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MASTERS OF DEFENSE STUDIES THESIS

**THE HIGH WALL OF SPACE**

By /par Jon Yost, Major, USAF

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## THE HIGH WALL OF SPACE

The blistering Texas sun beat down on the podium and enveloped the crowd. President Kennedy stood and spoke words that, while lacking in emotion, would have the most profound of effects. Smarting from the shock of the Soviets orbiting a man barely one month before Alan Shepherd's historic sub-orbital flight, exacerbated by the Bay of Pigs humiliation a week later, the young president was anxious to move the Cold War to a venue in which the United States could compete. The Moon, his advisers cautioned, provided the best chance of beating the Soviets. That is what the president was looking for, not the scientific exploration of the heavens, and not the inevitability of mankind to leave the nest of the earth for other worlds. Kennedy meant to divert national attention to a successful adventure. He needed to capture the nation's imagination. That is why, in May 1961, Kennedy had stood before a joint session of Congress and audaciously dared his country to dream. "I believe this nation should commit itself, before this decade is out, to landing a man on the Moon and returning him safely to the earth".<sup>1</sup> That is why he came to Rice University in mid-September, 1962, and stood under the Texas sun.

He spoke: "We chose to go to the Moon!" Waiting for the polite applause to die down, he emphasized, "We chose to go the Moon and do the other things—not because they are easy but because they are *hard*".<sup>2</sup> He intended to meet his Cold War rival in a new battleground of the young president's choosing. The Soviets were certainly ahead in booster technologies, but the technology surrounding the remainder of their space effort fell far short of what the United States was capable. Kennedy, and Eisenhower before him, pinned their hopes on this disparity.

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<sup>1</sup> John Fitzgerald Kennedy, President of the United States, in a Special Address to Congress on Urgent National Needs at the Capital, Washington, D.C., May 25<sup>th</sup>, 1961, as cited by Sorenson, Theodore C., *Let the Word go Forth; The speeches, statements, and writings of John F. Kennedy*, 1947 – 1963. Dell Publishing: New York. 1988. Page 174.

<sup>2</sup> Andrew Chaikin. *A Man on the Moon*. Penguin Books: New York. 1994. Page 1-3. Emphasis in original.

Kennedy charged NASA's Project Apollo to land on the Moon and return safely. The Space Race competition ended, therefore, after the landing of Apollo 11 on the Moon's Sea of Tranquility in 1969. Since that landing there has been no revolutionary advance in space technology. That is not to say that humans haven't done tremendous things in space. The point is that we continue to exploit space with derivatives of 1960s technology. The space assets on orbit today are technologically impressive, sophisticated, and wonderfully innovative machines. But they are not revolutionary. The dominant space agencies of the world, the United States and those of the Former Soviet Union, still use Cold War era boosters to reach orbit. These boosters are actually highly modified Intercontinental Ballistic Missiles (ICBMs) designed for delivering nuclear warheads to the far shores of the enemy. They were not originally designed for space travel, but delivering destruction from space. We still use the same techniques of spaceflight. We continue to employ similar space doctrine.

The radical, unimaginable technology that takes man to the next level of space travel—interplanetary or interstellar—has not yet been invented. And it will not be invented until an immense Manhattan Project-style investment in technologic advancement. Such a massive effort won't be mounted until there is another race for space achievement and technology like the one between the USSR and the US. The Space Race to the Moon served as the impetus for the First Space Age, driving both countries to mobilize whole economies and national intellectual resources in the pursuit of space technology advancement.

Having emerged victorious from the First Space Race, and not coincidentally from the Cold War, there is currently no credible contender for the United State's dominance in space. While US investment in space continues to be prodigious compared to other countries, space technology development does not have the national priority required for revolutionary advance.

Thus, we are stuck in the First Space Age, lacking the energy and technology needed to move to a Second Space Age.

Devised in the crucible of the Cold War the First Space Age was a product of nationally compelling motives. Both countries struggled for national survival. Both countries vied for the prestige of ascendancy in space. The Soviets struggling to demonstrate the superiority of their ideology through the superiority of their massive boosters, and the United States under pressure to obtain the reconnaissance those boosters necessitated. The national primacy placed on the colossal effort of reconnaissance was derived from bilateral national fears, United States' abject fear of another Pearl Harbour-style surprise attack, and the Soviet Union's fears of invasion. These two fears underpinned the enormous expenditure of national resources and both engineering and scientific talent consumed by the First Space Age.

The US was willing to do whatever was required, including risking Eisenhower's fear of an oppressive military-industrial complex, to avoid a nuclear Pearl Harbour. The Soviets went to great lengths, including the eventual bankruptcy of their economy, to avoid another occupation of their country. At the end of the day the reasoned and predictable competition between these two countries pushed both to extraordinary accomplishments in space. Ironically, both succeeded. The argument can be made that both conquered their extraordinary anxieties. The cost of this business, however, was extraordinary as well.

This paper contends that the First Space Age was the result of a peculiar set of compelling and unique world circumstances. Any subsequent Space Age will not occur until similarly compelling and unique conditions exist again. Any Second Space Age necessarily has as its precedence the urgency of another Space Race. Another Space Race is thus preceded by a

“rare confluence of historical forces”<sup>3</sup>, as compelling as the struggle for national survival of the first race into space.

To this end, this paper takes a three-fold approach. First, this paper addresses the reasons for the First Space Race since the First Space Age began with the Space Race. Second, this paper examines why these reasons do not exist currently, and therefore neither does the impetus for engaging in any Second Space Race. Third, we cast our minds forward to imagine what compelling reasons might generate a Second Space Race, and therefore, a Second Space Age.

## CHAPTER ONE—WHY RACE INTO SPACE?

The First Space Age arose out of fear. The Soviet Union feared invasion. Still sifting through the rubble of Nazi occupation, the Kremlin would do whatever it took to keep invaders from their borders again. The United States feared a debilitating surprise attack like the one at Pearl Harbour. The Japanese attack shocked the nation out of comfortable isolationism and into a cataclysmic World War. Washington would do whatever it took to prepare for any surprise attack in the hopes that preparation would deter such attack. Both nations feared for their survival because they had just emerged, one barely standing, from a holocaust in which their national survival had been in peril. Having defeated their common enemy, both the US and USSR realized that they were the two most powerful nations on the planet and had only fear each other.

Historians note that this fear originated in Tehran in November 1943. The Big Three, Churchill, Roosevelt, and Stalin met there to hash out military issues and post-war scenarios.

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<sup>3</sup> Ibid. Page 578.

What Roosevelt and Churchill did not know at the time was that Stalin had ordered their rooms bugged and he reviewed their conversations each morning. Stalin instinctively mistrusted the other two and left nothing to chance. This mistrust stemmed from the fact that Stalin—rightly, it turns out—believed that Roosevelt and Churchill conspired to allow the Soviet Union to bear the great brunt of the war. While the Nazis and Russians slaughtered each other on the Eastern Front, the Allies promised to open a second front in Europe, thereby lessening the strain on Stalin’s armies. Instead, Roosevelt and Churchill chose to marshal their forces for Normandy knowing that doing so served two purposes: one; such an attack, if launched prematurely, would fail, and two; allowing the Nazis to apply pressure on the Soviets weakened Soviet post-war military and economic strength, and therefore their after-war negotiating base. Britain and the United States, sharing a time-honoured “special relationship”, would be free to machinate the post-war world to their designs with minimal interference.<sup>4</sup>

The Big Three met again in Yalta in February 1945, and this marked the precipice of the alliance. Yalta was also the “beginning of the postwar world: the divisions between East and West became apparent”.<sup>5</sup> Stalin was uneasy because he understood the ‘special relationship’ between the other two powers, and he was bitterly conscious of being left out of it. Roosevelt and Churchill were content to divide the world into two spheres of influence, but were reluctant to include the cunning Stalin. Stalin knew this, thanks to his espionage efforts, and the mistrust continued after the war. Only the common objective of defeating the Nazis remained. Both sides, East and West, feared the motives and ambitions of the other.<sup>6</sup>

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<sup>4</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 12.

<sup>5</sup> Ibid. Page 13.

<sup>6</sup> Ibid. Page 13 to 17.

Those fears took many forms, including; the American's fear of a surprise attack, the Soviet fear of invasion, both feared the other's being viewed as superior, the fear that space was the natural evolution of weapons of mass destruction, and the fear of losing non-aligned countries to the other's sphere of influence. Make no mistake; the First Space Age was the product of a Space Race for dominance measured in prestige, influence, and military superiority. Whatever nation successfully dominated the high ground of space would, it was hoped in Moscow as well as in Washington, succeed in dominating their fear.

#### Reason One—Fear of Another Pearl Harbour

Unlike their wartime allies the Russians, the United States emerged from WWII bloodied but triumphant, assured of world prominence by virtue of economic and residual military power. Geographically isolated from the war's ruin across Europe, the US had not suffered invasion and had therefore been spared occupation's devastation.

What haunted the US national consciousness, however, was the Japanese surprise attack on Pearl Harbour. Caught completely unaware, vulnerable, and totally unable to carry the fight to the enemy, the US scrambled to build her military almost from scratch. Until her military-industrial complex mobilized to produce planes, tanks, and ships in significant number, the Americans were almost completely defenseless, due to the debilitating military draw down following the First World War. Terrified by this helpless position, teetering on the brink of defeat for two agonizing years unable to strike back, the Americans, like their Soviet counterparts, took a page from the First World War, and had since vowed "Never Again".<sup>7</sup> US

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<sup>7</sup> Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb*. Touchstone Books: New York. 1995. Page 19. "Duck and Cover" was a strategy for surviving a nuclear exchange where citizens were urged to duck under



leaders spent tremendous amounts of national treasury to ensure they would never again be surprised and vulnerable.

It is hard to imagine the intensity of the hysteria surrounding this fear. It permeated and shaped US society. “Duck and Cover” films were standard curriculum in elementary schools. Air raid drills were commonplace. Sensational reports of Soviet superiority dominated the news. A poll in the summer of 1955 determined that more than half of Americans felt it more probable to die in a surprise Soviet nuclear attack than from old age.<sup>8</sup>

At intelligence official’s behest, the RAND Corporation<sup>9</sup> conducted a series of studies that explained US vulnerability to surprise attack. In one study, conducted in 1953, the RAND staff concluded that a low level attack of only fifty older Soviet Tu-4 bombers carrying one atomic bomb each would destroy two-thirds of the Strategic Air Command’s (SAC) bomber force on the ground. The Soviets were, unquestionably, capable of this type of attack.<sup>10</sup>

RAND noted, “A substantial reduction in vulnerability would result from advanced indications of enemy activities” assuming such warning would parse into “sufficiently

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furniture, such as a school desk or a bed, and cover their head with their arms. The degree of protection provided was certainly dubious but was more intended to alleviate the feeling of helplessness such a situation created.

<sup>8</sup> Peebles, Curtis, *Shadow Flights: America’s Secret Air War against the Soviet Union*. Presidio Press: Navato, CA, 2000. Page 74-75.

<sup>9</sup> According to Sylvial Nasar in *A Beautiful Mind*, the war had barely ended when General Arnold, Chief of Staff of the Army Air Forces handed the Douglas Aircraft Company US\$10 million of residual wartime procurement monies for establishing a research assignment called Project RAND. RAND stood for “Research ANd Development”, and, according to William Poundstone’s history of RAND, was given a “surprisingly free hand” in researching the application of game theory to intercontinental warfare. RAND was a leading proponent of Intercontinental Ballistic Missiles (ICBMs), Air-to-air refuelling of jet bombers, the doctrine of “Fail Safe” where a certain number of bombers would be in the air constantly to avoid being caught on the ground, and the “Nuclear Surety” notion that ensured that more than one individual would have to execute nuclear attack orders to preclude one insane individual from singularly launching Armageddon. A prophetic 1946 RAND study titled “Preliminary Design of an Experimental World-Circling Spaceship ” noted that “the nation which first makes significant achievements in space travel will be acknowledged as the world leader in both military and scientific techniques”.

<sup>10</sup> Curtis Peebles. *Shadow Flights: America’s Secret Air War against the Soviet Union*. Presidio Press: Navato, CA. 2000. Page 75.

unambiguous states of alert”.<sup>11</sup> Without such indications, the first warning of attack would be radar detection of the incoming bombers, just as it was on December 7<sup>th</sup>, 1941.<sup>12</sup> The Central Intelligence Agency (CIA) estimated, ironically and with much misgivings, that it was unable to provide advanced warning of Soviet attack. The possibility was remote that, barring “some exceptional intelligence bonus breakthrough”, the CIA could anticipate clear forewarning of Soviet intention to attack.<sup>13</sup>

If the US could detect the “indications and warning” of an impending Soviet attack then response forces could step up readiness in anticipation. The response needed to be commensurate with the threat to prevent signalling provocation unintentionally. Therefore, the threat must be accurately quantified. Without a system of unambiguous states of alert, referred to as ‘Defense Conditions’ or DEFCONS, there was no way to determine if any Soviet military move was in preparation for attack, conducting a show of force, or in response to perceived American aggression. Neither side had any coherent method to read and accurately interpret the moves and intentions of the other. In this context, any misstep could have disastrous consequences.

In the ballet of diplomacy each side depended on knowing what the other was up to. Each side must accurately interpret and appropriately respond to the signals sent by the other. Each side feared the other, and, like a cornered animal, would strike out only if they felt they could get away unscathed, perceived by both to be an unlikely scenario, or if they felt they had no other choice. Knowing what the other side really intended to do was critical to avoid a catastrophic misreading of the situation. The Soviets could gather most information they needed

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<sup>11</sup> Ibid. Page 75.

<sup>12</sup> Ibid. Page 75.

<sup>13</sup> Ibid. Page75.

to make accurate decisions through open sources. The secrecy of the Soviet Union precluded the United States from consulting open sources. The US could only count on reconnaissance to answer their intelligence questions.

