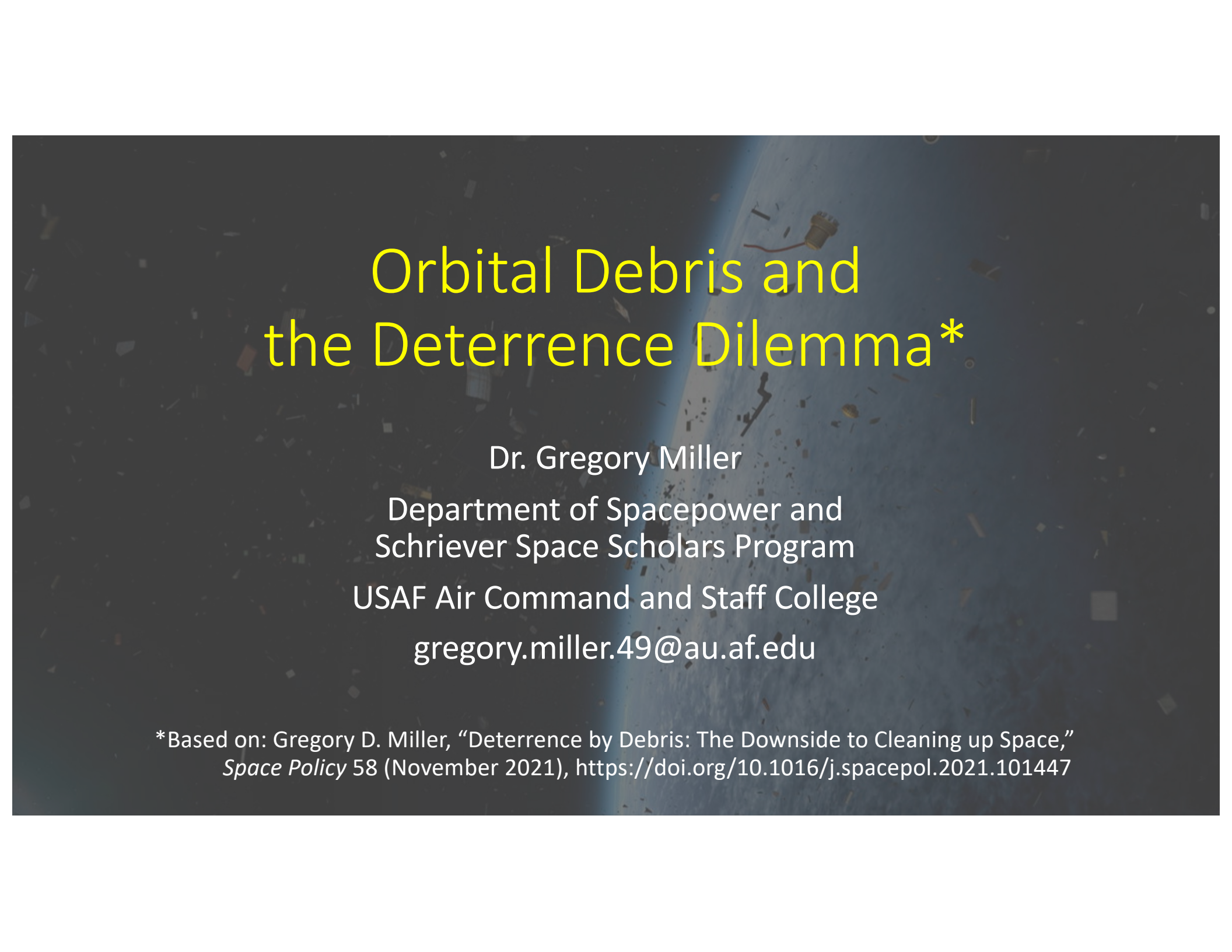




Orbital Debris and the Deterrence Dilemma*

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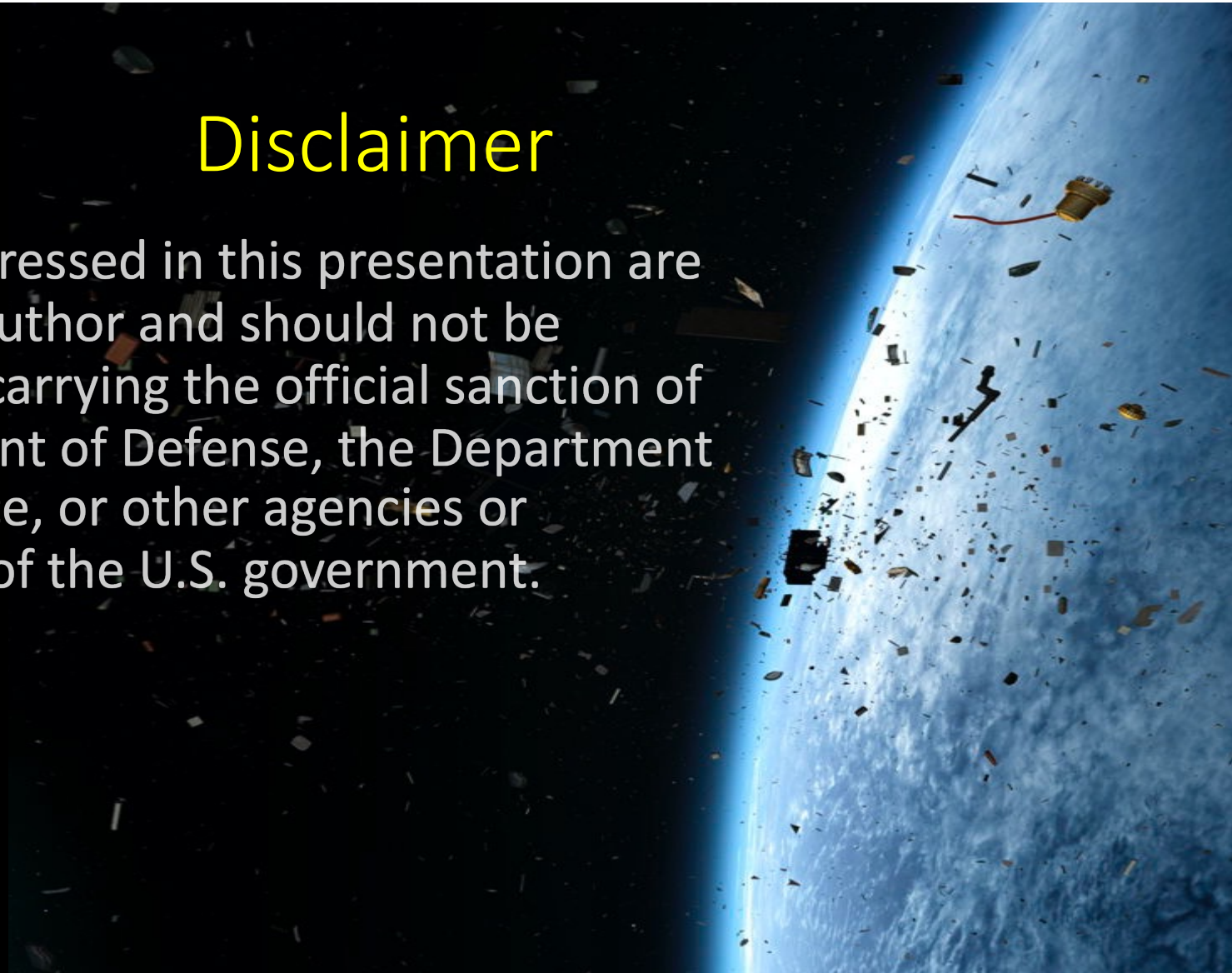
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*Based on: Gregory D. Miller, "Deterrence by Debris: The Downside to Cleaning up Space,"
Space Policy 58 (November 2021), <https://doi.org/10.1016/j.spacepol.2021.101447>

