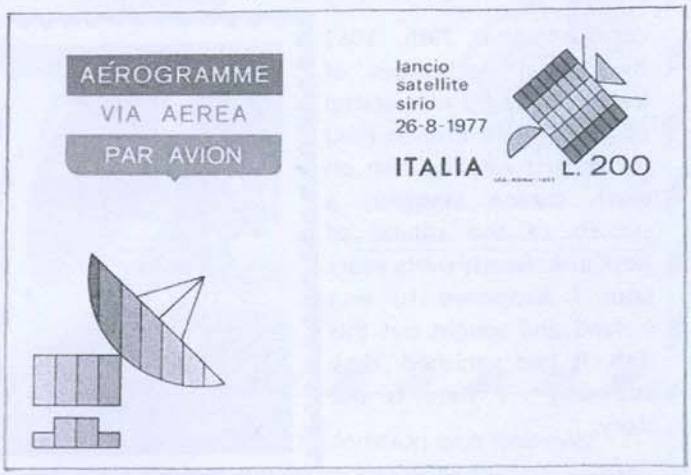
The Italian contribution to space discovery and exploration

In an article first published in the October-December 2010 edition of our Italian sister journal the on-line *AdAstra*, its editor **Umberto Cavallaro** reviews Italy's contribution to Space Exploration.



A major contribution has been made by Italy in discovering and exploring space. Few now recall that in 1964 Italy was the third nation in the world, after the superpowers USSR and USA, to design, implement and launch an artificial satellite into Earth orbit: San Marco. Little known are also the successes of the Italian Space Industry which, e.g., has contributed, through Thales Alenia Space, more than 50% to the ISS's pressurized, thus habitable, volume.

For the first time ever (in 1956 in fact) an artificial satellite appeared on a stamp – and it was an Italian one ! - dedicated to the 7th(*International Astronautical Congress)* held in Rome. The first IAC was held in Paris in 1950 and concluded with setting up the non-governmental organization IAF (*International Astronautical Federation*). During the Congress in Rome, the American Delegate illustrated the US plan finalized to put in Earth orbit a satellite during the International Geophysical Year. However the following year, just few days before the official opening of the 8th IAC in Barcelona, the Russians surprised the world and dealt American prestige a harsh blow by putting in orbit the first artificial satellite, Sputnik, which inaugurated the Astronautic Era (or Cosmonautic, as Soviets called it) and started the USA-USSR space race, one of the most spectacular and fascinating aspects of the Cold War.

The interest of Italy in space had started as early as 1959, less than a couple of years after the launch of Sputnik, when Gen. Prof. Luigi Broglio set up the Aerospace Research Centre of the University of Rome. In 1961 Telespazio SpA (the first space systems Services Company in the world) was founded. In 1963 started its operation the Fucino Space Centre "Piero Fanti" near L'Aquila: the first and most important space centre in the world for civilian use, where, in cooperation with NASA, the Telstar and Relay satellites were tested from 1963 onwards to broadcast international TV signals. The first Italian stamp related to Fucino came late in 1968. It features the Fucino basin, surrounded by the 2000-metre high mountains which naturally protect the facility from anthropogenic interference.

For this reason the Centre quickly grew into the principal satellite tracking station in Italy and today, with its 80 antennae is one of the largest space centres. The success of the San Marco project was commemorated in 1975, after 11 years, by an Italian stamp featuring the San Marco satellite flying over the space platform bearing the same name. Indeed the stamp celebrated ten years of Italian successes in space which already had included, at that time, the San Marco satellite designed and implemented by the Broglio's Aerospace Research Centre and the offshore launch site near Malindi, Kenya, known as the San Marco platform, with its secondary control platform. Poste Italiane in 1977 welcomed the launch of Sirio with postal stationery featuring the antenna of Fucino tracking the orbiting Sirio the first geo-stationary satellite for Telecommunication, entirely designed, built and managed by Italy, involving CNR, CIA, the University of Rome, Politecnico di Milano and Telespazio.

