

SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)
Contribution of Space Activities to Solving Global Societal Challenges (4)

Author: Dr. Isabelle Dicaire
European Space Agency (ESA), The Netherlands, isabelle.dicaire@esa.int

Dr. Leopold Summerer
European Space Agency (ESA), The Netherlands, leopold.summerer@esa.int

CLIMATE ENGINEERING: WHICH ROLE FOR SPACE?

Abstract

Global efforts made by the international community to reduce anthropogenic greenhouse gas emissions have not been successful yet to adequately address the challenge posed by climate change. On the contrary, global carbon emissions are still rising, raising the need to consider alternative back-up options to mitigate global warming. Such solutions are known as climate engineering or geoengineering and involve a deliberate large-scale intervention in the Earth's climate system as defined by the Royal Society in its geoengineering report in 2009. To ensure an adequate evaluation of climate engineering concepts the Royal Society recommended international collaborative research into the benefits, environmental impacts, feasibility, risks and opportunities presented by geoengineering and to develop international regulatory frameworks to guide both short-term and long-term research and deployment.

This paper identifies and evaluates possible contributions from space to different potential climate engineering concepts currently considered for mitigating the impact of climate change. These include technical aspects as well as contributions to organisational and regulatory aspects of such concepts. In particular, Earth remote-sensing instruments such as imaging spectrometers and Lidar systems could be employed to detect signs of illicit geoengineering activities or to collect data from small-scale legitimate field tests. The space sector could also play a more active role by deploying large solar shields in space to reduce the amount of solar energy reaching the Earth. The present assessment of potential space contributions to climate engineering is therefore intended to cover the entire range of such contributions, from the use of existing sensors up to more advanced visionary concepts such as the deployment of structures in space to reduce the total radiation level from the sun.