

**Conference on the
“McGill Manual on International Law Applicable to Military Uses
of Outer Space (MILAMOS)”**

21 – 23 June 2023, Berlin

Directorate-General for Legal Affairs, German Ministry of Defence

- The Legal Framework for the Military Use of Outer Space in Peacetime –



From 21 to 23 June 2023, the Directorate-General for Legal Affairs of the German Federal Ministry of Defence (MoD) hosted a conference on the “McGill Manual on International Law Applicable to Military Uses of Outer Space” (MILAMOS or McGill Manual) at the Federal Academy for Security Policy in Berlin. At the three day in person meeting, representatives of governments from partner nations, international organisations, such as NATO and ESA, commercial space providers and academia were invited to exchange views on the

international law applicable to the military use of outer space as presented in the McGill Manual on an expert level.

I. What is MILAMOS?

MILAMOS is the result of a six-year (2016-2022) effort to objectively articulate and clarify international law applicable to military uses of outer space in time of peace and periods of tension. With the input and participation of civilian, governmental and military experts, academics, observers and stakeholder institutions worldwide and from various fields of research, MILAMOS offers a diverse range of perspectives from around the globe.

Volume 1 of the McGill Manual was published in July 2022, containing 52 Rules. The Manual identifies and clarifies the applicable *lex lata* – the law as it is. In doing so, it additionally helps to identify ambiguity, confusion, diverse views, perspectives or gaps in the current *lex lata*.

II. Aim of the Conference

As emphasized by Dr. Jan Stöß, the Director General for Legal Affairs at the German MoD, in its welcome remarks, outer space must remain a common good to be used for the benefit, and in the interest, of all humankind. Clear and reliable legal guidance regarding the military use of outer space is a fundamental cornerstone of this effort.

The rapid developments in outer space, including its potential security implications, raises many legal questions, but many related details still merit thorough analysis, and their interpretation is characterised by a lack of informed state practice. In such an environment, unfriendly behaviour, including methods of hybrid warfare, is difficult if not impossible to recognise and address; the ability to clearly denounce and, if necessary, react to and sanction misconduct in the use of outer space is severely hampered. Ensuing factual and legal uncertainties, as well as normative gaps, exacerbate the risk of misunderstandings that could present a significant risk of potential escalation.

Thoroughly researched and internationally developed manuals, such as the McGill Manual greatly contribute to closing normative gaps in order to reduce such risk. MILAMOS will inform and inspire long-overdue national and international discussions about the international law applicable to military uses of outer space. The conference offered a starting point for these discussions.

III. Topics of the Conference

The Conference consisted of four sessions: Rights and Obligations of Space Actors, Interference with Space Activities, Use of Force and Possible Reactions, and Liability and Responsibility. The four sessions were initiated by the Commissioner for Space of the German MoD who set the scene for the discussions by giving an overview of the strategic environment in space and the challenges for the military use of outer space. Each session was opened with keynote speeches from MILAMOS experts and practitioners from the German Space Agency (DLR), the Bundeswehr Space Command, the German Cyber and Information Domain Services HQ and the German Aerospace Industries Association (BDLI). Both sides, academia and practice, provided a thorough basis for the discussions. Giving solid and reliable legal advice to (military) space actors demands taking into account the realities of the use of space as well as orbital physics, as the Commissioner for Space of the German MoD, LtGen Kai Rohrschneider, pointed out. Interpretation and application of space law is interdisciplinary work.

1. Rights and Obligations of Space Actors¹

The source of rights and obligations of space actors is the freedom of exploration and use of outer space as a province of humankind, Art. I OST. The further Articles of the OST contain caveats to and obligations derived from this principle.

The freedom to use space is accorded to States. Non-state actors can derive a right of their own to freely access and use space if and when authorised and supervised by States in accordance with Art. VI OST. Without a national implementation of Art. VI OST non-state actors do not have the right to freely use and access space.

Although the freedom of use is a manifest of State sovereignty that does not make outer space a *domain réservée*, the obligation to use space with due regard to the interest of other space actors, as stipulated in Art. IX OST, is fundamental.

