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Uses of Outer Space**
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Near-Earth Objects

**Information by the Space Mission Planning Advisory Group
(SMPAG): Summary of the Report by the SMPAG Ad-Hoc
Working Group on Legal Issues to SMPAG - Planetary
Defence: Legal Overview and Assessment**

1. The Space Mission Planning Advisory (SMPAG) Ad-Hoc Working Group on Legal Issues was established under the mandate of SMPAG at its 6th meeting in February 2016, with the scope, as per its [Terms of Reference](#), to provide legal advice to SMPAG, in particular to: describe the existing legal context, in particular international law, relevant to the work of SMPAG; identify, formulate and prioritize relevant legal questions and issues requiring clarification; where necessary, suggest possible ways forward to deal with legal questions and issues; and provide legal advice to SMPAG, as required.
2. The SMPAG Ad-Hoc Working Group on Legal Issues consists of legal experts and technical experts. The legal experts work on the legal questions, while the technical experts are responsible for clarifying aspects of the SMPAG work program, as required, and answering any technical questions raised by the legal side.
3. The present conference room paper contains a summary of the final report of the SMPAG Ad-Hoc Working Group on Legal Issues on an initial assessment of legal matters related to planetary defence as of April 2020.
4. The views expressed in this summary report and in the full report are the views of the members of the SMPAG Ad-Hoc Working Group on Legal Issues and do not express the views of national governments, ministries or agencies. The [full report](#) is available on SMPAG webpage at smpag.net (<https://smpag.net/documents>).

Summary report by the Space Mission Planning Advisory Group (SMPAG) Ad-Hoc Working Group on Legal Issues to SMPAG

“Planetary Defence – Legal Overview and Assessment“ (document SMPAG-RP-004, 2020-04-08, pp. 66-71, available at <https://smpag.net>)

The following is a summary of the SMPAG Legal WG’s analysis done to respond to questions and concerns that SMPAG Members have expressed regarding the potential legal implications of various planetary defence activities and options.



The following ‘caveats’ are to be considered:

- This work represents the views of the participating experts; it does not reflect the positions of national space agencies, ministries, or governments.
- This summary contains preliminary interpretations; it is subject to revision following future developments. Many of the issues addressed in the full report have not previously been addressed in depth by the legal community, and the discussions are based on little prior ‘state practice’ or legal evaluation; several of the points therefore remain tentative and debatable.
- This summary is premised on the current facts and technologies of planetary defence; as those underpinnings change, the legal analysis and judgments may also be subject to revision.

The conclusions:

1. If a State has information relevant to the prediction of a NEO impact threat to Earth, such information should be made available in line with the Outer Space Treaty, in particular Article XI, which requires State parties to inform others about the results of space activities to the greatest extent feasible and practicable, as well as Article IX, according to which States shall conduct their activities in outer space with due regard to the corresponding interests of all other States Parties. In addition, elementary considerations of humanity require, in certain circumstances, the sharing of information in order to avoid the loss of human lives. This does require at least some degree of communication of data related to the discovery of NEOs.
2. If a significant NEO threat is known, the question arises whether a State has a legal obligation to undertake a mitigation action. A State has the right and the obligation to try to protect its own territory and population from catastrophic dangers. However, this obligation is to be assessed in consideration of the existing capacity and availability of resources of the State in question. There is no obligation under international law to assist other States in any particular way or to any particular degree.
3. If any planetary defence-related information that is shared turns out to be incorrect, the SMPAG Legal WG concludes that there is no legal liability under international law in any of the following circumstances:
 - If a State (and this applies equally to SMPAG or IAWN) makes, in good faith, a diligent and well-founded probabilistic statement (such as giving notice that there is a certain likelihood of an asteroid impacting in a given location) there seems to be no international legal consequence associated to whether the event does or does not occur as forecast, even if the statement may have resulted in cost for those acting upon it; legal action under national law in domestic courts cannot be excluded, however.
 - If a State diligently releases objective information about a NEO threat, and that information is subsequently distorted or misinterpreted (e.g. by media), the State would not be responsible or liable for consequences caused by the distortion or misinterpretation.
 - If, however, a State in a grossly negligent manner or even deliberately releases information that it knows to be false, there might be a basis for a claim to compensation under general notions of state responsibility (for internationally wrongful acts).
4. A central question is what international law has to say about the choice among different types of planetary defence methods. The slow push/pull methods, which include gravity tractors, enhanced gravity tractors, ion beam shepherds and laser ablation, do not as such raise any particular issues of legality under international law unique to their character. However, in case of malfunctions, failures and damage caused on Earth or in outer space, the general rules on

responsibility and liability apply. Impulsive methods, such as kinetic impactors and conventional explosives, are mainly of concern in circumstances similar to slow push/pull methods, except for the potential use of Nuclear Explosive Devices (NEDs) which raises additional legal issues. Furthermore, environmental considerations, including Article IX Outer Space Treaty as well as non-legally binding safety standards and principles, such as guidelines on space debris mitigation and the use of nuclear power sources in outer space, should also be taken into account when conducting planetary defence missions.

