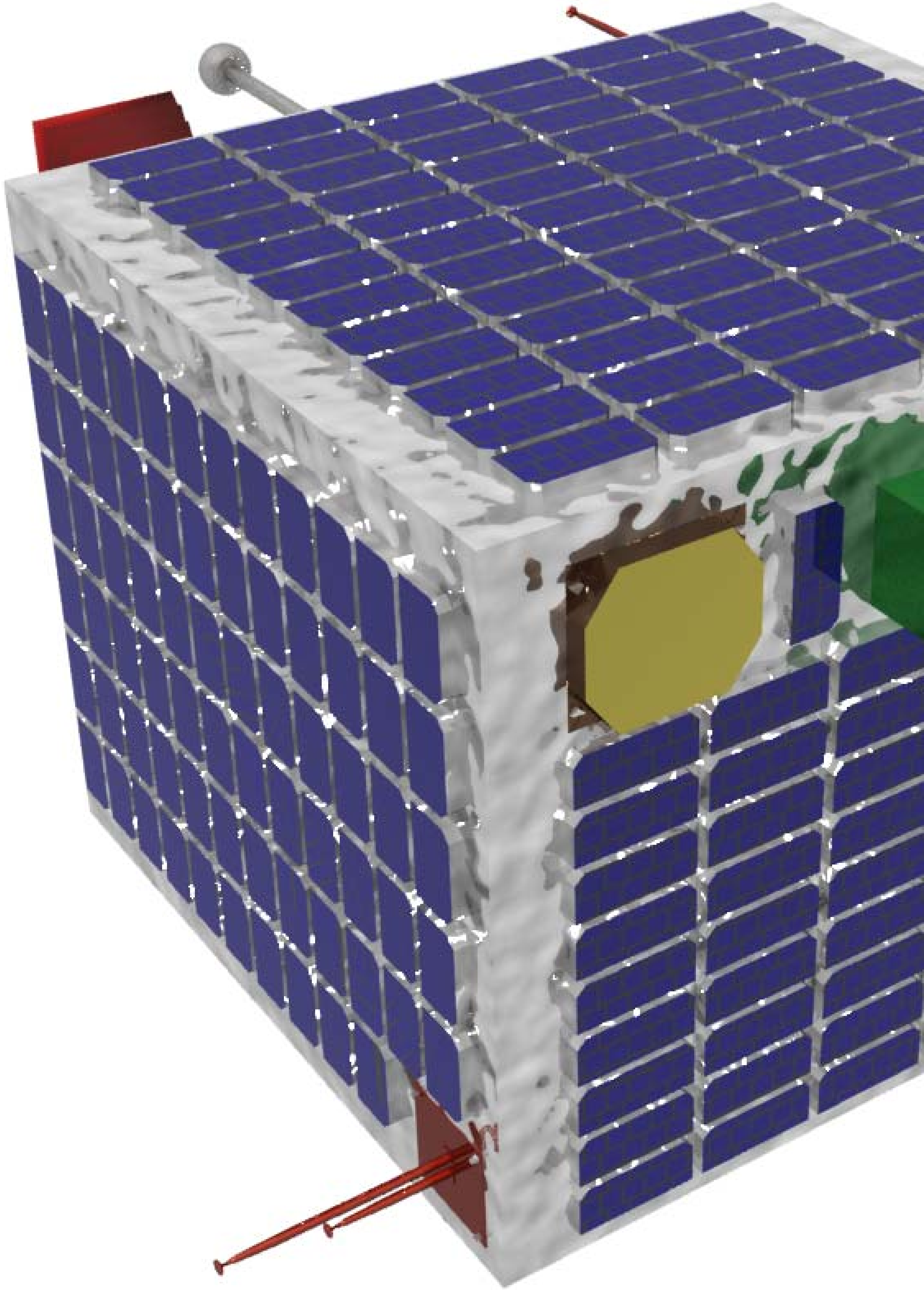
SpaceAlliance magazine



Issue 1 – January 2011

Russia and China hold the last space week's headline

On the 2nd of September, the Baikonur Cosmodrome was the host of a new Proton rocket's flight. The rocket, in the Block DM 2 configuration, carried to orbit three Glonass M satellites built by Information Satellite Systems Reshetnev Co. for the Russian Space Agency.

The Proton launcher left Kazakhstan from the hangar 81 at 00:53 GMT, injecting the three navigation satellites into a circular orbit with the inclination of 64.8 degrees, after a flight of about three and a half hours (separation occurred at 4:26 GMT). The three satellites have become active under the Cosmos 2464, 2465 and 2466 tokens.

This was the last M Class trio launched. In the future, more modern K Class satellites are expected to be launched instead.

Some time ago we reported about the launches from December 14, 2009 (when the Cosmos 2456, 2457 and 2458 were sent into orbit for the orbital plane no.1- slots 1, 4, 5) and from March 1, 2010 (when the orbital plane no. 3 was updated with three Cosmos satellites -2459, 2460 and 2461).

We also reported the problems that Glonass system has encountered last year, too. Glonass 2404, which has been launched in 2003, has been declared "unhealthy" on June 18, 2009, afterwards being abandoned. On May 13, Glonass 2435, a satellite which has been launched in 2007, also had technical problems but was partially recovered in August. However, its signals are still affected by disturbances and, in consequence, the satellite is not fully usable. On August 31st, Glonass 2444 also stopped functioning, even though it was launched recently in 2008. Finally on November 2nd the network lost the Glonass 2418, too.

The new satellites are going to become operational in maximum 45 days and have an operating lifetime estimated at seven years.

With the dimensions of 2.4 metres x 3.7 metres and having the solar panels span up to 7.2 meters, the satellites weigh 1480 kg each. The satellites which are three axes stabilized have the solar panels automatically held in the direction of the Sun while the main platform is aligned to Earth to facilitate the observation and communication.

The Proton rocket, which came into operation under the UR500 token, made the debut in a flight on July 16th, 1965. Since then it has managed to make 350 flights serving the most complex scenarios: it was used to launch Russian interplanetary missions to the Moon, Mars, Venus and Halley Comet, it transported different carriage to Mir stations and to ISS today and transported all types of commercial and military satellites into orbit.

This version of the Proton M rocket is 53 meters long and weighs 712 tons in nominal configuration.

It is a three stages rocket and has a system of boosters with a length of 42.3 m and a diameter ranging between 4.1 m and 7.4 m.

Additional control systems for orbital injection are present and differ accordingly to the mission specific. In this case, a Blok DM 2 system was used this one being equipped with a RD58M engine developing 85 kN of traction force.

The first stage of the rocket is powered by six RD 275 engines with a force of 10.5 MN, the second stage is powered by four engines type RD210 with a force of 2.3 MN and the third stage by a RD212 type engine with a force of 0.6 MN.

In this configuration the rocket is able to lift to orbit a payload of up to 22 tones in case of LEO missions or up to six tons for a GTO (geostationary transfer orbit) mission.

For the Thursday launch the first stage of the rocket flew for about 2 minutes, and after 10 minutes from take off, the third stage launched the Block DM 2 ensemble together with the satellites into an intermediary transfer orbit. Two successive activations of the ensemble took the satellites to the desired altitude of 19100 km and an inclination of 64.8 degrees, later followed by separation.

The Glonass system should have today 21 operational satellites, according to official information, including here the ones needed for a complete coverage of the Russian Federation (18) plus some additional platforms (for extending services to a global scale, 24 satellites are required instead), although the previous report of the Russian Space Agency in the early 2009 spoke of the system coverage of 95% for the Russian Federation and 83% globally.

The Glonass System (“Globalnaya Navigationnaya Sputnikovaya Sistema” or “Global Orbiting Navigation Satellite System”) was put into operation for the first time in September 1993 with a group of 12 satellites and has reached its projected number of 24 satellites in December 1995. However, due to financial problems at that time and the lack of new investment, some satellites have been retired without being replaced.

The system consists of three orbital planes separated by 120 degrees, with satellites in the same plane separated at 45 degrees. Each satellite is in an orbit situated at an altitude of 19100 km and an inclination of 64.8 degrees, and has an orbital period of 11 hours and 15 minutes. Satellites are identified uniquely by their so-called “slot number”: the first orbital plane contains slots 1 – 8, 9 – 16 the second and 17 – 24 the third.

Each satellite sends two types of signals: a standard one, accessible to business applications, and a coded, high-precision one dedicated to military use. There are, in fact, 25 channels separated by 0.5625 MHz in the frequency bands called L1: 1602.5625 - 1615.5 MHz and L2: 1240 - 1260 MHz.

According to official information, when the system will be complete, it will reach a maximum positioning error of up to 70 meters both horizontally and vertically, and the speed error will have a maximum of 15 cm/s (in the civilian system), while the error decreases to 10 – 20 meters in the military system.

In order to keep track with competing navigation satellite systems, the Glonass System will benefit from an investment of 2.6 billion dollars, hopefully reaching a number of 30 operational satellites in the late 2011.

This change in the system's design follows a study performed in 2007, when the expansion of the system from 24 to 30 satellites (8 operational and 2 spares per plane) has been foreseen.

The new generation of satellites, Glonass-K, which will be released starting with the second half of 2010, benefits from an improved design that should increase its operation period to 10 – 12 years and in parallel its reliability. They should be smaller and lighter (750 kg) which will allow the usage of Soyuz-2 as launcher, to the detriment of Proton-M, thus reducing the launching cost to half.