Three of the obligations of the OST were highlighted by the keynote speeches: Registration, information exchange and space debris and sustainability as a possible obligation of its own.

a) Registration

¹ Chapter III and IV of the McGill Manual, esp. Rules 118, 122, 124, 125, 129.

Art. VIII OST provides that States “*on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object*”. The obligation to register launched space objects is further defined in the Registration Convention.

In accordance with Art. II (1) Registration Convention launching States are obliged to maintain an appropriate national registry. A second international registry is maintained by the UN Secretary General.² Currently, this register is established with UNOOSA. The information necessary for this registry are stipulated in Art. IV Registration Convention.

The German national registry is held by the Luftfahrt Bundesamt and unlike the UNOOSA registry not publicly available. Upon registration in the national registry, Germany transmits the necessary information to the UNOOSA registry in a timely manner. UNOOSA can only rely on publicly available information to verify the information it is provided with.

The UNOOSA registry as well as national registries could serve as a valuable transparency and confidence building measure (TCBM) if made publicly available and used accordingly. But, although the lack of registration is, according to UNOOSA, just a rumour, as of yet States are rather creative in describing task and status of the registered space object in order to avoid making its military use public.

Art. VIII OST links jurisdiction and control over the space object to the State of registry which raises the question what the legal consequences are if a space object is not registered in any registry. The answer to this question is intrinsically linked to the question whether Art. VIII OST contains a right to register or an obligation to register. There are also further links between State and space object known by space law, such as Art. VI and Art. VII OST, to keep in mind.

b) Information exchange

Arts. IX and XI OST foster cooperation in space by obliging States to share information about their activities in space “*to the greatest extent feasible and practicable*”.³

² Art. III Registration Convention.

³ Art. XI OST.

As a means of implementing Art. XI OST, Germany, as many other States, published its space strategy.⁴ The space strategies published often include some information about the State's military activities in space.

Although this transparency is a first important step to build trust and confidence, two questions remain open: Is the publication of space strategies sufficient to implement the obligation in Art. XI OST? And what details if any have to be published about military space activities?

Art. XI OST specifies the information published to nature, conduct, locations and results of space activities. The constraint "*to the greatest extent feasible and practicable*" in Art. XI, however, leaves a lot of leeway to argue around this obligation. Especially information regarding military activities are generally sensitive, since their publication might endanger the security of the State. Hence, it can easily be argued that sharing information about military space activities in detail is neither feasible nor practicable.

c) Space debris and sustainability

Neither space law nor international law explicitly prohibit or limit the creation of space debris.⁵ There are, however, non-binding international initiatives, such as the LTS-Guidelines, which deal with the creation of space debris and try to minimise it. Looking at the devastating effect space debris can have, there clearly is a need for a more robust international initiative.⁶

⁴ A new German space strategy will be published in 2023.

⁵ It could however be argued that the due regard principle in Art. IX OST obliges States to at least minimise the creation of space debris. Space debris can potentially interfere with another States right to freely use and access outer space by e.g. blocking access to orbits, holding its space assets at risk, damaging or even destroying them which could even be the case in lower orbits as exemplified by the recent RUS ASAT test. Consequently, upholding the due regard principle requires a thorough risk analysis and perception on the possible consequences of the ASAT test for the space systems of others and the space environment and a careful balancing of the differing interests of the free use of outer space. The longevity of the debris would be only one of many criteria. Further criteria could be the importance of State's rights, the extent of damage anticipated, as well as the importance of the acting State's activities. In consequence, if a debris creating ASAT test is carried out with due regard has to be a case-by-case decision based on a reasonable and thorough thought process taking above mentioned criteria into account. However, there is little to no State practice in invoking the due regard principle as an enforceable obligation that imposes legal constraints on space activities and in this regard, the RUS ASAT test was a missed opportunity.

⁶ For debris in space see <https://whatsin.space/>.

Germany supports this effort with its work in UNCOUOS as well as on a national level. Government grants and contracts always include requirements for the mitigation of space debris, derived from the LTS-Guidelines.

