



*Promoting Cooperative Solutions for Space Sustainability*

# **Space and Civil Society: The Case of Secure World Foundation**

Dr. Michael Simpson  
Executive Director  
Secure World Foundation  
UNISPACE+50 Symposium  
18 June 2018



Promoting Cooperative Solutions for Space Sustainability

## Long term objective

The secure and sustainable use of the space domain.

We work toward this by.

- increasing the knowledge about the space environment and the need to maintain it
- promoting international cooperation and dialogue
- helping all space actors realize the benefits that space can provide.



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# Challenges

- Salience
- Credibility
- Competition



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## Communication



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# More Communication

## SPACE SUSTAINABILITY

A PRACTICAL GUIDE



### X-37B ORBITAL TEST VEHICLE FACT SHEET

Updated June 1, 2017

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www.swfound.org

#### Summary

The X-37B OTV is a technology demonstrator and experimental vehicle which is likely to be used for flight testing new reusable space launch vehicle (SLV) technologies (such as guidance and thermal protection) and on-orbit testing of new sensor technologies and satellite hardware primarily for space-based remote sensing. While it does have some capability for orbital inspection, repair, and retrieval, it is unlikely to perform these functions given its limited payload bay and altitude range. It has near zero feasibility as an orbital weapons system for attacking targets on the ground.

#### Background

- X-37B is an experimental re-usable space launch vehicle, completely robotic, and uninhabited.
- X-37B is designed to be launched into space on a rocket for months to years, and then re-enter the atmosphere and land.
- X-37B has thrusters for on-orbit maneuvering for powered flight in the air—it is not a glider.
- X-37B started life as a NASA program in 2004. DARPA transferred it to the USAF in 2009.
- Total program costs and budget line are classified.
- Although no official parameters have been released, X-37B has an altitude of 38-43.5 degrees and an altitude than most operational spacecraft.<sup>1</sup>
- Flight operations of the X-37B are overseen by the USAF, Colorado.

#### X-37B Orbital Flight History

Launch Date	Launch Location
April 22, 2010	Cape Canaveral, FL
March 5, 2011	Cape Canaveral, FL
December 11, 2012	Cape Canaveral, FL
May 20, 2015	Cape Canaveral, FL

### SPACE SITUATIONAL AWARENESS FACT SHEET

Updated May 2017

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#### Introduction

Space situational awareness (SSA) is the ability to accurately characterize the space environment and activities in space. Civil SSA combines positional information on the trajectory of objects in orbit (mainly using optical telescopes and radars) with information on space weather. Military and national security SSA applications also include characterizing objects in space, their capabilities and limitations, and potential threats.

SSA is an inherently international and cooperative venture. It requires a network of globally distributed sensors as well as data sharing between satellite owner-operators and sensor networks. SSA also forms the foundation of space sustainability as it enables safe and efficient space operations and promotes stability by reducing mishaps, misperceptions, and mistrust.

#### Types of SSA Sensors

Ground-based radars have historically been the backbone of SSA. Radar consists of at least one transmitter and receiver. The transmitter emits radio waves at a specific frequency, some of which reflect off the target and are measured by the receiver, which can then calculate the location of the target in relation to the radar. The primary advantages of radars are that they can actively measure the distance to a target and some types of radars can accurately track many objects at once. Some radars can also detect the motion of an object and construct a representation of its shape. The main disadvantages of radars are their cost, size, and complexity.

Optical telescopes are also widely used for SSA. Telescopes collect light or other electromagnetic (EM) radiation emitted or reflected by an object and focused into an image using lenses, mirrors, or a combination of the two. The main advantages of using optical telescopes for SSA is their ability to cover large areas quickly and, in particular, to track objects above 5,000 km (3,100 mi) altitude. Some telescopes can create high resolution images of space objects. The main disadvantage of optical telescopes is that they require specific lighting conditions and clear skies to see an object, although space-based optical telescopes eliminate some of these limitations.