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The views expressed in this presentation are those of the author and should not be construed as carrying the official sanction of the Department of Defense, the Department of the Air Force, or other agencies or departments of the U.S. government.



Puzzle(s)

Conventional Wisdom: Orbital debris is a growing problem.

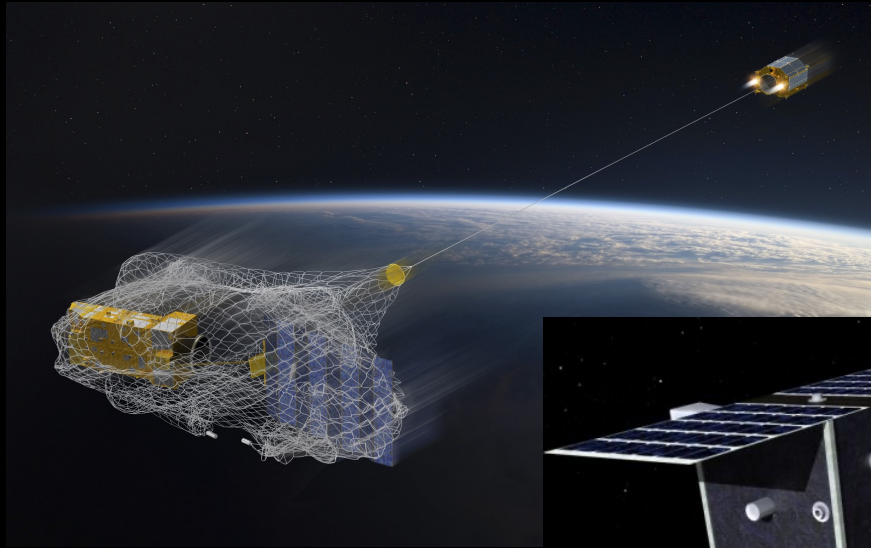
What are the unintended consequences of being able to clean up debris?

