In collaboration with the Lord Mayor of London

Financial Space Debris Mechanisms Workshop

Future of Space Technology, Centre for the Fourth Industrial Revolution

PRE-READ

JUNE 6, 8:30-12:00, MANSION HOUSE, LONDON, UNITED KINGDOM

Workshop Description

The space sector is faced with the challenge of the proliferation of space debris and the growing risk of orbital collisions associated with it. This workshop, organised by the **World Economic Forum's Future of Space Technology** initiative, in **collaboration with the Lord Mayor of London, The Right Honourable Michael Mainelli**, will explore new insurance and other financial mechanisms as possible solutions to this challenge. The interactive and informal discussion based on the Chatham House Rule will explore how various existing insurance tools, used widely in several industries such as shipping and maritime as well as oil and gas, could be applied to the space sector and what conditions would need to be met to ensure wide-scale adoption by the industry. As concrete example of Space Debris Removal Insurance Bonds will be presented for further elaboration and discussion. The workshop will bring together close to thirty members of the Forum's space community as well as leading actors from finance and insurance.

Overview of the Problem

Space is critical for our modern way of life – internet connectivity, global positioning, financial transactions, and satellite imagery are just a few examples of the ubiquitous applications of space technology. The global economy overall increasingly depends on satellites for helping optimize and ensure timely and efficient operations across these and other sectors; per the recent Forum report[1], the **future global space economy will reach $1.8 trillion by 2035**. It is also an essential tool for environmental monitoring, which is of vital necessity now more than ever, and we therefore need to protect this domain for the benefit of all humankind. Space similarly plays a vital role in alleviating poverty and elevating living standards, with 40% of UN Sustainable Development Goal targets relying on geo-location and earth observation satellites. However, the first five decades of activity in space has led to approximately 5,000 redundant satellites and rocket bodies cluttering Earth's orbits, posing increasing risks and costs to spacecraft operators. Overall, over 1 million objects larger than 1 cm (pieces of debris and other objects), threaten close to 9,000 (and growing) active satellites now in orbit. Traveling at 27,000 kph in low Earth orbit, even small debris can be highly destructive. For example, a single collision on its own could severely impact services, with up to $10 bn of UK GDP alone potentially lost if just the satellite navigation services failed for a week, with non-economic costs being likely much higher. Removing defunct satellites however that fail a standard Post Mission Debris (PMD) removal process is still very expensive.

An example of a possible solution

The 695th Lord Mayor's Space Protection Initiative, launched in October 2023, aims to mitigate space debris through the introduction of **Space Debris Removal Insurance Bonds (SPADRIBs).** These performance bonds would ensure financial resources are available for the de-orbiting of failed satellites and spent launch vehicle materials, even if satellite operators go out of business. The global insurance market has demonstrated its support for SPADRIBs by putting forward an 'Invitation to Treat' for up to US$500 million per operator so long as a spacecraft company clearly demonstrates it can de-orbit third party space debris and that

[1] https://www.weforum.org/publications/space-the-1-8-trillion-opportunity-for-global-economic-growth/

regulatory bodies in respect of space launch make SPADRIBS mandatory. The key aim of the initiative is to make SPADRIBs a mandatory condition for spacecraft launches, this could be achieved through a stronger mandate in the G7/G20 Leader's Communique.

Insurance operates on the principle that the premiums of many policyholders cover the losses of a few, focusing on fortuitous losses. Underwriters assess the risk presented by prospective insureds, determine the probability of loss, and set premiums accordingly, aiming to collect enough premiums to cover claims and generate a profit over a typical 12-month policy period. In the case of SPADRIBs, underwriters evaluate the financial strength of space operators, charging lower premiums to more solvent operators to ensure that collected premiums exceed the cost of de-orbiting spacecraft that operators fail to retire. Similar insurance products exist in other industries, such as marine insurance for shipping, aviation insurance for airlines, and crop insurance for agriculture, where premiums are determined based on the risk assessment of the insured entity and aim to cover potential losses.