In September 2022 following an US initiative, Germany furthermore committed not to conduct any destructive anti-satellite direct-ascent missile tests.⁷ This commitment is in line with the decision of the German Chief of Defence in 2021 that the German Armed Forces will not create debris in space with kinetic means.

2. Interference with Space Activities⁸

As part of electronic warfare, interference can come in various forms, such as dazzling, lasing or jamming. Effects of interference, direct or indirect, may be ranging from temporary to permanent, and from reversible to non-reversible. The use of non-kinetic physical means is harder to observe and more difficult to attribute than kinetic ones. The difficulties to detect and attribute such (usually electromagnetic) interferences might be the reason why (electromagnetic) interference is widespread and part of the daily struggle in space. Together with a missing express legal prohibition of interference, this leaves a huge grey area to act. Which gives raise to the question, are we prepared for a day without space?

But even without an express prohibition, at least harmful interference can implicate multiple international legal regimes, including general principles of international law, international space law, and international telecommunications law.

a) International Telecommunications Law

Art. 45 ITU Convention expressly prohibits “harmful interferences” only for spectrum-based space activities. Art. 48 ITU exempts military radio installations from this prohibition. This exemption must be invoked specifically and military radio installations must as far as possible observe the ITU rules on harmful interference.

b) General Principles of International Law

Due to missing state practice, it is unclear if there is a general obligation to avoid or a general prohibition of intentional harmful interference under customary international law. Likewise, its scope and threshold are unsettled. An agreed definition of “intentional harmful

⁷ [German ASAT Test commitment.](#)

⁸ Chapter VI and VII of the McGill Manual, esp. Rules 139 and 142.

interference” does not exist. Looking at the dictionary “interference” can be defined as hampering or endangering space activities, while “harmful” can be defined as to cause harm, injury or damage to any segment of space infrastructure. Although, intent requires proof, this criterion could be established easier than the other two, considering the high expertise and planning necessary to carry out such a military operation, provided that an attribution to a State is possible.

An example for such possible intentional harmful interference given at the conference was the jamming of a commercial space asset that provides communication to i.a. the military over the course of six weeks. Due to the duration and the bandwidth targeted the jamming must have been deliberate.

Without State practice or public – even general – statements of States where those red lines are when it comes to “harmful interference”, it will be hard to establish a general obligation to avoid harmful interference in the space domain. With regards to the high sensitivity of information surrounding interferences since that could publicly disclose the vulnerabilities of a State, such statements are not to be expected in the future.

c) Space Law

Art. IX S. 3 OST requires consultations “*if a State Party to the Treaty has reason to believe that an activity (...) planned by it or its nationals in outer space (...) would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, (...) it shall undertake appropriate international consultations before proceeding with any such activity*”.

The term harmful interference in the context of Art. IX OST is not yet defined, either. Its threshold seems to be significantly lower than that in general international law or the ITU since a “*reason to believe*” that a harmful interference will potentially occur triggers the obligation to consult.

However, no state practice regarding Art. IX S. 3 OST exists as of today. Hence, its exact scope with regards to potential harmful interference remains unsettled.

3. Use of Force and Possible Reactions⁹

⁹ Chapter VIII, IX and V of the McGill Manual, esp. Rules 151, 152, 137, 138, 133, 134.

As emphasized by Dr. Stöß, Germany reaffirms the applicability of international law, including the UN Charter, as confirmed by Art. III OST. This includes the prohibition on the (threat of) use of as well as the right to self-defence.

The preparation for an attack has to start in peacetime to be able to prevent it, plainest by way of credible deterrence. Successful deterrence presupposes a thorough and clear understanding what wrongful acts, such as a use of force and possible reactions look like, from an operative as well as from a legal perspective.

a) Prohibition of Use of Force

Use of force is comprehensively prohibited in Art. 2 (4) UNC and as a part of customary international law.

