Space Resources: New Actors
Recursos Espaciales: Nuevos Actores

Ian Christensen
Director of Private Sector Programs / Director de Programas del Sector Privado
Secure World Foundation / Fundación Mundo Seguro

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Secure World Foundation

Secure World Foundation is a ***private operating foundation*** that promotes cooperative solutions for space sustainability

- Why **space sustainability**? Increasing reliance on space assets coupled with potentially destabilizing trends

- **Our mission**: To work with governments, industry, international organizations, and civil society to develop and promote ideas and actions to achieve the secure, sustainable, and peaceful uses of outer space benefiting Earth and all its peoples

What We Do

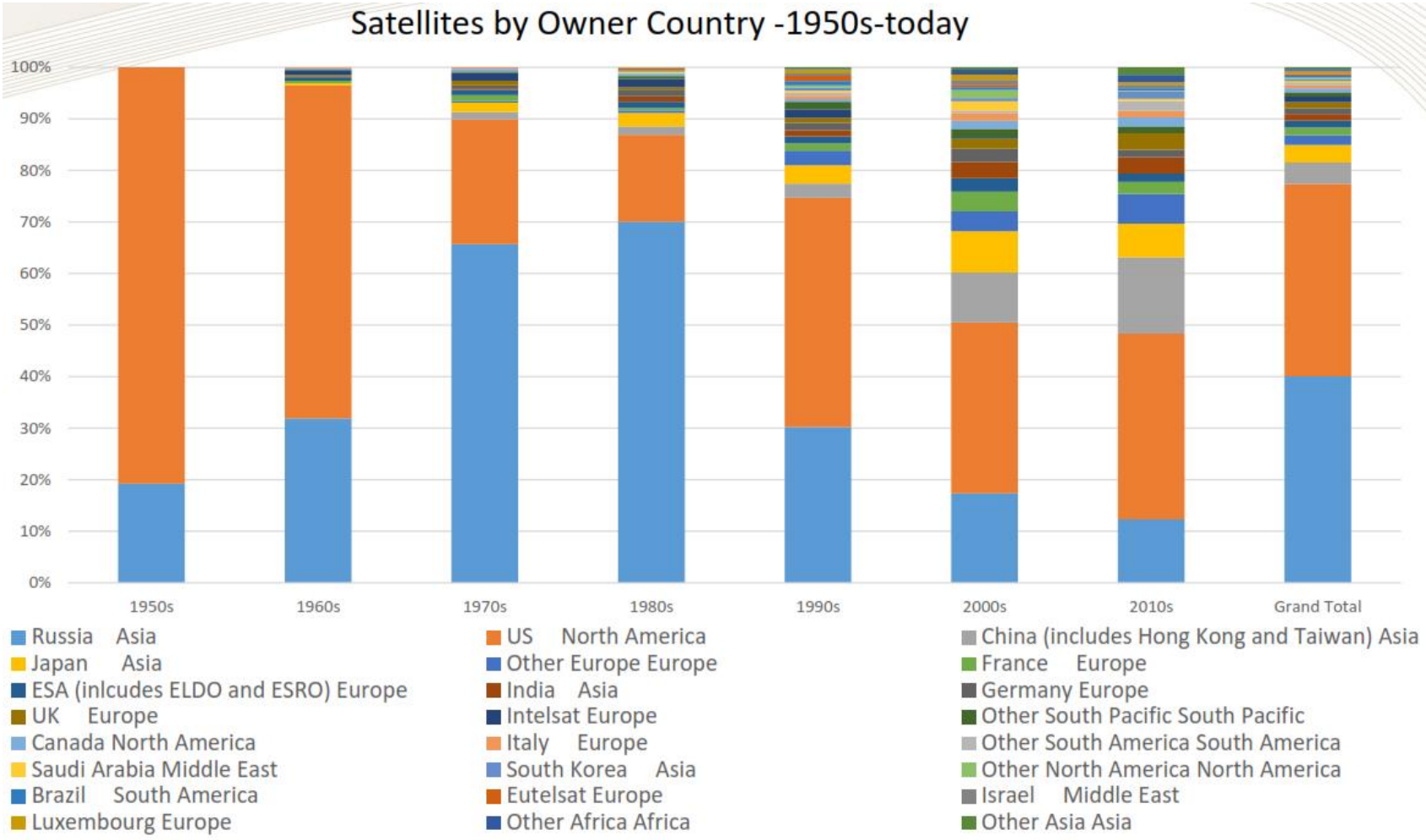
The Foundation works as a research body, convener and facilitator to examine key space policy topics often through partnership.

