Use of AI in Outer Space: Policy & Legal Considerations

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Introduction: Who Am I?

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Has served in the USAF for nine & a half years, mostly as a base-level prosecutor at legal offices.

Sent to the University of Mississippi School of Law to obtain Air & Space Law LL.M. (2019-2020 school year)

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Subjects of Discussion

1) Military Interest: space as “war-fighting” domain, interest in AI use in space, military applications

2) Legal Issues: Space Law, International Law, Policy, International Humanitarian Law (IHL)

3) Examples / Hypotheticals
Space as a “War-Fighting Domain”

“Space is the world's new war-fighting domain. Among grave threats to our national security, American superiority in space is absolutely vital.” – President Donald Trump, 20 December 2019
"...the use by the United States and its allies of the elements of civilian, including commercial, infrastructure in outer space for military purposes. It seems like our colleagues do not realize that such actions in fact constitute indirect involvement in military conflicts. Quasi-civilian infrastructure may become a legitimate target for retaliation...."

- Statement to OEWG, 12 September 22
Military Interest in Space-Related AI

Russia's Killer Drone in Ukraine Raises Fears About AI in Warfare

The maker of the lethal drone claims that it can identify targets using artificial intelligence.
But It’s Not (Primarily…) About Autonomous Weapons Systems – At Least In Space!

- Data: Compilation, Analysis, Etc.
- Predictive Prognostics / Logistics
- Resource Optimization
- Automation: Tracking, Behavior, Etc.
- Simulation / Training
- Design
- Autonomous Response
Space Law & Military Use: Key Provisions

OST, Article I:
  • “The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.”

OST, Article III:
  • States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.”
OST, Article IV:

- “States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.”
- “The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.”
Space Law & Military Use: Key Provisions(?)

OST, Article VI:

• “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. . . . .”
European Union “Artificial Intelligence Act”: Meant to . . .

- Ensure that AI systems placed on the Union market and used are safe and respect existing law on fundamental rights and Union values;
- Ensure legal certainty to facilitate investment and innovation in AI;
- Enhance governance and effective enforcement of existing law on fundamental rights and safety requirements applicable to AI systems;
- Facilitate the development of a single market for lawful, safe and trustworthy AI applications and prevent market fragmentation

But . . . “This Regulation shall not apply to AI systems developed or used exclusively for military purposes” (Article 2, para. 3).
International Law & Military AI

Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy (US State Department)

This set of non-binding guidelines was released at the Summit on Responsible AI in the Military Domain (REAIM 2023) in February.
A. States should take effective steps, such as legal reviews, to ensure that their military AI capabilities will *only be used consistent with their respective obligations under international law, in particular international humanitarian law*.

B. 

C. States should ensure that senior officials oversee the development and deployment of all military AI capabilities with high-consequence applications, *including, but not limited to, weapon systems*.

D. States should *adopt, publish, and implement principles* for the responsible design, development, deployment, and use of AI capabilities by their military organizations.
Political Declaration Responsible Military Use of AI and Autonomy

J. States should ensure that the safety, security, and effectiveness of military AI capabilities are subject to **appropriate and rigorous testing and assurance within their well-defined uses and across their entire life-cycles**. Self-learning or continuously updating military AI capabilities should also be subject to a monitoring process to ensure that critical safety features have not been degraded.

K. States should design and engineer military AI capabilities so that they **possess the ability to detect and avoid unintended consequences and the ability to disengage or deactivate deployed systems that demonstrate unintended behavior**. States should also implement other appropriate safeguards to mitigate risks of serious failures. These safeguards may be drawn from those designed for all military systems as well as those for AI capabilities not intended for military use.

L. States should pursue **continued discussions on how military AI capabilities are developed, deployed, and used in a responsible manner**, to promote the effective implementation of these practices, and the establishment of other practices which the endorsing States find appropriate. These discussions should include consideration of how to implement these practices in the context of their exports of military AI capabilities.
Increasing interest in military applications of AI—and associated concerns
Emphasis on International Humanitarian Law

Key IHL / Law of War Principles Continue to Apply:

1) **Distinction**: requirement to distinguish btw military objectives and civilians / civilian objects (Art. 48, Additional Protocol I (PI) to Geneva Convention)

2) **Military Necessity**: requirement that targets “make an effective contribution to military action” and attacking/neutralizing them “in the circumstances ruling at the time, offers a definite military advantage” (Art. 52, PI)

3) **Proportionality**: requirement to refrain from attacks in which civilian death / injury “would be excessive in relation to the concrete and direct military advantage anticipated” (Art. 51, PI)

4) **ETC.**
Examples / Hypotheticals

Fooling the AI: Policy/Legal Responses?

How can you draft & develop law/policy to allow sufficiently robust AI to adapt and respond to unexpected stimuli?

What is the relationship btw law/policy and how AI can be programmed to achieve its missions?

The AI Fooling You: Policy/Legal Responses

How can you draft & develop law/policy to prevent AI from adapting too much and creating unintended consequences or behaving in unintended ways?

What is the relationship btw law/policy and how AI can be programmed to achieve its missions without “learning” beyond its intended use?
Questions / Discussion