

SPECIAL 25th ANNIVERSARY EDITION



# MOON SHOT

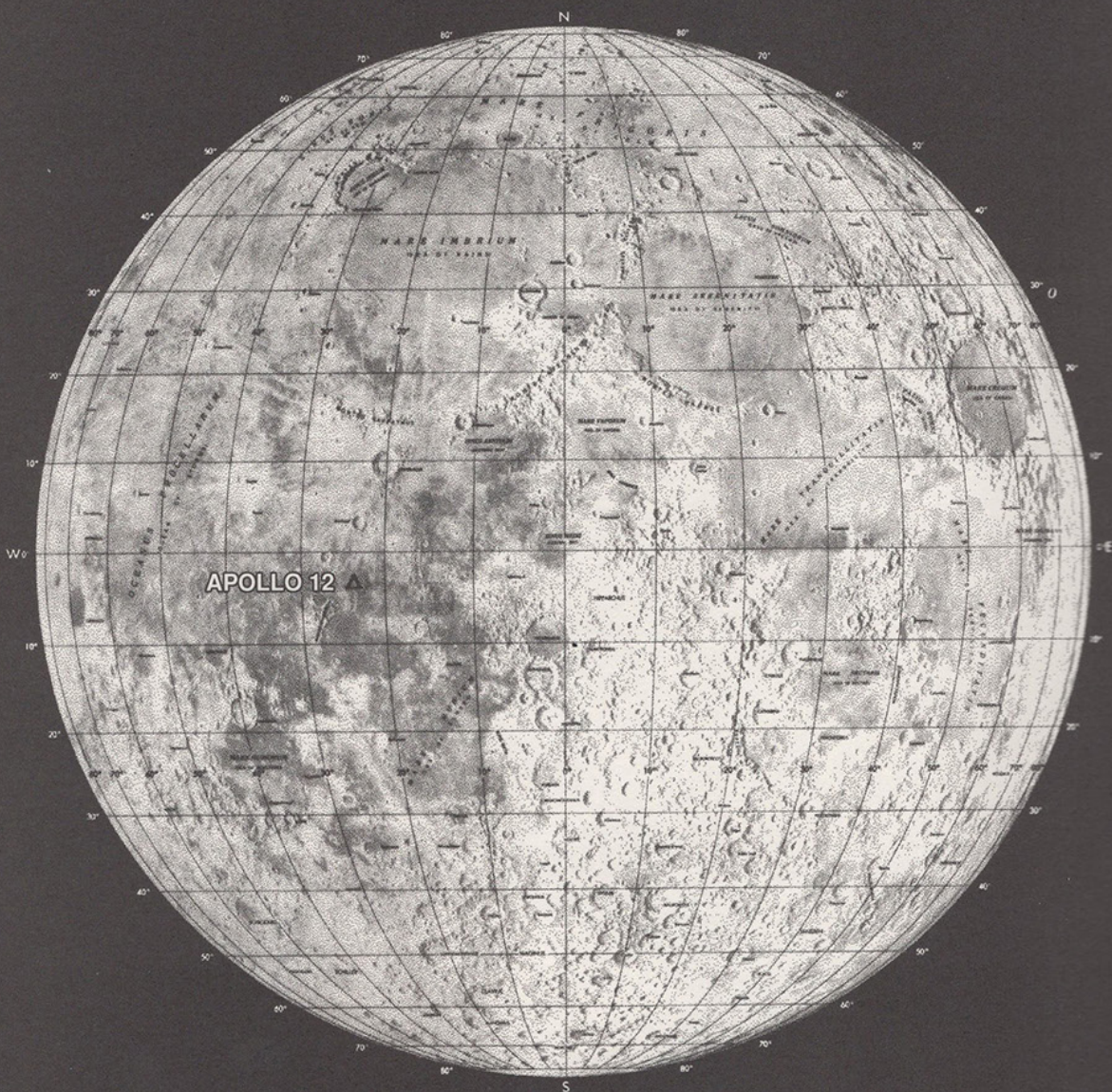
THE FLIGHT OF APOLLO XII

EXCLUSIVE  
ASTRONAUT  
INTERVIEWS



50th ANNIVERSARY  
REPRODUCTION

ALCALA-



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NOVEMBER 14, 1969,  
11:22 AM, APOLLO 12  
ROCKETS TOWARDS ITS  
APPOINTMENT WITH  
DESTINY...*THE MOON!*



**S**UDDENLY, AT T-PLUS 36 AND 53 SECONDS,  
THE EXPLOSIVELY FUELED SATURN V ROCKET,  
IS STRUCK BY *BOLTS OF LIGHTNING!*

**INSIDE THE COMMAND MODULE, THREE ASTRONAUTS WATCH AS EVERY EMERGENCY ALARM GOES HAYWIRE.**



**LUNAR MODULE PILOT, ALAN BEAN.**

WHAT HAPPENED?



**COMMAND MODULE PILOT, DICK GORDON.**

FULL CELLS  
DISENGAGED.

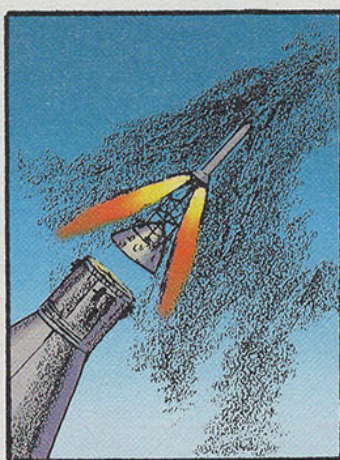


**AND COMMANDER CHARLES (PETE) CONRAD, MUST NOW CHOOSE...**

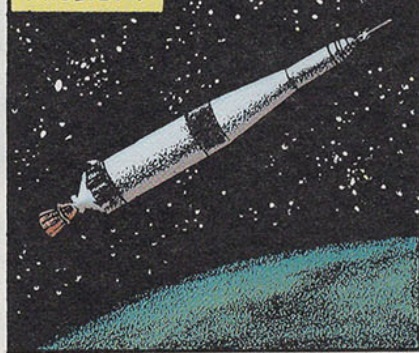
WE JUST LOST  
THE PLATFORM.



**HE WILL PULL THE ABORT HANDLE ON A MULTI-HUNDRED-MILLION DOLLAR MOON MISSION...**



**OR CHANCE RIDING A DEAD SPACECRAFT INTO ORBIT, A GUARANTEED ONE-WAY MISSION.**



PEPPER PIKE GRAPHIX PRESENTS

## **MOON SHOT**

The Flight of Apollo 12

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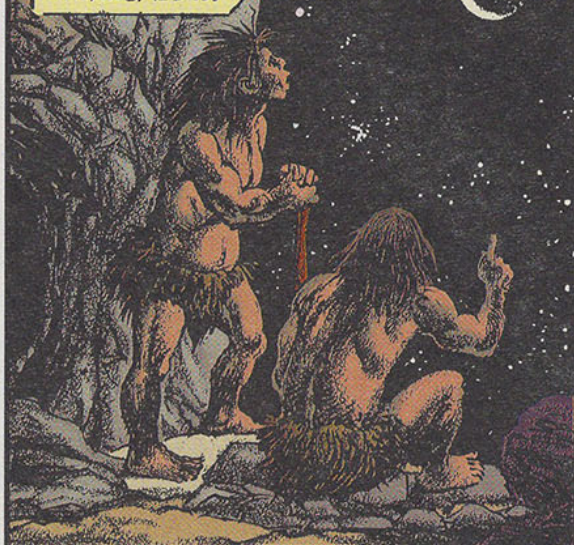
Capt. Richard Gordon USN (Ret.)

Capt. Alan Bean USN (Ret.)



**THE MOON, IT HAS FASCINATED HUMANITY THROUGHOUT THE AGES...**

**FROM THE DAWN OF MAN THEY HAVE WATCHED AND WONDERED...**



**TO SOME, IT WAS A GODDESS.**



**TO OTHERS, A CALENDAR.**

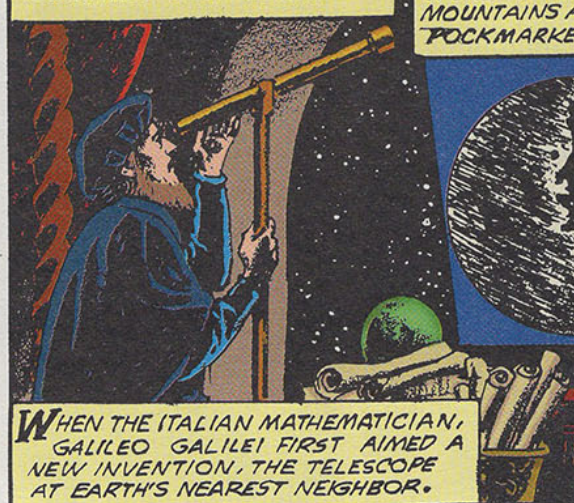


**THAT'S WHERE THE TERM "HARVEST MOON" ORIGINATED.**

**MANY PEOPLE BELIEVED THE MOON WAS A SMALLER VERSION OF EARTH, WITH STRANGE CREATURES LIVING ON ITS SURFACE.**

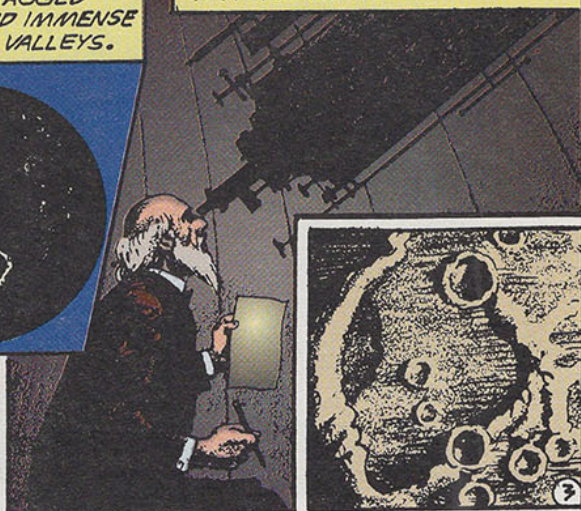


**IT WAS NOT UNTIL THE EARLY 17<sup>TH</sup> CENTURY THAT WE GOT OUR FIRST GOOD LOOK.**



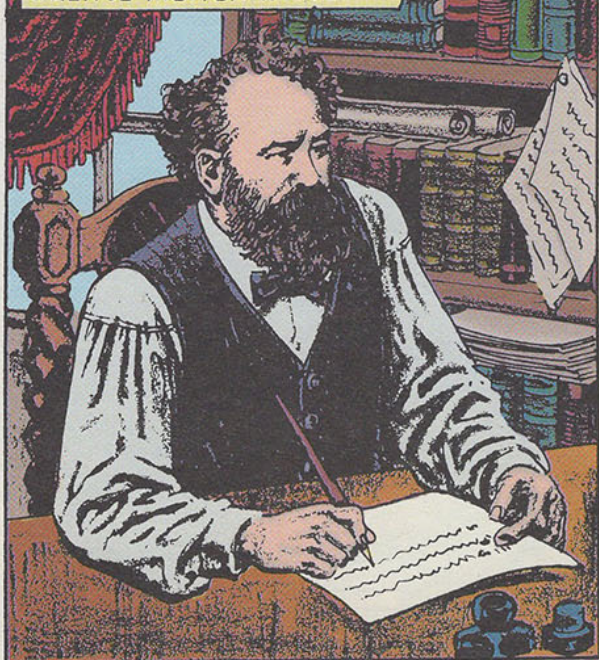
**HE FOUND NOT A MAN'S FACE, BUT A RUGGED WORLD WITH JAGGED MOUNTAINS AND IMMENSE POCKMARKED VALLEYS.**

**AS TIME AND SCIENCE MARCHED ON, WE CONTINUED TO WATCH THE MOON, BUT STILL COULD NOT TOUCH IT.**



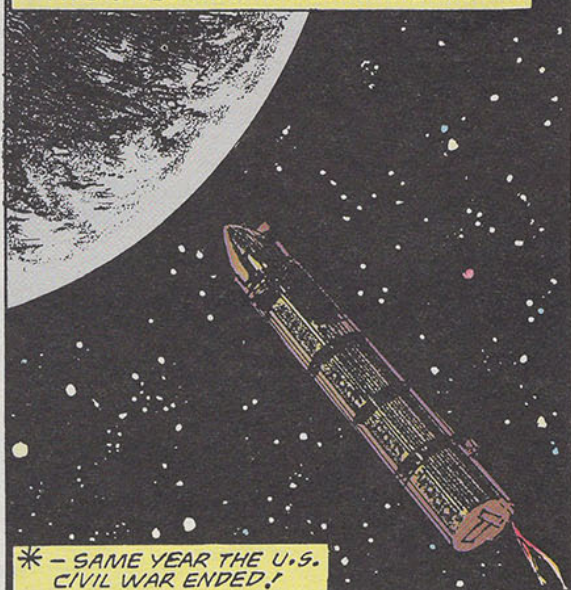
**WHEN THE ITALIAN MATHEMATICIAN, GALILEO GALILEI FIRST AIMED A NEW INVENTION, THE TELESCOPE AT EARTH'S NEAREST NEIGHBOR.**

**T**HE ONLY WAY TO TRAVEL TO THE MOON, WAS ON THE IMAGINATION OF THE EARLY SCIENCE FICTION WRITERS.



**JULES VERNE'S 1865 NOVEL "FROM THE EARTH TO THE MOON" WAS AN INSTANT BEST-SELLER.\***

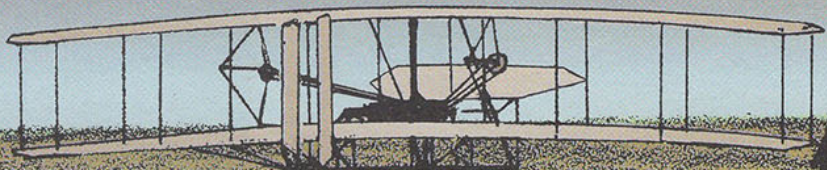
**IT TOLD THE STORY OF THREE MEN AND TWO DOGS THAT TRAVEL TO THE MOON.**



**\* - SAME YEAR THE U.S. CIVIL WAR ENDED!**

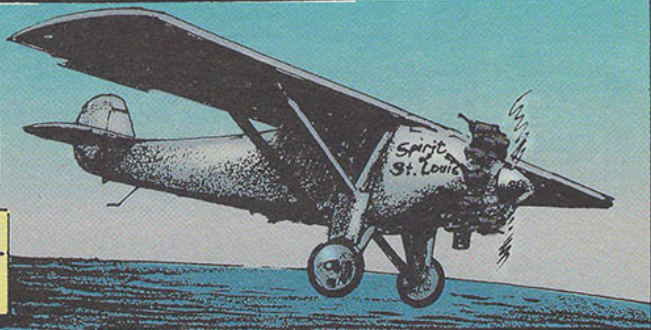
**B**UT BY 1865, WE HADN'T EVEN FLOWN THAT WOULD TAKE ANOTHER 38 YEARS.

**ORVILLE WRIGHT - DECEMBER 17, 1903.**



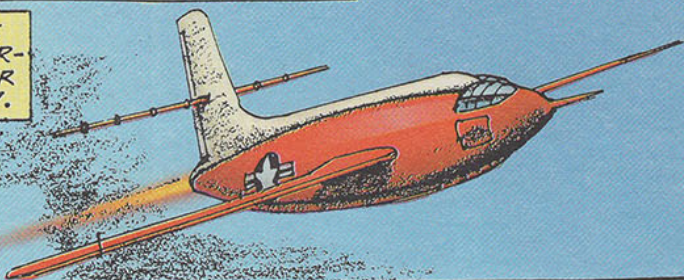
**WE CERTAINLY HADN'T FLOWN THE ATLANTIC SOLO...**

**CHARLES LINDBERGH - MAY 20-21, 1927.**



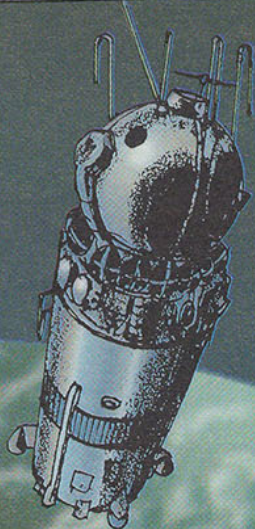
**NOR FLOWN FASTER THAN SOUND...**

**CHUCK YEAGER - OCTOBER 14, 1947.**



**AND DEFINITELY NOT IN SPACE!**

**RUSSIAN YURI GAGARIN - APRIL 12, 1961.**



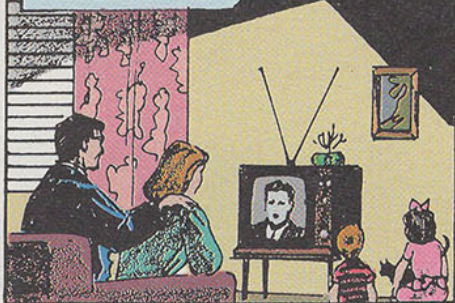
**T**O EXPLORE THE MOON, HUMANITY WOULD HAVE TO WAIT MORE THAN A CENTURY.

**I**N 1961, PRESIDENT JOHN F. KENNEDY TOLD THE AMERICAN PEOPLE THEY WERE HEADED UP.

"I BELIEVE THAT THIS NATION SHOULD COMMIT ITSELF TO ACHIEVING THE GOAL, BEFORE THIS DECADE IS OUT, OF LANDING A MAN ON THE MOON AND RETURNING HIM SAFELY TO THE EARTH."



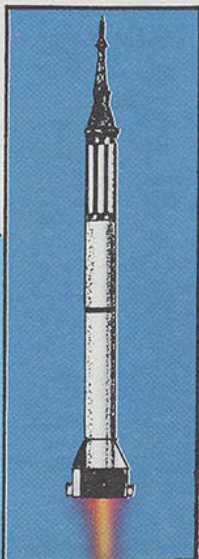
**"NO SINGLE SPACE PROJECT IN THIS PERIOD WILL BE MORE IMPRESSIVE TO MANKIND, OR MORE IMPORTANT IN THE LONG-RANGE EXPLORATION OF SPACE; AND NONE WILL BE MORE DIFFICULT OR EXPENSIVE TO ACCOMPLISH."**



**T**O GET THERE BY THE END OF THE DECADE, THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) HAD TO LEARN A LOT IN A HURRY.

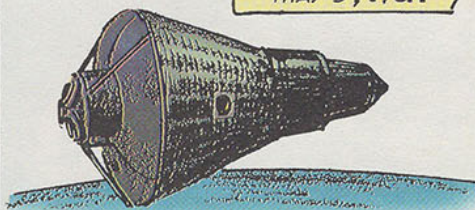


**T**HINGS LIKE-COULD MAN EVEN SURVIVE IN SPACE?



**P**ROJECT MERCURY TOOK THE FIRST AMERICANS INTO SPACE.

**ALAN SHEPARD - MAY 5, 1961.**



**A**ND THINGS LIKE-COULD HE SURVIVE LONG ENOUGH TO GO TO THE MOON?

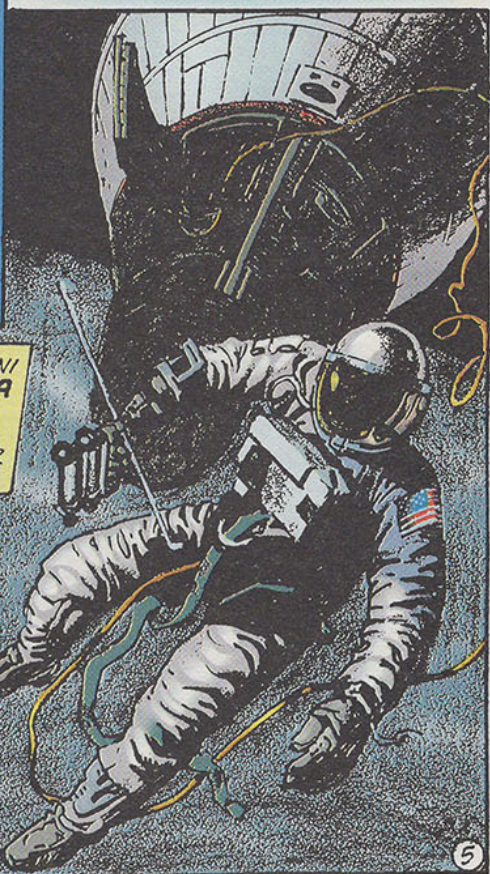
**C**OULD HE WALK IN SPACE?

**C**OULD HE RENDEZVOUS AND DOCK WITH OTHER SPACECRAFT?



**P**ROJECT GEMINI TAUGHT NASA MAN COULD SURVIVE, WALK AND MANEUVER IN SPACE.

**E**D WHITE - FIRST AMERICAN TO WALK IN SPACE - JUNE 3, 1965.



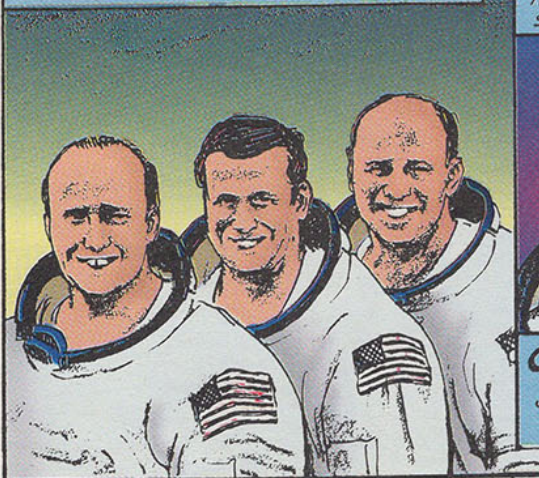
**IT WASN'T UNTIL JULY 20, 1969 THAT APOLLO 11 LANDED THE FIRST MEN ON THE MOON.**

THAT'S ONE SMALL STEP FOR A MAN, ONE GIANT LEAP FOR MANKIND...



