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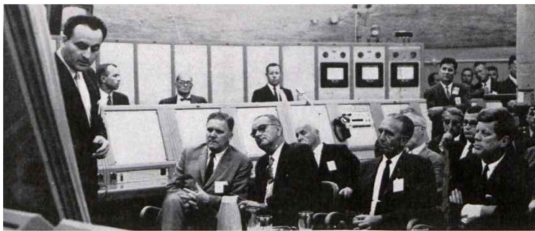


## Can We Still Be First On The Moon?

By DON A. SCHANCHE

Despite recent Soviet successes in space, Administration scientists and bureaucrats insist publicly that the United States still can be first on the moon. Is this official optimism well-founded or just wishful thinking? Beginning on the next page, a *Post* editor reports some disturbing facts.

## "A Communist will probably set foot on the moon before an American astronaut does."



President Kennedy, with Vice President Johnson and space advisers at a Cape Canaveral blockhouse briefing, ponders problems of the upcoming Saturn program.

When the first man puts his feet on another planetary body we will have witnessed the most dramatic physical event in history. No prior human event can equal the landing of a man on the moon." The speaker was a top scientist in the Government's space program.

"If that man is not an American," he continued, "it will hurt all of us. But if we are led to believe he must be an American, that we are supremely confident he will be, and he turns out to be a Russian instead, I shudder to think how demoralized we will be. The first Sputnik was a minor defeat in comparison."

The sad fact of the matter is that Americans are being led to believe that they will be first on the moon when in all probability a Communist cosmonaut's foot will kick up the moon's dust some time before a U.S. astronaut sets foot there. Those who predict otherwise base their opinions on vague hopes instead of the available facts, and if their illusory view prevails we do indeed face psychological disaster. Despite hurrahs from Washington and Cape Canaveral which seemed to imply that Walter Schirra's near-perfect performance was the greatest of all space shots, we are still far behind the Russians. Nor did Schirra's feat even do much to advance our moon program; in fact, the proposed 17-orbit flight of U.S. astronaut early next year should serve only to remind us that cosmonaut Gherman Titov had accomplished the same thing as least 18 months before.

If ordinary Americans are confused on the subject they may take dim comfort in the knowledge that even President Kennedy suffers from a lack of certainty in his understanding of the race to the moon.

A few weeks ago, while walking through the government engineering hangar at the Marshall Space Flight Center in Huntsville, Alabama, the President innocently questioned a group of his science advisers on the technical merits of a recent decision in the United States moon program.

Dr. Werner von Braun, the German-American rocket scientist who runs the Huntsville space center, assured the President that the best, quickest and cheapest way to land an astronaut on the moon is by a method called Lunar Orbit Rendezvous. Under this plan, which the National Aeronautics and Space Administration formally adopted last July, a three-man Apollo spacecraft will ferry the moon, eject a small two-man ferry ship called a Bug and wait in orbit while the two lunar

astronauts descend to the moon's surface, park around, then launch themselves back into orbit to rendezvous with the mother ship for the return to earth.

Hardly finished with his explanation, Von Braun was surprised by Dr. Jerome Wiesner, the President's personal science adviser, who suddenly interjected, "No, that's no good."

Then, while a chagrined President stood aside with arms folded and a frown on his face, the two scientists hashed out their disagreement in full hearing of the Kennedy party, which included Vice President Lyndon Johnson, British Defense Minister Peter Thorneycroft and a number of reporters. As the dispute progressed, Wiesner was joined by Dr. Harold Brown, the brilliant young director of Defense Department research and engineering. Von Braun was reinforced by NASA Administrator James E. Webb and D. Brainerd Holmes, chief of NASA's manned space-flight program. Finally the President stopped the argument with a noncommittal pleasantry, but not before a measure of the discontent which seethes around the U.S. moon program had erupted in public view.

Although the dissatisfaction in this case was confined to the scientists and involved a highly technical dispute over methods of landing spacecrafts on the moon, it extends to virtually every facet of the moon program, from the question of going there at all to the decision of what the astronauts will do when they get there. Not surprisingly, the most vigorously disputed question involves where we stand in the race against Soviet cosmonauts.