China managed to put into orbit on September 4th its newest platform for the China Satcom company – the sixth satellite from the Sinosat telecommunication series.

This geostationary satellite weighs 5 tones and will operate for approximately 15 years from the 125 degrees East orbital position, 24 transponders in C band, 8 in Ku band and one in S band, which should be able to serve the whole country's territory.

It is built on the basis of DFH-4, a versatile platform that can integrate up to 600 kg of communication equipment, with a necessary power of about 10.5 kW. Launched from the Xichang Satellite Launch Center in the south-western China, at 16:14 GMT, the Long March CZ-3B (Chang Zheng-3B) rocket carried the satellite into a geostationary orbit with the inclination of 25 degrees.

Before becoming operational, the satellite must apply a series of orbital maneuvers in order to enter a circular orbit and decrease the inclination of the orbital plane.

CZ-3B is a three stage rocket (four YF20C engines in the first stage, one YF24E engine in the second stage and one YF75 engine in the last stage) and additionally powered by four boosters YF25. With a height of 54.8 meters and a diameter of 3.35 meters, the rocket is able to carry a 12 tones payload to LEO or 5.1 tones payload to a GTO.

Chinese space program has two major directions: development of new satellites and the development of a human flight program, but an equally important problem remains the progressive enlargement of the launching capacity in order to have the necessary logistics for these projects.

China currently relies solely on the capacity of LongMarch (now in the 4th series) and on the future 5th series which should increase the mass sent onto a low orbit to 25000 kg or alternatively 14000 kg to a geostationary orbit (in the most powerful configuration).

Japan to become the sixth country with its own satellite navigation system

Japan made the first step towards building its own satellite navigation system, which would transform Japan into the sixth country owning this kind of applications.
Probably the best known is the American GPS system consisting of six orbital planes, each with four satellites (30 satellites being currently in operation). Similar systems are the Russian GLONASS system, using a different configuration (three orbital planes with eight satellites each, of which 21 are currently active), or the European Galileo system, still in the beginning phase, which will include until 2016 three planes of ten satellites each. Countries like China and India are also trying to secure their independence in this sensitive area of satellite navigation applications.

The Chinese Compass system will include five geostationary satellites and 30 satellites orbiting on MEO orbits, and will be operational by 2020.

India in turn has in plan to finish IRNSS (Indian regional navigation satellite system) until 2014- which includes three geostationary satellites and four MEO satellites.

Returning to JAXA's program, its first satellite from the new QZSS (Quasi zenith satellite system) which will include two more platforms, is called Michibiki, a name chosen after an intensive PR campaign among the Japanese public and which could be translated as "guidance".

The satellite is three axes stabilized, with a total mass of 4 tons in the form of a 2.9 x 3.1 x 6.2 m parallelepiped. It is powered by two LDAR (Large Deployable Antenna reflectors) solar panels with a span of 25.3 meters, generating 5 kW. It will operate for a period of approximately 10 years, in an orbit having an inclination of 45 degrees, with its apogee at 39.000 km and its perigee at 33.000 km.
Because of the orbit's specificity, the satellite will move south or north, depending on the rotation of the Earth, ensuring seven to nine hours of visibility of the Japanese territory. Thus, a constellation of three satellites would provide a 24 hour a day visibility of Japan for local users. A 2D projection of the orbit would result in an '8' type figure. In the end JAXA has chosen an asymmetric orbit which has the advantage of providing a bigger period in which the satellites would cross the Japanese territory and makes easier the signal transfer between satellites.
The satellite is built on an ETS-8 (Engineering test satellite) platform and will send four navigation signals in L1, L2 and L5 bands, compatible with GPS signals (the same central frequency, the same spectrum, the same structure of the message) but which will require special receivers from users, creating a local market for the standardization of such equipment.
Orbit or flight position correction maneuvers will be carried out with the help of one R-4D engine system, powered by N2O4/MMH and built by the Kasier Marquardt, a company which has a long history (their first model flew in the Apollo campaign, in 1966).

On board was a so-called "retro-reflector array" consisting of 56 retro-reflectors built in collaboration by Honeywell Technology Solutions Inc. and Instrumentation Technology Engineering Inc., reflectors which will allow fine measurements of the current orbit from the ground.
Additionally, the satellite is equipped with a TTS antenna used for calibrating two Rubidium Atomic Clocks, one L1-SAIF antenna which increases the power of the navigation signal, resulting in a positioning accuracy of less than one meter and finally a C-band antenna for bi-directional communication (telemetry and commanding).

The launch was done from Hangar One of Tanegashima Space Center, aboard a H-2A rocket. Launched Saturday, 11 September, at 11:17 GMT, the rocket successfully carried the satellite onto its orbit after a 28 minute and 26 seconds flight. The separation took place at 11:45 GMT, the first telemetry being provided by the ground station in Hawaii.
H-2A is a two-stage rocket capable of carrying a load of up to 10 tones on a LEO orbit (low orbit around the Earth) or equally cargo up to 3.8 tones to a GTO (geostationary transfer orbit) orbit.
53 m in length, weighing 289 tones, it is powered on the first stage by a LE-7A engine using liquid fuel; the engine provides a force of 1098 kN. The second stage is powered by a LE-5B engine, also fueled with liquid fuel and providing a traction force of 137 kN. Depending on the specific of the flight, a system of auxiliary “booster” engines which use solid fuel can be mounted on the rocket. The variants available for this purpose are SRB-A engines (with a traction force of 5040 kN) and SSB engines (with 1490 kN of traction force).
In this particular flight, named F18, the H2A202 version was used, meaning that two SRB-A type systems of “boosters” were mounted on the rocket.
A previous flight was conducted in May 2010, when several small satellites (Planet-C, Ikaros, K-Sat etc) were launched together.

So how does the new system really work? QZSS shouldn’t be seen as a stand-alone system, but merely as a complement to the American GPS. The first talks between US and Japanese representatives- which started targeting signal compatibility and interoperability of the two systems- began in September 1998 when the two administrations established the so called agreement "Joint Statement by the Government of the United States of America and the Government of Japan on Cooperation in the use of the Global Positioning System”.
As it is well known, for a complete determination of a position, at least four GPS satellites are needed.
However, in Japan, because the country’s specifics (mountainous terrain, agglomerate cities with tall buildings etc.) many obstacles tend to reduce signal quality or even lessen the amount of time in which satellite navigation is available.
For example, when using only the GPS signal, positioning accuracy is limited to 10 m while in case of simultaneous use of GPS and QZSS signals the accuracy will grow to 1 m in the first stage of the project (and even up to a foot in the future).
Availability will also increase from an average of 90% (when using at least four GPS satellites, which most of the time are available at an elevation greater than 20 degrees over Japan) to a value of 99.8% using the complementary QZSS system.

The power on time that electronic equipment needs to determine its position is expected to drop from 30 - 60 seconds now to only 15 seconds with the help of QZSS, while an abnormality in one of the navigation satellites (whether we are talking about GPS or QZSS) will be reported in less than 20 – 30 seconds.

Besides classical applications, the QZSS system will bring major improvements in other areas as well – for example, in the prevention of disasters. Here because of the increase of accuracy, the current tsunami warning buoys which are currently located at maximum 20 km away from the continental monitoring stations will be located at larger distances than today (meaning there will be a better reaction time and obviously better chances for local authorities to evacuate the population).

