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---- Communist**
Western states....non-western states

*All should not make difference*
• 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
<table>
<thead>
<tr>
<th>Space Specifics...</th>
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<tbody>
<tr>
<td>• Space is becoming central to socioeconomic, scientific and strategic development of a nation-state</td>
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<td>• Today's satellite is tomorrow's space debris</td>
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<td>• Debris removal technically feasible (LEO), but costly. Debris-removal systems could have military uses</td>
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<td>• 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.....</td>
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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
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<td>• Less discussed and researched but extremely important subject</td>
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<td>• It is said that Apollo Missions had luck on their side</td>
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<td>• From solar storms to weather in stratosphere....much needs to be monitored</td>
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<td>• Satellite damaged by weather or hostile action</td>
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Misconduct....

ASAT

Debris creation

Jamming Use of lasers

Zombie satellites

Not to warn others about...
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
• 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’
• 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

<table>
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<th>State Agenda</th>
<th>Commercial Interests</th>
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<tr>
<td>• Bi and Multilateral agreements</td>
<td>• Imagery and data sale</td>
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<tr>
<td>• Technology assimilation</td>
<td>• Satellite development assistance</td>
</tr>
<tr>
<td>• Technology transfer</td>
<td>• Launch facilities</td>
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<td>• Joint projects</td>
<td>• Ground infrastructure development</td>
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<tr>
<td>• Scientific experimentation</td>
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<td>• Data sharing</td>
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<td>• Training</td>
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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
• 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
• 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