United Nations/Islamic Republic of Iran Workshop on Space Law
"Role of International Space Law in the Development and Strengthening of International and Regional Cooperation in the Peaceful Exploration and Use of Outer Space"
jointly organized with and hosted by the Iranian Space Agency (ISA) and supported by the Asia-Pacific Space Cooperation Organization (APSCO)
8 to 11 November 2009
Tehran, Islamic Republic of Iran

The development of private and commercial space activities

Christophe Venet
ESPI

© ESPI 2009

Overview

1. The increasing relevance of commercial aspects in space policy
2. Space markets
3. Size of commercial space markets
4. Recent developments in space commerce
5. Future perspectives for commercial space activities
6. Commercial space activities and developing countries
7. Framework conditions to develop space commerce

© ESPI 2009

1. The increasing relevance of commercial aspects in space policy

- Space activities were essentially government-driven in the beginning of the space age
- Role of private actors increased significantly in the past years
- End of Cold War created a more favourable environment for space business (more open world, new markets)
- Utilitarian dimension of space was increasingly recognised (creation of jobs, wealth, trade, innovation, use of satellite applications to meet societal challenges)

© ESPI 2009

- However, space commerce is not business as usual
- Governments continue to play a central role, due to the specificities of the space sector (high costs, high technological complexity, strategic value of space assets)
  - Public sector remains the main investor in space R&D
  - Governments are the largest buyers of space goods and services
  - Governments set the framework conditions that govern commercial space activities (e.g. through space policies, space laws)

Credit: eyeball-series.org

2. Space markets

- Difference between the upstream segment (satellite and launcher manufacturing, launch services, ground stations) and the downstream segment (satellite services, space-enabled products)
- 3 main satellite applications (communications, navigation, EO) include many potential markets
  - Travel and entertainment (DTH TV, satellite radio)
  - Energy, resources (automated farming equipment, precise chemical applications)
  - Finance and corporate services (internet backbone, corporate networks)
  - Transportation, logistics (air transport communications, automobile navigation)
  - Science, biotechnology, healthcare (handicap assistance, robotic surgery)

© ESPI 2009

3. Size of the commercial space markets

- Estimate volume of the Space economy in 2008 is 257,22 bn U.S.$ (Space Report 2009)
- 83,04 bn U.S.$ public budgets
- 174,5 bn U.S.$ commercial revenues
- Downstream markets represent a much bigger share than the upstream segment
- Following figures extracted from ESPI Report 18, Space Policies, Issues and Trends in 2008/2009, Wolfgang Rathgeber

3.1 Satellite manufacturing

- Commercial satellite manufacturing revenues in 2008 (excluding governmental orders) = 5,6 bn U.S.$ (Futron)
- Total revenues = 10,94 bn U.S.$ (Space report 2009)
- Highly concentrated sector: Total revenues of the 5 main actors in 2008 = 7 bn U.S.$

