



*Promoting Cooperative Solutions for Space Sustainability*

# **Space Situational Awareness, Norms of Behavior, and Space Security**

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Military Space Situational Awareness  
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# The rhetoric about “war in space”

## Trump floats the idea of creating a 'Space Force' to fight wars in space

- President Donald Trump floated the idea of developing another service branch, the Space Force.
- Trump said the idea started as a joke, but “Space is a war-fighting domain, just like the land, sea, and air domains,” he said in a tweet. [ACQUISITION, AIR, SPACE, STRATEGY & POLICY](#)
- “Space is a war-fighting domain, just like the land, sea, and air domains,” he said in a tweet.

## CSAF Predicts War In Space ‘In A Matter Of Years’

Christina Wilkie | @christinawilkie

Published 5:59 PM ET Tue, 13 March 2018 | Updated 6:4

By COLIN CLARK

on February 26, 2018 at 4:00 AM

### SPACE

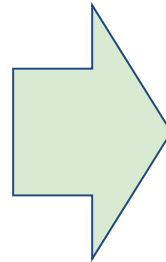
## Space war is coming – and the U.S. is not ready

‘We are now approaching a point where “Star Wars” is not just a movie,’ one government adviser warns.

By BRYAN BENDER and JACQUELINE KLIMAS | 04/06/2018 05:11 AM EDT

## Old Space Paradigm

- National
- Secret
- Military-led
- Independent
- Strategic



## New Space Paradigm

- International
- Transparent
- Commercial-led
- Interdependent
- All levels of war

Space is becoming “normalized”