La Fundación trabaja como un organismo de investigación, convocante y facilitador para examinar temas claves de la política espacial a menudo a través asociaciones.

The Changing Context of Space Activities

El Cambiante Contexto de las Actividades Espaciales

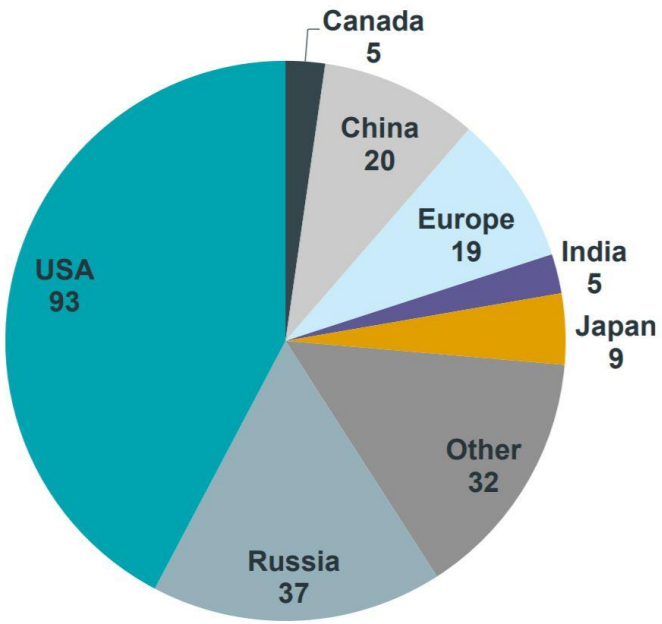
More International
Más Internacional



Source: Adapted from [IDA Global Trends in Civil and Commercial Space Study]

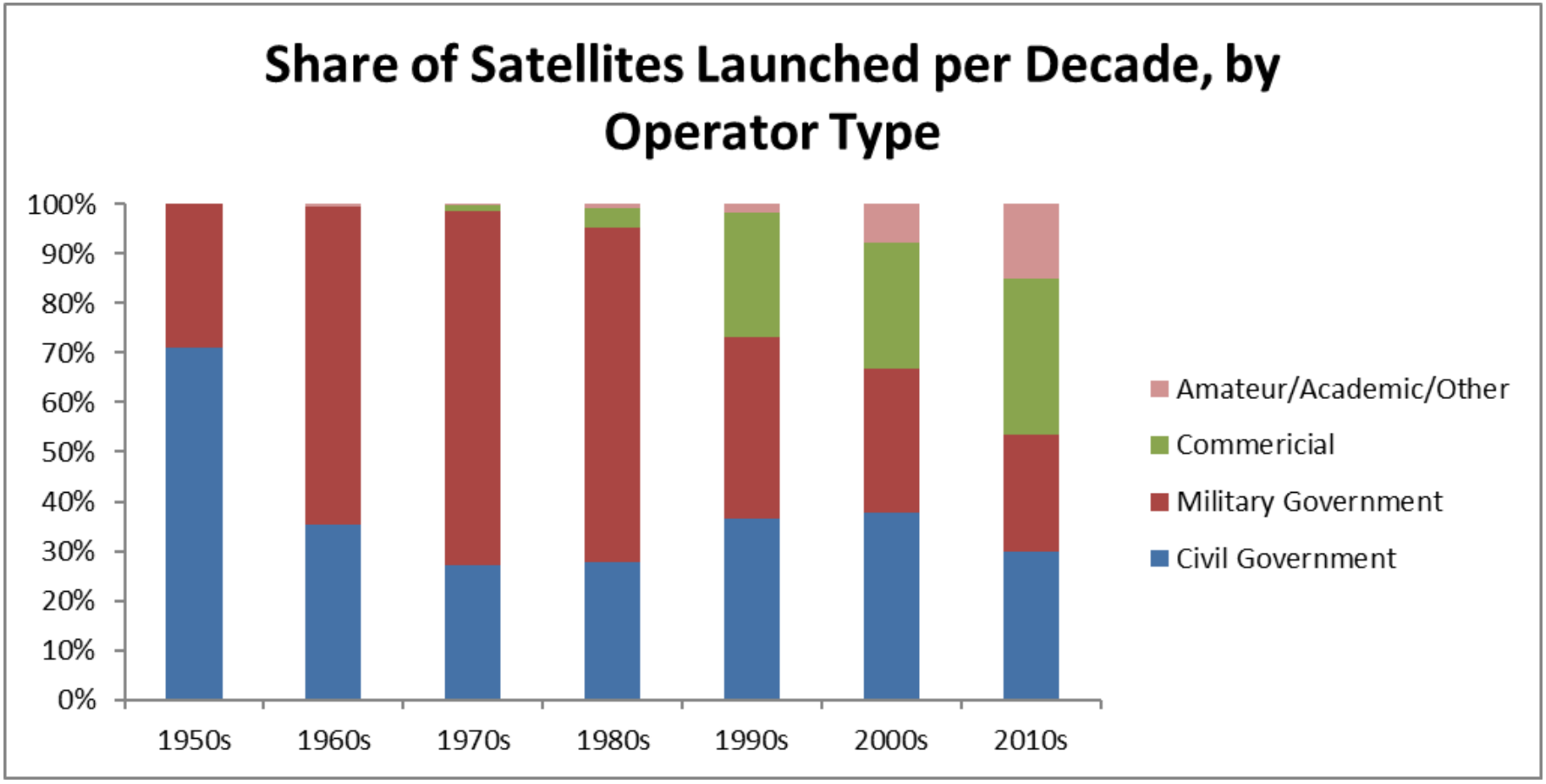
New National Entrants
Nuevos Participantes Nacionales