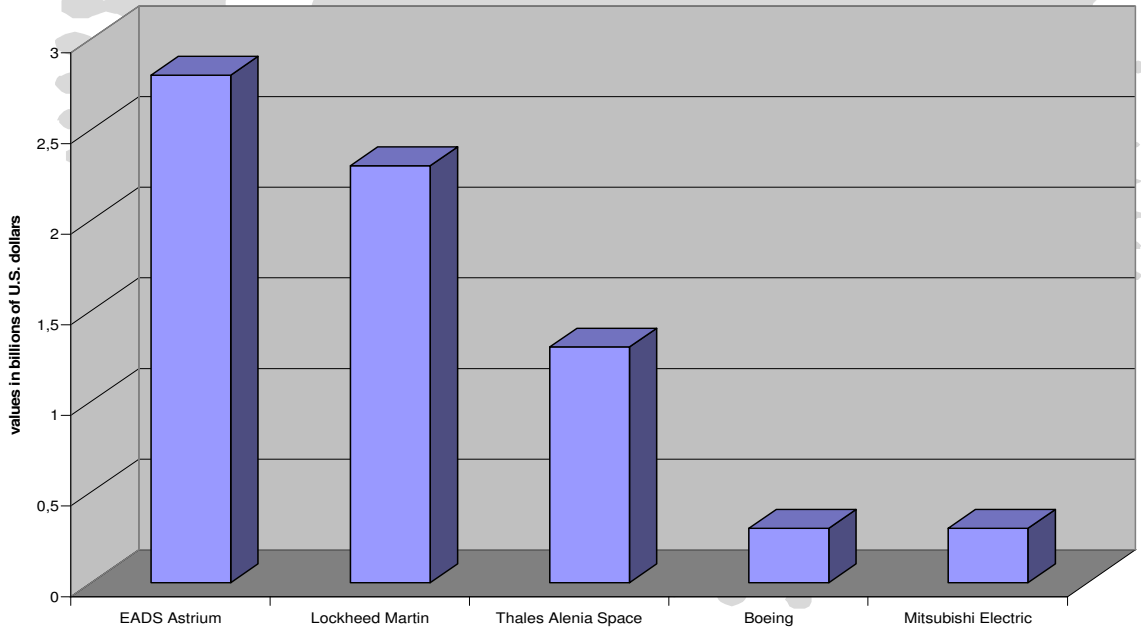


Figure 1: Estimated satellite manufacturing revenues of the main actors in 2008 (Source: Forecast International)

3.2 Commercial launch revenues

- Estimate commercial launch revenues in 2008 = 1,97 bn U.S.$ (FAA)
- Important role of the governments in the upstream sector: 60% of the 68 launches in 2008 were non-competed (=not open to international competition)
- Launch revenues concentrated in established spacefaring nations (Europe, Russia, USA)

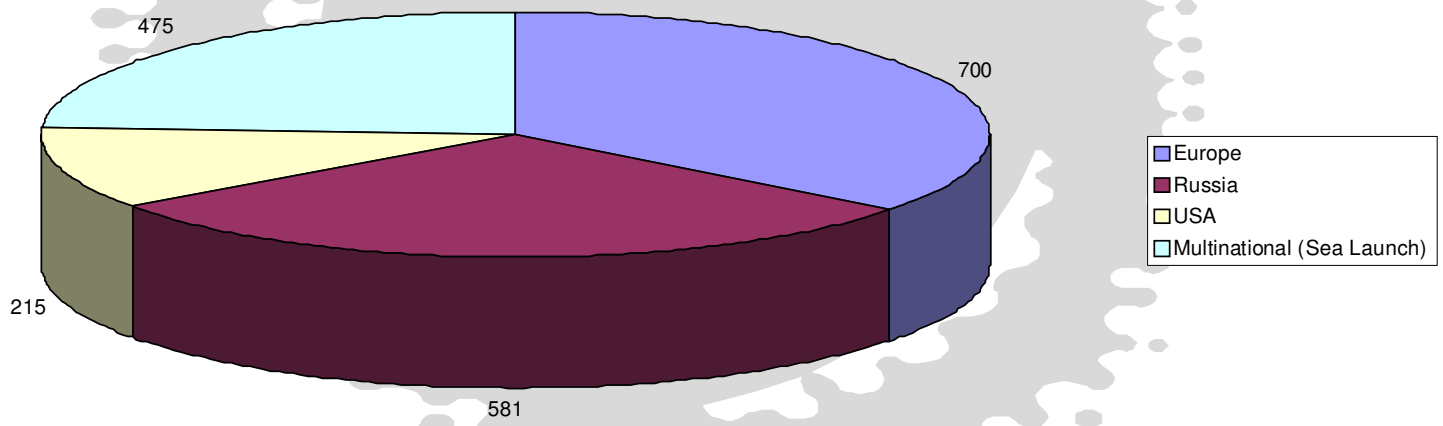


Figure 2: Estimated commercial launch revenues in 2008 by country/entity in million U.S.$ (Source: FAA)

3.3. Satellite services

- Estimate commercial revenues for 2008: 91 bn U.S.$
- 3 main services: Direct Broadcasting Services (DBS), Fixed Satellite Services (FSS), Mobile Satellite Services (MSS)
- DBS = 72,01 bn U.S.$ (DTH TV: 69,61 bn$, satellite radio: 2,4 bn$)
- FSS = 16,79 bn U.S.$ (most popular application: satellite TV)
- As part of FSS, remote sensing market is growing
- MSS = 2,2 bn$