In July 1951 the US Air Force Colonel Bernard Schriever asked Massachusetts Institute of Technology to establish Project Lincoln to research the critical issues of air defense and other national defense issues. Project Lincoln, which became the think tank known as Lincoln Laboratories, assessed the US Air Force's long view requirements for reconnaissance. They called the study Beacon Hill. MIT recruited numerous engineers and scientists from around the country to study ways the United States could learn more about their adversary. Beacon Hill was so profound and far-reaching that parts of it remain classified 50 years later. The report outlined revolutionary techniques of improving the US' intelligence picture of the USSR, "such as photographic radio, and radar surveillance, passive infrared, and microwave surveillance".<sup>14</sup>

Beacon Hill concluded:

*"We have now reached a period in history when our peacetime knowledge of the capabilities, activities, and dispositions of a potentially hostile nation is such as to demand that we supplement it with the maximum amount of information obtainable through aerial reconnaissance. To avoid political involvements, such aerial reconnaissance must be conducted wither from vehicles flying in friendly airspace, or—a decision on this point permitting—from vehicles whose performance is such that they can operate in Soviet airspace with greatly reduced chances of detection or interception."*<sup>15</sup>

In 1953 the air force instituted an advisory committee to determine ways to put into practice the policy recommendations made by the Beacon Hill study. Referred to as the Intelligence Systems Panel, the researchers learned the best intelligence available on the USSR

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<sup>14</sup> Ibid. Page 62.

<sup>15</sup> Ibid. Page 64.

was from the German GX reconnaissance photos collected during World War II. The panel worked to figure out how to reconnoiter the whole Soviet landmass.<sup>16</sup>

Eisenhower felt that the US military forces should be structured to counter an accurate picture of Soviet threat. Attempting to counter every reasonably feasible Soviet threat could be financially ruinous to the Western way of life. This type of structuring required an enormous and unprecedented reconnaissance effort.<sup>17</sup>

Eisenhower authorized James Killian, president of MIT, to form a committee to “advise him on new technologies that would improve US offensive and defensive capabilities as well as the effectiveness of intelligence-gathering methods”.<sup>18</sup> In 1954, Killian formed the Technological Capabilities Panel, originally referred to as the Surprise Attack Panel. Forty-one scientists, mathematicians, engineers, and military communications experts deliberated intercontinental defense concepts, friendly and unfriendly striking power, and potential US intelligence means.<sup>19</sup> After studying the nation’s most closely guarded secrets and talking to technology leaders including Lockheed’s aeronautical engineering wizard Kelly Johnson, what they envisioned was an aircraft capable of unusual altitude. Unfortunately, such an aircraft would not fly until after the US worst case fears were realized.

By most knowledgeable accounts, Sputnik was in fact “a technological Pearl Harbour”<sup>20</sup>. Dr. Edward Teller, revered father of the hydrogen bomb, referred to Sputnik as a greater defeat for the United States than Pearl Harbour.<sup>21</sup> The booster that lofted the artificial satellite into

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<sup>16</sup> Ibid. Page 73.

<sup>17</sup> Ibid. Page 76.

<sup>18</sup> Ibid. Page 77.

<sup>19</sup> Ibid. Page 77.

<sup>20</sup> Walter A. McDougall. *The Heavens and the Earth: A Political History of the Space Age*, The Johns Hopkins University Press: Baltimore. 1997. Page XIV.

<sup>21</sup> Stephen E. Ambrose. *Eisenhower: Soldier and President*. Touchstone Books: New York. 1990. Page 452.

orbit could just as easily carry a nuclear warhead. There was no way to know the weapon was on its way in a manner timely enough to intercede in any meaningful way. An Intercontinental Ballistic Missile, or ICBM, struck without advance indications and warning. Thus the benign satellite was almost superfluous to the booster's significance. Either way, the launch had a terrifying effect in the West. The nation had once again been caught unaware and totally helpless. It was the hysteria of December 7<sup>th</sup> again.

### Reason Two—Soviet Fear of Invasion

On the other side of the planet the Soviets emerged, barely standing, from the struggle of World War II. Nazi occupation destroyed 100,000 of its farms, 70,000 of its hamlets, and 1,710 of its towns, destroying nearly one-third of Soviet pre-war wealth. "32,000 factories were in ruin, 65,000 kilometers of railway track were ...useless".<sup>22</sup> The Soviets had suffered at the hands of the Nazi invaders. But, in Stalin's view, they had also suffered at the hands of their allies. Churchill and Roosevelt conspired to allow the carnage to almost swallow the Soviets. Ever mindful of the fact that, to his view, his nation had been left to her own devices against the German onslaught, "Stalin had one foreign policy objective that overrode everything else: to build a buffer zone along his country's western border".<sup>23</sup> Stalin felt it his prime responsibility to ensure Russia would never be invaded from Europe again. The Soviet Union had learned the bitter lessons of three brutal occupations in the last century and a half.<sup>24</sup> They fully understood "the wartime era of collaboration against a common enemy was over".<sup>25</sup>

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<sup>22</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 23.

<sup>23</sup> Ibid. Page 26.

<sup>24</sup> Ibid. Page 26.

<sup>25</sup> Ibid. Page 19.

World War II, called the Great Patriotic War by Russian survivors, had left the Soviet Union completely ravaged. With over 20 million dead, an economy in ruins, and cities reduce to rubble, the Soviets had only begun rebuilding. After suffering centuries of invasion, the Germans twice in the last thirty years, the Russians had barely survived by trading vast expanses of land and prodigious amounts of her young men for time—waiting for the bitter Russian winter to turn back the invaders Russia’s armies could not.<sup>26</sup> Instead, the Soviets turned to other means.

To realize his boyhood dream of spaceflight, Sergei Pavlovich Korolev, the enigmatic Chief Designer and mastermind of the Soviet space effort, had sold his soul to the Soviet Union. In return for increasingly dramatic stunts and propaganda triumphs of Soviet technological superiority in space, the Soviet Premier Khrushchev agreed to fund Korolev’s effort. The money came from a national inferiority complex, fear of the rest of the world perceiving the Soviet Union as weak. If, the Kremlin thought, the Western powers viewed the Soviets as weak they might invade with hordes of tanks and blizzards of planes. The West might even use The Bomb.

To forestall invasion, the Soviets could not, under any circumstances, appear weak. They must appear as strong, and preferably stronger, than any potential enemy. The Kremlin must demonstrate their strength in world politics and military might. The consequences of failure might result in another nightmarish struggle for national survival. Sputnik offered the Russians a chance to bury their reputation as inferior and backward and replace it with a façade of dangerous strength.

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<sup>26</sup> Ibid. Page 26. Estimates vary. Some sources put the number of war casualties closer to 30 million. It is worth noting that Stalin, in the aftermath of “The Great Patriotic War” (the Kremlin’s name for World War II) purged perhaps as many as 40 million more. We’ll never know the true numbers.

With this context in mind it is also of note that Stalin’s foreign policy objective of building a buffer zone ensured, Stalin hoped, that Russia would never be invaded from Europe again. As the Red Army liberated territories, Stalin installed pro-Soviet regimes to ensure control of his buffer. Propping up these satellite countries drew more money

Soviet thinking followed that a nation perceived as weaker than it is gains advantage only if it can surprise an aggressor in a spectacularly orchestrated battle. If, on the other hand, a nation is viewed by its opponents as stronger than it really is, then the enemy's misconception can be exploited with a diplomacy of intimidation.<sup>27</sup> Korolev's Sputnik afforded Khrushchev a missile bluff. As long as the West perceived the USSR as technologically superior by virtue of its mighty boosters, the Russians had only to perpetrate the myth with technologic stunts, engineered by their Chief Designer, maintain ironclad secrecy of the numerous failures while publishing her spectacular successes, and intimidate outrageously.

The Kremlin was all-too-aware of Soviet fragility. They embarked on programs to rebuild their shattered economy. With the sheer weight of national effort and vast natural resources, the Soviets set about to display their military superiority through the related disciplines of science and technology. The Russians intended to show the supremacy of their ideology through technological superiority, drawing currently noncommittal nations under their political canvas. Referred to as satellites, these nations were not just political bedmates. They served as the priceless land buffer between the motherland and potential European invaders, adding to the amount of land the Soviets could trade for the time history showed they would so desperately need in the event of another invasion. Controlled by Soviet iron will, these countries, locked behind an iron curtain, represented a national life insurance policy. They were viewed as the West as a bid for world domination and Sputnik accentuated the superiority of Soviet technology

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from that which might have gone to feeding the Soviet people and contributed to the eventual bankruptcy of the Soviet economy.

### Reason Three—Fear of Soviet Superiority

At 1:28 on October 4th, 1957, a Soviet booster lifted off from the steppes of Kazakhstan, spitting fire and hammering the night with its thunder. Automatically throttling back its engines to coast through “Max Q”, or the point of maximum dynamic pressure, the booster accelerated again. After burning the last of its hypergolic liquid propellant and oxidizer the second stage fell away, triggering separation of the protective fairing, and revealing a 184 pound, 22 inch aluminum sphere to the near-vacuum of space. Called Sputnik, or “Fellow Traveler”, the polished aluminum globe continued on its orbit into history. The sphere emitted a beep-beeping noise from its radio transmitter that told anyone operating a ham radio within the line of sight of the vehicle that the spacecraft was not only overhead, but also collecting intelligence.<sup>28</sup> While the spacecraft flying overhead was disconcerting, the booster that delivered it there was the terrifying thing.

In contrast to America’s fear of losing their technological edge, launching Sputnik was the Soviet attempt to maintain their perceived advantage. It was of no consequence whether the lead was real or manufactured, as long as the West believed it. If the unimaginable happened, Soviet thinking went, the West would again march to the gates Moscow. This thinking went as far back as Lenin, when he observed shortly after the revolution in 1919,

*“The war taught us much, not only that people suffered, but especially the fact that those who have the best technology, organization, and discipline, and the best machines emerge on top... It is necessary to master the highest technology or be crushed.”<sup>29</sup>*

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<sup>27</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 252.

<sup>28</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 155.

<sup>29</sup> V. I. Lenin, *Polnoe Sobranie Sochinemi*, 5<sup>th</sup> ed. Moscow. 1958-1965. Vol. 26. Page 116.



In 1931, Stalin observed, “In the period of reconstruction technology decides everything”.<sup>30</sup>

Like the Americans, the Soviets vowed “Never again”, and were determined to avoid the devastation of occupation at whatever cost.<sup>31</sup>

After Stalin purged the intellectual elite and military officer corps of Soviet society in 1939 and 1940, junior Soviet military planners, thrust into positions for which they were not properly seasoned, were charged by Stalin to dull the chances of invasion. They improperly placed too much prominence on Giulio Douhet’s supposition of massed bombardment.<sup>32</sup> Massed bombardment counted on the fact that the bombers get through opposition to reach their targets. Soviet planners understood the reality that all bombers might not get through, so the ones that did succeed in striking their targets would have to deliver the greatest possible payload. Stalin, still skeptical and distrustful of those officers that survived the purges, also understood this reality. In fact, he shrewdly counted on the deterrent value of it.

“A single demand of you, comrades,” said Stalin in one of his famed impassioned addresses, “Provide us with atomic weapons in the shortest possible time. You know that Hiroshima has shaken the whole world”, he continued, “The equilibrium has been destroyed. Provide the bomb. It will remove a great danger [of invasion] from us.”<sup>33</sup> The combined threat of Soviet bombers and ICBMs was vital to Soviet national survival.<sup>34</sup> The advent of the American monopoly on nuclear weapons offset the Soviet conventional advantage.<sup>35</sup>

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<sup>30</sup> Ibid. Page 116.

<sup>31</sup> Walter MacDugall., *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. Page 49.

<sup>32</sup> Alfred von Kesselring, *A Soldier’s Report*. New York. 1954. Page 90.

<sup>33</sup> Quoted by A. Lavrent’yeva in *Stroiteli novogo mira, V mire Knig*, 1970, number 9, page 4. Cited by Walter MacDugall., *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. Page 49.

<sup>34</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 49.

<sup>35</sup> Ibid. Page 49.

The US atomic potential meant that Western forces could march into Moscow with impunity. This threat forced the Soviet Union to cover their liability with imposing numbers. The official size of the Red Army in Eastern Europe was greatly exaggerated. In the late 1940s there were approximately 175 Russian divisions under arms. Their true war footing was exaggerated. Most were merely “paper units”, existing only administratively.<sup>36</sup> While the deceptive numbers of the Soviet army prevented a land invasion, the Red Army’s main utility was to conceal Soviet technological disadvantage, buying the Kremlin time to bring the country’s scientific resources up to parity. The Soviets instituted crash research and development programs in atomic, aviation, and rocket technologies, and thereby tacitly “announced its estimate of the dangers of the postwar world”.<sup>37</sup> Nuclear weaponry was essential to Soviet security.

The fact that they were able to run this race, even on an illusory basis, made the Soviets more confident in the superiority of their ideology. Soviet confidence inspired undecided countries’ confidence in them, adding to the Soviet’s sphere of influence, and thus both the land buffer available to the Soviet Premier and the threat perceived by the West. To win would have demonstrated to the rest of the world Soviet superiority, but to enter the race was both self-verifying and a deterrent to the West. Khrushchev personally identified with this strategy.<sup>38</sup>

The threat to Western security cannot be overstated. The launch of Sputnik in October 1957 and Gagarin in April 1961 shattered both premises. “Not only did the USSR herald its imminent strategic parity through intercontinental ballistic missiles”, but the technologic threat of a booster inequality and a manned Soviet mission in space “suggested to a half-informed

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<sup>36</sup> Thomas W. Wolfe. *Soviet Power and Europe*. Baltimore. 1970. Pages 38-40.

<sup>37</sup> Thomas W. Wolfe. *Soviet Power and Europe*. Baltimore. 1970. Pages 38-40.

world that America ...was anachronistic in an age of explosive technological advance”.<sup>39</sup> The politically embarrassed US pledged to do whatever was required to catch up, regardless of the sacrifice required. “For the first time since 1814 the American homeland lay under direct foreign threat; its citizens felt that constant fear and pressure”.<sup>40</sup> The USSR, western intelligence services mistakenly estimated, could now launch unprecedented mass destruction to the US soil. Of even greater significance was American inability to counter with a commensurate achievement in anything resembling the near term.<sup>41</sup> The western press asked hard questions of their leaders. Didn’t it make sense that a society capable of such tremendous achievement was intrinsically superior? “If the Soviet space triumphs that followed in frustrating succession seemed to show that communism was the best path toward rapid modernization”, the press lamented, “how credible was the appeal of liberal democracy to ...underdeveloped nations”?<sup>42</sup> In the race to choose up sides, the West was recruiting from the far weaker position.

#### Reason Four—The Natural Evolution of Weapons of Mass Destruction

There was tremendous tension between the US and Soviet Union long before Sputnik. In the months following World War II the shaky alliance between the Western powers, led by the United States, and those of the East, headed by the Soviet Union, shaped world politics. The Berlin Blockade in 1948 and explosion of the Soviet A-bomb in 1949 highlighted the call for information on Soviet Union capabilities. CIA and British Secret Intelligence Service were so desperate for information that might forestall another Pearl Harbour scenario they parachuted

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<sup>38</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. Page 59.

