

The International Institute of Space Law (IISL) and the European Centre for Space Law (ECSL)

## SPACE LAW SYMPOSIUM 2016

**“40 years of entry into force of the Registration Convention –  
today’s practical issues”**

***Glances on currently debated issues:  
registration of hosted payloads,  
in-orbit transfer of ownership  
and the future of notification  
and pre-launch notifications***



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# LEGAL FRAMEWORK



- Convention on Registration of Objects Launched into Outer Space *entered into force* on 15 September 1976
- Resolutions adopted by the General Assembly
  - (1) 1721 B (XVI) International Cooperation in the Peaceful Uses of Outer Space (20 December 1961)
  - (2) A/RES/59/115 Application of the Concept of the “Launching State” (10 December 2004)
  - (3) A/RES/62/101 Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects (17 December 2007)
  - (4) A/RES/68/74 Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space (11 December 2013)
- Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (29 July 2013)

# WHAT IS A HOSTED PAYLOAD?

A **hosted payload** is a portion of a satellite, such as a sensor, communications transponder, or another instrument, that is owned by a person other than the primary satellite operator.



There are **two options** regarding command and control of a hosted payload. A payload can be operated **through the host** satellite in cooperation with the satellite's owner or can utilize a completely **dedicated system**.



# BENEFITS OF HOSTED PAYLOADS

insurance lower cost expenses launch  
insurance cost-effective launch  
insurance manufacture cost-effective launch  
cost-effective lower cost launch  
lower cost manufacture launch  
expenses cost-effective lower cost launch  
cost-effective lower cost launch



fraction of time before launch fast access  
before launch fast access  
reach space gain in time 6-12 months fraction of time  
fraction of time before launch fast access  
6-12 months gain in time reach space fraction of time fast access  
gain in time reach space 6-12 months



space assets locations multiple platforms flexible architecture  
flexible locations multiple platforms flexible architecture  
access to space platforms flexible architecture  
multiple platforms flexible architecture  
flexible locations multiple platforms flexible architecture  
access to space platforms flexible architecture  
space assets architecture  
access to space space assets architecture  
more efficient multiple locations multiple  
multiple locations multiple platforms flexible architecture  
access to space platforms flexible architecture



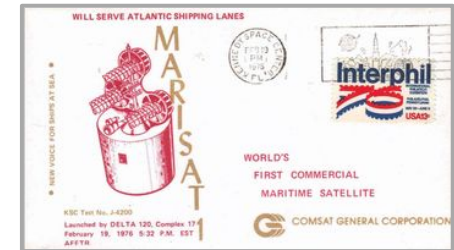
operational issues launch delays force majeure  
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program funding force majeure risk reduction protection  
risk reduction launch delays protection



# HISTORICAL OVERVIEW

The history of hosted payloads started in **1976** with the launch of three **Marisat-series satellites**. Each of them carried a hosted payload designed to support the **US Navy's** needs.

Satellite's Name	Launch Year	State of Registry	Hosted Payload	HP User	HP Registration
Marisat F1	19 February 1976	USA	UHF payload	US Navy (USA)	No
Marisat F2	10 June 1976	USA	UHF payload	US Navy (USA)	No
Marisat F3	14 October 1976	USA	UHF payload	US Navy (USA)	No



# DOES A HOSTED PAYLOAD REQUIRE REGISTRATION?




Convention on Registration of Objects Launched into Outer Space  
*entered into force* on 15 September 1976

- Article I, paragraph (b):  
*"The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof"*
- The main aims of the Registration Convention are as follows:
  - Establish a link between the launching state and the space object
  - Make provisions for the national registration by launching states of objects launched into outer space
  - Establish a central register of objects launched into outer space
  - Provide to State parties additional means and procedures to assist in the identification of space objects
  - Provide data needed for the implementation and application of other treaties




