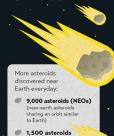
the ecosystem

ASTEROIDS RICH IN RESOURCES



The asteroid named Ryugu on which Jaxa - the Japanese Space Agency September 2018 contains an estimated mineral wealth of USD 82.7 billion. be used for long-term on Earth in the automotive and medical sectors

NEAR-EARTH ASTEROIDS



more accessible

than the moon

CONQUERING

THE MOON -**SPACE GATEWAY** TO THE FUTURE

The **moon** is the entry point for the exploration of space. The existence of water allows the production of energy and hence the mon could become a base for constructing and launching spaceships

The 1st artificial satellite is sent into orbit by the USSR, Spoutnik 1

APRIL 1961

The Soviet Youri Gagarine becomes the 1st human being DECEMBER 1962 to travel into space

MARCH 1965 The Soviet Alekseï Leonov is the 1st man to walk in space

Landing of Apollo 11. The Americans Neil Armstrong and Edwin Aldrin are the 1st men to walk on the moon

· JULY 1969

NOVEMBER 1957

The dog Laïka is the

A probe, Mariner 2, flies

over another planet for

the 1st time: Venus

1st living being sent into space

JULY 1976 The American probe Viking 1 successfully lands on Mars for DECEMBER 1979 the 1st time 1st launch of Ariane 1

APRIL 1981

1st takeoff of the American space shuttle Columbia

FEBRUARY 1986 • 1st element of the Soviet space station Mir is placed in orbit around Earth

in orbit of the ISS,

the international

The Hubble space telescope, developed by NASA and ESA, NOVEMBER 1998 enters into orbit Start of the assembly

OCTOBER 2003 space station 1st manned flight in space by the Chinese Yang Liwei with the Shenzhou 5 space capsule

APRIL 2001

Dennis Tito, 1st space tourist

MARCH 2004

The American probe Opportunity confirms the existence of traces of water on Mars

1st flyby of Pluto by the probe New Horizons

1st landing on the dark side of the moon, by the Chinese module Chang'e 4

The European probe

Huygens lands on Titan

THE SPACE MARKET X **IN LUXEMBOURG**

50 companies of which 6 are public

⇒ 800 skilled jobs 1.8% of GDP, a record



1988

satellite

LUXEMBOURG AND CONNECTIVITY

70 active SES satellites orbiting Earth

350 million connected home 1 billion connected people

THE SPACE SECTOR ** IN LUXEMBOURG

The exploitation of celestial minerals could generate between EUR 73 and 170 billion in turnover worldwide by 2045 and create between 845,000 and 1.8 million jobs, according to a study by the PwC firm, commissioned by the European Space Agency (ESA) and the Luxembourg Space Agency (LSA)



Creation of SES

Launch of the

Luxembourg becomes the 17th member of the ESA

2005

Launch of the government initiative SpaceResources.lu

Launch of the Luxembourg Space Agency (LSA)

Launch of the LSA data centre

USES OF WATER IN SPACE

Rocket fuel Oxygen

Drinkable wate



WATER-RICH **ASTEROIDS**

One asteroid of 75 meters in diameter could contain the total fuel - hydrogen and oxygen - used for 135

sending 1 litre of water from earth to space S EUR 15.000

