

PROJECT APOLLO

ITT's Federal Electric Corporation, worldwide service associate of International Telephone and Telegraph Corporation and a member of the ITT Defense-Space Group.

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NEWS RELEASE

UNITED STATES AIR FORCE

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Using C-Band radar, unified S-Band radar and telemetry receivers, these ships gather data on spacecraft performance and the well being of the astronauts. Such data is transmitted from the ship (as it happens) and relayed via satellite by the ship's communications

FOR IMMEDIATE RELEASE
WTE 69-6-19

VANDENBERG AFB, CALIF (AFWTR)... For centuries man's exploration of his environment has been closely linked with the sea. The pages of history are filled with such voyages. The journey of Columbus, for example, led to the discovery of a "new world." Today man's "new world" is the moon. With the flight of Apollo 11 man will extend his explorations to a new planet. Symbolically, men at sea will provide vital support to the voyage of the Apollo 11 astronauts.

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2-2-2

Apollo ships story

Four ships, the USNS Vanguard, Huntsville, Mercury and Redstone are each equipped with over 445 tons of extremely complex electronic and communications equipment required for the support of manned missions. Known as the Apollo Instrumentation Ships, they are part of NASA's worldwide tracking network for Apollo missions. These ships can be thought of as floating tracking stations. Operating in the broad ocean area, they are used to track and maintain communications with the Apollo spacecraft when it is out of reach of land based stations.

Using C-Band radar, unified S-Band radar and telemetry receivers, these ships gather data on spacecraft performance and the well being of the astronauts. Such data is transmitted from the ships in real time (as it happens) and relayed via satellite by the ship's communications system to the Mission Control Center at Houston. Commands originated at NASA's Mission Control Center can be sent in real time to the Apollo spacecraft through the digital command systems on each of the ships.

The performance of these four ships during earlier Apollo missions demonstrates their contribution to the overall mission. For example on Apollo 7, the first mission supported by all of the Apollo ships, the fleet tracked 212 passes of the spacecraft during the ten day mission and gathered 7,494 pounds of data. Included in this extraordinary amount of data were 699 reels of magnetic computer tape and 1,112 rolls of strip charts.

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3-3-3

Apollo ships story

By way of comparison, the data obtained by the Apollo fleet during that one mission is equivalent to the amount of data collected from approximately 100 ballistic missile launches. Total fleetwide tracking time during Apollo 7 was the longest mission coverage by the ships up to that time - nearly 26 hours.

During Apollo 9, an eight day earth orbital mission, the fleet tracked a total of 258 passes of the spacecraft and gathered 9,698 pounds of data during more than 32 hours of tracking.

Although the ships gather less data during a lunar orbit mission (since the spacecraft makes fewer earth orbits) the ships provide important coverage during several critical maneuvers and events. For example the Vanguard, generally stationed some 1,000 miles south-east of Bermuda in the Atlantic, must confirm to Mission Control that the spacecraft has attained the proper velocity and altitude for insertion into an earth orbit. This insertion maneuver is one of the critical phases of the flight. Since it occurs over the broad ocean area, it must be covered by a tracking ship.

During a lunar orbit or landing mission, the Mercury and Redstone are stationed in the Pacific to provide tracking coverage during the translunar injection maneuver. This maneuver takes the spacecraft out of its earth orbit and sends it on a course toward the moon. Finally,

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4-4-4

Apollo ships story

as the Apollo astronauts make the journey back to earth, the Redstone and the Huntsville provide tracking during the reentry into the earth's atmosphere. The Apollo Instrumentation Ships will perform these tasks for the Apollo 11 flight.

To track and command the Apollo spacecraft, the location of an instrumentation station relative to the spacecraft must be known. Since this poses great difficulties on the high seas, the Apollo ships are equipped with state-of-the-art navigation equipment to pinpoint their position. The ships use star sightings (both night and day), navigational satellite tracking and an inertial navigation system to precisely define their location.

Readying these ships for their complex mission requires a great deal of work and coordination between several agencies. The overall management of the Apollo ship operations is the responsibility of the Air Force Western Test Range. The Military Sea Transportation Service provides maritime crews and the Federal Electric Corporation (under contract to the Western Test Range) provides the technical instrumentation crews. About 400 such technicians are aboard the four ships. NASA's Goddard Space Flight Center is responsible for the configuration control and network interface of the ships in support of Apollo missions.