# TWO SCENARIOS

## Scenario 1

Name: <b>Intelsat 14</b>	Location: <b>45° W</b>	Launch date: <b>23 November 2009</b>	State of registry: <b>USA</b>	HP owner: <b>US Department of Defense</b>
		<p>Apart from 40 C-band and 22 Ku-band transponders the satellite has the Internet Routing in Space (IRIS) payload designed to serve the interests of the US Department of Defense and the US Strategic Command.</p>		

## Scenario 2

Name: <b>Intelsat 22</b>	Location: <b>72° E</b>	Launch date: <b>25 March 2012</b>	State of registry: <b>USA</b>	HP owner: <b>Australian Defense Force</b>
		<p>The satellite hosts a specialized UHF communications payload with eighteen 25 kHz channels under a contract with the Australian Defense Force. The resource of the payload is used both by the Australian and American militaries.</p>		

# HODOYOSHI-3 AND HODOYOSHI-4



Information furnished in conformity with  
the Convention on Registration of Objects  
Launched into Outer Space

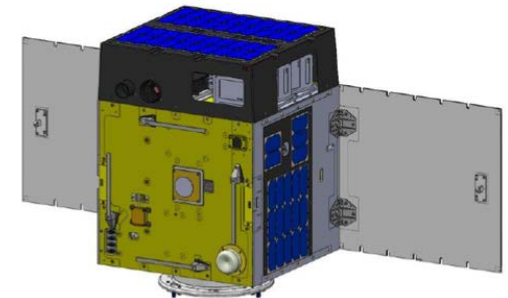
*Note verbale dated 8 January 2015 from the Permanent  
Mission of Japan to the United Nations (Vienna) addressed  
to the Secretary-General*

Name: Hodoyoshi-3 / Hodoyoshi-4  
State of registry: Japan  
Date of launch: 19 June 2014

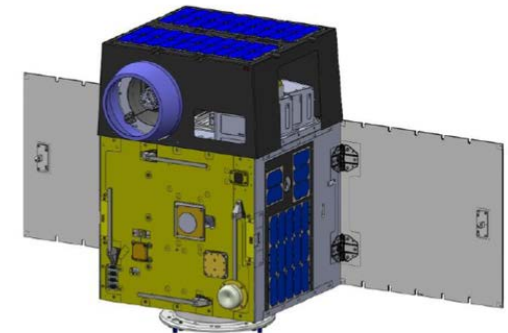
General functions:

- (1) Earth observation with optical cameras
- (2) Reception of radio frequency signal  
from on-ground sensors
- (3) ***Carrying hosted payloads using spaces  
within the satellites***

Hodoyoshi-3



Hodoyoshi-4





# HELLO KITTY IS IN SPACE

**Hello Kitty** became the first “catstronaut” when launched as a passenger on the small Japanese **Hodoyoshi-3 satellite**. The Earth views are real and a digital display above the window shows messages from the Earth.



The hosted payload mission was part of an anniversary celebration for the toy, while the satellite was part of a larger project to **promote interest in science and engineering**.

