



Contents lists available at ScienceDirect

Space Policy

journal homepage: www.elsevier.com/locate/spacepol

Peaceful Use of Lasers in Space? Potential, Risks, and Norms for Using Lasers in Space[☆]

Petr Boháček

Department of Political Science, Institute of Political Studies, Faculty of Social Sciences, Charles University, Prague. Smetanovo Nabrezi 6, Prague 1 110 01, Czech Republic

ARTICLE INFO

Article history:

Received 27 November 2020
 Received in revised form
 15 February 2022
 Accepted 28 March 2022
 Available online xxx

Keywords:

SSpace security
 Space policy
 Lasers
 Norms
 Space governance

ABSTRACT

The use of lasers in space is a technology area with plenty of promises for addressing challenges faced by humanity (space debris, space traffic management, planetary defense) and advancing human presence in space (space exploration, propulsion, space resource utilization). However, with this great potential comes an equal amount of risks of its intentional and unintentional misuse. We review both the beneficial and harmful uses of lasers in space and offer an analysis of the main policy challenges for mitigating the risks of misuse. With intent identification, attribution, and dual-use nature of the technology representing the main sources of mutual insecurity, transparency, and information sharing can address them. However, as we outline why the existing international space governance is unlikely to produce new norms on preventing misuse of lasers in space, we turn to discuss the existing practice and the prospects of new non-state actors using them to usher in new international norms for use of lasers in space.

© 2022 Elsevier Ltd. All rights reserved.

1. Introduction

Since powerful new technology is required to advance human flourishing on Earth and human presence in space, it is critical to search for social conditions that mitigate threats originating from technology misuse. The use of lasers in space, from ground- or space-based infrastructure, is one of the areas, which carries an enormous potential to advance human flourishing on and off the Earth. However, due to its dual-use nature, the full development and use of such powerful technology come with the development of its weapon potential. The potentially harmful use of lasers was ranked third in the most pressing space risks by a group of space security experts in the Project Ploughshares [1]. We believe that the combination of an increasing geopolitical rivalry in space and the power of laser technology create a need for global norms and mechanisms, which would mitigate the risks of intentional and unintentional misuses of lasers in space.

Reacting to these dynamics is the international Peaceful Use of Lasers in Space (PULS) initiative. PULS originated from the Prague Laser SpaceApps Workshop held by a group of state and non-state institutions (*Breakthrough Initiatives, Charles University, Czech*

Ministry of Transport, Czech Academy of Sciences, Institute of International Relations in Prague) in the Czech Republic, on September 25–27, 2019 [2,3]; [4]. The PULS was announced and endorsed at the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space in 2020 and 2021 [5,6] and was further crystallized in the initiative's Declaration endorsed by Nobel-laurate Gérard Mourou [7]. In 2021, the PULS initiative submitted its commentary to the United Nations Secretary-General on the responsible use of lasers in space in reaction to the UNGA Resolution 75/36 on reducing space threats through norms, rules, and principles of responsible behaviours, which this article further develops. In the article, we first outline the great potential of laser use in space before reviewing its contemporary military use. We then analyze the main policy challenges of establishing norms and mechanism for peaceful use of lasers in space and the existing practices. Lastly, we discuss the prospects of the emergence of such new international norms for laser use in space and the role private actors can play in this process.

2. Potential of laser use in space

The potential of laser use in space spans across a variety of areas that are critical to the flourishing of humanity. This includes space traffic management, space resource utilization, space exploration, and planetary defense. To demonstrate the utility we briefly review these areas.

[☆] This article is intended for the special issue *Astropolitics: The Ecosystem of Space* and was presented at the Virtual Global Forum on 25th June.

E-mail address: pbohacek@email.cz.