Proposed solutions can be weaponized.

Orbital Debris = "Any man-made object in orbit about the Earth, which no longer serves a useful function." -- NASA



Debris Removal Ideas



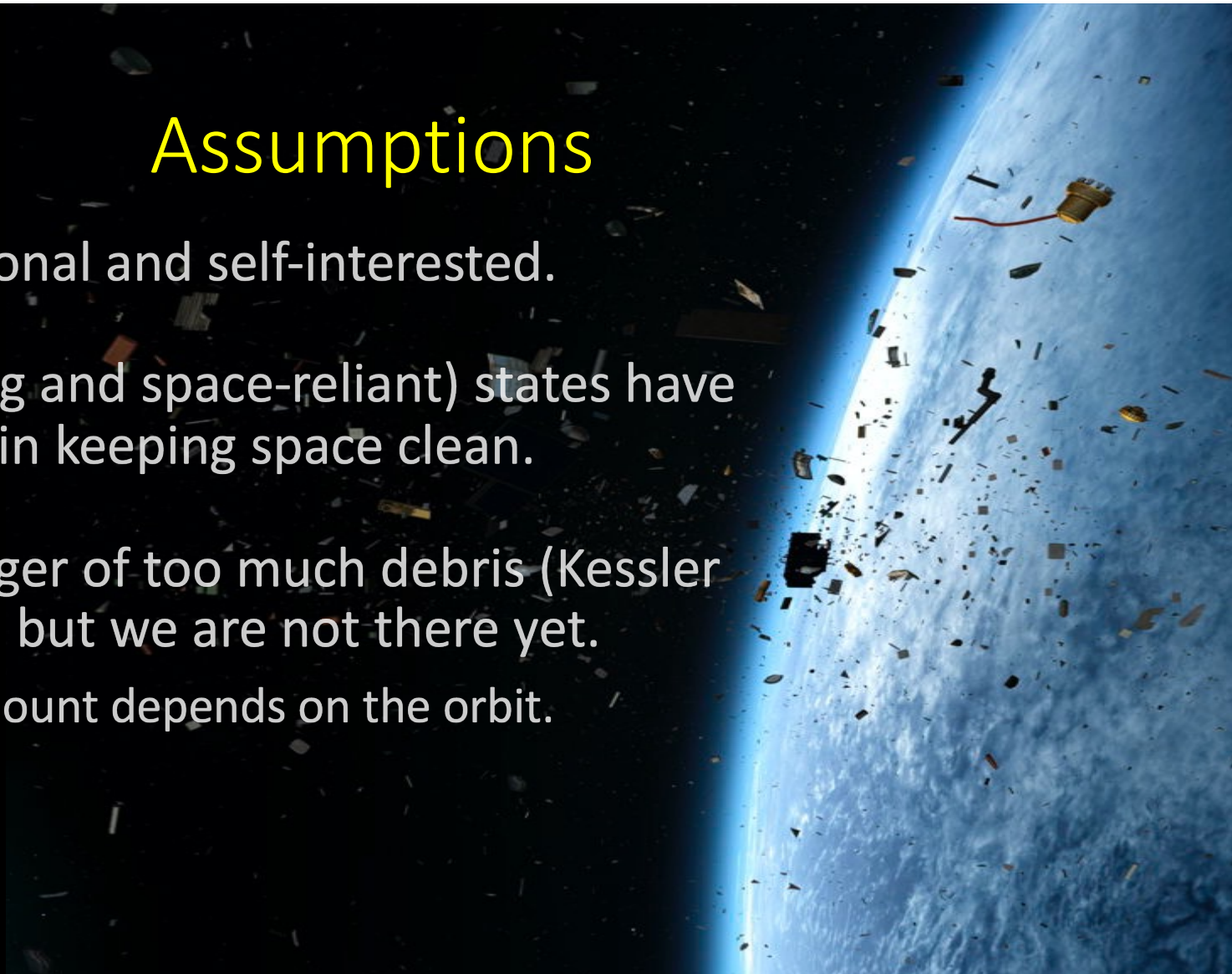
Assumptions

States are rational and self-interested.