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5-5-5

Apollo ships story

Despite the fact that these are "space age" ships, they are not entirely immune to the same problems that must have faced Columbus' fleet. For example, the Mercury tracked Apollo 7 while in the midst of a typhoon and during the Apollo 9 mission the Vanguard endured nearly three weeks of storms with high seas and winds up to 50 knots. Additionally, one of the onboard Satellite Communications Systems suffered a critical failure six days before the launch of the spacecraft. Using techniques developed and used during each of the previous two missions, the Apollo Ships Operational Readiness Force (a special Western Test Range task force who insure the ships are ready to support each mission) made arrangements for an emergency air drop of replacement parts. While it was only five days prior to the mission, the air drop provided the parts needed to ready the Satellite Communications System for support of the Apollo 9 flight.

With these four highly instrumented ocean going vessels, man's exploration of the moon will be made easier and safer.

-AFSC-

man's "new world" is the moon. With the flight of Apollo 11 man will extend his explorations to a new planet. Symbolically, men at sea will provide vital support to the voyage of the Apollo 11 astronauts.

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INTERNATIONAL
TELEPHONE AND TELEGRAPH
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PLAZA 2-6000

ITT TECHNICIANS PREPARE TO SUPPORT APOLLO 11 AT SEA

VANDENBERG AFB, CALIFORNIA -- Today, preparations are underway to land two men on the Moon and return them safely to Earth. World attention is focused on the developments of the Apollo 11 flight.

Four Apollo ships, each equipped with 445 tons of electronic gear will be used to support man's most historic flight. The overall management of the Apollo ship operations is the responsibility of the Air Force Western Test Range. The U.S. Navy's Military Sea Transport Service provides the maritime crews and International Telephone and Telegraph Corporation's Federal Electric Corporation (under contract to AFWTR) provides the technicians and engineers who maintain and operate all of the technical facilities aboard the ships and on the range. NASA's Goddard Space Flight Center is responsible for the configuration control and network interface of the ships in support of Apollo missions.

One of the essential elements of the Apollo project in putting American astronauts on the Moon and returning them safely to Earth is a global instrumentation network to track the spacecraft, monitor spacecraft performance, communicate with the astronauts, and monitor the astronauts' performance.

Since approximately three quarters of the Earth's surface is water, certain vital stations of the network must be located in the oceans.

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The four ships--USNS Vanguard, USNS Redstone, USNS Mercury and USNS Huntsville--will be performing vital roles in the Apollo 11 flight as ocean stations in the worldwide network.

The USNS VANGUARD--will be located 1,000 nautical miles southeast of Bermuda and will support the spacecraft's insertion into Earth orbit. After the Apollo 11 launch and the booster burnout, FEC technicians start tracking electronically as the spacecraft approaches the Vanguard. Systems are checked aboard the spacecraft, speed, altitude readings are relayed to Houston in real time (as it happens) and the decision of go or no go into earth's orbit is made. All of these readings, relays and decision making, all occur within thirty (30) seconds. As a backup emergency provision, the USNS Vanguard is equipped with recovery facilities should it be needed during the initial stage of the Apollo flight.

The USNS REDSTONE--will be located 700 miles south of Kwajalein and will electronically track the Apollo spacecraft during its two or three Earth orbits. The Redstone technicians are the primary crew for relaying the command decision for entry into the translunar flight. As the spacecraft enters translunar flight, technical crews aboard the Redstone measure engine burn and pick up the increase in speed of the capsule.

The USNS MERCURY--will be located 1,200 nautical miles southwest of Honolulu and will track during the Earth orbit of the spacecraft. The Mercury will be number two in the translunar injection phase of the Apollo flight.

The USNS HUNTSVILLE--will be located approximately 522 nautical miles from New Britain in the southwest Pacific. This ship may be used for electronic tracking support during the Earth orbit and after translunar injection. The FEC technicians aboard the Huntsville will be the primary group to track the spacecraft throughout the blackout period. The blackout is caused from intense heat as the spacecraft enters the earth's atmosphere causing metal to

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burn and flake with the resultant loss of electronic signals.

The tracking systems provide accurate information on the position and on the space vehicles relative to the ship. The data transmission links include a command control system, will be able to send to the spacecraft digital commands that originate either at the NASA Manned Spacecraft Center in Houston, Texas or on board the ship.

The navigational system is able to track stars both day and night and also has the capability of making the reading oceanographic charts. The computer system provides pointing and aiming data for the tracking antennas and improves tracking accuracy by compensating for ship motion and position.

The communications systems on the ships include a communications satellite terminal and high power transmitters for communicating with aircraft and spacecraft. In addition, there are normal high-frequency ship-to-shore and data links on board.

The telemetry systems are able to handle hundreds of channels for information including performance data of the spacecraft and health reports of the astronauts. The data collected by the ships electronic systems will be transmitted from the ships in real time (as it happens) to and from the mission control center and the Apollo spacecraft.

