

History and Policy in the Sixties

- Reading 1. "Spaceflight and the Myth of Presidential Leadership" Chapters 2 & 3
2. "The Heavens and the Earth" Chapters 11-22
3. "Beyond Horizons" Chapter 3

Strategic Themes:

- The use of the Space Program as a political tool to show the superiority of the U.S. vis-à-vis the Soviets and to recover from foreign policy disaster.
- The initialization and internalization of global space enabled communications.
- The use of the presidency to drive the nation in a technocratic large enterprise that fired the national imagination→ home run syndrome!
- The strategic value of space based on reconnaissance.
- The suppression of the military designs for aggressive use of space.
- The race for the Moon!
- The lure of the systems approaches.

The sixties starts with the Kennedy/Nixon campaign. Kennedy ran on the premise that the Eisenhower/Nixon administration had left the U.S. dangerously behind both in missiles, "the famous missile gap" and in space. He pledged to make the U.S. a nation that was first PERIOD. In a sense, Kennedy fell for the trap that Khruschev had set. Sputnik was used as an example of Soviet strength and U.S. weakness. The Eisenhower paradigm made no difference. The Kennedy paradigm was that prestige accomplishments in space did matter even if there was no other reason to undertake them. Of course in that respect Kennedy correctly captured the mood of the American public. Meanwhile to buttress the Kennedy case, Khruschev was arguing that Soviet space accomplishments were an emblem of the superior Soviet system and developing countries should emulate the Soviet rather than the American model. In this sense the space program can be seen as a symbol for the battle for the heart and minds of the uncommitted nations around the world. While Kennedy had been proclaiming a "missile gap", he found out as soon as he became President that it was fake. The U.S. had been undertaking limited reconnaissance of the USSR with U-2's. Thus ended abruptly on May 1, 1960 when Francis Gay Powers was shot down. Happily on August 20, 1960, the fourteenth flight of the CORONA project achieved success by sending down a film capsule with more photos of Soviet missile sites than all the U-2 flights combined. By late 1961, the U.S. knew the Soviets had less than 50 missiles. While the US had 233 missiles. Thus there was no gap. Thus the satellite reconnaissance program was a huge success for the Eisenhower policy. What also happened around this time was that Presidents' Science Adviser recommended that the nation's satellite reconnaissance system should be in a civilian agency in the DoD not in a military service. This followed from the policy that these assets should be dedicated to fostering the peaceful use of space. Thus the NRO was set up, directed by the Under Secretary of the Air Force but outside Air Force control.

Kennedy was thus in the position that having proclaimed he would make America first in space and missiles found the US already first in missiles. The Kennedy administration started slowly. It knew it wanted to do something in space to show the American superiority over the US but what? His science advisor, Jenny Wiesner of MIT, led a committee which reported that putting a man in orbit could not be justified on scientific or technical grounds. This of course is one of the refrains that has been heard throughout the space age, the value of humans in space relative to machines in space and the relative costs of human presence. To counter this dry view the Space Science Board of the National Academy of Sciences, chaired by Lloyd Berkner, a close friend of the new NASA administrator Jim Webb, came out and suggested that scientific exploration of the Moon and planets should be the ultimate objective of the US (civil) space program and that human participation was essential. The board also found that a sense of national leadership pointed towards a large manned program. The Board (from a prestigious institution) altered the terms of the debate. Before the scientists had always been for unmanned missions and the politicians for manned. Now manned spaceflight could now be viewed as something over which “good scientists disagree”. We know now from the minutes of the meeting that the report was mainly written by Berkner who had assured Webb that the report would support the NASA position on the value of manned spaceflight. Thus the forces for the decision for Apollo were gathering.

Another critical element lay in the personality and beliefs of Jim Webb, the new NASA administrator. Jim Webb was not a scientist but a man who understood policy, a big thinker, an excellent salesman, the sort of person who would not be content doing small things. He knew how to sell to Congress and how to work the Bureau for the budget. He decided to pitch the (cancelled) Project Apollo to the new Administration. This was a big project worthy of a national effort.