All (spacefaring and space-reliant) states have an interest in keeping space clean.

There is a danger of too much debris (Kessler Syndrome), but we are not there yet.

- Acceptable amount depends on the orbit.



Deterrence 101

3 C's: Commitment, Capabilities, Credibility

Deterrence by Denial vs. Punishment

- by norms; by entanglement

The “Tripwire”



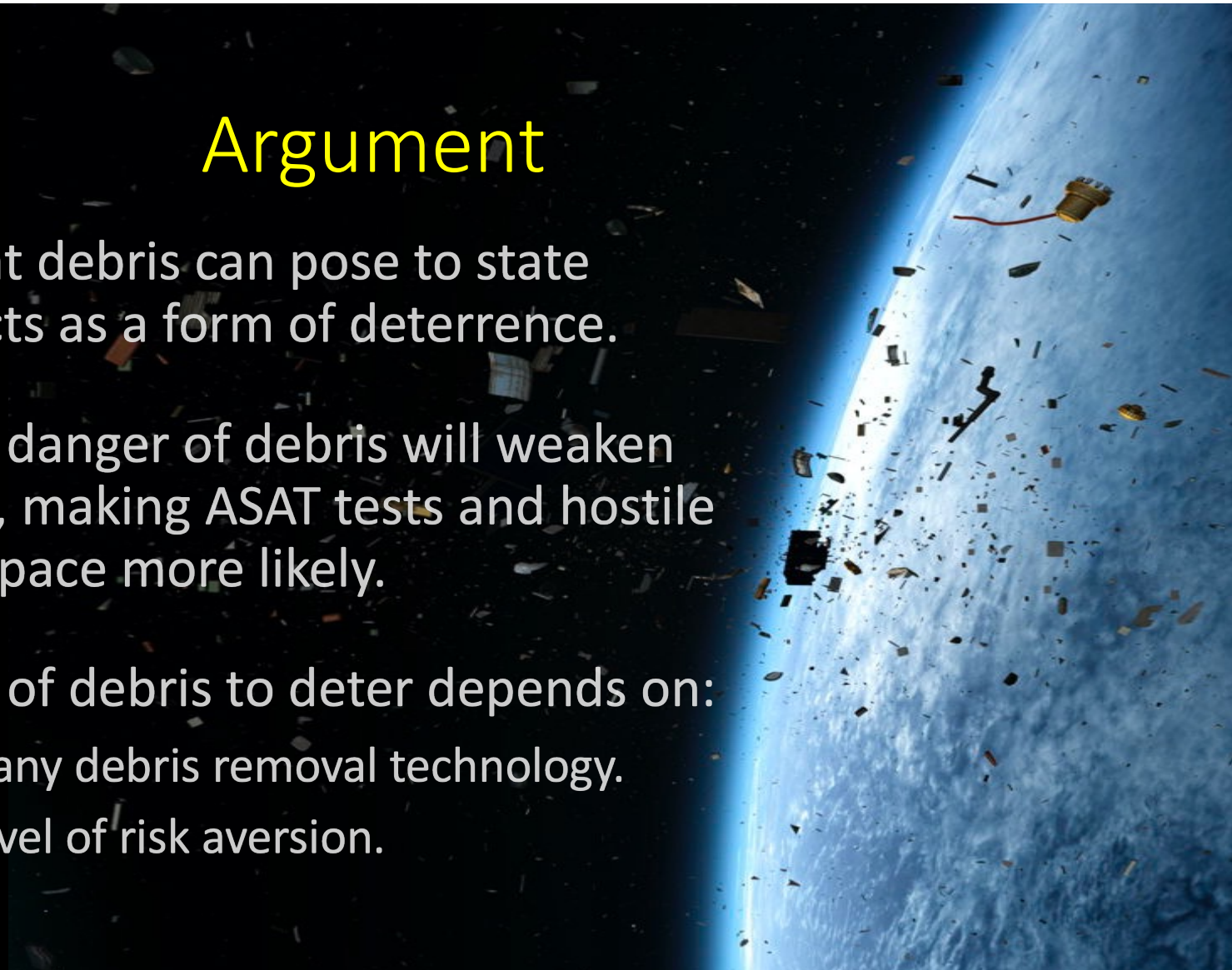
Argument

The threat that debris can pose to state interests acts as a form of deterrence.

Removing the danger of debris will weaken deterrence, making ASAT tests and hostile actions in space more likely.

