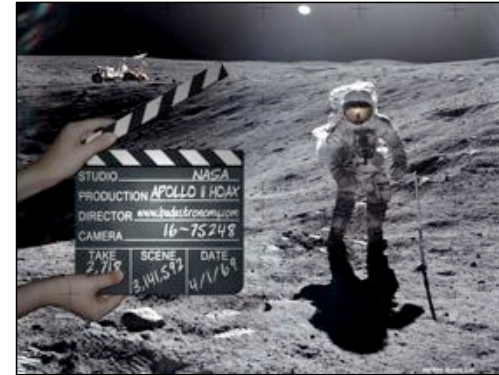


# The Great Moon Hoax



## The Great Moon Hoax



Great Moon Hoax / Introduction

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## The Great Moon Hoax

Why a hoax?

*President Kennedy couldn't deliver on the promise*

How many believe it?

*6% of all Americans have doubts*

At what stage in the Apollo programme did it start?

*Man in Earth orbit — yes. Man on the Moon — no.*

What is the “evidence”?

*Scientific scrutiny makes a good science lesson*

*...and hopefully an interesting talk.*

Great Moon Hoax / Introduction

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## Why a Hoax?

Kennedy made a promise...



Impressive... Important... Difficult... Expensive...

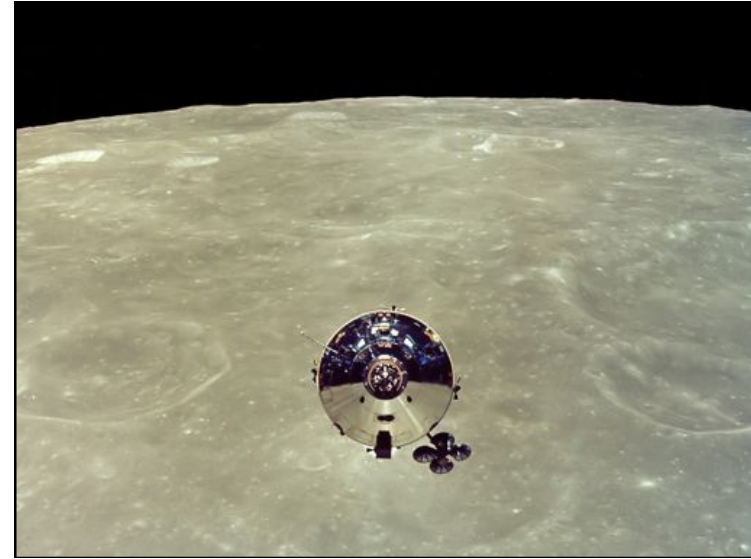
Great Moon Hoax / Why / Kennedy

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# The Great Moon Hoax



# The Great Moon Hoax





# The Great Moon Hoax

## The Evidence

- Computing power just wasn't up to the task
- Radiation in space would kill the astronauts
- Video anomalies :
  - filmed on Earth, just slowed down
  - flags wave in the breeze
  - dust doesn't fall at the right rate
  - hammer and feather experiment
  - rocket exhaust not visible from LM
- Image anomalies : *many anomalies are quoted...*

Great Moon Hoax / Evidence

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## So Many Image Anomalies...

- Shadow angles are **inconsistent** with illumination by Sun
- Shadow lengths are **inconsistent** with illumination by Sun
- Shadows are filled in by **another** light source
- **No** stars appear in the sky
- **No** blast crater underneath the Lunar Module engine
- **Same** background appears in images of **different** regions

*... and dozens more*

Great Moon Hoax / Evidence / Image Anomalies

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## So Many Image Anomalies...

Concerning the Hasselblad cameras used...

- Astronauts couldn't operate the cameras with gloves
- Fiducial cross marks appear **behind** objects
- Images are **perfectly** framed even though **no viewfinder**

Great Moon Hoax / Evidence / Image Anomalies

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## Look at the Evidence

Let's look at the evidence, piece by piece, and see how much of it stands up to scientific scrutiny.

Computers

Radiation

Video clips

Still images

Great Moon Hoax / Evidence

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# The Great Moon Hoax

## Computing Technology



Great Moon Hoax / Evidence / Computing

17

## Advancing Technology

1954: Scientists from the RAND Corporation illustrate how a "personal computer" might look in the year 2004...