**NEIL ARMSTRONG—FIRST MAN ON THE MOON.**

**NOW IT'S APOLLO 12'S TURN. THEY WILL TAKE SCIENCE TO THE MOON!**

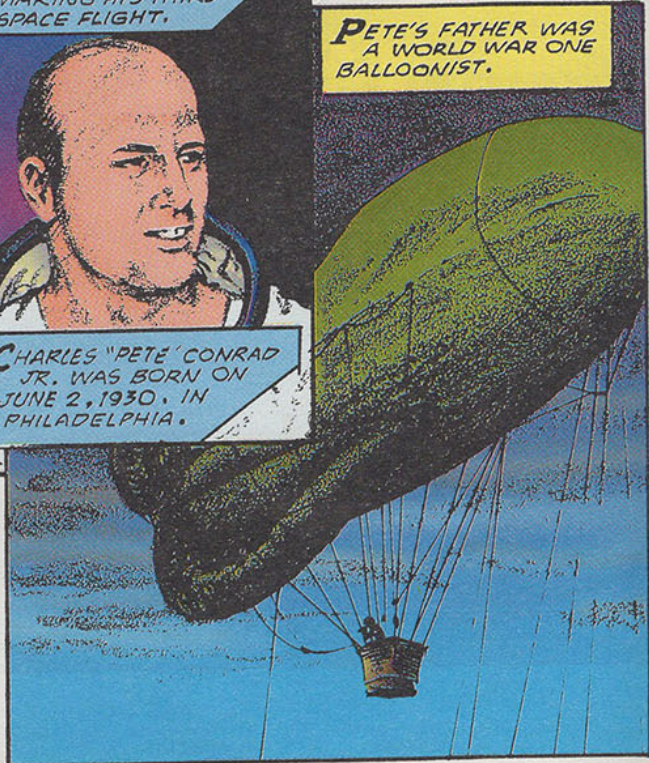


**THE APOLLO 12 CREW... MISSION COMMANDER PETE CONRAD WILL BE MAKING HIS THIRD SPACE FLIGHT.**

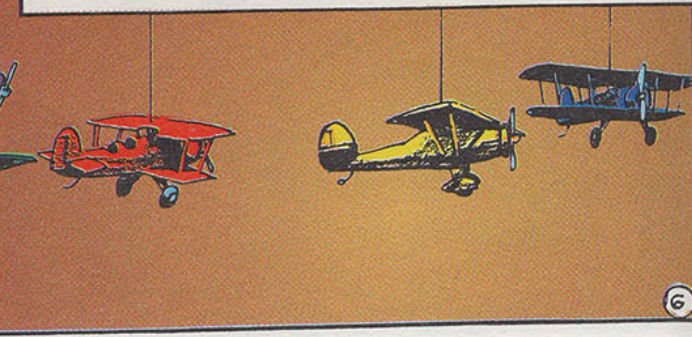
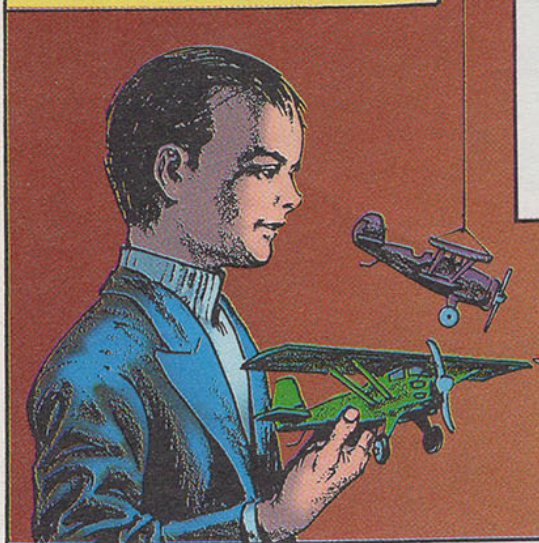


**CHARLES "PETE" CONRAD JR. WAS BORN ON JUNE 2, 1930, IN PHILADELPHIA.**

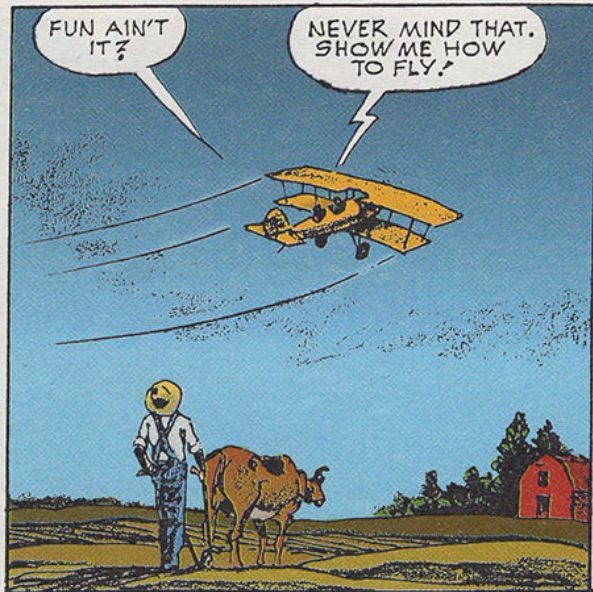
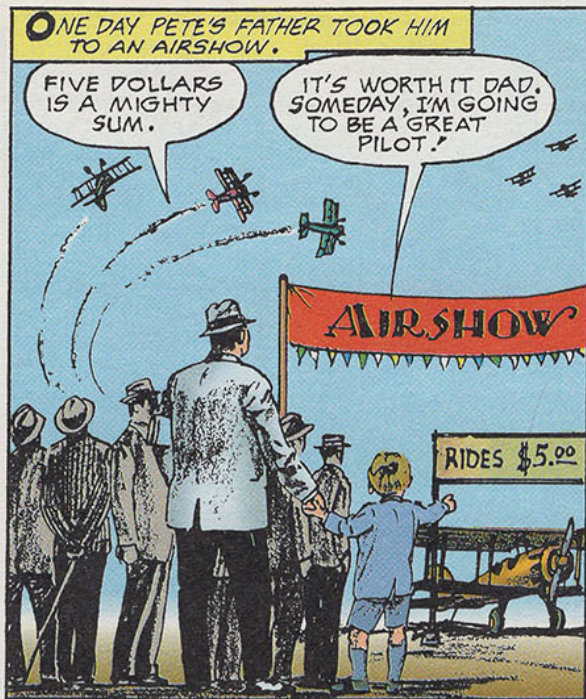
**PETE'S FATHER WAS A WORLD WAR ONE BALLOONIST.**



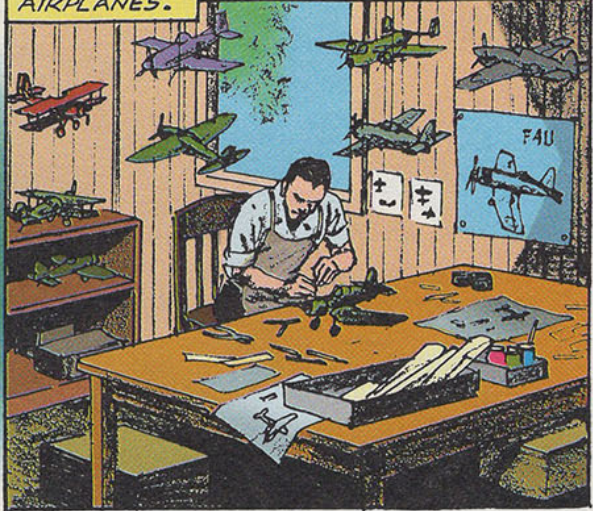
**MAYBE THAT IS WHERE HE GOT HIS LOVE OF AVIATION.**







LIKE PETE, WHEN DICK'S STUDYING AND CHORES WERE DONE, YOU COULD USUALLY FIND HIM IN HIS ROOM BUILDING MODEL AIRPLANES.

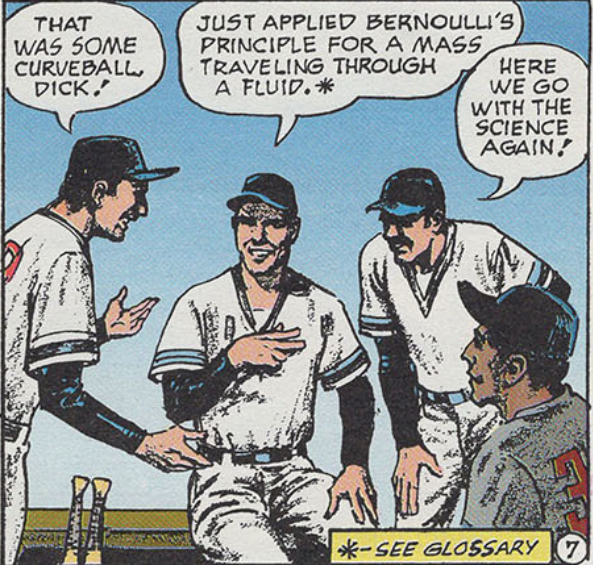
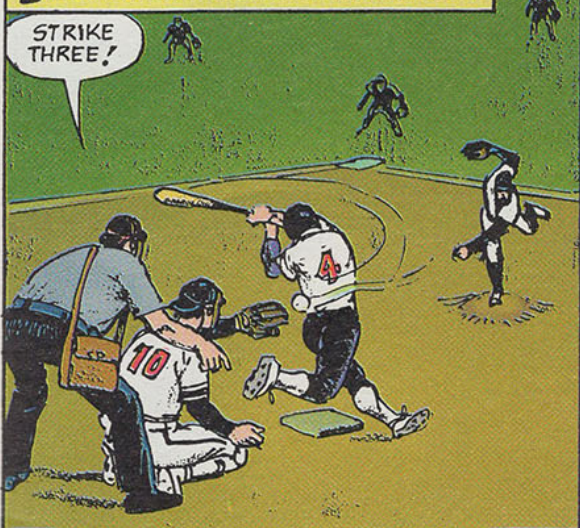


COMMAND MODULE PILOT DICK GORDON WILL BE MAKING HIS SECOND SPACE FLIGHT.

RICHARD FRANCIS GORDON JR. WAS BORN IN SEATTLE, WASHINGTON ON OCTOBER 5, 1929.



DICK ALSO EXCELLED AT ATHLETICS.



**L**UNAR  
MODULE  
PILOT ALAN  
BEAN  
WOULD BE  
MAKING  
HIS FIRST  
SPACE  
FLIGHT.

**A**LAN  
LAVERNE  
BEAN WAS  
BORN IN  
WHEELER  
TEXAS ON  
MARCH 15  
1932.



**L**IKE PETE  
AND DICK,  
ALAN LOVED  
ANYTHING TO  
DO WITH  
FLYING.



**H**E LOVED READING ABOUT BUCK ROGERS  
AND IMAGINED HIMSELF AS A SPACE  
TRAVELING HERO.

HOW'S BUCK  
GOING TO GET  
OUT OF THIS  
ONE?

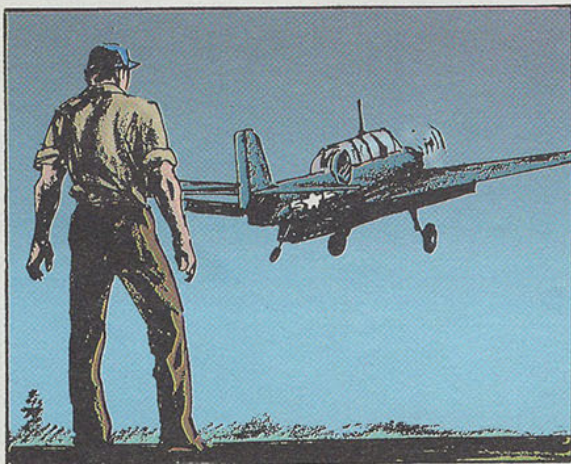
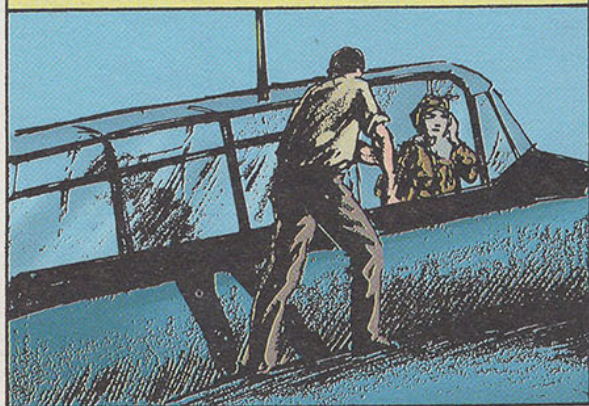
EXCUSE  
ME?



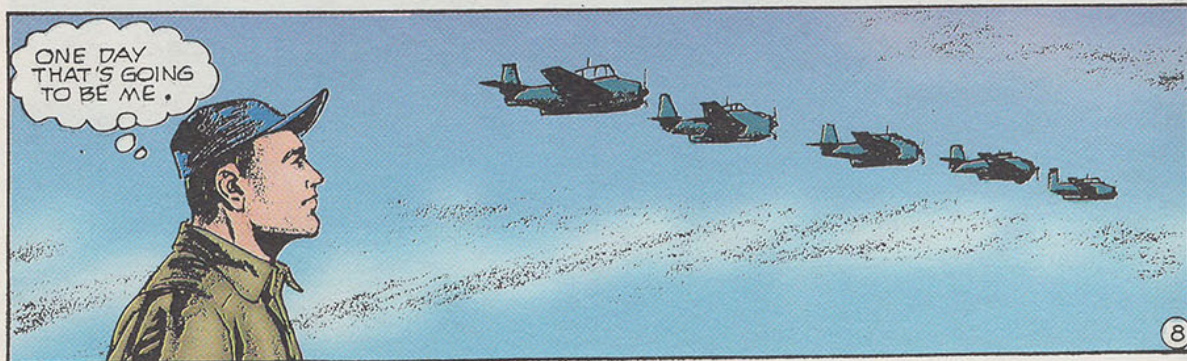
**W**HEN HE  
WAS 17,  
HE JOINED  
THE NAVY  
RESERVE.



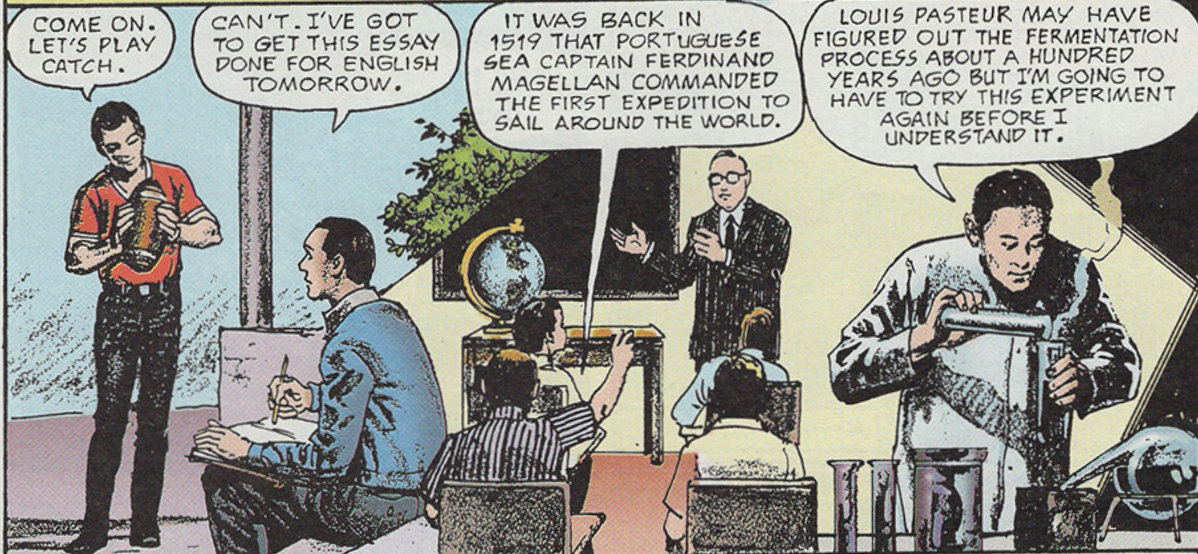
**O**NE OF HIS FAVORITE JOBS WAS TO HELP  
THE PILOTS GET READY TO FLY.



ONE DAY  
THAT'S GOING  
TO BE ME.



**ALL THREE KNEW IT TOOK MORE THAN A DESIRE TO FLY TO BECOME GREAT PILOTS!**



COME ON. LET'S PLAY CATCH.

CAN'T. I'VE GOT TO GET THIS ESSAY DONE FOR ENGLISH TOMORROW.

IT WAS BACK IN 1519 THAT PORTUGUESE SEA CAPTAIN FERDINAND MAGELLAN COMMANDED THE FIRST EXPEDITION TO SAIL AROUND THE WORLD.

LOUIS PASTEUR MAY HAVE FIGURED OUT THE FERMENTATION PROCESS ABOUT A HUNDRED YEARS AGO BUT I'M GOING TO HAVE TO TRY THIS EXPERIMENT AGAIN BEFORE I UNDERSTAND IT.

**PETE, DICK AND AL'S DETERMINATION PAID OFF.**

**WANTING TO FLY THE HOTTEST THINGS AROUND, EACH DECIDED TO JOIN THE NAVY AND EVENTUALLY QUALIFIED TO BECOME TEST PILOTS.**



NAVY WINGS ARE MADE OF GOLD. AIR FORCE WINGS ARE MADE OF LLLLLLAAA-AAAAA!

**AS A MATTER OF FACT, PETE WAS ONE OF AL'S INSTRUCTORS AT TEST PILOT SCHOOL.**



TEST SERIES ALPHA COMPLETE.

NOT BAD FOR GOVERNMENT WORK EH, PETE?

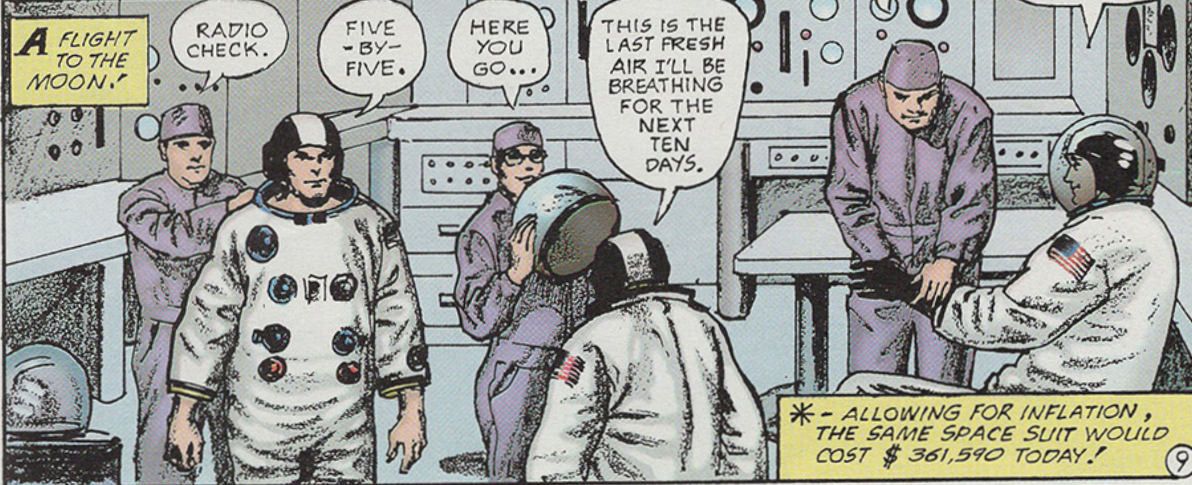
**AND PETE AND DICK WERE ROOMMATES ABOARD AN AIRCRAFT CARRIER.**



I HOPE YOU FLY PAPER AIRPLANES BETTER THAN YOU DO REAL ONES.

WATCH AND LEARN GORDON.

**NOW, AFTER BEING CHOSEN AS ASTRONAUTS AND WORKING HARD FOR YEARS, THESE THREE GREAT PILOTS ARE PREPARING TO EMBARK ON MANKIND'S GREATEST ADVENTURE...**



**A FLIGHT TO THE MOON!**

RADIO CHECK.

FIVE-BY-FIVE.

HERE YOU GO...

THIS IS THE LAST FRESH AIR I'LL BE BREATHING FOR THE NEXT TEN DAYS.

YOUR SUIT FITS GREAT TODAY SIR.

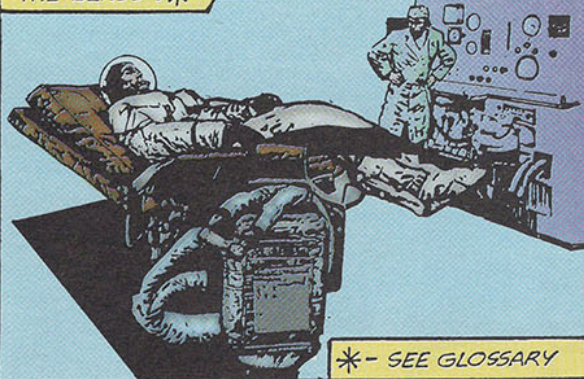
AT 100,000 DOLLARS A POP, I SHOULD HOPE SO.\*

\* - ALLOWING FOR INFLATION, THE SAME SPACE SUIT WOULD COST \$ 361,590 TODAY! \*

The Apollo suit would cost \$685,000 in 2019. Visit [www.nasa.gov/suitup](http://www.nasa.gov/suitup) to find out about the space suit for lunar astronauts of the Artemis Generation.

**A**LL DRESSED UP AND NOWHERE TO GO... FOR THE NEXT FEW HOURS.\*

**T**HE CREW MUST BREATHE PURE OXYGEN TO PURGE THE NITROGEN FROM THEIR TISSUES AND PREVENT THE BENDS.\*

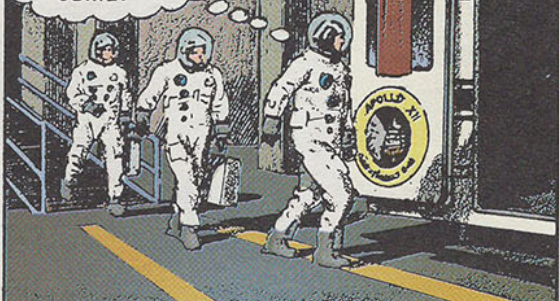


\*- SEE GLOSSARY

**P**ETE LEADS DICK AND AL TOWARDS THE TRANSFER VAN THAT WILL CARRY THEM TO...

T-3 HR, 7 MIN.\*

READY OR NOT  
MOON, HERE WE  
COME.



\*- T-MINUS 3 HOURS, 7 MINUTES

**T**HEIR RIDE - THE MIGHTY SATURN V!

**W**EATHER AT THE CAPE - LOW OVERCAST, LIGHT RAIN SHOWERS, GROUND WINDS UP TO 14 KNOTS - BARELY WITHIN NASA'S LAUNCH REQUIREMENTS.

**U**SUALLY SWARMING WITH TECHNICIANS WORKING ON THE ROCKET, TODAY LAUNCH PAD 39-A IS EMPTY.

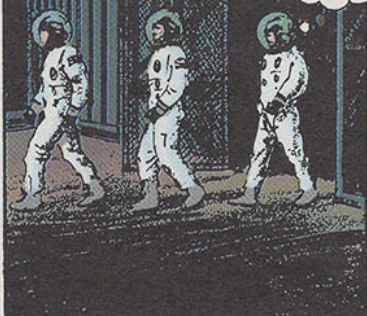
**A**POLLO 12'S SATURN-V IS ALIVE?

T-2 HR, 55 MIN.

**A**S THE COUNTDOWN CONTINUES, THE CREW INGRESSES.\*

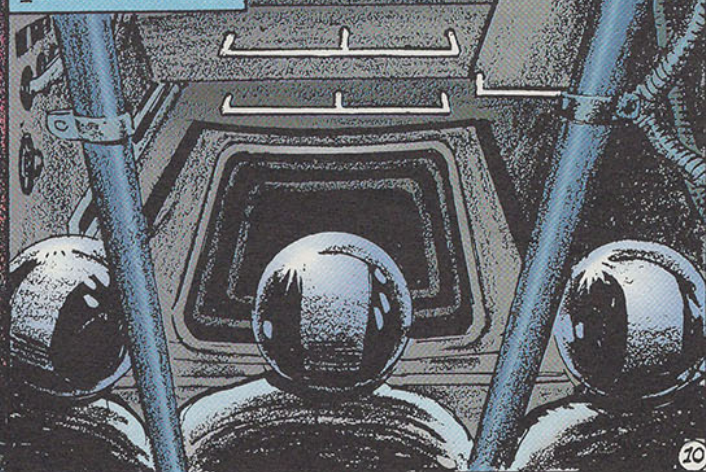
T-2 HR.  
40 MIN.

GEE, ADD  
A COUPLE  
MILLION  
POUNDS OF  
HIGHLY  
EXPLOSIVE  
FUEL TO  
THIS BIRD  
AND PEOPLE  
BECOME  
SCARCE.



\*-SEE GLOSSARY

**I**T'S A TIGHT FIT!



\*-SEE TECH NOTE

# TECH NOTES

## COMMAND MODULE - YANKEE CLIPPER

### STATS:

SERIAL NUMBER: CSM-108

MANUFACTURER: North American Rockwell

HEIGHT: 33 ft.

DIAMETER: 13 ft.

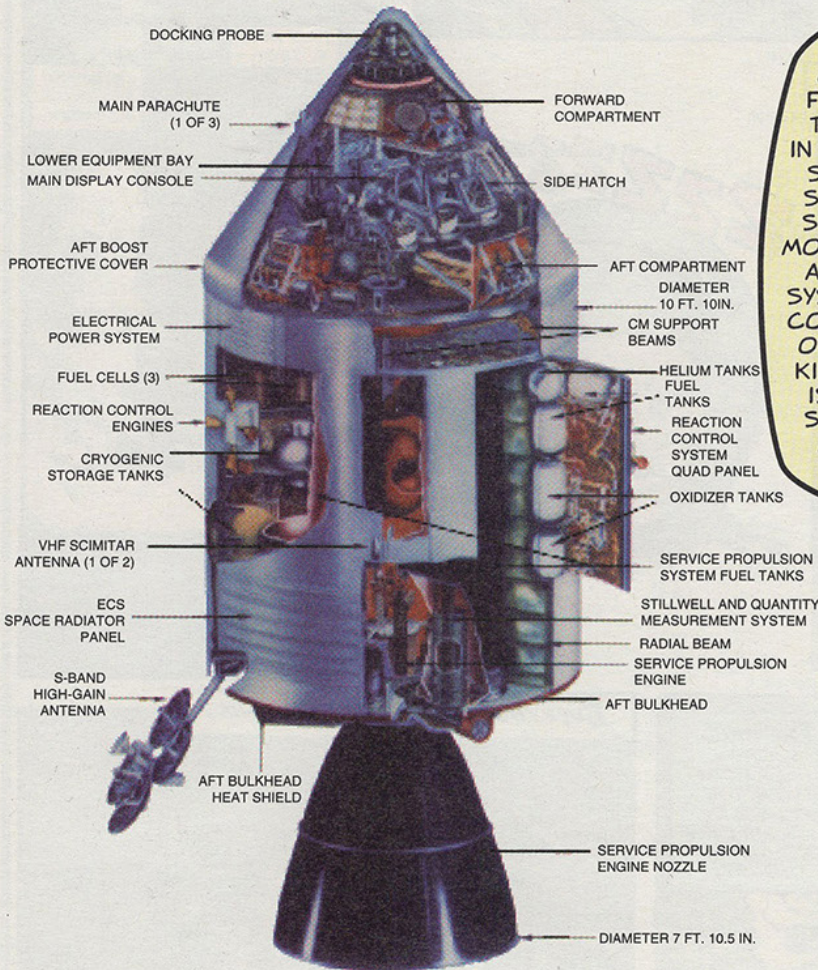
ROCKETS: 29

-- Command Module has twelve attitude XXthrusters

-- Service Module has sixteen attitude XXthrusters and one Service Propulsion XXSystem (SPS)

SPS THRUST: 20,050 lbs.

