Session 3:

Infrastructure and competitiveness.

Unsustainable uses of earth orbits

* Bhupendra Jasani

We are really concerned with space security, because we re trying to make sure earth is secure. The economic contribution that space can provide to us on earth makes it a priority to secure space.

What are the space assets we are talking about and how can we make it more secure?

At least 11 space faring nations that launch satellites by themselves, maybe 50 more than are not launching but do have space objects launched.

Space is interlinked with defence. Hence, we talk about space security

3 trends: use satellites to enhance development on earth

2) increased capabilities of commercial satellites

3) development of weapons to destroy satellites in orbits and missiles and warheads in transit through space.

Growing capabilities in commercial space- you can see from movements what people are doing.

EX: from the movement of people you can see that people are playing tennis and who is serving and who is receiving.

Arms control negotiations should consider some of the issues raised on slide 8. This should be a starting framework.

He is concerned about ground-based lasers. The main beam of lasers doesn’t kill satellites, but the beams that are used to track satellites did damage the sensors, and this capability already exists on the ground. So as far as lasers are concerned, it is ground based lasers that are the focus.

We need to talk about whether there is a need for an arms control. He thinks there definitely is. Parallel between nuclear weapons and spaced weapons.

Treaty for nuclear weapons was a little bit late because those weapons were already made.

He thinks we need to talk about arms control now in order to pre-empt.

Joe Pelton- Space weather is important to consider. The fact that we rely mostly on computers nowadays, we have to consider the weather issue which could wipe out the computers that make it possible to lead our daily lives.

Can we apply soft law tools to make space activities more accessible? What is the point of the soft law tools to regulate and guide these kind of activities in order to mitigate space debris in this area?

Use low intensity laser beams to modify the positions of satellites. But is this a peaceful use of outer space, or an disarmament issue?

Is it a good thing to avoid a collision or a bad thing because it could be a weapon?

Steve Bochinger

Key trends in economics and profitability of space investment

Discussion of the value chain in 2013- satellite manufacturing, launch service, satellite operation, equipment and terminals, services.

End-to end solutions- integration. (ie, manufacturing satellites used to provide services)

On the downstream, the satellite is a tool to feed a very diverse number of applications and communities for satellite communications.

Over 50 different sectors using satellite technologies.

Tremendous growth from the last decade:

* investment by US (specifically in defence)
* expansion and explosion of the number of space programs worldwide/diversification of actors.

Satellites to be launched- continuing the discussion about how countries are continuously building and launching satellites.

In the next 10 years, expecting 744 satellites. Growth of investment essentially driven by incoming countries who are chasing new capabilities.

Satellites are getting more expensive because now you need more power, more mass.

Constant increase on average satellite cost. This investment is absolutely essential to sustain the satellite community.

The cost of the infrastructure is an extremely important part of the cost of the satellite operator. Represents 50% of the capex to sales ratio.

Economic v social benefits:

Eco: value in monetary terms the added value provided by the space program

Social: impacts of the space program for the society as a whole which cannot be valued in monetary terms.

Investment is driven by profits and the sitcom sector is highly profitable.

Extremely growing revenues.

Joan Harvey (CSA)

Capturing and conveying the essence of the space economy

Problem: no national data coding system that allows us to put space activity into a register that we can use to pull out data.

A lot of work going on at the CSA

* annual survey of Canadian space sector
* ongoing international environmental scan
* actively supporting the OECD global forum on the space economy
* examining the economic impact of CSA and others investments
* supporting studies

OECD: the space economy is a lot bigger than the space sector.

A lot of people don’t realize this until they put the date on the table.

Growing body of OECD work on the space sector. CSA asking OECD to help them to understand.

Dual approach:

1. guide to the space economy (numbers)
2. case studies that demonstrate the benefits and challenges of the space economy

handbook, but this is just a starting point. Will continue to improve as we learn about the right methods.

CSA needs to partner with everybody as they have a small budget. They leverage with NASA and have treaties and agreements to leverage their technology.

When NASA (for example) undergoes a major policy change, CSA has to pay attention.

Canada #7 for space competitiveness. This position held for the last couple of years.

Types of economic impacts:

Spending: direct, short-term, long-term, induced.

In 2007, they saw the move to the socioeconomic model. Which brings with it some major complications to some who are trying to do metrics.

Other departments are now becoming co-investors in the space economy.

Lessons learnt

Summary comments:

Satcom and navigation sectors seem to be the most competitive and commercial. EO and human spaceflight are serving more public good needs and considered essential, but are not huge contributors to the economy

If we view the role of innovation policies as critical for restoring growth and competitiveness in S and T domains. (we need a broader view of innovation which includes the service component which includes the wider definition of what the space economy is).

She thinks there needs to be a different approach to impact analysis.

As science becomes commercialized and ICT makes access to knowledge easier, than science should diffuse more broadly and also into the economy.

S and T into services is part of the economy and it should form part of the analysis when we are analysing it.

* advocating for a shift from looking at it as a classic industry to more of a service knowledge orientated framework.

Martin Griffin

The use of navigational satellites for aviation

How can space help solve challenges on earth?

How can it help solve challenges near earth- the navigation applications for aviation.

Conventional navigation on the ground becomes less accurate as you get further away from the aid.

It is very expensive.

Problem of navigation over the high seas.

