

How many times have we read about space missions or have we seen films about incredible adventures on Martian bases and spaceships? For a long time, the desire to cross the Earth's borders has only been a dream, limited to the world of literature and to the silver screen. Just think about the novel **From the Earth to the Moon** by Jules Verne, which tells the story of three men launched to the Moon in a spaceship by a huge cannon; or about the movie **2001: A Space Odyssey**, by Stanley Kubrick, the story of five men who are on their way to Jupiter on board an amazing spacecraft. Nowadays, on the contrary, living in space on board revolving stations is no longer science fiction, but a reality: it is called International Space Station (ISS) and it can host a permanent crew of six astronauts.

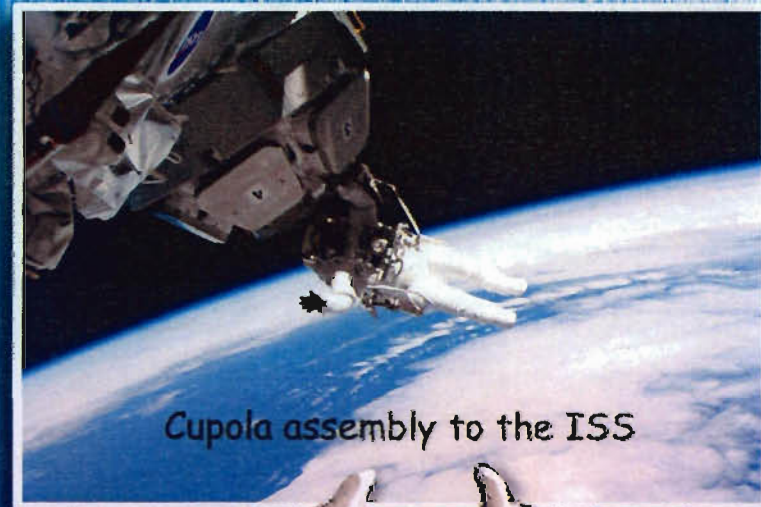
Everything started on the 25 January 1984, when the United States of America called upon several nations to take part in the making of a Space Station for peaceful purposes. This is why today the ISS is an international project, in which five space agencies cooperate: the Canadian Space Agency (CSA), the European Space Agency (ESA), the Japanese Space Agency (JAXA), the Russian Space Agency (RKA), and the American Space Agency (NASA). The Italian Space Agency (ASI) is involved in this project both as a member of ESA, since Italy is a founding member of the European Space Agency, and as a direct partner of NASA for the making of several parts for the Station.

The ISS, in its final configuration, is as big as a soccer field and it weights 445 tons. It is located between 350 to 400 kilometres from the Earth and orbits around it at a speed of 28,000 km/h. The ISS is so fast that orbits around the world in only 90 minutes! But how did they manage to build it? To date, we still do not have launchers powerful enough to launch such a huge structure into outer space. Since the Space Station could not have been put into orbit as a whole, they decided to launch it one piece at a time and to build it exactly as if it were an enormous Lego block. Then, the one hundred elements that make up the ISS were assembled both by robotic arms and by the astronauts themselves, who manually tightened the bolts and firmly joined one part to the other.

The ISS, however, is not only the most important and challenging program of international cooperation of all time; more than anything it is a large research lab. But why go into space to do experiments? It is a bit uncomfortable, considering the lack of gravity (or it is just a very little... since it is called microgravity!) and everything floats away, doesn't it? Well yes, it is really quite complicated to work while you're hanging in space, but it is due to these special conditions in outer space that make research done up there interesting and difficult to achieve on Earth. Gravity influences almost all biological, physical, and chemical processes that take place on Earth and therefore eliminating it allows scientists to discover the

real nature of these processes. Moreover, astronauts have been running experiments concerning the long-term effects of microgravity on human beings, which will provide essential knowledge for the human colonization of space. Scientists are then planning to carry out research on cosmic rays, interstellar dust, antimatter, and dark matter that would be impossible to perform on Earth. All those experiments will contribute to a more complete knowledge of the universe. But what is Italy's role in the ISS program? Thanks to the Italian Space Agency (ASI), Italian technology and experience are the backbone of the Space Station:

almost half of the living space of the station is, in fact, Made in Italy. ASI also furnished three logistic modules (MPLM) used to transport supplies, tools and machinery in the Shuttle's hold on board the station and it is responsible for their maintenance. In 2011, one of the modules, called PMM, was transformed into a permanent element of the ISS. In addition, three of the astronauts who have gone to live and to work on board the ISS are Italian. Their names are: Roberto Guidoni, Paolo Nespoli and Roberto Vittori. But now it's time for you to turn into a little astronaut and start building your own International Space Station!



Cupola assembly to the ISS