Two other events now happened which forced a decision. On April 12, 1961 Yuri Gagarin orbited the Earth. Again the Soviets had achieved a first! Again the newspapers and public clamored that the US was behind. One week later, the CIA backed invasion of Cuba failed at the Bay of Pigs. The Bay of Pigs fiasco suggested to Americans that the President was at least inexperienced and at worst incompetent. Something had to be done! On April 20, Kennedy called in Vice President Johnson and asked him to come up with something fast in space. Of course, Johnson was the senator who had used Sputnik to political advantage in criticizing the Eisenhower administration. He truly believed that America should be doing more. Kennedy asked him “Do we have a chance of beating the Soviets by putting a lab in space or...by a rocket to go to the moon and back with a man?” The final straw that pushed Kennedy to the Apollo decision was when McNamara noted that without Apollo there would be a dangerous (i.e. politically sensitive) oversupply of manpower in the aerospace industry. This young President did not need this! Of course, Johnson reported back to the President that the US could do a Moon landing by 1967 that it would cost \$33 billion, \$10 billion more than the entire projected NASA budget for the next ten years. Kennedy thus decided that the US should engage in a race to the Moon to show US superiority. He gave an extraordinary second State of the Union address on May 25, 1961 in which he announced an aggressive lunar landing program. His words are one of the clearest examples of an excellent systems

definition “Man on the Moon before the decade is out”. This gave a mass, place, and timescale for NASA to operate with.

The Congress by a nearly unanimous vote agreed with Kennedy. Project Apollo was reborn! The NASA budget went up 50% in 1961. In 1962, it exceeded all pre-1961 space budgets combined. The Congress agreed with the President partly because of the consensus building by Vice President Johnson, a master of the Senate and partly by the mood of the American people who were clamoring for something to be done in light of the Gagarin flights.

Ten months after Gagarin, on February 20, 1962 John Glenn soared into space on Friendship 7. Finally the US had matched the Soviet feat. There was a period of national release and catharsis which confirmed that Kennedy had caught the mood of the public. While Apollo was being initiated, interesting things were happening on three other fronts. Commercial space was born, military space was suppressed and many of the current space treaties were ironed out.

At the start of the decade it was hard to make overseas phone calls, there was no real time TV from far away and no reliable maritime communication. The satellite systems developed commercially in the sixties changed all that and gave the world the first commercial application of space technology and still the only one to make money!

An important report from Bell Labs in 1955 foresaw that reflecting satellites in LEO and active and passive reflection in synchronous orbit could provide broadband transoceanic communication. Of course as is well known the seminal paper in synchronous satellites was published by A.C. Clarke in 1945 (although he assumed they were manned). The military started first with the Advent program in 1960 to place a comsat in geosynchronous orbit. The progress was very ambitious for the time and needed a new launcher. By 1962, it was behind on schedule and performance and the DoD under McNamara cancelled it. The military was embarrassed by this and ceded leadership in comsats to the civilian sector. In the meantime, Hughes engineers came up with the famous spinning satellite which was small, simple and elegant. Better it could be launched with the existing Thor rocket and Delta upper stage. By late 1961 DoD and NASA agreed to sponsor a joint flight test of the Hughes satellite. In July 1963, Syncom II went into GEO and established the first GEO satellite communication. AT&T had earlier put up Telstar, a LEO bird, that broadcast the first live TV between continents. The GEO birds were the most useful since they provided communications all the time. The policy under Eisenhower administration was that space based communications should be province of privately carrier competing with each other with some advanced R&D through NASA. The role of the government was only to ensure fair competition through the FCC. The policy of the Kennedy administration was very different. In the same speech as Apollo, he asked for more money for comsats and asked the VP for the policy to ensure that the world would have the earliest optimal use of comsats especially in the developing nations. This policy of the Kennedy administration was a deliberate attempt to use American space technology as a means to bind the world together, in a peaceful interdependency based on comsats. It was thus really a foreign policy rather than

a space policy but one enabled by space technology. This would be repeated again with the Clinton administration and the Space Station. Thus the Kennedy administration wanted to give away the US space technology expertise for the good of the world, a far contrast for today when satellite exports are restricted and legally classified as a weapon.