### Confident Prediction

NASA Administrator Webb, an ebullient man who exudes a profound air of confidence when discussing the nation's space plans, recently answered with the prediction, "I think we will make the lunar landing and return before they do."

A reporter asked if the statement was based on solid information about the Soviet space program—facts, for instance, that would support our widely held supposition that the U.S. and Russia are running neck-and-neck in the race to develop super-boosters rockets big enough to launch manned lunar payload—or if it was based only on hope and optimism.

"It is judgment," said Webb, using the favorite debate-ending ploy of Washington press-conferenceman.

Webb's reply went considerably beyond forecasts the President has made about our race to the moon. While he has spoken forcefully about winning the space race, Mr. Kennedy has been careful to limit his optimism to the statement that we will reach the moon "in this decade." While predicting eventual victory over the Soviet Union, he has not specified a moon landing as the finish line.

What, then, makes Webb and other NASA officials so certain of success that they have gone beyond the President's own goal and placed the United States in a race to the moon which they boast we will win?

By the time you finish reading this report, based on weeks of interviewing officials and technical specialists of NASA, the Defense Department and industry, as well as seven years of close observation by this reporter of American missile and space programs, you should understand at least the basis of Webb's judgment. Unless you are an ostrich or a Soviet cosmonaut, you will not find this information particularly reassuring.

### Huakier Soviet Rockets

Since the race began with the first Soviet Sputnik launching on October 4, 1957, the question of supremacy and the ability to do dramatic things in space has boiled down to the simple matter of power. Soviet rockets were designed in the late 1940's and built in the early 1950's to launch heavy nuclear warheads. By the beginning of the space age they were more than twice as powerful and probably twice as reliable as the best in the U.S. arsenal. With them the Russians repeatedly beat the United States to significant space goals: the first satellite, the first man-made object to escape the earth's field of gravity, the first space vehicle to hit the moon, the first satellite to photograph the back of the moon, the first man in space, and finally, unless they achieve another first before this report is published, the first successful attempt to place two men in almost hand-shaking proximity while orbiting the earth in separate space ships.

As one space official wryly remarked, "The only part of the race where we are ahead of the Russians is in our ability to orbit small pay loads."

In many cases the U.S. has managed to match and in some instances exceed the Soviets' big pay-load achievements by industriously miniaturizing space equip-

ment. But the most dramatic feats have been, and will continue to be, the flights of men. "We could have beaten them in manned flight long ago," says Dr. Edward C. Welsh, executive secretary of the President's Aeronautics and Space Council, "if we could only have miniaturized man."

The astronauts could not be cut down to size, but their equipment was. The Mercury spacecraft which have orbited the earth represent almost the ultimate in miniaturization for manned flight. Even so, the Atlas booster rocket which puts the 3000-pound Mercury capsule into space must strain to the last ounce of its energy to accomplish the job. Russia's standard space booster, which has been popping objects into space with seeming ease ever since 1957, has launched Vostok spacecrafts of more than four times the weight of the Mercury craft.

In order to overcome this five-year-old Russian lead in rocketry, the United States has given top priority to a whole set of new booster rockets which, it is hoped, will eventually put this nation ahead in every phase of the space race. Their names are Titan II, Saturn, Advanced Saturn and Nova.

Unfortunately booster rockets, like automobile engines, do not particularly interest most Americans, who prefer instead to concentrate on the exotic space ships the boosters send aloft. But it is important to know something about the four rockets mentioned above. The future of the nation as a leader in world technology, space science, and perhaps defense as well, rests on them. The President recognized this in May, 1961, when he accelerated the booster programs and asked a willing Congress to authorize plans to put Americans on the moon by 1970. It is on these rockets that Webb and his associates pin their hopes of going the President one better and beating the Russians to the moon before 1970.

### Titan II, First and Last

The first and last of the four new boosters is the Titan II, a modified intercontinental ballistic missile which was already well along in its development by the time of the President's order. Although somewhat larger and a great deal more advanced than the Atlas, it still is not as powerful as the five-year-old Soviet booster and therefore represents only a stopgap in the race to the moon. But Titan II will do



Premier Khrushchev, with Soviet cosmonauts at a Red Square celebration of the twin orbital flight, enjoys the continuing Russian lead in significant space goals.