# Space is moving towards this

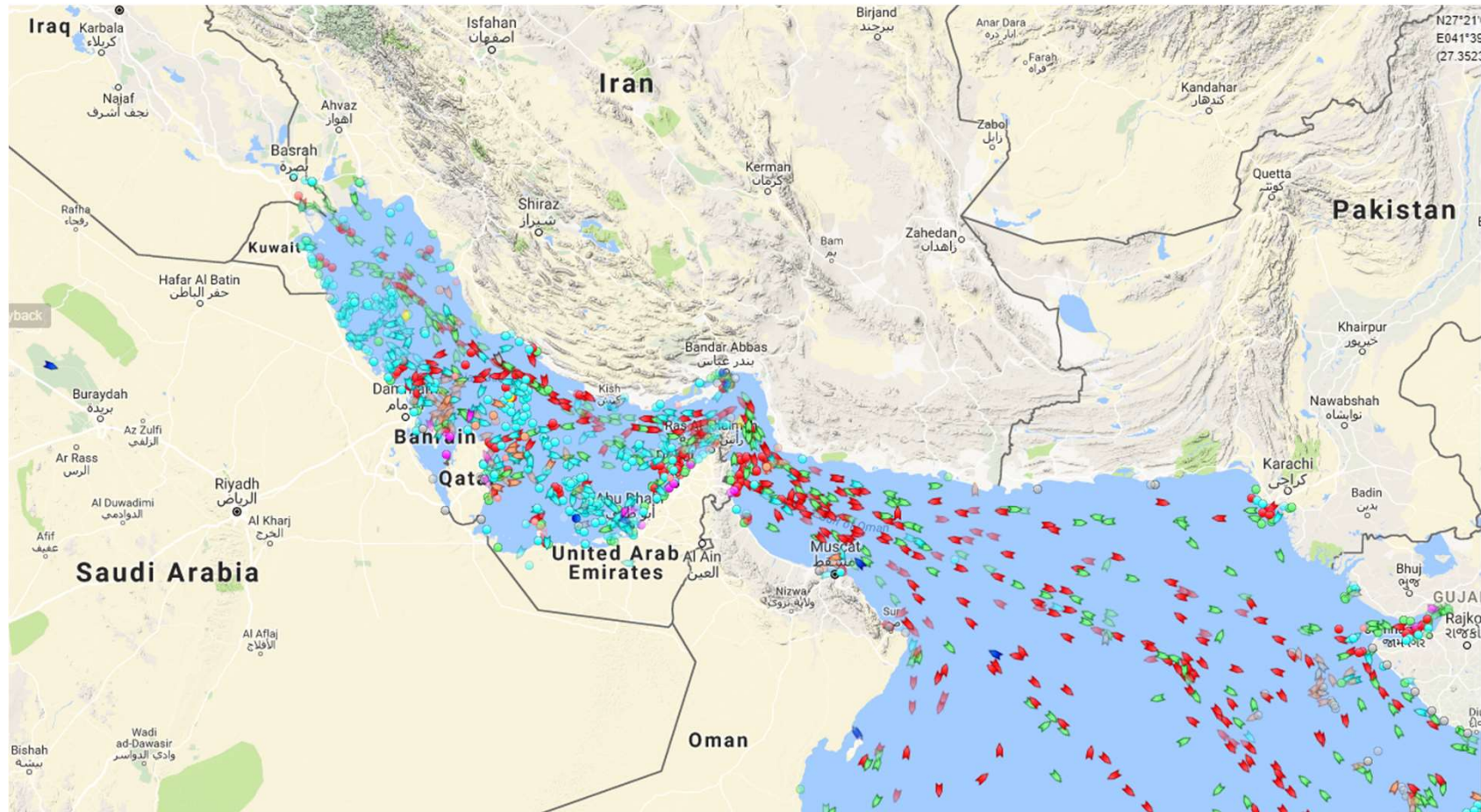


Image credit: [MaritimeTraffic.com](http://MaritimeTraffic.com)

# What are “norms”?

- **Sociology:** informal understandings that govern the behavior of members of a society
- **International relations:** Standard of appropriate behavior for actors with a given identity
- Norms are useful tools to moderate or influence behavior in the absence of laws and regulations
  - **Example:** Stand on the right, walk on the left on Metro escalators
- Laws are often (but not always) codifications of existing norms
  - **Example:** Drive on the same side of the road
- Norms can often play as big a role in encouraging compliance with laws as actual penalties
  - **Example:** Bans on watering lawns

# Norms in space governance

- Much of the existing space governance framework is based on norms
  - **Example:** Freedom of overflight for satellite reconnaissance
    - Launch of Sputnik in 1957 helped set the norm that satellite overflight did not breach territorial sovereignty
    - By mid-1960s, freedom of overflight was a generally accepted norm
    - Was not codified into “hard law” until Outer Space Treaty of 1967
- Norms are likely going to be the main mechanism to address future challenges
  - Far more space actors than ever before, with diverse interests and goals
  - Increasingly challenging to get global consensus on new “hard law”



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# RENDEZVOUS AND PROXIMITY OPERATIONS



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# Development of OOS and RPO Capabilities

- On-orbit servicing (OOS) and Rendezvous and Proximity Operations (RPO) are key to enabling future of on-orbit activities
- Benefits and challenges
  - Greatly increase the viability of and benefits from space activities
  - Raises a number of diplomatic, legal, safety, operational, and policy challenges that need to be tackled
- OOS and RPO are not new, and are already international
  - 50+ years of experience in doing it with human spaceflight, but increasingly shifting to robotic/autonomous
  - Multiple countries/companies developing and testing RPO capabilities
- How to develop norms and standards to enable cooperative OOS/RPO and mitigate challenges?





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# Are you coming to help or hurt?