© ESPI 2009

3.4 Ground equipment

- Network infrastructures, mobile and consumer terminals
- Revenues for 2008: 74,4 bn U.S.$

3.5 Insurance sector

- 2008 revenues: 0,95 bn U.S.$

3.6 Space tourism

- 2008 revenues: 0,04 bn U.S.$

Credit: fly.co.uk

4. Recent developments in space commerce

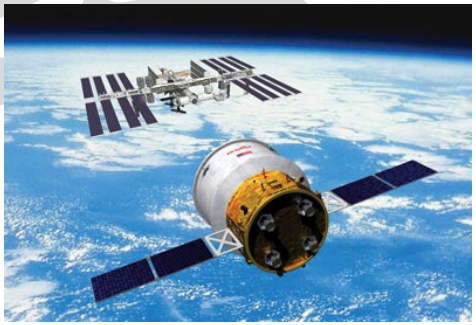
- Both established and emerging space powers recently started to develop commercial space activities more intensively
- Major spacefaring nations: focus on the upstream sectors (USA, Russia, Japan and Europe have an established technical expertise in these fields)
- India and China show increasing commercial ambitions (commercial launch services + satellite manufacturing)
- Other actors in Asia, Africa, the Middle East, focus on satellite applications, in particular satellite communications

© ESPI 2009

4.1 Commercial space activities in the US

- Development of commercial activities in the field of launch services
  - NASA awarded ISS resupply contracts (COTS) to 2 private companies in December 2008 (SpaceX and Orbital Sciences)
  - Rise of new competitors: SpaceX and Orbital Sciences developed their own launch vehicles for commercial purposes
- Rationale: strategic independance (reduce the Shuttle gap) and cost efficiency
- US companies very active in satellite manufacturing (Boeing and Lockheed Martin)
- Satcom applications are a huge market in North America

Credit: SpaceX



Credit: The Space Review

4.2 Commercial space activities in Europe

- Secure a strong industrial basis (upstream segment): economic benefits + source of strategic independance
  - Arianespace is dominating the launch sector
  - EADS Astrium and Thales Alenia Space are leaders in satellite manufacturing
- Recently: focus on downstream markets
  - Crisis acted as a strong incentive to invest in space (for future growth and innovation)
  - Contribution of space to the Lisbon Strategy: making Europe the most competitive and dynamic knowledge-based economy in the world
  - Support the development of new markets for the 3 main satellite applications: navigation (through Galileo), EO (through GMES), satcom (through the European broadband strategy)

© ESPI 2009

4.3 Commercial space activities in Russia

- Mainly in the field of launchers: 29% market share in commercial launch revenues (Proton launcher)
- Increasing integration of Russia‘s satcom industry in the world market (Russian manufacturer ISS Reshetnev offered first bid for competed satcom + first commercial order outside Russia for a Russian satcom in 2008)

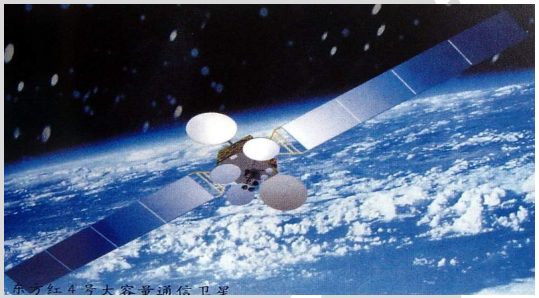
4.4 Commercial space activities in Japan

- For a long time, Japan was not an important commercial space actor, but recent paradigm shift (adoption of the Basic Space Law 2008)
- Objective: create a more favourable environment for space business
- Launch sector: new H2B launcher will offer commercial services
- Recent restructuration of the satcom sector
- Mitsubishi became a new entrant in the satellite manufacturing sector

