



NASA, 1968

COLLECTIVE ACTION PROBLEMS IN PLANETARY DEFENSE

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What are collective action problems?

Asymmetries between collective interests
and individual interests

Major examples:

1. Free rider problem (each party tries to hang back while others do the work)
2. Tragedy of the commons (all parties overexploit and ruin a shared resource)
3. Prisoners' dilemma (parties refuse to cooperate due to mutual fear of betrayal)

Possible Outcomes of Prisoner's Dilemma

Outcome	Henry Cooperates	Henry Defects
Elizabeth Cooperates	(1,1)	(5,0)
Elizabeth Defects	(0,5)	(3,3)

Penalties for (Elizabeth, Henry)



Doomed?



NEOs: perceived risks to nations

- **NEO research and countermeasures are expensive, limited resources**
- **Requires cooperation and trust between nations: sharing sensitive information, nuclear devices?**
- **Long time horizons: far-off threats are less salient than they should be**
- **No centralized system to set norms or coordinate action**
- **Myopic view of planetary threats**

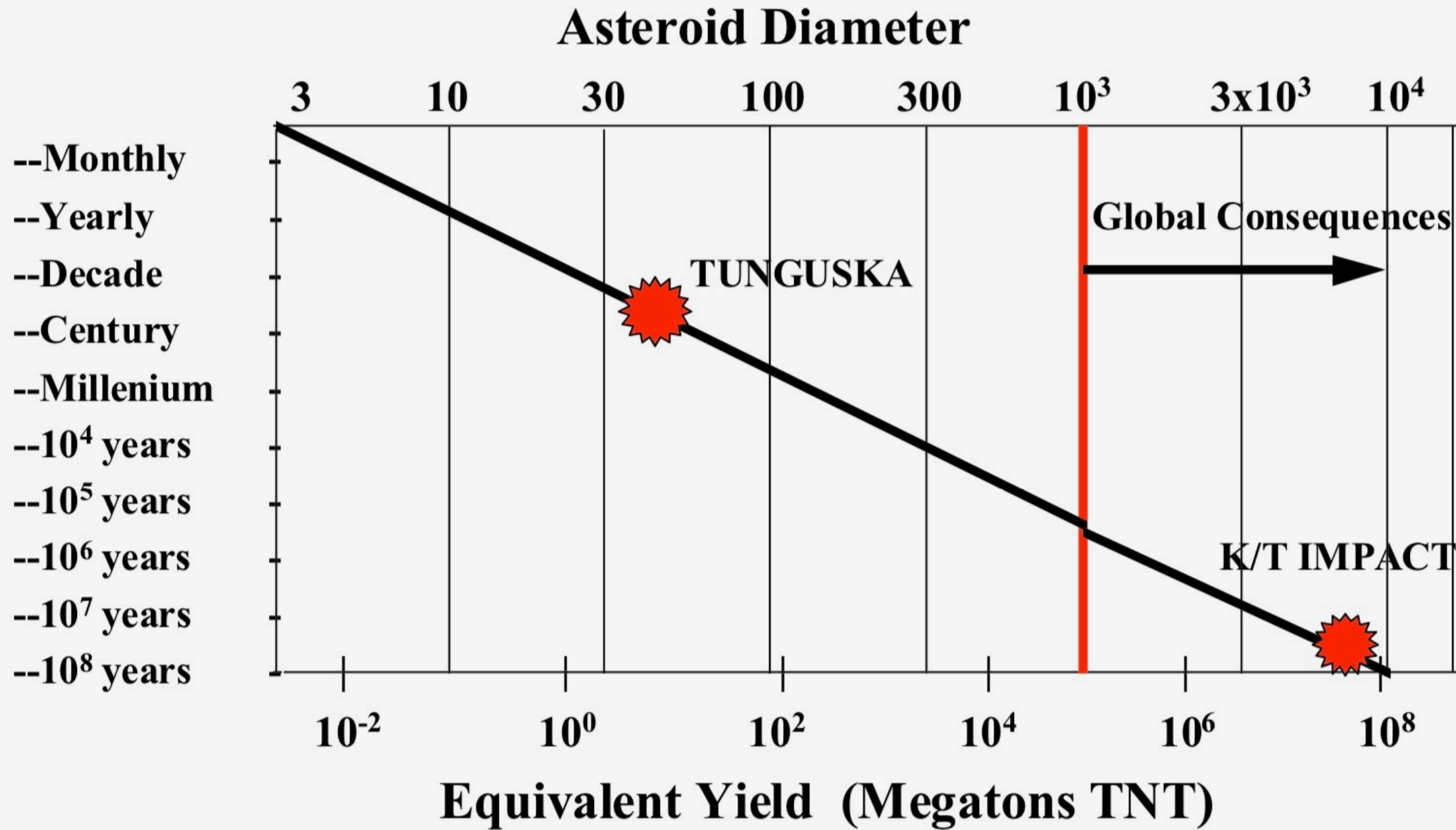


Figure 1-1. Asteroid Size/Impact Versus Frequency

Expanding the scope of planetary defense

Concerns:

- Satellite overcrowding (“mega-constellations”)
- Weaponization of space
- Anthropogenic climate change

Effects:

- Space debris: Kessler syndrome, jeopardize anti-NEO efforts
- Severe alterations to global env’t
- Large-scale threats to human welfare

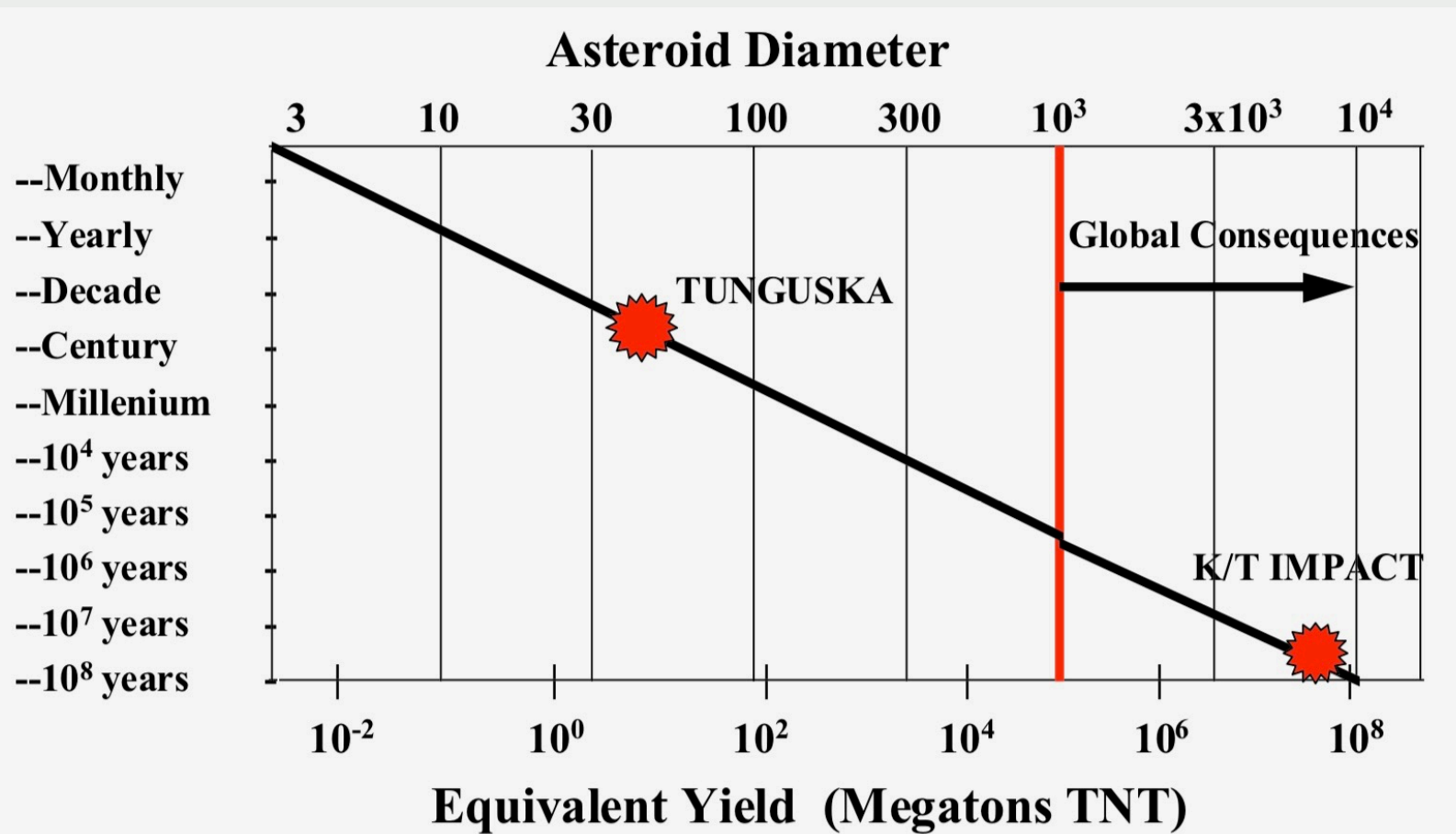


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SPACE

What's the environmental impact of space debris and how can we solve it?

Jul 13, 2022



Space industry should help solve climate change not worsen it.
Image: Pexels.