<sup>39</sup> Ibid, Page 7.

<sup>40</sup> Ibid, Page 7.

<sup>41</sup> Ibid, Page 7.

agents into the USSR, and clandestinely supported resistance groups in satellite countries to gather intelligence on Soviet readiness for war. All attempts at on-the-ground infiltration failed miserably. Agents were captured almost as soon as they hit the ground and were never heard from again.<sup>43</sup>

Despite the obvious risks, strategic thinkers and war planners were frantic to know the disposition of Soviet nuclear forces, particularly the Soviet ICBM program. Lacking such information Western planners would have to spend potentially ruinous amounts of capital preparing their nations for every eventuality. Eisenhower's obsession with balancing the US budget depended on knowing precisely what the Soviets had up their sleeve. If he knew what the enemy was doing he knew how to spend resources countering Soviet belligerence. How, Eisenhower wondered, could the West penetrate the secrecy the Soviets saw as their key to survival? Strategic thinkers determined that the information could only be gathered from above.<sup>44</sup> Barriers to gathering overhead intelligence was not technical, as extremely long range, high-altitude aircraft were already on the drawing boards.<sup>45</sup> The obstacles were more political, more precisely, legal in nature.

The rise of air power in World War I necessitated negotiation of international air navigation treaties and outlines one basic tenet; each state reserved the right to defend its "exclusive sovereignty in the airspace above its territory and territorial waters";

*"...Every power has complete and exclusive sovereignty over the air space above its territory. For the purpose of the present convention the territory of a State shall be*

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<sup>42</sup> Ibid, Page 7.

<sup>43</sup> Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novato, CA. 1995. Page 18.

<sup>44</sup> Ibid. Page 18.

<sup>45</sup> Robert A. McDonald. *Corona, Between the Sun & the Earth; The First NRO Reconnaissance Eye in Space*. American Society for Photogrammetry and Remote Sensing: Bethesda, MD. 1997. Page 30.

*understood as including the national territory, both that of the mother country and the colonies, and the territorial waters adjacent therein”,<sup>46</sup>*

indicating that the “welfare and safety of each nation was no greater than its command of the air overhead”.<sup>47</sup> This posed a problem. If caught flying through another nation’s airspace, the offended nation could defend that airspace, peacetime or war, to the point of shooting down the recalcitrant aircraft. Compounding the loss of hardware and pilot came the diplomatic embarrassment of being caught spying on one’s neighbors in peacetime. Far from precluding the Western nations from conducting clandestine and intrusive air operations against the Soviet Union, they went to extraordinary lengths not to get caught. The trick was to fly higher or faster than interceptors, or fast enough not to be acquired and tracked on radar.

Initially, capitalizing on their special relationship with the United States, the British used Havilland Mosquito PR-34s to overfly Soviet airspace and image both the Murmansk and Archangel port facilities in hopes of counting the Soviet Navy’s order of battle. These stripped down bombers reached 43,000 feet, barely out of range of Soviet interceptors. Unfortunately, the MiG-15, introduced in 1949, made these flights perilous, and they were discontinued.

In late 1950 President Truman, desperate for intelligence on Soviet disposition, approved a plan to photograph port facilities used by the Soviet navy using stripped down RB-36D Peacemakers, capable of reaching 58,000 feet, and the RAF-painted RB-45C Tornado jet bombers, which relied on pure speed in outrunning the MiG-15.<sup>48</sup> Replacing US markings with

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<sup>46</sup> Article 1 in the First International Convention, 1919. As cited in Robert A. McDonald. *Corona, Between the Sun & the Earth; The First NRO Reconnaissance Eye in Space*. American Society for Photogrammetry and Remote Sensing: Bethesda, MD. 1997. Page 30.

<sup>47</sup> Robert A. McDonald. *Corona, Between the Sun & the Earth; The First NRO Reconnaissance Eye in Space*. American Society for Photogrammetry and Remote Sensing: Bethesda, MD. 1997. Page 30.

<sup>48</sup> Curtis Peebles. *The Moby Dick Project*. Washington, DC: Smithsonian Institutional Press. 1991. Pages 99-100, 119-120.

RAF roundels would allow the US to disavow any knowledge of the RB-45Cs if the Soviets downed one. The RAF would explain that they had no such plane in service.<sup>49</sup>

Swift RB-47 Stratojet medium jet bombers replaced the Peacemakers and Tornados in 1953. The overflights were quick operations—dash in, cover the target expeditiously, and dart back out before the MiGs scrambled to intercept. Soviet protest was countered by claiming a training flight or weather mission had strayed off course. These flights couldn't penetrate far enough into Soviet airspace to gather more than a peripheral look into the Soviet industrial and military capabilities required by SAC planners. In the Urals, far beyond the limited range of these overflights, "whole cities had been built that no Westerner had ever seen".<sup>50</sup>

For this reason alone, these brief overflights were not the strategic answer. What was needed was a revolutionary technology that had both the range to reach otherwise inaccessible targets and was impervious to MiGs.

Enter the Aquatone. A new generation of jet engines matched with computer-designed super-efficient wings would have a maximum operating altitude beyond the reach of the front-line MiGs. Aeronautical engineers at Wright Patterson AFB envisioned a revolutionary aircraft with an operating ceiling of 70,000 feet and at least 3,000 miles of range. Far above the reach of the MiGs, this aircraft would operate out of the range of manned interceptors and would therefore not need to outrun them. The Aquatone would need to carry at least 700 pounds of high-resolution photography equipment in the "Q-bay" behind the pilot.<sup>51</sup> Invulnerable to

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<sup>49</sup> Curtis Peebles. *Shadow Flights: America's Secret Air War against the Soviet Union*. Presidio Press: Navato, CA. 2000. Page 25.

<sup>50</sup> Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novatno, CA. 1995. Page 19. These flights would be known as "keyhole" flights for the shape of the flightpath. The aircraft would sprint in straight, turn 180 degrees, and dart out along the entrance route. The name would reappear as the Keyhole generation of overhead reconnaissance satellites.

<sup>51</sup> *Ibid.* Page 19.

manned interceptors, the vehicle would be vulnerable only to surface to air missiles (SAMs). The thinking went that if Aquatone flew above the operating capability of Soviet radar nets it would not be seen. Not seen, the logic continued, means no fighter intercept or danger from SAMs, and more importantly, no incriminating evidence and therefore no diplomatic protests. With any luck at all the Soviets would never be aware of the flight.

Hearing about the proposal request for a high-altitude aircraft, Kelly Johnson, the engineering wizard behind Lockheed Martin's venerable "Skunk Works" secret engineering team, submitted an unsolicited entry. The US Air Force promptly rejected it on grounds that Johnson's proposed J73 engine was unsuitable and the proposed fuselage could not easily accommodate the preferred J57 engine. Undaunted, Johnson shopped his idea elsewhere.<sup>52</sup>

The CIA's assessment was that Johnson's innovative design was exactly what the fledgling agency was looking for. Johnson's aircraft advertised a ceiling of 73,000 feet over the target, well above Soviet SAMs.<sup>53</sup> The plane, which started life as CL-282, became known as the U2. President Eisenhower, however, remained unenthusiastic. He did not wish to provoke his Soviet counterpart. The irony is thick here, because he did not want to overfly and therefore provoke because he could not predict the response. He could have predicted the response if he had a better idea of Soviet capability. There was no way, unfortunately, to ascertain Soviet capability without the overflights. Eisenhower must have been greatly frustrated.

President Eisenhower addressed to the Science Advisory Committee of the Office of Defense Mobilization in March 1954, "Modern weapons had made it easier for a hostile nation with a closed society" as the Russians had, "to plan an attack in secrecy and thus gain an

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<sup>52</sup> Ibid. Page 21.

<sup>53</sup> Ibid. Page 19.

advantage denied to the nation with an open society” as the US and other Western democracies demanded.<sup>54</sup> The fear of surprise attack fuelled a defense spending frenzy. Eisenhower, aware of Soviet World War II capabilities, intuitively suspected that the Soviets were not able to build such an alarming arsenal so quickly after the destruction of their industrial complex suffered at the hands of the Nazis. Eisenhower felt that such fears were at best irresponsible and, at worst, an inherent danger to the US economy. Knowing what the Soviets had, and ultimately where to invest to counter their capabilities, could save the US not just the billions spent in speculation but an exponential growth in spending as technology evolved and the possibilities of Soviet capabilities increased.<sup>55</sup>

As the Cold War progressed, US policymakers redefined strategic reconnaissance. “With the advent of atomic weapons”, CIA historians write, “a few young officers and civilian scientists and engineers... began to think of it in quite different terms, as an intelligence tool that could be applied to provide advance warning of a surprise attack”.<sup>56</sup> Termed “pre-hostilities reconnaissance”, this strategy called for reliable intelligence about every aspect of the adversary relating to their preparedness for war. Looking for tip-offs, the strategy called for “periodic, high-altitude overflight in peacetime”, and it proved so successful that national leaders quickly made it national policy and therefore national priority.<sup>57</sup> At the behest of two consecutive presidents, the technical means would be invented and resources would be allocated to determine

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<sup>54</sup> Ibid. Page 21. Also see Robert A. McDonald. *Corona, Between the Sun & the Earth; The First NRO Reconnaissance Eye in Space*. American Society for Photogrammetry and Remote Sensing: Bethesda MD. 1997. Chapter entitled “*Post War Strategic Reconnaissance and the Genesis of Project Corona*”, page 25 to 60.

<sup>55</sup> Ibid. Page 25. For more details see Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Chapters 3 to 17.

<sup>56</sup> Ibid. Page 25. The first to articulate this strategy was LT Col. Richard Leghorn. He graduated from MIT with a BS degree in physics where he met James Killian, who would be have a major influence in formulating Eisenhower’s Cold War strategies. After graduation, Leghorn worked at Eastman Kodak, a company that would design both film and optics that served as the payload in the U2’s “Q-bay”, and in generations of reconnaissance satellites.

<sup>57</sup> Ibid. Page 25.



just what potential adversaries were up to. Called ‘indications and warning’ intelligence, it initially took the form of peacetime aircraft overflights. Then, singular-purpose high-flying reconnaissance aircraft and even balloons flew over adversaries, to limited effectiveness. Then, by 1960, this eventually evolved into higher-flying, self-directed satellites capable of greater intelligence collection, operating autonomously above the reach of enemy missiles.<sup>58</sup> The need for insider knowledge was about to move from important to critical.

“On the desolate steppe of northeast Kazakhstan it was drizzling at dawn on 29 August 1949, as it had been through the night.” At Semipalatinsk-21, a remote laboratory tucked away in the isolation of the desert, a team of Soviet scientists had worked through the night performing last minute circuit checks. The weather lightened, and the dawn cleared considerably. “At exactly 7:00AM a white fireball engulfed the hundred-foot tower built to support the bomb.” The fireball changed colors as it careered up into the atmosphere, heaving debris upwards into the ominous mushroom cloud that was the signature of that type of explosion. Everyone in the command bunker there was euphoric. They telephoned Stalin, waking him, and, revealing the efficiency of his internal espionage net, he responded to the news unemotionally, stating, “I know already”. The Soviets code-named their A-Bomb trial ‘First Lightning’.<sup>59</sup>

Five days later a US Air Force B-29 on a weather mission in the North Pacific, tested an air sample and found radioactivity 300 percent higher than expected. American scientists found unmistakable evidence of a bomb detonation with plutonium core with a natural uranium tamper.

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<sup>58</sup> Ibid. Page 25.

<sup>59</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 145-146.

Initially the US reaction was skepticism, then dismay, and then dread.<sup>60</sup> The Soviets had caught up and were now able to hold targets in the United States at risk.

To keep up with the Soviet development of nuclear weapons, the United States needed ever more precise information about Soviet strength.<sup>61</sup> In 1956, SAC Commander General Curtis LeMay stated that “Today, shooting wars are won or lost before they start. If they are fought at all, they will be fought principally to confirm which side has won at the outset”.<sup>62</sup> LeMay’s theorem was that a pre-emptive strike was the only way to stop the Soviets from reaching parity. He went so far as to suggest that the nation would best be served by precipitating the next war before the Soviet Union had the chance to catch up technologically. He viewed reconnaissance flights as necessary only for his planners to assemble proper targeting folders for Lemay’s bomber crews, and as potentially valuable if shot down. Provoking a Soviet retaliation to overflight would be a satisfactory reason for initiating a third world war.<sup>63</sup> It is interesting to note that LeMay’s military opinion was widely respected, and is reflective of the peril seen in the situation by the United States.

As a hedge against invasion, the Soviets, aware of the peril from their perspective, continued to increase their atomic ability in both numbers and capabilities. In rapid succession they tested Joe-2 and Joe-3. According to US Air Force weather flights and seismic data, Joe-2 was an improved implosion bomb with half the weight and twice the yield of similar US weapons, and Joe-3 was a more efficient design. These weapons, detonated on 24 September and 18 October respectively, were therefore not just test weapons, but operational in conception.

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<sup>60</sup> Ibid. Page 145-146.

<sup>61</sup> Ibid. Page 154.

<sup>62</sup> Ibid. Page 151.

<sup>63</sup> Ibid. Page 151.

Joe-3, the evidence suggested, was dropped from a Tu-4 bomber.<sup>64</sup> Based on extrapolations of Soviet industrial capacity, CIA estimates “projected the Soviet stockpile to be forty-five atomic bombs in mid-1951; the estimate for mid-1952 was a hundred weapons”.<sup>65</sup> These numbers suggested that the Soviets could inflict a “damaging blow” to the United States.<sup>66</sup> While the casualty estimates of up to a million killed and most cities partially destroyed were alarming, the reduction or delay of US counterattack was chilling.<sup>67</sup>

Of greater concern to US wartime planners was Soviet ability to deliver those weapons to continental US targets. The CIA estimated that the Soviets built as many as seven hundred Tu-4 bombers, codenamed “Bull” by NATO, which were actually reverse-engineered US B-29s which had landed on Soviet airfields after suffering battle damage in the skies over Japan during World War II. As the estimated number of Tu-4s increased, so did the number of nuclear weapons that could be delivered to US cities.<sup>68</sup> Chukotski Peninsula-based Tu-4s could reach targets in an arc from San Diego to Lake Superior; Kola Peninsula-based Bulls could reach an arc from Charlotte, North Carolina, to Portland, Oregon; and Tu-4s based in the Baltic could strike targets in an arc from Charlestown, South Carolina, to Bismark, North Dakota. Plotting these arcs on a map reveals the Soviets held virtually all-important military-industrial targets at risk. According to Gen LeMay, “The threat of a Soviet Attack on the United States [had] now become an operational reality.”<sup>69</sup> LeMay advocated “the US employ pre-hostilities strategic overflight

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<sup>64</sup> Curtis Peebles. *Shadow Flights: America's Secret Air War against the Soviet Union*. Presidio Press: Navato, CA. 2000. Page 28.

