SPACE LAW AND POLICY
WITH SIMULATED NEGOTIATIONS
[14]

[6] COMMERCIAL USES OF OUTER SPACE: AIR-LAUNCH ACTIVITIES

25 JULY 2016

YURI TAKAYA (PH.D)
LECTURER, KOBE UNIVERSITY

NATIONAL SPACE LAW AND POLICY: RESCHEDULED + ASSESSMENT

JAPAN	[MAY 16] MARINE
CANADA	[MAY 23] HARUKI
ESA AND EU	[MAY 30] AURELIEN
FRANCE	[JUNE 13] LING
UK	[JUNE 20] YAN
GERMANY	[JUNE 27] THOMAS
CHINA	[JULY 4] VERN
SOUTH KOREA	[JULY 11] SHAKHNOZA
US	[JULY 25] WEIXI

Assessment

Report

File: Word or PDF
A4, 2-4 pages, single line,
font size 11
with footnote (no copy!)

Structure: (for example)
1. Introduction
2. Summary of presentation
3. Your opinion

Deadline: August 12 (23:59 in Japan)

E-mal to: takaya@rabbot.kobe-u.ac.jp

North Korea 'jamming GPS signals' near South border

SPACE NEWS:

BBC News [22 July 2016]

Space: A giant leap for Africa

http://www.bbc.com/news/business-36866721

Around the world there is growing appetite for space exploration and Africa is no exception. Images from the MeerKAT telescope - currently being built in Carnarvon, South Africa - have been unveiled, showing that it has picked up 13,000 galaxies since construction of the telescope began in 2009. The BBC's Lerato Mbele has been to Carnarvon to find out more about the continent's contribution to the international space race.

THEME

"WHAT SHOULD BE CONSIDERED IN ALLOWING AIR-LAUNCH ACTIVITIES OVER THE HIGH SEAS?"

You are working in a private company providing air-launch services over the High Seas.
You need to buy small rockets for your business (cheaper & faster).
Please make a list of ① the conditions of appropriate states you can buy small rockets;
and ② transparency measures to avoid concerns raised in the int'l community.

TEAM A	TEAM B	TEAM C

Commercial Air-Launch Activities over the High Seas

25 July 2016

Yuri Takaya (Ph.D.)
Research Fellow / Lecturer
Kobe University

Outline

The previous lecture (11 July 2016): space tourism

① Applicability of Air and Space Law
② Authorization
③ Registration
④ Liability
⑤ The Status of Space Tourists

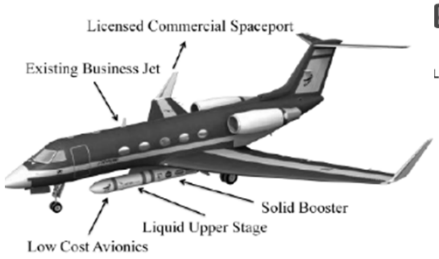
Today's lecture: air-launch activities

1. Legal Issues on Commercial Air-Launch over the High Seas
   ① Legal Status of Carrier Aircraft for Air-Launch
   ② Notification
   ③ Legality of Air-Launch over the High Seas
   ④ Launching States of Air-Launch
   ⑤ Damage caused by Space Object
2. Export Control related to Air-Launch Activities

Introduction

◆What is Air-launch?

Carrier Aircraft + Small Rocket/RLV



Generation Orbit Launch Services, Inc.

S3 SWISS SPACE SYSTEMS

Introduction (comparison with last week's model)

◆ (in the previous lecture)
Type of launch vehicle for space tourism

① Aircraft ＋manned space launch vehicle
② Rocket ＋Capsule-type of launch vehicle
③ Aircraft for Parabolic Flight (0-g experience)
↓
However, ① is designed as spacecraft.

© Virgin Galactic: SpaceShipOne

◆ Difference between launch vehicle for space tourism and for air-launch

The carrier aircraft for air-launch is designed and operated as aircraft.

※The US does not register the carrier aircraft in the UN Registry of space objects

©Virgin Galactic: SpaceShipTwo

1. Legal Issues on Commercial Air-Launch over the High Seas

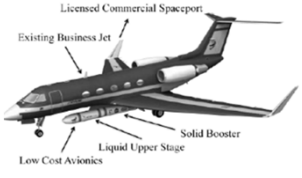
① Legal Status of Carrier Aircraft for Air-Launch

◆ Definition of Aircraft

[Paris Convention, Annex 7]

"[a]ny machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface."

→Is the mothership (carrier aircraft) aircraft or space object?



Generation Orbit Launch Services, Inc.