© ESPI 2009

4.5 Commercial space activities in China and India

- China
  - China is selling commercial launches with its Long March launcher
  - Aggressive pricing policy due to low production costs
  - Supporting factors: ITAR-free satellites by TAS + removal of US sanctions against China Great Wall Industry Corp.
  - China also started producing and selling its own satellite bus (Pakistan, Nigeria)



Credit: geocities.org

- India
  - New focus on the commercial aspects in the Indian space programme
  - Commercial use of the PSLV launcher (Italian and Israeli satellites)
  - Antrix, the commercial branch of ISRO, entered a commercial partnership with Astrium in 2006 to commercialise satellite buses

4.6 Other spacefaring nations

- For most states, no possibility to compete in the upstream markets
- Commercial activities mostly centred on the booming satcom applications (HD TV, broadband internet)
- Wide range of new entrants + operators growing fast, in particular in non-traditional spacefaring nations
  - Middle East (Nilesat, Arabsat, Thuraya, Yahsat, S2M, Smartsat)
  - Asia (Vinasat, Asiasat)
- Development of satellite manufacturing activities in new countries (Dubai, Kazakhstan), often through partnerships with established actors (e.g Astrium)

© ESPI 2009

5. Future perspectives for commercial space activities

- Downstream sector has the best potential on the long run
- Upstream sector likely to suffer from chronicle oversupply
- According to OECD, future demand for satellite applications is likely to be substantial (in particular satcom, EO and navigation)
- At the same time, structural problems of the space sector might lead to severe fluctuations in activity
  - Capital intensive nature
  - Long development cycles
  - High risks
  - Heavy investment of governments

Credit: Unesco

© ESPI 2009

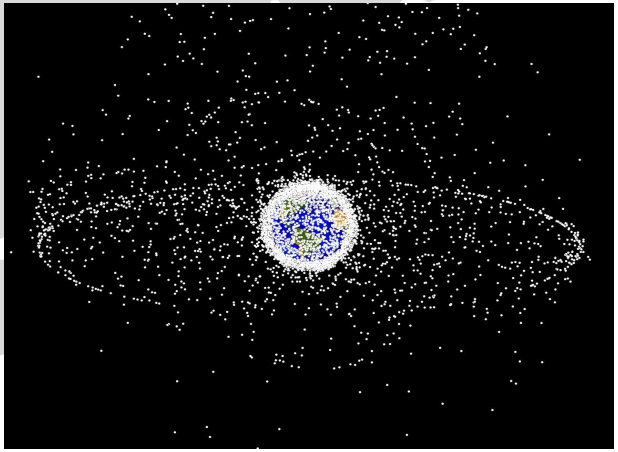
6. Commercial space activities and developing countries

- Satellite applications can contribute tackling societal challenges
- Private actors are a source of innovation + can bring expertise and skills absent in the public sector (in particular financial resources and technological expertise)
- OECD encouraged private sector participation to unveil the societal potential of satellite applications (Report Space 2030)
- Commercial use of space applications could be a cost-effective, efficient and sustainable way to address pressing concerns
  - Satcom services to bridge the digital gap (services in remote areas)
  - EO for disaster management, crop management etc.

© ESPI 2009

7. Framework conditions to develop space commerce

- Adapted the legal and regulatory framework
  - Determine the rules of the game
  - Necessary conditions for a stable and predictable business environment
  - Two levels: international space law regime and national legislations
- Concrete issues to be tackled in this respect
  - Reward entrepreneurship and innovation
  - Remove entry barriers and limit regulation burden (e.g. export control)
  - Discourage rent-seeking behaviour
  - Protect property rights
  - Tackle the space debris issue
  - Increase standardisation efforts



Credit: the globaleducationproject.org

- Central importance of national space policies in this new context
  - Shape and structure the interplay of the different actors involved in space policy (national institutions, international organisations, research, industry, public and private users)
  - Conciliate commercial and societal aspects of space
  - Enable long term planning
  - Basis for stable international cooperation
- Some countries have adopted space legislation pieces recently (France, Japan, South Africa, Australia)
- Many countries do not have national space laws, especially developing countries = source of uncertainty for private operators

© ESPI 2009