Other types of sensors can be used for SSA, including sensors that detect radio frequency (RF) or other types of signals from satellites, lasers that measure the distance or range to a satellite very accurately, and infrared sensors that detect heat. Combining data from many different types of sensors, both ground- and space-based, that are also distributed around the globe provides a much more complete picture of the space environment and of activities in space.

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## Yet again more communication



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## Enriching the Conversation



UNISPACE+50 High Level  
Forum 6-9 November 2017

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## And some of the most effective communication



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## Listening

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# Narrowing the Gap

## Advocacy and Inclusion



**Training Report**  
**SRTM-2 Digital Elevation Model (DEM) Applications**  
19 - 22 September 2016  
International Centre for Integrated Mountain Development (ICIMOD)  
Kathmandu, Nepal



5 October 2016



**CEOS**

**Resolution SRTM Data & Flood Y**  
**'5 - 29 May 2015, Tonantzintla and**  
**Announcement - Save th**

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**CEOS WGCAPD/RCMRD DEM Workshop**  
**8-10 May 2013**  
**Nairobi, Kenya**  
**Report**



The inaugural Committee on Earth Observation Satellites (CEOS) Working Group on Capacity Building and Data  
Democracy (WGCAPD) Digital Elevation Model (DEM) Workshop was held at RCMRD in Nairobi,  
Kenya, on 8-10 May 2013. The workshop was a joint effort amongst the following partners:  
- Instituto Nacional de Estadística y Cartografía (INEC)  
- Regional Centre for Mapping of Resources for Development (RCMRD)  
- Sector Map of Mapping of Resources for Development (RCMRD)  
- South African National Space Agency (SANSA)  
- U.S. Geological Survey (USGS)  
- U.S. National Oceanic and Atmospheric Administration (NOAA)  
- Radar Topographic Mission (SRTM) in a variety of ways, but with an emphasis on hydrological models.  
The final agenda can be found in the appendix of this report. The workshop included 12 participants  
from the following countries:  
- Ethiopia  
- Kenya  
- Somalia

Page 1 of 7

### CHAPTER 2

## BROADENING THE BASE COOPERATION AS A SPRINGBOARD FOR NEW PARTICIPANTS IN THE SPACE SECTOR

**MICHAEL SIMPSON, PH.D.**  
THE SECURE WORLD FOUNDATION

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### INTRODUCTION

Numerous examples of international cooperation among well-established  
spacefaring states have emerged over the last several decades. Although  
spacefaring states have emerged over the last several decades. Although  
the prime example may be the International Space Station, other missions  
are similarly worthy of mention: Cassini-Huygens, Chandrayaan 1,  
Hayabusa, and literally every mission launched by the European Space  
Agency. As a result of such cooperation our knowledge of our solar  
system, including our home planet, has been increased dramatically by  
missions whose success exceeded the capacity of single states, even I

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### SWF Scholarships for IAC 2018 are Available to Young Professionals

Wednesday, June 6, 2016

Secure World Foundation is pleased to announce that we will be accepting applications from young professionals for  
scholarships to aid in traveling to present papers at the 2018 International Astronautical Congress (IAC), October 1-5,  
in Bremen, Germany.

The goal of these scholarships is to provide young space professionals an opportunity to participate in one of the  
most prestigious international space conferences, further their professional development, and inject new ideas into  
the community. Scholarships are limited to reimbursement for: 1) conference registration; 2) air or ground  
transportation to and from Bremen, and; 3) lodging during the IAC.

Scholarship amounts are awarded in \$500 increments between \$500 and \$1500 at the discretion of SWF.

This application is open to young professionals 35 years old or younger as of the start of the IAC, working in the  
space field, and who have had an abstract accepted for oral presentation at the 2018 International Astronautical  
Congress in Bremen. The paper must be on one of the following topics:

- Space Sustainability
- Space Law and Policy
- Human and Environmental Security

Applicants should fill out the form below with their contact and paper details as well as provide a short essay of no  
more than 500 words on why they feel it is important to present their research at IAC, and what they hope to get out  
of the experience. Individuals selected to receive scholarships will be required to provide a trip report to SWF  
following the Congress.

