

Presentation

by

Ajey Lele

Institute for Defence Studies and Analyses (IDSA)

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Space Sustainability

A View

business-as-unusual

Will this atypical character sustain ???

The question is..... *'Is sustainable use of space possible'?*

If not, then what Should/Could be Done...

Space sustainability ... the concerns, efforts and solutions should be **universal**

Developed -----developing

Big----- small

Democracy----- Communism

Western states....non-western states

All should not make difference

Reality

- The world is becoming increasingly inter-connected and dependent on space systems
- Knowledge of Rocket Science is not must for becoming a space-faring nation
- Increase in space activity...more challenges
- Need to keep outer space safe and secure (as far as possible)

Clichés.... are other options available?

- Congested and contested nature of the space environment offers critical challenges
- Need to discuss challenges and opportunities
- International cooperation is the key

We know the **problem** but are collectively failing to find a solution either through the UN mechanism or otherwise

Challenges....

- Space Debris
- Space Weather
- Misconduct in Space
- Race for Resources

- Nature disasters or intentionally causing damage to ground infrastructure
- Near space systems (sub orbital and orbital activities)
- Space Tourism

Space Specifics...

- Space is becoming central to socioeconomic , scientific and strategic development of a nation-state
- Today's satellite is tomorrow's space debris
- Debris removal technically feasible(LEO), but costly. Debris-removal systems could have military uses
- Not every country is providing details about what they have in space . 60% of be orbital-debris population is owned by Russia and China add United States to this.....