<sup>65</sup> Ibid. Page 27.

<sup>66</sup> Ibid. Page 27.

<sup>67</sup> Ibid. Page 27.

<sup>68</sup> Ibid. Page 26.

<sup>69</sup> Gen Curtis E. LeMay, *Letter to Gen Hoyt Vandenberg, Air Force Chief of Staff, 12 December, 1949*. As reprinted in Peter J. Roman, “Curtis LeMay and the Origins of NATO Atomic Targeting”. *Journal of Strategic Studies*. 1993. 16: 49.

reconnaissance to detect Soviet preparation for a surprise attack and adopt a preemptive war policy”.<sup>70</sup> This counter-strategy required extensive penetrating overflight.<sup>71</sup>

After numerous presentations to Congressional committees by an assortment of military leaders, government concluded that the US military was woefully underprepared and needed massive increases in defence spending. The intention of this tact was a thinly disguised plea for more funding for the development of systems to counter the perceived Soviet threat. The military assumed a worst-case scenario and published commensurate data, since they had little evidence to the contrary. The bottom line conclusion appeared incontrovertible, Soviet long-range bombers threatened North America.

While difficult to counteract, bombers could be tracked and shot down. Not all the bombers would get through. Augmenting this line of thought was the CIA estimate that the readiness and ability of the average Tu-4 bomber crew was far below that of their US Air Force counterpart.<sup>72</sup> As Western detection, tracking, and interception nets improved in the early 1950s to meet the Soviet bomber threat, “the race was on to develop a vehicle that would transport a bomb to an enemy target in the fastest possible time.”<sup>73</sup> At the secret rocket base in Kazakhstan, called Baikonur, Soviet engineers refined a project they referred to as “the mechanism”, a guided missile capable of delivering hydrogen warheads at speeds making tracking and interception virtually impossible. “On 15 May, 1957 Soviet scientists successfully

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<sup>70</sup> Gen Curtis E. LeMay, *Letter to Gen Hoyt Vandenberg, Air Force Chief of Staff, 12 December, 1949*. As reprinted in Peter J. Roman, “Curtis LeMay and the Origins of NATO Atomic Targeting”. *Journal of Strategic Studies*. 1993. 16: 49.

<sup>71</sup> Curtis Peebles. *Shadow Flights: America's Secret Air War against the Soviet Union*. Presidio Press: Navato, CA. 2000. Pages 29-30.

<sup>72</sup> *Ibid.* Page 29.

<sup>73</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Pages 154-155.

tested the world's first-ever intercontinental ballistic missile [ICBM].”<sup>74</sup> Now the Soviets had both the destruction capability and means of delivery. The picture could not have been bleaker for the West.

After the Soviets tested atomic weaponry, the United States responded by greatly expanding defense spending to include development of the more devastating hydrogen weapons. The Soviets answered by doubling the Red Army to 5.8 million men by 1955 and researching hydrogen bombs as well. “In August 1953 they [the Soviets] exploded the first thermonuclear device and tested a deliverable H-bomb in November 1955.”<sup>75</sup> The Americans followed in short order. Make no mistake, there was an “H-bomb race”, just like there would soon be a missile race thinly disguised as the Space Race.<sup>76</sup> A bleak picture became bleaker still.

In the hysteria that followed, Eisenhower refused to panic. According to his intelligence experts the missile gap was overstated. U2 photographs showed Soviet efforts at rebuilding their shattered military industrial complex instead of turning out missiles “like sausages”, as Khrushchev threatened. “Eisenhower knew that his country had many more nuclear warheads than the Russians. He also knew there was no bomber gap.”<sup>77</sup> Eisenhower, who felt that balancing the budget would ensure US national security more assuredly than military buildup, knew that increases in defense spending to cover a fictitious bomber gap and a fabricated missile gap were unnecessary and potentially dangerous to national well-being.<sup>78</sup>

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<sup>74</sup> Ibid. Page 154-155.

<sup>75</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 52.

<sup>76</sup> Ibid. Page 52.

<sup>77</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 157.

<sup>78</sup> Ibid. Page 157.

In contrast, the clandestine U2 overflights provided Eisenhower a confidence he could not disclose without compromising the source of his knowledge. The historical irony would plague him as critics would deride the president as out of touch and unresponsive to Soviet aggression. “Ike knew that massive increases in defence spending and new missile programs were not necessary, but he chose not to reveal why”.<sup>79</sup> Instead he chose to take the heat and “kept his mouth shut”.<sup>80</sup> While wise diplomatically, even in his own estimation Ike failed to comprehend the level of national hysteria.<sup>81</sup> “Most surprising of all,” wrote Eisenhower, “was the intensity of the public concerns”.<sup>82</sup> Eisenhower’s confidence, based as it was on undisclosed fact, did little to alleviate the national panic. It did little to endear him to the military establishment either.

Wary of the armed services participating in the collection of intelligence, Eisenhower offset the military’s influence with civilian-led agencies such as the CIA, the National Reconnaissance Office (NRO), and the National Security Agency (NSA). . He feared the services might be predisposed to match their intelligence estimates to proposed weapons shopping lists—offering counter-threats for potential Soviet capabilities more perceived than real.<sup>83</sup> The Soviet threat was real enough without exaggeration.

The Soviets accelerated development of an ICBM using their innovative liquid-fuel engines. Eisenhower’s Secretary of State John Foster Dulles, brother of CIA chief Allen Dulles, warned that “we would go to the brink of war to combat Communist expansion, coining the term

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<sup>79</sup> Ibid. Page 157.

<sup>80</sup> Ibid. Page 157.

<sup>81</sup> Stephen E. Ambrose. *Eisenhower: Soldier and President*. Touchstone Books: New York. 1990. Page 449.

<sup>82</sup> Ibid. Page 449.

<sup>83</sup> William E. Burrows. *Deep Black*. Random House: New York. 1988. Page 70.

“brinkmanship” for his eye-to-eye confrontation technique”.<sup>84</sup> Dulles was fully aware of Russians’ apparent conventional superiority, noting: “they out-divisioned us by a factor of ten, out-tanked us by a factor of eight, out-airplaned us by a factor of four”.<sup>85</sup> Undaunted by these numbers, Dulles balanced his country’s nuclear superiority against Russian conventional strength with the menace of massive and decisive nuclear retaliation. Brinkmanship, defined as “going to the verge of war without actually getting into war is the necessary art”, was only viable if one had a clear understanding of the enemy.<sup>86</sup> This was a difficult proposition in the face of uncertain intelligence and the frenzy that followed.

The CIA and Joint Chiefs erroneously warned the president that Russia might be preparing a preemptive nuclear first-strike. The evidence was “fragmentary but unsettling”.<sup>87</sup> During the 1954 May Day parade in Moscow’s Red Square, just weeks before Eisenhower and Khrushchev met in Geneva for a summit conference, US military attaches glimpsed a “chilling peek” at the mighty Russian nuclear arsenal.<sup>88</sup> Six new long-range ICBMs on portable launchers paraded past Khrushchev’s reviewing stand, while wings of the latest long-range Bison bombers passed in close formation, numbering several hundred.<sup>89</sup>

It was not until the first U2 flights revealed the Soviet’s true capability and forced a reassessment of this count. Twenty or so Russian bombers, representing every plane that could get into the air that day, had orbited the Kremlin to be counted each time they passed the reviewing stand in a counterfeit show of force. Intelligence professionals had been taken in by an elaborate premeditated deception. Khrushchev’s bluff succeeded in duping both the US and

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<sup>84</sup> Ben Rich & Leo Janos. *Skunk Works: A Personal Memoir of My Years at Lockheed*. Little, Brown, and Company: Boston. 1994. Page 121

<sup>85</sup> Ibid. Page 121

<sup>86</sup> Ibid. Page 121

<sup>87</sup> Ibid. Page 122

<sup>88</sup> Ibid. Page 122

Muscovites that the Soviets had more long-range bombers than they really did.<sup>90</sup> Order of battle discrepancies only exacerbated US war planner's troubles.

The fact was Western strategic planners simply didn't have enough information on precise locations of industrial or military aim points to draft strategic targeting plans. A "massive amount of photomapping and technical intelligence was needed to provide the Strategic Air Command with up to date comprehensive targeting plan[s]."<sup>91</sup> The absence of real intelligence on the precise location and disposition of Soviet bases, industry, and how well they were defended forced the West into aggressive, potentially dangerous tactics. The U2 became a national priority.

Eisenhower appointed Dr. Land, a noted photography scientist, appointed head of Project 3 of the Technological Capabilities Panel. Eisenhower chartered the "Land Panel" to find ways of overcoming the lack of strategic intelligence on the Soviet Union. In a November 5, 1954 memo to CIA director Allen Dulles, Land explained that "No proposal or program that we have seen in intelligence planning can so quickly bring so much vital information at so little risk and at so little cost" as the U2 program.<sup>92</sup> Land portrayed the US as unable to "fulfill [their] responsibility for maintaining the peace if [they] are left in ignorance of Russian activities".<sup>93</sup>

Sensitive to the political realities of what amounted to spying on an ally in peacetime, Eisenhower was explicit in his intent for the program. The Air Force would support the program logistically, but civilian CIA pilots would fly the airplane. CIA photointerpreters, or "PIs",

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<sup>89</sup> William E. Burrows. *Deep Black*. Random House: New York. 1988. Page 64.

<sup>90</sup> Ibid. Page 65.

<sup>91</sup> Ben Rich & Leo Janos. *Skunk Works: A Personal Memoir of My Years at Lockheed*. Little, Brown, and Company: Boston. 1994. Page 122

<sup>92</sup> Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novato, CA. 1995. Page 22.

<sup>93</sup> Ibid. Page 22.



would spool thought the thousands of feet of high-definition film, peering through microscopes in search of Soviet facilities that might contribute to Soviet military whereabouts, noting new construction or unusual activity in hopes of spotting ‘tip-offs’ of Soviet provocation. The Agency ‘sheepdipped’ Air Force pilots to fly the U2 and Lockheed put them on the books and paid them out of a special Lockheed account of laundered CIA money so their paychecks would not be traceable to government funds. “The subterfuge was that the pilots were Lockheed employees involved in a government-contracted high-altitude weather and performance study.”<sup>94</sup> If the plane were to go down over enemy territory the pilot would not be military, and therefore not sanctioned by the United States government. The project was named “Aquatone”,<sup>95</sup> and it was entirely successful.

The U2’s success was in spite of the fact that Soviet radars tracked the U2 from the beginning and scrambled to find a way to down the intruder. This was contrary to AF or CIA mission planners’ belief and particularly irksome to the program leads who believed the Soviet radars could not track an aircraft above 70,000 feet. The US had given the Soviets air defense radars as part of their lend-lease apportionment during World War II. The Soviets re-engineered those sets, making improvements until they were more powerful than newer and more advanced American sets. The Soviets had leapfrogged American capability using outmoded sets and unsophisticated technological improvements.<sup>96</sup>

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<sup>94</sup> Ben Rich, & Leo Janos. *Skunk Works: A Personal Memoir of My Years at Lockheed*. Little, Brown, and Company: Boston. 1994. Page 120. Sheepdipping was a common practice of civilian companies hiring military pilots and other special skill sets after military discharge. This allowed the government to disavow any official involvement in clandestine activity while assuring control of the mission. The pilots maintained their paygrade and time in service, but were for all intents and purposes civilians.

<sup>95</sup> Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novato, CA. 1995. Pages 19 to 23.

<sup>96</sup> Curtis Peebles. *Shadow Flights: America’s Secret Air War against the Soviet Union*. Presidio Press: Navato, CA. 2000. Page 101.

While the Americans knew the Soviets had probably improved upon US World War II radar technology, the Americans had no idea the Soviets were as advanced as they were. In fact, Project Aquatone counted on the fact that Soviet radar nets were a derivative of the less-capable World War II American equipment, which could not track above 40,000 feet. Estimates were that the Soviets would take a year to two years to develop a radar net able to track the U2 with sufficient precision to direct fighters or protest diplomatically.<sup>97</sup>

From the beginning the Soviets found the U2 difficult to track, but nowhere near impossible. They could direct fighters to intercept, but their engines flamed out and the aircrafts stalled long before reaching the U2. Still, the Soviets were able to produce diplomatic protest notes outline in striking detail the times, altitude, and path of the overflights.<sup>98</sup> Denied by the US, these notes were nonetheless embarrassing politically. Diplomatic complaints are one thing, but the Soviets still were unable to produce substantive proof of airspace violation. Aquatone continued.

Finally, the situation changed on May 1, 1960, when an SA-2 (an advanced ground to air missile, or SAM) fired on a U2 flying at 72,000 feet approaching Sverdlovsk. The missile exploded behind the U2, damaging the right stabilizer and forcing the plane into a spin. Overstressed, the wings broke off and the airplane tumbled. The pilot escaped and parachuted safely, but was unable to activate the self-destruct mechanism. He was captured immediately after landing. Bits of the airplane rained down and the Soviets recovered the intact pieces, displaying the evidence in Moscow. Khrushchev embarrassed Eisenhower at the ensuing Paris Summit with a confession of spying by the captured pilot. Eisenhower was forced to admit he

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<sup>97</sup> Ibid. Page 101.

<sup>98</sup> Ibid. Page 101.

authorized the overflights, tantamount to authorizing peacetime spying on a then-ally. Promising no further overflights, Eisenhower shut the U2 program down.<sup>99</sup>

No one involved with the U2 program questioned that eventually the Soviets would shoot one down. Some calculated the useful length of service of the U2 might be less than a year and perhaps as long as two. The future of air-breathing reconnaissance was “captive of the atmosphere” and they would always be vulnerable to attack from the ground. The solution was simple; spy vehicles would have to go higher.<sup>100</sup>

Determined not to lose the only window into the Soviet military capability, the CIA had to find another method of overflight. The Soviets were able to reach the lofty heights of the U2 with missiles, but a study of “how a planes speed, altitude, and radar cross section affected its probability of being shot down” determined that a Mach 3 aircraft flying at 80,000 feet would be visible to Soviet air defenses for only twenty seconds, in contrast to ten minutes of warning for a U2. Once detected, the faster airplane would then be able to outrace any SA-2s fired at it.<sup>101</sup>

On July 20, 1959, Eisenhower approved development of what was to eventually become the A-12, called the Oxcart, and finally the SR-71, with in excess of Mach 3.2 speed and 97,000 foot maximum altitude.<sup>102</sup>

Still smarting after the embarrassments of the U2 shoot down, Eisenhower was reticent to allow the Oxcart full national priority. The SR-71 was, for all its unbelievable speed and unprecedented altitude, merely an upgrade to the U2 capabilities. How long until the Soviets

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<sup>99</sup> Ben Rich, & Leo Janos. *Skunk Works: A Personal Memoir of My Years at Lockheed*. Little, Brown, and Company: Boston. 1994. Page 159, and Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novato, CA. 1995. Page 45-46.

