



## SPACE-IN-BYTES Science Fiction - Science Fact

Whether it's the Starship Enterprise, or the space station from *2001 A Space Odyssey*, science fiction has always provided inspiration for the scientists and engineers that design and build real spacecraft. Satellites, space stations, men on the moon were once science fiction but are now science fact. A lot of space scientists actually write science fiction. The famous German rocket designer Werner von Braun was the man behind the Apollo moon landings as well writing science fiction for magazines and films.

So not surprisingly the European Space Agency (ESA) takes science fiction very seriously. Since it was founded in 1975, ESA has developed loads of advanced space-probes and satellites and sent European astronauts into space. Working with international partners it is currently building the International Space Station (the ISS).

One of the 20<sup>th</sup> century's most influential science fiction writers was Arthur C. Clarke. Before he was a writer he was a working scientist. Clarke wrote a paper in 1945 that proposed the idea of geo-stationary satellites for tele-communications.

There are now hundreds of these satellites orbiting the Earth and the geostationary orbit has been named after him - it's called Clarke's orbit. As well as writing many sc-fi novels Arthur C. Clarke wrote the screenplay for the classic science fiction movie -*2001 A Space Odyssey*.

Most of the action in *2001* is set on board a rotating space station. These can be traced back to the wheeled space stations proposed by Wernher von Braun in sci-fi magazines in the 1960's. The space station in *2001* acted as a transfer point from low Earth orbit to other planets. And one day the ISS may fulfil the same function as we send human missions to other planets in our solar system.

Space stations are very exotic, but of course they have to be constructed in space and the crew and supplies need to be ferried up to them from Earth. To do this you need spaceships that can escape the Earth's gravitational pull - and for this you need powerful rockets.

The man who's been called the father of modern space flight, *Konstantin Tsiolkovskii*, was inspired by writers like Jules Verne who wrote scientific adventure novels. Jules

Verne made a serious attempt to address the problem of launching a spacecraft that could escape Earth's gravitational pull. He opted to launch his heroes in a 'Moonship' from giant cannon with the crew inside in a huge shell. Unfortunately, in reality the acceleration forces created by Verne's cannon would have completely crushed the crew. The acceleration of real rockets is much lower than the shells from Verne's space cannon

ESA main rocket launcher is the Ariane series

In February of 2008 an Ariane 5 successfully launched ESA's automated space freighter - the ATV on its journey to the ISS. Based on the experience gained whilst building the ATV, ESA now has the capabilities to develop a spacecraft that can carry a crew into space. But for flights to other planets new innovative spacecraft will be needed to travel those vast distances in a reasonable amount of time. And once again science fiction is leading the way.

Interplanetary spacecraft driven by solar sails appear in films like Star Wars and Star Trek. But one of the earliest references to this amazing technology was a story by Cordwainer Smith. In the 1950s he wrote how the first interstellar ships might be propelled by light sails.

Light sails may sound like sci-fi fantasy but the international space agencies are thinking how to turn this amazing technology into reality. The idea is that particles of light (that's photons) from stars apply a pressure to the surfaces they hit. And in the near vacuum of space that can give enough energy to propel a spacecraft.

One of the main reasons to travel to other planets, is to set up a permanent base there. And the colonization of other worlds is a common theme in science fiction; from HG Wells' 'First men in the Moon' to Philip K. Dick's Martian stories, writers have speculated just how it could be achieved.

Expanding our presence in the universe is not something to be undertaken lightly but ESA, and the other international space agencies, are working on ideas for bases on the Moon and Mars. So just as science fiction led the way a 100 years ago, it is inspiring us again as we begin to plan missions to the other planets in our solar system.