

History and Policy in the Fifties

Reading: Chapters 1-10, The Heavens and the Earth.

Big Themes:

- Technocracy as a way for a nation to accomplish tasks
- The impact of the thermonuclear bomb and the technology of missiles
- The Cold War as a contest between Communism and Capitalism
- The need for accurate military reconnaissance
- The need to establish a law of space
- Sputnik as a Soviet triumph and American disaster

A short history of space in the Fifties:

Dreams of space flight go back well before the 1950's. In Russia, Konstantin Tsiolkovsky published the Principles of Rocket Motion in 1903. In America, Goddard published his treatise on rocketing in 1919. Both of these seem to have been inspired by Jules Verne and dreamed of using the rocket as a means of getting to Space.

The Soviet Union in 1924 became the first government to endorse and support the goal of space flight. They established the Central Bureau of the Study of the problems of Rockets to engage in several objectives including the study of the military applications of rockets. By contrast as late as 1941, the U.S. Army turned down Goddard for funding because they could see no value to his work on rockets.

The Soviet work on the issues of rockets was well underway when Germany invaded the Soviet Union in 1941. One of the men that arose in this pre-war period was Korolev who became the chief designer of the Soviet space program in later years.

During WWII, the Germans developed the V-1 and V-2 as terror weapons to help defeat the allies. The V-1 was a slow cruise missile while the V-2 was the first medium range ballistic missile. While the V-2 itself was first produced in a Germany desperate to beat the Soviet Union and the U.K., the basic principles were laid down in the previous Russian and American work. Captured Germans commented on how much they had learned from Goddard when the U.S. ignored him. As is well known, many of the best of the German engineers and equipment was surrendered to the Americans rather than the Russians. 115 German scientists and 100 operational V-2's were sent to the U.S. at the end of WWII in Europe while the Soviets captured the rank and file of the V-2 program. However, it is clear that except for the destruction of WWII, the Soviets had all the necessary knowledge and people but did not have the practical engineering. Thus WWII delayed the Soviet march to the Space Age and kickstarted the US march to the Space Age.

What also came out of WWII was the atomic bomb that was initially only an American weapon. The history of the early Space Age and the bomb are intertwined. Once the Soviets saw the power of the bomb they had to have it! They occupied Eastern Europe after WWII in order to give them strategic depth so that no enemy could ever

invade them again. But the bomb changed the whole equation. The Hiroshima bomb exploded on August 6, 1945. By mid-August Stalin ordered Kurchatov to “Provide us with atomic weapons in the shortest possible time. You know that Hiroshima has shaken the whole world. The equilibrium has been destroyed. Provide the bomb—it will remove a great danger from us.” In October 1946, the Soviets seemed to have decided that in the event of an American-Soviet war they needed long range reliable rockets (much better than the V-2) capable of hitting target areas on the American Continent. In a sense, they needed some way to overcome the advantage that the sea and the Navy gave to the U.S.

The U.S. responded to the Soviet bomb by a program to build a hydrogen bomb. This succeeded in Nov. 1952. The Soviet had their own by August 1953. These efforts only spurred the Soviets onto greater efforts so military and R & D rose 15% from each year from 1953-1956. The ICBM that eventually launched Sputnik was approved by 1954.

Stalin died in 1953. Under Khrushchev, even as he de-Stalinized the Soviet Union, still wanted the Soviet Union to defeat Capitalism not by war but by showing the rest of the world how strong was the Socialist Soviet style. At the 20th Congress Khrushchev perceived there would be a new cold war. Soviet nuclear and missile power removed the vulnerability of the socialist states and could be used to coerce people. Thus in October 1956, the Anglo-French forces retreated from Suez following a Soviet threat of “rocket attacks”. The new Cold War would not be in direct military conflict but would be in the spheres of economic productivity, scientific progress, and influence in the underdeveloped nations and in struggles for national liberation. Thus given the Soviet emphasis after Stalin, the march to Sputnik and the American policy was inevitable.

The International Geophysical (IGY) was set to start on July 1, 1957. On July 29, 1955 the U.S. announced that it intended to launch a satellite during the IGY. The next day, the Soviet Union announced that same goal. The Soviets rushed ahead based on using the R-7 rocket that was the basis for their ICBM. On August 3, they successfully fired their first ICBM. On October 4, 1957 the same rocket put up Sputnik and the world was never the same again.

The contrast with the U.S. could not have been starker. The U.S. did not have a long history of large-scale federal support for significant scientific and technical projects. This only started in WWII with the Manhattan project. However, the U.S. had captured the cream of the crop of the German rocket developers as well as 100 operational systems. Thus while WWII retarded the Soviets, it accelerated the U.S. work on rockets.

As the cold war became colder, the U.S. developed the hydrogen bomb, the Marshall Plan and the strategy for containment of the Soviet Union: when Eisenhower came into office, his overriding concern with the Soviet Union was how to curtail it without making the U.S. a garrison state. The thinking of senior people at the time was significantly affected by a prescient RAND report on October 4, 1950, seven years before Sputnik. This RAND report focused on the implications of space including the politico-

military implications. It has been called the birth certificate of American Space Policy for it set the tone for the next decade. It both led to the second place finish by the U.S. and the fact that the eventual American Space Program was better suited to national needs. The RAND report suggested the following:

1. The primary function of satellites is future tools of strategic and meteorological reconnaissance.
2. The legal right to overfly countries (the Soviet Union) for reconnaissance purposes was unclear.
3. Given the secrecy of the Soviet Union, their response was uncertain. They might consider it an attack.
4. The best way to minimize the risk of countermeasures was to launch an experimental satellite on an equatorial orbit and thus establish the freedom of space in a politically advantageous way.