<sup>100</sup> William E. Burrows. *Deep Black*. Random House: New York. 1988. Page 78.

<sup>101</sup> Curtis Peebles. *Dark Eagles: A History of Top Secret US Aircraft Programs*. Presidio Press: Novato, CA. 1995. Page 51.

found the technology to intercept the Oxcart? What was needed was a way to fly higher and faster than an enemy's defenses could reach. The answer came in the form of satellites operating above the atmosphere and therefore above the range of air-breathing interceptors.

The extraordinary effort dedicated to knowing what the other fellow was doing was only part of the equation. The other half was fielding a credible counter-threat. To insulate the American economy and society while simultaneously avoiding building a garrison state, US war planners opted for a nuclear arsenal. The nuclear option was touted as a “cheap tool for deterrence”.<sup>103</sup> The Soviets atomic crash program spoiled the US nuclear monopoly on September 23, 1949 with the explosion of Little Joe. This demonstration of power brought the Soviet Union to the forefront as a technical and political rival. Budget cuts in the US military budget driven by a presidential obsession with balancing the federal budget, which precluded a balancing force in Europe, and an American reluctance to militarize intensified this conundrum. “After the race for the A-Bomb would come the race for the H-bomb, then the race for rockets, and after that—a race for space”.<sup>104</sup> Satellites were the only acceptable answer maintaining the precarious balance of power.

Satellites, according to a RAND report, could not be more relevant to national security. While they were not weapons in the conventional sense, they were ideal platforms for gathering information of the highest military value unavailable from any other source. Satellites were, actually, unconventional weapons of unprecedented utility. Winning the race to space would have profound political-psychological effect in the balance of power. According to the same

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<sup>102</sup> Ibid. Page 54. Performance given is from unclassified sources. The true performance of the SR-71 remains classified.

<sup>103</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 95-96.

<sup>104</sup> Ibid. Page 95-96

RAND report the political consequences of controlling the high ground make it imperative for the US to exploit the advantage of a public spaceflight program. “What the US government *says* about it [the space program] is just as important as what it does”.<sup>105</sup> A successful satellite launch would cause a spectacular shift in world perception, galvanizing friendly and neutral nations to American, or presumably Soviet, might.<sup>106</sup>

The problem, prognosticated RAND, would come when allies and opponents realized the significant advantage for clandestine reconnaissance the Americans would then have. The Soviets would, it could be safely assumed, perceive a satellite as an attack on their secrecy, spying, illegal, and therefore a threat to their security. They could not be expected to allow the West to peek behind the iron curtain of secrecy the Soviets had so carefully maintained to hide their vulnerability.<sup>107</sup> To the Soviets, removing their cloak of secrecy was tantamount to war, because once their insubstantiality was known Western invasion was, the Soviets feared, imminent.

Therefore, the Soviets had unequivocally challenged overflight of their airspace, quoting conventional international law. The debate became whether airspace had an upper limit. According to the 1944 Chicago Convention on Civil Aviation, national sovereignty of airspace was unchallenged, but the convention did allow innocent passage. Of course the Soviets did not recognize any limitation on its dominion, but if recognized international law contained a loophole through which a spacecraft might pass with impunity, the Soviets could not afford to go

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<sup>105</sup> Paul Kecskemeti. *The Satellite Rocket Vehicle: Political and Psychological Problems*,” RAND RM-567, 4 Oct. 1950, as cited in MacDugall, Walter, *The Heaven and Earth; A Political History of the Space Age* , Johns Hopkins Press: Baltimore. Page 108. Emphasis in MacDugall.

<sup>106</sup> Ibid.

<sup>107</sup> Paul Kecskemeti. *The Satellite Rocket Vehicle: Political and Psychological Problems*,” RAND RM-567, 4 Oct. 1950, pages 13 – 15, as cited in MacDugall, Walter. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore, MD. Page 109.

against it without incurring the scorn of the world court of conscience. Officially, the Soviet Union had to construe a satellite of any kind as a belligerent act.<sup>108</sup>

This bipolar political situation illustrates the central quandary of the Cold War. One society was open while the other depended on secrecy. Each viewed their world as a zero-sum gain and therefore a direct confrontation. US open society policies depended on reconnaissance to alleviate the anxiety of not knowing the capabilities and intentions of the other. Satellites offered a peaceful solution but it was vital to ascertain the legal right to use them.<sup>109</sup> The last thing US leaders wanted to do was provoke Soviet aggression, since the entire idea of reconnaissance was to prevent a conflict. Conversely, the Soviets had no need to orbit a reconnaissance satellite. They could easily find out most of what they needed to know about their adversary through open sources.<sup>110</sup>

“Truman came to rely on the atomic shield, because it was internationally impressive, domestically unobtrusive, and, above all, cheap”.<sup>111</sup> However, such a shield required extensive knowledge about Soviet indications and warning. Eisenhower, Truman’s successor, recognized the wisdom of an atomic shield and relied on it even more to provide low-cost security. To spend large amounts of national treasury on deterrence would destroy the private enterprises that built the considerable US wealth in the first place<sup>112</sup>. He knew that a nation’s economic well-being and its military might were inextricably linked. He also knew, and claimed anyone who read Lenin should also know that “the Communist objective is to make [the US] spend [themselves] into bankruptcy”.<sup>113</sup> If the Cold War could be kept cold, then the only way either

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<sup>108</sup> Ibid.

<sup>109</sup> Ibid. Page 110.

<sup>110</sup> Ibid. Page 110.

<sup>111</sup> Ibid. Page 112.

<sup>112</sup> Ibid. Page 177.

<sup>113</sup> Stephen E. Ambrose. *Eisenhower: Soldier and President*. Touchstone Books: New York. 1990. Page 484.

country would lose would be to spend itself into insolvency. Each must balance both its “essential military force” and a prosperous financial system against the capabilities of the other superpower. Such a balance would be easy to maintain if each fully understood the other’s abilities.<sup>114</sup>

Again, reconnaissance, specifically reconnaissance from above the atmosphere, became absolutely necessary to US national security. In fact, if the Americans had to balance conventional might against that of the Soviet Union the cost of deterrence would be a garrison state and unchecked military spending.<sup>115</sup> If the US had reliable intelligence of the Soviet Union then the balance of power, and therefore an uneasy peace, could be maintained interminably.

To base their intelligence estimates on hard facts, wrote Edwin Land:

*“We must find way to ...provide better strategic warning, to minimize surprise in the kind of attack, and to reduce the danger of gross overestimation of the threat. To this end, we recommend adoption of a vigorous program for the extensive use ...of the most advanced knowledge in science and technology.”<sup>116</sup>*

The scientist had cast the die of national policy. His thoughts would echo in the highest government and military circles. He wrote, “first and foremost, space was about spying, not because the United States was aggressive but because the USSR was secretive”.<sup>117</sup> The US was going to space as a matter of national security. The Space Race, and by proxy the First Space Age, would likewise be a matter of national security.

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<sup>114</sup> Ibid. Page 484.

<sup>115</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 115.

<sup>116</sup> James R. Killian, *Sputniks, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*. Cambridge, Mass: 1976. Pages. 70-75. Quote from p. 75. Italics in original. The report was commissioned in April 1954 and presented to the NSC on 14 Feb. 1955.

<sup>117</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 194.

Eisenhower then did a very clever thing. He made sure that the first US satellite would not be a military booster or a military satellite. The first US space vehicle would be unquestioningly civilian. In fact, Eisenhower took every precaution to reign in all US military space efforts. He sent inspectors to Werner Von Braun's launch site in Cape Canaveral in anticipation of Von Braun making an unauthorized launch of test re-entry vehicles into orbit first. Eisenhower wanted assurances that Von Braun removed the upper stage booster from his Redstone rocket so the payload would not "accidentally" reach orbit.<sup>118</sup> He knew Von Braun's ambitions and capabilities well.

Eisenhower also knew through CIA channels that the Soviets were racing toward a launch of their own. Eisenhower's aims were to find insight into Soviet military progress; manage the arms race without spending the country into insolvency or building a fortress state; and to gently propel the US into the Space Age. If allowing the Soviets to venture first into space accomplishing all three with the added benefit of legitimizing space overflight, then perhaps the concession of prestige would be worth it.<sup>119</sup> One wonders if Eisenhower regretted that decision, because he badly misjudged the hysteria a 184 pound sphere made of polished aluminum could manufacture.

"The public outcry after Sputnik was ear-splitting. No event since Pearl Harbour set off such repercussions in public life".<sup>120</sup> The space age had been opened, however, and the way was now clear for US reconnaissance satellite overflight. The Soviets could not complain of sovereignty since they had overflowed first.

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<sup>118</sup> Ibid. Page 123.

<sup>119</sup> Ibid. Page 124.

<sup>120</sup> Ibid. Page 142.



On one hand, the US had definitively lost the esteem of being first in space. On the other hand, Eisenhower ensured the US space program would be peaceful when he created the National Aeronautics and Space Administration (NASA), and charged the civilian organization with leadership of the US space effort. This allowed the US to negotiate from a nonmilitary point of view. It was a thin technicality but politically expedient in the long race ahead.

Eisenhower, continually bewildered by the histrionics generated by Sputnik, admitted he had erroneously anticipated its impact psychologically and politically. He warned against a making that mistake in other areas, particularly economical. The Meanwhile, Soviets had given up their doctrine of expansion by force for one of economic and political coercion.<sup>121</sup> Therefore, the US most potent advantage became its economic health. Of course, that health banked on knowing Soviet intention so that US policymakers could spend resources wisely. Eisenhower knew the value of space-based reconnaissance.

Meanwhile, the Soviet Union was crystal clear about the value they realized in space achievement: they intended to leverage Korolev's dramatic feats into support for their assertion of Soviet supremacy. Undecided nations could not help but be seduced by the preponderance of the evidence and the Soviet sphere of influence would expand without the use of force, expanding the Soviet land buffer without cost. The balance of power would shift yet again. Consequently, "prestige and perceptions were as important as actual military force".<sup>122</sup> The national strategy of the Space Race would henceforth be about prestige and perceptions.

CIA estimates, ironically based on the space-borne reconnaissance of Project Corona, conclusively spelled out that the goal of the Soviet space program was indeed manned flight

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<sup>121</sup> Ibid. Page 158.

<sup>122</sup> Ibid. Page 178.

based on discovery, military, and scientific advancement. Since the Soviets would lead the US for several years in heavy space lift, these achievements would no doubt be touted as examples of Soviet Supremacy. The US had more sophisticated satellite technology; the Soviets lead in booster technology. The Soviets would do all they could to sustain the illusion of their lead.

#### Reason Five—Recruiting Unaligned Countries

In the US camp, policymakers struggled to analyze what the Soviet achievements really meant. What threat did the Soviets really pose? What signals did the Soviets intend to send? What should US response be? Were the Soviet's latest moves a precursor to massive nuclear confrontation or merely defensive? Operating in a data-poor environment, any answer to these questions was speculative at best and could quite possibly mislead strategists to draw perilous conclusions.

International competition boosted Sputnik to importance. Both countries were moving toward the technology since the capture of the scientists, designers, and German V2 rockets in 1945. The reality was that the rocket that carried it to orbit was far more important than its payload because the booster could also be used to deliver thermonuclear weapons, dropping with impunity out of the sky like rocks from a highway overpass on unsuspecting American cities.

The missiles were an “incremental and predictable feat of engineering” given the struggle into which both Superpowers had entered.<sup>123</sup> Sputnik had long-reaching political, technological, and ideological implications as well because of the “volatile historical conjuncture at which it occurred”.<sup>124</sup> Having assumed the mantle of “free world leader” by virtue of emerging from World War II most intact and most wealthy, the US held onto their title based on two premises:

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<sup>123</sup> Ibid. Page 7.

<sup>124</sup> Ibid.

“first, the evident superiority of American liberal institutions and the material realm of prosperity”, and second, “the overwhelming American superiority in the technology of mass destruction”, defending her protectorates from Eastern aggression.<sup>125</sup> The Americans were able to do so only because their sphere of influence viewed them as “better and mightier than its chief rival”, those behind the Iron Curtain.<sup>126</sup> Of course, the same was true for those aligned with the Soviets.

These stakes were as high or perhaps higher than during World War II because, with the lack of convincing information about Soviet capability, their rival was assessed as so much larger and technologically accomplished than Nazi Germany. From the point of view of the West, the US was the last stalwart against the evils of communism. National survival, and the survival of those like-minded nations, depended on maintaining that lead.

“What Sputnik did, in simultaneously presaging nuclear parity and suggesting Soviet scientific superiority, was to alter the nature of the Cold War”.<sup>127</sup> The Eisenhower administration, counter to critics but unwilling to disclose the national technical means that were the source of the knowledge, realized the true nature of the problem. Lyndon B. Johnson, a vociferous critic and political foe, observed:

*“Failure to master space means being second best in every aspect, in the crucial arena of our Cold War world. In the eyes of the world first in space means first, period; second in space is second in everything”.*<sup>128</sup>

Space technology was viewed as a metric of critical national prestige. American credibility was synonymous with dominating the high ground of space.

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<sup>125</sup> Ibid. Page 7.

<sup>126</sup> Ibid.

<sup>127</sup> Ibid. Page 8.

Democratic detractors notwithstanding, the Republican Eisenhower knew more than he was telling. “He understood the problems of the age perhaps better than his critics among the Best and the Brightest”<sup>129</sup>. However, Eisenhower had no intention of divulging the clandestine source of his knowledge. He knew the fiscal penalty of entering into a misinformed technologic race. He also realized that disclosing his source might or might not assuage the public fear. Eisenhower preferred to take the conservative view and play his cards close to his vest. The conservative view meant keeping one’s presidential options open, which in turn demanded knowing as much strategically about the enemy as possible.