## Russian Luch Satellite Relocates – Next to Another Intelsat Craft

by Mike Gruss — October 16, 2015

## Air Force sent GSSAP satellite to check on stalled MUOS-5

by Mike Gruss — August 18, 2016

## Secretive ANGELS satellite part of new space experiments

by Mike Gruss — April 14, 2016

## In-Space Eavesdropping? – China's Shijian-17 completes High-Altitude Link-Up

📅 December 9, 2016

## Stalkers in Space: Defeating the Threat

*Brian G. Chow*

# FONOPS for space?

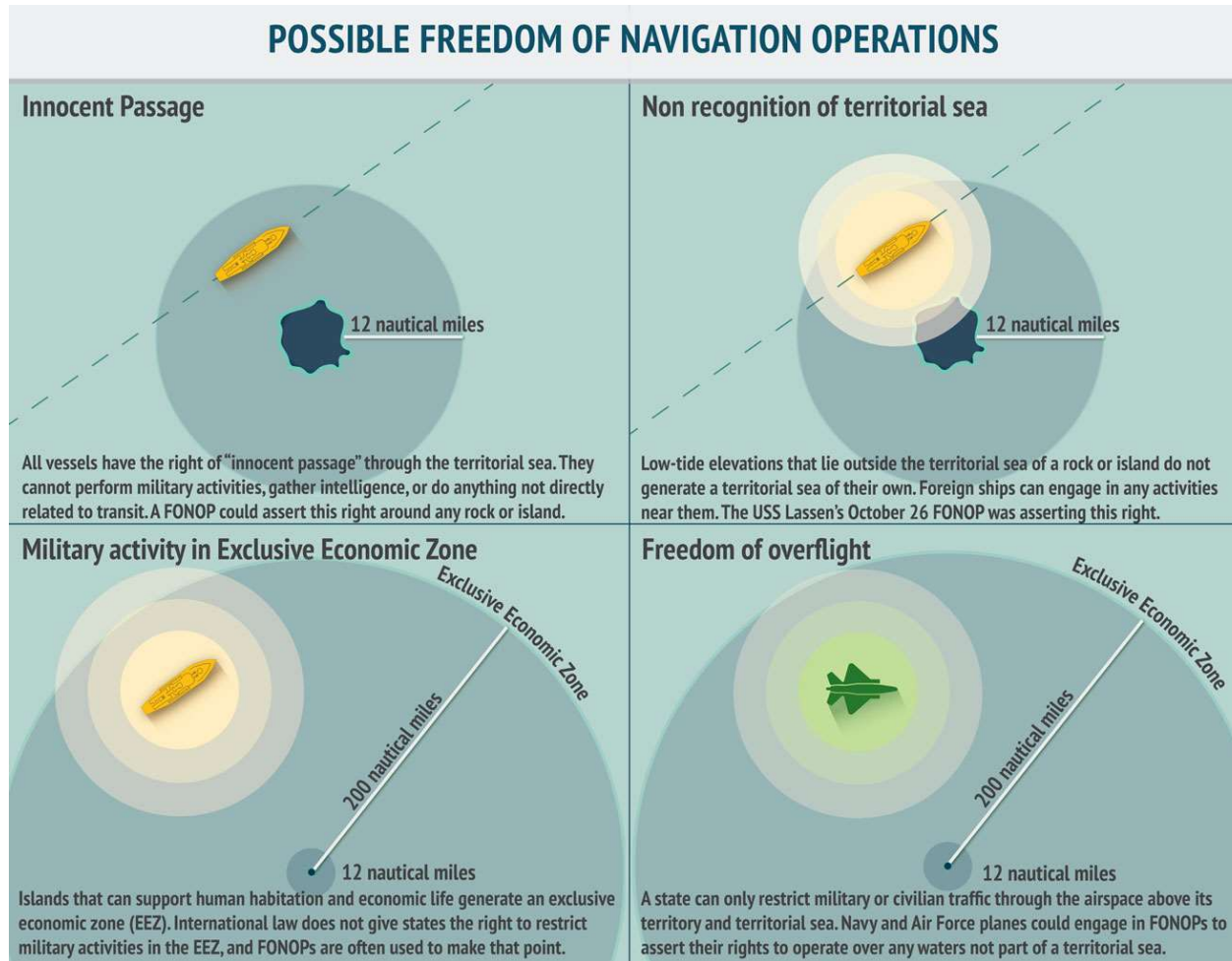


Image credit: [Asia Maritime Transparency Initiative](#)