"With teletype interface and Fortran language, the computer will be easy to use."



Great Moon Hoax / Evidence / Computing

18

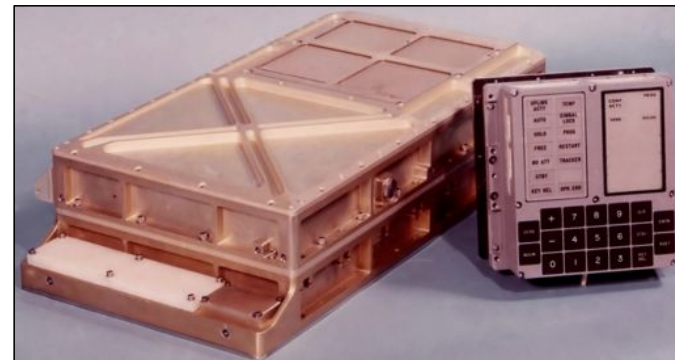
## Computers Too Big



Great Moon Hoax / Evidence / Computing

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## Apollo Guidance Computer



Was this sufficient computing power to put a man on the Moon?

Great Moon Hoax / Evidence / Computing

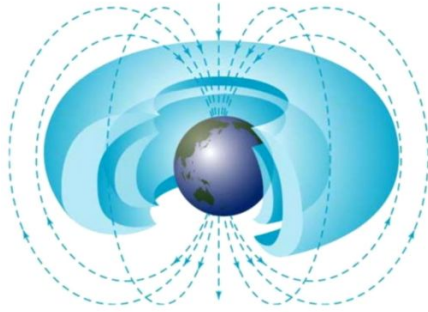
20

# The Great Moon Hoax

## Radiation

Energetic protons and electrons from the Sun get trapped in the Van Allen belts encircling the Earth.

Astronauts travelling to the Moon would receive a "lethal" dose of radiation.



Great Moon Hoax / Evidence / Radiation

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## Blowin' in the Wind



Great Moon Hoax / Evidence / Video / Flag

22

## Apollo 11 Flag



Great Moon Hoax / Evidence / Video / Flag

23

## Rocket Engines on the Moon

Why is there no rocket engine exhaust plume?



It must be a studio model on wires.

Great Moon Hoax / Evidence / Video / Engine Exhaust

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# The Great Moon Hoax

## Rocket Engines in Earth Orbit



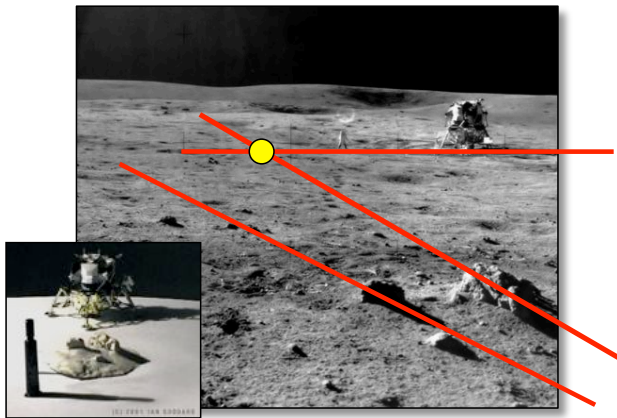
Engine exhaust plumes are not visible in a vacuum

Great Moon Hoax / Evidence / Video / Engine Exhaust

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## Impossible Shadows



Great Moon Hoax / Evidence / Images / Shadows

27

## Where's the Light Source?

If the Sun is the only light source, why is Aldrin visible when in shadow?



Great Moon Hoax / Evidence / Images / Shadows

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# The Great Moon Hoax

## Where Are the Stars?

Why are there no stars in the sky?

NASA didn't want to get it wrong!