The debate over how to meet these foreign policy goals was contentious and pitted the carriers like AT&T against the aerospace companies. The Communications Satellite Act of 1962 created Comsat, a funny public/private company. It could sell shares to the public but no buyer was allowed to get a dominant influence. Its assignment was to be the American voice in international satellite communications and create an international telecommunications consortium. Comsat started working with the Europeans, Canadians, Japanese etc. and by July 1964, Intelsat was created to provide international satellite based services. By 1990, Intelsat had 115 member nations with 15 satellites in 3 ocean basins. It has caused the price of telephone calls to drop dramatically and has given us worldwide information flow. As a policy statement, it has been very successful and even though the US gave away the technology, US prime contractors managed to build eight successive generations of Intelsat satellites. The existence of a large entity much as Intelsat has also led to repeated development of new technology. Thus Intelsat developed the first operational synchronous satellite (Intelsat I), the first channelized repeater (Intelsat IV), the first spatial reuse of frequencies (Intelsat IVA), the first spatial and polarization frequency reuse (Intelsat V), the first use of TDMA (Intelsat VI). Most of it was done in the US.

Intelsat serves all members at the same rates, as a direct reflection of the Kennedy policy goals. Thus large users subsidize small users and the Third World is enabled to be part of the telecommunications revolution. This would probably never have happened under Eisenhower administration policy. The 1962 Act had no provision for purely domestic systems. None at the time foresaw the technical possibility that a satellite's downlink beam could be narrowly focused enough to cover just a single country. By the mid 1960's the ability to stabilize large antennas and form sculptured beams led to American domestic satellites. Comsat argued that it should provide all the service. ABC disagreed and in good government fashion the Johnson Administration formed a panel to study the policy issue. The panel was undercut by the decision of Johnson not to seek reelection.

The Nixon people in 1969 decided the issue under the policy of "Open Skies" any financially qualified organization could apply for and receive authority to operate a domestic satellite system. In the "Open Skies" environment, there was a critical policy change from Intelsat, namely that the rates would be set by competition not as a fixed percentage of the investment base. This had a profound effect on the economics of communications. It created a market place characterized by multiple suppliers and multiple buyers.

At the start of the sixties, the Air Force had risen to the place as the preeminent service in space. They had not always appreciated the subtleties of the Eisenhower policy. With the rise of NASA, the Army and Navy programs had largely been transferred to NASA. While the creation of the NRO took away the space reconnaissance

role, the Air force had in place a large number of space programs including early warning satellites, space detection and tracking systems, new launchers (the Titan), the Dyna-Soar (a military man in space), a satellite inspector program (SAINT) and various efforts in space based weapons.

With the Kennedy administration, the Air Force felt that with the emphasis on space it would do well to capture the high ground. In FY62, the DoD appropriation was only \$0.7 billion less than the NASA figure. However, they quickly found themselves frustrated. The administration policy of "Space for Peace" prohibited development and deployment of offensive space systems that could deny the Soviet space superiority. Second the NASA emphasis on manned spaceflight undercut AF man in space program. Third, under Secretary McNamara, the DoD position was that there be an integrated national space program in the name of cost effectiveness with no wasteful duplication. Thus the Air Force entered into major cooperative agreement with NASA. For example, for project Mercury, the Air Force provided most of the astronauts, launch facilities, vehicles, range support and recovery vehicles. Then came the "firestorm". On June 11, 1962, the New York Times reported that the DoD was embarking on a man-in-space program to prevent foreign military control of space. It reported that the Air Force would develop a manned satellite designed to destroy hostile space vehicles (a combination of Dyna-Soar and SAINT). This led to a public outcry from critics who suggested that these programs were directly competing with NASA and in violation of the administration position of space for peaceful purposes. The administration reaffirmed its space for peaceful purposes and cancelled the SAINT project. This was also the beginning of the end for the Dyna-Soar project. In October 1963, McNamara recommended a military follow on to Gemini, NASA countered with a military MOL (Manned Orbiting Lab). Dyna-Soar could not survive. It was cancelled in December 1963 with the Air Force told to focus on MOL instead. Basically under the strategies of assured destruction passive military satellites were seen as stabilizing and any active system was destabilizing. Unfortunately, for the Air Force, the MOL was itself shot down. Its military objective was unclear (it was billed as a reconn facility) and by the late sixties it was the costliest project in the Air Force budget for R&D unrelated to the Vietnam war. Thus it did not survive the budget cuts looking to finance the cost of the Vietnam war. Secretary Seamans said in the late sixties that the cost of a manned space system was too great to be borne at that time relative to modernizing its tactical and strategic forces.