LOADED WEIGHT (fully fueled): 63,570 lbs.



THIS IS MY SHIP *YANKEE CLIPPER*, NAMED AFTER THE FAST WOODEN SAILING SHIPS THAT HELPED BUILD AMERICA IN THE 1900'S. THE CYLINDRICAL STRUCTURE WITH THE ENGINE STICKING OUT IS CALLED THE SERVICE MODULE, IT CARRIES MOST OF THE SUPPLIES AS WELL AS THE PRIMARY PROPULSION SYSTEM. ON TOP OF IT SITS THE COMMAND MODULE, WHICH KIND OF LOOKS LIKE A HERSHEY'S KISS. THE COMMAND MODULE IS ABOUT AS SPACIOUS AS A STATION WAGON AND SERVES AS OUR CONTROL CENTER, KITCHEN, BEDROOM AND BATHROOM!



### FUN FACTS:

The Command and Service Modules contain over two million parts!

The Command Module alone contains fifteen miles of wiring, enough to supply fifty two-bedroom homes!

Unlike the lunar module, the command module is designed for both air and space and must endure temperatures ranging from -280-degrees Fahrenheit to +5000-degrees Fahrenheit during reentry!

Read Tech Notes about Orion, the new NASA spacecraft that will carry the first woman and the next man to the Moon by 2024, on the next page.

# orion Quick Facts

Orion is America's next generation spacecraft that will take astronauts to exciting destinations never explored by humans. It will serve as the exploration vehicle that will carry the crew to distant planetary bodies, provide emergency abort capability, sustain the crew during space travel, and provide safe reentry from deep space.

## Orion Summary

Number of crew .....	4
Total change in velocity .....	4,390 ft/s
Gross liftoff weight .....	78,010 lbs
Injected mass .....	58,467 lbs

## Launch Abort System – Emergency Crew Escape System

### Mass Properties

Dry mass/propellant .....	11,120 lbs
Gross liftoff weight .....	16,850 lbs

## Crew Module – Crew and Cargo Transport

Pressurized volume (total) .....	690.6 ft <sup>3</sup>
Habitable volume (net) .....	316 ft <sup>3</sup>
Reaction control system (RCS) vacuum engine thrust .....	160 lbf/engine
Return payload .....	220 lbs

### Mass Properties

Dry mass/propellant .....	22,397 lbs
Oxygen/nitrogen/water .....	133 lbs
Propellant .....	370 lbs
Landing weight .....	20,500 lbs
Gross liftoff weight .....	22,900 lbs

## Service Module – Propulsion, Electrical Power, Fluids Storage

### Mass Properties

Dry mass .....	13,635 lbs
Gross liftoff weight .....	34,085 lbs

## Orion-to-Stage Adapter

### Mass Properties

Jettisoned Fairings .....	3,050 lbs
Spacecraft Adapter .....	1,125 lbs

### Crew Module

The crew module is capable of transporting four crew members beyond low-Earth orbit, providing a safe habitat from launch through landing and recovery.

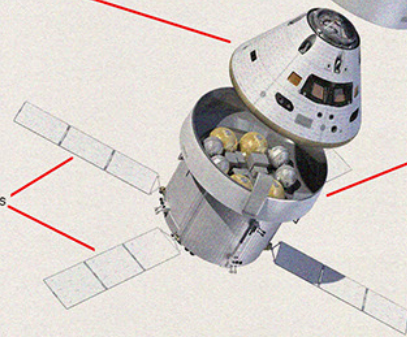
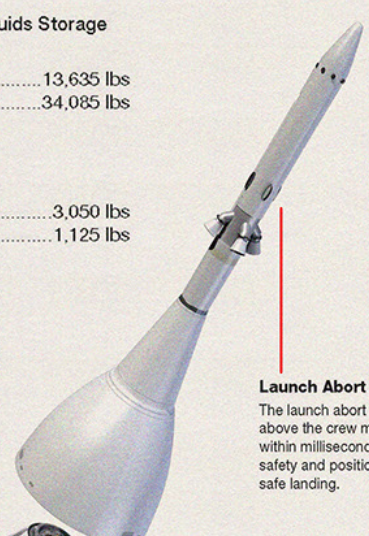
### Launch Abort System

The launch abort system, positioned above the crew module, can activate within milliseconds to pull the crew to safety and position the module for a safe landing.

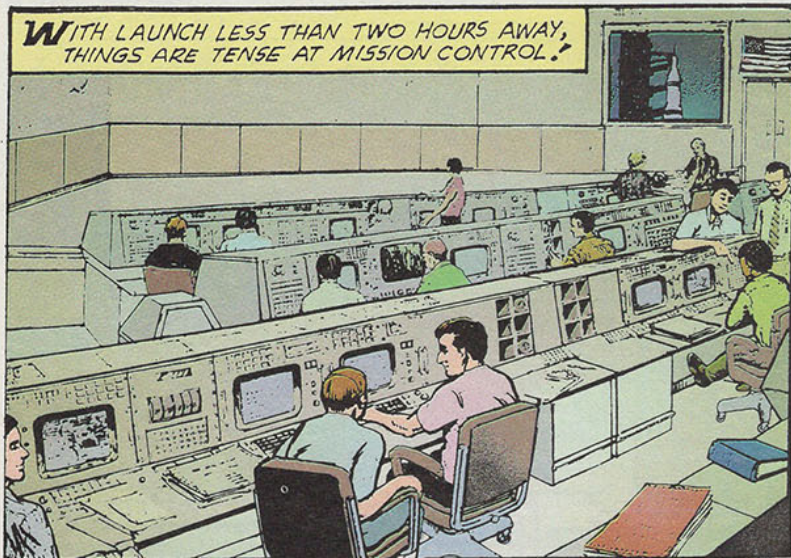
### Service Module

The service module provides support to the crew module from launch through crew module separation prior to entry. It provides in-space propulsion capability for orbital transfer, attitude control, and high altitude ascent aborts. While mated with the crew module, it also provides water, oxygen and nitrogen to support the crew module living environment, generates and stores power while in space, and provides primary thermal control. The service module also has the capability to accommodate unpressurized cargo.

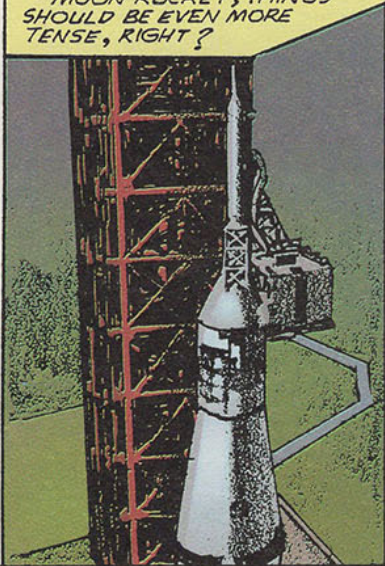
### Solar Arrays



WITH LAUNCH LESS THAN TWO HOURS AWAY, THINGS ARE TENSE AT MISSION CONTROL.



ON TOP OF THE HUMONGOUS MOON ROCKET, THINGS SHOULD BE EVEN MORE TENSE, RIGHT?



ZZZZZZZZ



T-42 MIN.

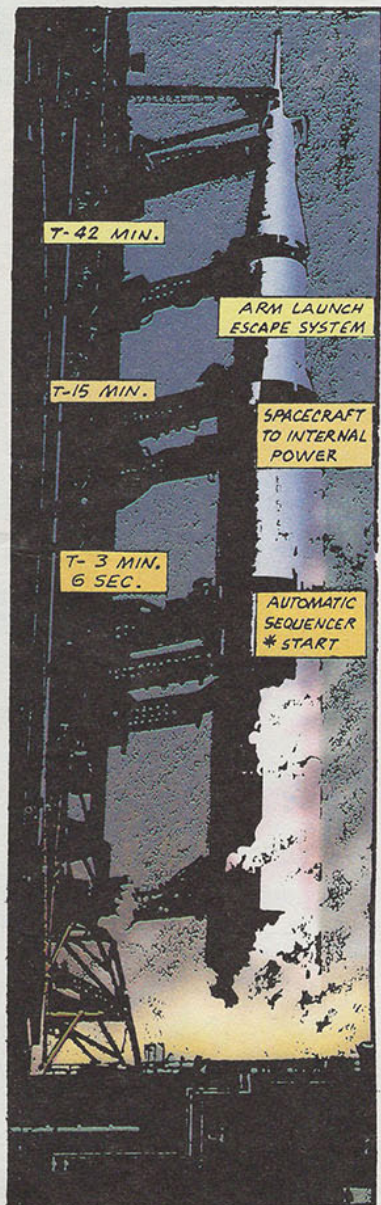
ARM LAUNCH ESCAPE SYSTEM

T-15 MIN.

SPACECRAFT TO INTERNAL POWER

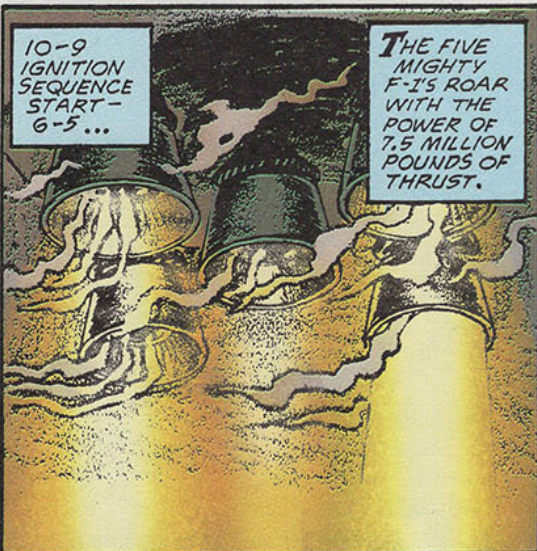
T-3 MIN. 6 SEC.

AUTOMATIC SEQUENCER \* START



10-9 IGNITION SEQUENCE START-6-5...

THE FIVE MIGHTY F-1'S ROAR WITH THE POWER OF 7.5 MILLION POUNDS OF THRUST.



EVERYBODY'S AWAKE FOR THIS!



# TECH NOTES

## APOLLO - SATURN V

### STATS:

SERIAL NUMBER: AS-507

### FUN FACTS:

The thirty seven rocket engines of the Saturn V have thrust ratings ranging from 70 lbs. to more than 1.5 million!

Made up of three million parts, the Saturn V consists of three stages and an instrument unit which provides vehicle guidance, navigation and control.

Due to the extremely cold propellant that powers the Saturn V, the 363 foot tall rocket actually shrinks ten inches when fully fueled!

### INSTRUMENT UNIT (IU)

MANUFACTURER: IBM

HEIGHT: 3 ft.

DIAMETER: 21 ft. 8 in.

WEIGHT: 4,306 lbs.

### THIRD STAGE (S-IVB)

MANUFACTURER: McDonnell Douglas

HEIGHT: 58.3 ft.

DIAMETER: 21.7 ft.

MAIN ENGINES: One J-2

WEIGHT: 260,523 lbs. (fueled), 25,000 lbs. (dry)

### FUN FACT:

Insulation between the third stage's liquid hydrogen and liquid oxygen tanks is necessary because liquid oxygen (-293-degrees Fahrenheit), is WARM ENOUGH to rapidly heat liquid hydrogen (-423-degrees Fahrenheit).

### SECOND STAGE (S-II)

MANUFACTURER: North American Rockwell

HEIGHT: 81 ft.

DIAMETER: 33 ft.

MAIN ENGINES: Five J-2

WEIGHT: 1,059,171 lbs. (fueled), 288,750 lbs. (dry)

### FUN FACT:

The second stage is made of a metal alloy that actually becomes stronger the colder it gets!

### FIRST STAGE (S-1C):

MANUFACTURER: Boeing

HEIGHT: 138 ft.

DIAMETER: 33 ft.

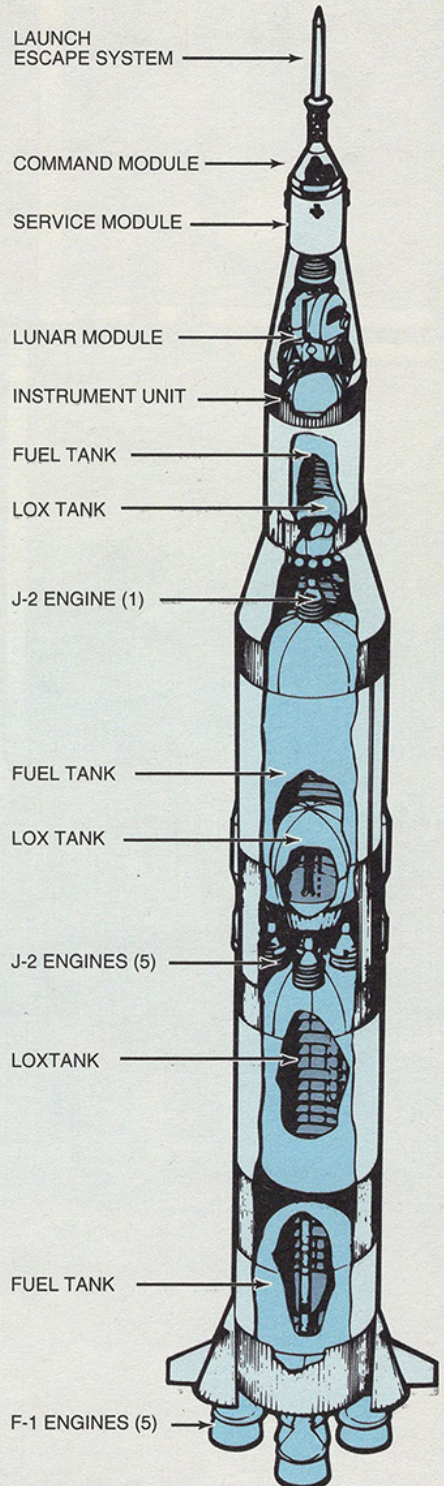
MAIN ENGINES: Five F-1

WEIGHT: 5,022,674 lbs. (fueled), 288,750 lbs. (dry)

### FUN FACTS:

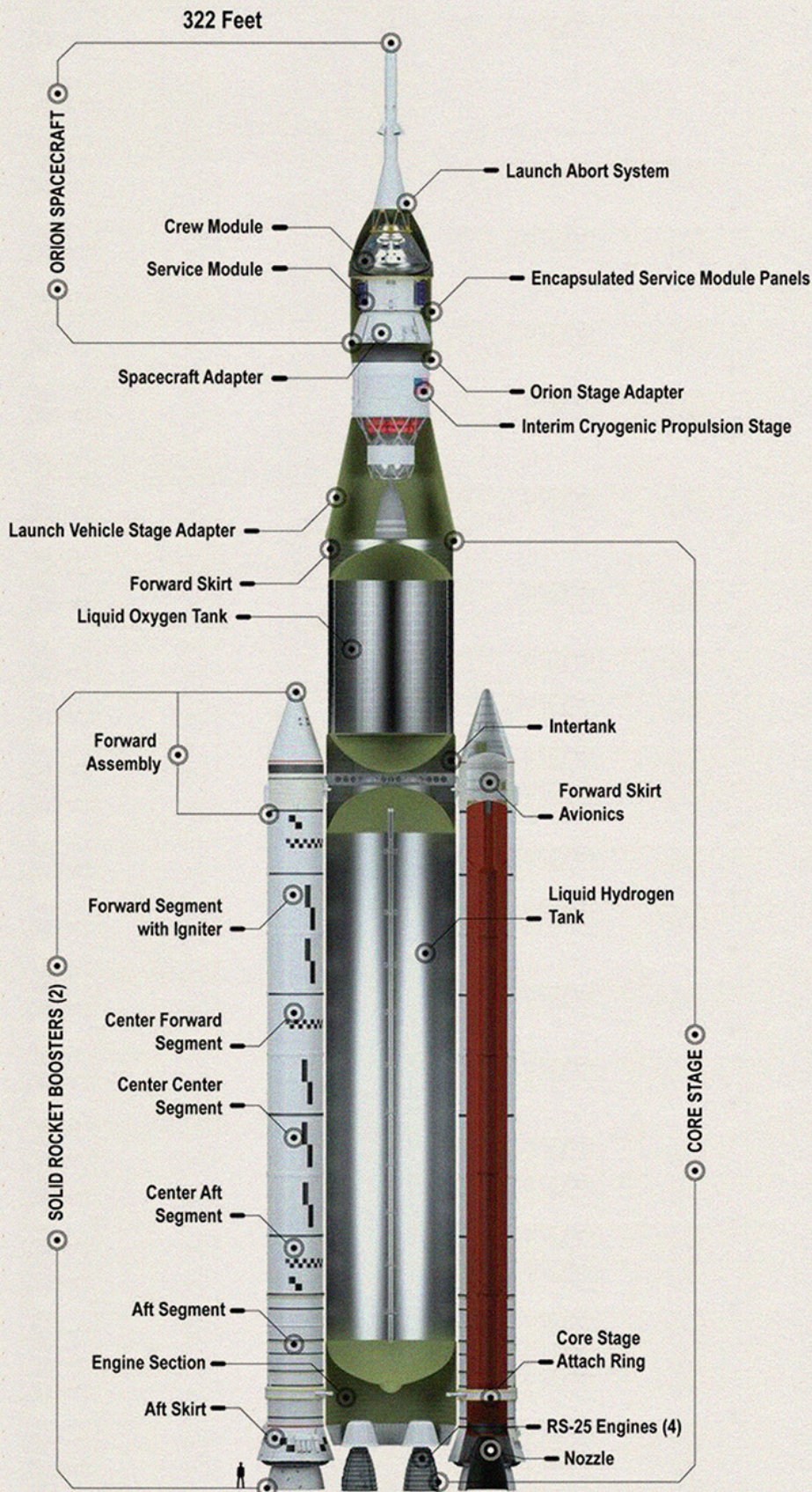
The rocket's five F-1 rocket engines produce 7.5 million pounds of thrust, equivalent to 62 Concorde supersonic airliners at maximum thrust!

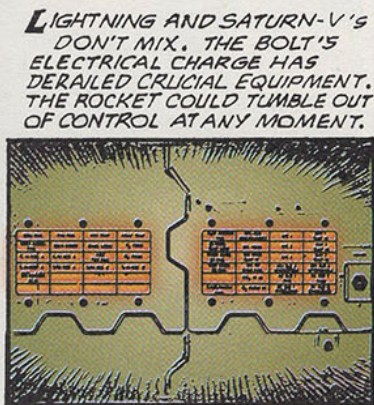
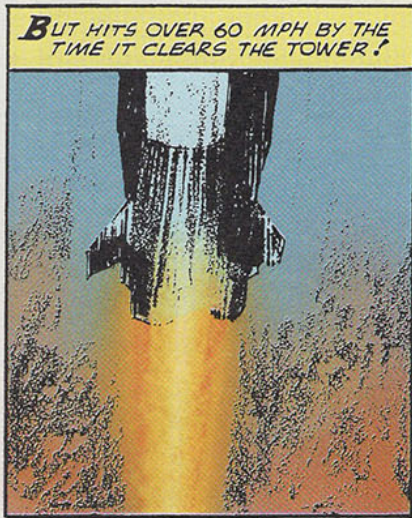
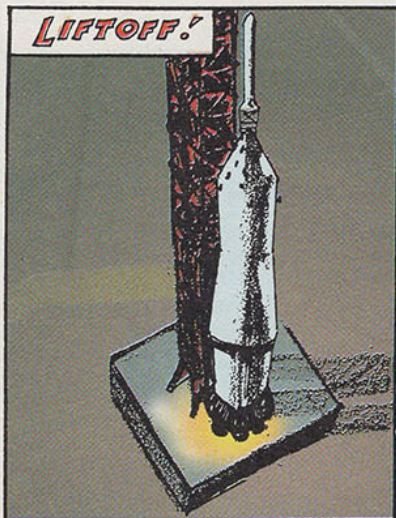
Burning nearly three tons of propellants every second, the temperature in the F-1's combustion chamber reaches almost 6,000 degrees Fahrenheit!





# SLS 70-metric-ton Initial Configuration





WHAT THE HECK IS GOING ON?

I THINK WE WERE HIT BY LIGHTNING.

YIKES!

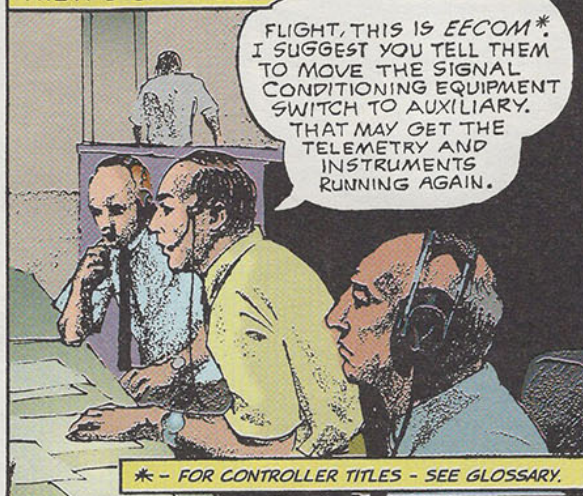
NASA'S COUNTING ON ME TO MAKE THE RIGHT DECISION. SO ARE DICK AND AL.

**AS MISSION COMMANDER, IT'S UP TO PETE.**

THIS IS A NEW ONE. NOBODY EVER THOUGHT ABOUT LIGHTNING.

AND MY MONEY SAYS WE RIDE IT OUT... FOR NOW.

**NOT ONLY ARE THE ASTRONAUTS WELL TRAINED, MISSION CONTROL KNOWS THEIR STUFF TOO!**



FLIGHT, THIS IS EECOM\* I SUGGEST YOU TELL THEM TO MOVE THE SIGNAL CONDITIONING EQUIPMENT SWITCH TO AUXILIARY. THAT MAY GET THE TELEMETRY AND INSTRUMENTS RUNNING AGAIN.

\* - FOR CONTROLLER TITLES - SEE GLOSSARY.

**THE FLIGHT DIRECTOR STANDING AT HIS POSITION TALKING INTO HIS MICROPHONE.**



GOOD IDEA EECOM. CAPCOM, TELL THEM - 'SCE TO AUX'.

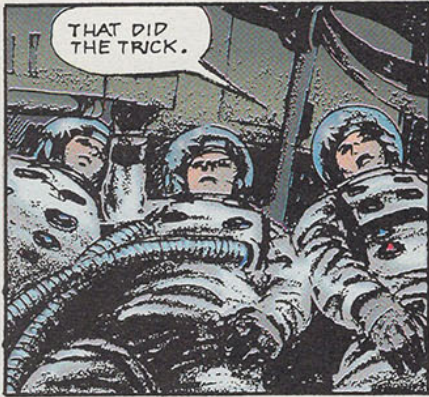


APOLLO 12, TRY...



**EACH ASTRONAUT IS RESPONSIBLE FOR DIFFERENT SYSTEMS. THIS ONE IS AL'S.**

I GOT IT.



THAT DID THE TRICK.



**BY T+2 MIN, 42 SEC. APOLLO 12 IS ALREADY 36 NAUTICAL MILES UP AND TRAVELING OVER A MILE A SECOND!**

HOUSTON, WE HAVE STAGING.

\* - A NAUTICAL MILES IS 1.1508 STATUTE MILES



**AT T+9 MIN, 13 SEC. THE SECOND STAGE DROPS AWAY. APOLLO 12 IS 103 MILES UP TRAVELING ALMOST 4 1/2 MILES A SECOND.**

WHAT A RIDE!