Without accurate strategic information, the US conclusions were extrapolations of their own capabilities; erroneously assuming the enemy thought and operated like the US would. That is not to say there were not striking commonalities between both countries. Both countries were the product of violent revolution, “inspired by ideologies of progress, faith in the works of man, and patriotism rooted in common ideas, values, and experience”.<sup>130</sup> Both countries came of age on the international scene during the world wars. Both were victorious because of “geographical expanse, remoteness, and unprecedented mobilization of technological resources”.<sup>131</sup> Both found themselves thrust into the role of “continental super-states” for both their technological sophistication and their ideological distinctiveness.<sup>132</sup> Their differences were in the relationship between the government and its people. In any case, the assumption that similar circumstances meant similar *modus operandi* was flawed and therefore dangerous. One of the dangers was the risk of turning into one’s enemy.

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<sup>128</sup> Johnson as quoted by Richard Hirsch and Joseph Trento, *The National Aeronautics and Space Administration*. New York: 1973. Page 107.

<sup>129</sup> Robert A. Divine. *Eisenhower and the Cold War*. Oxford: 1981. Citations in chapter 5, note 4.

<sup>130</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore, Page 71.

<sup>131</sup> Ibid.

For the duration of their terms, both Truman and Eisenhower worked toward deterring a Cold War confrontation without turning the United States into a garrison state. Eisenhower reproved Congress, “should we have to resort to anything resembling a garrison state, then all that we are striving to defend...could disappear”.<sup>133</sup> Nuclear deterrence fettered the American military-industrial complex to massive spending and rapid technological change. Meanwhile, the Soviets, intent on defending themselves against Western aggression, “committed itself to making the missile revolution as quickly as possible”.<sup>134</sup> Incongruously, Eisenhower’s efforts to respond to a secretive, single-minded adversary without succumbing to obsessive hysteria while keeping a lid on defense spending decelerated the US space effort. The Soviets leapfrogged past the US into space, which caused a wave of dread. The failure of America to lead in space must therefore mean they are also woefully behind in the Cold War and therefore fundamentally inferior, destroying Eisenhower’s attempt to curtail Cold War escalation.<sup>135</sup>

According to US doctrine, an American monopoly in nuclear technology meant peace “for all time”, while a Soviet lead could only mean ghastly Armageddon; “atomic energy could bring an economic millennium and an end to all causes of war, or else the destruction of the world”.<sup>136</sup>

In a series of briefings to explain this last point to Congress, Air Force General Carl Spaatz used a polar projection map instead of the customary Mercator world map. The “Soviet Union hovered over North America in a great crescent at what would soon become bomber

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<sup>132</sup> Ibid.

<sup>133</sup> Stephen E. Ambrose. *Eisenhower: Soldier and President*. Touchstone Books: New York. 1990. Page 453.

<sup>134</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press, Baltimore. Page 72.

<sup>135</sup> Ibid. Page 73.

<sup>136</sup> Ibid Page 82.

range”, or arcs describing the range of Soviet nuclear bomber penetration.<sup>137</sup> His effect was calculated to terrify. By all accounts, Spaatz succeeded in galvanizing leaders of western-minded nations, and several of the nations sitting on the fence, of Soviet aggression and designs on world domination.

In conclusion, there was really only one reason for the First Space Race, and that is fear. The Americans feared another surprise attack like the one at Pearl Harbour., and went to extraordinary lengths to understand the indications and warnings of hostile actions of their chief adversary, the Soviet Union. The Soviets, in turn, feared invasion. Each time they had suffered invasion they had been forced to trade land for time. While the Soviets decided to increase their land buffer by controlling bordering countries, they also tried to leverage their marginal rocketry advances to bluff their way out of a national inferiority complex to a position of apparent daunting military strength. Of course, as the Soviets appeared stronger, the West viewed the Soviets as more treacherous, necessitating military countermeasures and increased posturing. This posturing forced the Soviets to attempt to rebalance the scale with atomic, then hydrogen weapons. These weapons, paired with Soviet boosters, provided the ultimate protection against invasion. As the Soviet Union propagandized spectacular technological achievements in space, they increased their sphere of influence by recruiting and controlling satellite countries. The US and her allies viewed the Soviets attempt to increase their land buffer as a bid for world domination and a very distinct threat. Adding to this cycle of fear was the fact that ICBMs could strike anywhere on the globe with little useful warning. This stimulated the American fear of surprise attack and whipped the populace into a hysterical frenzy. While Eisenhower knew, thanks to the U2 photography, that the Soviets were not as advanced as they appeared, he could

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<sup>137</sup> US Senate, Military Affairs Committee, Department of Armed Services, Department of Military Security:

not divulge his reasons for knowing why without compromising access to future valuable strategic information. Nonaligned countries could reasonably be expected to throw in their lot with the nation they viewed as superior, which meant that being second in any aspect, including space technology, and meant being second in everything. Both the Americans and Soviets were conscious of this fact. Therefore, the First Space Race was a struggle to overcome these fears in the context of the Cold War.

## CHAPTER TWO—HISTORY WILL NOT JUDGE US KINDLY

The end of the Cold War is difficult for historians to pinpoint with precision. Some say the Cold War ended when the Berlin Wall fell. Others point to the historic meeting between Gorbachev and Bush, when Gorbachev told his one-time rival that “We don’t consider you an enemy anymore”.<sup>138</sup> Whatever the case, the end of the Cold War brought an almost immediate cooperation between the Superpowers. Speaking on the occasion of winning the Nobel Peace Prize in 1990, Gorbachev reminded his audience, “If perestroika fails, the prospect of entering a new peaceful period of history will vanish.”<sup>139</sup> The end of the Cold War, he stated, was therefore a “common victory”.<sup>140</sup>

The demise of the Cold War was an end to a competition that had demanded grandiose achievement from both sides. The fear that drove the competition had abated, leaving no energy to continue bludgeoning each other with technological wizardry and political trump cards. This de-escalation of conflict and reduction in tensions was certainly a positive trend for the world

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*Hearings*, 79<sup>th</sup> Congress, the 1<sup>st</sup> Session, 1945. Pages 291-92.

<sup>138</sup> Jeremy Isaacs, and Taylor Downing. *Cold War: an Illustrated History, 1945-1991*. Little, Brown, and Company: Boston. 1998. Page 402.

<sup>139</sup> *Ibid.* Page 413.

<sup>140</sup> *Ibid.* Page 417.

situation; but it sounded the death knell for each country's space programs. There was simply no reason, and none on the horizon, to continue the effort.

The Space Race ended because the reasons for it; fear of surprise attack or invasion, fear of appearing inferior, the impasse on space weaponry, and the fact that we are no longer in a bipolar world and in that sense do not actively recruit non-aligned nations, are no longer valid. There was no motivation to continue running the race once one contestant had crossed the finish line. The lack of competition, imagination, and coherent direct mean that both nations are suspended in the First Space Age, waiting patiently for historical forces to once again realign and provide the energy needed to advance into a Second Space Age.

Immediately after Sputnik, the US aerospace firms worked feverishly on several "Man in Space Soonest" plots. NASA residual boosters could launch one of the brand new experimental X-15 hypersonic rocket planes into space. Engineers considered converting existing boosters into higher performance space launchers by fitting upper stages to them.<sup>141</sup>

In the end, none of these "Man In Space Soonest" programs saw the light of day, for technological difficulties, financial reasons, or political realities. Conversely, they did provide a wealth of ideas and people with the expertise to engineer Von Braun's vision.

Wernher Von Braun, the famous German rocket designer, built V-2s for Hitler to hurl against England. As the war wound down he realized that surrendering his team to the Allies was the best option of ever obtaining his boyhood dream of spaceflight. He gave himself and select members of his team up to an unsuspecting US Army Private on May 2<sup>nd</sup>, 1945.<sup>142</sup> From then on Von Braun's team was the very best rocket talent available in the world at that time, and,

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<sup>141</sup> <http://www76.pair.com/tjohnson/navaho1.html>, *Space Launch Report*. 16 Dec 2001.



like Korolev the Chief Designer for the Soviets, Von Braun became the driving force of American Spaceflight engineering.<sup>143</sup> In an article titled “Man Will Conquer Space Soon” written for Collier’s magazine in 1952, Dr. Von Braun outlined his vision for man’s inevitable permanent presence of space.<sup>144</sup> Von Braun estimated that his plan to build a space station would cost \$4 billion in 1952 dollars and take 10 - 15 years to complete.<sup>145</sup> The ultimate aim of such a project would be to unify mankind under an umbrella of security and common purpose. Von Braun predicated the umbrella as “either the greatest force for peace ever devised, or one of the most terrible weapons of war—depending on who controls it”.<sup>146</sup> What Von Braun needed was someone to build his vision. He needed American aerospace industry and the American economic resources.

Only there was no aerospace industry at that time. Promising aeronautical engineers were converted to the aerospace variety. They assumed that spaceflight would resemble an extrapolation of experimental, high performance test flight.

Flight test was exacting business. To minimize the considerable risk to both plane and pilot, engineers on both sides of the iron curtain religiously followed a conservative and rigid step by-step process. “Experimental aircraft would go progressively faster and higher until, at some future date, one would leave the atmosphere and go into orbit.”<sup>147</sup> Chuck Yeager and the Bell X-1 broke the unbreakable sound barrier, opening the door to supersonic flight. The X-2

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<sup>142</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. 1985. Page 44.

<sup>143</sup> Rex Hall and David J. Shayler. *The Rocket Men: Vostok & Voskhod, The First Soviet Manned Spaceflights*. Springer—Praxis Books: Chichester, UK. 2001. Page 20.

<sup>144</sup> Wernher Von Braun. “*Man Will Conquer Space Soonest*”, page 21. The article describes Von Braun as “Technical director of the Army Ordinance Guided Missile Group”, and says, “He is considered the foremost rocket engineer in the world to day”. Von Braun was brought to the US by the US Government in 1945 to work on various US rocketry programs culminating with the Saturn V rocket that took astronauts to the Moon in 1969.

<sup>145</sup> Ibid.

<sup>146</sup> Ibid, page 25.

program reached Mach 3 and over 100,000 feet. The X-15 was designed to achieve Mach 6 and touch the limit of space. The Dyna-Soar space glider would take the next tentative steps into space. Dynasour would launch vertically atop a rocket booster and land horizontally on the Edwards lakebed.<sup>148</sup> This iterative approach was time-proven and scientific. It was also conservative and slow.

Traditional test flight would have eventually taken men to space, had Soviet leaps ahead not intervened. “Changing space policy, internal Air Force squabbles, and the pressure of the US-Soviet space race brought an end to Dyna-Soar” and the other conservative approaches. The iterative chain was missing a link. To reach space and run side-by-side with the Soviets required moving faster than conventional wisdom allowed. Dyna-Soar would take too long to develop, “Manned spaceflight used capsules”, because they were faster to develop than the gradual evolution of experimental aircraft. Radical advances demanded radical measures. Besides, the object was not to develop the best spacecraft, or even to make space travel routine. The object was to get a “Man in Space Soonest”.

*“A lifting-entry spacecraft, like the Dyna-Soar, could be flown during the reentry. Like an airplane, it developed lift during reentry and used aerodynamic control surfaces to change its flight path. Its pilot could control the vehicle, down to a precise landing on a runway. The lifting-entry spacecraft could then be refurbished and launched again. Space travel would have the routine and flexibility of an airline.”<sup>149</sup>*

This type of vehicle, on the drawing boards since the very early 1960s and with lineage back to Nazi rocketry design in the 1930’s, could have provided cheap, reliable, and safe access to space, putting space technology far past where it is today. Unfortunately, because it required a

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<sup>147</sup> Milton O. Thompson, and Curtis Peebles. *Flying Without Wings: NASA Lifting Bodies And The Birth Of The Space Shuttle*. Washington DC: Smithsonian Institution. 1999. Page VIII.

<sup>148</sup> Jay Miller. *The X-Planes: X-1 to X-45*. Midland Publishing: Hinckley, UK. 2001. Chapters 2-6, 19, and 24.

<sup>149</sup> Milton O. Thompson, and Curtis Peebles. *Flying Without Wings: NASA Lifting Bodies And The Birth Of The Space Shuttle*. Washington DC: Smithsonian Institution. 1999. Page VIII.

long test and development phase, it could not do so quickly enough for the race to the Moon, so the idea has lain dormant. It remains buried under inertia.

The decision to circumvent traditional X-plane development wisdom would come back to haunt the aerospace industry when the enormous cost and risk of spaceflight triggered national reprioritization of Project Apollo. Since the US had beaten the Soviets to the Moon, why did we continue to fund billion-dollar missions to bring back rocks?

Meanwhile, the hardware built for Apollo was ill suited to do anything else but go to the Moon. Apollo did not make spaceflight routine or flexible and was therefore not a cost effective means to space. The First Space Race was run for its own sake and not with the vision of proceeding in an orderly fashion from the First to a Second Space Age. The reasons for this are three-fold: one, there is no competition demanding the technological development necessary for a Second Space Race and therefore a Second Space Age; two, there has been no space mission with the credibility to capture the imagination of nations with the fervour or sense of purpose of Project Apollo; and three, no nation threatens the space superiority of the United States sufficiently to goad the Americans into unilaterally investing in the research necessary to initiate a Second Space Age.

#### Reason One—Lack of a Race to Run

The fears that drove the First Space Race have been conquered. Both successfully obtained their Cold War Objectives—the Soviets were not invaded and the US was not the victim of a surprise attack. The diplomatic ballet dictated that the Soviet Union and United States became partners in global international relations. The antagonism that once existed is too

difficult to maintain, as is the secrecy that once veiled the Soviet Union.

Currently, both players have much more to gain by cooperation than antagonism.

The break-up of the USSR left the once-great Soviet space design bureaus scrambling for subsistence. They sell off what services they can at rock bottom prices to whomever can deliver hard currency. The launch facilities at Baikonur are rusting in place. Their most talented engineers are driving buses, waiting tables, or working at whatever jobs they can find to earn their living. The lucky ones are immigrating to countries that can afford their prodigious talent. Energia, one of the resident bureaus that still launch the 1960s era Proton rockets for US-built civilian payloads, struggles to meet their payroll.<sup>150</sup> The Kremlin wields much less power than it did in the 1960s. Her economy no longer allows her to continue a race for prestige. Clearly, the Soviets pose no threat in space.

Absence of this threat means that the Americans have no direct competitor. Without a proper antagonist, there is no story to ignite the imagination of a nation emerging from underneath the terrifying umbrella of Mutually Assured Destruction.

