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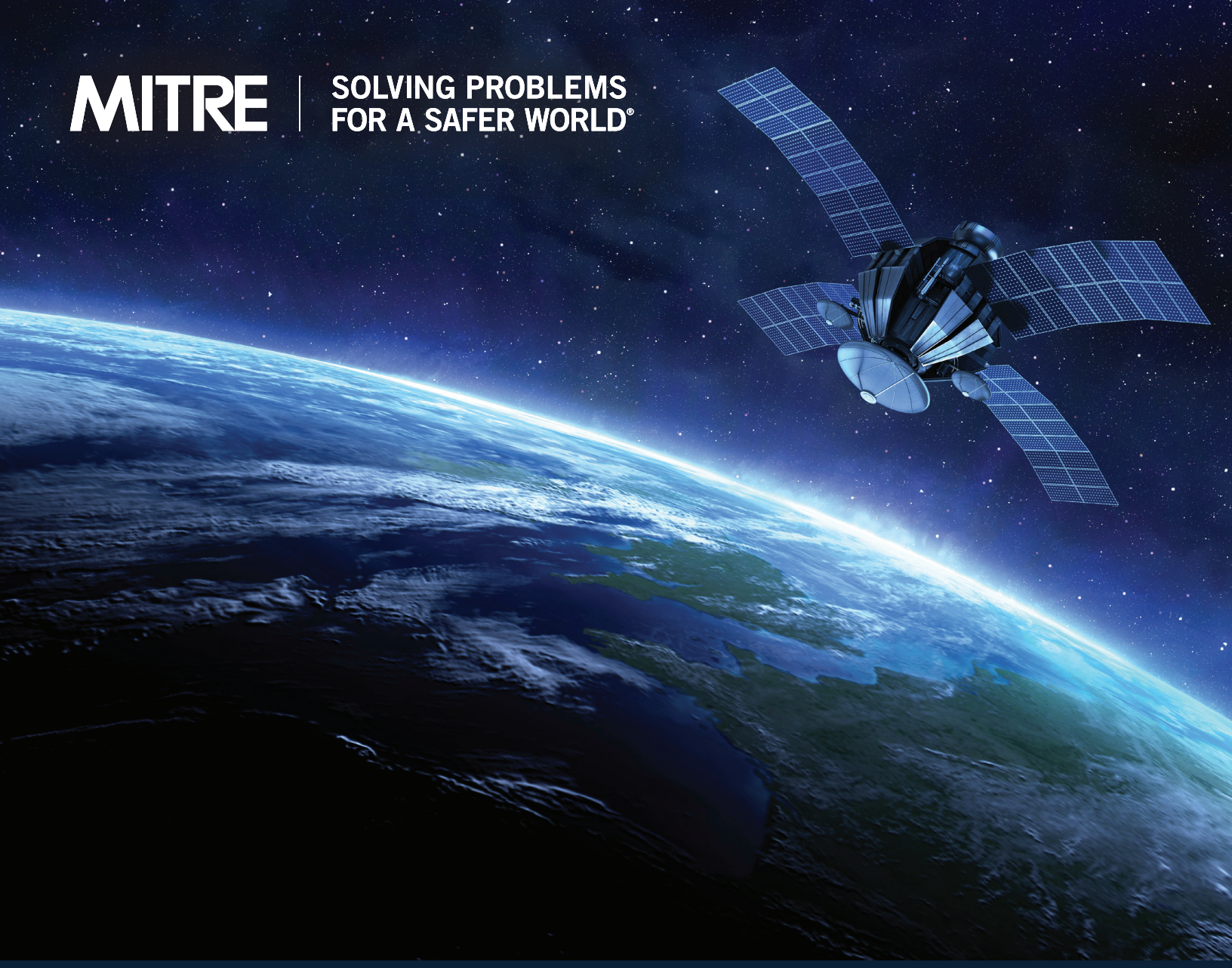

ARE WE CLOSER TO NORMS THAN WE THINK?

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ABSTRACT

As the space community debates the potential processes, fora, and instruments to create agreement on norms for responsible behavior in space, the discussion moves quickly to the barriers and weaknesses of each. Will countries agree, how will they be enforced, and how long will it take? However, as this process progressed, we saw independent action by states that should inform our thinking. The lead-by-example approach illustrated by the U.S. ban on destructive direct-ascent ASAT led to quick action by numerous other states and a United Nations Resolution, "Destructive direct-ascent anti-satellite missile testing," that overwhelmingly passed with 154 votes of endorsement for the U.S.-led moratorium. This paper will examine the opportunities to create and capture norms for responsible behavior that can be achieved outside formal negotiation structures and agreements. In examining those opportunities, careful consideration will be given to their verifiability, which is essential to distinguish between adherence and non-compliance.