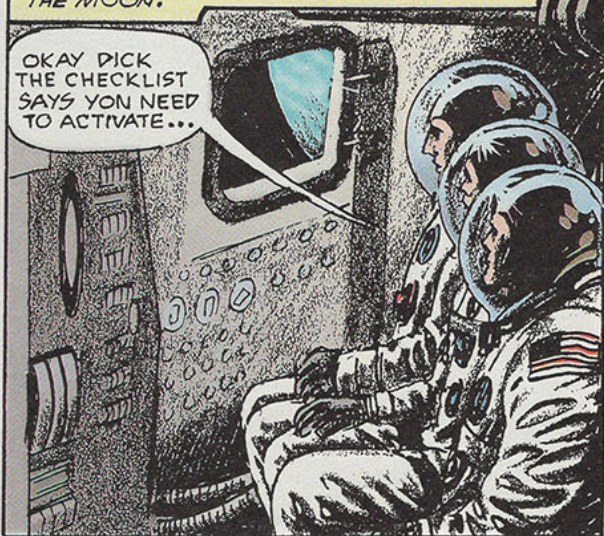
BY T+ 11 MIN, 33 SEC. THE THIRD STAGE HAS SHUT DOWN. THE MOON ROCKET IS NOW TRAVELING OVER 5 MILES PER SECOND.

HOUSTON, APOLLO 12 IS IN ORBIT AT 17,000 MPH.



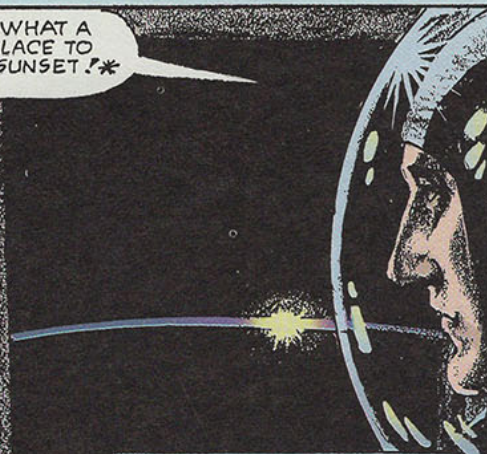
THERE IS PLENTY OF WORK TO BE DONE BEFORE APOLLO 12 CAN PRESS ON FOR THE MOON.

OKAY DICK THE CHECKLIST SAYS YOU NEED TO ACTIVATE...



PETE AND DICK HAVE BEEN HERE BEFORE BUT IT'S AL'S FIRST TRIP INTO SPACE.

MAN, WHAT A COOL PLACE TO SEE A SUNSET!\*



\* - IN EARTH ORBIT, A SPACECRAFT SEES ONE SUNSET EVERY 90 MINUTES

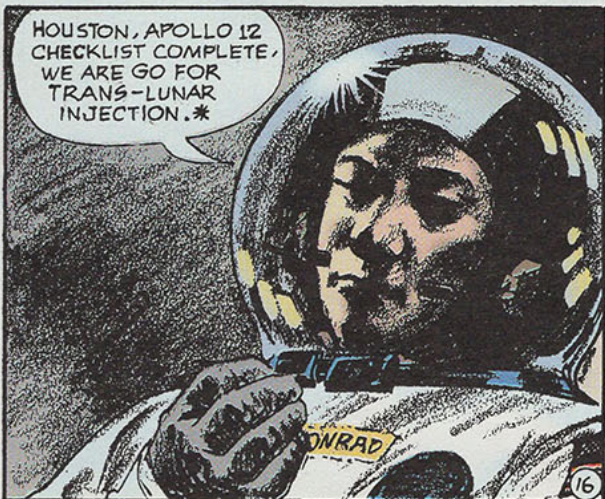
FROM ORBIT, THE MIGHTY HIMALAYAS LOOK LIKE A CRUMPLED SHEET OF PAPER.



I'M GLAD I'M FLYING WAY OVER TOP THOSE THUNDERSTORMS INSTEAD OF INSIDE OF THEM.



HOUSTON, APOLLO 12 CHECKLIST COMPLETE, WE ARE GO FOR TRANS-LUNAR INJECTION.\*



\* - A FIRING OF THE THIRD STAGE ROCKET DESIGNED TO SPEED APOLLO 12 TOWARD THE MOON.

**BUT BACK AT MISSION CONTROL, THEY ARE NOT SO SURE.**

THOSE BOLTS OF LIGHTNING MAY HAVE DAMAGED ELECTRICAL SYSTEMS OUR TESTING HASN'T EXPOSED.

THERE IS A GOOD CHANCE THE PYROTECHNICS \* ON THE COMMAND MODULE'S REENTRY PARACHUTES MAY HAVE MISFIRED.

WITHOUT THOSE PARACHUTES, THE CREW DOESN'T STAND A CHANCE.

\* SEE GLOSSARY.

AS FLIGHT DIRECTOR, IT'S MY CALL.

THE CREW WOULD WANT TO PRESS ON.

BUT THAT'S THE KIND OF GUYS THEY ARE.

AND THE KIND OF GUY I AM.

**AFTER ALL, YOU DON'T GO WHERE NO MAN HAS GONE BEFORE WITHOUT GOING BOLDLY.**

3-2-1  
IGNITION!

TRANS-LUNAR INJECTION - 2 HRS.  
53 MIN (GET) GROUND ELAPSED TIME

THE SATURN V'S 3RD STAGE FIRES FOR 4 1/2 MINUTES, INCREASING APOLLO 12'S SPEED TO ABOUT 25,000 MPH - ALMOST SEVEN MILES PER SECONDS.

HOUSTON, APOLLO 12 IS REALLY HAULING THE MAIL.

WE ARE ON OUR WAY, JOSE!

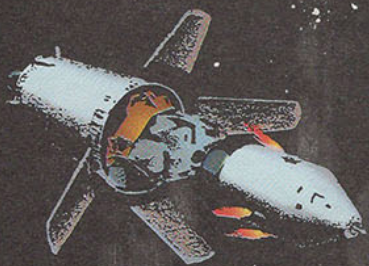
THEIR TARGET LIES SOME THREE DAYS AND 200,000 PLUS MILES AWAY.

COMMAND MODULE PILOT, DICK GORDON IS IN CHARGE OF THE NEXT CRUCIAL MANEUVER ...

T+3 HR. 18 MIN.

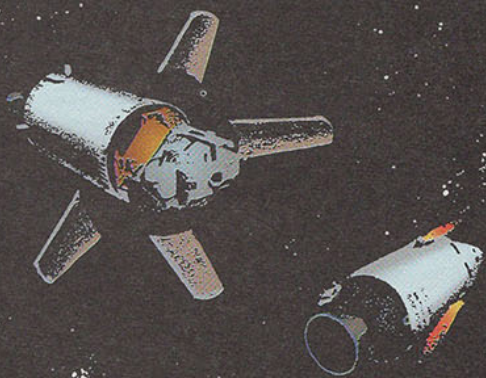
17

... TRANSPOSITION AND DOCKING.



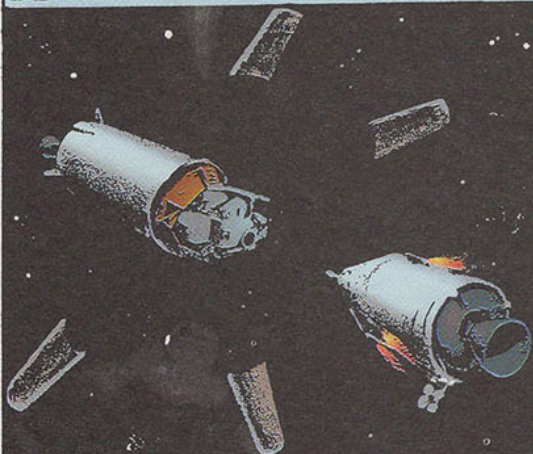
USING THE SERVICE MODULE'S REACTION CONTROL ENGINES, DICK SEPARATES "YANKEE CLIPPER" FROM THE REST OF THE ROCKET...

HIS GOAL, EXTRACT THE LUNAR MODULE "INTREPID" FROM THE NEW USELESS ROCKET.



ABOUT 75 FEET OUT, DICK AGAIN FIRES THE THRUSTERS AND THE COMMAND MODULE TURNS AROUND...

AND CAREFULLY APPROACHES "INTREPID".



YANKEE CLIPPER IS 65,000 POUNDS OF HIGHLY EXPLOSIVE FUEL PACKED INTO A THIN SHELL. IT'S ABOUT TO MEET 35,000 POUNDS OF THE SAME IN THE INTREPID.

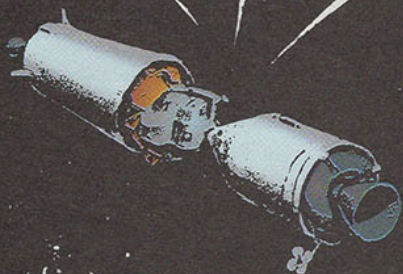


EASY DOES IT.

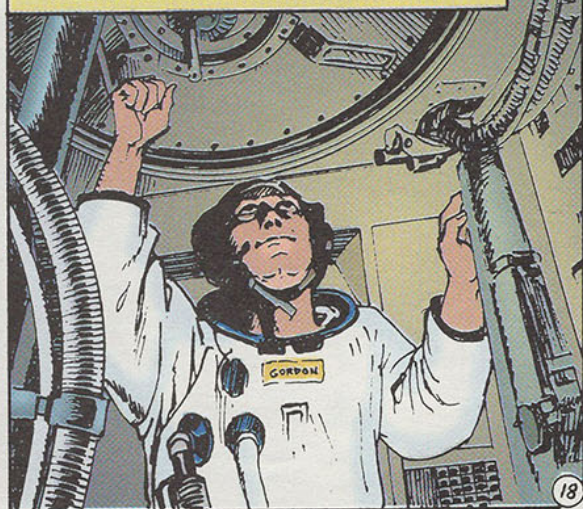
HOUSTON, WE HAVE DOCKING.

COULDN'T HAVE DONE BETTER MYSELF!

WAY TO GO DICK!



DICK MUST CHECK TO MAKE SURE THE DOCKING LATCHES ARE ENGAGED.



- DOCKING LATCHES ENGAGED -  
- UMBILICALS ATTACHED -  
- PRESSURE EQUALIZED -  
- SEPARATION .

4:14  
G.E.T.

THE LUNAR  
MODULE IS  
LOOKING  
GOOD  
HOUSTON.

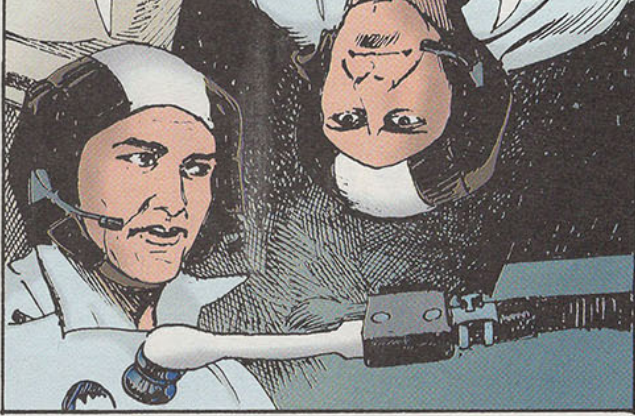
NOT BAD  
AFTER  
20,000  
MILES  
IN THE  
BACK  
SEAT.



THE CREW FINALLY GETS TO CLIMB OUT  
OF THEIR SPACE SUITS. WEIGHTLESSNESS  
HAS CHANGED THEIR BODIES.

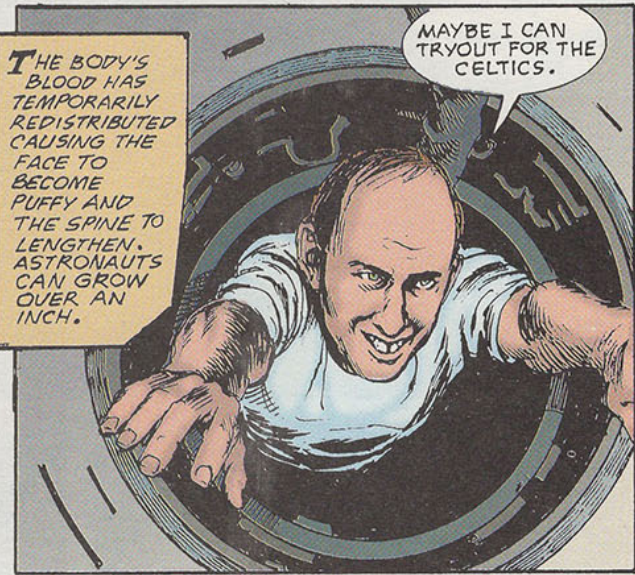
YOU'RE  
UPSIDE DOWN  
DICK.

NO, YOU'RE  
UPSIDE DOWN  
AL.



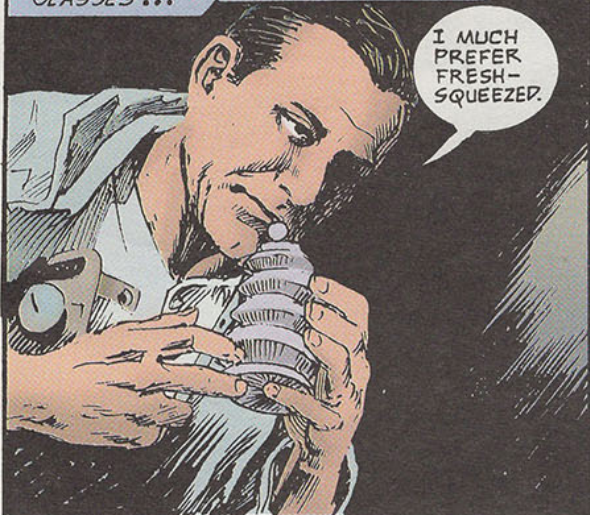
THE BODY'S  
BLOOD HAS  
TEMPORARILY  
REDISTRIBUTED  
CAUSING THE  
FACE TO  
BECOME  
PUFFY AND  
THE SPINE TO  
LENGTHEN.  
ASTRONAUTS  
CAN GROW  
OVER AN  
INCH.

MAYBE I CAN  
TRYOUT FOR THE  
CELTICS.



FINALLY, IT'S TIME TO EAT. IN SPACE,  
DINNER TIME MEANS SQUEEZABLE  
GLASSES ...

I MUCH  
PREFER  
FRESH-  
SQUEEZED.



FREEZE-DRIED REHYDRATABLE SPOON-BOWLS  
AND INTERMEDIATE MOISTURE BITES. NOT  
EXACTLY GOURMET DINING.

THIS IS THE BEST  
HAM PASTE I'VE  
HAD TODAY.



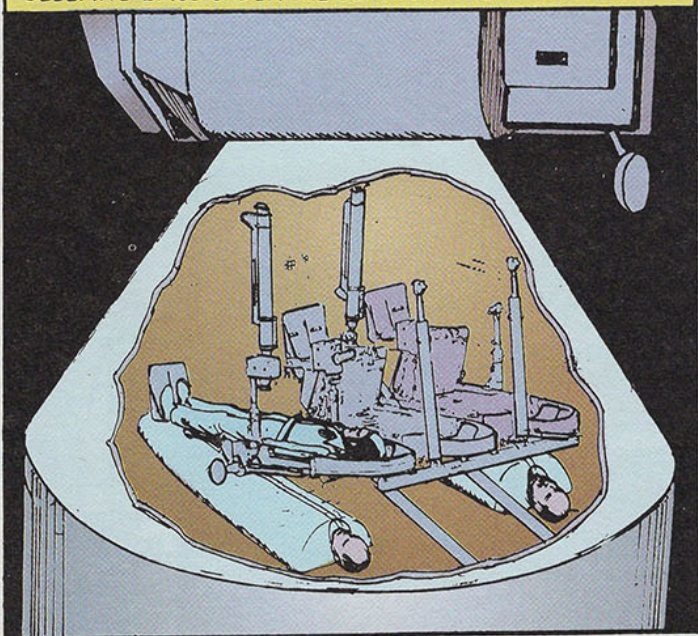
17:00 G-E-T.

OKAY CREW, IT'S BEEN A LONG DAY. LET'S GET THESE WINDOW BLINDERS UP SO WE CAN GET SOME SHUTEYE.\*



\* - IN CISLUNAR SPACE THERE IS NO DAY OR NIGHT.

DICK SLEEPS IN THE LEFT COUCH WITH THE HEADSET ON, READY TO TALK WITH MISSION CONTROL IN CASE OF AN EMERGENCY. PETE AND AL USE THE BETA-CLOTH SLEEPING BAGS UNDER THE LEFT AND RIGHT COUCHES.

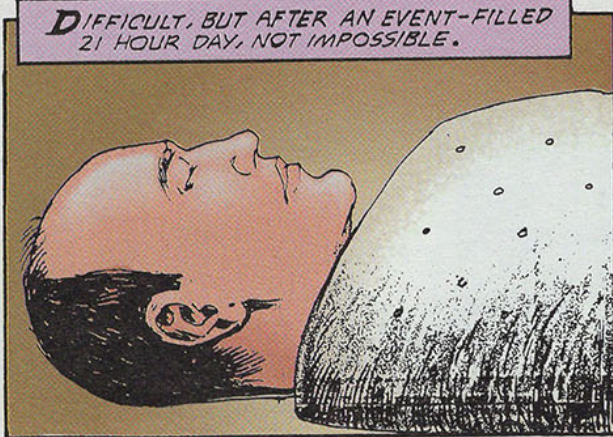


ZIPPED INTO HIS SLEEPING BAG, AL FINDS IT HARD TO SLEEP.

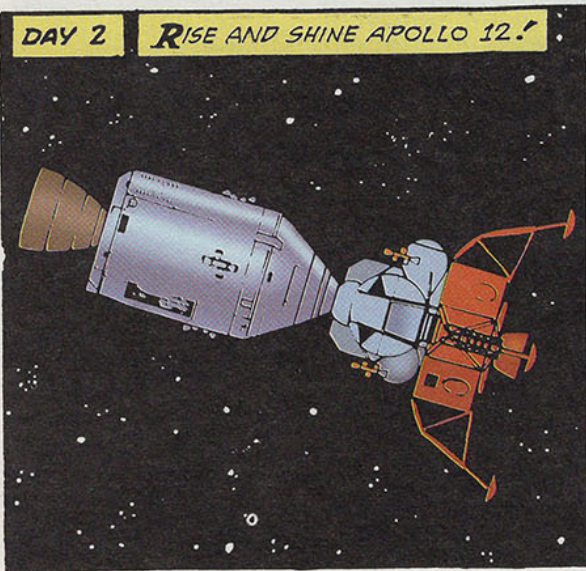
MAN, THIS IS STRANGE. THERE IS NO PRESSURE ON MY BODY ANYWHERE AND NO PILLOW TO REST MY HEAD ON... AS IF I NEED A PILLOW IN WEIGHTLESSNESS.



DIFFICULT, BUT AFTER AN EVENT-FILLED 21 HOUR DAY, NOT IMPOSSIBLE.

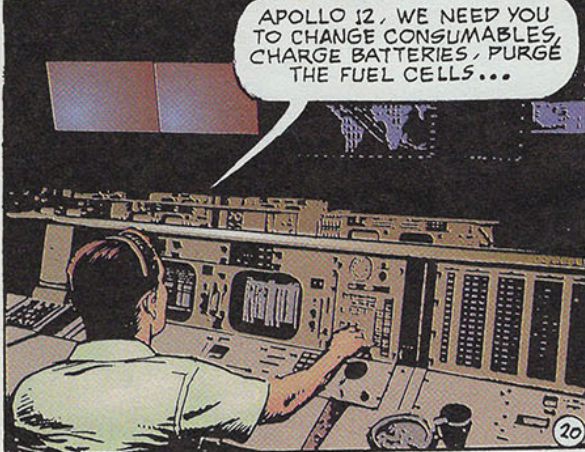


DAY 2 RISE AND SHINE APOLLO 12.!



THOUGH THE DAY TWO WORKLOAD IS RELATIVELY LIGHT, MISSION CONTROL ALREADY HAS A LONG LIST OF HOUSE-KEEPING CHORES FOR THE CREW.

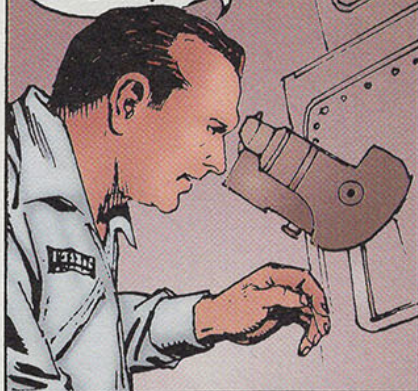
APOLLO 12, WE NEED YOU TO CHANGE CONSUMABLES, CHARGE BATTERIES, PURGE THE FUEL CELLS...





**DICK'S FIRST JOB OF THE DAY IS TO GET AN UPDATED POSITION FIX.**

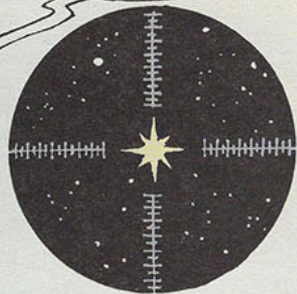
I'M THE SHIP'S NAVIGATOR AND HAVE A RIGHT TO KNOW WHERE I AM.



**HE USES THE SAME GUIDE STARS AND BASIC NAVIGATION TECHNIQUES THAT EXPLORERS HAVE USED FOR CENTURIES.**

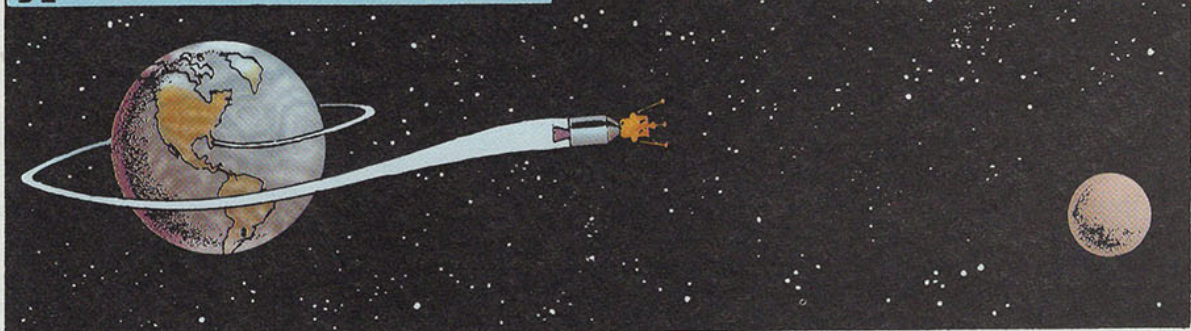


BINGO! NAILED YOU POLARIS\*.



\* - THE NORTH STAR.

**APOLLO 12 IS ALMOST HALFWAY THERE.**



**AS TIME ALLOWS OVER THE NEXT TWO DAYS, THE CREW STUDIES THEIR FLIGHT PLAN. THEY KNOW, ON A MOON MISSION, THERE IS NO MAKEUP EXAM.**

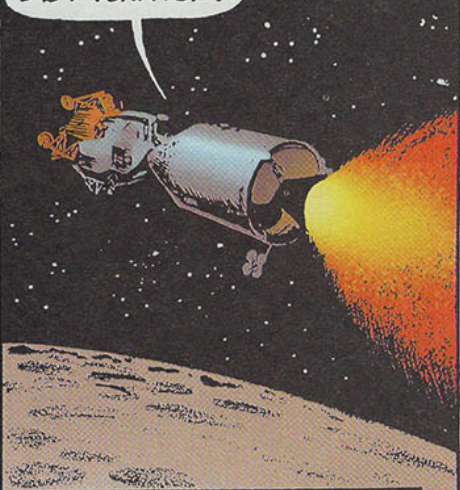
IF I GET A 1201 ALARM LIKE NEIL DID ON APOLLO 11...

LOPC 1 REQUIRES A BURN TIME OF...



**DAY 4, (83:25 G.E.T.)**

L.O.I.\* BURN, 3-2-1-IGNITION!



**THE COMMAND MODULE'S MAIN ENGINE FIRES FOR ALMOST SIX MINUTES SLOWING APOLLO 12 DOWN ENOUGH FOR THE MOON'S GRAVITY TO CAPTURE IT.**

\* - LUNAR ORBIT INSERTION.

SOON, THE CREW IS PRIVILEGED TO WITNESS A SIGHT ONLY NINE OTHER HUMANS IN ALL OF HISTORY HAVE SEEN BEFORE...

I'VE GOT TO TAKE SOME FILM OF THIS.

EARTHRISE!

BEAUTIFUL!

IT SURE IS SMALL—THE SIZE OF AN EGG!

JUST THINK, LITERALLY EVERYBODY WE KNOW AND EVER KNEW IS WAY BACK THERE.

WITH A SUCCESSFUL LUNAR ORBIT OBTAINED, THERE IS LITTLE FOR THE CREW TO DO UNTIL THE NEXT DAY'S SCHEDULED LANDING... OR IS THERE?