"Only an ostrich or a Soviet cosmonaut will find comfort in this information on space."

an important job. It will launch the two-man Gemini spacecraft, an extraordinarily sophisticated capsule which will give two astronauts, sitting side by side, space flights of up to two weeks' duration. More important, small rockets in the Gemini spaceship will allow the astronauts to maneuver their capsule in space, changing orbit and jockeying the craft so gently that they will actually link up with an unmanned satellite, as an engine and a railroad car join on a track.

As an added attraction, Project Gemini will treat Americans to the suspense of listening, or perhaps even watching on television, while one of our astronauts steps out into black space and hangs weightless in orbit with no visible means of support other than a slack safety line to the capsule. Both the rendezvous skill and the ability of men to operate outside as well as inside their spaceships will be essential to the moon mission.

#### Russian Rendezvous Next

Unfortunately, the Soviet Union probably will accomplish both feats long before Titan II gets a manned Gemini capsule off the ground. After tracking Vostok III and Vostok IV last August as they came within a mile or two of each other in space, NASA officials conceded that within the next few months the Soviets may rendezvous and link two manned spaceships in orbit. The trick of stepping outside requires only a reliable, fully pressurized space suit.

The Gemini capsule, on the other hand, will not even reach space until late 1963, and men will probably not fly in it until 1964. Late that year, or by early 1965, one of the nine recently selected astronaut trainees and one of the veterans from the present Mercury team will perform the first American rendezvous with an unmanned satellite.

The first really big booster in America's space power line is the Saturn, which also was under development long before the President decided, as he put it recently, to "shift our efforts in space from low to high gear." But Saturn, too, is only an interim booster in the race to land men on the moon. Although it is at least half again as powerful as Russia's Old Reliable, it is still not big enough to accomplish the job of putting a round-trip manned spaceship on the moon. But it will be able to place into orbit space ships more than twice as heavy as the Russian

Vostoks, and it will be able to send a respectable load of scientific instruments to the moon and the planets.

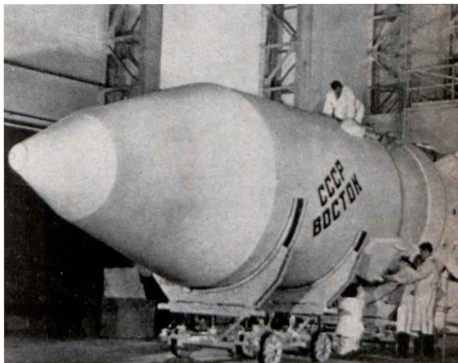
Saturn thus is an important step, but not a climactic leap, in the moon race. It will be most useful as a source of power with which to test the Apollo spaceship, the three-man, multipurpose craft which eventually will be used to perform the moon mission.

Recent plans for a speedup in the Saturn program call for it to launch three Apollo Astronauts into a low earth-orbit practice flight in late 1964. However, many experts in NASA doubt if this will be accomplished before 1965. Saturn represents a classic example of the indecisive, stop-and-start approach this nation took until recently to the space race. Originally proposed by Von Braun's missile team in Huntsville early in 1957, Saturn dragged along until 1960 before it finally was given a priority rating by the Eisenhower Administration. At one point a decision was made to cancel the program; at another it became the foundation for a lunar-landing plan called Project Horizon, which was proposed by the Army but received a completely cold reception in Washington. "Now for the life of me," said President Eisenhower, "I cannot see any reason why we should be using or misusing military talent to explore the moon."

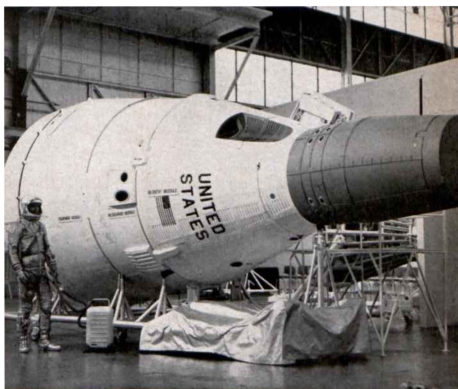
After many delays, Saturn still exists in only partial form. Its first stage was successfully tested a year ago and again last April. Two more such first-stage tests are scheduled, one this month and another in January. Sometime next spring a Saturn will fly with its second stage, a radical but so far unsuccessful rocket called the Centaur. After that, at least three more Saturn flights will be conducted before an occupied Apollo capsule is launched.