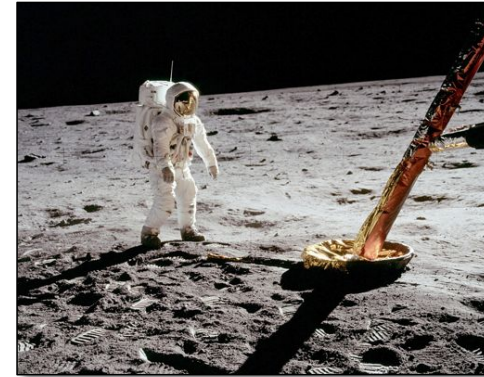


Great Moon Hoax / Evidence / Images / Stars

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## Why Footprints?

Why did the astronauts leave footprints, but the footpads on the Lunar Module did not sink into the soil?



Great Moon Hoax / Evidence / Images / Soil

30

## Sinking in the Soil

Why did the footpads on the Lunar Module not sink into the soil?

Sometimes they *did*.



Great Moon Hoax / Evidence / Images / Soil

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## Sinking in the Soil

Why is there no 'blast' crater visible below the descent engine?



Great Moon Hoax / Evidence / Images / Soil

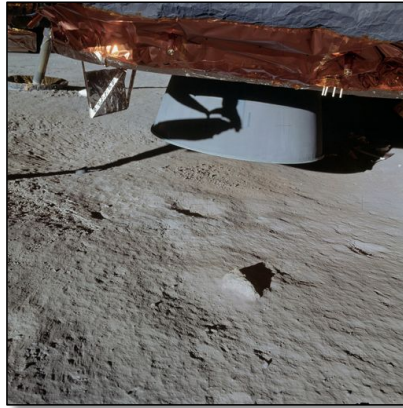
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# The Great Moon Hoax

## Sinking in the Soil

Sometimes there *is* a small blast crater — it is simply rather shallow.



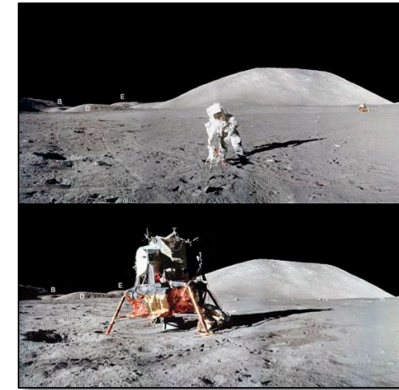
Great Moon Hoax / Evidence / Images / Soil

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## Studio Set

Two views taken from different locations have “identical” backgrounds.

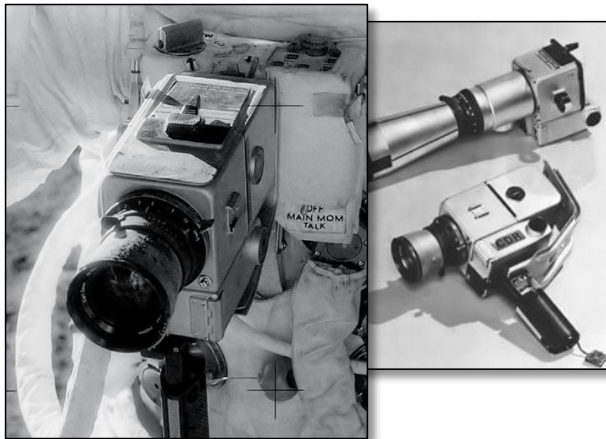
Is this proof that the same studio set “backdrop” was used twice?



Great Moon Hoax / Evidence / Images / Topography

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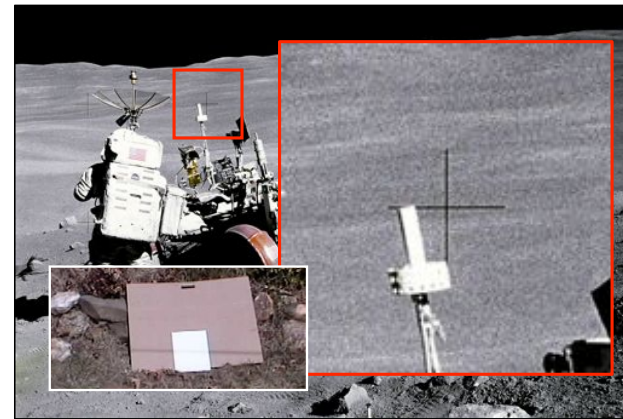
## Hasselblad Cameras



