The Moon Race [July 1969] — down to the wire!

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SPACE CENTER HOUSTON
APOLLO-11 FIFTIETH ANNIVERSARY
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SOVIET LUNA IN MOON ORBIT

Medals on the Moon for 5 Heroes of Space

Our Astros Put On TV Show

Luna Orbits Moon; Is Landing Near?

A **** Space Spectacular on TV
Unexpected last-minute drama was added to Apollo-11 by the appearance of a robot Soviet moon probe that might have returned lunar samples to Earth just before the astronauts got back. We now know that even more dramatic Soviet moon race efforts were ALSO aimed at upstaging Apollo, hoping it would fail. But it was the Soviet program that failed -- and they did their best to keep it secret. These Soviet efforts underscored their desperation to nullify the worldwide significance of Apollo-11 and its profound positive impact, as JFK had anticipated, on international assessments of the relative US/USSR balance of power across the board -- military, commercial, cultural, technological, economic, ideological, and scientific. These were the biggest stakes in the entire Cold War, whose final outcome hung in the balance depending on the outcome of the July 1969 events in space.
On July 13, 1969, three days before Apollo-11, the USSR launched a robot probe to upstage it.

**Luna 15 mission events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date (1969)</th>
<th>UT</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Launch</td>
<td>13 July</td>
<td>0255</td>
<td>-</td>
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<td>Midcourse correction</td>
<td>14 July</td>
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<td>-</td>
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<td>Lunar orbit insertion</td>
<td>17 July</td>
<td>1000</td>
<td>55-202 km, i=127 deg</td>
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<tr>
<td>Orbit change</td>
<td>19 July</td>
<td>1308</td>
<td>95-221 km, i=126 deg</td>
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<tr>
<td>Orbit change</td>
<td>20 July</td>
<td>1416</td>
<td>16-110 km, i=127 deg, T=114 min</td>
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<td>Crash landing</td>
<td>21 July</td>
<td>1551</td>
<td>Crash at 57E,16N, Engines off at 1547 UT.</td>
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DAY BEFORE APOLLO-11 LANDING – BOTH SPACECRAFT ORBITING MOON IN CRISS-CROSS ORBITS

MOSCOW SAYS THAT LUNA 15 WON'T BE IN APOLLO'S WAY; AMERICANS CHECK MODULE
THE SOVIET PROBE GOT TO THE MOON FIRST & WENT INTO ORBIT AROUND IT AS APOLLO BEGAN ITS MISSION.
A FEW YEARS LATER, ONCE A NEW MISSION HAD SUCCEEDED, MOSCOW RELEASED DRAWINGS OF THE VEHICLE AND HOW IT OPERATED TO LAND, RETRIEVE SAMPLES, AND RETURN TO EARTH
Jodrell Bank radio telescope in Britain told the world about the final phase of the Luna 15 drama, in a news release:

"Signals ceased at 4.50 p.m. this evening [1550 UT on 21 July 1969; Soviet news releases gave the time as 1551 UT]. They have not yet returned. The retrorockets were fired at 4.46 p.m. [1546 UT; Soviet news releases gave the time as 1547 UT] on the 52nd orbit and after burning for 4 minutes the craft was on or near the lunar surface, The approach velocity was 480 km/h [presumably determined by measuring the Doppler shift] and it is unlikely of anything could have survived."

http://www.jb.man.ac.uk/history/tracking/part2.html
There is an audio recording of scientists monitoring the Luna 15 mission (spanning July 19-21, 1969). The audio was released in 2009 to coincide with the 40th anniversary of the Moon landing. The audio is from British scientists at the Jodrell Bank Observatory, and features astronomer Sir Bernard Lovell and others who were listening in to both American and Soviet radio transmissions via the Lovell radio telescope. ...