Ideal quantity of debris to deter depends on:

- The nature of any debris removal technology.
- Each actor's level of risk aversion.



Some Proposed Solutions

More maneuverable and resilient satellites:

- Raises cost to launch.
- Reduces lifetime and mission effectiveness.
- Weakens deterrence from debris.

Norms against actions that create debris:

- Difficult to enforce; apparently do not work.

International institutions:

- Difficult to enforce.



Retaining Deterrence

View orbital debris as comparable to naval mines.

- Accountability even without hostile intent against victim.

Treat actions that intentionally create debris as acts of war.

- Cross-domain deterrence doesn't require state to have launch capabilities.

Factors to enhance deterrence:

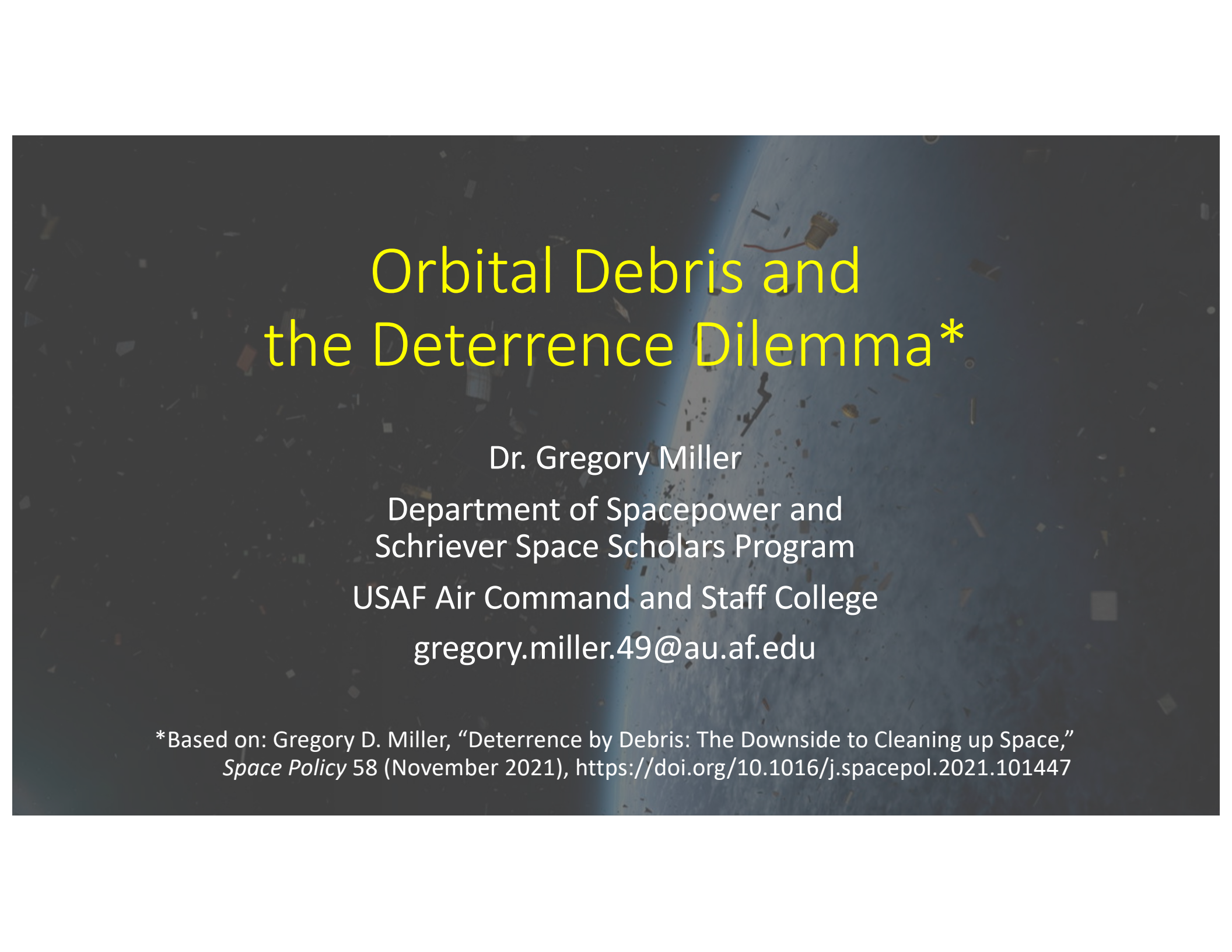
- More multinational and dual-use spacecraft.
- More crewed spacecraft.



Thank You

Questions?





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