### Reason Two--Lack of Imagination

In his world travels, astronaut Stu Roosa, Command Module Pilot for Apollo 14, saw an unfinished obelisk in Aswan Egypt. The artisans, working thirty five hundred years ago, had abandoned their work in place when the rock split. Had they finished their work the obelisk would have been the largest of its kind in the world at one hundred thirty seven feet tall and

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<sup>150</sup> Essence of an interview with Dr. Boris Krezyenkov (spelling unknown), a Russian interpreter, conducted October 21<sup>st</sup>, 2000 in Baikonur, Kazakhstan.

eleven hundred pounds. When asked about Apollo, Roosa recalled the story of the obelisk, unfinished, half-emerged from the rock slab on the valley floor.

“I always thought Apollo was our unfinished obelisk,” explains Roosa. “It’s like we started to build this beautiful thing and then we quit.” He continues, “History will not be kind to us, because we were stupid.”<sup>151</sup> Mankind first foray into space was an historical anomaly; preset in unique circumstances based on perceived threat and counterthreat. “The Moon was an ideal target—close enough to reach, audacious enough to capture the imagination”.<sup>152</sup> There is no such target today.

As a frustrated Ken Mattingly, another astronaut and the Command Module Pilot for Apollo 13, sees it, there is no national will to undertake such a race today. There is no reason to demonstrate US ability to anyone. There is no one that could challenge the US to do so. Without a race there is simply no urgency. With indifference come budget cuts, and the cuts force talent to earn livings in other ways. The corporate knowledge evaporates with shrinking dollars. Mattingly warns that “If you don’t build things you don’t know how to build things” and you forget how to go to explore space.<sup>153</sup> A national effort clearly requires the imagination to dwell in the realm of what is possible.

### Reason Three—Lack of Coherent Direction

Andrew Chaikin, noted historian and manned spaceflight expert, noted “Project Apollo remains the last great act [the United States] has undertaken out of a sense of optimism”.<sup>154</sup> The

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<sup>151</sup> Andrew Chaikin. *A Man on the Moon*. Penguin Books: New York. 1994. Page 577.

<sup>152</sup> Ibid. Page 577.

<sup>153</sup> Ibid. Page 578.

<sup>154</sup> Ibid. Page 583.

direction given to NASA by a young and dynamic leader during turbulent and terrifying times captured the imagination of a nation. “If NASA has lost direction”, Chaikin continues, “it is because we have failed to give it one”.<sup>155</sup>

If we have failed to provide our space agencies, Soviet or American or Chinese or whomever, with the direction needed to galvanize national will there are two possibilities: one, mankind fails to imagine, which has been discussed already, and two, there is no longer any compelling direction to give. There simply is no current reason to invest in space. Is there a relevant mission?

Of course, there are commercial reasons. There are certainly military reasons evidenced by the capable nations continuing to spend billions in space. These reasons are not compelling enough to provide the spark necessary to ignite any Second Space Race and therefore trigger the technological revolution defined by a Second Space Age, since the present technology is enough to accomplish the mission at an acceptable cost. There are currently no strong arguments for spending the kind of resources necessary to send anything other than remote proxies to other planets or continue to refine pre-existing technology. Nations need to clearly understand the bottom line benefit over cost ratio before reallocating precious national resources. Spending those resources is a decidedly political decision.

NASA is, at the end of the day, a political organization. It depends on support on Capital Hill and in the public domain. Without both, there is “no bucks, and no Buck Rogers”.<sup>156</sup> Edwin Diamond, writing in *Newsweek* compared the Space Race to a “Potlatch ceremony” in which neighbouring chefs prove their wealth and therefore prestige by throwing valuables into the

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<sup>155</sup> Ibid. Page 586.

<sup>156</sup> Philip Kaufman, *The Right Stuff: How the Future Began*. Warner Nome Video: Burbank, CA. Based on the book by Thomas Wolfe. 1991.

cooking fire. Others referred to Apollo as a “moon-doggle”.<sup>157</sup> Such unflattering references challenged the common wisdom that military and space research and development stimulated a struggling economy. Many public voices held the space program responsible for economic ills including unemployment and inflation. Public outcry changed from exhortations to beat the Russians to the Moon, to outcries of waste and misappropriation. Even Ike spoke out against NASA’s budget, explaining that spending forty billion dollars to travel to the Moon was “just nuts”.<sup>158</sup> Why not spend the money on terrestrial matters instead?

After the first Moon landing, congressional money became tight. As the money stream slowed to a trickle, NASA scaled back plans and compromised on designs. NASA had too many ideas worthy of their limited budget. Caught in the crossroads, NASA management was unable to divine a relevant mission. All of this raises the somewhat heretical question of whether NASA ought to survive.

This question is evident in those most passionate about spaceflight, and astronaut Michael Collins, Command Module Pilot for Apollo 11 Moon landing, perhaps best represents the feeling. According to Collins, the Apollo program could never have occurred if not for struggle between the US and the Soviets. Both countries owe their space programs to the other. In his book “Carrying the Fire”, Collins observed “[i]nternational competition underlay the swift pace of Apollo.”<sup>159</sup> However, after reaching the perceived finish line of the Moon, the program languished because of waning public support, shrinking budget dollars, and the breakup of the Soviet Union. National priority shifted and national resources shifted with it. Where was the

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<sup>157</sup> Walter MacDugall, *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. 1985. Page 393.

<sup>158</sup> Ibid. Page 394.

<sup>159</sup> Michael Collins, *Carrying the Fire*. The Adventure Library: North Salem, NY. 1998. Page 383.

urgency once the Soviets had been beaten to the finish line of the Moon?<sup>160</sup> Without a new mission, a new urgency, NASA seems irrelevant.

Looking to re-ignite the passionate imagination for space accomplishments lost after the 1969 Moon landing, “a White House report recommended (a) an expedition to Mars, (b) a station in earth orbit to develop the technological building blocks for the Mars trip, and (c) a vehicle to shuttle back and forth between earth and station. First (a) and (b) got cancelled, leaving the shuttle.”<sup>161</sup> The Shuttle, which Collins refers to as the “DC-3 of the Space Age”, is essentially a “sound design, built with 1960’s technology. Collins wonders if we couldn’t do better with present technology. What is the next generation shuttle? There appears to be no coherent answer.

With the launch, assembly, and operation of the International Space Station, the Russians are “junior partners, along with the Europeans, Japanese, and Canadians”<sup>162</sup>. Completion of this massive project, scheduled for sometime “early in the twenty-first century”, will deliver part (b) of the White House plan.<sup>163</sup> Unfortunately, the ISS project has been riddled with political infighting and cost overruns.<sup>164</sup> Neither of these problems would even be relevant if the reasons for building a space station were compelling enough.

Part (a) of the 1969 report begs the question of what has been the delay in reaching our sister planet, Mars? Mars has sufficient oxygen and water to sustain crews and space habitation<sup>165</sup>. The reason is that “Apollo mismanaged public perception”. Project Apollo, along with both Mercury and Gemini, was not intended to be a technology demonstrator, but a

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<sup>160</sup> Ibid. Page 383.

<sup>161</sup> Ibid. Page 383.

<sup>162</sup> Ibid.

<sup>163</sup> Ibid.

<sup>164</sup> Ibid.



“beginning of a period of exploration”. The Space Race objective was to “to land a man on the Moon and return him safely to earth”. Apollo 11, the Moon landing mission, accomplished that, and having accomplished the goal was unable to find a new, more inspiring one.<sup>166</sup> Have we not reached past the Moon because to do so is not persuasive enough?

According to Collins, “Mars is the next logical step in our exploration of the universe, extending our domain through the solar system”.<sup>167</sup> The ISS and perhaps the Moon will serve as a weigh-station on our way to the other planets, but building and orbiting it has taken a very long time.

In conclusion, the First Space Race terminated because the fear that drove it evaporated after the crew of Apollo 11 returned safely from the Sea of Tranquility. With the securing of their spacecraft, the Eagle, at Stable One,<sup>168</sup> the outcome of the First Space Race was settled. The competition was over. It is ironic that both countries achieved their overarching goals; the US had avoided a surprise attack, and the Soviets had forestalled another invasion. However, neither had a foil against which to measure their national wills. With the termination of the competition there was nothing urgent enough to capture either nation’s imagination in a way that could justify the massive expenditure needed to maintain the effort of space technology innovation. Terrestrial matters are far more visible and therefore received priority. Contributing to this failure is the failure of our space agencies to adopt a meaningful, relevant mission compelling enough to demand national support and funding. NASA’s current mission of

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<sup>165</sup> Ibid.

<sup>166</sup> Ibid.

<sup>167</sup> Ibid.

<sup>168</sup> “Stable One” refers to the condition of the Apollo spacecraft after it splashes down. Stable One means the spacecraft is floating upright and the crew is configured for water rescue. Stable Two is the less stable condition of the spacecraft floating on its side, and Stable Three is floating upside down, waiting for the floatation bags to inflate and right the spacecraft. From an interview with docent aboard the USS Hornet, the aircraft carrier responsible for recovering the Apollo 11 spacecraft. 7 February, 2001.

scientific exploration is uninspired. Therefore, we are unmistakably stalled in the First Space Age. For this, history will indeed judge us unkindly.

### CHAPTER THREE—CASTING THE MIND FORWARD

So we are stunted in the First Space Age. Progressing to a Second Space Age evidently requires the compelling stimulus of a Second Space Race. Given what has come before, what, exactly, would precipitate a Second Space Race?

The following three examples illustrate triggers that might set off a Second Space Race, including: development a silver bullet technology that makes the a Single Stage-to-Orbit reusable launch vehicle<sup>169</sup> feasible, the emergence of an as yet unexploited reason for operating in space, and the ascendance of a challenger to the US' space superiority.

#### Example One: A Military Space Plane

The surest path to another Space race is the invention some new engineering or physical principle breakthrough that makes spaceflight routine. Given the current situation such a breakthrough “is more likely to be made by some twenty four-year-old ... than by the engineers, laboring under political constraints in the laboratories of NASA or Rockwell.”<sup>170</sup> Perhaps the military will make the breakthrough “after another Sputnik-like national security scare”. However it comes about, what is needed is a radical advancement of the inefficient 1960s-style rocket.

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<sup>169</sup> A Single Stage to Orbit (SSTO) launch vehicle is considered the next generation space shuttle and will be explained later.

Once spaceflight overcomes the limitations of current technology to become truly standard and reasonably priced, previously infeasible missions become possible, instigating the leap to a Second Space Age.<sup>171</sup> People will stop asking, “Why explore space? How much will it cost? Haven’t we more pressing needs here on earth?” The question will then be, “Why not?”<sup>172</sup>

The Holy Grail of space lift has always been a Single Stage-to-Orbit Military Spaceplane (MSP) that would take off from a launch pad or runway directly into orbit and return to Earth without discarding any stages or fuel tanks. The vehicle would only have to be serviced and fuelled before it could again return to space, making space travel routine and, most importantly, economical. A Second Space Age requires such “airplane-like operations” in space.<sup>173</sup> What is missing is the technology to do so currently.

Spaceplane concepts have become a central part of the Air Force's collective mental picture of its future. The *Air Force 2025* study included an MSP on the US Air Force’s top ten list of systems required for aerospace dominance.<sup>174</sup> Long-range plans written by Air Force Space Command portray a next generation of reusable space vehicles providing “space control, including assured launch capabilities, surveillance, protection of assets in space, and the prevention of hostile operations”.<sup>175</sup>

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<sup>170</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page xvii.

<sup>171</sup> Ibid. Page xvii.

<sup>172</sup> Ibid. Page xviii.

<sup>173</sup> Milton O. Thompson, and Curtis Peebles. *Flying Without Wings: NASA Lifting Bodies And The Birth Of The Space Shuttle*. Washington, DC: Smithsonian Institute. 1994. Page 224.

<sup>174</sup> *Air Force 2025 Executive Summary*, chapter 3. Maxwell AFB, Ala.: Air University Press: 1996. Accessed through <http://www.au.af.mil/au/2025>. 13 January 2002.

<sup>175</sup> Grant, Rebecca. “*Is the Spaceplane Dead?*” *Air Force Magazine*, Vol. 84, No. 11, November 2001.

The Air Force's long-range vision has included some form of an MSP for 40 years going back to the Dyna-soar program.<sup>176</sup> MSP supporters estimate that a fully reusable spaceplane would slash launch costs from \$10,000 per pound of cargo to far less than \$1,000 per pound, giving the Air Force unprecedented flexible access to space for the full spectrum of military missions. Quick response and deep strike possibilities represent the “ultimate counter to any adversary's anti-access strategies”; a spaceplane descending into a threat environment from orbit at Mach 25, and dash away to land at a safe runway would be impossible for adversaries to intercept before striking its objective. In 1962, Gen. Bernard A. Schriever explained requirements for the MSP, including “the ability to orbit, maneuver, rendezvous, de-orbit, re-enter, and land on a routine basis”. It is “unlikely that the Air Force will ever be able to achieve an aggressive aerospace force vision by relying on [conventional expendable, or multi-staged, launch vehicles] for its access to space”.<sup>177</sup>

This stunning capability has significant budgetary implications. Current USAF funding makes it hard to find the “significant streams of investment” needed to underwrite the engineering effort and associated technologies of an MSP. Of course, if there were a significant threat the resulting reprioritization would make sufficient funding available. According to

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<sup>176</sup> According to Milton O. Thompson and Curtis Peebles in *Flying Without Wings: NASA Lifting Bodies And The Birth Of The Space Shuttle*, page 12, “On October 10, 1957, the Air Force's Air Research and Development Command consolidated a series of studies into a single project called Dyna-Soar (a contraction of “Dynamic Soaring”), only six days after Sputnik was launched and a year before the X-15 was delivered.”

Designed to demonstrate a piloted, manoeuvrable vehicle and explore the military use of space for both reconnaissance and strategic bombing, Dyna-Soar was, in essence, an antipodal lifting body designed to boost into orbit aboard a Titan III, converted ICMB and heavy lift booster, before landing horizontally on dry lake bed at Edwards AFB.

<sup>177</sup> Grant, Rebecca. “*Is the Spaceplane Dead?*” Air Force Magazine, Vol. 84, No. 11, November 2001.

Secretary of Defense Rumsfeld, “we are closer than ever to a Military Spaceplane.”<sup>178</sup>

Evidently, the MSP is still on the national priority list.