Although there is no clear definition as to what constitutes a use of force, it generally involves physical damage, destruction, injury or death which could also derive from 2nd and 3rd order effects. Further indicators for a use of force can be the magnitude and duration of the military activity or the direct involvement of armed forces. A non-kinetic action could constitute a use of force if it has the same effect as a kinetic use of force. Consequently, short-term acts with reversible effects (including 2nd and 3rd order effects), such as jamming and dazzling, generally do not constitute a use of force. It is, however, disputed whether a use of force requires a further level of sufficient gravity in its scale.¹⁰

b) Prohibition of the threat of use of force

The threat of use of force needs a communicative element. Hence, actions that merely endanger the security of the State do not necessarily constitute a threat of use of force if they do not at least implicitly carry as well the communication of a threat, i.e. the signalled intention, the stated or declared readiness to use force.

This, however, is, not only but in particular in the outer space domain due to its unclear nature, a fine line, and leaves a huge grey area to act. The intent of the actor is not always clear, especially in the space domain where we do not have a 24/7 real time picture or state

¹⁰ There are broadly two views on that: (1) The consequences of a forceful act have to extend beyond a “*de minimis level*”. E.g., laser interference that resulted in minor physical damage to a satellite, but which did not impact the satellite’s functionality or the impairment of a TV broadcasting satellite which only leads to inconveniences, would not amount to a use of force. (2) There is no requirement to exceed a *de minimis* level. Hence, a military space activity that resulted in minor physical damage to a satellite, but which did not impact the satellite’s functionality, would nonetheless amount to a use of force.

practice and corresponding rules of behaviour on which we can rely if we see a deviation from normal behaviour. Reliable space domain awareness (SDA) is key for this, and the first step to a credible deterrence posture.

c) Retorsion

Retorsions are unfriendly acts directed against the interests of another State without amounting to an infraction of obligations owed to that State under international law. They are predominantly rooted in the political sphere.

d) Countermeasures

The criteria for a lawful countermeasure can be found Arts. 49 -53 Articles on State Responsibility. One criterion seems to be especially problematic in the context of outer space: the need to cease once the offending States resumes compliance.¹¹ In the outer space domain, internationally wrongful acts below the threshold of armed attack, such as jamming, can be turned on and off in an instant. Therefore, it is extremely difficult to assess if the act ceased altogether or if the jamming belongs to a larger pattern. The obligation of the perpetrator to guarantee and assure that the act will not be repeated, could be helpful in these situations to determine if the act has actually ceased.¹²

e) Collective countermeasures:

Most State space actors cannot effectively act in space alone, partnerships are a crucial factor. Therefore, the question of collective countermeasures is of critical practical importance.

To preclude the wrongfulness of their actions States need a legally defined and accepted justification. Hence, to be a lawful justification it does not suffice that collective countermeasures are not expressly prohibited, they need to have a solid foundation in law either written or customary. Art 48 Articles on State Responsibility could provide a solution. It can easily be argued that the free use of outer space constitutes an *erga omnes* obligation, or is at least owed to the State Parties to the OST, and hence a group of States. Thus, it could further be argued that an infringement of the free use of outer space as it is defined by the OST, could lead to several States taking countermeasures alongside each other, since they are directly affected by that infringement according to either Art. 48 (1) (a) or (b).

¹¹ Art. 53 Articles on State Responsibility.

¹² Art 30 (b) Articles on State Responsibility.

Such action by several States would not constitute a collective countermeasures *strictu sensu*, but amongst partner nations and allies it would be possible to align countermeasures to have a greater deterrence effect.

f) Self-defence

The right to self-defence is enshrined in customary international law and Art. 51 UNC. In the exercise of the right of self-defence, the physical and legal characteristics of outer space must be taken into consideration.¹³

Since the space domain is covered by space law as a specific legal regime, the question arises how space law and the right to self-defence interact, in particular, if there is a discrepancy or a conflict between different norms in a specific situation. This question can be illustrated along the application of Art. IV OST in a situation that triggers the inherent right to self-defence.¹⁴ Art. IV OST is owed to the international community as a whole and meant for the benefit of humankind and hence cannot be superseded in general by rules regulating conflicts between two States or more (*erga omnes*) as the right to self-defence.