Global navigation satellite systems.

Now we are at the stage that we have performance based navigation. The benefits are massive.

The ability with satellite navigation systems is that we can design routes in a flexible manner. We are not tied to where the navigation aid is on the ground, nor looking to the next navigation aid.

Right now, 2 dimensional (linear and lateral)

Moving to 3rd dimension, eventually 4th dimension.

Next step is hyper sonic transport.

The commercial space activities in air space is something we have only just started thinking about and we are looking to see if our existing navigational facilities will support that. We have just started communicating with Maslan on the issue and hope to make progress in the future.

We do cost/benefit on the applications of PBN for aviation, but how can we cost a life with safety. This is something to struggle with.

Session 4

Bringing space down to earth: using satellites for education- china’s experience

Prof. Dr. LI, Juqian

China university of political science and law

Use of satellites in china has great prospects.

Policy and law enable china to use satellites for education.

Policy:

1986 joint notification- this is passed to the lower levels of each government branch. These branches of government will carry on with those policies.

In this notification, the use of satellites is for education and establish a TV channel that is an educational challenge. So 1986 was the first time China began to allocate a channel for education.

1998-The country will put the channels on priority for educational development, because in that area the infrastructure faces difficulties.

There are more policy documents, but these are a few of the important ones that deal with long distance education and internet and connect satellites and the internet and other forms of infrastructure together.

Law:

There is no law directly regulating the use of satellites for education.

Art 4- education is the business for modernization, so education is the national priority. This means that all other branches of the central govt will give their resources or support to educational development.

3 models in using satellite for education:

1) CETV and CEBSAt

Cetv: you have a TV, and if there is sat transmission power in your area, you can easily watch TV.

2) universities use a higher education satellite system. By 2007, there are 98 unis that have developed this kind of system.

Other schools and uni students can have access to this.

According to the western china project- by 2006, chain would establish 10,000 satellite education receivers. The project for rural areas will cover 530,000 schools.

Even for eastern china, the resources are good and can be easily accessed.

But it is still difficult to have cable internet.

Western china is specifically concentrated on those areas which have high mountains and difficulties for communication.

Tri-net= internet plus satellite net plus cable TV. Take the information from satellite and the information can be saved on the internet and a person can access the information over the internet in another area in order to watch the class or other information. Cable TV can access, but it is difficult for cable TV and internet. It is better with satellite net.

Conclusions:

1. all technology is possible when you can use it for education which means that technological development is the most important thing to advance education, including education in some natural resources or areas in which the infrastructure is not so good.
2. There is no best or better model. The feasible model depends on the situation. If you have the base model for TV, for example, you can also use it for education.
3. Law and policy can play a very active role using satellites for education. If education can play such an important role in society than we can use law and policy to push the development of education using satellites. If you just keep it in the national sectors where we are looking to make a profit, then it will not develop and education will not be improved.

Ram Jakhu

Satellites for enhancing human rights

Freedom of expression is considered a a central human right as other human rights depend on this one. It has been elaborated and incorporated into international treaties. This is simply a duplication of Art 19 of the declaration on human rights, which essentially holds that everyone has the freedom to hold an opinion, etc.. it is a broad view of what we are trying to involve.

Nowadays in the new information age, the perspective on this right has evolved significantly.

The result of 3 new technologies: satellite, TV and internet.

The enhanced globalization of activities shadows the globalization of human rights

Globalisation, convergence and new media are the tripod.

The satellites role in human rights is played individually, but also the primary role is to play in convergence with other rights.

Crowdsourcing is intelligence gathering at the lower level and plays a significant role. Also used as crisis prevention. UNDP is using this technology/approach extensively in problematic areas.

Satellites are reaching all areas, IE: satellite on a mud hut in Nepal. Also in Algeria, many satellites.

If you publicize the violations of human rights then you are making people aware of that and showing that satellites play an important role in the publicity of violation of human rights.

The 2 things in publicizing violations are:

1. the stoppage of torture (ie, stopping torturing the prisoners in Iraq by the Us government when this practice was publicized through extensive media)- although this didn’t work in Cuba.
2. It is believed that genocide in Rwanda could have been averted if the hate propaganda had been publicized.

Technology is not neutral. You can use it for good or bad, but it is not neutral.

This technology is here and will be here tomorrow and we are looking at the globalization. Satellites play a tremendously important role in the protection and enhancement of human rights.

Johnathan

How are we going to share data? Explain the databases that exist? How to use them? How to share them?

If we share the data that results, then therefore we can come up with highly imaginative solutions

One of the best practices is to triangulate data.

Its good if you can have 3 different sources of information, so that you can have 3 different satellites from 3 different countries. You can compare and contrast and this creates more content and more credibility.

Satellite Sentential – able to make triangular images, and information which denies deniability for crimes against humanity in Sudan.

They want to keep pushing the envelope forward and show the capacity of satellite imagery to triangulate eyewitness reports.

When we show what space can do, we need to give a lot of thought to interesting stories.

Gives a window into a multi-layered and complex situation. No one report can capture everything.

The big vision moving forward is to put together a big toolbox that can speak to human rights in the context of human security and human dignity.

From an economic perspective, businesses will have a harder time investing and staying in an area if there is no social stability. So it is in everyone’s best interest to promote human security, both for conflict prevention and build up the local economies.