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CONTACTLESS DE-ORBITING OF SPACE DEBRIS BY THE ION BEAM

DYNAMICS AND CONTROL



NATIONAL ACADEMY OF SCIENCES OF UKRAINE
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НАЦІОНАЛЬНА АКАДЕМІЯ НАУК УКРАЇНИ
ДЕРЖАВНЕ КОСМІЧНЕ АГЕНТСТВО УКРАЇНИ
ІНСТИТУТ ТЕХНІЧНОЇ МЕХАНІКИ

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БЕЗКОНТАКТНЕ ВИДАЛЕННЯ КОСМІЧНОГО СМІТТЯ ІОННИМ ПРОМЕНЕМ

ДИНАМІКА ТА КЕРУВАННЯ

ПРОЕКТ
«УКРАЇНСЬКА НАУКОВА КНИГА
ІНОЗЕМНОЮ МОВОЮ»

КИЇВ
АКАДЕМПЕРІОДИКА
2019

A. P. ALPATOV, S. V. KHOROSHYLOV, A. I. MASLOVA

CONTACTLESS DE-ORBITING OF SPACE DEBRIS BY THE ION BEAM

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PROJECT
*«UKRAINIAN SCIENTIFIC BOOK
IN A FOREIGN LANGUAGE»*

KYIV
AKADEMPERIODYKA
2019

UDK 629.7

A 41

<https://doi.org/10.15407/akademperiodyka.383.170>

Reviewers:

V. S. HUDRAMOVICH, Dr. Sci., Professor Corresponding Member
of the National Academy of Sciences of Ukraine,

N. M. DRON, Dr. Sci., Professor

*Approved for publication by the Scientific Council of the Institute
of Technical Mechanics of the National Academy of Sciences of Ukraine
and State Space Agency of Ukraine (May, 06, 2018 Protocol No. 4)*

**Publication was funded in the frame of the Targeted Complex
Program " Creation and Development of Scientific Publishing Complex
of the National Academy of Sciences of Ukraine" "**

Alpatov A. P.

A41 Contactless de-orbiting of space debris by the ion beam. Dynamics
and Control / A. P. Alpatov, S. V. Khoroshylov, A. I. Maslova; Institute of
Technical Mechanics of the NAS of Ukraine and SSA of Ukraine. — Kyiv:
Akademperiodyka, 2019. — 170 p.

ISBN 978-966-360-383-4

The book is devoted to a promising technology for contactless removal of space debris, dubbed "ion beam shepherd". Dynamic models to simulate and study the motion of the "shepherd" and the space debris object during its contactless de-orbiting are presented. Simplified analytical models have been developed to calculate the ion beam impact. Algorithms and results of numerical calculations of the forces and torques transmitted by the ion beam to the upper stages of the "Cyclone-3" and "Cyclone-4" launch vehicles are given. The evolution of the space debris orbit was analyzed taking into account the necessity to switch-off the ion thrusters in the shaded areas of the orbit. The book may be of interest for research and engineering staff working in the field of rocket and space technology, as well as for undergraduate and graduate students studying in the relevant areas.

UDK 629.7

ISBN 978-966-360-383-4

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