The first Romanian satellite, Goliat, to be launched in 2011 not in 2010

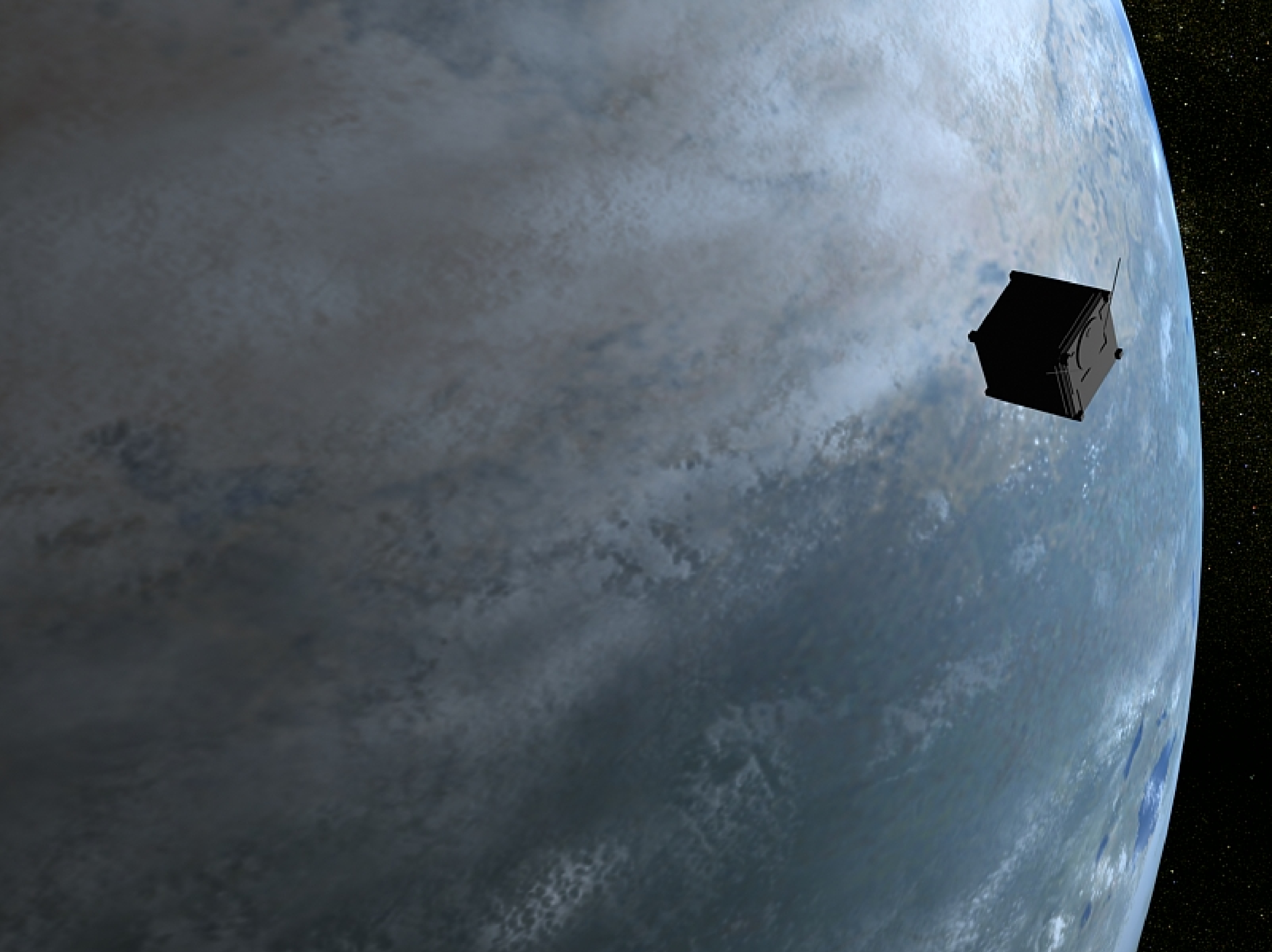
The European Space Agency ESA, representing the interests of the 18 members, the ArianeSpace company, ELV SpA (European Launch Vehicle) and Evry France have signed recently the VERTA document- Vega Research and Technology Accompaniment Program which establishes the mass production for the components of the new launcher, covering in the first phase 5 new missions apart the test flight (on the sponsored list we can find the European satellites ADM Aeolus, Lisa Pathfinder, the Swarm constellation and IEV-Intermediate Experimental Vehicle).
With this, the Vega project moves from the designing and development phase to the exploitation phase.

This huge operation called Vega involves directly 7 European countries (Italy, France, Spain, Belgium, Holland, Swiss and Sweden) prime contractor being the Italian company ELV SpA where the Italian Space Agency ASI holds 30% of the shares and the rest is the property of Avio SpA.
The group will be represented by ArianeSpace who will offer on the commercial market the rocket's new launching services and it will take care of all the operational aspects.

The first flight approaches fast, the first stage P 80 of the rocket has been prepared and waits fully loaded at the French Guyana space center, while the other two stages (Zefiro 23 and Zefiro 9) and the rest of the avionics payload have been assembled in Italy and wait to be transported in Kourou.
Unfortunately, the testing agenda proved to be again unrealistic because the modernization and construction operations of the infrastructure in Kourou, have been slowly than expected.
The engineers currently work on several fronts (the usual preparation of the Ariane5 flights are going normally and supplementary are made efforts to bring into operations the newcomers Vega and Soyuz).
Soyuz, which has a proven technology will enter the operation directly and will have priority being able to bring fast income to the company.
The ArianeSpace director said that probably the Soyuz will have the first flight at the beginning of 2011, followed in an interval of couple of months (mid 2011) by the first Vega flight.

Vega intends to be positioned in the niche of the small launchers bellow the Ariane5 (the big class ArianeSpace launcher) and the newcomer –the modernized Soyuz which will operate in the medium sector.
ArianeSpace did not have a launcher in this niche, but the estimations speak about at least two Vega launches per year.

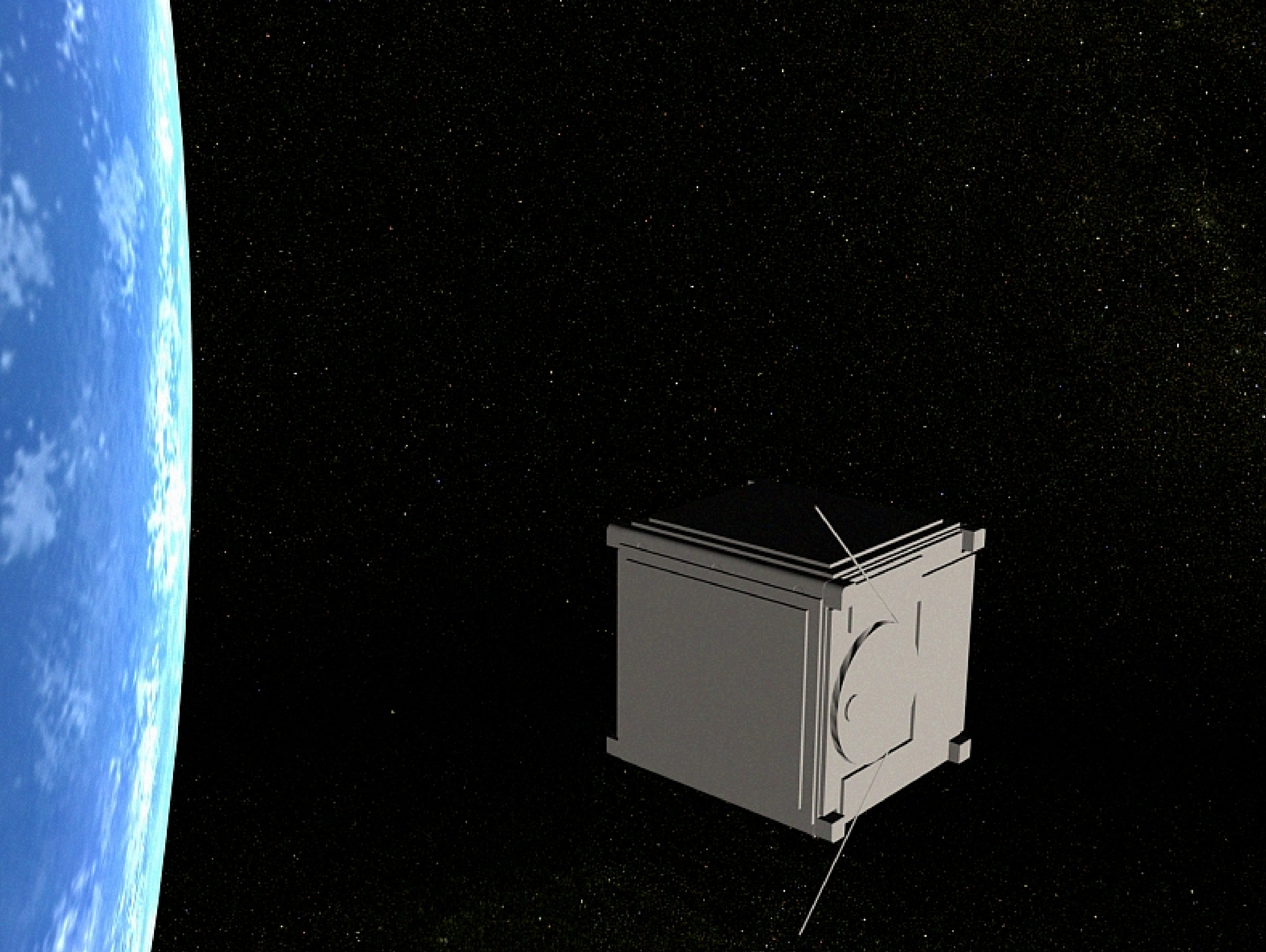
The rocket, with a weight of 137 tones, 30 m in length and a diameter of 3m, has four stages: a P 80 engine using solid fuel for the first stage-with a 3040kN force of traction and 107 s burning time, a Zefiro 23 engine powered by solid fuel for the second stage- with a force of 1200 kN and a burning time of 71 s, again a solid fuel engine type Zefiro 9-with a force of 213 kN and a burning time of 117s and finally a fourth stage powered by liquid fuel engine AVUM (Attitude and Vernier Upper Module) with a force of 2.45 kN and a burning time of 315 s.
The launcher is able to put in a circular, 700km height orbit, a satellite weighting up to 1500 kg which is usually the characteristic of the scientific Earth observation satellites.



The Vega rocket will use the spaceport ELA-1 from French Guyana – the same place used before by the Ariane 3 and Ariane 1 rockets. The hangar needed a complete refurbishment starting from the buildings of the complex and continuing with the auxiliary electrical, protection or control systems and last but not least the transport mechanisms. More, there will be a new mobile platform transporting the rocket, with a height of 50 m and a speed of 5m/minute, being able to cover the distance of 80 m which separates the operational position and the parking place.
The launch campaign for a standard flight has been increased from the current 2-3 weeks to 42 days, just to ensure the proper preparation, taking into account that the new rocket could serve in the future up to 4 flights per year.