Further, it will enumerate a short list of candidate normative propositions that, if declared at the right place, time, and way, lead us to understand that we might be closer than we think to shaping the space-related normative behavioral landscape. Declarative regulatory norms can be a practical alternative to disarmament or arms control approaches. Harnessing this approach can develop future norms in space, including rules around registration, rendezvous and proximity operations, safety-related functions, critical infrastructure, safe zones, and right of or giving way.

INTRODUCTION

In recent years, there has been growing concern about the responsible use of outer space. The increasing presence of commercial and state actors and the potential for space-based activities to impact the environment have raised questions about the need for a normative framework for responsible space use. However, despite these concerns, it is worth noting that we are actually closer to norms for responsible space use than many people believe.

One reason for this is the existence of many treaties and agreements that set the framework for responsible space use. For example, the Outer Space Treaty of 1967, which 109 states have ratified, establishes the principle of the peaceful use of outer space and prohibits the placement of weapons of mass destruction in orbit. Other agreements, such as the Convention on International Liability for Damage Caused by Space Objects and the Convention on Registration of Objects Launched into Outer Space, further define the legal framework for responsible space use.

In addition to these existing agreements, there is a growing recognition of the need for additional norms to address new and emerging challenges. For example, the recent surge in the deployment of small satellites has led to increasing concerns about creating space debris and the need for responsible spacefaring practices. In response, some countries have proposed new norms for responsible space use, such as guidelines for deorbiting small satellites and using "space traffic management" systems to monitor and coordinate the activities of actors in space. The practical realities of operation in space and the independent desire to protect space assets have driven commercial actors to self-define responsible behavior and State actors to consider new approaches to behavior and oversight.

EMERGING NORMS

Many commercial space companies are already following best practices for responsible space use. This adherence includes measures such as avoiding the creation of new space debris, implementing collision avoidance protocols, and developing environmentally friendly propulsion systems. Adhering to these responsible practices sets a positive example for others. This exemplifies our premise that norms exist when actors demonstrate expected behavior, whether or not there is an agreement to do so.

While there is undoubtedly a need for continued efforts to strengthen the normative framework for responsible space use, it is important to recognize that we are closer to achieving these norms than many believe. The existence of treaties, the development of new norms, and the responsible practices of many actors in the space sector demonstrate that the international community is moving in the right direction toward a more sustainable and responsible use of outer space. Building on this foundation of obligations and leaning toward propositions for inherently valid new norms can foster a framework for normative acceptance that repeats the recent successes of 2022's moratorium on ground-based ASAT testing.

CASE EXAMPLE: 2022 ASAT TESTING MORATORIUM

In 2022, the United States proclaimed a unilateral moratorium on ground-based KE-ASAT testing. This statement represents a declarative norm and leading by example. The declaration as a normative proposition succeeded and has become a bona fide international norm among 10 additional nations and the United Nations with 154 UN resolution votes of affirmation.

APPLYING DEONTIC LOGIC FOR SHAPING SPACE BEHAVIOR

Deontic logic is a branch of formal logic that studies the concepts of obligation, permission, and prohibition in ethical and moral reasoning. It is used to analyze and reason about normative concepts such as what is right or wrong, what is permitted or forbidden, and what is required or obligated. In deontic logic, normative statements are expressed using modal operators such as "must," "should," "may," "cannot," and so on. These modal operators indicate the degree of obligation, permission, or prohibition associated with a particular action.

Deontic logic is used in fields such as ethics, legal theory, and artificial intelligence to reason about normative concepts and to provide a systematic approach to making ethical and moral decisions. It provides a formal framework for analyzing normative concepts and making ethical judgments and can be used to evaluate the normative implications of various actions and policies. In summary, deontic logic is a way of formally analyzing and reasoning about normative concepts such as obligation, permission, and prohibition, and it provides a framework for making ethical and moral decisions based on normative considerations. Can it be used as a way to shape good behavior in space use by providing a framework for reasoning about the ethical and moral implications of different actions?