Initially planned for August 18th, the launch was postponed by a week. The Polygraphic Institute (which prints stamps and official postal items in Italy) had to destroy the 60.000 "wrong" postal stationeries produced meanwhile. Although the development had passed through countless problems and difficulties, the satellite proved to be a great success: designed for an operational life of two years, it was actually in use for eight years, until 1985, used by researchers in Italy, UK, France, Germany, North-Europe, USA and China. The Sirio satellite was also represented in the drawing which Emilio Greco prepared for commemorating the third World Telecommunications Exhibition, featuring a women calling through an old-fashioned phone device, with Sirio flying in the background.

Two Italian communication satellites – indeed San Marco II and L-Sat – appear on labels in the centre of the block of stamps issued in 1983 to celebrate the most important achievements of Italian Aircraft. San Marco II (or San Marco B) the satellite for Earth upper atmosphere study, designed by the Italian Air Force,

with the support of the Italian space industries, was successfully launched on April 26, 1967, from the San Marco platform near Malindi, Kenya. This was the first satellite ever launched from an offshore platform. L-Sat (Large Satellite), later called Olympus, went on with the Telecomm experiments started with Sirio. At the time of launch (12th July 1989), it was the largest civilian telecoms satellite ever built – which is where its alternative name L-Sat (LargeSat) came from. It was the first European satellite to offer capacity in the Ka band -- (20 / 30 GHz) – a band which became increasingly important, in the following years, for internet communications by satellite (videoconference, remote teaching, etc). It was the first satellite destroyed in the impact with a meteor.

Italian technology progressively imposed itself in telecomm satellites and Italy started to play a makor role as ESA Partner. Two Europe Cept stamps in 1991 celebrate the Italian cooperation in the implementation of DRS (Data Relay Satellite), a key component in the ESA space telecommunication infrastructure to support platforms operating between 400 and 800 km altitude such as Columbus and Hermes. Today we take for granted that satellites and receiver dishes are involved when we deal with telecomms and internet.

Not only Italian telecomms satellites, but also Italian scientific experiments in space gained in esteem. In 1992 Franco Malerba, first Italian Astronaut, flew onboard Space Shuttle Atlantis in the STS -46 mission as payload specialist to deploy the "Tethered" satellite experiment, a quite complex project conceived by the scientist Giuseppe Colombo – in a complex cooperation of Alenia, Martin Marietta, ASI and NASA, aiming at demonstrating the feasibility of producing energy in space. The event was celebrated through a postal stationary featuring Giuseppe Colombo.

1n 1996 the experiment was repeated with the support of the Italian Astronaut Umberto Guidoni and the Tether Satellite System circled the Earth at an altitude of 296 kilometres, placing the tether system within the rarefied electrically charged layer of the atmosphere known as the ionosphere. Again Poste Italiane celebrated the event with a postal stationary, shown above.

During the International Year of Astronomy (IYA2009), marking the four hundredth anniversary of the first astronomical observation through a telescope by Galileo Galilei, the new TNG telescope, named after him, has discovered and immortalized the farthest object ever observed by human beings. That primordial star exploded and generated an extremely energetic burst of gamma-rays— among the brightest explosions in the universe. In a few seconds such explosion released more energy, than the Sun may release during its whole existence. Such an observation was important not only because of the tremendous amount of Energy, but mainly because of the age of that celestial body which, being 13 billion of light-years far, is considered the oldest star we know in the Universe and, therefore, the nearest to Big-Bang.

To TNG, the Italian National Galileo Telescope located on the island of San Miguel de La Palma (or, more simply, La Palma), in the Canary Islands, Poste Italiane has dedicated one of the two IYA stamps issued in May 2009: the 60¢ stamp features the TNG telescope, with the universe observed by telescope, represented in the background.

The 65¢ stamp in the same set refers to another important Italian space achievement: *Agile* the small X-ray and Gamma-ray astronomical satellite of the Italian Space Agency (ASI). In the background the Earth is represented.