Unfortunately neither the other rocket which will take part of the European launching system- the Soyuz 2 is not in a better condition, this program having also big delays.
Because it was impossible for ArianeSpace to serve the first flight in December 2010 and in order to avoid the loss of a first client- the British company Avanti Communications who wanted to launch their Hylas 1 satellite using the services in French Guyana, the company has decided to move the spacecraft onboard its Ariane 5 flight from November 2010 as the rocket has a dual launch capacity, used successfully many times before.
This being said, the inaugural Soyuz 2 flight from Kourou, will be probably marked by a political decision, ESA or CNES giving as alternatives one of their Galileo or Pleiades satellites.
Compared with the original version launched from Baikonur or Plesetsk, Soyuz 2-1a has increased the transport capacity from 1.7 tones to 2.7 tones (for a geostationary orbit).
This happens not only due to the technical modifications but also because a flight from Kourou is closer to the Equator, the Earth rotation bringing a supplementary delta to the velocity of the launcher.
It is also foreseen a Soyuz 2-1b version which will put in place an update of the flight control system, an increase of the third stage traction and another fairing system with an increased volume. With all these innovations, this Soyuz version will be able to lift 3.6 tones into a geostationary orbit.

The ArianeSpace company has reported for the financial year 2009, an income of 1.046 billions euro, increased with 9.4% compared with 2008, an income where the major contribution came from the 7 Ariane 5 flights operated in 2009 versus the 6 ones from 2008.
The previsions for the future are even better as in February 2009 a new contract of 4 billions euro has been signed, including a number of 35 new Ariane 5 units to be operated during the next years, without counting here the contribution that the newcomers Vega and Soyuz will bring soon.



The commercial market has been dominated in the last period by the variations of the launching cost especially because of the dumping prices used by the SeaLaunch operator, but as with the bankruptcy of this one, the analysts are expecting a come back of the launching prices to some realistic values, and a better economical perspective for the two major actors remained on this stage the ArianeSpace and ILS-International Launch Services.

Romania, which is at his first space adventure with the Goliat satellite, will have to wait a bit more until the road to space will open. Delayed again, the Romanian team coordinated by the Romanian Space Agency ROSA will have to see, like the other participants, how the Vega agenda will continue and when the inaugural flight will actually take place.
The Goliat project which aims to lift the first Romanian satellite in orbit, has been started in 2005 by ROSA, having an initial budget of approximately 400.000 euro.
It is a nanosatellite based on the American Cubesat standard, cube-shaped 10x10x10 cm and weighting 1 kg. There are three scientific experiments onboard: SAMIS which aims to measure the meteorites flux, Dose-N which should measure the cosmic radiation dose on an Earth orbit and probably the most valuable, the acquisition of images from a 3Mpixels and 21x28 m ground resolution camera installed on the satellite.

The latest information speak about an elliptical orbit 350x750 km with an inclination of 71 degrees which would be a major change compared with the initial requirements of the designing team – a circular polar orbit with 500 km altitude.
In more concrete terms it will mean the project will only cover the medium latitude sites and will never reach the poles. Most of the scientific missions are launched in polar orbits because they need to have a complete set of Earth data and this is the only type of orbit which can ensure a full coverage (also for the poles).
The Romanian project and some other 8 satellites from the same category are given the chance to fly in the inaugural launch of the European Vega rocket (most of these satellites coming from emergent countries which, as Romania, have started their national space programs and will soon join the European Space Agency):

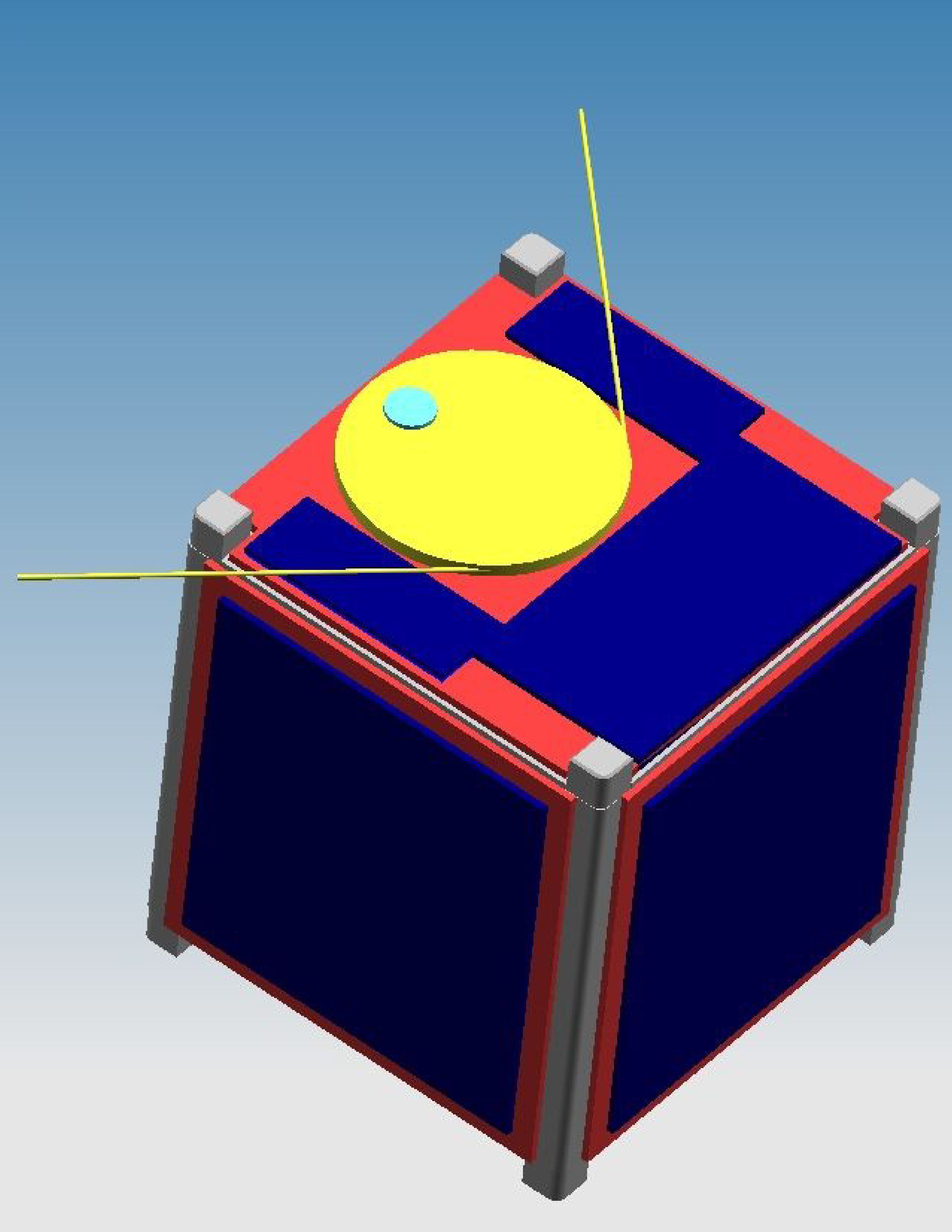
-SwissCube (École Polytechnique Fédérale de Lausanne, Switzerland)
-Xatcobeo (University of Vigo and INTA, Spain)
-UNICubeSAT (University of Rome, Italy)
-Robusta (University of Montpellier 2, France)
-AtmoCube (University of Trieste, Italy)
-e-st@r (Politecnico di Torino, Italy)
-OUFTI-1 (University of Liège, Belgium)
-PW-Sat (Warsaw University of Technology, Poland)

These 9 Cubesats are attached to the main payload- LARES (Laser RElativity Satellite) and the ALMASat (Alma Mater Satellite) a demonstrative mission developed from 1993 by the Bologna University. As with the previous Italian missions Unisat 1 and 2, the mission is trying to develop a modular concept able to integrate a large variety of scientific experiments at a very low cost.

Romania is involved in another 2 European space programs, two of the universities from Bucharest- the Polytechnic University of Bucharest and University of Bucharest being included on the research center list who will work for the development of the ESMO and ESEO projects.

ESEO or European Student Earth Orbiter is the third satellite designed for the Education Satellite Program of ESA- in fact a micro-satellite operated in a LEO orbit and intends to capture Earth images, to measure the radiation level and to test new technologies such as new star cameras, reaction wheels etc.

ESMO or the European Student Moon Orbiter will be the first educational satellite to be sent to the Moon. With a technology inspired by the previous ESA's Smart 1 mission it will be the fourth satellite from the Education Satellite Program. The main contractor is the Surrey Technology Limited from UK and subcontractors spread trough several universities from ESA member or cooperating states.
Romania is represented in this project by the Polytechnic University of Bucharest- responsible for ADCS and structure systems and by University of Bucharest- responsible for the development of the radiation monitoring experiment.



New military satellites launched into orbit

The end of September has been dominated by the military component of the satellites launches and as with all the operations of this type, despite the lack of information, the two launches we are speaking about-one accomplished by USA and the other one by China- have generated a big interest in the media or between the space analysts.
The first launch has been performed on 20th of September at 04:03 GMT when an Atlas 5 rocket has flown from the Vandenberg Air Force station in California marking the fourth event of the American launcher in 2010.

Flown as a 501 type Atlas 5, this has the lowest transport capacity from the Atlas 5 series –being able to carry into a LEO orbit a mass of up to 8250 kg, into a SSO orbit a mass of up to 5945 kg or into a GTO orbit a mass of up to 3970 kg.
Compared with its sister versions, the 501 type does not have the CCB (common core booster) system, its first stage being powered only by a single RD-180 engine with an old Russian design and having a secondary Centaur stage powered by a single RL-10A4-2 engine.
The fairing is built by the Swiss company RUAG, has a diameter of 5.4 m and three possible versions: a small one 20.7 m in length, a mid-size version of 23.4 m and a long version of 26.5 m, being able to accommodate a variety of satellite platforms.