Furthermore, it should be noted that the right to self-defence cannot be applied in isolation from other rules of international law. Hence, as much as other arms control treaties, such as the Chemical Weapons Treaty, continue to apply during a self-defence situation, Art. IV OST, as an arms control rule, continues to apply and cannot be derogated from.

(1) Criteria for Self-defence

Precondition for the right to self-defence is an armed attack. Guidance as to what constitutes an armed attack can be found in the jurisprudence of the ICJ. In *Nicaragua*, the ICJ held that only “*the most grave forms of the use of force*” constitute an armed attack.¹⁵ Non-kinetic military space activities will be classified as armed attacks if they are sufficiently grave.

¹³ E.g. the prohibitions related to certain weapons, Art. IV OST and having due regard to the corresponding interests of other, not involved, space actors, Art. IX OST.

¹⁴ Four approaches to interpret the interaction between Art. IV OST and the right to self-defence if a conflict between those two norms arises in a specific situation are possible: (1) The right to self-defence supersedes if the need arises to place, station or install nuclear weapons or WMD in the orbit around the Earth as *lex specialis*. (2) Pursuant to Art. 103 UNC, Charter law and hence the right to self-defence prevails. (3) Art. IV OST is an *erga omnes* norm and is therefore unaffected by the usual rules of interpretation and consequently prevails. (4) Space law constitutes the *lex specialis* for any situation taking place in the space domain and therefore prevails over general international law, *per se*.

¹⁵ Military and Paramilitary and Paramilitary Activities in and against Nicaragua (Nicaragua v USA) [*Nicaragua*], ICJ Reports (1986) 14, at para. 191.

Under the current *lex lata* the key parameters whereby States can establish that an armed attack occurs entail imminent or actual death, injury, extensive physical damage or destruction. Hence, for example activities causing (only) a loss of control over a satellite as such do not constitute an armed attack.

Recognising that in outer space the consequences of an attack can be highly unpredictable, not only given the unclear nature of some space assets and the complex interdependencies between different systems, but also the difficulties in anticipating accurately how much debris will be caused by an impact and which orbits will be affected by the debris over time, all reasonably foreseeable consequences have to be considered in assessing the gravity of the attack within a clear chain of causation.

To qualify as an armed attack the adversarial action has to cause significant consequences for an important element of the infrastructure of the State attacked, namely its military, security, economic, or administrative infrastructure as protected by its territorial integrity or sovereignty; purely non-governmental commercial interests do not fall within this category. However, given the dual use nature borne by the majority of space assets and/or the services provided through these assets it may be more challenging to establish a purely non-governmental commercial interest in the extra-terrestrial than the terrestrial context.

Furthermore, an act in self-defence has to be necessary and proportional. Necessity and proportionality have to be assessed on a case-by-case basis, with regard to the circumstances surrounding the initial armed attack and the “scale of the whole operation”.

E.g. outer space is a unique environment in which the physical destruction of space objects with a kinetic impact create debris posing danger to other objects in orbit and potentially interfere with the space activities of other States.¹⁶ As was recognised by the ICJ in *Legality of Nuclear Weapons*, there is a general obligation on States to ensure that “*activities within their jurisdiction and control*” has regard to the environment of other States or areas beyond national jurisdiction.¹⁷ This general obligation is reinforced by the due regard principle in Art. IX OST with regards to States not involved. Taking this possible devastating effect of debris

¹⁶ To see how crowded Earth orbits already are go to <https://whatsin.space/>.

¹⁷ *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, ICJ Reports (1996) 226, at para. 29, 30: “Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality.”

for the space environment and the consequences for the free use of space for all States into account, raises the question if the destruction of a space object in space is ever proportionate?

It is, however, not necessary to respond to an armed attack that happened in space only in space. It might be easier and more proportionate to react on land, in air or in the cyber domain.

(2) Imminent armed attack

An imminent armed attack might give rise to the right to self-defence. An armed attack is imminent if a necessity of self-defence is “*instant, overwhelming, leaving no choice of means, and no moment for deliberation*” (Webster Formula).¹⁸ Hence, an imminent armed attack can be described as “the last feasible window to react”.

