

CHINA CROSSROADS

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Space Sustainability: Preventing Collisions with Satellites in Space

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More than one million objects larger than 1cm are orbiting the Earth, posing significant challenges to current and future operations in the space environment. They are at risk of affecting every person on earth, in case of loss or disruption of space-based infrastructures or activities due to expected catastrophic collisions. Space debris are not a vague concern, as they are high risk elements of the daily operation in the space domain. Whether addressed as space surveillance awareness, debris removal, space traffic management, or space sustainability ratings, the technical solutions may not suffice in a dynamic and booming environment. Given the growing number of government and commercial actors, plans of mega constellations, and the growing complexity of with standards, norms, and guidelines, there is a critical need to consider implementing tools that will incentivize space actors to foster responsible behavior, data sharing practices, and implement debris mitigation and remediation measures in order to ensure long-term sustainability of the space environment.

[Jean-Paul Kneib](#) is Professor of Astrophysics and Director of the EPFL Laboratory of Astrophysics (LASTRO) since 2016. His main interest in astrophysics is observational cosmology research. In particular he has been the principal investigator of the SDSSIV/eBOSS project from 2011 to 2018 and has led the construction of the fiber positioner robotic system for the SDSS-V project. He is also leading the Consortium of the Swiss participation to the Square Kilometre Array Observatory (SKAO). He is also very active in three observational collaborations which plan to constrain the nature of Dark Energy: using gravitational lensing techniques (Euclid) and using galaxy clustering (DESI and 4MOST). Jean-Paul is also renowned for his work on gravitational lensing, a field in which he is still active with participation in the Hubble Frontier Field and contributions using the James Web Space Telescope. In 2017, Jean-Paul Kneib was nominated Director of the EPFL Space Center. This center aims to educate future talents in the “space domain” and develop novel and ambitious research projects focusing on “Space Sustainability” in particular to (a) develop technologies for space debris removal in support of the ClearSpace-1 mission, (b) initiate research regarding the sustainable space ecosystem, and (c) to implement the Space Sustainability Rating. Jean-Paul Kneib has a master degree in space technologies and a PhD in Astrophysics. After his PhD, he has worked as a support astronomer, at the European Space Observatory in Chile. He has conducted research in Cambridge (UK), Toulouse, Caltech, and Marseille before coming to EPFL in 2012 with an ERC advanced grant.

[China Crossroads](#) hosts talks on all topics related to China, including business, foreign policy, and other areas as they relate to China, the idea being that China is both already a “crossroads” of the world and itself at a “crossroads” in terms of its future global influence. For more information, contact Frank Tsai at editor@shanghai-review.org.