#### Advanced—and Then Some

The payoff booster in the American moon program is the Advanced Saturn, the first rocket in the free world which will be capable of powering the manned moon mission. Unfortunately, the rocket was misnamed, a fact which space officials lament but have done nothing to correct. It is not, as its name suggests, an advanced Saturn. Identifying it as such is like calling a Cadillac an Advanced Volkswagen. Without going into technical distinctions, which are almost as numerous as the parts of the rocket, the



Russia's Vostok I (above): the capsule that made Yuri Gagarin the first man in space. Smaller Gemini (below) is U.S.'s first two-man capsule, is sophisticated in design but will not be in orbit until 1963.



Dr. Werner von Braun

To President Kennedy: "You promised we'd land on the moon in this decade and, by God, we'll do it."



Dr. Hugh Dryden

NASA's deputy administrator scoffs: "We've been waiting for the Russians to show us their big boosters."



James E. Webb

A jovial man with a confident air: "I think we will make the lunar landing before the Soviets do."



important difference is that the Advanced Saturn will be five times as powerful as its namesake. With this power—7,500,000 pounds of thrust in the first stage alone—the super-booster will be able to launch men on their way to a moon landing and return.

The schedule of Advanced Saturn flights is impossible to predict with certainty, because much of the super-booster still exists only on paper. Early tests have been conducted on its basic engine, and a great deal of design work has been completed, but successful flights of the complete Advanced Saturn-Apollo system are still years away. Space-agency officials hope to use it for launching Apollo spaceships into earth orbits by late 1965 and to complete the payoff mission of landing men on the moon in 1967. Many scientists within the agency, however, are not so optimistic. One of them says that it will be 1967 before the first manned flights take place and at least mid-1968 before the Advanced Saturn-Apollo system proves reliable.

During this test period the space agency plans to send the system on at least one circumlunar flight which will take the Apollo spacecraft out to the moon, loop around it without landing, and return to earth. The experts, including Dr. Hugh Dryden, deputy administrator of NASA, concede that the Soviet Union may be capable of making such a circumlunar flight right now, although they would have to do it with a small spaceship unable to make a safe lunar landing.

### From the Bug to the Moon

After the circumlunar flight, the Advanced Saturn will launch an Apollo for lunar landing. It will orbit the moon and eject its Bug containing two astronauts, who will descend to the lunar surface. After a brief period on the moon they will launch their Bug back into orbit for a rendezvous with the mother ship, which will then return to earth. NASA's most optimistic forecast for this climactic flight is sometime in 1967. Skeptics within the agency suggest that a more realistic target is 1969.

Advanced Saturn is powerful enough to stagger the imagination of most men, but a fourth rocket in the U.S. plan will have almost twice its strength. This is the Nova, a giant capable of throwing 200-ton spaceships into orbit or of sending three men directly to the surface of the

moon without the need for the weight-saving device of orbital rendezvous with an Apollo Bug. Although the decision to speed development of Nova has been made, the project still is mostly in the paper stage. It will not be developed soon enough to have any bearing on the race to land men on the moon.

Thus the United States has established an orderly program to develop super-rockets and to solve the dozens of other problems associated with landing men on the moon. Most of the experts agree that Russia, too, can develop the spaceship and related equipment to do the job. But its present Old Reliable booster is far too small, so that in order to beat us to the moon Russia must develop a super-booster of roughly the same size as the Advanced Saturn. When she will do so thus becomes the crucial factor in the moon race.

### Will U.S. Ingenuity Win?

Webb and some, but by no means all, of his colleagues in NASA are confident that the speed-up in the U.S. booster program came soon enough to give this nation a better-than-even chance of beating Russia to the super-booster. They believe that the Russians are no further along than America in the business of constructing the huge rocket. "It is for this reason, in fact, that our national goal was set at the lunar flight," says Doctor Dryden.

