

## USA-GROUP ASTRONOMY (25/05/2007)

### NASA

NASA = *National Aeronautics and Space Administration*. Founded in 1958.

Predecessor: NACA = *National Advisory Committee for Aeronautics*, founded in 1915 Special military interests. Main objective: increase speed. WW II of great importance: first developments of jet engines + rockets (Wernher von Braun!).

Cold war: development of espionage satellites a high priority. Russians were the first to launch a satellite: *Sputnik* (1957), soon followed by the American *Explorer* (1958). Russians continued being the first: Yuri Gagarin first human to orbit the Earth in 1961, John Glenn 3 x around the Earth in 1962. Then, stimulated by Kennedy, the Americans got the upper hand: First space walk in 1965, first docking in 1966 and first men on the Moon in 1969! Six *Apollo* flights followed until 1972 (a total of 12 astronauts walked on the Moon), then money ran out (Vietnam war!).

In the meantime other projects had already been carried out:

- *Mariners* flew past Venus, Mars and Mercury in the 1960's; in 1971 *Mariner-9* was the first probe to enter planetary orbit around Mars: huge success, 85% of the surface mapped.
- *Vikings-1 + 2* were combined orbiters + landers around/on Mars in 1975 and 1976.
- *Pioneers*: nrs 5-9 in orbit around the Sun around 1970 to study solar winds and solar flares. *Pioneer-10* launched in 1972, was the first probe to travel to the outer planets.
- *Voyagers-1 + 2*, launched in 1977, also flew past the outer planets. By early 2005 both probes had left the SS, but continued to send information.

Then ideas were developed about a re-usable *shuttle*, the size of an airliner. Enormous technical challenge, many years of preparation. First launch in 1981: shuttle orbited the Earth and landed safely after 54 hours. First real use in 1983: ESA's *Spacelab* + 6 astronauts transported into orbit after which the shuttle returned.

After 24 flights disaster struck when in January 1986 the shuttle *Challenger* exploded shortly after its launch: crew of 7 died. No flights during the following 2 years + 8 months.

September '88 saw the launch of the (improved) shuttle *Discovery*, followed by 75 further flights, nine of which to dock with the Russian space station *Mir* (international cooperation!) and in 1998 the first one with the *International Space Station*.

A second disaster occurred in February 2003, when the *Columbia* shuttle disintegrated during its landing, again with a crew of seven.

During the '80's ideas were developed to bring a large telescope into orbit. In April 1990 the *Hubble Space Telescope* was launched, on board a *Discovery* shuttle. It is 13 m. long, weighs 11,000 kg, flies 600 km above the Earth in a 94-minute orbit. But first images were vague. Hubble was 'short-sighted'. Repair mission in 1993, results fantastic. Enormous amount of images and other types of info collected over the past 14 years.

However, in c. 2007/08 Hubble will stop (main camera already stopped in January of this year).

In October 2006 it was decided to carry out a repair-mission – launch in May 2008 – which will keep Hubble operational until at least 2013.

In the meantime the *International Space Station* was built. First plans date from 1969. In 1984 Ronald Reagan gave the green light and suggested international collaboration. The Russians had developed their *MIR* Space station, and their experience was invaluable for the development of the ISS-project. Later on also Japanese and Europeans joined in.

In March 2001 the ISS was complete (built up in parts, not launched as one item). Crews stay for several months, carrying out all sorts of studies: weather on Earth, medical experiments, weightlessness, physical condition of astronauts etc.

And of course other projects were carried out, several of them with great success: the Mars Rovers *Spirit* and *Opportunity* (launched in January 2004 for 90 days' work, but still active), the *Cassini* probe orbiting Saturn + ESA's *Huygens* landing on Saturn's moon Titan in 2004, etc.

But the future is uncertain, as President Bush announced a new direction: new manned flights to the Moon, partly in preparation of sending astronauts to Mars...

This may mean that less money will be available for existing or other planned projects.

