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Fifty years ago, President Kennedy announced his decision to send U.S. astronauts to the Moon. You have observed the U.S. space program for most of those 50 years and have written extensively about it. Take us back to that presidency.

Kennedy came into office Jan. 20, 1961, not knowing much about the space program. Nobody could have predicted that, only four months later, he would make the historic decision to mobilize really immense national resources in an effort to send Americans to the Moon.

What was the situation as JFK entered the White House in regard to U.S. space plans?

In the late 1950s, NASA, the military, and some elements of the technical community had ideas for ambitious future space programs. NASA had already chosen a lunar landing as its long-term goal, and these plans were briefed to President Eisenhower, who was unenthusiastic about human spaceflight. Eisenhower said, no way am I going to send people to the Moon. Then Kennedy's [presidential transition] task force on space downgraded the importance of human spaceflight, and the biomedical people in his scientific advisory group could not assure him that humans could survive in space. So the future of human spaceflight was very much in doubt as Kennedy took office.

So what happened to influence his decision?

At first, Kennedy said he didn't know what kind of a post-Mercury human spaceflight program he wanted, and needed time to make up his mind. He also said, in his inaugural address, that his first preference was to cooperate with the Soviet Union in space. Then came the historic launch of [Soviet cosmonaut] Yuri Gagarin into orbit in April 1961. The worldwide reac-

tion to it was very positive. What Kennedy concluded in the immediate aftermath of the Gagarin flight was that the United States could not stand by and let the Soviet Union do all the dramatic "firsts" in space. The Cold

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War was on, and U.S.-Soviet competition was fierce on all fronts.

Did U.S. embarrassment at Cuba's Bay of Pigs in that same month influence Kennedy's decision to go to the Moon?

To some extent, it did. But I believe that the basic decision to compete in space was made before the Cuban fiasco. After the Gagarin launch and the Bay of Pigs, Kennedy wrote a classic memo asking his advisors to find him "a space program that promised dramatic results with which we could win." His set of requirements was clear: space, dramatic, win. He made the fundamental decision in the immediate aftermath of the Gagarin flight that the U.S. had to get into the leading position in space.

It is important to realize that Kennedy brought to the presidency the concept of "American exceptionalism"—that the U.S. rightly was and should be the leading nation in the world. He was willing to expend national resources and to demand national sacrifice to make sure that the United States was the leading nation.

NASA's Mercury program was under way at the time. How did it figure in Kennedy's outlook on Apollo?

A condition necessary to Apollo happening was the success of the sub-

orbital [Mercury] flight of Alan Shepard May 5, 1961, just as the president's advisors were preparing to give him their recommendations on accelerating the space program. If the Shepard flight had been a failure—and there

was great concern about the risks involved—it is doubtful that Kennedy could have gone to Congress three weeks later and said we are going to send people to the Moon even though we just killed an astronaut.

When was the Moon landing adventure recommended to Kennedy?

The recommendations from his advisors were prepared over the weekend of May 6 and 7, 1961, and embodied in a May 8 memorandum that first went to [Vice President] Lyndon Johnson, which Johnson endorsed. It went to JFK the same day. It was a remarkable document, mainly for the language that was used to justify setting a lunar landing as the central goal. It said men, not machines, capture the imagination of the world, and that, basically, the national prestige that comes from large-scale space achievements, even though it may not have military or economic value, is "part of

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the battle along the fluid front of the Cold War."

How does that set of circumstances relate to the current debate over the priorities of today's space program?

One of the problems today is that there is no question of high political significance, the answer to which is go

to Mars or even go back to the Moon. Kennedy concluded that space leadership was essential to U.S. leadership. And how could the United States become the space leader? Kennedy's answer was: send people to the Moon. It worked, and now in 2011, 50 years later, the United States remains the space leader, although potentially in danger of losing that position.

Can you draw a parallel with the contemporary space issues?

I happen to think that today there is a similar answer to the question of how to assure U.S. leadership in space: Send humans somewhere out there and explore, but this time as the leading partner in a cooperative undertaking. Human involvement is subject to reasonable debate, but my conclusion is that the line in the recommendation to Kennedy—that men, not machines, capture the imagination of the world—still has validity. Machines also capture our imagination now—Mars Rovers and the Hubble telescope, for example—but I think human involvement in spaceflight is still an essential element of using the space program as an element of U.S. 'soft power.'

Many American astronauts have gone into orbit since the Apollo program, on Skylab, the shuttle, the international space station. Does that count for something?

Over 500 people have gone into space, but relatively few of their missions have captured the public imagination to anywhere near the extent of Apollo. Repetitive missions to Earth orbit really aren't all that exciting.

Do we have to be in competition with a rival nation in order to do the kind of things we did in Kennedy's time?