The NASA officials say that, given an even start in the super-booster race, traditional U.S. ingenuity in managing men, money and material, and in surmounting technical problems, is bound to win the day. As Webb put it, "I am judging as an administrator on the basis of what happens when you put large resources into a program like this. . . . It will be very difficult for them [the Soviets] to make the rate of progress that these resources invested here indicate for us."

As an interesting sidelight to Webb's comment, one of our engineers who visited the Soviet Academy of Sciences last year heard almost the same remark played back by a Russian interpreter. "The trouble with you Americans," he said, "is that you have not put the amount of money or the organizational effort that we have into this thing."

Crucial to Webb's reasoning is the assumption of an even race. But did we start even with the Soviets in our race to

build the big booster? The answer is: probably not. Let the experts speak.

"Not long ago a group of us from NASA, Defense and industry put together all of the scraps of information we had on the Russian space program," said a Government rocket scientist who prefers to remain anonymous. "We concluded that they must have begun working on a booster big enough for the lunar mission in the 1957-1960 period. There is some evidence that they have already static-test-fired the big booster."

As early as December, 1957, Doctor von Braun, now responsible for the development of our big boosters, testified before a senate preparedness subcommittee investigating U.S. satellite and missile programs, "We have pretty sound proof that the Russians have, in single units, engines that are many times stronger than the most powerful engine we have in this country, and that they have an even more powerful engine under active development."

"The Russians have been launching satellites and deep-space probes for five years now," said a Defense Department expert recently. "So far every one we had been launched with the same basic booster. Does it make any sense to believe that they developed that one booster, then sat back on their haunches and shouted, 'Hooray, we've got it licked; let's stop right here.'? I don't think so. I don't surprise me if they start flight-testing a booster as big as our Advanced Saturn within another year and a half."

### Dropping the Other Shoe

But Doctor Dryden recently scoffed that "ever since the space agency was formed we have been waiting for this other shoe to be dropped. People have told us every month. 'The Russians are going to produce this big booster in the next few months.' Now four years have gone by and they have not yet shown us this big booster."

Unfortunately neither Webb nor Dryden, nor the experts who disagree with them, know any more than you or I do about Russian intentions in space. However, U.S. intelligence services do pick up some information on Soviet rocketry. Although it is a delicate subject, the methods of gathering this information are generally known.

The first source is the U.S. space-tracking network, including, among other

devices, such powerful radars as those on the BMEWS line, which is designed to spot Soviet ICBM's if ever they are launched across the polar horizon. With this tracking net, U.S. listening posts can pick up a Soviet rocket almost from the time of launching until it ejects its payload in orbit or into deep space, and then follow the pay load on its flight.

In addition to this, the U.S. presumably acquires some information from covert intelligence operatives within the Soviet Union, but experts hint that this source produces little reliable information. More valuable, but still not very informative, are the occasional public statements and technical papers delivered by Soviet officials and scientists.

### "We Will Know About It"

Thus the tracking network is by far the best source of information, and it is described as: "One high space official decried it, 'If they launch something into space, you can be pretty sure we will pick it up. When they launch a really big booster, we will know about it very quickly.'"

As an example of the efficiency of this system, consider the case of the first human space casualty, an unsung Russian cosmonaut killed in a fiery rocket explosion in October of 1960. At the time, Premier Khrushchev was inexplicably extending, then re-extending, his boisterous visit to the United Nations in New York. U.S. tracking units had been alerted to the possibility of a spectacular Soviet space feat which would bolster the prestige of the Russian leader during his visit. After days of expectant waiting one U.S. listening post homed in on a Soviet rocket launching. Tape recorders instantly began preserving the telemetry signals emanating from the Russian rocket. Among the signals was one which pulsed with the familiar regularity of a human heartbeat. As the booster rocket reached the altitude where, from past experience, U.S. observers knew its first stage would burn out and its second stage would ignite, the heartbeat signal pulsed faster. Apparently the man aboard, anticipating the critical moment of second-stage ignition, was showing a normal apprehension, just as you would react with an increased heart rate in anticipation of a dangerous ordeal. Suddenly, at the moment when the second stage should have ignited, all signals ceased, and the

## "Space supremacy has boiled down to power. And Russian rockets still have the power."

tracking device lost contact with the rocket on which it had homed.