-ITT-

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WHAT IS YOUR APOLLO I.Q.?

1. The Apollo spacecraft flies orbits near the earth and Moon. An orbit is: a) a prototype spacecraft b) an oxygen system for the astronauts c) a circular or elliptical path about the planet d) a widely varying flight path to allow ground radar tracking
2. Dr. Kurt Debus is director of NASA's: a) Marshall Space Flight Center b) Kennedy Space Center c) Manned Spacecraft Center d) Goddard Space Flight Center
3. A "G" force is: a) weightlessness b) the feeling of weight c) the pull of gravity d) none
4. ALDS is a key part of the Kennedy Space Center telemetry systems, operated and maintained by ITT's Federal Electric Corporation. The initials stand for: a) Apollo Launch Data System b) Apollo Logistical Determination System c) Auxiliary Launch Time Determination System d) Auxiliary Liquid Dehydration System
5. A rocket engine pushes the vehicle because of: a) Gresham's Law b) magic c) centrifugal force d) Newton's third law of physics
6. Newton's third law of physics states: a) for every action there is an equal and opposite reaction b) a body at rest stays at rest unless acted upon by an external force c) a falling apple gathers no moss d) atmospheric pressure decreases geometrically as altitude increases
7. The lunar module (LM) is the unit in which: a) the men ride on the surface of the moon for exploration b) the men ride from lunar orbit to the surface and back again into orbit c) the package of equipment is placed to record moon quakes d) the television cameras used to show the lunar landscape are protected from asteroid impact
8. OTV is operated and maintained for NASA by ITT's Federal Electric Corporation. The initials stand for: a) operational thrust vector analysis b) optional television capabilities c) operational television system d) operational terminal voltage
9. The command module (CM) plays an important part in the flight. The CM is: a) a small room at mission control b) the spacecraft in which the astronauts ride from earth to lunar orbit and back c) the spacecraft in which the astronauts land on the Moon d) the small container which holds the spacecraft radio system
10. LOX used in Saturn flights is: a) smoked salmon for crew lunches b) a gas for emergency water supply pressurization c) liquid oxygen d) latent optical experiment plans
11. The height of the fully assembled Saturn/Apollo launch vehicle is: a) 363 feet b) 427 feet c) 233.5 feet d) 127 feet

12. The stage which actually places the Apollo Command-Service Module into Earth orbit is:
a) SIC b) SII c) SPS d) SIVB
13. The Earth terminator is: a) the precise moment of rocket engine cutoff b) the point where daylight ends and darkness begins c) the exact time of splashdown d) the latitude and longitude of splashdown
14. The Kennedy Space Center real-time computer operated by ITT's Federal Electric Corporation produces readouts of data: a) as they happen b) completely printed and in bound volumes c) not calculated, but fast d) delayed no more than 10 seconds
15. The Command Module can be described, in lunar orbit, as: a) the orbiting power station b) the mother ship c) the fourth Saturn stage d) none of these
16. Gravity, on Earth is how many times stronger than on the Moon? a) 6 times b) 0.86 times c) 8.6 times d) 3 times
17. The Saturn V's first stage engines burn fuel at a rate of: a) 10 tons per minute b) 20 tons per minute c) 15 tons per second d) 3.2 tons per second
18. The first stage of the Saturn V burns two and one half minutes. At first stage engine shutdown, how are the engines cut off? a) two diagonally opposed engines at one time b) center engine first, then outboard engines c) outboard engine first, then center engine d) all at once
19. The Sweeney Probe used by ITT's Federal Electric Corporation in the KSC weather station:
a) measures lightning potential b) checks the weight of the launch vehicle c) determines soil hardness at the pad prior to launch d) measures acoustical levels near the rocket motors
20. Thrust from the Saturn V's five first stage engines totals: a) 10 million pounds b) 500,000 pounds c) 2.85 million pounds d) 7.7 million pounds
21. How long before actual liftoff do the Saturn's first stage rocket engines ignite? a) 0.075 seconds b) 14 seconds c) 8.9 seconds d) 0.63 seconds
22. First motion of the Saturn V is determined when the vehicle has risen off the pad a distance of:
a) 7-1/4 inches b) one millimeter c) one inch d) 3/4 inch
23. The lunar module separates from the third stage of the Saturn vehicle by means of: a) small rocket motors b) thrusters c) springs d) electric motors
24. The SLA plays an important part in the lunar flight. SLA stands for: a) secondary lunar ascent b) synchronized logistical aptitude c) spacecraft lunar module adaptor d) part of the astronauts first meal
25. Yaw, in spacecraft flight, is: a) 'right-or-left' movement of spacecraft nose b) a yellow potato used in astronaut meals c) 'up-or-down' movement of the spacecraft nose d) a condition requiring medication