Government Smallsats by Country of Operator, 2012 – 2017



Source: Bryce Space and Technology "Small Satellites By the Numbers 2018"

More Private Sector Actors
Más Actores del Sector Privado



Source: McDowell, Jonathan C, 2017—Satellite Statistics http://www.planet4589.org/space/log/stats2/own_categ.txt

How to Address Changing Environment?

¿Cómo Abordar el Cambio de Ambiente?

What Secure World Foundation is Doing

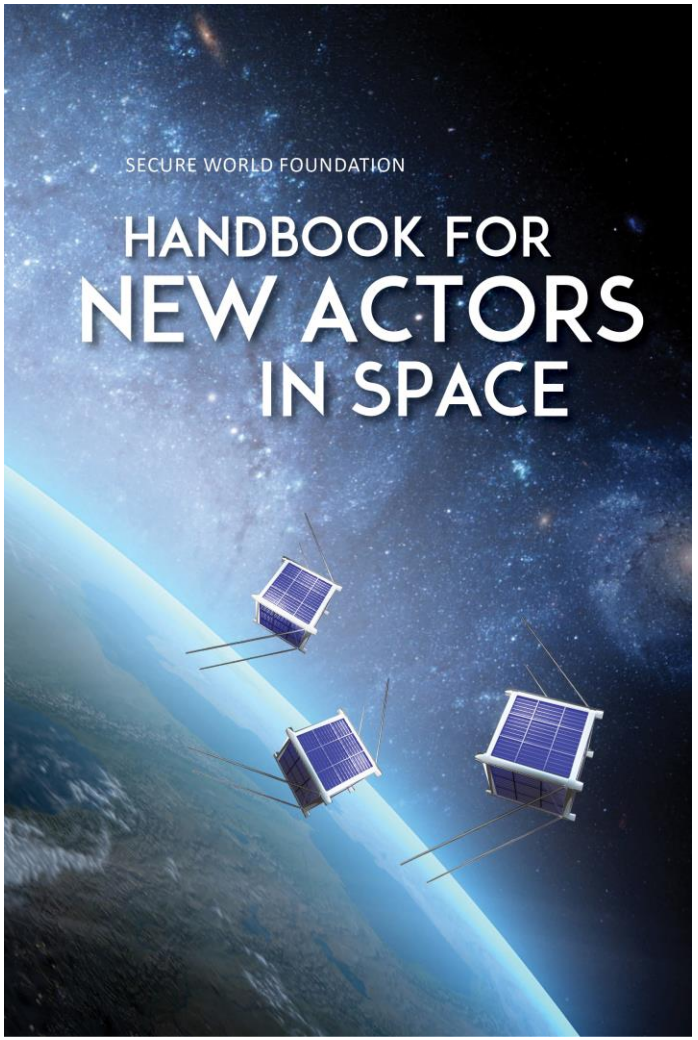
Lo que Fundación Mundo Seguro Está Haciendo

SWF Handbook for New Actors in Space

- **Goal:** Create a publication that provides an overview of fundamental principles, laws, norms, and best practices for safe, predictable, and responsible activities in space

- **Meta:** crear una publicación que proporcione una descripción general de los principios, leyes, normas y mejores prácticas fundamentales para actividades seguras, previsibles y responsables en el espacio.