Another 501 type flight has been executed in April 2010 when the passenger was the X37B Boeing-NASA prototype, while the other 2 flights mentioned earlier for 2010 took place with rocket versions 401 (in February 2010 with Solar Dynamics Laboratory SDO) and 531 (in August 2010 with the newest Advance Extreme High Frequency Satellite).
The debut of an Atlas 5 rocket took place in 21st of August 2002 when the first passenger was the telecomm satellite HotBird 6. Since then a total number of 23 flights have been served by the Atlas 5 rockets.
We have to remind here that both Atlas 5 and Delta 4 rockets have been developed for the EELV (Evolved Expendable Launch Vehicle) program which intended to increase the launch vehicle capacity for the US Army.

Despite the lack of information mentioned at the beginning of the article, it is however known the indicative of the satellite –NROL-41 (USA215) and the name of the owner- the National Reconnaissance Office.

The first amateur observations of the satellite's orbit are speaking about a retrograde 1057x1072 km elliptical orbit with an inclination of 123 degrees. The new NORAD 37162 satellite has a visual magnitude of 6.5. Information comes also from the type of faring used- a weight relatively low but still with a big volume- which suggests a low density spacecraft, probably carrying a large antenna. Combining this conclusion with the high orbit used (not favorable for the optical observations of the targets on Earth), one could suggest a radar class satellite as in some of the past cases when several platforms have been placed in retrograde 53 degrees inclination orbits.

The second launch took place Wednesday 22nd of September at 02:42 from the Jiuquan Space Center in China- the fourth launch of this year involving a Long March CZ-2D rocket.
This has been the 13th launch of this rocket, the 131st of the entire Chinese space history (the first placed in 1970) and the 9th flight of the last 50 days- which reflects clearly the ambitions of the Chinese space program.
The main satellite carried into orbit, the Yaogan 11 (placed in an ellipse 627x657 km by 98 degrees inclination) has been built by the Space Sciences Academy. Apparently, there was also a secondary payload onboard- 2 ZPDS (Zhe Da Pi Sing/Zhejiang University Pico Sat) pico-satellites 150x150x150 mm by 3.5 kg weight.
As with the previous cases, the Chinese part claimed they have launched a scientific Earth observation and disaster preventing satellite, however the specialists are speaking about a military spy SAR (synthetic aperture radar) mission – in fact a telescope operated exclusively by the Chinese army to capture pictures of various targets on ground.

The Yaogan Weixing class is grouping all the remote sensing Chinese satellites in two major subcategories: the first subcategory -electro optical digital imaging satellites are launched on board the CZ-2C/D rockets from the Jiuquan Space center while the secondary subcategory-synthetic aperture radar imaging satellites are launched from Taiyuan Space Center on board the CZ-4B/C launchers.

The first subcategory is derived from the old FSW4 platform and replaces the film capture with a digital capture, having a ground resolution of 0.6-1m.
The second subcategory is a bigger 2.5 tons platform equipped with retractable solar panels and a SAR instrument which can produce high quality images independent of the operating conditions.

The remote sensing Yaogan series has been developed by China since 2006. Then, on 27th April 2006, China was launching Yaogan 1 from the Taiyuan. Meanwhile, were launched Yaogan 2 (25th of May 2007), Yaogan 3 (12th of November 2007), Yaogan 4 (1st of December 2008), Yaogan 5 (15th of December 2008) and Yaogan 6 (22nd of April 2009). Finally, the Yaogan 8 was launched on 15th of December last year and later a triple launch putted on orbit Yaogan 9A/9B/9C.

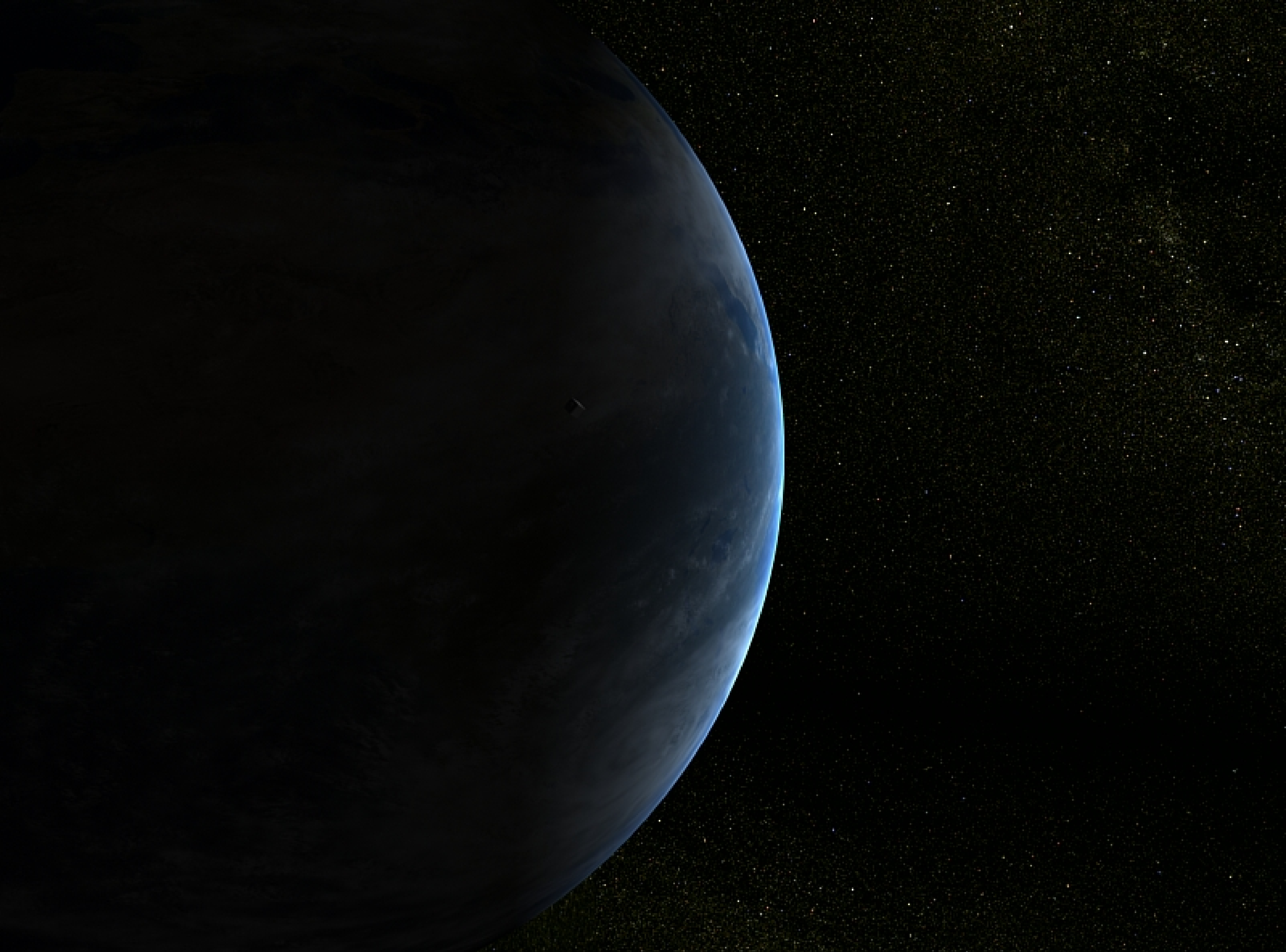
The Chinese Long March launcher (now at the 4th generation) can transport up to 4200 kg into a LEO orbit or alternatively up to 1500 kg into a geostationary orbit, but the next generation the 5th will increase the transport capacity to 25000kg for LEO and 14000kg for GTO.
Coming back to the current rocket version used for this flight- the 2D- it can carry 3500 kg for LEO orbits and 1300 kg for a SSO orbit.

Currently, China is running several space experiments. Recently, there have been reported actions in minisatellite formation flying where 2 satellites launched in August have closed their distance under the 200m proving an orbital rendez-vous.

Moon is equally important for China. After the successful first mission of the Chang'e-1 spacecraft around the Moon, another mission will start soon the exploration of the Earth's natural satellite. On long term, hopefully until 2025, China intends to replace the automatic exploration with humans which could bring back also soil probes.
On even longer term, following the recently launched international trend, the attention of the Chinese space agency will move to Mars, where the first satellites will be launched in the interval 2014-2033 and a human expedition will be put in place no sooner than 2040-2060.

