

## The Legacy of Sputnik

On October 4, 1957, the Soviet Union surprised the world and its only technological rival, the United States of America, by orbiting a 60 cm, 83 kg metal ball called Sputnik-1. A small transmitter inside broadcast radio signals back to Earth as Sputnik circled the planet. On that day, Sputnik-1 became the first artificial satellite to orbit the Earth and its flight opened the space age.

Against the backdrop of the cold war, Sputnik-1 was a Soviet challenge to the United States for supremacy in the skies. A month later, on November 3<sup>rd</sup>, eliminating all doubts about their space supremacy, the Soviets orbited Sputnik-2. On board, the dog Laika became the first living creature to fly in space.



The United States had initiated its own orbital project, called Vanguard, which was still in its infancy, though a first space flight became urgent in the face of Sputnik. However, on December 6 of that year, American pride was further wounded when the Vanguard rocket on its first launch, rose to less than a meter, shook a little, and disintegrated in a spectacular fireball before the cameras of the press and a large cast of VIPs and special guests.

The story was just beginning, however. The American reaction to Sputnik was galvanic. The failed Vanguard Project gave way to the Explorer Project, this time led by the charismatic Werner Von Braun and his team of German scientists who emigrated to the United States after World War 2. Von Braun's team worked fast and, on January 31, 1958, Explorer-1, the first American satellite, successfully entered orbit. In addition to a radio transmitter, Explorer carried a package of instruments, led by Professor James Van Allen of the University of Iowa, who discovered the famous charged particle radiation belts that surround the Earth and bear his name.

Months later, cementing the American response to the Soviet challenge, the U.S. Congress passed the National Aeronautics and Space Act, known as the "Space Act," which in July, 1958 transformed the National Advisory Committee for Aeronautics (NACA) into the National Aeronautics and Space Administration (NASA). In the early 1960s, with the support of the Kennedy and Johnson Administrations, U.S. annual investment in the space program reached 5 percent of the national budget (more than \$ 100 billion a year in today's dollars).

One could say that Sputnik was the metaphoric gunshot that, in October, 1957, initiated a space race that ended in July of 1969 with the first human – an American – on the surface of the Moon. The open contest was over, America had won. The Cold War also ended two decades later, and the Soviet Union was transformed into today's Russia and the Commonwealth of Independent States. The chemistry of confrontation gradually gave way to one of collaboration, mutual respect, and inter dependence.

Today, despite dying vestiges of the old cold war paradigm, space is fortunately evolving into a place of business, a place for humans to live, work and explore. The International Space Station (ISS) has been inhabited for more than 15 years and astronauts from many nations have now flown in space. While far from complete, this democratization is a healthy trend, being fueled by a growing number of space-faring nations who are laying their bets on space as key to economic prosperity. The private sector is also catalyzing this transition with many entrepreneurial initiatives being the pursued in the "final frontier."

Thus, sixty years from Sputnik, humanity moves from a planetary species to a cosmic one. Far from the much feared nuclear holocaust, space produced unprecedented technological benefits, without which we would not have reliable atmospheric predictions, GPS navigation apps like Waze or Google Maps, Uber service, cell phones, satellite TV, tele-medicine, safe, cheap and reliable air travel, long shelf-life foods, self-driving cars, precision agriculture, and so many others. The legacy of Sputnik also alerted us, in time, to the greenhouse effect, the ozone layer and of our fragility as a single-planet species. Looking back, it was a good investment. The space dividend lubricated the Internet and brought us benefits of great value, some unimaginable at the time. Perhaps most importantly, Sputnik made our children dream. Looking forward, its legacy is doing nothing less than ensuring our survival.

*F. Chang Díaz, Houston, October 4, 2017*