# An “Incidents in Space Agreement”?

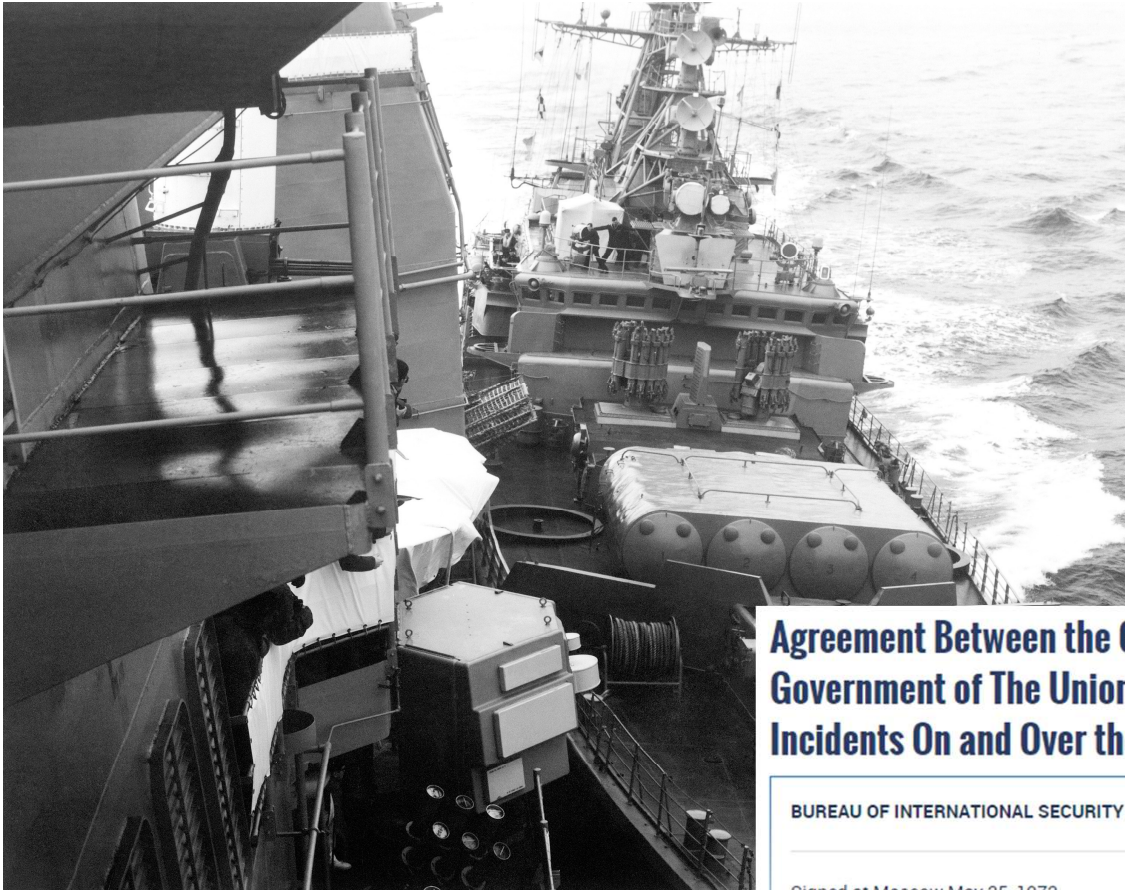


Image credit: [Wikimedia Foundation](#)

## Agreement Between the Government of The United States of America and the Government of The Union of Soviet Socialist Republics on the Prevention of Incidents On and Over the High Seas

BUREAU OF INTERNATIONAL SECURITY AND NONPROLIFERATION

Signed at Moscow May 25, 1972

Entered into force May 25, 1972

[Narrative](#)

[Treaty Text](#)

[Protocol](#)

# Space Rules of Engagement?



DILEMMA	RESPONSE
3. PROJECTILES THROWN (NO SOLDIERS INJURED, APPREHEND ASSAULTER(S) AFTER USING MINIMUM FORCE).	REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON. DODGE THE PROJECTILES; DO NOT THROW THEM BACK. APPREHEND THE ASSAILANT(S); TURN THEM OVER TO POLICE.
4. IN-PROGRESS CRIME AGAINST A PERSON (SERIOUS BODILY HARM OR DEATH MAY HAPPEN).	STOP THE ASSAULT WITH MINIMUM FORCE NECESSARY; USE DEADLY FORCE IAW ROE; REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON.
5. IN-PROGRESS CRIME AGAINST (ARSON; LOOTING; DESTRUCTION) A JTF-DESIGNATED "PROTECTED FACILITY."	STOP THE CRIME WITH MINIMUM FORCE NECESSARY; USE DEADLY FORCE IAW ROE; REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON.
6. IMMINENT HARM TO YOU.	PROTECT YOURSELF WITH MINIMUM FORCE NECESSARY; USE DEADLY FORCE IAW ROE. REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON. APPREHEND ASSAILANT; TURN OVER TO POLICE.
7. PERSON OBSERVED WITH WEAPON.	REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON. OBSERVE.
8. ACCESS TO KEY/VITAL/DESIGNATED FACILITY REQUESTED.	REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON. CHECK WRITTEN SPECIAL INSTRUCTIONS. CHECK INDIVIDUAL'S ID. PROTECT YOURSELF WHILE MAKING CHECKS. BE COURTEOUS. DENY ENTRY TO UNAUTHORIZED PERSONNEL.
9. COME UPON CIVILIAN CASUALTY.	REPORT TO CHAIN OF COMMAND. MAKE DETAILED LOG ENTRY. EMPLOY COMBAT VHS CAMERA. INFORM POLICE LIAISON. RENDER FIRST AID. EVACUATE TO SAFE LOCATION.

Table H-1. Adapted rules of engagement dilemmas (continued).



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# HOW DO WE GET THERE FROM HERE?