The next dramatic moment came on July 21 when the probe began to descend; it suddenly became clear to Lovell's team that Luna 15 was designed to land, not just take orbital photos as the Soviets had indicated. This surprised everyone in the listening room, and you can hear them discuss a rumor from a source in Moscow suggesting that the probe was designed to return a sample. The team proceeds to listen as the probe lands, exclaiming "It's landing!" and "Phew!" The very last line is classic: "I say, this has really been drama of the highest order!“


On 21 July 1969, while Apollo 11 astronauts finished the first human moonwalk, Luna 15, an unmanned Soviet spacecraft in lunar orbit at the time, began its descent to the lunar surface. Launched three days before the Apollo 11 mission, it was the second Soviet attempt to return lunar soil back to Earth with a goal to outstrip the US in achieving a sample return in the Moon race. .... The Luna 15 lander crashed into the Moon at 15:50 UT, hours before the scheduled American lift off from the Moon.

https://en.wikipedia.org/wiki/Luna_15
THIRTY YEARS LATER, AFTER THE COLLAPSE OF THE SOVIET REGIME, RUSSIAN SPACE ENGINEERS WERE ABLE TO PUBLICLY ADMIT THEIR FAILURE

**Space Program's Past, Present, Future**  
*Itogi* magazine, Moscow, October 7, 1997

“It should have made a soft landing, taken samples of lunar soil, and delivered them to Earth. It crashed just as the Americans left the moon. If it weren’t for this catastrophe, *Luna-15 would have delivered the first lunar rocks three hours before the crew of Apollo 11 returned*...

*Moskovskie Novosti*, 07 Apr 7, 1996, page 17

“The idea was remarkable: to be ahead of the Apollo-11 astronauts by at least a day. And such an attempt in actuality was made. Specialists of the Lavochkin Plant honorably carried out the mission of the party and the government and launched the *Luna-15* station precisely on time. But it, alas, broke up upon landing on the lunar surface. The ambitious attempt did not succeed and the triumph of the Americans was complete.”
IN A MOON METAPHOR TOO IMPOSSIBLE TO BE CREDIBLE IN A SCIENCE FICTION STORY, THE APOLLO-11 CREW HAD LANDED SAFELY ON THE ‘SEA OF TRANQUILITY’….. AND THE SOVIET PROBE HAD SMASHED TO BITS ON THE ‘SEA OF CRISSES’

WAS THE MOON RACE OVER?
OR HAD IT NEVER BEGUN?

• CYNICS ACCUSED NASA OF INVENTING OR EXAGGERATING THREAT OF
  SOVIET MAN-ON-THE-MOON VICTORY AS A BUDGET PLOY

• JFK COMMITMENT TO APOLLO WAS CONTINGENT ON NEEDING SUCH A
  TRIUMPH TO RESTORE WORLD PRESTIGE OF AMERICAN KNOW-HOW

• JFK’S ASSASSINATION ‘LOCKED IN’ THE PROGRAM AS A TRIBUTE TO HIM

• CLOSED SOCIETY IN USSR [AND MILITARY SECRECY] HINDERED
  DETECTION AND RECOGNITION OF CLUES TO THEIR TRUE INTENTIONS

• BY THE TIME THE INTELLIGENCE REPORTS BECAME UNAMBIGUOUS IT
  WOULD HAVE BEEN TOO LATE TO PREPARE AN ADEQUATE RESPONSE
WIDESPREAD WESTERN CLAIMS THE ‘MOON RACE’ WAS ILLUSORY