Answers: 1.c; 2.b; 3.c; 4.a; 5.d; 6.a; 7.b; 8.c; 9.b; 10.c; 11.a; 12.d; 13.b; 14.a; 15.b; 16.a; 17.c; 18.b; 19.a; 20.d; 21.c; 22.d; 23.c; 24.c; 25.a

20-25 right: You're an assistant astronaut!
15-20 right: You're a budding space authority!
10-15 right: Better brush up!
5-10 right: Get out those old Buck Rogers comic books.
0-5 right: Consult your nearest eight-year-old for special tutoring on space!

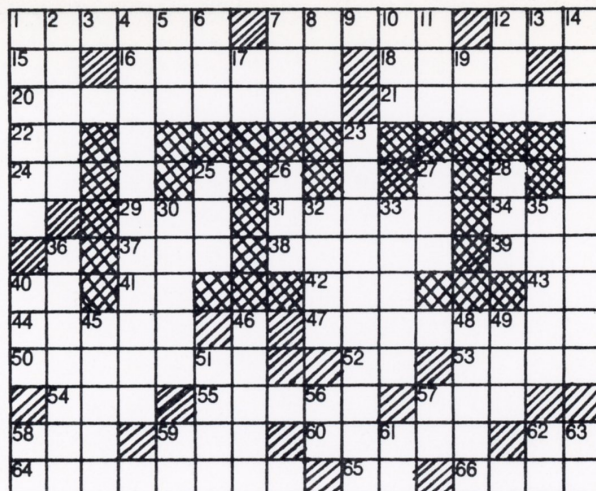
You need research!
What Is Your Apollo I.Q.?

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ACROSS

DOWN

1. Gumbdrop, Snoopy, Charlie Brown, Spider all belong to this family.
7. NASA exec. with historical name.
12. A sharp one works best.
15. Launch operations (ab.)
16. Natural radioactive isotope of thorium.
18. Race track shape.
20. Not alike
21. Acronyms: radio detecting and ranging.
22. Registered nurse (ab.)
24. Pronoun
29. You believe in 'em or you don't.
31. Calls the shots at KSC
34. Long or short, it's still heavy.
37. Battery terminal (ab.)
38. First name, Aurora 7 pilot.
39. Unit of energy.
40. Present tense of was.
41. Flack (ab.)
42. Prefix: three
43. Laotian coin
44. Language peculiar to a group.
47. Required (music)
50. Flat roof or open platform.
52. In other words.
53. Charge upon property for debt satisfaction.
54. Rodent.
55. Beginning
57. Guided.
58. Headcovering.
59. Apollo _____ was first manned flight of program's spacecraft.
60. All Mercury spacecraft carried this number.
62. International body (ab.)
64. Second part of 36 down.
65. Rear Admiral (ab.)
66. Space agency.