In the context of space use, deontic logic can help decision makers determine the right course of action when making decisions about the use of space resources, the protection of the space environment, and the regulation of space activities. For example, deontic logic can be used to determine the obligations of spacefaring nations to act responsibly and avoid harmful activities that could impact the space environment. By using deontic logic, decision makers can ensure that their actions align with ethical and moral principles and that they are making decisions that are in the

best interest of humanity and the long-term sustainability of the space environment. Deontic logic provides a systematic way to analyze space use's normative aspects and make decisions based on ethical and moral considerations, rather than economic or political considerations.

Overall, deontic logic can play a valuable role in shaping good behavior in space use by providing a framework for ethical decision making and promoting responsible and sustainable space activities.

NORMATIVE PROPOSITION

A normative proposition is a statement or idea that expresses a value judgment, recommendation, or evaluation of what ought to be. It reflects an individual's or a group's beliefs and values about what is right, wrong, good, or bad. Normative propositions are often used in ethics, political philosophy, and other fields that deal with morality and social values. For example, "All individuals have a right to freedom of speech" is a normative proposition because it expresses a value judgment about what ought to be the case with regard to individual rights. Similarly, "It is wrong to discriminate based on race" is a normative proposition because it evaluates discrimination as being bad or unethical.

Normative propositions are essential in shaping public opinion and guiding policy decisions. They often serve as the basis for laws, regulations, and social norms that shape the way society operates and governs itself. In a typical normative development process, there exist several steps that require continuous monitoring and review, as shown in Table 1.

Table 1: A Typical Norms Development Process

Norm Process Step	Norm Process Step Description
Identifying the need for norms	The first step is to determine why norms are needed and what problems they are meant to address.
Stakeholder involvement	The next step is to engage relevant stakeholders affected by the norms. This can include representatives from government, industry, civil society, and other relevant groups.
Defining the norm	The third step is to clearly define the norm and what it aims to achieve. This can involve creating a draft or proposal for the norm and seeking stakeholder input.
Consultation and feedback	Once the draft norm has been developed, it is important to engage in a process of consultation and feedback. This can include holding workshops, focus groups, and other forms of outreach to gather stakeholder input.
Finalizing the norm	Based on the feedback received, the norm is refined and finalized. This may involve making changes to the draft, adding additional provisions, or incorporating the suggestions of stakeholders.
Implementation	The final step is to implement the norm and ensure it is widely adopted and adhered to by relevant actors. This may involve providing training and support to those who need to comply with the norm and monitoring and enforcement mechanisms to ensure compliance.

An alternative method for normative development can involve normative propositions and declarative statements. As we have seen in the case of the KE-ASAT testing ban of 2022, some declarations can cascade faster than others and in ways that bypass the traditional norms development process described in Table 1.

A new way to establish normative behavior in space use by using normative propositions in international space relations could involve the steps described in Table 2.

Table 2: Establishing Space Norms by Way of Normative Propositions

Norm Process Step	Norm Process Step Description
Definition of normative propositions	The first step would be clearly defining a set of normative propositions relating to space use and the associated ethical and moral considerations. These propositions could be based on the principles of international law, such as the Outer Space Treaty of 1967, and the values and norms widely recognized and shared by the international community.
Stakeholder engagement	The next step would be to engage with relevant stakeholders, including governments, international organizations, civil society, and the private sector, to seek their input and feedback on the normative propositions. This could involve holding workshops, consultations, and other forms of outreach to ensure the propositions reflect the wider community's views.
Refinement of normative propositions	Based on the feedback, the normative propositions could be refined and further developed to ensure they are comprehensive and widely accepted.
International agreement	Once the normative propositions have been developed, the next step would be securing international agreement. This could involve negotiating a new treaty or other international instrument that legally binds states to adhere to the normative propositions in their use of outer space.
Implementation	The final step would be to implement the normative propositions and ensure their widespread adoption and compliance by relevant actors. This could involve providing training and support to those who need to comply with the propositions and monitoring and enforcement mechanisms to ensure the propositions are being followed.

Using normative propositions in international relations to establish normative behavior in space use can jump-start the international community by ensuring that ethical and moral considerations guide space activities and that they promote the long-term sustainability of the space environment. This could help to build trust and cooperation among stakeholders and ensure that space activities contribute to the betterment of humanity.