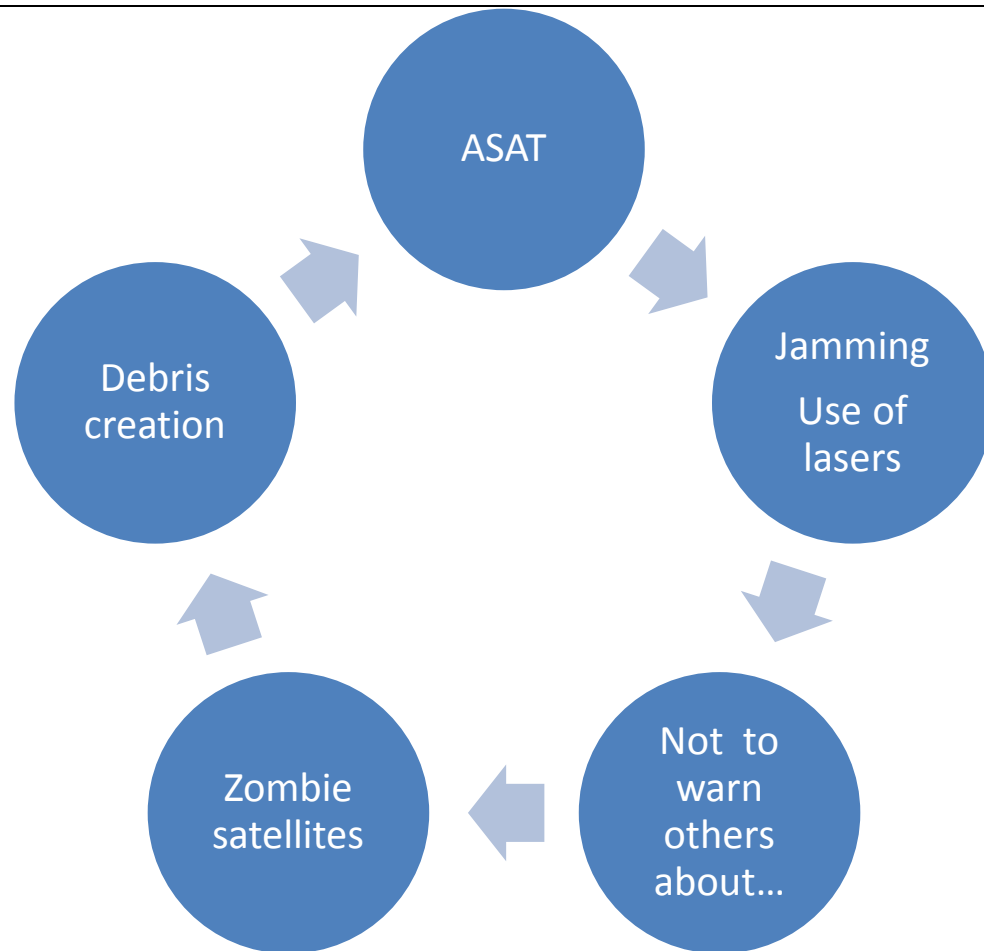
Debris Dilemma

- Threat to space assets (from debris) is a reality, the challenge is *exact quantification of the risk*
- Space crafts as well as objects on ground are at risk, on-orbit servicing of space objects will also add to debris
- Cleaning exercise will remain a continuous process
- Issues like whose debris who will play...the forecast is **Orbital Debris Problem to Triple by 2030**

Space Weather

- Less discussed and researched but extremely important subject
- It is said that Apollo Missions had luck on their side
- From solar storms to weather in stratosphere....much needs to be monitored
- Satellite damaged by weather or hostile action

Misconduct....



Resources...

- Space exploration is a state (government) activity
- Likelihood of race for resources
- No legal mechanism since Moon Treaty. No major players have ratified it.....
- Space entrepreneurs.....would make the difference!!!

Near Space

- Issues in regards to 'operations' in the area between stratosphere and beneath LEO...what is it?
- 90km to 100km.....aircraft...spacecraft, region for launch on demand....
- Aviation Law?????.....Space Law

Space Tourism Industry



- This idea was a joke in 1990s
- Today, more than 100 people are ready to pay \$ 25 million price tag for space trip
- By 2030-5 to 10 million passengers/year may visit LEO
- 50,000 to 100,000 people staying in 'Orbit hotels'

Issue....

- Awareness of the challenges of space sustainability...is it there? Is it taken seriously?
- Are states doing their own cost-benefit analysis? Could (should) complete freedom of action in space would be compromised?
- How do you contextualize issue of missile defence?
- Industry interests likely to dominate the debate in near future
- Universities to military to non-state actors ...increase in number of players

Collaboration in Space

State Agenda

- Bi and Multilateral agreements
- Technology assimilation
- Technology transfer
- Joint projects
- Scientific experimentation
- Data sharing
- Training

Commercial Interests

- Imagery and data sale
- Satellite development assistance
- Launch facilities
- Ground infrastructure development

Asia and Space

- China is using space as an instrument of 'soft power'. Making major investments in Africa and LAC. US has business interests too
- Japan, India are also major players in the region. Economic interests are increasing
- Spaceports, support services..smaller states are trying to establish a niche with an eye on emerging service sector
- South Korea, Malaysia are keen to make commercial investments while Iran and North Korea.....

Look for answers...

- Space issues needs to be looked at more seriously...move beyond 'responsible use of space', 'global commons'
- Learn from NPT, CWC and BTWC experiences
- Is the approach developing a non-legally binding mechanism correct ?
- Do not miss out on deep space

Choices....

- Need to take UN more seriously
- Could we think of a mechanism on the lines of IAEA, OPCW.....
- Develop an international mechanism in regards to space situational awareness
- Do not have a covert agenda to degrade US and China's space advantage but at the same time don't allow them to shape the agenda to suit their requirements

Choices....

- CoC can't be the last word...no charm in having a *toothless* mechanism
- Experience in cyber is not great...important to understand that technological developments do not wait for development of regimes
- Technology challenges-look beyond rocket science ...emergence of multidisciplinary field...bio, nano, info, robotics, materials....

Choices....

- Would the nature of *Deterrence* change
(Bows, Arrows and Nuclear Weapons)
- Military aspects...thin line between Militarization and Weaponisation
- Engage all budding players
- Multilateral mechanisms, existing regional forums could be asked to put “space” as an additional agenda

Thank You