More, at the beginning of March, and under the international refuse of his participation at the international space station -ISS, China released to the public his intention to produce its own space laboratory.
Starting with 1992, China manifests an interest for the human space flight. Its first serious initiative in this field was the so called 921 military project, an improvement of the previous 714 and 863 projects (initiated in 1967 and respectively 1986).
Unfortunately the effort was bigger than expected and it took more than 11 years and 2 billions dollars for China to send an astronaut in space, becoming thus the third country in the world succeeding this (on 15th of October 2003).
Since then the interest moved from the simple orbital flight to the more ambition objective of having a permanent station in space.
Even thought is inspired by the MOL program which was abandoned by USA in 1969, the first Chinese laboratory Tiangong 1 appears today much closer to the design of the European project ATV. It is in fact a laboratory fully equipped with sensors of last generation and who is going to work mostly autonomous.
In parallel there will be more effort spent for the development of the Shenzhou program which will play a role in the space-taxi concept.
The accent will go on the capacity of this vehicle to perform flights with a human crew onboard.
As with the ISS, the Chinese astronauts will come periodically on board of the station, they will be able to inspect it, they could collect the recorded data and could do some other manual experiments.
Separate of the Tiangong station, China plans the launch until 2020, of even a bigger and better station (20-25 tones in weight) which will have technology inspired by the Russian Mir laboratory.

But all these ambitious plans for the future cannot be sustained without permanently increasing and improving the performances of the launch vehicles, and this is a strategic direction where China is going to invest a lot of money in the next years, hoping to close the distance which still separates it from the other two big actors USA and Russia.



The SBSS system becomes reality

The SBSS system became reality after the first satellite has been sent to space on 26th of September 2010.
Six years ago, in March 2004, US Air Force has organized a competition for the building of a new system which should detect and track the objects in space, equally if they are active satellites or orbital debris. This data should complete the US Surveillance Network data which currently surveys approximately 19.000 objects from space and will assure the skeleton for what is generic called Space Situational Awareness.
The collected information will mainly be used for military operations but not only, it could equally help the development of the space debris avoiding strategies onboard the ISS or the preparation of the orbital maneuvers for the commercial satellites which should avoid Iridium 33 type events.

The first SBSS-1 satellite (together with the entire ground facilities) part of the Block 10 contract, has been built with an estimated cost of 823 millions dollars-40% going to the satellite itself and another 35 millions paid for the launch.
Northrop Grumman Mission Systems took the first phase of the contract (mission area prime integration) and the Boeing Space Systems & Ball Aerospace the second phase (development of the satellite and the operational aspect).

The new satellite has been built based on a BCP2000 platform (Ball Configurable Platform), weights 1031 kg at launch time and will operate for approximately 7 years. BCP2000 is a versatile platform, developed by Ball Aerospace in order to integrate any kind of Earth observation instrument, and has a very good three axes stable, fast pointing and responsive attitude and orbit control system.

The active control is done using a hydrazine thruster system and the sensor components include GPS receivers, 2 star cameras etc.
The power is generated using 2 solar panels each having 3 independent sections, being free for rotation on two of the axes and being guaranteed to generate at least 840W at EOL (end of life).
The communication is ensured by a powerful X band antenna with a telemetry downlink rate of up to 320Mbp and by an S band antenna for commanding uplink.
We have to mention that the first satellite built on a BCP2000 platform was the Cloudsat launched in 2006, a meteorological satellite operating a special radar for the measurement of the altitude and properties of the clouds.

Coming back to SBSS-1, it should be said that, like in most of the cases of this type when new programs are started, the real agenda was completely different of the initial plan, the launch initially programmed for 2007, slipping finally to September 2010 this mainly due to the delays in the satellite development program and later to the problems accounted with the launcher.

Launched from the Complex 8 of the Vandenberg Air Force in California at 04:41 UTC, the Minotaur 4 rocket placed the SBSS-1 satellite 15 minutes later into a transfer orbit with the height of 540 km and the inclination of 97.99 degrees. From this orbit, the satellite will be moved to the final operational orbit- circular, sun synchronous with the altitude of 630 km.
After this operation is accomplished, it will take US Air Force another 90 days, spent for testing and calibrations, before receiving a full operational satellite.

It was the first orbital flight for a Minotaur 4 rocket after the earlier April suborbital flight of a Minotaur 4 Lite rocket having onboard the Hypersonic Technology Vehicle HTV-2a.
Derived from the old 70s Peacekeeper missiles which were dismissed from operation later in 2005 as part of the Start 2 treat, Minotaur 4, built by Orbital Sciences Corporation, is a 23.8 m long rocket, with a diameter of 2.34 m, a weight of 83 tones and being powered by 4 solid fuel engines.

First stage, built by Thiokol/ATK is powered by a SR118 engine with traction of 2200kN, the second stage built by Aerojet is powered by a SR119 engine having a traction force of 1365 kN, and the third stage built by Hercules Incorporated is powered by a SR120 engine and 329 kN.
The fourth stage is configurable and makes the difference between the standard Minotaur 4 and the Minotaur 4 + powerful version. For the first version, an Orion 38 engine with 32.2 kN of thrust is used-built by the same Hercules Incorporated and used in the past for the Pegasus and Taurus rockets, while for the second version it is used a Star-48V engine built by Thiokol/ATK with 68.6 kN.
The rocket is able to lift into a LEO orbit a satellite weighting up to 1735 kg. The next flight of the launcher is expected for 2011 and will carry onboard a new HTV experiment, the version 2b.

So how does it work the SBSS system? Compared with the terrestrial similar systems (either we speak of radars or telescopes) tracking the object from a space point has the advantage of not being affected by the meteorological conditions, the atmospheric interferences or the moment of the day.
The orbital position ensures a longer visibility for a target and not only when it crosses an observation point i.e. as for a ground station.
The idea is not new but it continues the MSX project (Midcourse Space Experiment) launched in 1996. One year later in 1997, left without the cryogenic fuel that was meant to keep the low temperature of the focal plane inside the principal scientific instrument Spirit 3 (Space Infrared Imaging Telescope), the MSX satellite lost the infrared sensor but continued to function with the SBV (Space Based Visible) a sensor capturing normal, visible images.
This functioned until June 2008 when it brooked and finished the MSX mission.

In comparison with the MSX project, the new SBSS-1 brings in attention a 30 cm telescope placed on a platform which can rotate on two of its axes -which means it can assure an individual rotation of the instrument without the need of reorienting the entire spacecraft.
Having a large visual field and 3 component lenses, with a focal plane of 2.4 Mpixels and with a reduced interference of the electronics, the new telescope brings 2 times more sensitivity, 2 times more speed in the detection of possible orbital conflicts and 10 times more processing capacity.
Last but not least, it can monitor not only the geostationary satellites but also the ones from medium MEO orbits or high HEO orbits around the Earth.

China is once again in the forefront of spatial launches

On 22nd of September we were reporting the launch of Yaogan 11 from Jiuquan space center and only a week later we can already speak about an intense campaign taking place in China, because in the meantime, two other launches were performed.

The first one Chang'e 2 is China's second probe sent to the moon and was an investment of 134 million for the Chinese Space Program. It was initially built as a spare platform for Chang'e 1, in case it would have failed, but the scientific part was substantially improved afterwards.
It was launched symbolically on 1 October, on the Chinese national day, at 10:59 from hangar two of Xichang space base, aboard a Long March 3C rocket. The probe will continue its exploration of Earth's satellite. The transfer period to the final polar orbit around the Moon (which will have a height ranging from 15 to 100 km and a period of 117 minutes) will be of about 5 days (or more accurately 122 hours), half the transfer period of Chang'e 1 (12 days). This change is mainly due to the increased orbital injection velocity of the CZ 3C launcher, compared to CZ 3A which was used in the previous flight. The speed allowed a direct placement of a Chinese satellite onto a transfer orbit to the Moon for the first time, without needing a fly-by around the Earth, as before.

According to the scenario, Wednesday at 3:06 UTC, took place the orbital injection maneuvers aiming an initial placing of the satellite on a high elliptical orbit, followed by two corrections meant to decrease the height of the orbit.

The first Chinese spacecraft, Chang'e 1, launched on 24 October 2007 aboard a Long March 3 launcher, successfully fulfilled its mission, collapsing on the lunar surface at 1.5 degrees south latitude and 52.36 degrees east longitude.
Its name comes from the Chinese mythology, representing an ancient Moon goddess. The purpose of the mission which lasted 16 months (except for obtaining maps of the moon) was to study the ability to adjust the trajectory and orbital degrees of freedom of the probe in the vicinity of the Moon. The tests were made by remote control, using two ground bases: Qingdao and Kashi.