Great Moon Hoax / Evidence / Images / Cameras

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## Impossible Images



Great Moon Hoax / Evidence / Images / Fiducials

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# The Great Moon Hoax

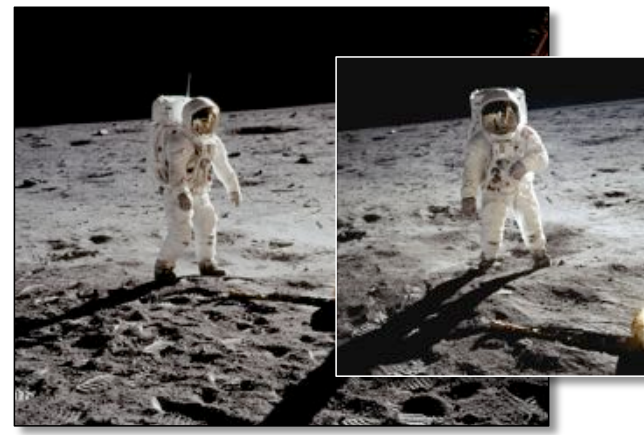
## How Did They Get Perfect Framing?



Great Moon Hoax / Evidence / Images / Framing

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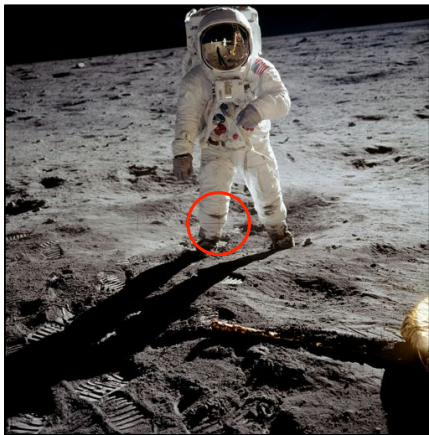
## Spot the Difference



Great Moon Hoax / Evidence / Images / Framing

38

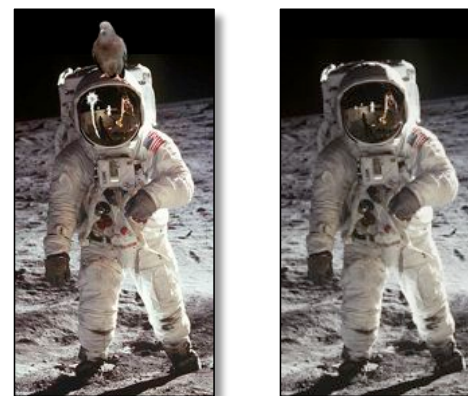
## How Did They Get Perfect Framing?



Great Moon Hoax / Evidence / Images / Framing

39

## Signs of Life



Take 1

Take 2

Great Moon Hoax / Evidence / Images

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# The Great Moon Hoax

## Proof

So the question remains...

Is there *any* evidence that can prove, beyond any reasonable doubt, that the moonlandings *did* take place?

That depends on your definition of 'reasonable'.

Great Moon Hoax / Proof

41

## Hammer and Feather



Great Moon Hoax / Proof / Hammer and Feather

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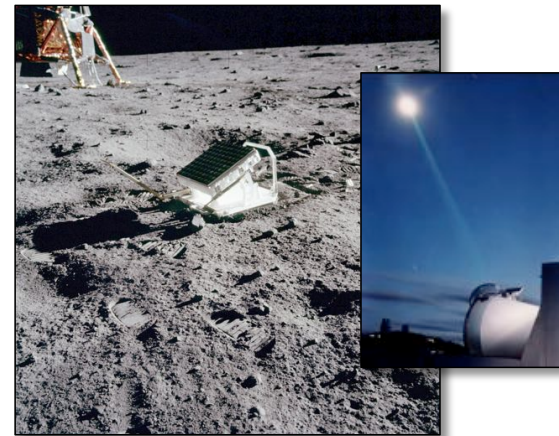
## Kicking Up Some Dust