The reasonable conclusion from the electronic evidence was that the Soviets had lost their first cosmonaut in an explosion which took place during ignition of the second stage of their first manned flight. Khrushchev packed up and went home, and the Soviets said nothing about their tragic failure. The U.S., too, remained silent, partly to protect the security of its listening posts and partly to avoid being accused of crying "sour grapes." Although word of the incident leaked out much later, it was months before even senior officials of NASA were told that the Defense Department had tracked such a flight.

More recently, Webb announced that the U.S. tracking network had recorded five Soviet failures out of six attempts to probe Mars and Venus. Ironically, according to one informant, Webb himself knew little about the Soviet failures, the first of which took place two years ago, until the National Security Council gathered the information from the Defense Department, and Central Intelligence Agency, decided to make it public, then gave it to NASA for release.

One must assume from these incidents that, although intelligence on Soviet space launchings is good, Webb and Dryden do not always get the facts quickly. More important, virtually all of our intelligence is "after the fact" information. We know about a rocket as soon as the Russians launch it, but we have little or no solid information on what they may be developing for launching next month or next year. "It would be completely unwise," cautions Doctor Welsh of the Space Council, "to underestimate their program and capabilities."

### "Even If We Run Second"

Doctor Welsh, who works under Vice President Lyndon Johnson in coordinating and helping to frame national space policies, is optimistic about our chances in the race to the moon, but unlike Webb he will not predict that Americans will land there first. "It is important to strive to get there first, if for no other reason than to maintain a sense of urgency," he said. "Certainly it is far more important to try, even if we run second, than not to try at all. If we are not first, but are a close second, then except for a brief period of public reaction it will still be more or less of a tie."

Another space leader, the brilliant and

forceful D. Brainerd Holmes, director of NASA's Office of Manned Space Flight, suggested that his own considerable optimism, shared by Webb and Dryden, is based on admiration of our booster-development programs reinforced by an absence of evidence rather than on solid information about what the Soviets are doing. "All we know for sure is that they have not yet tested a booster as big as our Saturn," says Holmes. This is a dubious base for assertions of victory. Few experts to whom I talked believe the Soviets will bother developing a Saturn-sized booster at all. They believe the Russians are leap-frogging directly to a super-rocket the size of America's still undeveloped Advanced Saturn. To make such a major leap forward takes time, say the experts in explaining the absence of big-booster test flights in the Soviet Union.

### "We May Catch Up Later"

"They started the race ahead of us by at least two years," says one expert. "They have been ahead of us in big-booster technology all along, and, unless they voluntarily bow out or run into so much political or economic trouble that they have to slow down, I think they'll stay ahead of us well past the first moon flight. We may catch up after that with Nova and nuclear rockets, although we are not presently pushing the nuclear-rocket program very hard either."

It would seem, then, that Webb's judgment hangs by a rather slender thread, spun almost entirely of hope, natural optimism, and faith in this country's capacity to move quickly once men, money and materials are committed to a task. But, however heartening it is to know that our own space programs are progressing rapidly after years of sluggishness, the evidence hardly supports Webb's vast confidence. Perhaps, like a football coach prodding downcast players at halftime in a losing game, the chief of the national space program must radiate optimism. But the obvious danger in such a flat forecast of victory is that the nation once again is being set up for a demoralizing defeat.

Instead of boasting that the United States will beat the Russians to the moon, Webb might have said, "While we cannot guarantee that we shall one day be first, we can guarantee that any failure to share this effort will make us last."

Those are the words that the President used when he first asked Congress to authorize the moon program. **THE END**

NOVA  
12,000,000 lbs  
thrust

ADVANCED SATURN  
7,500,000 lbs  
thrust

SATURN C-1  
1,500,000 lbs  
thrust

TITAN II  
600,000 lbs  
thrust

*U.S. hopes are pinned to these new boosters. Titan II, a modified ICBM, is only a stopgap rocket. Saturn is scheduled to launch the three-man Apollo. Advanced Saturn will power a moon mission. Nova is still in paper stage.*