The reason it even appears on the list is because the US Air Force is haunted by national pressure to remain one step ahead of the opposition, on the cutting edge of technology, especially in the high ground of space. “How long can we penetrate [enemy air defenses] with stealth?” Common wisdom is pessimistic. “Why penetrate with a bomber when the weapon could be delivered from a suborbital spacecraft?”<sup>179</sup> An MSP would provide an immediate attack option against immediate high-value target such as weapons of mass destruction on an ad-hoc basis regardless of obstacles that might prevent a more conventional response.<sup>180</sup>

In addition of unprecedented terrestrial response, US Air Force futurists believe “the major battles [of the future] will occur in space”. To fly, fight, and win in space requires tremendous investment in research and development.<sup>181</sup> Perhaps this is where the elusive revolution in space technology will emerge.

### Example Two: An As Yet Unseen Military Reason To Operate In Space

An MSP capability tackles current problems in an innovative way. However, due to the unprecedented rate of change in the world there are problems not yet imagined. For example, the space successes of the Gulf War notwithstanding, wars thus far have been terrestrially based. What if, as some futurists suggest, the next battle is not fought on the ground, on the seas, and in the air but are instead between armed spacecraft?

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<sup>178</sup> Ibid.

<sup>179</sup> Ibid.

<sup>180</sup> Ibid.

<sup>181</sup> Executive Summary: 2025. Montgomery AL: Air University Press. Chapter 2.

The problem is that current international treaties prevent the arming of spacecraft. In October 1963, the Soviets and Americans agreed to refrain from orbiting nuclear weapons. In December of that year, the UN passed a resolution outlining the international law concerning space weaponry. UN Resolution 1962 (XVIII) signed on December 13, 1963, titled the *Declaration of Legal Principles Governing Activities of States in the Exploration and Use of Outer Space* proclaimed that space was open to peaceful exploitation only—precluding any “activity potentially harmful to peaceful uses of space. There would be no weaponization of space as long as countries valued international law.

International treaties notwithstanding, space theorists advocate and prudence demands maintaining the ability to weaponize space in the case of those who do not chose to honour treaties or international law. In 1964, Barry Goldwater voiced to Congress his “Realistic Space Program for America”. He advocated that all spacelift be controlled by the military, and the US would institute a crash program to develop space missiles and space-borne lasers. “The laser would have many applications” Goldwater encouraged, “but it would be ...worth the money...if it did no more than guarantee... military control and access to space”.<sup>182</sup>

Goldwater’s ideas were lost in the politics of the day. However, if such a system were feasible then it would be, in Goldwater’s words “one of the most practical defensive devices ever conceived by the brain of man”<sup>183</sup> As of yet, there is no reason for such a system as long as terrestrial forces meet most defense requirements. In fact, fielding such a weapon would divert untold billions away from conventional forces.

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<sup>182</sup> As cited in Walter MacDugall, *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. Page 400.

<sup>183</sup> Walter MacDugall, *The Heaven and Earth; A Political History of the Space Age*. Johns Hopkins Press: Baltimore. Page 400.

Especially in the consideration of current international law, there appears to be no compelling reason to weaponize space unilaterally. But if there was a challenger to US dominance, the equation, once again, could change rapidly.

### Example Three: Another Nation Challenging US Sovereignty In Space.

Which brings us to the next example of a challenger to US space sovereignty. In this arena, China is uniquely positioned to defy American dominance. Although lacking in the resources currently, China boasts an active space program, one tooled to exploit space for both military and commercial purposes.<sup>184</sup> Compounding this threat, China is as secretive as the Soviet Union ever was. With their current capabilities, China could reasonably take aim at harvesting near earth resources, such as minerals from the Moon and solar energy with large-scale power satellite systems. China's focus could be economic domination instead of military pre-eminence. A Second Space Race would begin if other spacefaring nations, the US predominantly, decided to deny an instigating country uncontested lead in these lucrative areas.<sup>185</sup>

It is important to note that China, very close to orbiting a manned spacecraft, is not a third world nation in terms of space potential. Jane's Online reports that the Chinese are aggressively pursuing this goal, including the official announcement of Chinese intent to build a manned space station.<sup>186</sup> A perfect application of such a station would be the construction and servicing of space-to-earth power beaming satellites. The Chinese have taken careful note of

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<sup>184</sup> Bill Carswell. "*The Outer Space and Moon Treaties and the Coming Moon Rush. Space Daily*". [www.spacedaily.com/news/oped-02.html](http://www.spacedaily.com/news/oped-02.html). Accessed 18 April, 20002.

<sup>185</sup> Ibid.

<sup>186</sup> Ibid.

industry developments in this area and have gone so far as to agree to purchase such a system from Corporate Space Power Industries and Electric, Inc, upon successful demonstration of their system. Like the booster race of the 1960s, this technology could trigger another race to exploit the medium. The idea hinges on the fact that the technology for turning crude “lunar regolith into structural support materials for the photovoltaic farms, or using lunar water for station-keeping fuel” and requires relatively unsophisticated on-orbit technology.<sup>187</sup> Because of the comparative simplicity of the operations, this capability is in the reach of several nations. A gold rush scenario could ensue. While the timeline for maturation of this concept is uncertain, it is doubtful that other spacefaring nations would tolerate a monopoly of this type of expertise.

The historical confluence of such a race for resources could instigate a Second Space Race needed to spark another Space Age if the bottom line were attractive enough.

Technology, national capability and wealth, and the resulting derivative global power would provide sufficient impetus for monumental investment.<sup>188</sup> Unlike the Cold War race to the Moon, national prestige would not be the goal. Economic ascendancy could supplant military supremacy as the objective. The economic balance of power could change rapidly if an emergent technologic lead were left unchallenged.

The US would have no choice but to oppose the ascendancy of a challenger to US space sovereignty for at least two reasons. One, the general public will demand the US maintain its traditional control of the high ground of space. Two, a demonstrated business model based on

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<sup>187</sup> Ibid.

<sup>188</sup> Ibid.



non-speculative numbers and a credible profit margin will demand participation by other corporations,<sup>189</sup> not exclusively American. The bottom line is that

*“it is easy to envision a scenario in which a forward-looking, space-faring, and developing country like China, or maybe even India, undertaking a lunar development activity and sparking the next great space [gold] rush.”<sup>190</sup>*

Consequently, George Tenet, Director of the Central Intelligence Agency, on testifying to the Senate Select Committee on Intelligence, stated that events in the world make it more important than ever to capitalize on the advantages inherent in the high ground of space, both military and economic. The next challenger to US predominance in space could come from a myriad of sources. The proliferation of weapons of Mass Destruction, China’s drive for “recognition as a Great Power”, the “serious and immediate” threat of terrorism, and the threat to the national security of the United States through asymmetric measures in space all pose a clear and present danger.<sup>191</sup> Additionally, economic wealth gained from harvesting space resources could unsettle the current balance of power. These threats require the US to maintain its dominance in space technologies, as well as other related fields. In fact, the exponential development of technology provides a dangerous adversary in itself, in that allowing hostile nations to develop unchallenged niche capabilities pose a situation perilous to US global position.<sup>192</sup> The US is forced to deny domination of the high ground to potential adversaries on all fronts.

In summation, the surest path to another Space Race is the invention of a new technologic breakthrough that make airplane-like operations to space feasible. This might mean the USAF’s

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<sup>189</sup> Ibid.

<sup>190</sup> Ibid.

<sup>191</sup> “World Wide Threat-Converging Dangers in a Post 9/11 World”, testimony of Director of Central Intelligence George J. Tenet before the Senate Select Committee on Intelligence, 6 February 2002.

<sup>192</sup> Ibid.

dream of a Military Spaceplane could become an operational asset in the near time. Such a capability would provide the greatest force for peace yet devised. Perhaps a challenger will emerge to dispute American dominance in space, with either military or economic designs. Although current international treaties prohibit arming spacecraft there are several space-capable nations who cannot be counted on to honour such treaties. America must be prepared to counter this threat, should the next war be fought asymmetrically and unconventionally above the atmosphere. The threat is not only military but economical. What if the next competitor had the notion to unilaterally monopolize the untold wealth of near Earth resources with the intent of leverage this wealth into global power? These threats are as real as those posed by DCI Tenet; weapons of mass destruction, the constant jockeying of countries for position terrorism, and asymmetric warfare. One thing is clear; such a bid for space dominance will be challenged by the present powers. A radical shift in global power will not occur unilaterally, either for strategic control of the high ground of space, or the ascendancy of economic dominance. These types of maneuvers could set off a Second Space Race and therefore a Second Space Age, the consequence of which could be that failing to be first in any aspect means being second in all aspects.

In conclusion:

*“Nothing has changed our perspective on the political history of the Space Age more than the end of the Cold War. In the 1980s it was still possible to imagine the United States in a mortal race for the “high ground” of space and to argue the pros and cons of the “Star Wars” program. Today, with the Soviet empire gone, the Space Age seems almost coterminous with the Cold War itself. That age was born in the initial competition between the Americans and Soviets to get their hands on Nazi V-2s and their designers. It accelerated in the 1950s as both sides raced for an intercontinental ballistic*

*missile. It took off with Sputnik I, ...climaxed with the Moon race, declined with détente, and died when the Soviet Union died.”*<sup>193</sup>

To prove the thesis that the First Space Age, initiated by the urgency of a Space Race, was the result of a peculiar set of compelling and unique circumstances and any subsequent Space Age will not occur until similar unique conditions exist again, this discussion tackled the question in three parts. First, it explored the reasons for the First Space Race, listing: the US fear of a Pearl Harbour scenario, the Soviet fear of invasion, both countries’ fear of the other’s superiority, the fear of the evolution of mass destruction into space, and the need to use the success of space to sway unaligned countries under one’s umbrella. Second, we examined why these reasons no longer exist, including the lack of competition, imagination, and a coherent direction. Third, it cast our minds forward to imagine what compelling reasons might generate a Second Space Race, and therefore, a Second Space Age. These reasons included the evolution of an enabler technology allowing operation of a Military Spaceplane capable of unprecedented missions, the weaponization of space, and an emerging challenger to US supremacy in space.

### The Gift Of Apollo

Reflecting on manned spaceflight, noted astronomer and visionary Carl Sagan wrote, “Once upon a time, we soared into the solar system. For a few years. Then we hurried back. Why? What happened? What was Apollo really about?”<sup>194</sup>

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<sup>193</sup> Walter MacDugall. *The Heaven and Earth; A Political History of the Space Age*, Johns Hopkins Press: Baltimore. Page xvi.

<sup>194</sup> Carl Sagan. *Pale Blue Dot: A Vision of the Human Future in Space*. Balantine Books: New York, 1994. Pages 166-167.

Sagan wondered how a nation could mobilize for such a gigantic effort. He wondered how a nation could commit its economy to building machines with materials not yet imagined, navigation using unproven mathematics, to send a man to an unexplored world. Kennedy, in his May 25, 1961 speech, challenged his nation to, within less than a decade, land a man to the Moon and returning him safely. There was no frail story of discovery or advancing science. Kennedy wanted a gesture of national greatness, an adventure. The US was clearly ahead of the Soviet Union in every area of technologic achievement, economics, and military preparedness.<sup>195</sup> What, wondered Sagan, was the draw?

The draw, clearly, was that the rocket technology that could send men to the Moon could also be used for nuclear war. The same technology for orbiting the Hubble astronomy telescope could also orbit a death star. Spaces and associated technologies, Vice President Johnson agreed, were the new high ground:

*“The Roman Empire controlled the world because it could build roads. Later—when moved to sea—the British Empire was dominant because it had ships. In the air age, we were more powerful because we had airplanes. Now the Communists have established a foothold in outer space. It is not very reassuring to be told that next year we will put a better satellite into the air [sic]. Perhaps it will even have chrome trim and automatic windshield wipers!”<sup>196</sup> The fear ran deep; now the Soviets will be able to drop nuclear weapons on us “like rocks from a highway overpass”.<sup>197</sup>*

Preparing for war by launching a missile downrange with fully instrumented test warheads toward impact in the atoll in the South Pacific is not a glorious undertaking. It does not capture the imagination. A Moon landing “commands attention and galvanizes world

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<sup>195</sup> Ibid. Pages 166-167.

<sup>196</sup> William E. Burrows. *Deep Black*. Random House: New York. 1988. Page 88.

<sup>197</sup> Philip Kaufman. *The Right Stuff: How the Future Began*. Warner Nome Video: Burbank, CA. Based on the book by Thomas Wolfe. 1991.

opinion, while demonstrating tremendous military influence”.<sup>198</sup> Even those countries that disagreed with US foreign policy “acknowledged the genius and heroism of the Apollo Program”. This was entirely the plan.<sup>199</sup>

Wrote Sagan:

*“A case can be made then that Apollo served another purpose—to move the US-Soviet space competition from a military to a civilian arena. There are some who believe that Kennedy intended Apollo as a substitute for an arms race in space.”*<sup>200</sup>

Without knowing the mind of the man it is difficult to make this evaluation. What we can begin to understand is that we will not see any Second Space Age until another Space Race compels us to prioritize national will and treasury toward it. . As Sagan stated, and the evidence suggests, the First Space Age was the result of a peculiar historical convergence of events. Any subsequent Space Age will not occur until similarly peculiar and compelling conditions exist. One can only guess when those conditions might occur again.

We are left with the words of a young President Kennedy, when asked why he felt the US should challenge the Soviets to a race into space, Kennedy told a story about Frank O’Connor, the Irish writer. When O’Connor was a boy he would roam the countryside with his friends. When they came to a wall that seemed too high to climb and too long to go around, one boy would invariably snatch the hat of his friend and throw it over the wall. The boys had no choice but to climb the high wall to retrieve it.<sup>201</sup> The Soviets threw the US’ hat over the wall with the

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<sup>198</sup> Carl Sagan. *Pale Blue Dot: A Vision of the Human Future in Space*. Balantine Books: New York. 1994. Page 168.

<sup>199</sup> Ibid. Page 171

<sup>200</sup> Ibid. Page 169.

<sup>201</sup> John Fitzgerald Kennedy, President of the United States, in Remarks at Dedication of Aerospace medical Helath Center in San Antonio, Texas, on November 21<sup>st</sup>, 1963, as cited by Sorenson, Theodore C., *Let the Word go Forth; The speeches, statements, and writings of John F. Kennedy, 1947 – 1963*. Dell Publishing: New York. 1988. Page 174.

launch of Sputnik and the prevailing fears of the day. The ensuing Space Race guaranteed the First Space Age, man's first foray into space.

What hat and high wall is required for man's second venture into space?



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