• NY TIMES, 1964: "There is still time to call off what has become a one-nation race ..”
• Journey to Tranquility (Doubleday, 1969), “…by 1963 it had become clear that the Russians had little immediate interest in the Moon and that the race for space did not, in fact, exist.”
• London Sunday Times, 1971: "It became obvious long before the Americans landed on the Moon that they were winning the space race hands down…. There was never the remotest chance that the Russians would get to the Moon first."
• Walter Cronkite, in 1974, reviewed the history of the 1960s and intoned: “It turned out that the Russians were never in the race at all.”
• Howard Benedict, AP aerospace writer, June 1974: “During the 1960s, the United States conducted a crash program to beat the Russians in putting a man on the Moon. Now American space officials have evidence that the Soviets never were in the race . . .”
• Chicago Sun-Times, July 15, 1979: "As the decade progressed, it became obvious the Russians had dropped out of (or never entered) the moon race, but still we pressed on."
• NBC News Productions, Apollo 20th anniversary, July 1989, narrated by Leonard Nimoy: "The space race hadn't been a race at all."
During the '60's, Unambiguous Soviet Comments

- Soviet Encyclopedia of Space Flight, published in late 1968, unequivocally stated that the Zond flights “were launched for flight testing and further development of an automatic version of a manned lunar spaceship.”

- Cosmonaut #2 Gherman Titov had written: “As for myself, I dream of flying around the moon... Cosmonauts have a good chance of getting a close view of the moon.”

- Cosmonaut Vladimir Komarov, before his death in 1967, had told newsmen that “I can positively state that the Soviet Union will not be beaten by the United States in the race for a human being to go to the moon...

- Aleksey Leonov had stated that “man will visit the moon in the nearest future. I dream of this being accomplished by men of our detachment. If I am very lucky, I will get the assignment.”

- Pavel Belyayev commented on the moon race in 1965: "We are not idle. We shall see who will be first." Michael Collins wrote concerning a private, off-the-record meeting he and fellow-astronaut David Scott had with cosmonaut Pavel Belyayev at an air show in Paris in early 1968. The men were discussing their own future flight plans, and Collins later noted that “we found that Belyayev himself expected to make a circumlunar flight in the not too distant future.”

- Nikita Khrushchev referred to his man-to-the-moon project in his memoirs when he paid homage to Sergey Korolev, head of the Soviet space program, whose unexpected death in 1966 at age 59 crippled their program for five crucial years. "I'm only sorry," Khrushchev recalled, "that we didn't manage to send a man to the moon during Korolev's lifetime."
THE FULL STORY TOOK YEARS TO DRIBBLE OUT

• THE CRASH OF LUNA-15 WAS ONLY THE MOST PUBLIC OF A SERIES OF DEVASTATING SOVIET MOONFLIGHT-RELATED FAILURES IN 1968-9

• ON JULY 3, TWO WEEKS BEFORE THE LAUNCH OF APOLLO-11, THE SOVIET RESPONSE TO THE AMERICAN SATURN-5 SUPER-ROCKET HAD EXPLODED ON LIFTOFF, DESTROYING ITS LAUNCH PAD

• THE PREVIOUS YEAR, DESPERATE ATTEMPTS TO FLIGHT-QUALIFY A MANNED LUNAR FLYBY SPACECRAFT [CODE-NAMED ‘ZOND’] HAD BEEN OVERTAKEN BY THE BOLD APOLLO-8 LUNAR ORBIT BY THREE ASTRONAUTS IN DECEMBER

• IN JANUARY 1969, COSMONAUTS CONDUCTED A PRACTICE MISSION FOR LUNAR ORBIT RENDEZVOUS AND CREW TRANSFER, WHICH HAD SUCCEEDED – UNTIL ONE OF THE RETURNING ‘SOYUZ’ SPACECRAFT CAME WITHIN SECONDS OF DISINTEGRATING DURING REENTRY. THE NEAR FATAL DISASTER WAS COVERED UP BY SOVIET AUTHORITIES FOR DECADES.

• UNMANNED ORBITAL FLIGHT TESTS OF A MANNED LUNAR LANDING VEHICLE HAD SLIPPED INTO 1970 AND THE LAST HOPE WAS THAT APOLLO WOULD ENCOUNTER A CRIPPLING DISASTER THAT WOULD ALLOW THE SOVIETS TO CATCH UP
WHY THE RUSSIANS WERE NOT DISCOURAGED

- THE TYPICAL SOVIET ROCKET DEVELOPMENT PROCESS IN THE 1960s WAS TO FLIGHT TEST AS SOON AS POSSIBLE IN ORDER TO SHAKE OUT ENGINEERING FLAWS THAT GROUND TESTS AND COMPUTER MODELING COULD NOT FIND.