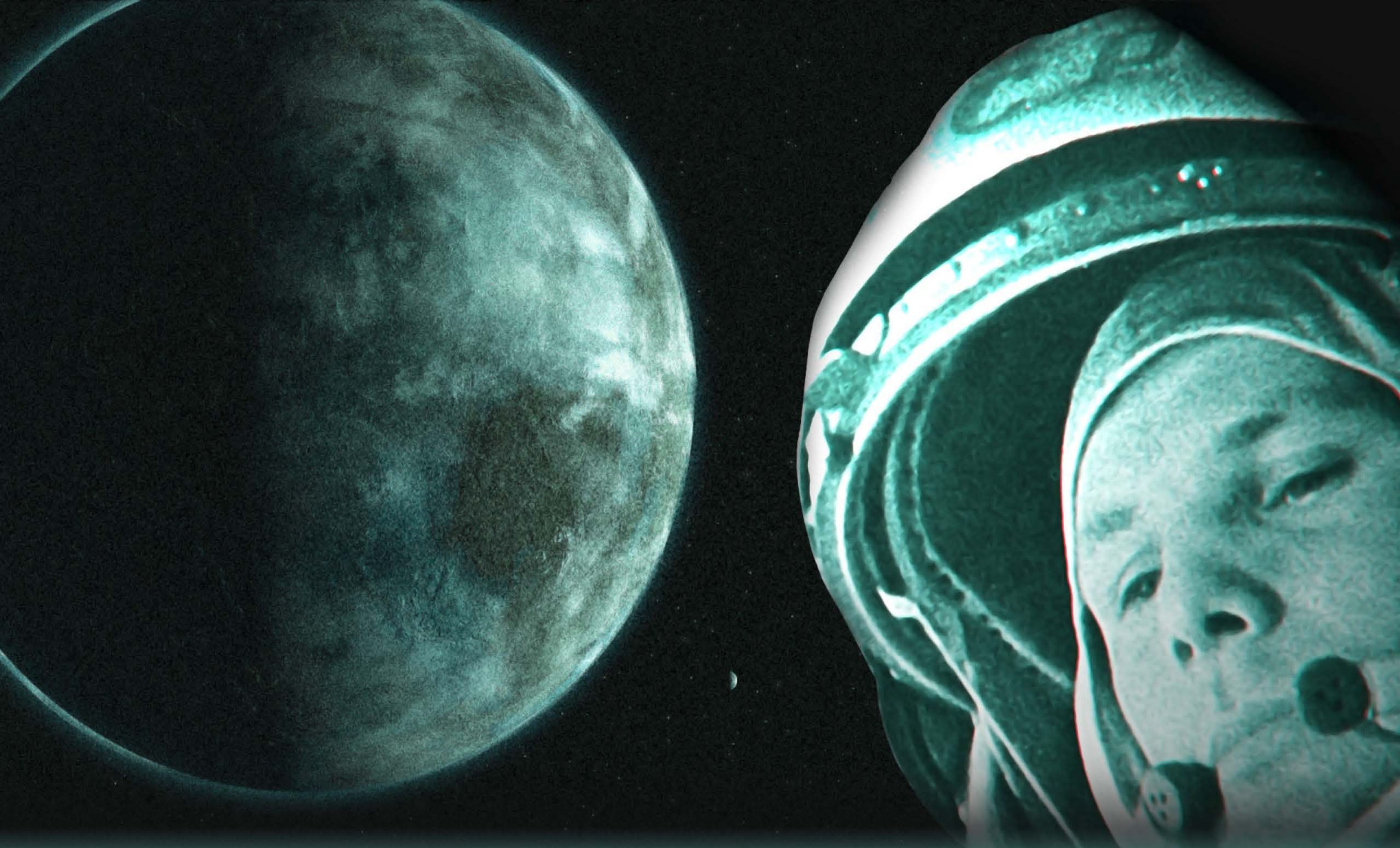
The new satellite is going to gather high resolution images (1.5m-10m depending on altitude 15-100km, compared to 100m from the Chang `e 1 flying at 200 km altitude) for a minimum of 6 months with possibility of extension if things go well and will prepare the ground for Chang'e 3 which will fly in March 2013 (choosing sites favorable for landing) and later for manned missions.

Chang'e 2 is a 2480 kg satellite equipped with a new stereo-type HD CCD camera. On board there are two spectroscopes in x and gamma range that will allow investigation of the content and distribution of elements such as Al, Mg, Si, Ti, etc. in the lunar soil. By scanning the lunar surface using a so-called 'Microwave Detector' at frequencies of 3.0, 7.8, 19.35 and 37 GHz, Chang'e 2 will be able to collect additional information on soil properties.
The probe also has a solar particle and ion detector, which will allow the study of the influence of solar wind on the surface of the moon. For the first time, the satellite will bring in attention the use of X-band communications for 'deep space' missions, technology that is intended to be used for other future missions to Mars and Venus.

Ground network stations are placed at Kunming, Beijing and Urumqi (under the tutelage of National Astronomical Observatories of China), but the interesting thing is that the satellite's antennas will be able to communicate equally with China Satellite Maritime Tracking & Network Control Department, whose spaceships Yuanwang 3.5 and 6 have compatible command and telemetry systems installed on-board.

A second release was made based on Tayiuan, Wednesday, October 6, 0:49 pm UTC using a Long March 4B rocket. Passengers were two satellites from the Shijian 6-1 class, a space designed experiments class, the 6G and 6H platforms. They come at two years time since the last release (October 2008) and will fly in an orbit with an altitude of 640 km and inclination of 98 degrees. The Shijian satellite class launching scenario is classic and is carried on board a CZ-4B missile involving a dual flights. The first flight took place in September 2004 when platforms 6A and 6B were launched. The second one took place in October 2006 with 6C and 6D platforms and the third one which we mentioned earlier in October 2008 with 6E and 6F satellites.
This was the second release of the year from the Tayiuan base and the 11th of the Chinese space program in 2010.

The two new satellites were built for the China Aerospace Science and Technology Corporation by the Shanghai Academy of Space Flight Technology, China Electronics Technology Corporation and Dongfanghong Satellite on a CAST968 platform, and their lifetime should be somewhere around two years. The next Chinese launch will most likely take place on the 30th of October, when is expected that a new Beidou 2 navigation satellite (platform with 4G telecom capabilities) will be put into orbit by a CZ-3C rocket. The previous launch of a satellite of this kind took place in June.



WORLD SPACE WEEK

Sirius Series enhanced by a new telecommunication satellite

The last days saw the launch of the newest platform of the XM Satellite Radio Holding Inc. XM-5 was built by Space Systems/Loral as a result of a contract won in June 2005 and finished 3 years later from the initial establishment. The launch was made by International Launch Systems.

The liftoff took place on 14th of October at 6:53 PM with the use of Baikonur space port hangar nr. 24. A Proton rocket in the Breeze M configuration lifted the new satellite into a geostationary transfer orbit. The XM-5 is the fifth XM Satellite Radio series platform, series which began in 2001 with XM-1 and XM-2 satellites and eventually continued in 2005(XM-3) and 2006(XM-4).
It's the first time when the Boeing 702 basic platform is replaced with the LS-1300S in the same configuration that is used also for Echostar Satellite Services satellites, a Dish Network corporation subsidiary-in other words, Space Systems/Loral on the design/development part and ILS for launch. The ILS company (International Launch Services) based in Virginia, USA, whose major shareholder is the Russian company Khrunichev Space Center- the Russian builder of the Proton rocket, has exclusive rights for the marketing of the transportation services to the commercial satellite operators from around the world.

Space Systems/Loral is a subsidiary of Loral Space & Communications corporation that owns 64% of Canada's Teles group and 56% of the group is partnered with HISDESAT (founded by Hispasat S.A and Spanish Ministry of Defence). Headquartered in Palo Alto, California, SS/L has started its activity 50 years ago and since then has managed to build more than 220 satellite for commercial purposes or government clients worldwide: APT Satellite, AsiaSat, Asia Broadcast Satellite, DIRECTV, DISH Networks, EchoStar, Globalstar, Hisdesat, Hispasat, Hughes Network Systems, ICO, Intelsat, Japan's Ministry of Transport and Civil Aviation Bureau, the National Oceanic & Atmospheric Administration (NOAA), Optus (SingTel), SatMex, SES, Thaicom, Sirius XM Radio, Telesat, TerreStar Networks, ViaSat, WildBlue Communications or XTAR. Last year parent company, Loral Space & Communications announced revenues of 1.008 billion dollars, increasing from 2007 (814 million) and 2008 (881 million) and a total of 2,400 permanent employees and 150 employees.

The new satellite, weighing 5984 kg will operate for about 15 years from an 85.2 degrees west orbital slot. It features two large antennas and has generated an output of 19.5 kW minimum. The flight to orbit lasted 2 hours and 12 minutes and was a complex one, including an initial parking in a circular orbit followed by another four maneuvers that raised the height of the orbit and decreased the orbital plane inclination. At the moment of the separation from the rocket, the satellite was placed into a GTO orbit with perigee at 4235 km, apogee at 35737 km and a 22.84 degree inclination. In the few days elapsed since the satellite launch -which received in the meantime the ID 37185- used its onboard engines for orbital correction (in order to circularize and lower the orbital plan inclination to 0), so that now it flies into a GEO orbit, placed at 80 degree west orbital slot. For a month the team engineers will perform regular tests after launch and will turn on all equipment on board. The satellite will then be moved to the final operational position a few degrees longitude away.

This was the ninth launch of a Proton rocket in 2010, and the 62nd time when is used by the ILS.
The Proton rocket, which came into operation under the UR500 call, made its debut in a flight on 16th of July 1965. Since then it has managed to accomplish 360 flights with the most complex scenarios: was used to launch Russian interplanetary missions to the Moon, Mars, Venus and Comet Halley, to transport loads to the Mir station (and now to the ISS) and last but not least to transport commercial and military satellites into the orbit.

The Proton rocket is 58.2 meters long and weighs 705 tons in normal configuration. It is equipped with three engines and a system of boosters, with a length of 42.3 m and a diameter ranging between 4.1 and 7.4 m. On top of the rocket we found the additional Breeze M system which develops an additional force of up to 20kN and is equipped with a triaxial stabilization system, a navigation system and an onboard computer, being directly responsible for the quality of the orbital injection. In his case, the amount of fuel loaded depends on the mission's target and is varied to optimize flight performance. The first stage of the rocket is powered by 6 RD-276 type engines that provide a total of 11MN. The second stage is powered by three type RD 210 engines, plus a type RD 211 type engine providing a total force of 2.4 MN. The third stage is powered by a type RD 213 engine with a 583 kN traction force, and the control and direction of the flight are made with triple redundant avionics system that controls 31kN motor with four nozzles. With this equipment, the rocket is capable to carry in a geostationary transfer orbit a mass of up to 6360 kg.