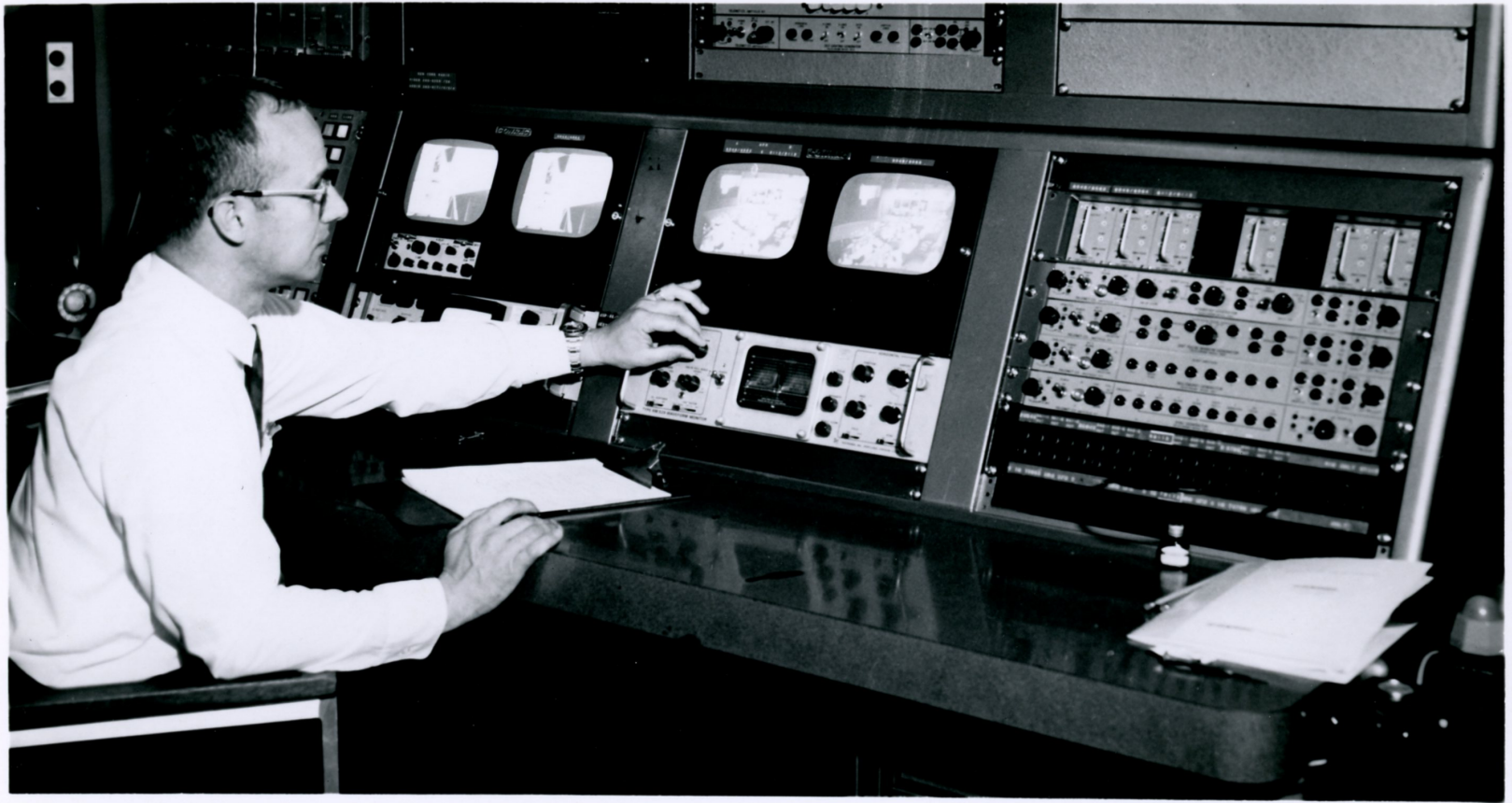
1. Buzz
2. Apex
3. Irish: son of
4. Portable environment (two words)
5. Loss of energy (ab.)
6. Office of Navy Research (ab.)
7. Play on words.
8. Come to (ab.)
9. Self.
10. Goes with neither.
11. Space walking (ab.)
12. The "petals" which enclose lunar module during launch (ab.)
13. Article.
14. Shots are called from here.
17. By way of explanation (ab.)
19. Paid press or broadcast notice (ab.)
23. One who almost makes the circular trip.
25. Temporary end of radio contact (ab.)
26. Mormons (ab.)
27. EDT replaced it at KSC
28. Shoshonean
30. Shape (Lat.)
32. Outside: (comb. form)
33. Useful.
35. Speak.
36. ITT's international service associate: first word.
40. Smallest single piece of information used in telemetry and computation.
45. Unhappy.
46. Several wise ones.
48. First orbiting American.
49. Succor.
51. Coconut husk fiber.
56. Navy emergency service specialist (ab.)
57. French article.
58. Pronoun.
59. Changing action word (ab.)
61. Vice Admiral (ab.)
62. Located on 63.
63. Continent (ab.)

1. Aldrin 2. Point 3. O 4. Life support 5. LOE 6. Pun 8. Amt.
9. I 10. Nor 11. EVA 12. Sia 13. A 14. Washington 17. ie.
19. Ad 23. Suborbiter 25. LOS 26. LDS 27. EST 28. Ute
30. Format 32. Ecto 33. Utile 35. Orate 36. Federal 40. Bit
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39. Eng. 40. Be 41. P.R. 42. Tri 43. Al 44. Idiom
47. Obligate 50. Terrace 52. o.e. 53. Lien 54. Rat
55. Onset 57. Led 58. Hat 59. VII 60. Seven
62. U.N. 64. Electric 65. R.A. 66. NASA

Answers - Down

Answers - Across



EARTH TUNES IN -- As Apollo 11 takes off from Cape Kennedy July 16 for man's first touchdown on the moon, the historic moment will be telecast to millions of living rooms throughout the world. From launch to moon landing, the color and black-and-white TV spectacular will be monitored and relayed to nations abroad by ITT World Communications Inc., a subsidiary of International Telephone and Telegraph Corporation. An engineer in the Company's TV control room is shown adjusting equipment in preparation for the big moment.