- EARLY FAILURES WERE USUALLY FOLLOWED BY HIGHER SUCCESS RATES.

- GIVEN THE DEMONSTRATED PRACTICAL EXPERIENCE AND KNOWLEDGE OF THEIR 'ROCKET SCIENTISTS' THAT IS JUST WHAT THEY WOULD HAVE EXPECTED WITH THE MOON HARDWARE, WITH JUSTIFICATION.

- MEANWHILE, KEEPING THE SETBACKS SECRET PROTECTED THE DESIRED PUBLIC IMAGE OF SOVIET SUPERIORITY IN SPACE TECHNOLOGY.

- FLIGHT TESTING OF MAN-TO-THE-MOON HARDWARE CONTINUED IN SECRET FOR SEVERAL YEARS AFTER APOLLO-11.
The next N1 test flight came on 3 July 1969, only weeks before Apollo 11 made its successful lunar landing. Known as launch vehicle 5L, this N1 was also destroyed shortly after liftoff due to a failure in the first stage. Just 0.25 seconds into the flight, the pump of engine number 8 ingested debris and exploded setting off a large fire in Block A. The N1 managed to climb just above the top of the launch tower when the remaining engines were shut down prematurely. The rocket plummeted back onto the pad in a spectacular explosion that destroyed the launch facility known as 110 East. Not only did it take 18 months to repair the pad, but the failure ended any last remaining hope of impressing the world prior to the American lunar landing.

http://www.aerospaceweb.org/question/spacecraft/q0196.shtml
ONE-MAN LUNAR LANDER

The Soviets secretly built a ‘Lunar Cabin’ [“L-3”] to perform the functions of NASA’s ‘Lunar Module’. It only carried a single cosmonaut who had to spacewalk from and to the command module in lunar orbit.

On all my Russian visits, my hosts were always very gracious but they never let me get near this vehicle.

• http://www.aerospaceweb.org/question/spacecraft/russia/lk-lander.jpg
ALONG WITH A LUNAR MODULE, A MANNED MOON EXPEDITION WOULD NEED A SPACESUIT DESIGNED TO OPERATE ON THE SURFACE OF THE MOON.

FORTUNATELY, WE FOUND ONE TO EXAMINE.
MY JOB WAS TO VALIDATE THE ARTIFACTS AND HELP WRITE THE CATALOG

THE FIRST TRICK WAS TO OPEN THE ENTRY HATCH ON THE BACK...
MAJOR AUCTION ARTIFACT WAS A SPACESUIT BILLED AS A “MOON SUIT” FOR A PLANNED COSMONAUT LUNAR EXPEDITION [ON LEFT – A NORMAL SPACE STATION SUIT IS ON RIGHT]. AS CONSULTANT, MY TASK WAS TO EXAMINE IT AND VALIDATE SUIT’S ALLEGED PURPOSE. THE YELLOW CIRCLES IDENTIFY THE CRUCIAL ELEMENT OF PROOF.
THE SUIT SENT TO SOTHEBY’S WAS A GENUINE MOON-SUIT BECAUSE IT WAS DESIGNED TO BE WORN UNDER GRAVITY CONDITIONS – WITH Padded braces TO REST ON THE COSMONAUT’S SHOULDERS TO CARRY THE SUIT’S WEIGHT

WALKING ON MOON  //  FLOATING IN ORBIT
TO SUMMARIZE:

• THE SOVIETS BUILT A ROBOTIC SPACECRAFT [“LUNA-15”] TO RETRIEVE LUNAR SAMPLES FOR INITIAL STUDY

• THE SOVIETS BUILT A MEDIUM-CLASS ROCKET [‘PROTON’] AND A MODIFIED ‘SOYUZ’ CREW-CARRYING VEHICLE FOR EARLY LUNAR FLY-BY

• THE SOVIETS DESIGNED, BUILT, AND AUTOMATICALLY FLIGHT-TESTED A LUNAR LANDING MODULE FOR ONE PILOT

• THE SOVIETS BUILT A SPACESUIT SPECIFICALLY DESIGNED FOR USE ON THE MOON

• THE SOVIETS BUILT A SATURN-5 CLASS BOOSTER FOR CARRYING THIS COMBINED SPACECRAFT TO THE MOON

• THE MULTIPLE CAPABILITIES THAT THEY TRIED TO BUILD CLEARLY SHOW THEIR INTENTIONS TO LAND A COSMONAUT ON THE MOON
• After years of denial by silence and misinformation, the Soviet Union has now disclosed that in the 1960's it was indeed racing the United States to be first to send men to the Moon.

• American aerospace engineers returning from Moscow reported yesterday that they were shown for the first time a spacecraft that Soviet engineers told them was ready to go to the Moon in 1968, a year before the Apollo 11 mission made the first landing on July 20, 1969.

• One of the Americans, Dr. Edward F. Crawley of the Massachusetts Institute of Technology, said the lunar-landing craft and Earth-return module he and his colleagues inspected and the descriptions they heard were "confirmation that the Soviets did have a well-developed lunar-landing program." Previously, he said, "the evidence was entirely circumstantial."

• ...James E. Oberg, an independent expert on the Soviet space program and author of "Red Star in Orbit," said: "The evidence had always appeared persuasive. Now we have pictures of the spacecraft that should be the final proof."
WE FINALLY FOUND OUT FULL DETAILS OF THEIR MOON PLANS

http://www.russianspaceweb.com/lk.html


https://upload.wikimedia.org/wikipedia/commons/thumb/1/19/Landef%C3%A4hren-neu.jpg/800px-Landef%C3%A4hren-neu.jpg


[artwork credit Eberhard Marx]
DOCKING PROBE FOR MOORING TO LUNAR MODULE ROOF
CREW HABITATION MODULE
CREW REENTRY VEHICLE FOR EARTH LANDING
SERVICE MODULE FOR PROPULSION OUT OF LUNAR ORBIT
ROOF ATTACH PLATE FOR MOORING BY CREW RETURN VEHICLE
CREW CABIN FOR LUNAR LANDER [TERMINAL LANDING AND THEN LIFTOFF]
PROPULSION STAGE FOR LUNAR ORBIT INSERTION, THEN DESCENT TO HOVER
UPPER STAGE FOR TRANS-LUNAR INSERTION FROM LOW EARTH ORBIT

THE SOVIET MISSION PROFILE WAS DANGEROUSLY DIFFERENT FROM THE NASA SCHEME BECAUSE THE CRITICAL ENGINE BURNS HAD NO FALL-BACK CONTINGENCY OPTIONS
WOULD THE SOVIET SCHEME HAVE WORKED?

I defer to Aleksey Leonov's opinion [he was to be the prime pilot for the landing] telling an American video crew in 1989: "I’m just happy that I didn't have to bet my life on that plan."

LEFT: At ‘Star City’ cosmonaut training center

RIGHT: At Baikonur launch site for a ‘Soyuz’ blastoff
LEONOV WAS ALSO A GIFTED ARTIST WHO PAINTED MANY SPACE FLIGHT SCENES WITH SPECIAL FOCUS ON HIS SPACE WALK, HIS SPACE LINKUP WITH AN APOLLO CRAFT, AND THE LUNAR LANDING HE’D TRAINED TO PERFORM, IF.....
LEONOV ARTWORK OF ‘HIS’ MOON LANDER