# A MORE COMPLICATED CASE

Name: <b>SES-16 / GovSat-1</b>	Location: <b>21.5° E</b>	Launch date: <b>H1 - 2017</b>	State of registry: <b>Luxembourg (?)</b>	HP owner: <b>TBD</b>
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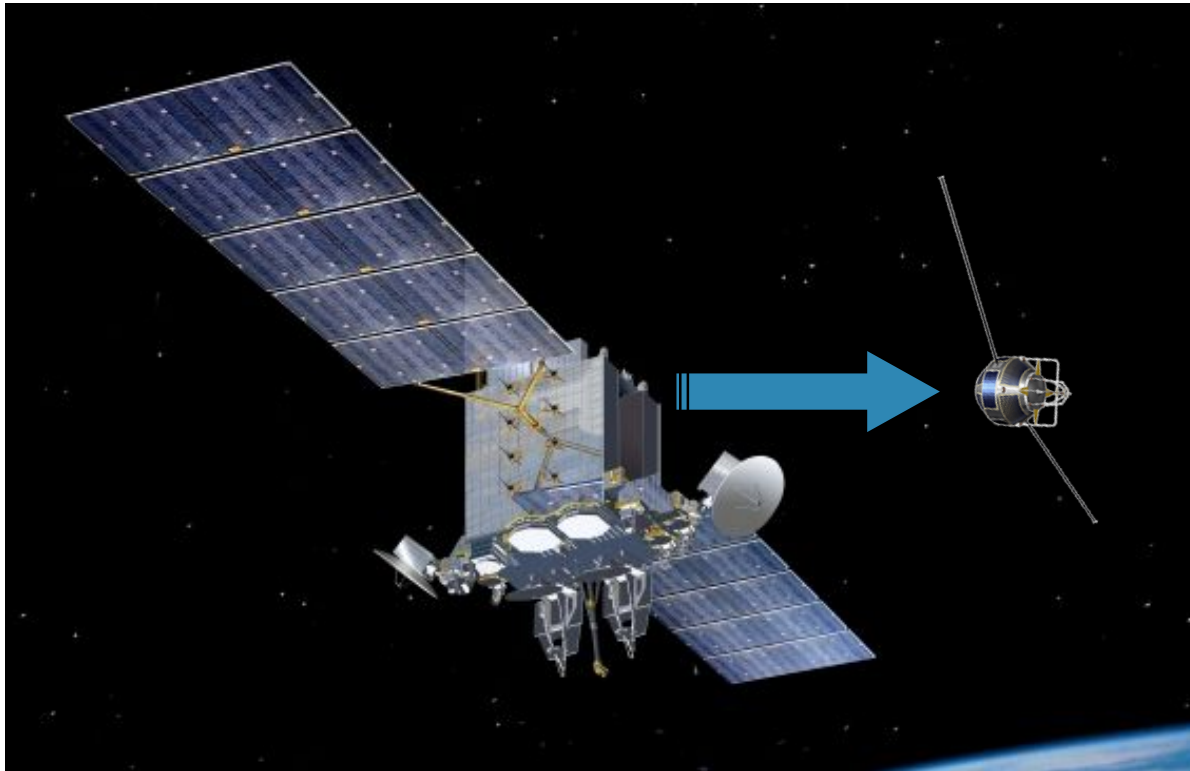


SES-16, a satellite ordered by a joint venture between SES and the Luxembourg Government, will feature a special port, which allows a hosted payload to dock with it in orbit.

The port will be the support structure for an unidentified hosted payload to be launched on a future SES satellite and released in the vicinity of SES-16. Then it will travel to the satellite and attach itself.

# DISPENSED PAYLOADS

**Dispensed payloads** are integrated with a host satellite, which after its launch **carries** them to the desired orbit. Then the host satellite **ejects** the dispensed payload, which **powers on** and **starts its own operations**.





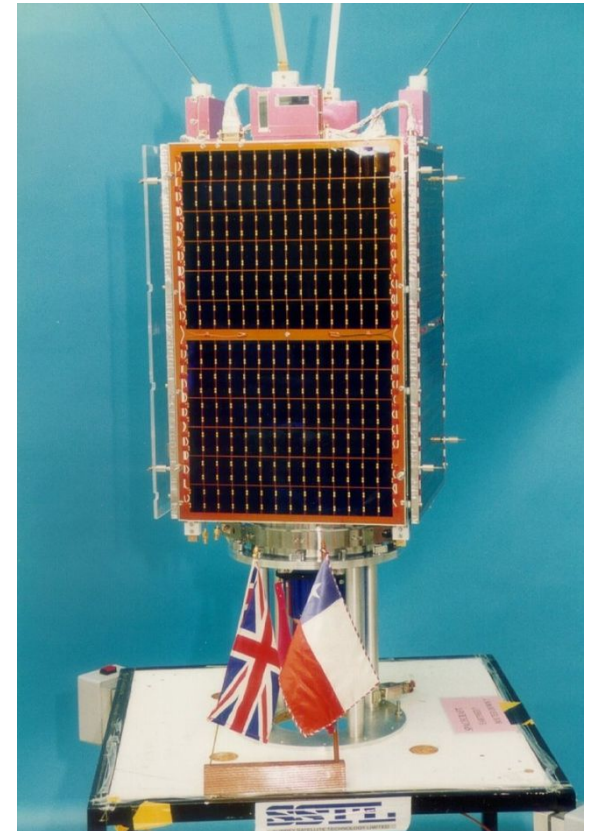
# FASAT-A



Information furnished in conformity with  
the Convention on Registration of Objects  
Launched into Outer Space