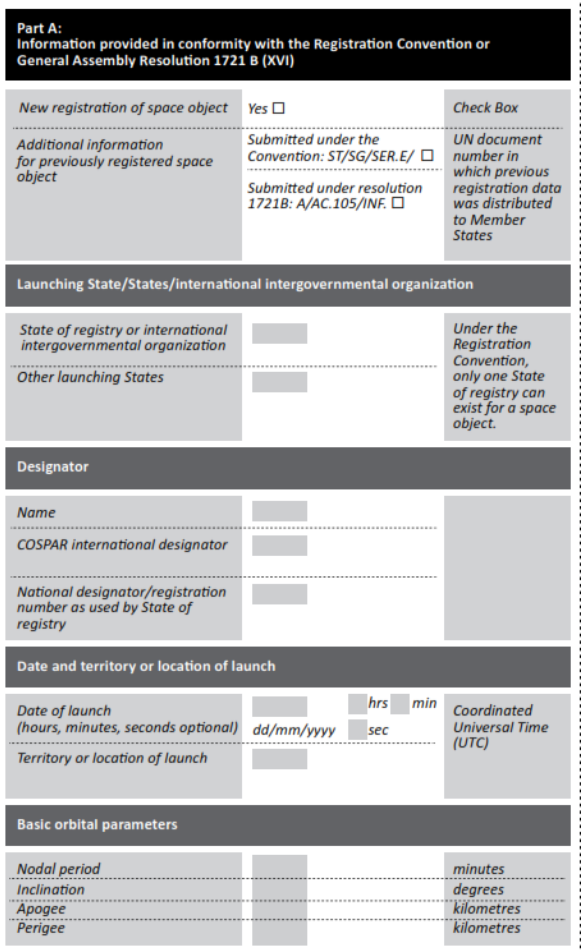
https://swfound.org/handbook



Chapter 1 – International Framework

Capítulo 1 - Marco Internacional

- Freedom and Responsibility
- Registration of Space Objects
- International Frequency Management
- Remote Sensing
- International Standards
- International Export Control
- International Liability
- Dispute Settlement
- Environmental Issues
- Advanced Issues
- International Organizations



Part A:
Information provided in conformity with the Registration Convention or General Assembly Resolution 1721 B (XVI)

New registration of space object	*Yes* ☐	*Check Box*
Additional information for previously registered space object	*Submitted under the Convention: ST/SG/SER.E/* ☐ *Submitted under resolution 1721B: A/AC.105/INF.* ☐	*UN document number in which previous registration data was distributed to Member States*

Launching State/States/international intergovernmental organization

State of registry or international intergovernmental organization		*Under the Registration Convention, only one State of registry can exist for a space object.*
Other launching States		

Designator

Name		
COSPAR international designator		
National designator/registration number as used by State of registry		

Date and territory or location of launch

Date of launch (hours, minutes, seconds optional)	*dd/mm/yyyy* *hrs* *min* *sec*	*Coordinated Universal Time (UTC)*
Territory or location of launch		

Basic orbital parameters

Nodal period		*minutes*
Inclination		*degrees*
Apogee		*kilometres*
Perigee		*kilometres*

UNOOSA International Registry Form

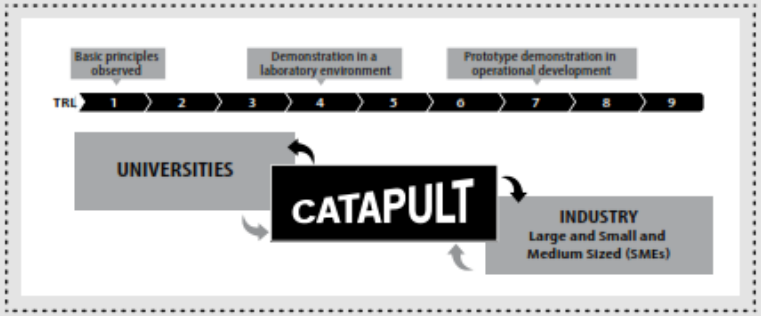
Chapter 2 – National Policy and Administration

Capítulo 2 - Política Nacional y Administración

- Public Policy
  - Rationales, objectives, principles
  - Government roles and responsibilities
- Public Administration and National Oversight
  - National regulators and licensing
  - National frequency administration
  - Export controls
- Case Study: Remote Sensing Policy and Administration

Case Study:
The United Kingdom Satellite Applications Catapult

The United Kingdom Satellite Applications Catapult was established by the government of the United Kingdom (UK) in May 2013 with the goal of creating economic growth in the UK through supporting the development, commercialization, and use of satellite applications. According to its Delivery Plan 2015–2020, the Catapult (Figure 8) aims to promote satellite application and technology development and to help domestic industry "bring new products and services more rapidly to market." The Satellite Applications Catapult is one of 11 "Catapults" operating in the UK, each focusing on different technologies and application areas. The Catapult operates as a private, not-for-profit research organization. It is governed by a board, which includes representation from the United Kingdom Space Agency (UKSA) and from Innovate UK—a government agency focused on fostering technology and economic development.