I think our bitter competition with the Soviet Union made it possible to conduct the peaceful but warlike mobilization of resources to win the race

to the Moon. People tend to forget what was involved in that mobilization. After Kennedy's decision, NASA's budget went up 89%, and the next year, it went up 101%. This was the largest peacetime mobilization of human and financial resources in U.S.

history. Even the Panama Canal and the Manhattan Project cost considerably less.

I now think that the set of circumstances that made the Apollo program possible—a new, young president at the beginning of his time in the White

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Logsdon was the founder and long-time director of GW's Space Policy Institute. From 1983 to 2001, he was also director of the Center for International Science and Technology Policy. He is also on the faculty of the International Space University.

During 2008-2009, Logsdon held the Charles A. Lindbergh Chair in Aerospace

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His book John F. Kennedy and the Race to the Moon was published in January 2011. He is also the author of The Decision to Go to the Moon: Project Apollo and the National Interest, and is general editor of the eight-volume series Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program.

Logsdon was a member of the NASA Advisory Council from 2005 to 2009 and remains a member of the council's Exploration Committee. In 2003, he served as a member of the Columbia Accident Investigation Board.

He is a recipient of the Exceptional Public Service, Distinguished Public Service, and Public Service medals from NASA, the 2005 John F. Kennedy Astronautics Award from the American Astronomical Society, and the 2006 Barry Goldwater Space Educator Award from AIAA. He is a fellow of AIAA and AAAS and a member of the International Academy of Astronautics and numerous other space-related institutions.

Logsdon is on the editorial board of the international journal Space Policy and was its North American editor from 1985 to 2000. He is also on the editorial board of the journal Astropolitics. He holds a B.S. in physics from Xavier University and a Ph.D. in political science from NYU.



House, a powerful rival, no big national debt or budget deficit, no technological breakthrough required, just lots of good engineering—were unique and will not be repeated.

Tell us more about Kennedy's decision in the context of the Cold War and what it means for U.S. space decisions today.

It is hard to recreate the sense of dire U.S.-Soviet competition, of real fear, of bomb shelters and civil defense. The possibility of nuclear war with the Soviet Union was very real, and there was the perception that the U.S. was in danger of losing its position as the world's leading nation.

What about China? Its successful ASAT test and its space programs and ambitions in general are said to be cause for concern.

The parallel between U.S.-Soviet competition in the Cold War and U.S.-Chinese competition for global leadership in the 21st century has some validity, but I don't think it's totally valid. Since the U.S. has made space central to its warfighting capability—maybe excessively so—it is entirely logical from the Chinese point of view to develop the capability to counter that.

But I don't think that necessarily means that China is intent on using its military power directly counter to U.S. interests, in the way that the Soviet Union during the Cold War developed military power to counter U.S. interests in Europe and in other locations. I don't agree with the notion that space is or will be an area of U.S.-Chinese competition in the same way that it was with the Soviet Union during the Cold War.

As I recall, we were worried about the clear Soviet advantage in heavy-lift launch vehicles. How did that play into Kennedy's decision to prepare to go to the Moon?

After careful study of what led to Kennedy's decision, I came to believe that his number one concern was having a more powerful rocket than the

Soviet Union, because that would allow the U.S. to do anything it wanted to do in space. There was a great disparity in rocket lifting power between the U.S. and the Soviet Union. The Soviet rocket, the R-7, which had already been built as the first Soviet ICBM, turned out to be a terrible ICBM but was a very good, very powerful space launch vehicle, now called Soyuz and still in use in much-improved form. It gave the Soviets a great weight-lifting advantage.

How did Kennedy and his advisors assess the importance of the R-7?

Their calculation was that the Soviet Union, using that launch vehicle, could be first in doing almost everything dramatic in space, including possibly sending one cosmonaut around the Moon.

So it was obvious at the time that the U.S. needed to build a much more powerful space launch rocket?

That's right. Saturn V. In simplistic terms, the Saturn V rocket was a very scaled-up V2 rocket. Wernher von Braun started the V2 in Germany and the V2 led to Saturn V. But von Braun didn't originate the F1 engine for Saturn V. The USAF did.

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Back to the Apollo decision. What happened after Kennedy made it?

What made Kennedy's involvement with Apollo so remarkable was that not only did he set the goals and allocate the resources, but that he stayed with it. When faced in 1962 and especially in 1963 with criticism and concerns about the burgeoning cost of the program, he had his staff look very carefully at the pros and cons of backing off or going ahead, and his decision was to go ahead. So it was not only his original decision but also a series of reinforcing deci-

sions that made Apollo possible and ultimately successful.

Compare then to now.

