

Hi, this is Steve Nerlich from Cheap Astronomy www.cheapastro.com and this is *Space Race: A brief history of manned spaceflight from Vostok 1 to Apollo 11*.

Before we get started I want to tell you that the space age really began on the 4th of October 1957 with the launch of Sputnik 1. Shortly thereafter in November 1957, Laika the dog became the first astronaut to orbit the Earth in Sputnik 2. Unfortunately she didn't make it back – so here's a message to the future of humanity. When you work out time travel and cloaking devices, go back and get her out of there. Give her some water and a pat and take her for a walk. Hey, it's Laika.

Anyway, after that, things went better– with Sputnik 5 in August 1960, the Russians sent up two dogs, Belka and Strelka, along with a rabbit, 42 mice and 2 rats. All passengers survived. Premier Nikita Khrushchev presented one of Strelka's pups to John F Kennedy's younger daughter Caroline as a bit of a diplomatic jibe. The American's had been struggling to get anything into orbit and their most famous non-human astronaut was Ham the Chimp who went up and back in a sub-orbital flight in January 1961.

But things really took off (small astronomy joke there) on the 12th April 1961, when Yuri Gagarin launched in Vostok 1 and did a single orbit in a flight lasting 108 minutes. Three weeks later, the Americans launched Alan Shepherd in a sub-orbital flight on the 5th of May 1961. Now Alan Shepherd was one of seven Mercury mission astronauts and it's worth making a quick detour here to note that the names of five of those seven astronauts are immortalized as the sons of Jeff Tracy – Scott, Virgil, John, Gordon and Alan, the pilots of the Thunderbirds.

And now back to the space race. After Alan Shepherd, the Americans send up Virgil (or Gus) Grissom for another brief sub-orbital flight while the Russians send up Gherman Titov for a whole day in space in which he does 17 orbits.

But finally in February 1962, the Americans get John Glenn into orbit – indeed he does 3 orbits in just under 5 hours. Scott Carpenter does a similar flight in May 1962, then the Russians up the ante again doing the first multiple space flight with Vostok 3 and 4 in flight at the same time, maneuvering within 5 miles of each other.

The Americans keep plodding along with Wally Schirra, the only flown Mercury astronaut not have a Thunderbirds puppet named after him, who did 6 orbits in October 1962 followed by Gordon Cooper in May 1963 who managed 34 hours in space – although this is quickly upstaged by Valery Bykovsky in Vostok 5 who sets a record of 5 days in space. And if that wasn't enough, Vostok 6 is launched in June 1963 with Valentina Tereshkova, the first woman in space. The Americans don't equal that feat for another 20 years when Sally Ride goes up in a Space Shuttle in June 1983.

Anyway, that was it for the Vostok and the Mercury missions. Incidentally, the seventh Mercury astronaut Deke Slayton never flew a Mercury mission due to concerns about a heart condition – and never had a Thunderbirds puppet named after him either. But there is an interesting footnote about him that I'll come to later.

As we move into 1964, the Russians commence their brief Voskhod program. Strangely, the first crew of Voskhod 1 was dumped 3 days before the launch after it was discovered that Boris Volynov's mother was Jewish. The substitute crew of 3 become the first crew in space in October 1964. Then Voskhod 2, having only 2 crew, but with both wearing space suits, takes off in March 1965 and Alexei Leonov becomes the first person to spacewalk for 12 minutes outside Voskhod 2. And that was it for the Voskhod program. Voskhod 3, with Boris Volynov back in line to fly, is cancelled 10 days before the launch following the death of Sergey Korolyov, the Russian's *Chief Designer* who had been behind much of the Russian's success in space to this time.

After that, the Russians seemed to come to a standstill, giving the Americans a chance to get ahead. In March 1965, the Americans commence the Gemini program, starting with Gemini 3 up to Gemini 12 all with two crew members, nearly all of whom go onto become Apollo astronauts apart from Gordon Cooper. On the first flight, Gemini 3, Ed White does the first American space walk, something also achieved by Gene Cernan on Gemini 9, Michael Collins on Gemini 10, Dick Gordon on 11 and Buzz Aldrin on 12.

Neil Armstrong and Dave Scott, subsequent commanders of Apollo 11 and Apollo 15, conduct the first hard docking in space between Gemini 8 and an unmanned Agena rocket. But things go badly shortly after when one of Gemini 8's thrusters is stuck open, sending the capsule into an uncontrolled spin. But Armstrong manages to engage the Gemini's re-entry system - aborting the rest of the mission but saving their lives. Otherwise the program goes smoothly - testing and proving key maneuvers such as hard docking and space walking - and Gemini 7's almost two week flight demonstrates astronauts can survive in space more than long enough to fly to the Moon and back.

From here we enter the era of the Apollo and the Soyuz missions, but both commence with disaster. Gus Grissom, Ed White and rookie Roger Chaffee all die on the launch pad in an early test of the Apollo 1 spacecraft on the 27th of January 1967. On the 23rd of April 1967, the Russians launch their new Soyuz 1, but something goes wrong with the guidance systems and Vladimir Komarov becomes the first person to die during a space flight.

After some major rebuilding the American's are first to get back up there with Apollo 7, launched on the 11th of October 1968 after a series of unmanned Apollo flights. Only days behind, the Russians launch Soyuz 3 on the 26th of October 1968. Both flights are successful and the Russians conduct their first hard dock with the unmanned Soyuz 2.

But then the Americans play a real trump card and send Apollo 8 to the Moon. Frank Borman, Jim Lovell and Bill Anders do 10 lunar orbits on Christmas Eve 1968 and then head on home without a hitch. Wow. Meanwhile, the Russian's send up Soyuz 4 and 5 – and they both dock in Earth orbit in January 1969. One of Soyuz 5's crew, Boris Volynov, finally becomes the first ever Jewish astronaut, but whatever... everyone can see what's coming.

In March 1969, Apollo 9 tests the lunar module in Earth orbit, and then in May 1969, Apollo 10 tests the lunar module in lunar orbit. Then Apollo 11 launches on July 16 1969.

The mission draws on everything that been learnt so far. On entering lunar orbit, Neil Armstrong and Buzz Aldrin move from the Columbia command module to the lunar module known as the Eagle. Then they detach, leaving Michael Collins to wait in lunar orbit in Columbia. From there, they engage the descent engine, already fully tested in the Apollo 9 and 10 missions and commence a landing. The only really new and untried procedure in this mission is avoiding a few rocks before touchdown.

And on July the 20th (or the 21st if, like me, you were in Australia), Neil and Buzz do a two hour moon walk, the ultimate space walk – then join back up with Michael Collins and the three of them head home. Once back at Earth, they commence aero-braking – standard procedure since Vostok 1, using their heat shield to slow the spacecraft down until parachutes can be deployed for a final landing.

And there you go. Manned spaceflight is astounding, amazing and totally plausible. Moon hoaxers, get a life.

Now, one footnote. You may recall Deke Slayton who I mentioned was the seventh Mercury astronaut – grounded due to a heart condition. Deke served as NASA's Director of Flight Crew Operations from November 1963 until March 1972, when he was granted medical clearance to fly – at which time he was 51 years old and became the eldest astronaut in space to that time. The mission was the Apollo-Soyuz Project, the first international docking and handshake in space, between the Americans and the Russians, conducted in July 1975.

Thanks for listening. This is Steve Nerlich from Cheap Astronomy, www.cheapastro.com. Cheap Astronomy offers an educational website helping you do worthwhile astronomy things without remortgaging your house. No ads, no profit, just good science. Bye.