The Proton rocket's launch will be continued on November 14th when on board will be the SkyTerra1 satellite, while the next Sirius satellite will be the FM6 platform which will fly in 2011(for compliance should be noted that the U.S. company is developing both XM and FM series of satellites in parallel, the latter having a highly elliptical orbit type Tundra 23975 km x 46983 km x 63.4 degrees and thus can serve the far North American region).
Founded in 1992 and currently valued at over 6 billion $, XM Satellite Radio Holdings Inc., also known as Sirius Satellite Radio brand, is headquartered in Washington DC and its majority shareholder is Liberty Media Corporation, which owns 40% of the company's shares. The company is focused on providing radio programs (presently over 130) to 19.5 million people in the Americas. Secondary services have been developed providing information about weather, navigation, traffic, etc.: SIRIUS Backseat TV ™, XM NavTraffic ®, SIRUS Traffic ™, XM ™ and SIRIUS Marine Weather Nav ™. In 2009 the company earned 2.53 billion dollars, increasing wit 4% from 2008, the only growth for a radio company in American economy.
Despite the slight decrease in the number of subscribers (257,000) revenue per subscriber increased by 2% reaching 10.56 dollars in 2009 from 10.73 dollars in 2008.

Globalstar network moves to phase two

Star Company, part of Arianespace, which operates the Soyuz 2-1A rocket from Kazahstan, managed to simultaneously launch six satellites for the U.S. telecom operator Globalstar.
Soyuz 2 is the same rocket that will be operated by the French Guyana, besides Ariane 5 and Vega.
Launched on 19 October, at 17:10 UTC from Baikonur, the rocket managed to inject all of the six satellites onto a transfer orbit with the altitude of 920 km and an inclination of 52 degrees, after a 100 minute flight. From this point, the orbital motors aboard will increase the orbit's height until it reaches the operational orbit – circular orbit 1410 km x 1410 km x 52 degrees.
Placed inside the protective capsule on two levels, two satellites at the top and four at the bottom, the new Globalstar platforms left the launcher one by one, all their signals being received successfully by the Russian ground stations.
The satellites are part of the new generation Globalstar 2 and are built by the Franco-Italian company Thales Alenia Space that signed a contract in 2006, which included 48 platforms and which had a value of 660 million euro, with an average price below 15 million euro per satellite.
Weighting 700 kg, they are equipped with 32 transponders, being able to communicate in L,S and C bands. With the life expectancy of 15 years, the two solar panels generate a minimum of 1.7 kW enough to cover the consumption of energy.
It's a change from the first generation of Globalstar satellites, which were almost half the weight, i.e. 450 kg. The lightweight allowed the launch of 4 satellites simultaneously with the Soyuz classic board, between 1999 and 2007, Starsem performing 8 flights for Globalstar. These satellites were built by Space Systems and had a life expectancy of 7.5 years.
The flight we're talking about now is only the first of the four planned for Globalstar 2, a total of 24 satellites will join the network and ensure the continuity of voice and data services until at least 2025.

Repairing the constellation was imperative because communication services have recently suffered from the physical wear of the satellites. Since 2007, because of a decrease in performance of the S-band antennas, the 400,000 users were unable to use voice services and duplex data communication and had to use as an alternative the tools available on the website, in order to calculate the communication windows.
This is clearly an improvisation and a weak point for the American operator, especially because many of the users from the country-side have no other option but satellite communication.
By this time, the constellation covers about 80% of the Earth's territory (excepting remote areas like the poles) and uses CDMA (Code Division Multiple Access) signal technology, any one of the satellites being able to receive calls from its instantaneous coverage area and transmit it over from satellite to satellite until one of the platforms is in the vicinity of a gateway (avoiding in this way ground obstacles; transmission is made possible in remote areas via the spatial segment). Terrestrial transmission points are connected with local voice and data networks, which take the signal and finish the operation.
Unlike the case when geostationary satellites are used, the use of a LEO orbit eliminates the echo effect and the delay of telephone conversations and allows use of smaller handsets.

Globalstar Inc. is a company with customers in over 120 countries, with centers in Covington, Louisiana and Milpitas, California, incorporating Globalstar Mobile Satellite System and Globalstar Gateway Earth Stations as subsidiaries. Beside the spatial segment, the American company also holds a spatial operations command center, SOCC (Satellite Operations Control Center), a network of ground antennas, GDN (Globalstar Data Network), and antenna command center, GOCC (Ground Operations Control Center).
Globalstar Inc. is the successor of Globalstar LLC since March 2006, when the shareholders decided to change the company's name. Globalstar LLC had taken the assets of Globalstar LP, which had declared its financial problems back in 2003 and came under bankruptcy protection, in April 2004. New investments that began in 2006 with an order of 48 satellites are therefore part of a management plan that should boost the company's market value and its long term income.

Italy completes the Cosmo-SkyMed constellation

Italy was able to send into orbit the last satellite from the Comso-SkyMed series, a program meant for observations of the Earth, focusing in particular on the Mediterranean basin area. Its applications are in agriculture, prevention of natural disasters, mapping and monitoring of the Italian peninsula coast.
The Cosmo-SkyMed program has a mixed character: it can be used in both military and civil applications and was initiated in partnership by the Italian Space Agency (ASI), which owns 70% of the consortium, and the Italian Defense Ministry, with a participation of 30% from the shares. The constellation, which cost around one billion Euro, is composed of four satellites, the first three of which have already been deployed (Cosmo 1 in June 2007, Cosmo 2 in December 2007 and Cosmo 3 in October 2008).
The industrial consortium which handled the construction of the satellites included the Italian subsidiary group of Thales Alenia Space (former Alenia Spazio) as prime contractor, but also some other players in the aerospace market in the peninsula, such as Galileo Avionics, Telespazio etc.

All four satellites were built on a common platform called “Prima”, a platform which will be part of the new Sentinel satellites in the future. The satellites in cause weigh about 1900 kilograms and are planned to be operational for a period of at least 5 years in a circular/polar LEO orbit (619 km x 619 km x 97.8 degree inclination). They will constantly scan the surface of the Earth using SAR (synthetic aperture radar) technology in the X band, at a frequency of 9.6 GHz and being able to play high-resolution images. The major advantage is the generation of these images in cascade (each satellite can deliver up to 450 images per day and the revisiting period is only 6 hours), independent of observation conditions (lighting, weather conditions).
For civil applications, the resolution communicated to the public is about 1 meter, being lowered for military uses. It is hoped to better secure the Italian territory even more, as the Italian side hopes to use additional information from the French military satellites, the Pleiades, in a strategic partnership called “Orfeo”.

As in the previous three cases, the launch was made aboard a Delta 2 rocket with a 7420-10 C configuration. The rockets dispose of four GEM 40 boosters using solid fuel to help at liftoff, a first stage powered by a RS-27A motor and a second stage powered by an AJ-10-118K motor.
Departed from California's Vandenberg Air Force on November 6th at 7:20 local time, the rocket placed the satellite into orbit after a new 58-minute flight. This was the 93rd consecutive successful attempt by Delta rocket since the incident in February 1997 which broke the line of successes (in total the US launcher successfully launched 146 flights from 148 attempts).
The flight was also symbolical, marking the 350th flight made by a rocket from the Delta family which has a 50 year long history. But despite this history, the Delta 2 version has an uncertain future. Currently there are only three more flights taken: the Argentinian SAC-D satellite, the Grail lunar probe, owned by NASA and the NPP meteorological satellite. Theoretically, the stored components are enough to build five more rockets, but by now no use has been found for them, while the market is already crowded with other models of rockets, more modern and versatile than Delta 2.

The first SkyTerra satellite in orbit

On 14th of November 2010, at 17:29 GMT (12:29 AM EST), a Proton-type rocket designed to place into orbit a new civilian satellite named SkyTerra 1 was launched from the Baikonur Cosmodrome in Kazakhstan.

The satellite belongs to LightSquared (formerly SkyTerra, formerly Mobile Satellite Ventures) and, together with a second satellite, SkyTerra 2, which will be launched in 2011 with the help of another Proton rocket, is intended to offer a full coverage of North American continent: USA, Canada, Mexico and the Caribbean, being positioned in a geosynchronous orbit 22,300 miles altitude and 101.3 degrees west longitude.

With two satellites, the company LightSquared, aided by Boeing Satellite Systems, International Launch Services Inc. and Khrunichev State Research and Production Space Center will be able to provide by the end of the year 2016 the latest generation mobile phone service (4G), together with its own terrestrial network.

The satellites will communicate in Ku and L bands and are built on the Boeing 702HP platform, using an antenna with the largest reflective surface used so far on civil satellites and being able to fold.

Using for communication with the two satellites four ground stations built by Boeing, the company aims to achieve a telephone network able to provide a link to any user, at any time, regardless of location or weather, hoping to avoid, after the year 2016, situations similar to Hurricane Katrina, when all ground communication systems became unusable, circumstances under which even the interventions of the National Guard teams were not coordinated.

The satellite, part of a project which doesn't constitute a scientific innovation, but rather a social necessity, is intended to remain in use for a period of at least 15 years. The project was initially conceived with the prospect of a further third satellite, MSV-SA, meant to expand the network over South America as well.