① Legal Status of Carrier Aircraft for Air-Launch

◆ Carrier Aircraft for Japan-US ALSET project

It seems to regard the carrier aircraft as “space object”.

because FAA requires the project to obtain

license for commercial space transportation

for test launching (already obtained from FAA).

However,

FAA does not register their licensed launch vehicle

into UN Registry of Space Objects.

→ legal status of the carrier aircraft is unclear; however,

in both cases, it needs to meet the ICAO’s requirements

“Standards and Recommended Practices: SARPs”

② Notification

Article 11 of the 1967 Outer Space Treaty

“In order to promote international co-operation in the peaceful exploration and use of outer space, States Parties […] agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community,
to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities. […]”

→ What is the public?

Regardless the lack of its definition, states for air-launch activities need to notify to ICAO, IMO, and ITU.

② Notification

◆ Nonfiction to ICAO

Article 37 and Annex 15 of the Chicago Convention of 1944

NOTAM (Notice to Airmen) is required to alert aircraft pilots of any hazards en route or at a specific location that could affect the safety of the flight

Annex 11 Standard 2.17.1

to coordinate arrangements for activities potentially hazardous to civil aircraft, whether over the territory of a state or over the high seas, with the appropriate air traffic services authorities

◆ Nonfiction to IMO

IMO resolution A.705(17) "Promulgation of Maritime Safety Information"

IMO resolution A.706(17) "World-Wide Navigational Warning Service"

※both approved by the Maritime Safety Committee of IMO at its 85 session (MSC 85) in November/December 2008

② Notification

◆ For Maritime Distress and Safety Radio-Communications…

→advance notification of air-launch activities are required.

IMO works with…

International Telecommunication Union (ITU)
World Meteorological Organization (WMO)
International Hydrographic Organization (IHO),
International Mobile Satellite Organization (IMSO)

③ Legality of Air-Launch over the High Seas

The Outer Space Treaty of 1967
Article I (2) of "Free Use and Exploration in Outer Space"

UN Convention on the Law of the Sea
Article 87 (1) "[T]he high seas are open to all States, […],
under the conditions laid down by this Convention and
by other rules of international law"
"(b) freedom of overflight."
Article 87(2) [..] to ensure due regard for "the interests" of other States
in their exercise of the same freedom as well as for the rights

→the principle of freedom of the High Seas covers its air-space,
no legal conflict in air-launch over the area.

④ Launching States of Air-Launch

◆ Launching state under Article VII of the Outer Space Treaty of 1967
Article I of the Liability Convention of 1972

launching state / procuring state
launching from its own territory / launching from its own facility

↓question

① The state of nationality of the carrier aircraft?
According to Article VI of the Outer Space Treaty of 1967
② The owner state of "facility" = airport/spaceport located in its territory
③ The owner state of "facility" = carrier aircraft
④ The state "allowing" the air launch "within its territorial air space" ?
⑤ The sub-contractor state that undertake the integration?

(※departure but returned → attempted launching?)

⑤ “Damage” caused by “Space Object”

◆ Carrier aircraft, space object?

Article I (d) of the Liability Convention of 1972
(..including) “component parts of a space object as well as
its launch vehicle and parts thereof”

→ to apply LC, carrier aircraft needs to be registered as “space object”
in accordance with the Registration Convention of 1975
(though designed as aircraft)
→ to apply the Rescue Agreement of 1968,
carrier aircraft needs to be registered as “space object” (again!)
…..→ even if it is not registered, if any accident occurs on the High Seas,
states are still obliged for environmental protection
under Article 212 and 222 of the UNCLOS
(the pollution from air space over the High Seas)

2. Export Control related to Air-Launch Activities

① Missile Technology Control Regime (MTCR)

Objectives:

to limit the risks of proliferation of WMD by controlling transfers that could make a contribution to delivery systems (other than manned aircraft) for such weapons.

The Guidelines are not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to delivery systems for weapons of mass destruction.

Documents: Guidelines for Sensitive Missile-Relevant Transfers

Equipment, Software and Technology Annex

Member States: 34 States: on a basis of consensus principle

Argentina (1993)	Greece (1992)	Republic of Korea (2001)
Australia (1990)	Hungary (1993)	Russian Federation (1995)
Austria (1991)	Iceland (1993)	South Africa (1995)
Belgium (1990)	Ireland (1992)	Spain (1990)
Bulgaria (2004)	Italy (1987)	Sweden (1991)
Brazil (1995)	Japan (1987)	Switzerland (1992)
Canada (1987)	Luxembourg (1990)	Turkey (1997)
Czech Republic (1998)	Netherlands(1990)	Ukraine (1998)
Denmark (1990)	New Zealand (1991)	United Kingdom (1987)
Finland (1991)	Norway (1990)	United States of America (1987)
France (1987)	Poland (1998)	
Germany (1987)	Portugal (1992)	

① MTCR

■ How was MTCR established?

