POLITECNICO DI MILANO

PhD in INGEGNERIA AEROSPAZIALE / AEROSPACE ENGINEERING - 37th cycle

THEMATIC Research Field: DEVELOPMENT OF A SPACE DEBRIS INDEX AND DEFINITION OF THE CAPACITY OF THE SPACE ENVIRONMENT

Monthly net income of PhDscholarship (max 36 months)
€ 1350.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	In the effort of guaranteeing the sustainability of future space activities, some efforts in the space community are currently devoted to the development of a space debris index that can assess the impact that a mission has on the space environment. In parallel, it is important to understand how the contribution of each new mission can be aggregated to define the capacity of the overall space debris environment. The objective of this research is to develop a formulation of the space debris index that can be applied to any missions in Low, Medium, and Geostationary, and Highly eccentric orbit. The second objective is to define a formulation of the space capacity and to define which threshold can be used for future space traffic management. www.compass.polimi.it
Methods and techniques that will be developed and used to carry out the research	The research will enhance and extend the current tools being developed in the COMPASS group at Politecnico di Milano as part of the COMPASS European Research Council funded project and of a project funded by the European Space Agency to develop an operational software for assessing the impact of missions on the space environment. Algorithm and tools for creating the space debris index will be designed and developed in Matlab and Phyton. Moreover, the research will focus on the reverse engineering of fragmentation events monitored in space through the extension of the PUZZLE tool.

Educational objectives	The objective of this Ph.D. is to develop skills in the modeling of space debris and in the assessment of the capacity of the space environment. Through this Ph.D. project, the candidate will develop skills in mathematical development, simulations, programming (Matlab, Phyton). Soft skills in presenting the research, writing reports, outreach, dissemination, and preparing industrial progress meetings will be also achieved through the Ph.D. project. For further information on the project visit: www.compass.polimi.it
Job opportunities	The Job opportunities that this project opens are in the field of mission analysis and trajectory design and long-term orbit propagation for space debris mitigation. During the Ph.D., collaborations will be made with the European Space Agency.
Composition of the research group	0 Full Professors 1 Associated Professors 1 Assistant Professors 6 PhD Students
Name of the research directors	Prof. Camilla Colombo

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	566.36 €
By number of months	0

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The Ph.D. candidate will receive a desk, a personal computer. Apart from the compulsory ones, the Ph.D. candidate will have the opportunity to follow additional courses, receive economic

support to attend summer schools, and participate in conferences. There will be the possibility of paid teaching assistantship.

During the Ph.D., the candidate will have the opportunity to follow some Ph.D. classes and perform some teaching activities. A PC will be provided and funding is available for attending meetings and conferences.