UK Satellite Applications Catapult

Chapter 3 – Responsible Space Operations
Capítulo 3 - Operaciones Espaciales Responsables

- Pre-launch
  - Licensing
  - Launch vehicle selection and integration
  - Insurance
- Launch
  - Safety considerations
- On-orbit
  - Orbit determination, propagation, and tracking
  - Conjunction assessment and collision avoidance
  - Anomaly response
- End-of-life

Examples of CA Screening Volumes

Orbit Regime	Orbit Regime Criteria/Definition	Predict/ Propagate/ Time	Radial Miss (km)	In-Track Miss (km)	Cross-Track Miss (km)
GEO	1300min < Period < 1800 min Eccentricity < 0.25 & Inclination < 35°	10 days	12	364	30
HEO 1	Perigee < 2000 km & Eccentricity > 0.25	10 days	40	77	107
MEO	600 min < Period < 800 min Eccentricity < 0.25	10 days	2.2	17	21
LEO 4	1200 km < Perigee ≤ 2000 km Eccentricity < 0.25	7 days	0.5	2	2
LEO 3	750 km < Perigee ≤ 1200 km Eccentricity < 0.25	7 days	0.5	12	10
LEO 2	500 km < Perigee ≤ 750 km Eccentricity < 0.25	7 days	0.5	28	29
LEO 1	Perigee ≤ 500 km Eccentricity < 0.25	7 days	2	44	51

Examples of close approach screening volumes

A Example: Space Resources

Un Ejemplo: Recursos Espaciales

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Promoting Cooperative Solutions for Space Sustainability

"Non-traditional" Space Applications

Rapid expansion in the number & types of commercial space applications is challenging existing policy context for space activities

Image Source: NASA

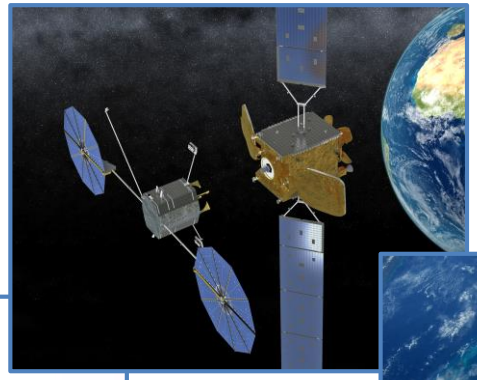

Image Source: Orbital ATK

Image Source: Planetary Resources

Image Source: UNOOSA / Sierra Nevada Corp

La rápida expansión de la cantidad y tipos de aplicaciones espaciales comerciales es un desafío para el contexto político actual de las actividades espaciales

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Promoting Cooperative Solutions for Space Sustainability

Example Case: Space Resources

Asteroid Mining

PLANETARY RESOURCES

DSI DEEP SPACE INDUSTRIES

Lunar Mining

ispace

MOON EXPRESS

USERS

ULA United Launch Alliance

MADE IN SPACE

OFFWORLD

NASA ?

?

Coordination of principles at national and international level will help States establish the conditions under which **socio-economic benefit** might result from space resources development

La coordinación de principios a nivel nacional e internacional ayudará a los Estados a establecer las condiciones bajo a las cuales el beneficio socioeconómico podría resultar del desarrollo de los recursos espaciales

Societal Benefit

How can space resources development contribute to benefit of all?
How can policy and law support?

¿Cómo puede contribuir el desarrollo de los recursos espaciales en beneficio de todos?
¿Cómo las políticas y el derecho pueden apoyar?

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Promoting Cooperative Solutions for Space Sustainability

Thank You! / ¡Gracias!

Source: USAToday

Dagger from King Tut's Tomb, analyzed to contain iron from a meteorite

Cuchillo de la Tumba del Rey Tut, analizado por contenir hierro de un meteorito

We've been using space resources for a long time…

…accessing them in space is new

Questions and Discussion?

ichristensen@swfound.org