1) 1981: While the US-USSR negotiations over the SALT-I and SALT-II, a concern about the proliferation and WMD and delivery systems led to the establishment of task force within the US.
2) 1982: The US President Reagan signed National Security Decision Directive70 to investigate how to control ICBM proliferation.
3) 1987: G7 Members (US, UK, France, Germany, Italy, Canada and Japan) decided to establish MTCR.

■ Who are not MTCR members with missile/rocket capabilities?
China, India, Pakistan, Israel, Iran Iraq, North Korea

■ Who are not MTCR members but declared for the compliance
China, India, Israel, Rumania, Macedonia, Slovakia

16

① MTCR: List of Items

Category I (all prohibited)	Category II (case by case)
1. Complete Delivery Systems - Complete rocket systems (including ballistic missiles systems, space launch vehicles, and sounding rockets) capable of delivering at least a 500kg "payload" to a "range" of at least 300km. - Production facilities, specially designed for the systems above. - Software, especially designed or modified for the use of production facilities. 2. Complete Subsystems Usable for Complete Delivery Systems	3. Propulsion Components and Equipment 4. Propellants, Chemicals and Propellant Products 5. … 11. Avionics 12. Launch support 13…18 19. Other Complete Delivery Systems ($\geq$300km) (cruise missile & systems) 20.

17

① MTCR: How it works?

1) rests on adherence to common export policy guidelines applied to an integral common list of controlled items listed in the MTCR Equipment, Software and Technology Annex.
2) does not take export licensing decisions as a group, rather depends on individual states responsible for implementing the guidelines and Annex on the basis of sovereign national discretion and in accordance with national legislation and practice
3) welcomes non-partners to adhere to the Guidelines without being obliged to join the group, and a number have done so. (e.g. China)
4) holds Plenary annual meetings for information exchange about relevant national missile non-proliferation export licensing issues

18

① MTCR: Factors to be considered

■ In the evaluation of transfer applications for Annex items, the following factors will be taken into account:

A) Concerns about the WMD proliferation;
B) the capabilities and objectives of the missile and space programs of the recipient state;
C) the significance of the transfer in terms of the potential development of delivery systems (other than manned aircraft) for WMD;
D) the assessment of the end-use of the transfers, including the relevant assurances of the recipient states (no modification, no re-transfer without the prior consent of the Government)
E) the applicability of relevant multilateral agreements;
F) the risk of controlled items falling into the hands of terrorist groups and individuals.

19

① MTCR: Challenges

- The consensus principle (the same obstacle in the UNCOPUOS?)
- How to involve non-MTCR member states who declared its compliance
- Lack of treaty, lack of verification regime
- Lack of technical clear distinction between missile and rockets that leave non-MTCR states free for satellite launching tests without transparency

20

② International Code of Conduct against Ballistic Missile Proliferation (Hague COC: HCOC)

■ Overview

The HCOC, the only multilateral transparency and confidence building instrument concerning the proliferation of ballistic missiles, :

- ✓ consists of a set of general principles, modest commitments, and limited confidence-building measures;
- ✓ is intended to supplement, not supplant, the MTCR;
- ✓ is administered collectively by all subscribing states;
- ✓ established in 1993 with 96 states (**137** states as if 2013);
- ✓ was signed and entered into force in 2002;
- ✓ has Executive Secretariat in Austria, while Presidency-holder changes every year
- ✓ is linked to the UN with the Resolutions regarding the HCOC, adopted during the 59th, 60th, 63th, 65th, 67th and the 69th UN-General Assemblies in New York.

21

③ Proliferation Security Initiative (PSI)

■ Overview

PSI:

- ✓ was established in 2003 (as of 2015, 105 states);
- ✓ is an initiative of the Bush administration after a failed attempt to stop a North Korean shipment on a Cambodian-registered ship that included 15 Scud missiles and conventional warheads bound for Yemen;
- ✓ is a response to the growing challenge posed by the proliferation of weapons of mass destruction (WMD), their delivery systems, and related materials worldwide;
- ✓ seeks to involve in some capacity all states that have a stake in nonproliferation and the ability and willingness to take steps to stop the flow of such items at sea, in the air, or on land;
- ✓ consists of interdiction principles to establish a more coordinated and effective basis through which to impede and stop shipments of WMD, delivery systems, and related materials flowing to and from states and non-state actors of proliferation concern, consistent with national legal authorities and relevant international law and frameworks, including the UN Security Council

22