



# Space wars

## Deep Dive session

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# The background

- Most of the world's critical infrastructure depends on space infrastructure
- Satellites and space assets are vulnerable, especially to cyber attack
- Possible threats come from all directions
- Space is becoming “cheap”
- Pace of change means defenders are always likely to be on the back foot
- Technology cannot be the entire answer to threats, it will need policy, cooperation, standards etc. – a “community of the willing” <sup>1</sup>



<sup>1</sup> "Space, the Final Frontier for Cybersecurity?", Livingstone and Lewis, Chatham House

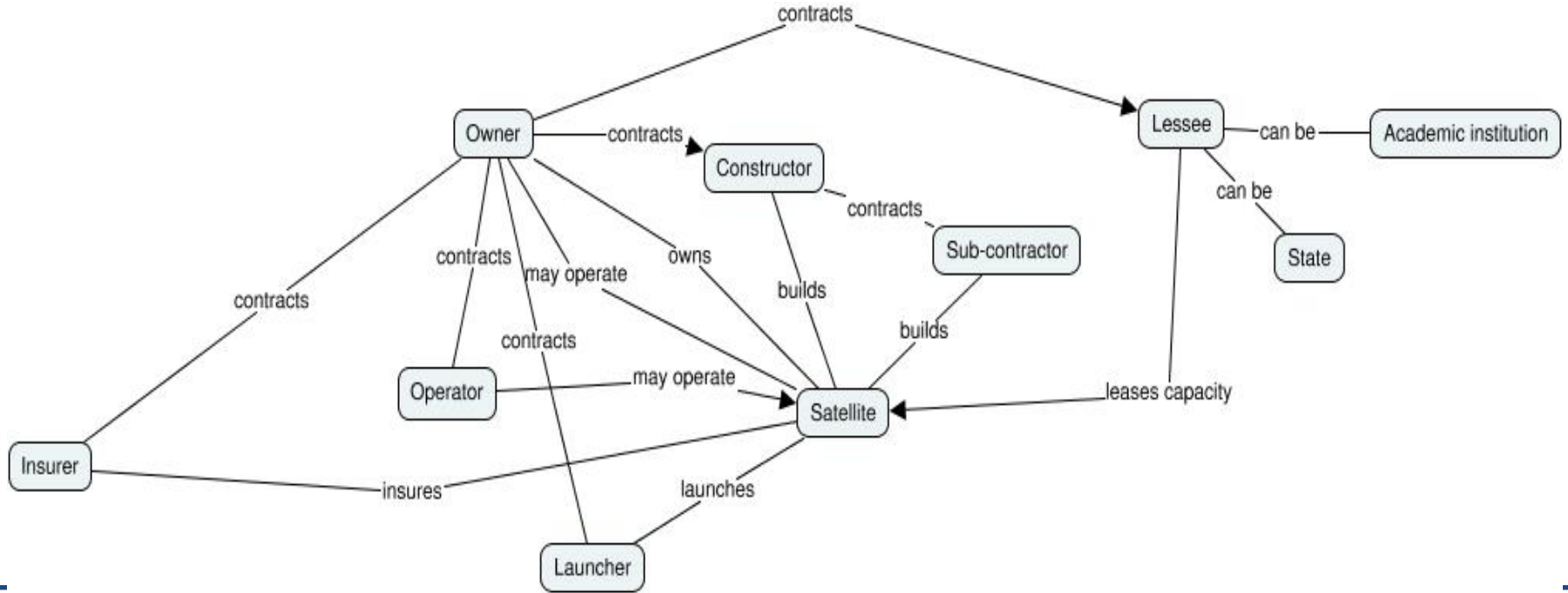
# Vulnerabilities

- Satellites are vulnerable
  - Physical interference
  - Jamming/Spoofing
  - Hijack
- Ground facilities are vulnerable
  - Physical attack
  - Hacking
  - Destruction
  - Hijacking
  - Etc.

# Actors (and their motivations)

- States
- Non-states
  - Criminal organisations
  - Commercial organisations
  - Terrorist organisations
  - Individuals
- Motivations
  - Create/deny strategic advantage
  - Create/deny economic advantage
  - Highlight agenda
  - Prestige
  - Altruism??

# Commercial organisations (The tangled web)



# Cheapness

- <http://Interorbital.com>
- A cubesat (with delta-v capability) can be put into orbit for \$20k
- Satellite builders and operators want flexibility and low costs
  - General purpose computers on board now so more susceptible to hacking
  - COTS/Open source software and hardware
  - Standard comms and protocols
  - Security is an overhead

# Pace of change

- Builders and operators want longevity
  - Flexibility

# Solution

- Development of a flexible, multilateral space and cybersecurity regime
- That will be a lot more difficult than it sounds
  - Competing objectives



# Gaming Ideas

# Gaming

- Actual space war games (ASAT etc.) are of limited appeal and utility
  - Not likely to be the main threat vector, or will not appear to be the main threat vector (false flags)
- Cyber wargames are space wargames
  - False flag operations
  - Vulnerable, international, complex supply chains
  - Space and ground assets to be targeted
- Gaming the approaches to and strategies for the development of security in space could be fruitful (matrix games?)
  - How do you incentivise commercial organisations to be secure?
  - How can states co-operate without giving away an advantage?
  - How can non-state actors affect efforts (for good or ill)?
- Resource management games?
  - Orbital slots, capabilities etc. are all scarce resources – How to repair/maintain a degraded capability?



**Thank you**

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