Great Moon Hoax / Proof / Dust

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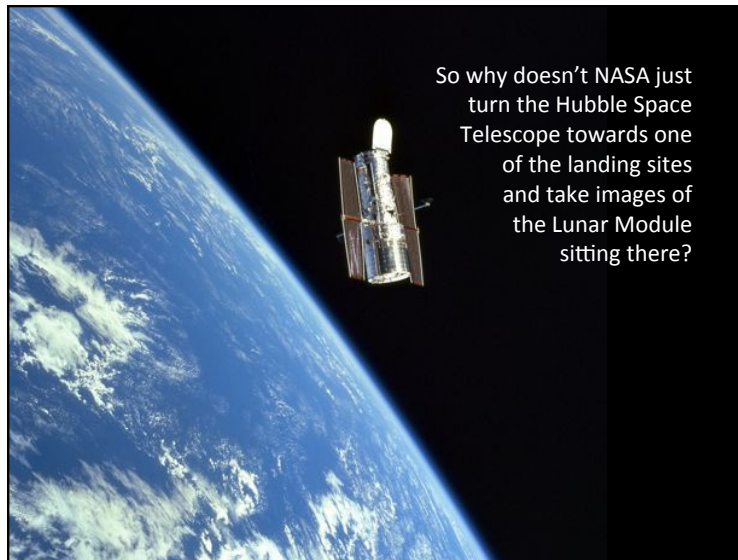
## Reflectors



Great Moon Hoax / Proof / Reflectors

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# The Great Moon Hoax



## Can Hubble See Apollo?

Despite what some Moon Hoax advocates believe, we still have to obey the laws of physics.

Resolution of the HST  $\sim \lambda / D \sim 0.2 \mu\text{radians}$

$\sim 10$  millionths of a degree

$\sim 0.05$  arc seconds.

To see an object a few metres across at a distance of 400,000 km would need a resolution of

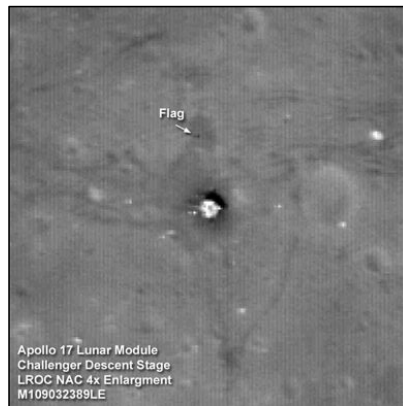
$\sim 0.01 \mu\text{radians}$

$\sim 0.002$  arc seconds.

The Lunar Module is **too small** by a factor of  $\sim 30$ .

## Can Anything See Apollo?

The mapping satellite Lunar Reconnaissance Orbiter Camera (LROC) has a Narrow Angle Camera (NAC) that can see the evidence.



## Be Sure of Your Facts

Professor Goddard does not know the relation between action and reaction and the need to have something better than a vacuum against which to react. He seems to lack the basic knowledge ladled out daily in high schools.

**New York Times editorial 1921**

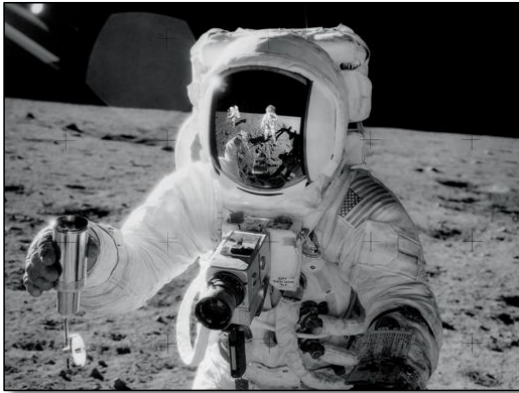
Correction: It is now definitely established that a rocket can function in a vacuum. The Times regrets the error.

**New York Times July 1969**



# The Great Moon Hoax

## What's Wrong With This Image?



Great Moon Hoax / Evidence / Images / Problem

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## What's the Point?

Why are there **so many** Moon Hoaxers?

Do they **really** believe their "scientific evidence"?

Most arguments can be countered with some basic physics...  
...so analysis of the "evidence" makes a good science lesson.

Thinking about why things (might) behave differently on the Moon can help teach "Physics on Earth".

Great Moon Hoax / Why

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