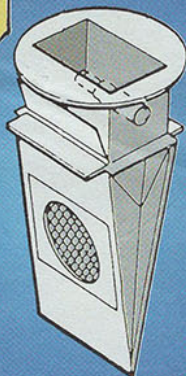
OKAY GUYS, TOMORROW IS GOING TO BE A BIG DAY AND I DON'T WANT ANYTHING TO SLOW US DOWN. SO, EACH OF US IS GOING TO GO DOWN INTO THE LOWER EQUIPMENT BAY, PROP OUR DRAWERS AND DO OUR BUSINESS. AL, YOU FIRST.

ME? I DON'T HAVE TO GO.

YOU'RE KIDDING, RIGHT?

NO.

IN THE ZERO-GRAVITY OF SPACE, WHERE NOTHING GOES TO THE BOTTOM OF THE BAG, THE WASTE CONTAINMENT SYSTEM IS CONSIDERED THE MOST UNPLEASANT ASPECT OF SPACE EXPLORATION AND CAN TAKE UP TO AN HOUR TO COMPLETE.



DAY 4 -  
THE BIG  
DAY!

HAVING POWERED UP, EXTENDED  
THE LANDING GEAR AND  
THOROUGHLY CHECKED OUT THE  
LUNAR MODULE INTREPID, PETE  
AND AL PULL AWAY FROM  
YANKEE CLIPPER.

WE HAVE  
SEPARATION.

INTREPID FLIES  
LIKE A FIGHTER  
PLANE!

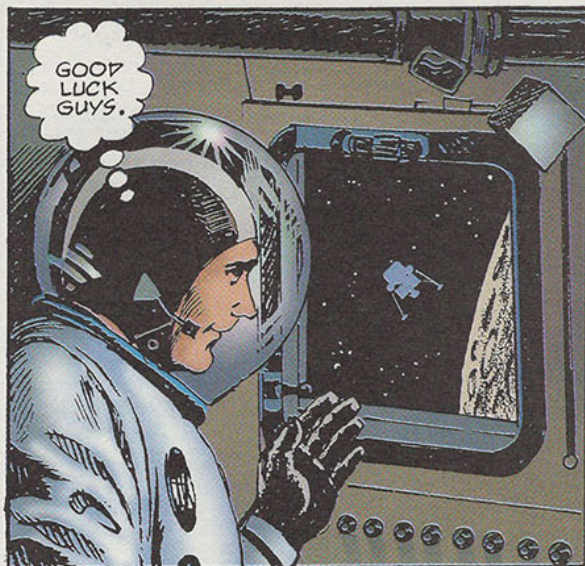


WHILE PETE AND AL MAKE THE MOON  
LANDING ATTEMPT, DICK MUST REMAIN  
BEHIND IN LUNAR ORBIT.

I WISH YOU COULD  
COME WITH US BUDDY.  
BUT SOMEBODY'S GOT  
TO HOLD DOWN  
THE FORT.



GOOD  
LUCK  
GUYS.



THE FLIGHT DIRECTOR MAKES ONE FINAL  
QUERY OF HIS CONTROL TEAM BEFORE  
POWERED DESCENT.

ONE LAST TIME  
AROUND THE  
ROOM -

FIDO?  
GUIDO?  
RETRO?  
TELMU?  
GNC\*?

GO!  
GO!  
GO!  
GO!  
GO!

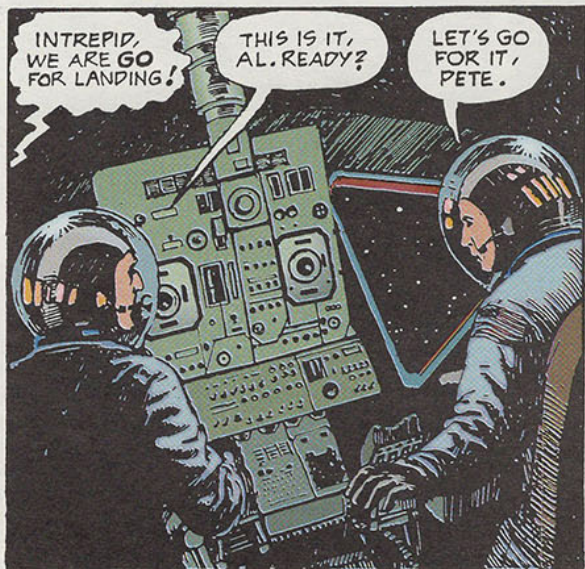


\* - SEE GLOSSARY

INTREPID,  
WE ARE GO  
FOR LANDING!

THIS IS IT,  
AL. READY?

LET'S GO  
FOR IT,  
PETE.



110:19 G.E.T. - POWERED DESCENT INITIATION

HOUSTON,  
WE HAVE  
P.D.I.

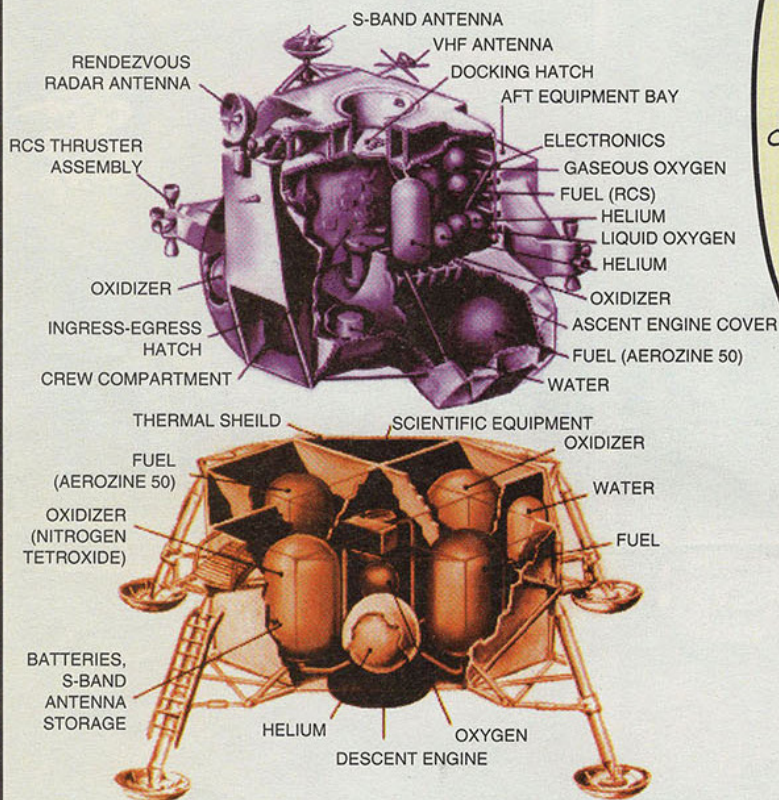


# TECH NOTES

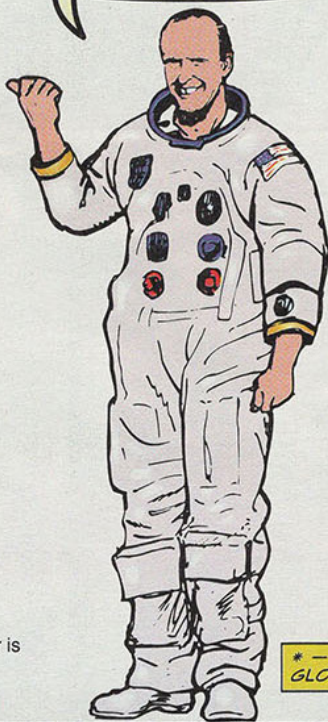
## LUNAR MODULE - INTREPID

### STATS:

SERIAL NUMBER: LM-6  
MANUFACTURER: Grumman Corporation  
HEIGHT: 22 ft. 11 in. (legs extended)  
DIAMETER: 31 ft. (diagonally across landing gear)  
ROCKETS: 18 (total)  
DESCENT ENGINE THRUST: variable between 1,050 lbs.  
- 9,870 lbs.  
LOADED WEIGHT (fully fueled): 33,325 lbs.



THIS IS MY SHIP, *INTREPID*, NAMED AFTER THE DICTIONARY DEFINITION\*. THE LUNAR MODULE IS A TWO-PART SPACECRAFT. THE DESCENT STAGE HAS THE LANDING GEAR, ENGINES, MAIN BATTERIES AND FUEL NEEDED FOR THE MOON LANDING. THE ASCENT STAGE HAS THE CREW COMPARTMENT, FLIGHT CONTROLS AND ITS OWN PROPULSION SYSTEM FOR LUNAR LIFTOFF. DESIGNED TO CARRY THE COMMANDER AND LM PILOT, THE LM HAD TO BE ULTRA-LIGHTWEIGHT. SO LIGHT, IN FACT, THE ENGINEERS EVEN TOOK OUT OUR SEATS!



### FUN FACTS:

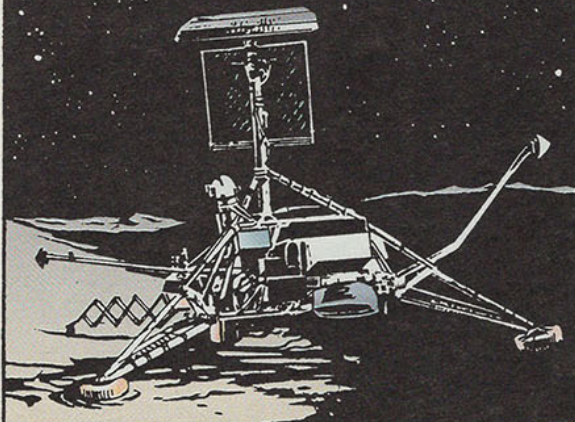
Over 70-percent of the Lunar Module's weight is fuel!

The Lunar Module is so fragile its pressure shell can be pierced by a dropped screwdriver!

Designed to work in no more than 1/6th Earth gravity, the Lunar Module's landing gear is so flimsy that on Earth a fully fueled Intrepid would collapse of its own weight!

\* - SEE GLOSSARY.

**I**NTREPID'S TARGET, AN UNMANNED MOON LANDER CALLED **SURVEYOR 3** LOCATED ON A ROCKY LUNAR PLAIN CALLED THE OCEAN OF STORMS \*.

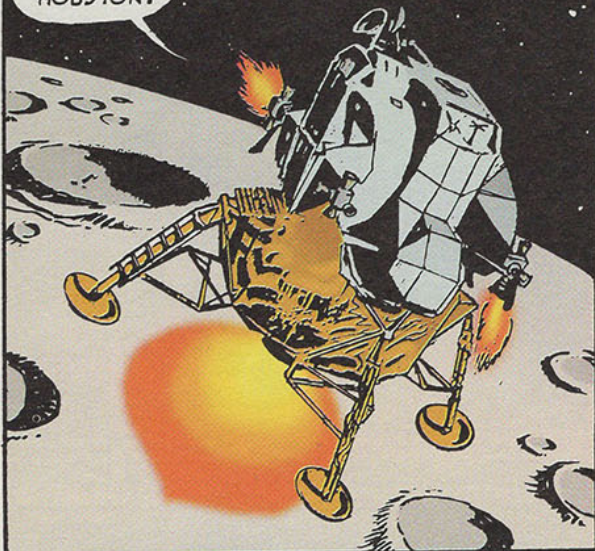


\*- APOLLO 11 HAD LANDED OVER 4 MILES OFF TARGET. PETE AND AL ARE DETERMINED TO MAKE MAN'S FIRST PINPOINT LUNAR LANDING, CLEARING THE WAY FOR EVEN MORE HAZARDOUS LANDING SITES ON FUTURE MISSIONS.

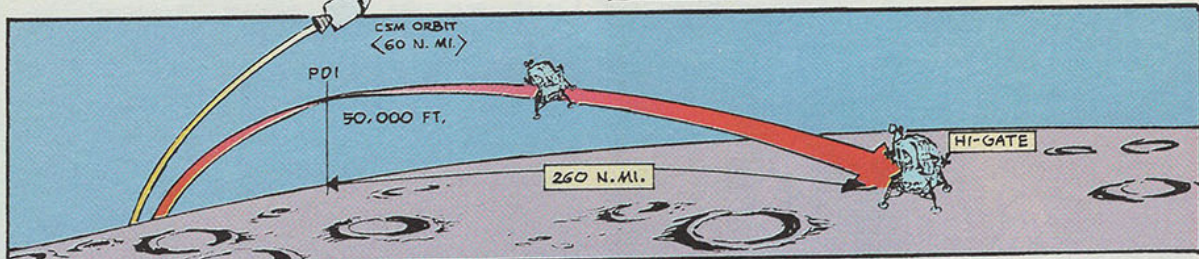
**A**T 8½ MINUTES INTO POWERED DESCENT, INTREPID REACHES HI-GATE \*.

WE HAVE PITCHOVER HOUSTON.

ALT. 7,300 FEET.



\*-A BARNSTORMER TERM FOR FINAL APPROACH



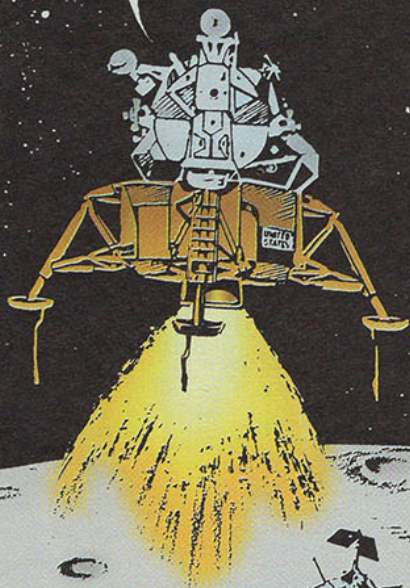
**T**EN MINUTES INTO THE BURN, INTREPID'S DESCENT RATE IS STEEPER-THAN-PLANNED.

IF WE WANT TO LAND NEAR THE SURVEYOR, I NEED A BETTER LOOK AROUND. I'M TAKING MANUAL CONTROL.



BOY, YOU'RE REALLY MANEUVERING AROUND.

ALTITUDE 500 FEET.



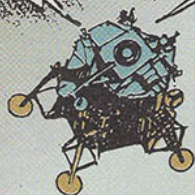
YEP.



ALTITUDE - 50 FEET.

WATCH FOR THE DUST.\*

I CAN'T SEE A THING.\*



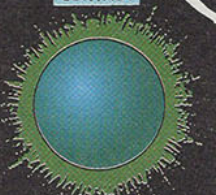
\*IN THE VACUUM OF SPACE, INTREPID'S ROCKET CREATES A DUST STORM IN PETE'S LANDING ZONE!

F'INALLY...

CONTACT LIGHT.\*

ENGINE STOP.

LUNAR CONTACT



\*AT LEAST TWO OF THE THREE CONTACT PROBES ATTACHED TO THE BOTTOM OF INTREPID'S FOOT-PADS HAVE IMPACTED THE LUNAR SURFACE.

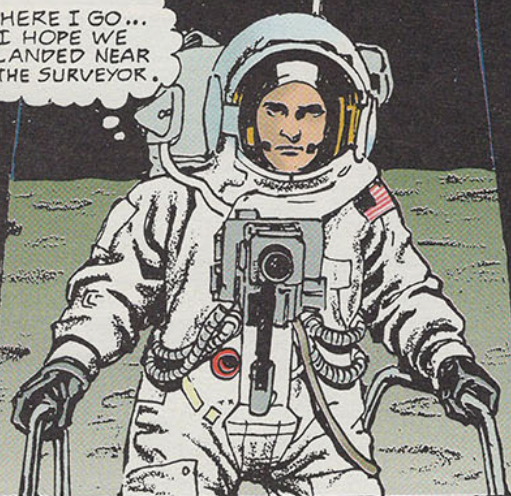
111:32 G.E.T. - INTREPID HAS LANDED ON THE OCEAN OF STORMS.

GOOD LANDING, PETE.\* OUT-STANDING, MAN!



FOUR HOURS LATER, CHARLES "PETE" CONRAD DESCENDS INTREPID'S LADDER.

HERE I GO... I HOPE WE LANDED NEAR THE SURVEYOR.



WHOOPEE, MAN, THAT MAY HAVE BEEN A SMALL ONE FOR NEIL, BUT THAT'S A LONG ONE FOR ME.\*

\*PETE IS INCHES SHORTER THAN APOLLO 11'S NEIL ARMSTRONG.



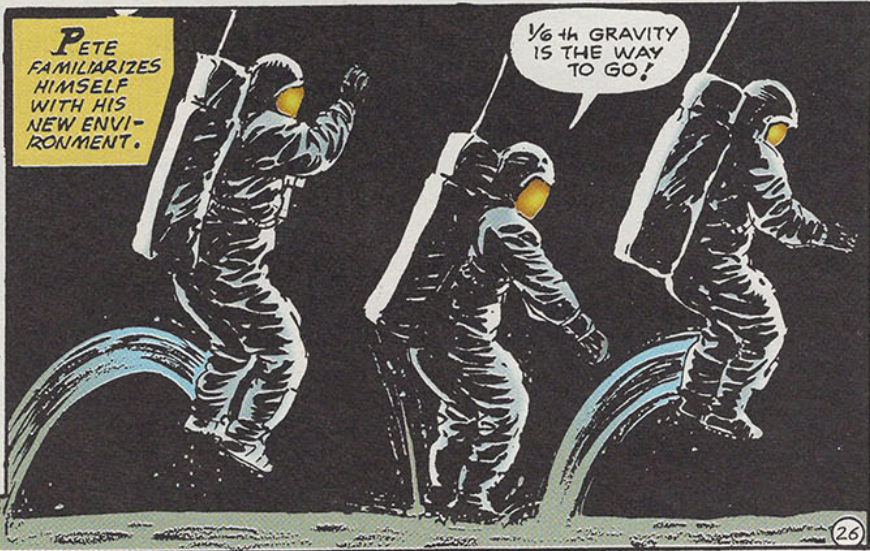
BOY, THAT'S SOFT BUT I DON'T SINK IN TOO FAR.\*



\*SCIENTISTS HAD BEEN WORRIED MOON DUST WOULD BE SO THICK IT WOULD SWALLOW UP AN ASTRONAUT!

PETE FAMILIARIZES HIMSELF WITH HIS NEW ENVIRONMENT.

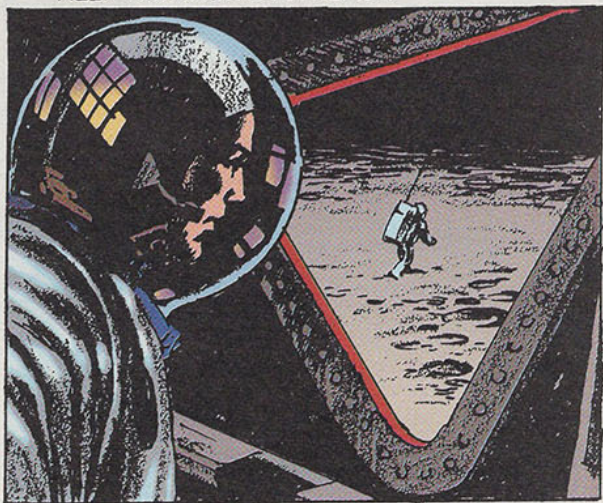
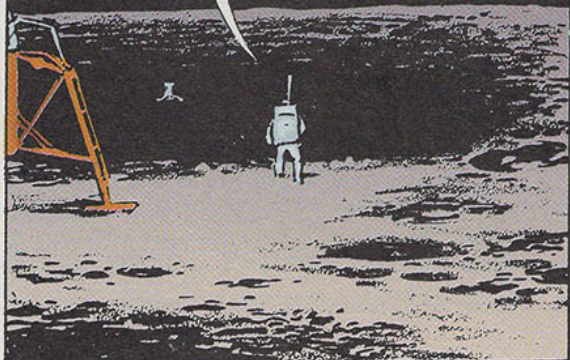
1/6th GRAVITY IS THE WAY TO GO!



**THERE ON THE FAR EDGE OF A CRATER 1,100 - FEET WIDE SITS THEIR QUARRY.**

**FOR THE FIRST 45 MINUTES, AL'S RESPONSIBILITIES KEEP HIM INSIDE INTREPID.**

HOT-DIGGETY-DOG, OLD SURVEYOR 3, RIGHT WHERE IT'S SUPPOSED TO BE!



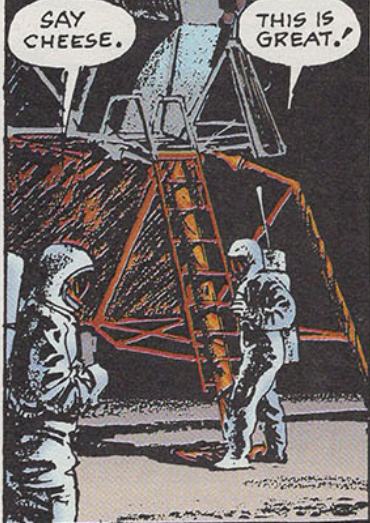
**FINALLY IT'S AL'S TURN.**

**PETE AND AL HAVE A LONG LIST OF THINGS TO DO. SO MANY IN FACT, THEY EACH HAVE A CHECKLIST ON THE SLEEVE OF THEIR SPACESUITS TO REMIND THEM.**

**UNKNOWN TO PETE AND AL, BACKUP MISSION COMMANDER DAVID SCOTT\* HAD DRAWN SEVERAL SNOOPY CARTOONS IN THEIR CHECKLISTS.**

SAY CHEESE.

THIS IS GREAT!



LET'S SEE, AL YOU NEED TO DEPLOY THE TV CAMERA. HEY, LOOKIE-HERE!



YOU BETTER NOT TRY THAT ONE AL.

OF TRAVERSE  
LM  
PHOTOS OTHER THAN NOMINAL  
SAMPLE BAG NUMBERS  
DOCUMENTED SAMPLE

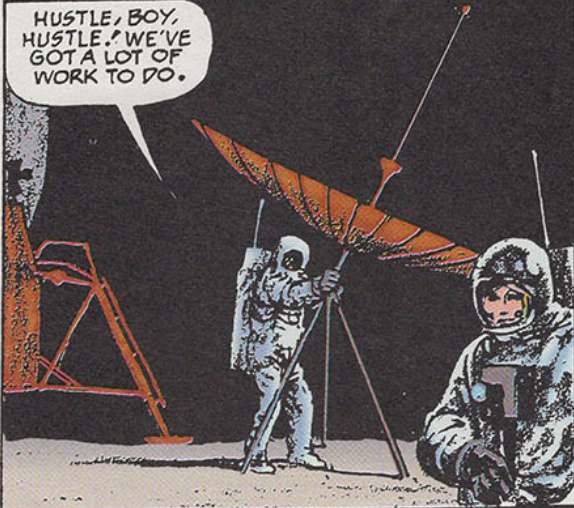
SELECT SAMPLE  
PLACE GNOMON UP SUN OF SAMPLE  
SAMPLE & GNOMON [8.5.2] X SUN  
RETRIEVE SAMPLE



\*- PETE'S REPLACEMENT HAD HE GOTTEN ILL.

**WHILE PETE SETS UP A BIGGER ANTENNA TO IMPROVE COMMUNICATIONS WITH EARTH, AL MOVES THE TV CAMERA TO A BETTER LOCATION.**

HUSTLE, BOY, HUSTLE. WE'VE GOT A LOT OF WORK TO DO.



**IT'S SPECIAL HONOR FOR PETE AND AL TO DEPLOY THE SECOND SET OF STARS AND STRIPES ON THE SURFACE OF THE MOON.**

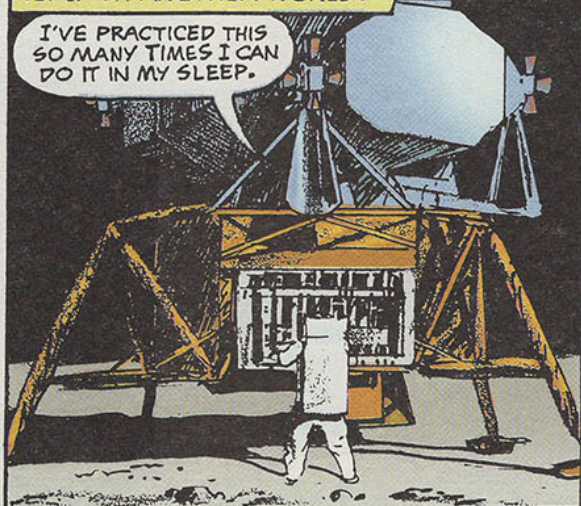
HOPE EVERYBODY DOWN THERE IS AS PROUD OF IT AS WE ARE TO PUT IT UP.