5. Regarding the use of NEDs in outer space, several treaties are relevant, as summarized below. The obligations contained in these treaties apply only to States that have become party to the relevant treaty; most (but not all) of the leading space-faring States have joined each instrument.
 - The Outer Space Treaty (Art. IV) bars three specific actions: placing a nuclear weapon in Earth orbit, installing it on a celestial body, and stationing it in space in any other manner. The SMPAG Legal WG concluded that the treaty is best understood as addressing the inherent nature or capability of a nuclear device, not simply its avowed purpose. The treaty makers intended to foreclose a nuclear arms race in space, and the inescapable dual functionality of a nuclear device would not change its nature and initial designation and does not allow to interpret a carve-out for planetary defence.
 - The 1963 Limited Test Ban Treaty (Art. I) requires its parties “to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion” in the atmosphere, in outer space or under water. It also requires its parties “to refrain from causing, encouraging, or in any way participating in” such explosions. The Limited Test Ban Treaty therefore constitutes a very stringent prohibition against nuclear explosions in space. Unlike the Outer Space Treaty, the Limited Test Ban Treaty applies explicitly to ‘any’ nuclear explosion, regardless of purpose. The use of NEDs for the purpose of planetary defence is therefore prohibited under the Limited Test Ban Treaty.
 - The 1970 Nuclear Non-Proliferation Treaty prohibits all States Parties which are not recognized as nuclear-weapon States from acquiring or possessing NEDs or exercising control over NEDs and associated materials. It also prohibits the transfer of NEDs or of the control over NEDs by nuclear-weapon States Parties. It is the most important and nearly global treaty on nuclear non-proliferation. It would inhibit some possible forms of collaboration between States in the use of a nuclear device for a planetary defence mission.
6. States are obliged to act in accordance with their international legal obligations. Naturally, the same rules apply to space activities, including planetary defence missions, which must be carried out in accordance with international law. There are however exceptional instances where an action not in conformity with international law may not be regarded as wrongful. For example, this could be true in a case where the use of a nuclear device was determined to be the only method to avoid a catastrophic asteroid impact. The applicable legal concept is ‘circumstances that preclude the wrongfulness’ of a State’s action that would ordinarily constitute an illegality. Such circumstances may be invoked only with utmost care. We considered three such exculpatory theories, each of which might be relevant in particular factual situations:
 - Distress. The concept of distress justifies an otherwise illegal action undertaken by a state when there is ‘no other reasonable way’ to save human lives. Distress applies only to extraordinary situations and cannot be invoked if the conduct that is sought to be excused endangers more lives than it may save or is otherwise likely to create a greater peril.
 - Necessity. The concept of necessity applies when an otherwise illegal act is ‘the only way for the State to safeguard an essential interest against a grave and imminent peril’. Like distress, this principle is intended to be stringent, not

allowing a State to escape too readily from its treaty commitments. Necessity might be applicable in some planetary defence scenarios, but only if the NEO impact threat is clearly and objectively established, if there is no other possible way of mitigating the impact, and if essential interests of other States are not seriously impaired.

- Consent. Any State that requests or participates in a planetary defence operation that would ordinarily be regarded as unlawful has effectively waived its objection to the violation of its rights under international law, and the same may also be true of a State that merely supports the mission. Widespread endorsement for a planetary defence operation that used a nuclear explosive device, for example, would therefore carry legal significance. However, States that objected to the mission or that remained silent about it would not be precluded from complaining about the illegality.
7. If a planetary defence mission is undertaken by, or in collaboration with, non-state actors such as a private corporation or non-governmental organization, we conclude that this variation is consistent with international law. Under Outer Space Treaty Article VI, each State is internationally responsible for national space activities carried on by governmental agencies or non-governmental entities, and is required to authorize and continuously supervise non-governmental activities.
 8. Another concern is a State's potential legal liability for a planetary defence mission, for example that diverted an incoming asteroid so that it impacted State X, instead of State Y, where it would have struck if there had been no intervention or for other harms, caused for example by a malfunctioning space object.

The 1972 Liability Convention establishes an important distinction between causing harm to objects in space vs. causing harm on the surface of the Earth (or to aircraft in flight). In the former case, the launching State is liable only if it is at 'fault,' a concept not well defined in international law, but involving a wrongful act, acts of gross negligence or wilful misconduct. In the latter case, the State has 'absolute' liability, meaning that it is strictly obliged to compensate, even if it was not at fault. In other words, if a State undertakes a planetary defence action that results in damage to the territory of another State, the acting launching State is liable, even if it took all reasonable and appropriate measures to ensure the safe and effective actions of its launch vehicle and payload. In this case an important issue is causation. That is, the Liability Convention establishes liability for action 'caused by' a space object (i.e. a human-made spacecraft). The space object would be only indirectly the cause for damage inflicted on Earth, if the space object alters the trajectory of an asteroid, and it is the asteroid that directly damages the affected State. Ordinarily, this pattern of behaviour should be sufficient to trigger the liability of the launching State(s), but if the causal link became more tenuous – such as a case where there were other factors also affecting the asteroid's behaviour – the analysis could become more complicated. It could be useful to discuss questions of third-party liability in advance of a planetary defence mission and seek broad international understanding, rather than being forced into a reactive approach once possible damage has occurred.

9. Regarding possible decision bodies for planetary defence action planning, under Chapter VII of the United Nations Charter, the Security Council has extraordinary power to deal with a 'threat to the peace'. It can authorize or require States to undertake action that would otherwise violate their obligations under other treaties (e.g. the use of a NED for planetary defence), and all United Nations Members have pledged to accept and carry out the decisions of the Security Council. In the event of a conflict between a State's obligations under the Charter and its obligations under any other treaty, the obligations under the Charter, including abiding by decisions of the Security Council, prevail.

Another possibility, in particular if the UNSC fails to act, due to a lack of the required majority among Members or due to a veto by one of the permanent Members, could be a recommendation by the UNGA. While the UNGA could allow a more representative and inclusive deliberation, its recommendations are not binding upon States and cannot overrule contradicting international law obligations.

Other international organizations, including United Nations bodies like COPUOS, could contribute to a broad political support for a planetary defence mission, but those institutions do not have authority to permit actions that are contrary to international law as the Security Council does.