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## CONFERS Team



### Advanced Technology International (ATI)

- Prime, lead for consortium development



### Secure World Foundation (SWF)

- Lead for outreach and engagement



### University of Southern California Space Engineering Research Center (SERC)

- Conducting research into existing standards and practices



### Space Infrastructure Foundation

- Space-related standards development expertise

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# CONFERS: A Holistic Approach To Standards

## Interfaces and Designs

- Engineering and design to increase the safety, viability, and interoperability of satellite servicing

## Operational Practices

- Behavior of satellite servicing and RPO activities

## Data Exchange and Sharing

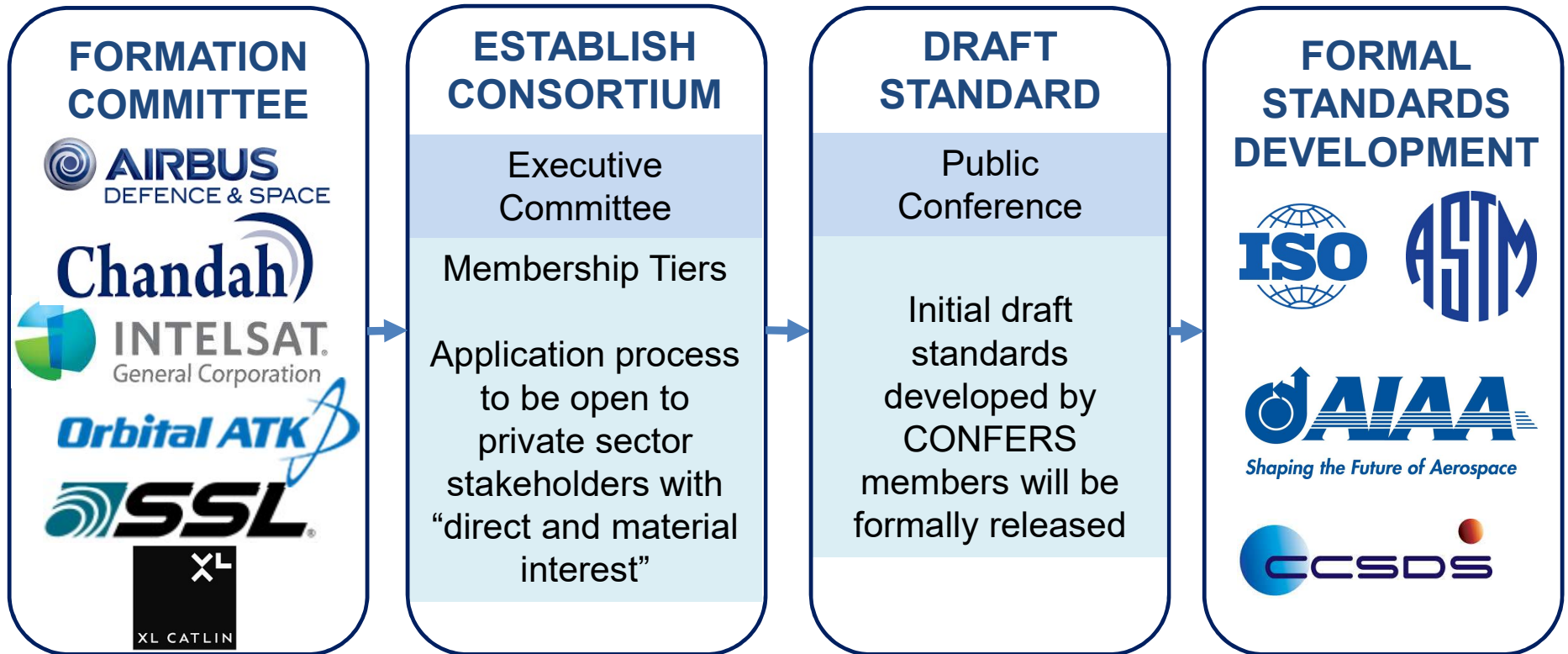
- Information sharing between servicing companies, clients, and governments

## Transparency and Confidence-Building Measures

- Mechanisms to reduce misperceptions and concerns about the dual-use nature

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# CONFERS Process



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# MILAMOS and Woomera Manuals

## The Woomera Manual



A Manual on the International Law of Military Space Operations



Manual on International  
Law Applicable to Military  
Uses of Outer Space



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## **BUT WHAT ABOUT SSA?**



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## SSA is fundamental to all of this

- Improved SSA for **all space actors** is critical to establishing and reinforcing norms of behavior
- More public and international sources of data will increase awareness of the problem and provide a foundation for norm development
- More private and national capabilities will increase trust that others are following norms (**trust but verify**)
- SSA could eventually provide ability to verify legally-binding agreements



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# THANK YOU. QUESTIONS?

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