ARTISTIC LICENSE ALLOWED LEONOV TO PORTRAY HIS LANDER MUCH BIGGER THAN IT REALLY WAS. NOTE THE MULTIPLE ENGINES AND TWO-MAN CREW.

http://pop.h-cdn.co/assets/15/17/1429538508-scan-16-1.png

BELLOW: LIFTOFF LEAVING ONLY THE LANDING LEGS AND LADDER BEHIND
THE SIGNIFICANCE OF JULY 1969

• THE UNITED STATES WAS ON THE VERGE OF FULFILLING JFK’S VISION OF AN UNAMBIGUOUS DEMONSTRATION OF US TECHNOLOGICAL SUPERIORITY

• THE SOVIET UNION WAS PURSUING A BROAD-BASED SPACEFLIGHT TECHNOLOGICAL CAPABILITIES DEVELOPMENT PROGRAM TO COUNTER THIS

• THEY HAD OVERCOME INITIAL FAILURES IN MANY EARLIER PROJECTS

• WITH THE HEART OF THE RACE CENTERED ON WORLD ATTITUDES TOWARDS RELATIVE US/USSR TECHNOLOGY STANDING, ANYTHING THAT DIMINISHED THE APPARENT SIGNIFICANCE OF APOLLO-11’S SUCCESS BENEFITED MOSCOW

• EVEN AFTER APOLLO-11 THE SOVIETS [AND THEIR WOLDWIDE WELL-WISHERS] PUSHED ON, WITH HOPES TO NEUTRALIZE ITS IMPACT ON WORLD ATTITUDES

• THE US PROGRAM REMAINED ‘FRAGILE’ WITH SOVIET HOPES RELYING ON A FLIGHT DISASTER THAT WOULD PERSUADE THE NEW PRESIDENT TO RETREAT

• THEIR MAN-ONTO-THE-MOON PROGRAM WASN’T TERMINATED UNTIL 1972
THE ‘WHY’ OF APOLLO

• "“It was a geopolitical mission to demonstrate U.S. power and prestige,” wrote eminent spaceflight historian John Logsdon. “It restored the perception of America as a country that could be admired — a powerful and successful country.”"

• Oberg’s corollary: EXACTLY TRUE. And the demonstration, as JFK had anticipated, had profound positive diplomatic, commercial, military, cultural, and technology-base benefits that made it well worth the price in time, treasure, and blood. It reversed the high-water mark of Soviet prestige and set that country onto the downward spiral to disintegration two decades later.
WHY WE WENT & WHY WE STOPPED

• The reason we stopped going -- and even before Apollo-11 had already shut down the production line of spacecraft and boosters -- was because it was never intended to be a sustained and expanding program.

• **It was absolutely the correct short-term response to Sputnik.** The US, the Soviet Union, and the rest of the world had begun to wonder which political system had the better chance of mastering future technologies, and their conclusions would have profound diplomatic, commercial, cultural, military, scientific, and other consequences.

• JFK picked the moon landing goal with exactly that in mind, and post-Apollo world history showed his strategic vision was spot on -- thanks to American technology management actually fulfilling his [and much of the rest of the country's] hopes.

• The USSR fell back from its apex in world esteem and twenty years later collapsed of a broken heart and soul [and budget]. That was Apollo's greatest short-term achievement, entirely justifying the time, treasure, and lives that it cost.

• Long-term, of course, it was infinitely more rewarding as an inspiration and as a compulsion to eventually expand on it.
THE LEGACY OF JULY 1969
FURTHER READING

• http://www.jamesoberg.com/2009_apollo_anniversary_his.html
• http://www.thespacereview.com/article/3617/1
• https://www.popularmechanics.com/space/rockets/a22531/why-didnt-russia-make-it-to-the-moon/
• https://crashmacduff.wordpress.com/tag/luna-15/
• https://fas.org/spp/eprint/lindroos_moon1.htm
• https://www.youtube.com/watch?v=__U1cf0KfWg