Although such a scenario is possible in outer space, due to a plethora of uncertainties in the outer space domain and its high unpredictability the Webster Formula is hardly practicable.

(3) Identification of the injured state

The operation of space objects is often a multinational endeavour not only due to the high costs that come with it, but also due to regulations in space law. Hence, a complex collection of potentially overlapping legal connections may exist between several States and a particular space object.¹⁹ With regards to the right to self-defence the existence of different regimes leads to the questions which of these States is the injured State and hence the State entitled to exercise the right to self-defence.

The rise of the right to self-defence requires an armed attack on a State, i.e. an attack must cause significant damage to a critical element of a State’s infrastructure. Consequently, it is required that the significant damage is suffered by the State who claims to be entitled to resort to self-defence, unhinged by its legal connection to the attacked space asset.

¹⁸ The Caroline case, 1837: Letter of Mr Webster to Mr Fox (April 24, 1841), 29 British and Foreign State Papers, 1840-41 at 1137-38 (1857); factors to be considered in assessing imminence of attacks can be found in the UK’s Attorney General’s speech on 11 January 2017.

¹⁹ According to Art. VI OST each State bears international responsibility for all national activities; Art. 1 (c) Liability Convention attributes liability caused by a space object to the launching States. Those are all States that are involved in launching or procuring the launch of the space object as well as the State from whose territory and / or facility the object is launched; and furthermore, jurisdiction and control over the space object is attributed to the State of registry in accordance with Arts. VIII and XII OST and the Registration Convention.

4. Liability and Responsibility²⁰

Due to the rapid commercialisation of space and the close cooperation between commercial space actors and militaries it is of urgent importance to find an answer and a common standard on who is responsible and who is liable for commercial space activities in an inter-state context.

The status of the military integrated commercial space actor could be one indicator to answer these questions.²¹ It is, hence, of utmost importance for, not only, commercial space actors to know when they are used in conflict and could become a target, before they get involved in a conflict.

Looking at the Russian war against Ukraine the question of State responsibility for activities of commercial space actors became more apparent and pressing and was raised a couple of times during the conference. While the McGill Manual Vol. 1 seems to indicate that activities of non-state actors give rise to State responsibility with the implication of an automatic attribution in accordance to Art. VI OST,²² participants were a bit more cautious with the interpretation of Art. VI. It was argued that Art. VI is not an article for attribution, but rather purely an article of responsibility as an area *sui generis*. Attribution has to be derived from the Articles on State Responsibility.

IV. Conclusion

Legal certainty and legal clarity established by such exchanges amongst government experts and academia will establish predictable actions and reactions and thence eventually contribute to a credible deterrence in outer space. A posture that is in the current strategic environment needed more than ever to prevent a space degraded environment in a conflict that will see no winners. As stressed by Dr. Stöß, addressing security challenges in the space domain is a matter of urgency. We need to be prepared for an even more competitive, contested and eventually degraded environment, today.

The conference showed very clearly that space is a military domain and that its legal order is constantly tested by grey area activities. And while some might assume that the current legal

²⁰ Chapter V of the McGill Manual.

²¹ Commercial space actors are often integrated in military activities by way of cooperation and can greatly contribute to resilience and deterrence of military space activities.

²² Rules 130 and 133.

framework for space activities is not sufficient and will not stand the test of time, the McGill Manual as well as the conversations during this conference are proof that this is not true.

The conference and the McGill Manual have shown that space and its military use have to obey a legal framework. At the moment, however, as proven by all keynotes and discussions there are more question than answers. The conference offered a starting point to think about possible answers and ended with the hope that the discussions started here will be carried on and transfer in the daily work of the participants.

As stated by Dr. Stöß, the German MoD firmly believes that legal clarity, legal certainty and the resulting predictability can fundamentally limit the possibility or probability of escalation.

Participants are invited to send their views on the rules contained in Vol. I of the McGill Manual on <https://www.mcgillmanual.ca>. We look forward to the publication of Vol. 2.