On March 16, 1955 the U.S. Air Force established a secret program project WS-117L to develop a strategic satellite system. Thus the Eisenhower administration policy was to push to develop military reconnaissance satellites, establish the right of overflight and to minimize the amount spent on the military industrial complex. The concept of being first into Space was not a high priority. In essence the two adversaries were fighting two different battles. The USSR was fighting for prestige and recognition, the U.S. for objective military advantage. In several secret reports to the President the consequences of a Soviet first were discussed particularly the psychological ones.

The U.S. thus decided to proceed in a plan to launch a peaceful scientific satellite during the IGY. While the ostensible objective was scientific, the real objective was to test the legality of overflight. Also a critical policy goal was to preserve U.S. freedom to develop military systems in space. Thus the U.S. decided to launch during the IGY with an NRL Viking. This choice was made over the Redstone, a V-2 derived army rocket. The Viking (later called Vanguard) was a completely new rocket that unlike the Redstone had no heritage. This decision proved to be disastrous in the race to put up a satellite first. Part of the reason for the decision was the concern that using the Redstone, a clearly military rocket might provoke the Soviets to challenge satellite overflight.

In the meantime the work on the Atlas ICBM continued at a feverish pace. The Titan missile was started in 1955. Both of these ICBM missiles later became obsolete as ICBM's but lived on as space launchers until today.

The Vanguard launcher had many problems with its upper stages. All four first firings of the launcher failed. Meanwhile the Army Jupiter-C had several successful flights and could have launched a satellite. However, despite Von Braun, Washington didn't want it. They even sent a team to Huntsville to ensure that Von Braun did not accidentally launch Eisenhower genuinely did not believe it was necessary for the U.S. to be first in space. He rather took a longer-term view towards seeing behind the Soviet curtain.

Sputnik was a sharp slap to American pride. The U.S. and world response clearly surprised Eisenhower. The only good that came out of it from the point of view of the Eisenhower administration is that it unintentionally established the concept of the freedom of international space. The Soviets said it did not overfly countries, rather countries rotated underneath it.

In the harsh light of Sputnik, several critical space policy decisions were made. The public outcry and the press response were ear splitting. This was as big as Pearl Harbor. Perhaps because the beep-beep from space removed the American assumption of invincibility: The cause of this American humiliation was placed on several quarters: The supposed lack of rigorous science based education in the U.S., the lack of funding for space and the lack of imagination in the White House presided over by a golfer.

Lyndon Johnson, then the senior senator from Texas, saw Sputnik as a way to embarrass the Republicans and advance his political agenda to be president. He started influential hearings that were galvanized by Sputnik II on Nov. 3, 1957 (with the dog Laika). They started in November. In December, under TV cameras, Vanguard, blew up. The ignominy seemed complete. The hearings fed the public hysteria and were adroitly used by Johnson to embarrass the White House.

Eisenhower had to respond! His response was the creation of NASA; a federal agency devoted to the conduct of the Space Age. As an aside, the Sputnik debacle also led to the first big leap into federal funding for local education. The supposed science crisis in the country had to be fixed! Now the Space Age had been started by the Soviets the question arose as to which U.S. federal agency could be in charge of responding. NACA had become a shadow of itself by 1955 and had only a small interest in space. Hunsaker, (MIT) was timid and was replaced by Jimmy Doolittle and by 1957, 20% of NACA was space related. Other claimants were each of the services, DOD itself, the AEC, NSF, NAS. Some relief came with the launch of Explorer I on January 1958 on a Jupiter-C. Explorer I returned far more useful data than the Soviet Sputnik, for example, it discovered the radiation belts. As a temporary relief, ARPA was created within the DOD and given the U.S. Military Space programs. ARPA was created to be revolutionary and never again to allow the U.S. to be surprised. Of course, it later led to the first multitasking computers and the Internet which arguably changed the world as much as Sputnik. ARPA was a military organization and the desire to emphasize use of space for peaceful purposes argued for an agency outside the DOD. NACA ended up being preferred by the PSAC under Killeen (MIT) because of its experience, facilities and cordial cooperation with the military departments. Thus even at the creation of NASA it was desirable to have close ties to the military. Thus NASA was created on October 1, 1958 out of NACA. Space in the U.S. would from then on be split NASA (peaceful and open) and the DOD.

The role of NASA was the expansion of human knowledge, improvement of aircraft and space vehicles, development of crafts to carry instruments and organisms through space, preservation of the US as a leader in Space science and applications,

cooperation with other nations and optimal utilization of US scientific and engineering resources.

While NASA had been created, Eisenhower still did not believe in the need for "stunts" to prove the US was better than the Soviets. He really wanted the military reconnaissance satellites. One of his last acts as President was to cancel Apollo, the trip to the moon.

Policy discussion

The Soviets have launched Sputnik. There is considerable pressure on the President to do something to respond. Several agencies step forward arguing that they should be given the lead and resources to respond. These include the each of the services, the DoD, the AEC, the NSF, the NAS and NACA.

Break up into groups with each group representing an agency position. Articulate to the class why your agency should be given the mandate to respond. You should couch your response in terms of the known intent of the president, which is to focus on military reconnaissance and who wants to avoid building up the military industrial complex.