*Note verbale dated 13 December 2012 from the Permanent  
Mission of Chile to the United Nations (Vienna) addressed  
to the Secretary-General*

Name:	Fasat-A
State of registry:	Chile
Date of launch:	31 August 1995
Orbital parameters:	No parameters are available since the launch into orbit was unsuccessful and the satellite is <b>currently coupled</b> with the Ukrainian satellite Sich-1



# MORE EXAMPLES

## UniSat 5

State of registry: Italy  
Date of launch: 21 November 2013  
General function: Educational civilian satellite. It is also a platform for the **release of smaller satellites**

- 4 CubeSats
  - ICUBE-1(Pakistan) ✓
  - HumSat-D (Spain) ✓
  - Dove-4 (USA) ✓
  - PUCP-Sat 1 (Peru) ✓
- 5 “Pocket Cubes”
  - Eagle-1 (USA) ✓
  - Eagle-2 (USA) ✓
  - QBScout-1 (USA) ✓
  - PUCP (Peru) ✓
  - WREN (Germany) ✓

## UniSat 6

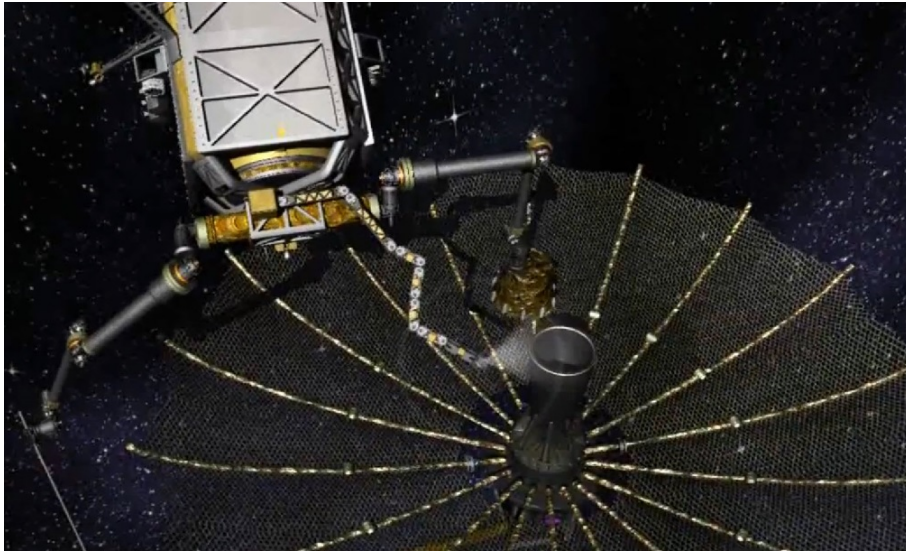
State of registry: Italy  
Date of launch: 19 June 2014  
General function: Educational civilian satellite. It is also a platform for the **release of smaller satellites**

- 4 CubeSats
  - AeroCube-6 (USA) ✓
  - AntelSat (Uruguay) ✓
  - TigriSat (Italy) ✓
  - Lemur-1 (USA) ✓