The setting is much different. In 1961, the U.S. decision on what to do in space was tied to the U.S. position in the world. That's not true any more, for better or for worse. We are not spending anywhere near the same level of national resources on space, either. The NASA budget in the last years of the Kennedy administration was about 3.5% of the federal budget. Now it's 0.6%. So we are not asking for the same level of support out of the political system that Kennedy asked for.

You noted that Kennedy, in his inaugural address, called for cooperation with the Soviet Union in space. Tell us more about that. What happened along the way?

Kennedy kept returning to the idea that cooperation was better than competition. He proposed space cooperation again in his first State of the Union message 10 days after his inaugural. But all of that was trumped by the Gagarin flight and Kennedy's decision that the United States really needed to take the leading position in

space. Even so, very shortly after the May 25, 1961, announcement of his decision to go to the Moon, he met with [Soviet Premier Nikita] Khrushchev in Vienna—on June 3 and 4—and proposed going to the Moon together. Basically, Khrushchev said no.

Was that the end of it?

No, it wasn't. I find it remarkable that very few people in the space community know or remember that Kennedy went to the United Nations September 20, 1963, just two months before his assassination, and asked,

why shouldn't the United States and the Soviet Union—and indeed all other countries—pool their efforts in this great adventure. It is fascinating to speculate what might have happened if Khrushchev had accepted Kennedy's proposal—as it seems he was willing by 1963 to do—and if Kennedy had lived.

The Apollo budget eventually came into question, though, didn't it?

It did. For the first couple of years after Kennedy announced his decision to go to the Moon, Congress was supportive. But in 1963, there was increasing skepticism of the value of the lunar landing program. That year, the Congress cut NASA's budget by 15%. But after Kennedy was assassinated, Apollo became a monument to him, and that momentum carried the program through the Apollo 1 accident and on to its successful completion. President Johnson did nothing to delay Apollo, but he was not committed to a space exploration program beyond Apollo. In fact, it was Johnson who made the initial decision to shut down the Saturn V production line. Skylab was the last Saturn-fired launch.

So would you say that there was a negative aspect to Apollo's success?

One of the problems with Kennedy's rationale for going to the Moon was that it wasn't sustainable. It was cast as a race, and once we won the race, with Apollo 11, the race was over. There was enough residual momentum for six more missions to the Moon, five of them successful, but three additional missions were cancelled. Kennedy's decision to go the Moon was something really great in American history, but it wasn't good for the space program after Apollo.

Go ahead and elaborate on that.

Apollo created a large organization in NASA, lots of great new capabilities, lots of jobs for people, and, thus, lots of political interest in particular congressional districts. In my mind, the main sustainment of the space program in the 40-plus years

since Apollo has been the relatively parochial political interests in maintaining jobs, maintaining contracts, and maintaining the economic impact of the space program at certain facilities around the country, not fully committed presidential leadership.

Will we see anything like Apollo ever again?

It seems to me that the circumstances and context that made Apollo possible cannot be repeated, and will not be repeated. And so, in thinking through what is required for a sustainable space exploration program, we

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have to develop a rationale that does not depend on geopolitical competition or public entertainment or excitement. The problem is that all attempts to do that since Apollo have come up relatively empty. In my opinion, we need to develop a single, clearly articulated, widely supported rationale for human exploration of space, and we need to understand that expanding our experience, doing things we have not done before, is part of our responsibility as a leading society, and is part of our being human.

Do you think it will happen?

I think ultimately there is going to be human travel beyond Earth orbit that will be lasting, not just for decades but for centuries. We just have to find something of economic value out there, and be able to live off the land

once we get there. We can't continue to send everything from home. At the moment, the question is whether there is the political will among our country's leadership to allocate sufficient resources—in a very difficult, resources-constrained environment—for leadership in space.

If the U.S. doesn't lead, will another nation fill the gap?

I think even back in the early 1960s Kennedy saw that in the long run, human space exploration and deep-space development should be a cooperative enterprise transcending national military and geopolitical rivalries. That imperative hasn't changed. The space program today is global. It is a very, very different world from the one in which only the two global superpowers had space capabilities, as was the case back then. Now there are nine countries—and counting—that have space launch capability, 50-some countries with space agencies, and high-quality technical space capabilities in a number of nations.

Whether the Obama administration and Congress can put the United States in position to be a reliable partner in a global program of space exploration is the key space policy issue of the next few years, I believe, and is still to be determined.

What is the salient connection between Apollo and the formulation of U.S. space policy today?

Apollo turned out to be an example of how not to do a sustainable space program. Apollo is constantly referred to as the golden age of the U.S. space program, and in some ways, it was. We did exciting, grand things in Apollo. But it was not a model for a sustainable 21st century program. And I think that's what the Obama strategy proposed last year is all about—let's get off the Apollo paradigm and create a space program that is appropriate for the 21st century. The debate since then has certainly been confusing, and unfortunately, the way forward is still not clear.