Editorial

Space journey: The nonfunctional European Satellite 'Envisat' is the biggest scrap object in Earth's orbit

The European Space Organization (ESA) has not yet finally come forth with the final decision. It may like to celebrate its space missions as the biggest success. Europe is responsible for the present most dangerous object in the earth proximity orbit which has been an out of control satellite Envisat. Since 8th April 2012 the contact to once celebrated environmental satellite torn off and suddenly became an environmental problem.

Presently the Envisat ruins revolve round the earth at a height of 766 km and move discharged in the region in which the scrap in the design of rocket upper class, worn out satellites and fragments are heavily concentrated. Sooner or later the 25 metre long koloss the biggest ever flown earth observation satellite collides with another scrap fragment and distribute a further cloud of fragments in this region as on the 10th February 2009 when the communication satellites Iridium-33 and Cosmos-2251 collided together in the earth's orbit and generated almost 2000 fragments which were bigger than 10cm. with the destruction of Chinese weather satellite Fengyun IC two years before were generated rather more than 3000 similar broken pieces. The Chinese State Execution had wanted to demonstrate how they can achieve with their medium range rockets. Both collisions together made till today 36% of the catalogued space scraps.

Space travel engineers speak of 'Kessler Syndrome' named after the NASA scientist Donald J Kessler. He had in 1978 as the first one formulated, that the number of pieces in earth proximity Cosmos must increase due to such collisions without fail even when no more new satellites in the earth's orbit would have transported.

However these considerations do not play any role as after 10 years the design for Envisat was developed. Nobody was worried about the fact that at the end of its lifespan what should happen with the satellites. Even when the contact with it was not torn off the fuel on board could not be accessible in order to bring it back into an orbit at the end of its functional period. It would have been placed in security the glowing in the earth's atmosphere upto 25 years.

Now Envisat must therefore in other way brought down otherwise it will remain in its present position for a minimum period of one year if it is not broken in fragments beforehand due to a collision. The probability therefore was 15% to 30% according to a report of Space News already in 2010 by experts. However under the full unrealistic assumption, that the scrap

density during the period remains constant. In fact, risk might remain clearly higher.

However it appears the ESA need not have to be too hasty with the scrap disposal. As before one year above all once the originally trusted Envisat model was withdrawn ahead of space journey research centre Estec in Noordwijk, still from 2021 as start date for the mission e.Deorbit for the withdrawal of the real satellite was still the matter of discussion.

Few months later therefrom it may be 2023. But in the meantime Luisa Innocenti, the leader of the Clean Space Office at the Paris ESA centre speaks rather of 2024. Technical and financial basis is responsible for the deadline shifting – she says.

Actually the controlled withdrawal of a nonfunctional satellite from out of the orbit is a technological virgin area. During smaller fragments through the objective bombardment from the earth it could be brought down with violent downfall. In that case the putting in the technology with Envisat for the ESA is not in question. But Laser cannot be used to remove big objects - Innocenti clarified. Big objects require a controlled re-entry in the earth's atmosphere in order to limit the damage on earth to the tune of 1:10 000. Therefore the physical capture of Envisat is necessary by means of which the insertion of a robot arm is favoured. We will along with that investigate further nets – says Innocenti. Because these can be utilized for the removal of several scrap objects and can exhibit evasion solution.

In order to be able to catch hold of functionless and staggering satellite with help of a robotarm the movement of catcher satellite, however, must first of all be timed to that. To that it must be clear where the holding can be fastened; in order to build up a sufficient stable connection. For that therefore an exact knowledge of the objects is necessary. When the difficult connection- medium robotarm once comes to a position it has however the big advantage that the whole system gets through the rigid coupling better controlled that with the substitute of a net. With the 8 ton heavy satellite it is an important criterion.

Before the final decision on robot arm or net comes up, however a further reason be conducted for the Innocenti, 40 million € for the next three years has been estimated. It is rightly optimistic to get the medium. The mission e.Deorbit is a part of the General Support Technology Programme (GSTP) of EAS that with the last minister meeting of the member states at beginning of December 2016 had been over-subscribed. That means there is sufficient fund. The detailed expenditure of the medium was according to Innocenti beyond the coming January 2017 regulated. The sustenance in cosmos is of greater importance. Therefore she is full of hopes that – e.Deorbit will find the necessary support for the removal of as the present several proposed mission worldwide.

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