AFFIRMATIVE PETE!



ONE OF APOLLO 12'S MAIN ASSIGNMENTS IS DEPLOYMENT OF A.L.S.E.P.\* THE FIRST FULL-PLEGED SCIENTIFIC STATION TO BE SET-UP ON ANOTHER WORLD.

I'VE PRACTICED THIS SO MANY TIMES I CAN DO IT IN MY SLEEP.



\* - APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE.

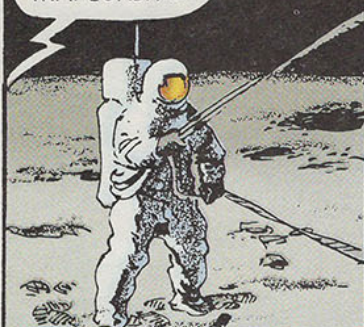
DESIGNED TO WORK FOR OVER A YEAR, APOLLO 12'S A.L.S.E.P. IS POWERED BY ITS OWN NUKE PLANT.

PETE, THIS THING IS STUCK.



PLUTONIUM-238 IS HOT STUFF \* AND CAN BURN RIGHT THROUGH A SPACESUIT.

DON'T TOUCH THAT CORE, AL!



\* - 1,400 DEGREES FAHRENHEIT

IF WE DON'T GET THE NUCLEAR FUEL OUT, THE WHOLE STATION IS A BUST, PETE.



AL'S RIGHT, BUT SOMETIMES EVEN THE MOST ELEGANT EXPERIMENTS NEED A LITTLE OLD-FASHIONED MUSCLE.

PERHAPS, THE OLD MARK-1, MOD-1...

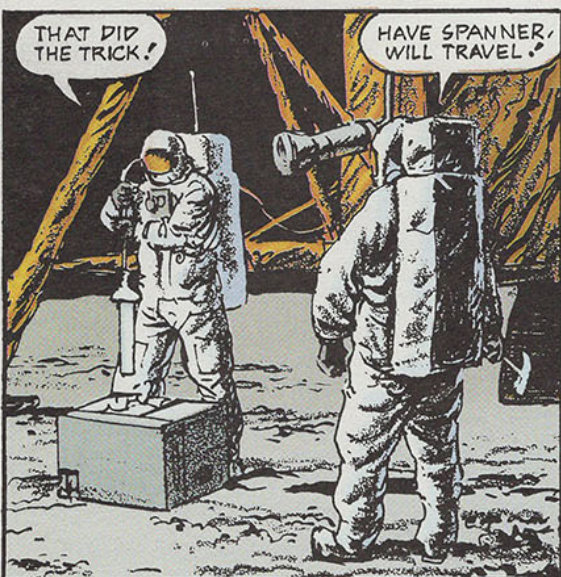


HAMMER!  
CLUUNNK



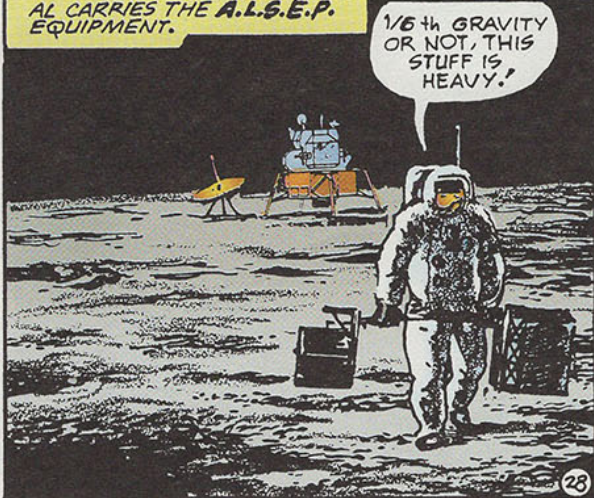
THAT DID THE TRICK!

HAVE SPANNER, WILL TRAVEL!



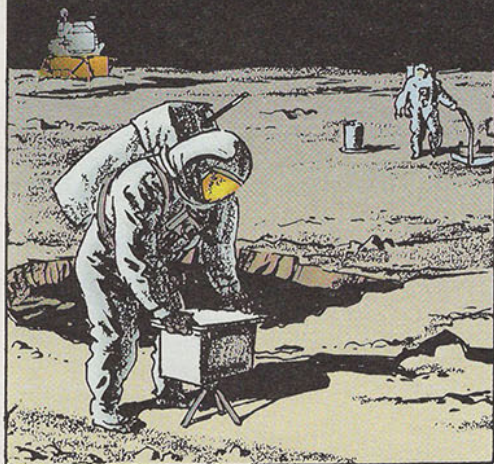
WITH PETE IN THE LEAD TO SCOUT FOR A GOOD AREA TO LAY OUT THE EXPERIMENTS AL CARRIES THE A.L.S.E.P. EQUIPMENT.

1/6th GRAVITY OR NOT, THIS STUFF IS HEAVY!





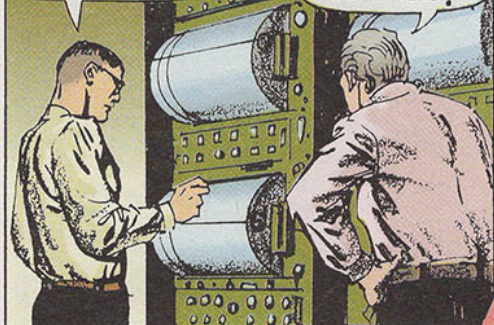
PETE HAS FOUND A LEVEL AREA SOME 500 FEET AWAY FROM INTREPID - FAR ENOUGH AWAY THAT TOMORROW'S BLASTOFF WON'T EFFECT A.L.S.E.P.'S SENSITIVE INSTRUMENTS.



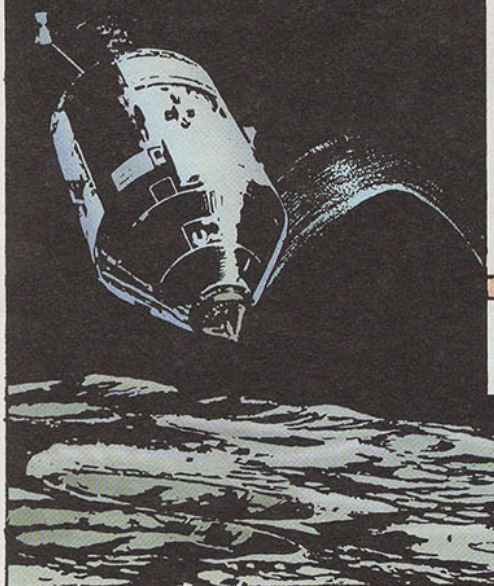
SCIENTISTS WATCH AS THE TOUCHY SEISMO METER SENDS BACK ALSEP'S FIRST INFORMATION.

TOO SMALL TO BE MOONQUAKES.

IT'S PICKING UP THE ASTRONAUTS FOOTFALLS!

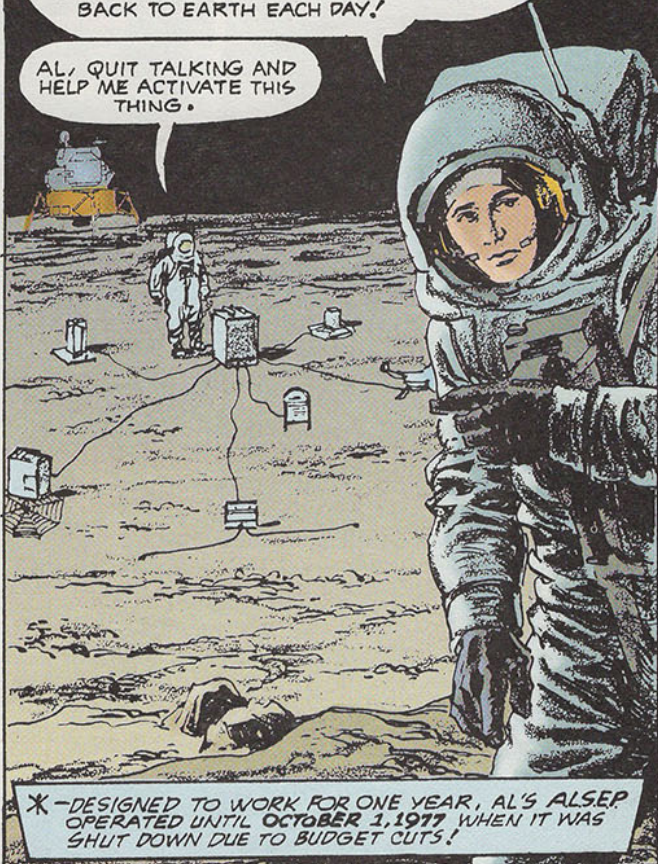


WHILE PETE AND AL WORK ON THE SURFACE, DICK'S BUSY TOO.



THIS IS MY A.L.S.E.P. SITE - FIVE EXPERIMENTS DESIGNED TO OBTAIN INFORMATION ABOUT THE MOON'S SURFACE, INTERIOR AND ATMOSPHERE. THE EXPERIMENTS ARE CONNECTED BY CABLES TO THE CENTRAL STATION WHICH CAN TRANSMIT UP TO 9 MILLION READINGS BACK TO EARTH EACH DAY!

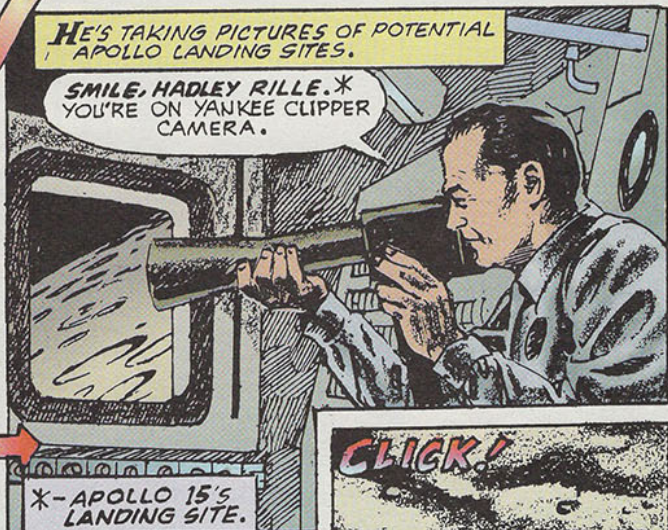
AL, QUIT TALKING AND HELP ME ACTIVATE THIS THING.



\* - DESIGNED TO WORK FOR ONE YEAR, AL'S ALSEP OPERATED UNTIL OCTOBER 1, 1977 WHEN IT WAS SHUT DOWN DUE TO BUDGET CUTS!

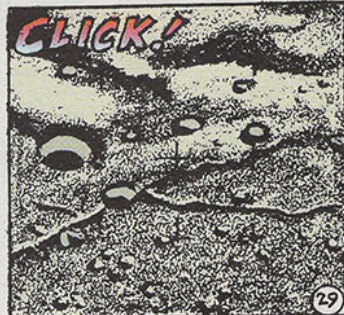
HE'S TAKING PICTURES OF POTENTIAL APOLLO LANDING SITES.

SMILE, HADLEY RILLE. \* YOU'RE ON YANKEE CLIPPER CAMERA.



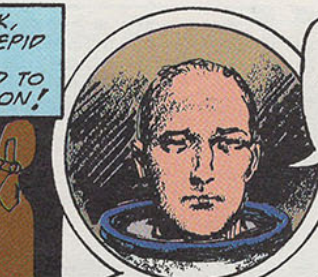
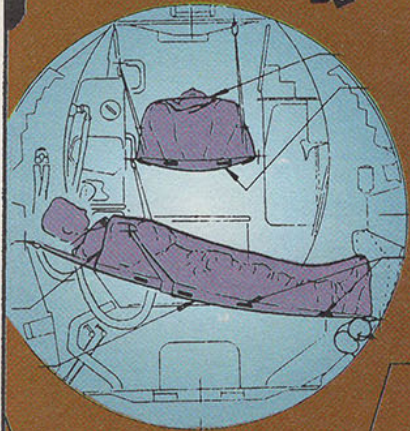
\* - APOLLO 15'S LANDING SITE.

CLICK!



**AFTER A 4 HR. 1 MIN. MOONWALK, PETE AND AL ARE BACK IN INTREPID FOR DINNER AND A REST PERIOD. THOUGH TIRED, THEY FIND IT HARD TO SLEEP IN HAMMOCKS... ON THE MOON!**

**RRRR-CLANKKK!**

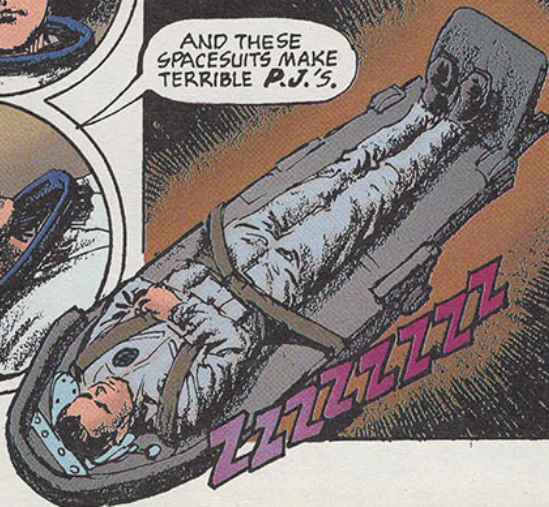


WITH ALL THESE INSTRUMENTS AND COOLING PUMPS WORKING, IT GETS PRETTY DARN LOUD IN HERE.

60 MILES UP, DICK FINDS YANKEE CLIPPER MORE COMFORTABLE.



AND THESE SPACESUITS MAKE TERRIBLE P.J.'S.



**AFTER A 5 HOUR SLEEP, BREAKFAST AND TALK WITH HOUSTON, PETE AND AL BEGIN EVA #2.**

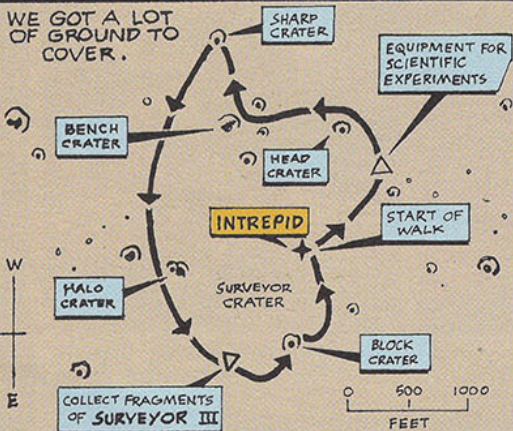
LOOK OUT SURVEYOR, HERE WE COME!



\*-EVA- EXTRA VEHICULAR ACTIVITY

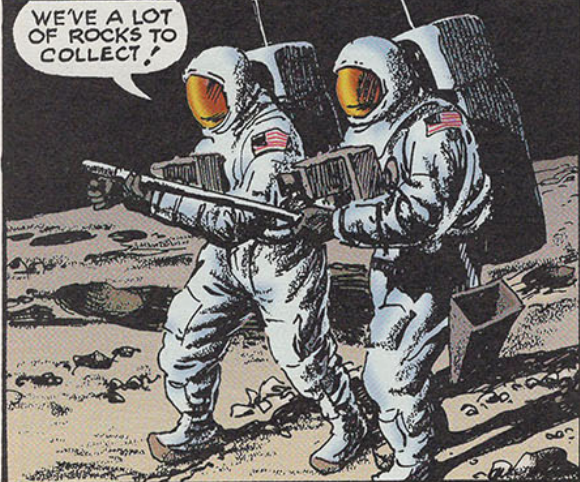
**THEIR CAREFULLY PLANNED FOUR HOUR MOONWALK WILL TAKE THEM OVER A MILE!**

WE GOT A LOT OF GROUND TO COVER.



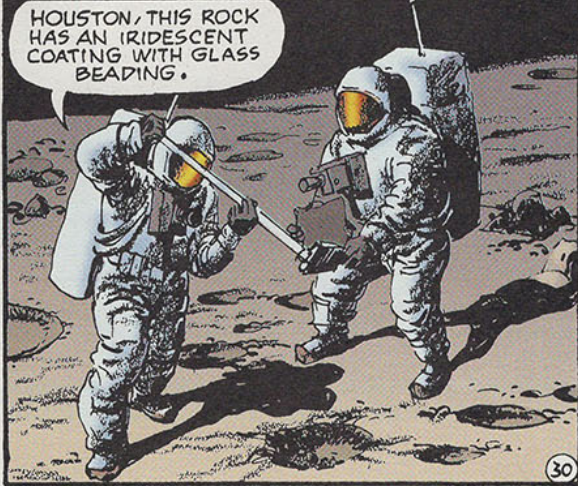
**THEIR TOOLS-HAMMERS, SAMPLE BAGS, CORE TUBES, SHOVELS AND TONGS.**

WE'VE A LOT OF ROCKS TO COLLECT!



**AT "BENCH CRATER" PETE AND AL WORK TOGETHER TO GATHER A SAMPLE.**

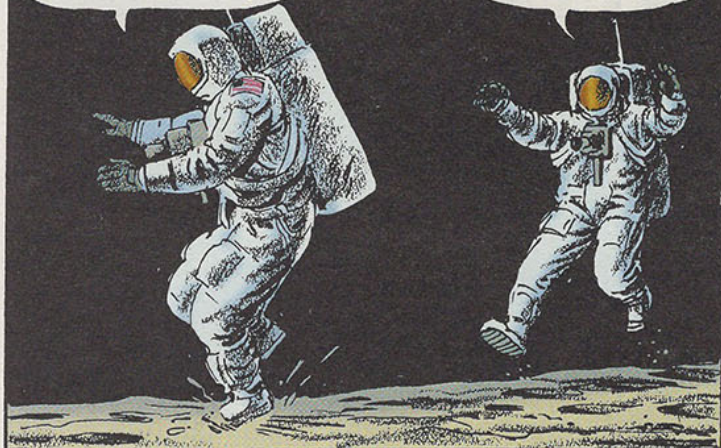
HOUSTON, THIS ROCK HAS AN IRIDESCENT COATING WITH GLASS BEADING.



WITH ONLY A LIMITED AMOUNT OF TIME ON THE LUNAR SURFACE, PETE AND AL HURRY BETWEEN SAMPLE STATIONS.

I FEEL LIKE ONE OF THOSE GIRAFFES IN THE NATURE FILMS RUNNING IN SLOW MOTION.

NOTHING TO THIS MOONWALKING. JUST BEND AND ROCK FROM SIDE TO SIDE.



THOUGH ON THE RUN, AL CAN'T HELP BUT SNEAK A PEAK AT HIS HOME PLANET.

THIS IS THE MOON. THAT IS THE EARTH. I AM REALLY HERE.

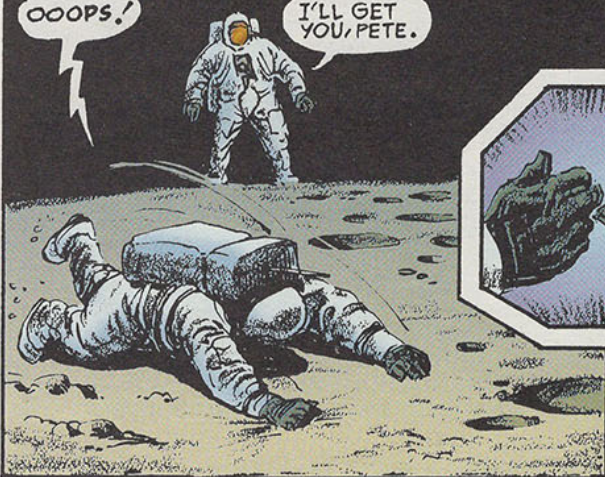
I AM REALLY HERE.



THE COMBINATION OF BULKY SPACESUITS AND THE UNFAMILIAR 1/6th GRAVITY, CAUSES PETE AND AL TO FALL SEVERAL TIMES.

OOOPS!

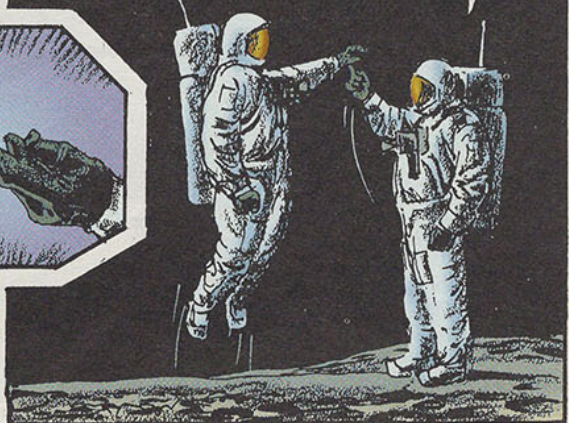
I'LL GET YOU, PETE.



ON THE MOON, YOU CAN PICK UP YOUR FRIEND WITH ONE FINGER!

THANKS FOR THE LIFT.

DON'T MENTION IT.



TRAVELING ON THE LUNAR SURFACE DOES HAVE ITS SHORTCOMINGS. THERE IS NOTHING FAMILIAR TO JUDGE DISTANCE—NO TREES, HOUSES, TELEPHONE POLES OR ROADS...

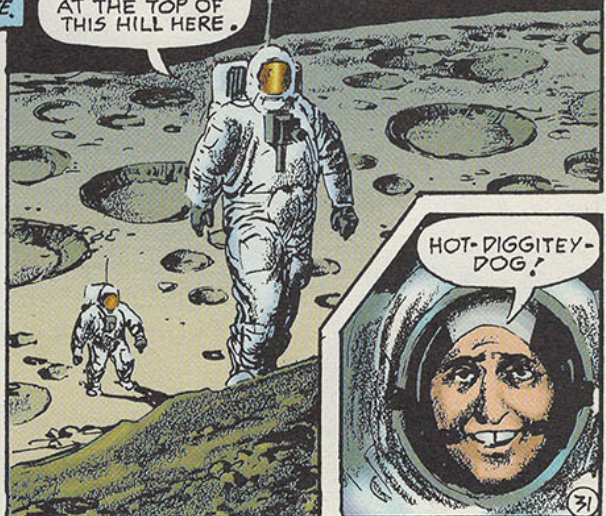
I CAN'T BELIEVE WE'RE IN THE RIGHT PLACE, PETE.

NEITHER DO I.



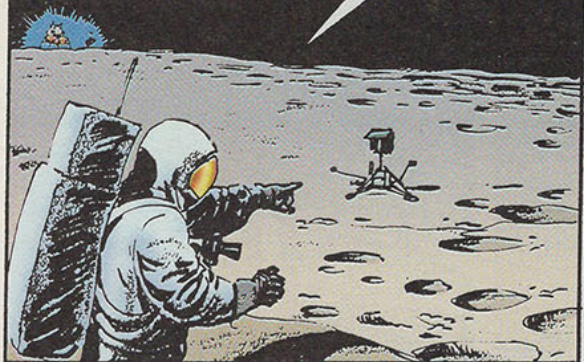
LET ME LOOK AT THE TOP OF THIS HILL HERE.

HOT-DIGGITEY-DOG!



**SURVEYOR III \* , PETE AND AL'S FINAL OBJECTIVE , LIES IN A CRATER SOME 600 FEET DUE SOUTH OF INTREPID .**

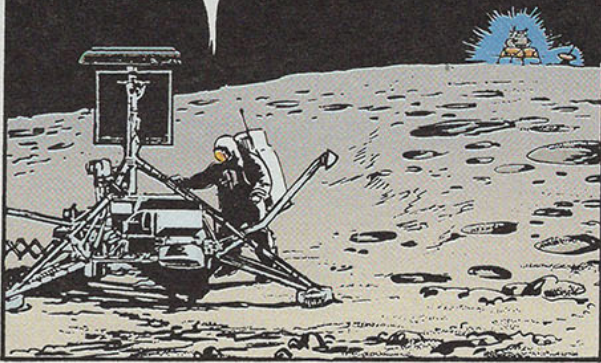
WE'RE IN THE HOMESTRETCH, AL.



\* - LAUNCHED IN APRIL OF 1967, THE UNMANNED SURVEYOR III HAD TAKEN SOME OF THE FIRST CLOSE-UP PICTURES OF THE LUNAR SURFACE.

**PETE AND AL PLAN TO CUT OFF PARTS OF THE SPACECRAFT SO THAT SCIENTISTS CAN STUDY THE HARSH LUNAR ENVIRONMENT'S LONG-TERM EFFECTS ON MAN-MADE MATERIALS.**

EXCEPT FOR A LITTLE TAN-COLORED DUST, THE OLD SURVEYOR STILL LOOKS BRAND NEW.

