THE FISHERHAVEN ASTRONOMER

**OSIRIS-REX**

NASA launched its latest spacecraft *Osiris-Rex* on Thursday 8 September 2016. According to this acronym loving agency, the name of the spacecraft is a contraction of “Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer”. *Regolith* being the name for the fine dust layer one would find on the moon or on asteroids and comets.

The tasks of Osiris-Rex are to fly to and intercept the asteroid [101955 Bennu](https://en.wikipedia.org/wiki/101955_Bennu), to capture a sample of the asteroid’s surface and bring the sample back to earth.

Asteroids, of which there are literally millions, are left-over planetesimals, the building blocks from which the four rocky inner planets originally formed during an accretion process. Asteroids (*Aster* = star in Greek, and the term asteroid means a small star, which these things are not!) basically live within the asteroid belt between the planets Mars and Jupiter and there is some scientific consensus that the large gravitational field of Jupiter may have been the fly in the ointment that disturbed these planetesimals from forming or joining another planet.

*Asteroids* come in three basic flavours, C-type (carbon rich), M-type (metallic rich) and S-type (silicon rich) asteroids. They differ inherently from *comets*, which inhabit the Kuiper belt beyond the orbit of Neptune and consist mainly of ices and dust. The term *meteoroid* is assigned to a small solar system body (SSSB) of less than one meter in diameter and which may be either an asteroid or a comet.

There are some asteroids that are in orbits close to that of Earth, or sometimes even crossing Earth’s orbit around the sun. These asteroids are called near-Earth asteroids (NEAs) and there is knowledge of 14,000 such NEAs. According to NASA there are 837 NEAs with diameters in excess of one kilometre, of which 157 are considered to be potentially hazardous objects (PHOs).

Asteroid 101955 Bennu is such a PHO and is considered to be a potential Earth impactor with an estimated 1 in 27,000 chance of impacting the Earth in the 22nd century. It has an average diameter of 492 m and is a C-type (carbonaceous) asteroid whose material originated from dying red giant stars and super novae. The material came together some 4.5 billion years ago during the birth of our solar system. Visiting this asteroid will allow scientists to learn more about the formation and evolution of the solar system as well as about the formation of organic compounds that may have been the origin of life on Earth.

|  |  |
| --- | --- |
| Osiris-Rex will travel for two years through space before it enters into an orbit around Bennu. It will survey, map as well as photographing the asteroid in various wavelength for some 500 days from a distance of five kilometres. On completion of this task the spacecraft will close the asteroid very slowly. Once close enough, it will collect samples of the regolith by means of an articulated robotic arm and a sampler collector. The samples will then be stowed in a Sampler Return Capsule (SRC). The SRC will be returned to Earth in September 2023 and will be recovered by means of a parachute. Thereafter the sample will be extensively studied. | From Wikipedia |

Compiled by Johan Retief with information from various sources, amongst others a talk by Dr Jakob (Japie) van Zyl of JPL (Jet Propulsion Labotatory) in Pasadena in an Afrikaans radio programme *“Sterre en Planete*” and Wikipedia.