# PROSPECTION: THE PHOENIX PROJECT

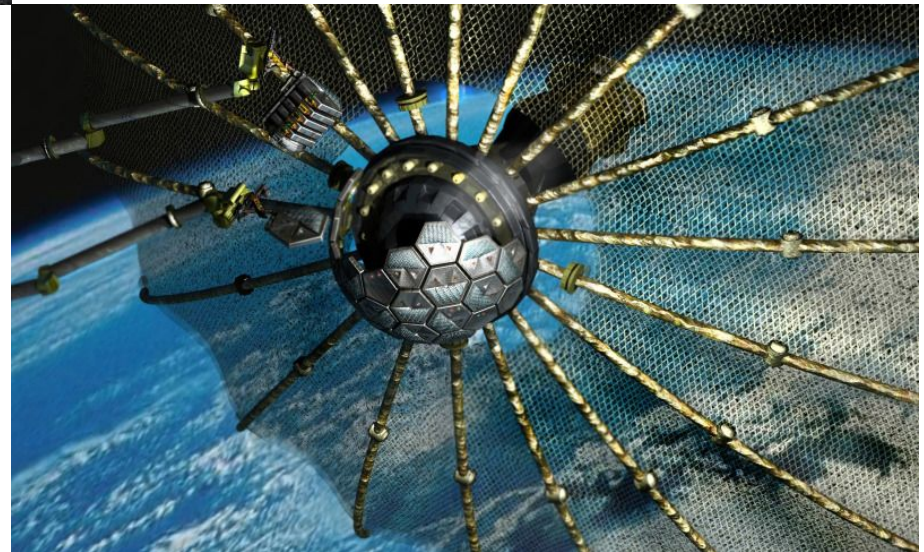


The Phoenix Project is developed by the US Defense Advanced Research Projects Agency



The Project has three areas of research

- **Advanced GEO space robotics** – a spacecraft with abilities to assemble, repair, and refuel satellites in orbit
- **Satlets** – small independent and physically aggregate modules incorporating essential satellite functionality
- **Payload Orbital Delivery System** – mechanism designed to carry and release satlets to the GEO





# IN-ORBIT TRANSFER OF OWNERSHIP

## Scenario 1

Within the **state**  
of registry

A → B



...



## Scenario 2

From the **state**  
of registry to another  
**launching state**

A



C



...



## Scenario 3

From the **state**  
of registry to a **non-**  
**launching state**

A



...



D



# RESOLUTION ADOPTED BY THE GENERAL ASSEMBLY ON 17 DECEMBER 2007



62/101. Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects

The General Assembly

4. Recommends that, following the change in supervision of a space object in orbit:
  - (a) The State of registry, in cooperation with the appropriate State according to article VI of the Outer Space Treaty, could furnish to the Secretary-General additional information, such as:
    - (i) The date of change in supervision;
    - (ii) The identification of the new owner or operator;
    - (iii) Any change of orbital position;
    - (iv) Any change of the function of the space object;
  - (b) If there is no State of registry, the appropriate State according to article VI of the Outer Space Treaty could furnish the above information to the Secretary-General.





# PRE-LAUNCH NOTIFICATION

The **pre-launch notification** is aimed at ensuring the **security** of space launches, improving **space traffic management** and **information interaction** among states, and increasing the overall **confidence and transparency** in space activities.



The International Academy of Astronautics:

- *Space law lacks numerous provisions, which are essential for a comprehensive traffic management regime (i.e. pre-launch notification).*
- *A pre-launch notification system is necessary.*

(Cosmic Study on Space Traffic Management, 2006)



The Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities:

- *Some transparency and confidence-building measures for outer space activities have already been enacted. Such measures include pre-launch notifications.*
- *States should provide pre-launch notifications of space vehicle launches and the mission of launch vehicles.*

(Report of the Group, 2013)

# BY WAY OF CONCLUSION



The UN General Assembly has noted the following changes in space activities since the Registration Convention entered into force:

- *an increase in the number of States carrying out space activities;*
- *continuous development of new technologies;*
- *an increase in international cooperation in the peaceful uses of outer space;*
- *partnerships formed by non-governmental entities from one or more countries;*
- *an increase in space activities carried out by non-governmental entities.*

A/RES/59/115      Application of the Concept of the “Launching State”  
(10 December 2004)

A/RES/62/101      Recommendations on Enhancing the Practice of States and  
International Intergovernmental Organizations in Registering  
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*Thank you  
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