DECLARATIVE NORMS

Both declarations and normative propositions can effectively shape good behavior in space in different ways. Declarations are formal statements that express states' or international organizations' political will and intentions. They do not have the same legal force as treaties or other binding international instruments, but they can be an important tool for building consensus, expressing common values and principles, and signaling political commitments, as evidenced by the ASAT testing ban.

On the other hand, normative propositions are statements or ideas that express a value judgment, recommendation, or evaluation of what ought to be. They reflect an individual's or a group's beliefs and values about what is right, wrong, good, or bad and provide a framework for ethical decisionmaking. Normative propositions can provide a framework for ethical decision making and promote responsible and sustainable space activities by guiding the actions of individuals and organizations. They can also be used to evaluate the normative implications of different actions and policies and to ensure they align with ethical and moral considerations.

Both declarations and normative propositions play important roles in shaping good behavior in space. Both declarations and normative propositions have the potential to shape good behavior in space, and both can be effective in their own ways. The most effective approach will likely depend on the specific context and the stakeholders' goals. Declarations can build political will and raise awareness among states and international organizations about the importance of responsible and sustainable space activities. They can also provide a basis for future negotiations and the development of more formal agreements. Meanwhile, normative propositions can capture the values that drive the discussions.

We propose harnessing specific candidate declarative norms to serve as additional normative propositions for current and future responsible space use. They may be either adopted by additional declarative statements from the international community or ushered through multilateral fora, such as the Open-Ended Working Group.

CANDIDATE DECLARATIVE NORMS FOR SPACE

The following declarative norms are not intended to change existing behavior but to capture principles that are accepted but not documented or reflected in international treaties or agreements. The barriers to international negotiations do not preclude common behavior, particularly when there is a mutual interest to do so. Some candidates for new declarative propositional norms are enumerated in the table below.

Table 3: Add Title

Declaration	Candidate Declarative Normative Propositions
A	Space objects operating in or through congested orbits shall be able to maneuver to avoid a conjunction.
B	Space objects with humans on board shall have priority.
C	A maneuvering object, including orbit raising, shall give way to a non-maneuvering object.
D	Operators shall participate in a space situational awareness information-sharing regime.

MANEUVERABILITY IN CONGESTED ORBITS

When a state does not authorize the insertion of non-maneuverable objects in orbits with an apogee above 400 km, it means that the state is prohibiting the deployment of objects that cannot be maneuvered in a specific type of orbit. An orbit with an apogee above 400 km is the point in an elliptical orbit where the distance between the orbiting object and the body it is orbiting is most significant and begins to enter

a highly congested low earth orbit. In practice, this means that non-maneuverable objects would be prohibited from being placed in certain orbits.

The reason for this type of restriction is to prevent the creation of new space debris and reduce the risks of collisions. Non-maneuverable objects, such as dead satellites or other space debris, are unable to alter their course or speed and may remain in orbit indefinitely. If these objects are placed in orbits with an apogee, they may collide with other objects, creating further debris and increasing the risk of collisions for other space activities.

This declarative norm can help to mitigate the risks associated with space debris and promote the safety and sustainability of space operations. In addition to a declarative normative proposition, this type of restriction may be implemented through national laws and regulations or through international agreements and conventions.

Overall, prohibiting the insertion of non-maneuverable objects in congested orbits is an important step in reducing the risk of collisions and promoting responsible space operations. It is one of several measures that can be taken to mitigate the risks associated with space debris and ensure the long-term sustainability of space activities.

A plan for declaring a norm that all space objects operating in congested orbits should have the ability to maneuver to avoid conjunctions with other resident space objects should consider several steps.

The first step in declaring a norm for space object maneuverability is establishing the need for such a norm. This can be done by highlighting the risks posed by the increasing amount of space debris in congested orbits and the potential for collisions that could cause further debris and damage to operational satellites.

The norm should be developed in consultation with relevant stakeholders, such as space agencies, industry experts, and international organizations. The norm should specify that all space objects operating in congested orbits should be able to maneuver to avoid conjunctions with other resident space objects, with specific requirements for the type and extent of maneuverability.

Once the norm has been developed, gaining consensus from all relevant stakeholders is important. This consensus can be achieved through engagement and consultation with stakeholders, as well as by highlighting the benefits of the norm, such as improved safety and reduced risk of collisions.

The norm should be communicated widely to space agencies, satellite operators, and other relevant parties. This can be done through publications, workshops, and other outreach activities.