Several Italian industries are involved in many ESA and NASA projects, for which they provide specialized instrumentation: several devices designed and implemented in our country are presently operating inside many communication satellites, in the International Space Station, and in many scientific satellites which are exploring the different planets of the Solar System.

Also Italian are two out six instruments onboard the space probe Mars Express, launched by ESA in June 2003 and orbiting Mars since December of that year: indeed the ***PFS*** or *Planetary Fourier Spectrometer* aimed at observations of atmospheric temperature and pressure and the ***MARSIS*** or *Sub-Surface Sounding Radar Altimeter*, a radar used to assess composition of sub-surface aimed at search for frozen water.

Made in Italy is also the innovative ***SHARAD*** (Mars SHAllow RADar sounder) installed aboard the Mars Reconnaissance Orbiter (MRO), launched by NASA in August 2005 with the aims of daily monitoring meteorological conditions and identifying new landing sites, thu paving the way for the future Mars missions Sharad has been designed, developed and built under the responsibility of ASI (Italian Space Agency) by the Italian industry Thales Alenia Space and by the University of Rome La Sapienza, its main goal being to investigate and map the first kilometre below the Martian surface, with the intent of locating water/ice deposits and other materials which could be useful in future missions.

To the "Exploration of Mars" one innovative stamp was dedicated in March 2005, printed in full colour on self-adhesive paper, with a silvered warm-applied hologram and letters printed with gold-transparent interferential ink. The drawing features the radar in Mars orbit. At bottom-left you can see the logo of ASI, which is coordinating the Italian participants in the project. On the hologram, symbolizing the electromagnetic waves issued by the radar, innumerable small "ASI" acronyms are reproduced.

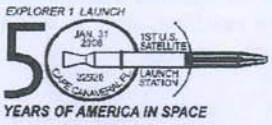
Directly space-oriented were Italy's Millennium stamps, as above and very peculiar is the drawing which won the International Award in the school competition "How do you see the Future?". The stamp features a small boy who is starting to climb on the ladder joining together Earth and Moon.

A very important stamp is expected shortly for the fun of space enthusiasts: as an exception to its unwritten rule of commemorating only Italian Personalities, as well as events in which Italy has been directly involved, the Italian Postal Authority will issue on 12 April 2011 a stamp commemorating an event which marked the beginning of the new Era: the 50th anniversary of the First Manned Space Flight.

As noted in *Topical Time* for Nov-Dec 2010—presented by Felix Perez.

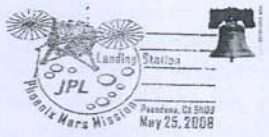
Astrophilately

Fiftieth anniversary of the launch of *Explorer 1*, 1st U.S. Satellite Launch Station, Jan. 28, 2008, Cape Canaveral, Fla., USA.



Fiftieth anniversary of the launch of *Explorer 1* March 11, 2008, Madrid, Spain.

Phoenix-Mars Mission Landing Station, May 25, 2008, Pasadena, Calif., USA.



Nasa's Kepler Mission (also pictures Johannes Kepler, 1571-1630), May 7, 2009, Weil der Stadt, Germany.

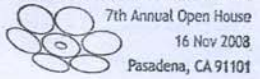
Special Mission, Herschel E. Planck, Frascati, Italy, May 14, 2008.

Tungusta Meteorite centennial (1908-2008), June 28, 2008, Gmünd, Austria.

Palomar Observatory Station (60th anniversary), Aug. 30, 2008, Palomar Mountain, Calif., USA.

Nebra Sky Disc, Oct. 8, 2008, Halle (Saale), Germany.

Carnegie Observatories Station (Giant Magellan Telescope), Nov. 16, 2008, Pasadena, Calif., USA.



Fiftieth Anniversary of *Lunik 3*, Soviet space probe, Vienna, Austria, Oct. 4, 2009.

Ramon Maria Aller, astronomer and mathematician, Oct. 19, 2009, Santiago de Compostela, Spain.

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