The sixties were a period of profound space diplomacy. Space law and policy was being created for the first time. Many of the policies which govern space today have their genesis in this period. Space diplomacy in the sixties moved ahead on four axes: protection of US military space programs, cooperation with the USSR in space arms control and space science, cooperation and competition with European allies and organization of a regime for the operation of communication satellites. In 1961, the US opted to "blackout" all reconnaissance launches. The NRO disappeared from view. This was to keep military reconnaissance from the public eye and avoid antagonizing the Soviets. Thus in May 1962 the administration decided to support a ban on nuclear weapons in space but oppose any prohibition on military uses of space. This position was

ultimately accepted by the Soviets in a policy success as they developed their own spy satellites.

The cooperation with the Soviet Union produced the partial test ban treaty which banned nuclear explosions in air and space. This is ultimately what killed Project Orion, the rocket powered by nuclear explosions. It also led to the UN Principles on Outer Space were declared in Dec. 13, 1963 when the Soviet Union retreated from its position on spy satellites. These principles declared outer space free for exploration by all and out of bounds to national sovereignty, space activities to be carried out for the benefit and in the interest of ALL mankind in accordance with the UN Charter, states to bear responsibility for their national space activities, states to be guided by principles of cooperation with consultations to preclude activities harmful to the peaceful uses in space; spacecraft to remain under the jurisdiction of the launching state with the latter accepting liability for damage to foreign property, astronauts to be regarded as “envoys of all mankind” and rendered every assistance.

The cooperation with the Europeans started in space science and allowed the European programs to start to build their expertise. This later led to Ariane! The big player during the sixties was Apollo led by Jim Webb. In 1961, NASA had 6000 people, by 1965 it was over 60,000 and there were 411,000 people in the country working on NASA projects. The high point in funding was FY65 when NASA received \$5.2 billion when in FY60 it had received \$0.46 billion. A large change in just five years! It led to the creation of infrastructure all over the country notably in Texas and Florida. It also led to building 39 at MIT as well as other universities.

NASA adopted and improved the systems approach from the military use for ICBM. The Apollo-Saturn program was one of the biggest ever done in peacetime. For many, large-scale systems engineering and NASA seemed synonymous. By 1965 however, critics of the program in Congress (mainly Republicans) forced the first cut. This delayed the Moon landing from 67 to 69. Also increasingly the space race was seen as a powerful engine of progress relevant to other goals. Thus by the late sixties, the NASA approach to large scale systems engineering was seen as capable of solving the issues of poverty, rebuilding cities, etc. It led to the famous phrase “If we can put a man on the moon, we can...”. The race for the Moon went on. We know now that the USSR was trying to get to the Moon and had a lunar lander built. What they did not have was the giant launcher needed. Their N-1 blew up four times and was abandoned. Our Saturn V worked and we went to the Moon.

Webb left in 1968 after another budget reduction for NASA. His star had passed. While Johnson remained committed to the Moon landing, his administration and the country became more concerned with the Vietnam war, the war on poverty, the great society. To some extent these flowed from the NASA success. Of course, Apollo landed on the Moon in July 1969. NASA had won the race for the US. Then came the big question, now what?

Policy discussion

The new technology of space based communications allows the possibility of tying the world together in a new way. It also offers the possibility that it will be used to military advantage by countries not friendly to the US. The President needs advice on how to proceed.

Break up into groups with each group representing an agency position (DoD, State, Commerce, Congress etc). Articulate to the class the choice the President should make. You should couch your response in terms of the known intent of the president, which is to engage the Soviets all over the world.