To ensure compliance with the norm, compliance mechanisms must be established. This could include requiring satellite operators to demonstrate their maneuverability to avoid conjunctions and implementing penalties for non-compliance.

Regular monitoring and enforcement of the norm will be essential for ensuring its effectiveness. This can be done through satellite tracking and coordination mechanisms and by implementing reporting requirements for satellite operators.

Overall, declaring a norm that all space objects operating in congested orbits should have the ability to maneuver to avoid conjunctions with other resident space objects is an important step in promoting the safety and sustainability of space operations. By following the steps outlined above, it will be possible to establish a widely accepted and effective norm for reducing the risk of collisions in space.

CREWED MISSIONS

Space objects with humans on board, such as crewed spacecraft, should have priority over all other resident space objects for several reasons.

Space missions that carry human crew are inherently risky, and the crew's safety is paramount. In the event of a potential collision, it is important to prioritize the crew's safety and take all necessary measures to avoid a collision.

Crewed space missions typically have higher stakes and greater importance than other resident space objects. These missions often involve significant time, resources, and expertise investments and are critical for achieving scientific or operational goals.

The number of humans in space at any given time is limited, and their presence represents a significant investment of resources. It is important to prioritize their safety and well-being to ensure human space exploration's continued success.

International space law, such as the Outer Space Treaty of 1967, establishes that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and that states have a duty to avoid harmful interference with other space activities. Prioritizing space objects with humans on board is consistent with this legal framework, as it supports the safety and well-being of the crew and ensures space activities are carried out responsibly and safely.

Crewed space missions often capture the public's imagination and generate significant public support. Prioritizing these missions' safety and success can help maintain public support for space exploration and inspire future generations of space professionals.

Prioritizing space objects with humans on board is an important principle supporting human space exploration's safety, success, and sustainability.

While all space objects are important and should be subject to safe and responsible operations, space missions with human crew require special attention and priority to ensure their success and the continued advancement of space exploration.

GIVE WAY

In space, maneuvering objects have the ability to alter their course or speed in order to avoid collisions with other objects. However, non-maneuvering objects cannot change their course or speed and are typically in a fixed orbit. When a maneuvering object encounters a non-maneuvering object in its path, the maneuvering object is responsible for giving way to the non-maneuvering object to avoid a collision.

Giving way to a non-maneuvering object means taking evasive action to avoid a potential collision. This may involve altering the course or speed of the maneuvering object in order to pass safely by the non-maneuvering object. The specific actions required to give way will depend on the relative position, speed, and trajectory of the two objects and any other objects in the vicinity.

A declaration that the maneuvering object is responsible for maintaining a safe distance from non-maneuvering objects and taking all necessary actions to avoid collisions is important for ensuring the safety and sustainability of space operations.

A SPACE SITUATIONAL AWARENESS INFORMATION-SHARING REGIME

Participating in a space situational awareness information-sharing regime means that space

operators are providing and receiving information about the locations, trajectories, and other characteristics of space objects to improve the safety and sustainability of space operations. This information-sharing regime is intended to enhance situational awareness, which is the ability to understand and anticipate the movements and behavior of space objects in the vicinity.

Space situational awareness (SSA) is essential for the safe and effective operation of space activities, as it enables operators to monitor and track the movement of space objects and assess potential collision risks. By sharing SSA information, space operators can coordinate their activities and take action to avoid collisions and minimize the risk of damage or disruption to space activities.

The information that is shared in an SSA information-sharing regime typically includes data on the orbits, trajectories, and other characteristics of space objects, as well as information on potential collision risks and any planned maneuvers or activities. This information can be shared through various channels, such as databases, communication networks, and online platforms.

Participating in an SSA information-sharing regime requires space operators to share information and use the information provided by other operators to inform their own activities. This involves a commitment to transparency and cooperation and a willingness to collaborate with other operators to improve the safety and sustainability of space activities.

This candidate norm proposition could become an important step in promoting the safe and effective operation of space activities and mitigating the risks associated with space debris and potential collisions. By working together to share information and coordinate activities, space operators can improve the reliability and sustainability of space operations and help to ensure the long-term exploration and use of space.

CONCLUSION

A declared normative proposition may not result in a behavior change. However, like the U.S. declaration of a ban on destructive direct-ascent ASAT testing, the codification of existing behavior and the assertion that it will continue creates an opportunity for others to take similar action.

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