

Animal Astronauts

The achievements of human astronauts would never have happened without the brave sacrifices made by animals. Our feature celebrates the work of these early animal astronauts. Names such as Laika, Belka, Strelka, Baker, Gordo, who all helped teach us about survival in space environments.

Yuri Gagarin; Alan Shepard; Valentina Tereshkova. Spaceflight pioneers whose names are immortalised in history. But their achievements may never have happened without the brave sacrifices by other, less heralded names such as; Laika, Ham, Belka and Gordo. These heroes were the monkeys, chimps, cats, dogs and many other animals that paved the way for man to travel into space. Many of them never made it back alive.

The Space Race

During the 1950's the Soviet Union and the United States were pitted against each other in a bitter race for technological and military supremacy – the so-called 'Cold War.' America was focused on rockets and missiles as weapons. But the Soviet Union stunned the world when they launched the first satellite, Sputnik

1, into space on October 4th, 1957. A month later, the first animal in space, a stray dog from Moscow named Laika, was launched on board Sputnik 2. America was caught off guard and the race to send the first human into space was now on.

Scientists on both sides did not know what the effects of weightlessness and other space environments would be on human astronauts. The potential for disaster would be a terrible blow during the era of cold war propaganda. So scientists needed to use a number of animals in test flights to investigate these effects.

Whilst Sputnik 2 orbited the Earth, instruments on board the craft monitored Laika. She seemed to suffer no ill effects. But Sputnik 2 was not designed for recovery, Laika was doomed to die as the capsule air ran out. Sputnik 2 fell into the atmosphere and burned on April 14th,





1958, 162 days after its launch.

The Soviet Union sent more dogs into space, each flight further pushing the boundaries of knowledge. On August 19, 1960, the dogs Belka and Strelka were launched aboard Sputnik 5 spending one day in space orbit before the capsule landed back to Earth. They became the first living animals to survive orbital flight.

Monkeynauts

The US military launched the first primate into space aboard a Jupiter AM-13 rocket on 13th December, 1958. Gordo, a squirrel monkey survived the sub orbital flight but he died on return when the rocket's floatation device failed. The US launched two more monkeys six months later. On May 28th, 1959, 'Monkeynauts' Baker, a female squirrel monkey, and Able, a female rhesus monkey, flew to an altitude of 480 kilometres at speeds up to 16,000 kilometres per hour. Having become weightless for nine minutes, and withstanding 38 times the normal pull of gravity, they were recovered after re-entry becoming the first animals to reach space and return safely. Able, died after surgery to remove implanted sensors. Baker however, lived until 1984 and is thought to be the longest lived squirrel monkey in captivity.

On the 1st October 1958, the National Aeronautics and Space Administration, or NASA was born. The first project announced was Project Mercury – a program designed to send the first man into space. The program used Mercury capsules atop Little Joe rockets. A rhesus monkey named Sam was the first to travel into space on December 4th, 1959. Travelling 88 kilometres into space, Sam was used to test a couch and restraint harness that would protect humans during periods of high acceleration.

NASA needed to prove that live animals could perform tasks during launch, weightlessness and re-entry. Ham, a chimpanzee trained to pull levers on specific cues was selected for the task. On January 31, 1961, he was launched inside Mercury Capsule number 5, aboard a Redstone rocket. The mission was nearly a disaster as the rocket overshot sending the capsule 196 kilometres off course. Ham experienced speeds of 9,400 kilometres per hour and was weightless for a total of 6.6 minutes. Even so, Ham was able to perform his tasks almost perfectly. He was captured alive and well in the Atlantic Ocean, despite a leak that let seawater into his capsule. The success of this flight led directly to Alan Shepard's flight on May 5th, 1961.



A zoo in space

Scientists continued to use animals in space for research. From 1966 to 1969, the US launched 3 biological capsules to investigate the effects of space flight, especially radiation and weightlessness on living organisms. Known as Biosatellites, the animals that were studied included; insects, frogs eggs, fruit flies and a pig-tailed monkey.

The Soviet Union launched similar biological capsules, known as Bion satellites between 1973 and 1996. Animals studied included; tortoises, rats, insects, fish, newts, frogs and various monkeys.

In 1973, a student project was selected for NASA's Skylab 3 space station. The study was to observe how a spider could spin its web under near zero gravity. Arabella, an orb weaving garden spider spent 59.5 days in orbit and at first, was not able to spin a good web. After several more attempts, the web became more conven-

tional, although closer analysis by scientists revealed that the silk thread was very uneven – thin in some places, thick in others. This compares with an Earth dwelling spider, which has an even thickness throughout. Micro gravity clearly affected Arabella's web making ability.

The Space Shuttle Columbia launched on April 17th, 1998 contained a large menagerie of animals for its Neurolab mission.

Neurolab was an onboard series of animal experiments designed to investigate the effects of low gravity and near-Earth orbit on animal's brain and central

nervous systems. The project included 170 newborn rats and pregnant mice, 229 tiny swordtail fish, 135 snails, four oyster toadfish, and 1,500 cricket eggs and larvae. The results from these experiments were considered vital if Man was to ever explore new frontiers in space.



One mission that suffered a fateful end was Columbia flight STS-107 that disintegrated during re-entry on February 1, 2003. Seven crew perished in the accident and much science data acquired over a 16-day period was lost. Amid the mountains of debris spread over large swathes of ground, investigators did find one experiment - hundreds of worms, known as *Caenorhabditis elegans* that were secured in a locked box, had not only survived, but were 4 to 5 generations

removed from the original worms sent to space. They had survived the impossible heat of re-entry and the shock of impacting the ground.

A new era

The Cold War is long over. But a new space race has recently begun to

emerge. Countries like India, Japan and China have their own space program. China has even sent men into space. As with the Russians and the US, these developing space-exploring nations have used animals in space for their research.

Without the sacrifices made by animal astronauts, humans may never have left the planet. There would be no moon landing, no space shuttle, Mir or international space station. Dreams of human exploration of space would remain science fiction instead of science fact.

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Written by Seymour Yang

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