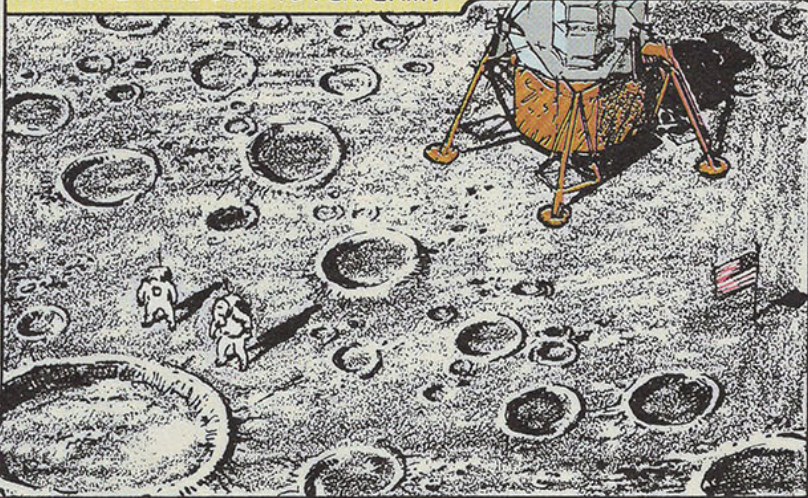


THE ALUMINUM TUBING IS MORE BRITTLE AND EASIER TO CUT THAN THE TUBES WE USED DURING TRAINING.

YOU COMPLAINING?

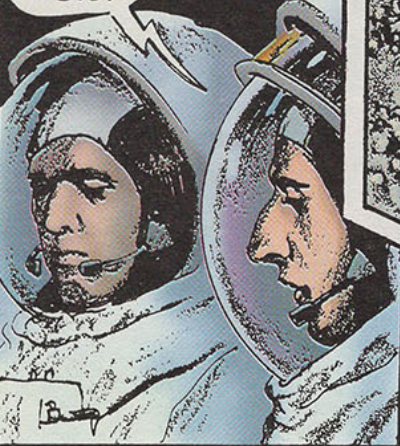


**AFTER 3 AND 1/2 HOURS OF MOONWALKING, PETE AND AL PREPARE TO LEAVE THE LUNAR SURFACE FOR THE FINAL TIME... BUT THEY HAVE ONE FINAL DUTY TO PERFORM.**

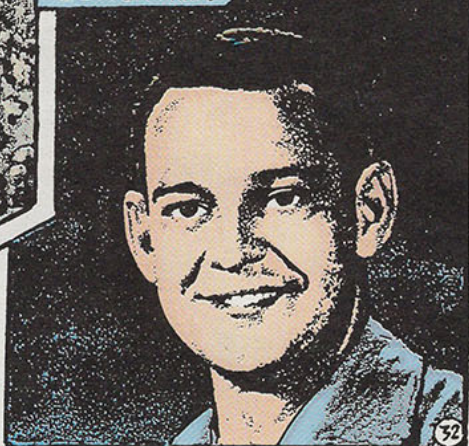


**PLACING A FALLEN COMRADE'S WINGS ON THE LUNAR SURFACE.**

WE MADE IT C.C.



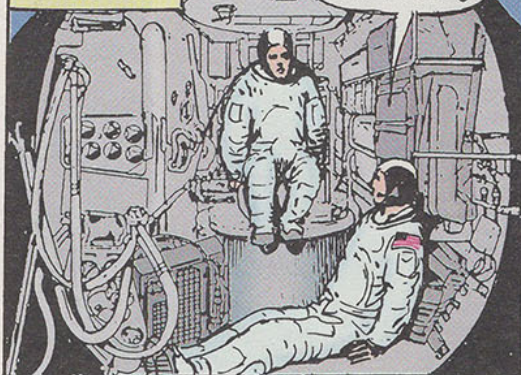
**ASTRONAUT C.C. WILLIAMS WAS AN ORIGINAL MEMBER OF THE APOLLO 12 CREW. C.C. DIED IN A JET ACCIDENT DURING TRAINING. HIS CREWMATES HAVE NOT FORGOTTEN HIM.**



**AFTER A FOUR HOUR SPACEWALK AND LUNCH, THERE IS LITTLE FOR PETE AND AL TO DO UNTIL LIFTOFF.**

**EXCEPT THINK ABOUT THINGS.**

**BEANO, YOU WORRIED ABOUT THE ENGINE?**



**BOTH PETE AND AL KNOW, THERE IS NO BACKUP FOR INTREPID'S ASCENT ENGINE. IF IT DOESN'T LIGHT...**

**YEP.**



**AS MISSION COMMANDER AND SPACE VETERAN, IT'S UP TO PETE TO EASE HIS CREWMATE'S NERVES... RIGHT?**

**NO SENSE WORRYING ABOUT IT, AL. IF IT DOESN'T WORK, WE'RE JUST GONNA BE THE FIRST PERMANENT MONUMENT TO THE U.S. SPACE PROGRAM.**

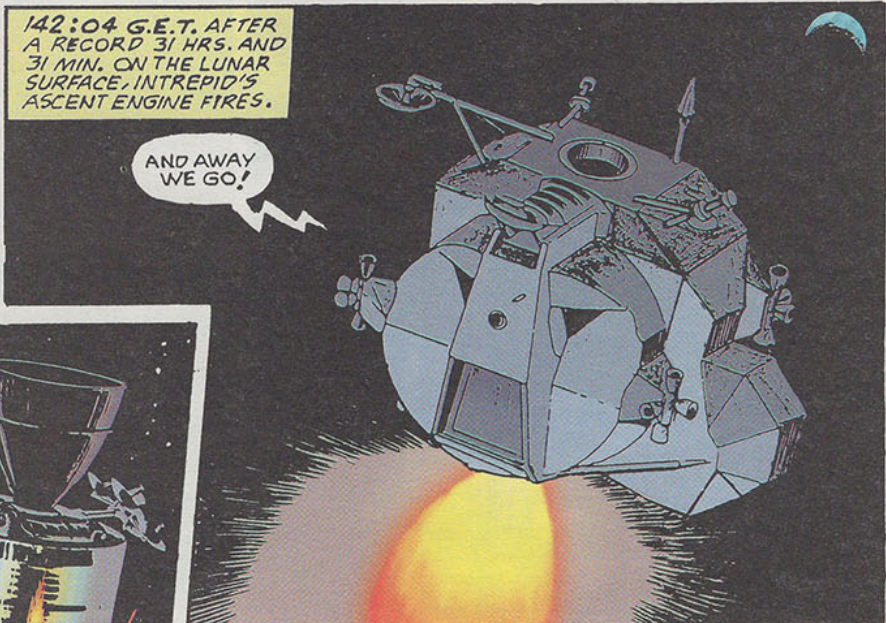


**GEE, THANKS!**



**142:04 G.E.T. AFTER A RECORD 31 HRS. AND 31 MIN. ON THE LUNAR SURFACE, INTREPID'S ASCENT ENGINE FIRES.**

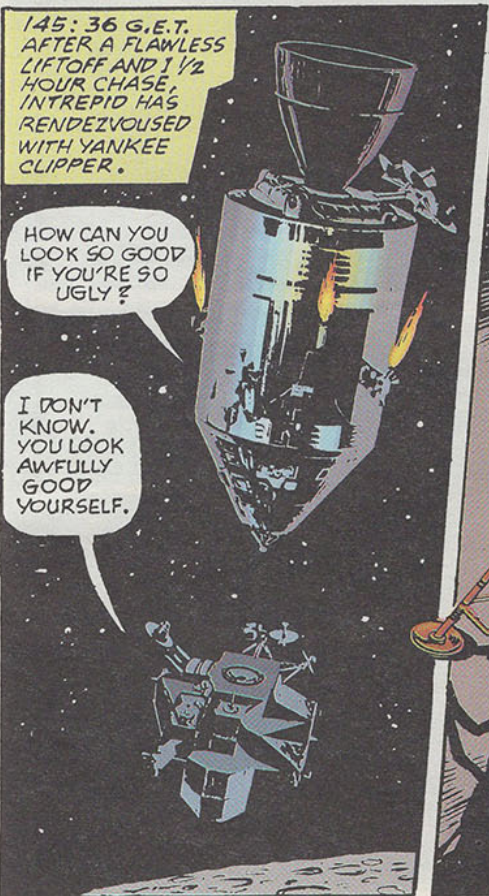
**AND AWAY WE GO!**



**145:36 G.E.T. AFTER A FLAWLESS LIFTOFF AND 1 1/2 HOUR CHASE, INTREPID HAS RENDEZVOUSED WITH YANKEE CLIPPER.**

**HOW CAN YOU LOOK SO GOOD IF YOU'RE SO UGLY?**

**I DON'T KNOW. YOU LOOK AWFULLY GOOD YOURSELF.**



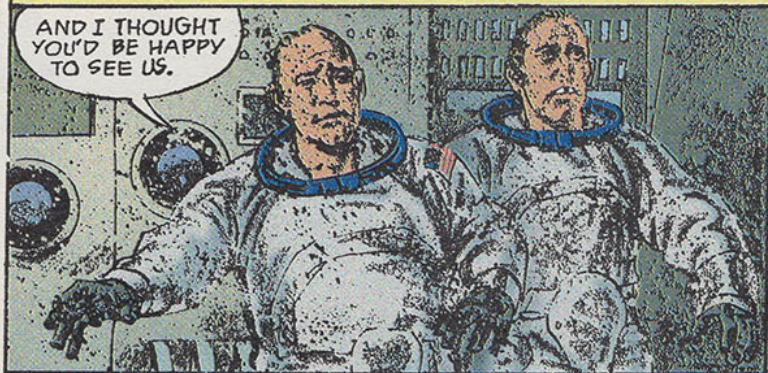
**AFTER EXECUTING A PERFECT DOCKING, DICK OPENS THE HATCH BETWEEN YANKEE CLIPPER AND INTREPID.**

**WELCOME... OH, NO YOU DON'T. YOU GUYS AREN'T GOING TO MESS UP MY NICE CLEAN SPACE-CRAFT.**



LUNAR DUST THAT HAD PREVIOUSLY CLUNG TO INTREPID'S FLOOR NOW FLOATS FREE IN THE ZERO GRAVITY OF SPACE.

AND I THOUGHT YOU'D BE HAPPY TO SEE US.



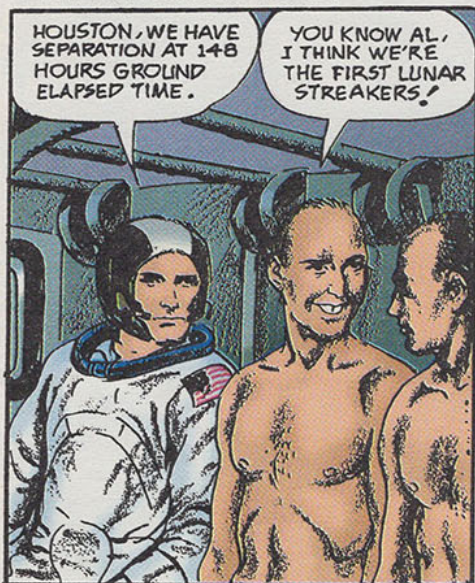
I'M NOT KIDDING GUYS. ALL THAT DUST CAN SET BEHIND SWITCHES AND SHORT OUT ELECTRICAL SYSTEMS. TAKE OFF THOSE FILTHY SPACE SUITS AND I'LL LET YOU IN.



THE TIMELINE TIGHT, PETE AND AL BARELY HAVE ENOUGH TIME TO STRIP DOWN TO THEIR BIRTHDAY SUITS AND TRANSFER THEIR PRECIOUS MOONROCKS AND THEMSELVES BEFORE DICK JETTISONS INTREPID.

HOUSTON, WE HAVE SEPARATION AT 148 HOURS GROUND ELAPSED TIME.

YOU KNOW AL, I THINK WE'RE THE FIRST LUNAR STREAKERS.



HAVING CARRIED PETE AND AL SAFELY TO AND FROM THE LUNAR SURFACE, THE NOW UNMANNED INTREPID HAS ONE FINAL JOB TO DO.

CRASH INTO THE MOON AT 5,000 MPH.

**KABOOM!**



BACK ON EARTH SCIENTISTS WATCH AS APOLLO 12'S A.L.S.E.P. SENDS BACK DATA. SEISMOLOGISTS BELIEVED SUCH INFORMATION WOULD TELL THEM ABOUT THE MOON'S STRUCTURE.

THE MOON'S RINGING LIKE A BELL.

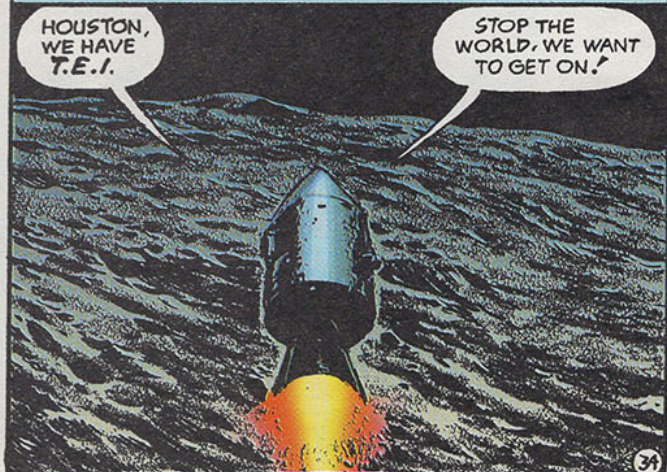
ON EARTH, SUCH A TREMOR WOULD LAST NO MORE THAN TWO MINUTES. ON THE MOON, IT LASTS FOR FIFTY-FIVE.



172:27 G.E.T. AFTER 45 REVOLUTIONS AND 88 HRS 56 MIN IN LUNAR ORBIT, YANKEE CLIPPER'S SERVICE PROPULSION ENGINE FIRES FOR 130 SECONDS, INJECTING APOLLO 12 INTO A TRANS-EARTH TRAJECTORY.

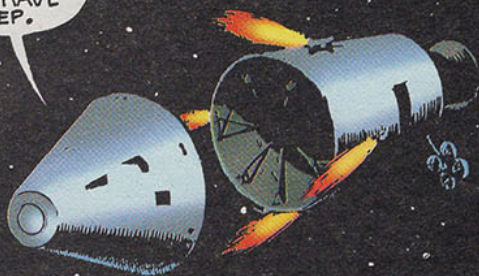
HOUSTON, WE HAVE T.E.I.

STOP THE WORLD, WE WANT TO GET ON.



244:07 G.E.T. AFTER A TWO AND A HALF DAY, 240,000 MILE RETURN VOYAGE, THE CREW PREPARES FOR REENTRY. DICK FIRES THE PYROTECHNICS TO SEPARATE THE COMMAND MODULE FROM THE SERVICE MODULE.

HOUSTON, WE HAVE SEP.



OF THE OVER 6-MILLION POUND, 363-FOOT HIGH SATURN V THAT SENT APOLLO 12 ON ITS WAY TEN DAYS EARLIER, ONLY THE 12,000-POUND, 12-FOOT TALL COMMAND MODULE REMAINS!

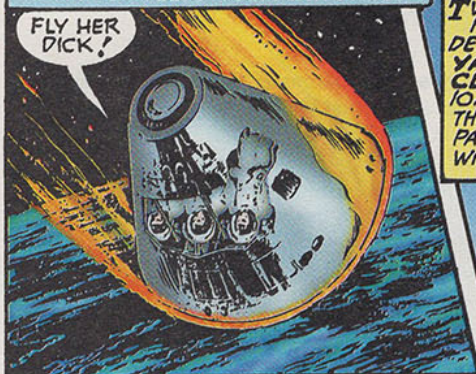
WHILE DICK CONCENTRATES ON FLYING YANKEE CLIPPER, PETE AND AL CAN'T HELP BUT SNEAK A PEAK OUTSIDE.

THE WORLD IS RUSHING IN LIKE A FREIGHT TRAIN!



244:22 G.E.T. ALTITUDE: 300,000 FEET. SPEED: 24,733 MPH.

FLY HER DICK!



ATMOSPHERIC FRICTION SENDS THE TEMPERATURE OF YANKEE CLIPPER'S HEAT SHIELD SOARING TO 5,000 DEGREES FAHRENHEIT!

ALTITUDE: 24,000 FEET. SPEED: 300 MPH.

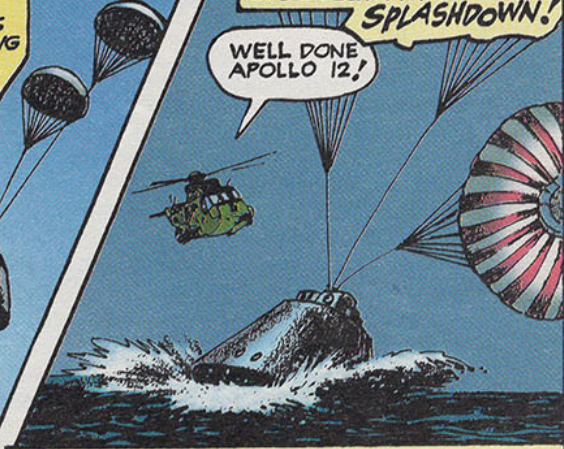
TWO DROGUE PARACHUTES DEPLOY SLOWING YANKEE CLIPPER. AT 10,000 FEET THREE MAIN PARACHUTES WILL DEPLOY.



NOVEMBER 24, 1969... ALTITUDE: 0 FEET. SPEED: 22 MPH.

SPLASHDOWN!

WELL DONE APOLLO 12!



MISSION DURATION: 10 DAYS, 4 HOURS, 35 MINUTES, 25 SECONDS, MILES TRAVELED: 953,000 < STATUTE > LUNAR SAMPLES RETURNED: 74.7 < EARTH > POUNDS < PLUS PARTS OF SURVEYOR 3 >.

A HUNDRED YEARS FROM NOW...

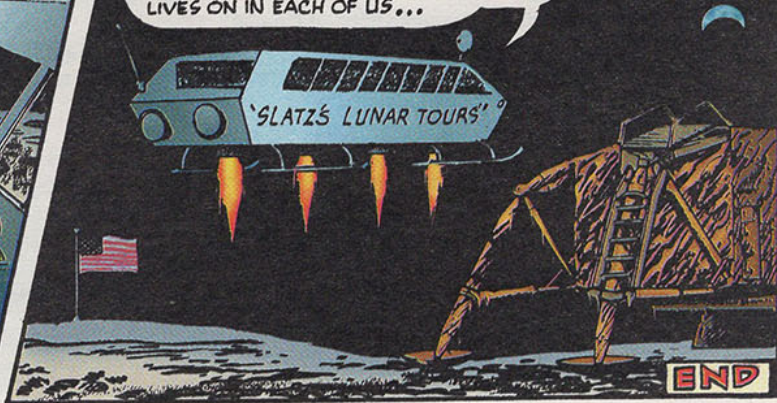
'SLATZ'S LUNAR TOURS'

TO MY LEFT IS APOLLO 12 INTERNATIONAL PARK.



AS IN ALL OF HUMANITY'S EARLY VENTURES INTO SPACE, APOLLO 12 CAME, EXPLORED AND LEFT. BUT LIKE THEIR FOOTPRINTS, WHICH WILL REMAIN IN THE LUNAR SOIL FOR THOUSANDS OF GENERATIONS, THEIR LEGACY AND DREAM OF SPACE FLIGHT LIVES ON IN EACH OF US...

'SLATZ'S LUNAR TOURS'



END

# LUNAR TRIVIA

**Q: How wide (diameter) is the moon?**

A: 2,180 miles (3,500 kilometers), about the distance between St. Louis and San Francisco.

**Q: What does astronaut mean?**

A: Star Voyager.

**Q: How many astronauts walked on the moon?**

A: Twelve.

**Q: How many pounds of rocks did the Apollo astronauts bring back from the moon?**

A: 841 Earth pounds (remember, the moon has 1/6th the Earth's gravity).

**Q: What was the biggest moon rock the astronauts brought back?**

A: Dubbed 'Big Mulley' by the Apollo 16 crew, the football-sized rock tipped the scales at 25.89 (Earth) pounds.

**Q: Who was the first geologist to walk on the moon?**

A: Harrison Schmitt on Apollo 17.

**Q: What is a contingency sample?**

A: The first geological sample an astronaut takes from the lunar surface.

**Q: What is a crater?**

A: A depression formed by the impact of a meteorite.

**Q: Besides werewolves, what visible effects does the moon have on things on the Earth?**

A: It causes tides in large bodies of water like the Atlantic and Pacific oceans.

**Q: Which came first, Arnold Schwarzenegger or the terminator?**

A: The terminator! It is an astrological term going back eons describing the dividing line between the illuminated and dark portions of the moon (or other celestial bodies).

**Q: Which planned Apollo lunar landing mission became the world's first deep space emergency?**

A: Apollo 13.

**Q: Which Apollo mission named their spacecraft after cartoon characters?**

A: Apollo 10, the command module was dubbed Charlie Brown and the lunar module, Snoopy.

**Q: How long is a lunar day?**

A: Same as a lunar night - 14 Earth days.

**Q: How cold does the moon get at night?**

A: Minus-270 degrees Fahrenheit! It's exactly opposite in the daytime - plus-270 degrees Fahrenheit.

**Q: Who had the most and least moonwalking time of all the astronauts?**

A: Most: Gene Cernan on Apollo 17: 22:04 hours

Least: Buzz Aldrin on Apollo 11: 2:15 hours



**Q: Who hit a golf ball on the moon?**

A: Alan Shepard on Apollo 14.

**Q: How many astronauts have made the trip beyond the Earth's gravitational influence?**

A: 24 (three made the trip twice).

**Q: Can you name the three astronauts who made the trip beyond the Earth's gravitational influence?**

A: Jim Lovell (Apollo 8 & 13), John Young (Apollo 10 & 16), and Gene Cernan (Apollo 10 & 17).

**Q: How much ice builds up on the skin of the Saturn V before launch?**

A: 1400 pounds.

**Q: Which moonwalker also flew the X-15 rocket plane?**

A: Neil Armstrong.

**Q: Which moonwalker also flew the space shuttle?**

A: John Young.

**\*Q: Currently, what is the average number of applicants for each two year cycle of NASA's astronaut candidate program?**

A: 3000.

**\*Q: On average, how many applicants for each astronaut selection are accepted?**

A: Twenty.

**Q: Who said - 'We choose to go to the moon and do the other things not because they are easy but because they are hard'?**

A: United States President John F. Kennedy.

**\*Q: How come we haven't returned to the moon?**

A: You got us!

\* Lots has changed since this comic was published. In 2016, there were more than 18,300 applicants! Twelve were accepted, including five women. And America is going back to the Moon. By 2024, the Artemis program will send the first woman and next man to the Moon for the next generation of lunar exploration. By 2028, NASA will establish a sustainable human presence on the Moon, then set its sights on Mars! Read all about it at [www.nasa.gov/artemis](http://www.nasa.gov/artemis).



# LUNAR GEOLOGIST GRAHAM RYDER

**Q: Scientists have been studying lunar samples for over 25 years. Haven't you learned everything there is to learn by now?**

GRAHAM: Definitely not! We haven't fully looked at all the rocks yet and there are new scientific techniques that weren't around 25 years ago that are just now becoming available.

**Q: Where are the moonrocks now?**

GRAHAM: The main sample collection is at the Johnson Space Center in Houston. A small, virtually untouched reserve is kept in a vault at Brooks Air Force Base in San Antonio. Also, there are samples loaned out to researchers and still others on display at museums around the world.

**Q: How are lunar samples stored?**

GRAHAM: The moon is a vacuum and a vacuum is very hard to work in. But, if a sample were exposed to Earth's atmosphere it would be contaminated. So we compromised, storing the lunar samples in dry nitrogen and handling them while wearing rubber gloves coated with Teflon.

**Q: How do you study a lunar sample?**

GRAHAM: We use chemical analysis to find out what they are made of. We use a microscope to do texture analysis, that gives us some idea how the rocks are constructed. Finally, there is radioactive isotope dating to determine the age of the lunar sample.

**Q: What's one interesting fact about the moon?**

GRAHAM: The moon is incredibly dry. It doesn't contain a single water molecule that we know about.

**Q: Where did the moon come from?**

GRAHAM: We still don't know the answer to that one. The information we have points to a large, Mars-sized body hitting the Earth early in its evolution. The resulting impact blew a lot of debris into Earth orbit where it came together to make the moon.

**Q: If I had a moon rock, how much would it be worth?**

GRAHAM: I don't think there is such a number. You can only talk about a moonrock's replacement cost. For example, if a lunar sample got lost, what would you do? You can't replace it... easily. Project Apollo cost billions and there are currently no moon landing programs planned. The moonrocks the Apollo astronauts brought back are national treasures and are priceless.

