

Crowded space: the tale of the man-made debris circling the Earth

Voice-over 1:

The 34-metre TIRA Tracking and Imaging Radar has to move quickly to be able to spot high-speed debris and work out what it is.

L. Leushake:

We have two radars mounted in this big antenna. One is for tracking the object, for finding out the position, and the other radar is for imaging the object. So, we can have images, pictures and even radar films of the object as you might see here.

Voice-over 1:

This is the Adeos-1, a Japanese Earth observation satellite. In 1997, one of its solar panels broke and contact was lost.

L. Leushake:

In the radar film, you can visualise how the remaining solar panel is flapping around at the end of the, of the boom. This satellite is of course space debris now.

Voice-over 1:

Thousands of pieces of space debris have now been tracked. But others are unclaimed - often the remains of secret military missions.

L. Leushake:

The goal of those measurements is to provide the agencies with data by which they can verify the models they are building for statistical description of the population. For example, ESA's MASTER model which has to be calibrated by those snapshot measurements which we do by mainly by radars in Low Earth Orbits.

Voice-over 1:

The only way to avoid collision is to run computer models of the space environment - calculating the mass, speed and orbit trajectory.

Heiner Klinkrad:

The shield of the International Space Station which protects the manned modules is able to defeat objects of about one centimetre in size. This is an aluminium sphere of 1.2-centimetre diameter, and this aluminium sphere was fired at a solid aluminium block at the velocity of 26,000 kilometres an hour; and if you do this, then this tiny object here will cause such a crater.

So, what one tries to do is to improve the shields in order to increase the shielding capability from one centimetre upwards; and the other thing is, we try to improve the observations to reduce the tracking threshold from ten centimetres further down.

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