Rajeev Suri

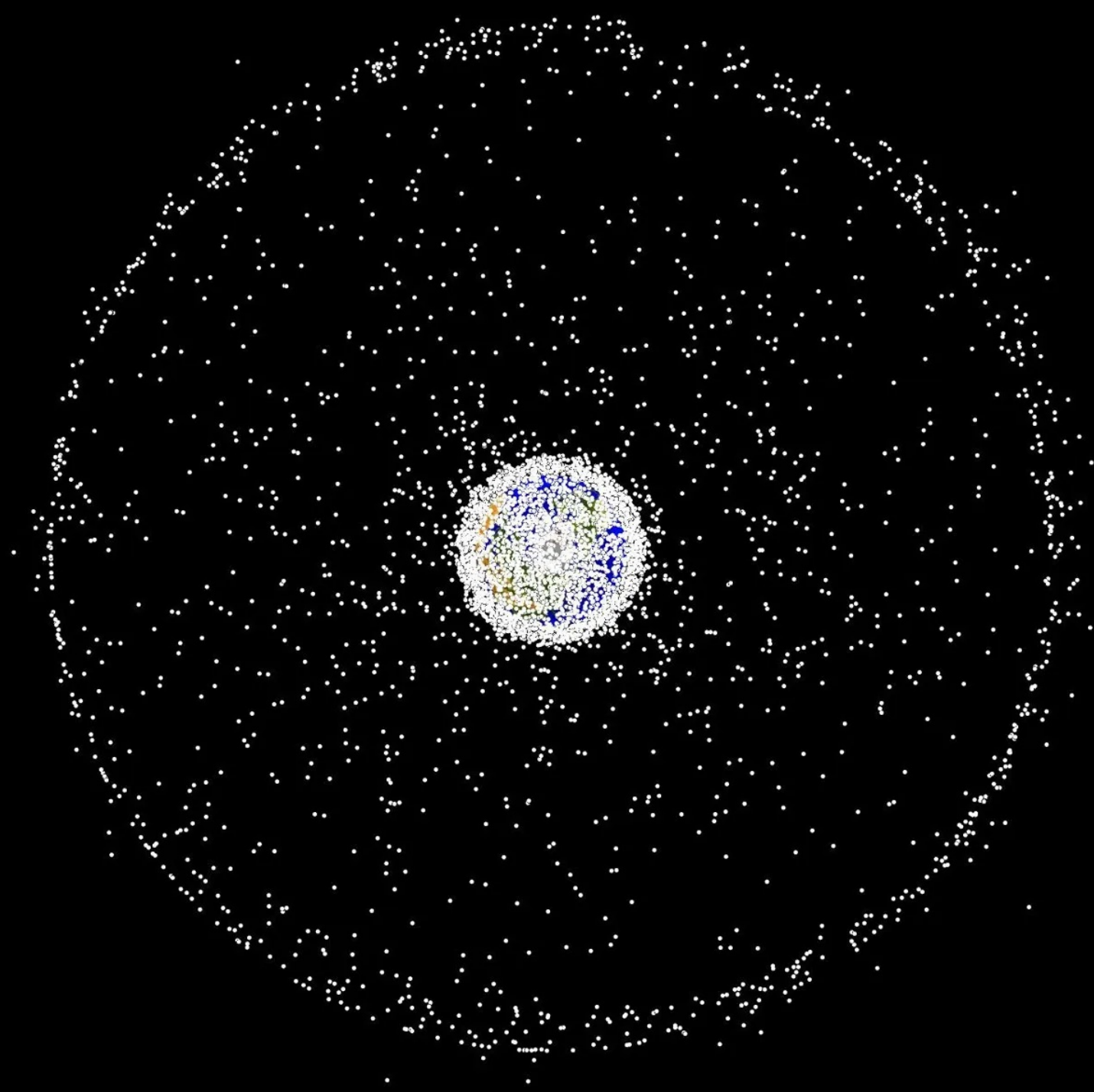
Chief Executive Officer, Inmarsat Global



World is on brink of catastrophic warming, U.N. climate change report says

A dangerous climate threshold is near, but 'it does not mean we are doomed' if swift action is taken, scientists say

BY SARAH KAPLAN
MARCH 20 AT 5:33 PM



NASA/JSC/
Orbital
Debris
Program
Office,
2017

Proposals for boosting cooperation

Strategies:

- Strengthen incentives for cooperation
- Reduce uncertainty and strengthen basis for coordination
- Frame planetary defense, debris reduction, and space anti-militarization in terms of widely-held values and interests
- Use treaties as pre-commitment devices

Tactics:

- Establish Planetary Defense Convention under OST
- Clarify terms of Space Liability Convention
- Establish UN body for “planetary security” under Security Council
- Create int’l partnerships with countries
- Connect space debris with environmentalism and industry
- Increase public messaging about small and medium-sized NEOs (emphasize risks *and* potential to prevent)



NASA, 1990