**Q: How is a crater formed?**

GRAHAM: Craters are formed when something smacks into the moon at high speed.

**Q: Why are some craters bigger than others?**

GRAHAM: They depend on how big the rock is that hits the lunar surface. The usual ratio we use is ten-to-one. That is, if you are looking at a crater ten meters wide, you can be pretty sure it was created by the impact if a rock about one meter wide.

**Q: How long will Pete and Al's lunar footprints last?**

GRAHAM: Tens of millions of years, perhaps more.

**Q: Why will their footprints last so long?**

GRAHAM: There is nothing up there to erode them like there is here on Earth. There is no atmosphere, no air or water to blow the dust around. Unless a big rock hits at just the right place, which is pretty unlikely, it will take millions of years of bombardment by micrometeorites to erode their footprints.

**Q: Micrometeorites are small meteorites?**

GRAHAM: Exactly. The size of a period at the end of a sentence... or smaller. Meteorites and micrometeorites are the debris left over from the creation of our solar system. They hit the Earth too but usually burn up in the upper atmosphere and become shooting stars.

**Q: Do you wish you could go to the moon?**

GRAHAM: Sure. I'd probably be scared to death but I'd go.

**Q: Are the 841 pounds of moon the astronauts brought back enough to tell us everything we want to know?**

GRAHAM: We have only visited six lunar sites and spent only a few hours at each of them. If scientists tried to understand the Earth from such a small-scale study, they'd probably be a long way from knowing what they wanted to know.

**Q: How does someone become a lunar geologist?**

GRAHAM: You have to go to college and study geology or planetary geology.

**Q: Can you tell the difference between a rock from the moon and one from Earth?**

GRAHAM: Easily. I can tell just by looking at a lunar sample under a microscope that it is a section of the moon. It's not a meteorite. It's not of the Earth. It's from the moon.

**Q: Do you get a kick out of working with moonrocks?**

GRAHAM: You bet! When I was a kid, the moon was out of reach. We could look at it through telescopes but nobody had ever visited there. Now, I sometimes walk out of the lab at night and look up into the sky, see the moon and realize I've just been working with part of that! It is an amazing thing.

## SUGGESTED READING

"Apollo By the Numbers" by Richard W. Orloff, 2000, US Government Printing Office. <https://history.nasa.gov/SP-4029.pdf>

"Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions" by W. David Compton, 1989, US Government Printing Office. <https://history.nasa.gov/SP-4214.pdf>

In the half-century since people visited the Moon, NASA has continued to push the boundaries of knowledge to deliver on the promise of American ingenuity and leadership in space. NASA will continue that work by moving forward to the Moon with astronauts landing on the lunar South Pole by 2024.

Learn about the legacy of Apollo at <https://www.nasa.gov/apollo50>.

Artemis is the first step to begin the next era of exploration. NASA will establish a sustainable human presence on the Moon with the goal of sending humans to Mars. NASA will lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities.

Learn about Artemis at <https://www.nasa.gov/artemis> and NASA's Moon to Mars approach at <https://www.nasa.gov/topics/moon-to-mars>.

NASA's Space Launch System will be the most powerful rocket we've ever built. It will enable astronauts to begin their journey to explore destinations far into the solar system. NASA's Orion spacecraft is built to take humans farther than they've ever gone before. Orion will serve as the exploration vehicle that will carry the crew to space, provide emergency abort capability, sustain the crew during the space travel, and provide safe re-entry from deep space return velocities.

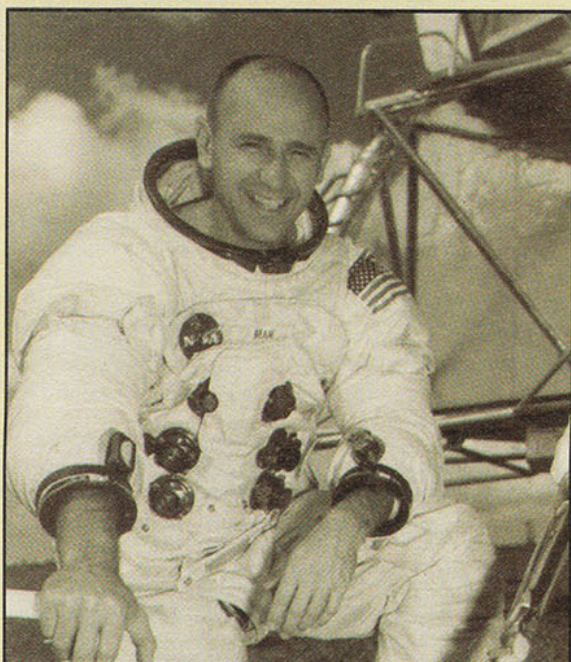
Learn more about the rocket at <https://www.nasa.gov/exploration/systems/sls/index.html>.

Learn more about the spacecraft at <https://www.nasa.gov/exploration/systems/orion/index.html>.

To find out how to become an astronaut, visit <https://www.nasa.gov/content/astronaut-selection-program>.

Discover the NASA STEM Forward to the Moon Educators Guide and hands-on science activities for the whole family at <https://www.nasa.gov/stem-ed-resources/nasa-stem-forward-to-the-moon-educators-guide.html>.

## LUNAR MODULE PILOT ALAN BEAN\*



**Q: If you landed on the "Ocean of Storms", where is the water?**

**AL:** Back in the early 1600's, when Galileo trained his telescope on the moon, he saw mountainous areas and regions that looked darker and flatter. Galileo thought they must be the same as the oceans and seas on Earth. So, as discoverers do, he named his findings accordingly. That is why Apollo 11 landed on the "Sea of Tranquility" and Pete and I landed on the "Ocean of Storms".

**Q: What was walking on the moon like?**

**AL:** It was truly a wonderful adventure and reminded me of the time I was a small boy visiting my grandparent's farm in Michigan. In the wintertime my parents would bundle me up in a snowsuit, overshoes, mittens and hat. When I walked through my grandparent's uneven plowed fields it was a lot like walking on the moon because all that winter clothing was bulky like my space suit and the moon's surface, although made up of volcanic rock and dust, is very uneven like a plowed field. Everything we did on the moon kicked up powdery, grayish dust.

**Q: Except the moon's gravity is different.**

**AL:** Right! It isn't like running on the Earth because the moon's gravity is only 1/6th that of Earth. Down here, I weigh 150 pounds and my space suit and backpack weigh another 150 pounds. But on the moon, the combined weight of me and my gear was only 50 pounds. I felt strong up there. When I pushed off with one foot, there was a long pause until landing on the other foot; it was like running in slow motion.

**Q: What does the dark side of the moon look like?**

**AL:** First point I should make is that there is no dark side of the moon anymore than there is a dark side of the Earth. Just as the Earth spins around once every 24 hours giving you day and night, the moon does also only more slowly. It spins around once every 14 Earth days. But only one side is ever visible from the Earth. That's the near-side.

**Q: Okay, what does the far side of the moon look like?**

**AL:** It looks a lot like the near side only much rougher because it lacks the flat 'oceans' and 'seas' of the front side.

**Q: How come there are no craters on the Earth?**

**AL:** There are! As a matter of fact we trained for Apollo 12 in the biggest crater on Earth., Meteor Crater in Arizona. It is the biggest at 4,150 feet in diameter.

**Q: What was your biggest thrill while on the moon?**

**AL:** Looking back at the Earth. It was about the size of a baseball and I remember thinking that I am really here on the moon and everybody else, except Pete and Dick and me, were on this beautiful blue and white ball.

**Q: What was weightlessness like?**

**AL:** Weightlessness is one of the most difficult things to describe because there is nothing perfectly like it on Earth. However, the thing that comes closer than any other is floating in a swimming pool. The problem with that is in a swimming pool, your hand and leg movements propel you through the water. In zero gravity of space, the air doesn't resist your hand and leg movements enough to make any significant motion.

**Q: How can I become an astronaut?**

**AL:** First of all, if you're in school, there is nothing more important than learning as much as your teachers can teach you. To be a good astronaut, you not only have to be a good pilot and a good scientist, but you have to be able to write and communicate complex information, do mathematics and science without being intimidated and have a good understanding of physics and chemistry. Basically, none of the things you learn in school are unimportant.

**Q: What would happen if your space suit broke?**

**AL:** If my space suit sprung a leak, either from a seam ripping or a meteoroid impact, it would let all the air out and I would immediately fall unconscious. In fact, I probably wouldn't know that it occurred and shortly after lapsing into unconsciousness I would die from lack of oxygen to the brain.

**Q: Were you ever scared?**

**AL:** Yes, I was scared sometimes but through training and self-discipline I learned to quit thinking about being scared and to concentrate on the job that I had to do. If I can do it, so can anyone!

**Q: What lies in the future?**

**AL:** People will go back to the moon. It will happen much the same way humans first explored the frontiers of Earth. First there will be small settlements, then villages and finally cities. And when that is complete we will probably do the same thing on Mars, some of Jupiter's moons and the other planets. So, young people should realize that the great adventures are in the future not in the past and if they want to be part of it, they should start getting the training and education they need.

\*  
*Alan Bean died May 26, 2018, at age 86.*

## GLOSSARY

**APOLLO:** the Greek god of light

**BENDS:** sometimes fatal disorder characterized by paralysis and distress in breathing caused by the release by gas bubbles in tissue upon too rapid decrease in air pressure

**BERNOULLI'S PRINCIPLE:** increase in the velocity of any fluid is always accompanied by a decrease in pressure (air is considered a fluid).

**CISLUNAR:** the area of space between the Earth and the moon

**COSMONAUT:** Russian term for 'astronaut'

**EECOM:** (Environmental, Electrical and Communications Engineer) EECOM monitors and troubleshoots command/service module systems.

**ESCAPE VELOCITY:** the speed which a particle or larger body must attain in order to escape the gravitational field of a planet or star

**FIDO:** (Flight Dynamics Officer), plots spacecraft trajectory

**GNC:** (Guidance and Navigation Officer), in charge of command module's guidance, navigation and propulsion systems. G.E.T.- Ground Elapsed Time (since liftoff)

**GUIDO:** (Guidance Officer), chief navigation officer.

## COMMAND MODULE PILOT DICK GORDON\*



**Q: Why does your space suit look different than your crew mates?**

DICK: Mine was unlike Pete and Al's because it was not designed for EVA (Extra-Vehicular Activity). It didn't have the connections to be hooked up with the spacecraft and backpack at the same time. Also, the interior of their suits was different. They had a water-cooled garment to help cool them while they were on the lunar surface and their suits had more layers of protection due to the radiation and heat they would be exposed to on the lunar surface.

**Q: Did you get much sleep the night before launch?**

DICK: I slept very well. I realized I had done everything I could possibly do and was ready to fly. Everybody thinks you'd be keyed up and excited and you are, but there's a certain calmness that you surround yourself with.

**Q: How about in space? Is it easy to sleep up there?**

DICK: It isn't the 0-gravity that keeps you up. It's the noise level inside the spacecraft. We would darken the command module by placing shades over the windows to keep out the light and it got just like night. But there was always popping and gurgling from the fans and machinery that was constantly running. Despite those distractions, I never did have much problem sleeping up there.

**Q: Why did you always sleep in one of Yankee Clipper's couches?**

DICK: I found it more comfortable and familiar than the sleeping bags. I could use the straps to tie myself down and tuck my hands underneath my body so they weren't floating around. You had to do that so they wouldn't float out and inadvertently flip a switch on the instrument panel.

**Q: Why was Apollo 12's liftoff in such bad weather?**

DICK: Some people say we were launched because the President of the

United States was in the V.I.P. stands. Actually, we were ready to fly, the bird (Saturn V) was ready to fly and mission control gave us the 'Go'. So, we went.

**Q: What happened when you got hit by lightning?**

DICK: We had more warning lights than we ever saw during training. But we all did our jobs. Pete was telling mission control about our situation. I was making sure the booster (Saturn V), was functioning properly. And Al was busy trying to get the electrical system back on line.

**Q: Were you scared?**

DICK: It really wasn't a frightening experience because we were too busy taking care of business to think about it.

**Q: What did the lightning do to the spacecraft?**

DICK: That was one of mission control's concerns throughout the entire mission. They thought we might have damaged our parachutes and that would have been the end of that story. Fortunately, all it did was derail a fuel quantity gauge but that wasn't enough to call a halt to the mission... And it gave us one heck of a story to tell our grandchildren.

**Q: What were you doing when you weren't actually flying Yankee Clipper?**

DICK: There were always chores to perform just like taking care of any house. A simple thing on Earth like eating would take an incredible amount of time in space and create a remarkable amount of garbage that you'd have to clean up. Also, there were lithium hydroxide canisters that needed to be changed, water that needed to be chlorinated, dust screens that needed to be cleaned. A lot of tiny things but they add up.

**Q: What does space food taste like?**

DICK: It wasn't bad but I'm not very objective. I always eat whatever is put on my plate.

**Q: You were alone in the command module for 38 hours. Did you get lonely while Pete and Al were on the lunar surface?**

DICK: Actually, I didn't have time. I was always doing something. Either taking pictures of the lunar surface, housekeeping in the command module or performing an engine burn, I had something to do almost every second. Besides [smiles], with those two guys gone I finally had some room to move around.

**Q: During reentry, the temperature outside Yankee Clipper soared to almost 5000 degrees Fahrenheit. How warm did it get in the spacecraft?**

DICK: Around 75 degrees. We had a heat shield that was designed to dissipate heat by the process of ablation. That is, the heat shield was made of a material that would partially erode, carrying the heat along with it as evaporated.

**Q: You kind of looked like a big meteor, right?**

DICK: Yes. It was quite a show out the spacecraft window. Lots of blues-greens, yellows and oranges trailing behind the spacecraft as far as the eye could see.

**Q: What is the coolest thing about being an astronaut?**

DICK: I would have to say the adventure. You get to go where no one has gone before and do things no one has done.

\* Dick Gordon died Nov. 6, 2017, at age 88.

**INGRESS:** the act of entering

**INTREPID:** characterized by resolute fearlessness, fortitude and endurance

**PYROTECHNICS:** controlled explosion designed to propel apart two previously joined surfaces

**REGOLITH:** the moon's unconsolidated rocky debris and soil (lunar dirt)

**RENDEZVOUS:** the planned meeting of two or more spacecraft in close proximity, matching orbits and velocities

**RETRO:** (Retrofire Officer), in charge of the spacecraft's reentry into the Earth's atmosphere

**SELENOLOGY:** the study of the moon

**STAGES:** two or more rockets stacked on top of each other in order to reach higher altitudes or have greater payload capability.

**TELEMETRY:** a system of data relay via radio

**TELMU:** (LM Systems Officer), monitors the lunar module's electrical, environmental and other systems.

# ASK CAPTAIN PETE\*\*

—Do you think there's any life in space?

— Edward Zisk, (15) Springfield, OH

Captain Pete: Haven't seen any, but I believe it is a definite possibility. After all, there's plenty of unearthly looking things moving around in my refrigerator so there's always a chance of life springing up almost anywhere.

—If you weren't an astronaut, what would you be?

— Chad Mellon, (12) St. Louis, MO

Captain Pete: A cosmonaut.\*

— How do you go to the bathroom in space?

— Stacey Rimer, (14) Washington, D.C.

Captain Pete: If you want to keep your friends, very carefully.

— Did you really sleep on the launch pad?

— Jan Kennish, (17) Toronto, Canada

Captain Pete: Yes, but I wish I could tell you it's a result of me being as cool as ice. The truth is I spent most of the night before launch staring at the ceiling of my bedroom thinking about the fact that the next day I was headed to the moon... for real! That night I got zero sleep and the next day's countdown had some places where where a guy doesn't have much to do. The rest is nap history.

— Did you feel lonely on the moon?

— Lydia Lacey Hart, (28) Hoboken, NJ

Captain Pete: Nah, I was just glad to get out of that cramped spacecraft and stretch my legs. Besides, I had Al with me and Dick was only 60 miles away.†

—Did you really walk on the moon? I heard it was all a trick filmed in the desert.

— Paula Weinberg, (16) Fort Dodge, IA

Captain Pete: All I know is I did and Al did. Maybe the other flights were faked but ours wasn't. Besides, you think we could keep this thing quiet all these years if it wasn't real?

— Did your rocket go warp speed?

— Theresa Warner, (12) Mobile, AL

Captain Pete: According to my good friend Captain Kirk, warp speed is equal to the speed of light (186,000 miles per second!) Since my Saturn V's top speed was a mere 7 miles per second (25,000 mph), it came as close to warp speed as I come to dunking a basketball!

— What's your favorite thing about being an astronaut?

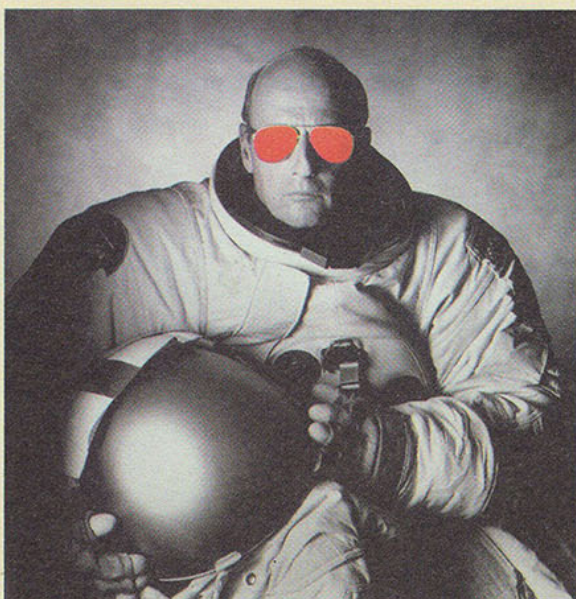
— Heather Hewitt, (15) Louisville, KY

Captain Pete: Seeing the Earth from space. That was awesome.

— How come you didn't have a moon car to ride around in?

— Fritz Greenspan, (14) Sarasota, FL

Captain Pete: Riding is for weenies! Al and I will take hoofing any day of the week... Actually, both of us got kind of tired moonwalking in those bulky suits and sure wished there was something to take us around. The last three Apollo flights (15, 16, 17), all had moon cars called lunar rovers. Those rovers really expanded the range of exploration away from the lunar module. [See upcoming issue for the lunar rover story!]



— How do I become an astronaut?

— David Berman, (10) Grand Forks, SD

Captain Pete: Study hard. Learn to fly. Walk the straight and narrow... but don't forget to have a blast!

— What kind of glasses are those anyhow?

— Chris Gilliam, (16) Nashville, TN

Captain Pete: Top Secret.

— Do you fly the Space Shuttle?

— Meg Macer, (12) Charleston, WA

Captain Pete: No.

— Why not?

— Meg Macer, again!

Captain Pete: After my Skylab flight I knew it was going to be a long time before the Shuttle would fly. And I knew I didn't want to sit around on my hands for eight years so I went on to other things.

—What are you doing now?

— Tonia Dobbs, (17) Phoenix, AZ

Captain Pete: I'm at McDonnell Douglas Aerospace working on a new rocket that may very well launch you and other people your age, into space someday in the future. Other than that, I'm giving speeches and doing the best I can to get the news out about the importance of space.

— I've always wanted to be an astronaut. You have a cool picture. Where can I get a poster of that?

— Kenny Carlson, (17) Santa Monica, CA

Captain Pete: A sharp, discerning eye is important in an astronaut. You'll go far in this man's space program! Regarding the poster, direct your baby-blues below.

Thanks for writing and writing and remember - *If you want some time in zero-g, you gotta log the hours in the libraree! Love and Command Modules, - Captain Pete*

\* - see Glossary

† - Dick Gordon's command Module orbited at 60 miles altitude.

\*\* - Pete Conrad died July 8, 1999, after a motorcycle accident, at age 69.

MOON SHOT, *The Flight of Apollo 12*, was published originally in June 1994. NASA created this 50th anniversary electronic reproduction through the courtesy of copyright owners Nancy Conrad, D.C. Agle and Kurt Blemaster. "Ask Captain Pete" and the "Captain Pete Poster" are no longer available.

Nancy Conrad says: "In 1969, Pete and his two best friends strapped in for their ultimate adventure... the launch aboard a Saturn V rocket for their journey to their landing site, the Ocean of Storms, Moon. It was the most daring and extraordinary adventure humanity had ever dared to dream. And it was a time of magic. If Pete were here today he would encourage you to become a student of life and to conceive, believe and achieve the breakthrough ideas, technologies, and sustainable solutions that will influence and determine the future and the wellbeing of our planet. He would ask us to all work together as we seek new crew members for the next great Moonshot... sustaining spaceship Earth."



## Humanity's Return to the Moon

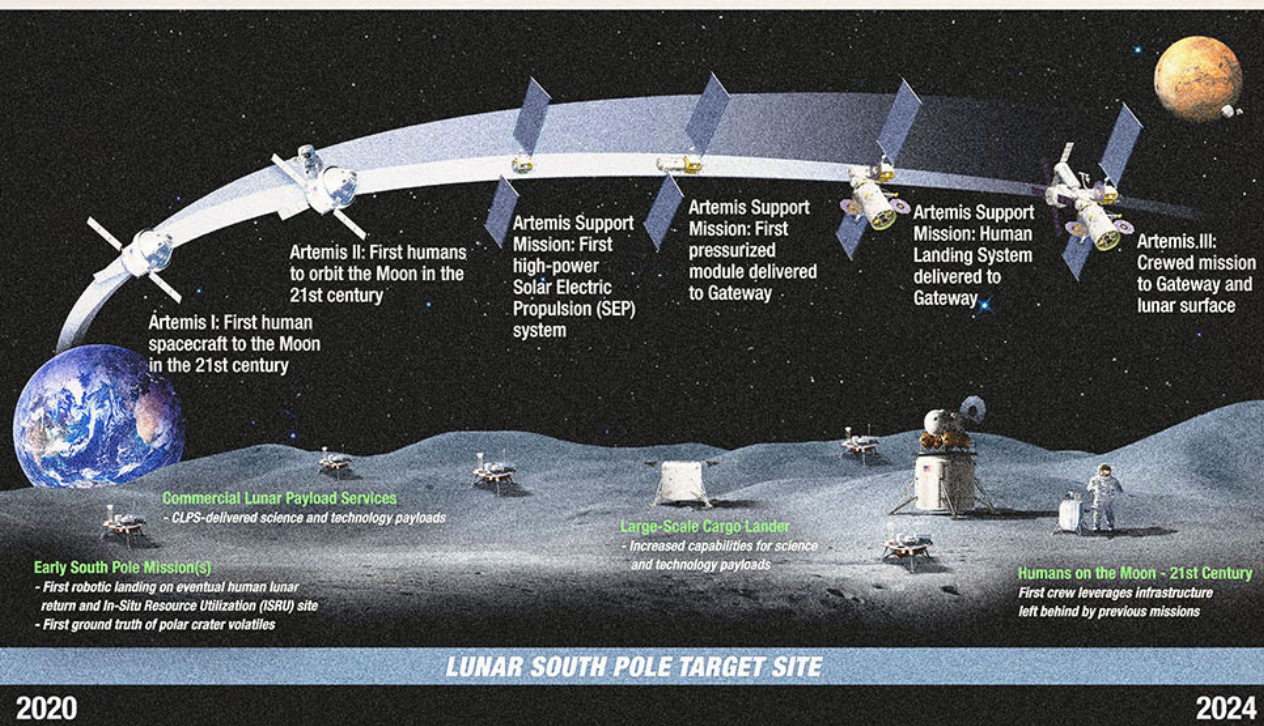
Apollo captured the world's attention and inspired generations of great achievements, exploration, and scientific discovery.

From July 1969 to December 1972, six Moon landings put 12 astronauts on the lunar surface and transformed how we see humanity. The mission of Apollo was to land Americans on the Moon and return them safely to Earth. The Apollo program represents one of the greatest engineering and scientific achievements of the 20th century. NASA is returning America to the Moon!

### We are going to the Moon to prepare for Mars.

In Greek mythology, Artemis was the twin sister of Apollo. With the Artemis program, NASA will land the first woman and next man on the Moon by 2024, using innovative technologies to explore more of the lunar surface than ever before. We will collaborate with our commercial and international partners and establish sustainable exploration by 2028. Then, we will use what we learn on and around the Moon to take the next giant leap – sending astronauts to Mars.

### We are going with a sustainable architecture, the likes of which has never been built before.



This timeline illustrates NASA's preferred approach to landing the first woman and next man on the Moon. It highlights only the near-term path. Artemis includes all our lunar exploration activities through at least the next decade.



APOLLO  
50    
NEXT GIANT LEAP