Apply Now

Deadline for Applications is 11:59 PM (EDT) Sunday, June 10, 2016.  
For further questions, please contact SWF Project Manager Josh Widny.

Last updated on June 5, 2018

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## Building Capacity and Expectation

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# Spreading the benefits



Approved by GEO XII Plenary on 11 November 2015

## The Group on Earth Observations (GEO) Mexico City Declaration

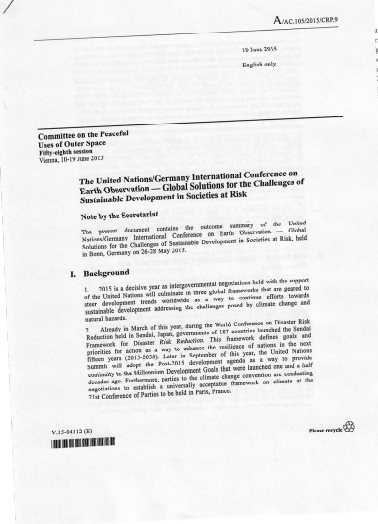
Mexico City, 13 November 2015

We, Ministers, GEO Members and Participants attending the Group on Earth Observations (GEO) Mexico City Ministerial Summit:

1. **Confirm** that full and open access to Earth observation data, information and knowledge is crucial for humanity as it faces unprecedented social, economic and environmental challenges at global, regional, national and local levels. **Recognize** that Earth observation data and the information and knowledge derived from those observations are fundamental for identifying and implementing solutions, monitoring progress and measuring impacts.
2. **Note** that Earth observations take many forms including in situ, remotely sensed, and space based. **Welcome** GEO's inclusion of all of these types in its efforts. **Emphasize** that Earth observations and economic and social data, information and knowledge should be used together for policy and program decisions. **Affirm** that GEO and its Earth observations and information will support the implementation of, inter alia, the 2030 Global Goals for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030, the United Nations System of Environmental and Economic Accounts, and the United Nations Framework Convention on Climate Change.
3. **Note** the progress GEO has made, recalling its Geneva Declaration (2014) call to improve GEO's effectiveness, broaden its engagement with stakeholders and sustain resources. **Reaffirm** that comprehensive and sustained Earth observations and derived knowledge are needed to assess, understand and predict how Earth resources are a basis for sustainable development and its choices impact the Earth life support system upon which the wellbeing of present and future generations depends.
4. **Recognize** that GEO is a unique partnership of governments and participating organizations

### 2017 Roundtable on Value & Benefit Creation in Commercial Space

- NOTIONAL AGENDA:**
- 8:45 – 9:00: Opening, welcoming remarks, ground rules  
• Master Moderator: Ramin Khadem
  - 9:00 – 10:30: Discussion 1: Always listen to experts. They'll tell you what can't be done, and why. Then do it. – Reagan/Revisist of Last Year  
• Moderator: Ramin Khadem  
• Speaker 1: Michael Lopez Alegria  
• Speaker 2: Adi Jafari  
• Speaker 3: Sean Casey
  - 10:30 – 11:00: Break – coffee
  - 11:00 – 12:30: Discussion 2: "Everything is theoretically impossible, until it is done." – Business Models Beyond LEO and GEO  
• Moderator: Daniel Faber?  
• Speaker 1: Bernard Kutter or Melissa Samson, United Launch Alliance  
• Speaker 2:
  - 12:30 – 1:30: Lunch –
  - 1:30 – 3:00: Discussion 3: "Anything which is physically possible can always be made financially possible." – The Financiers Perspective  
• Moderator: Jose Ocasio-Christien, Caelus Partners  
• Speaker 1:  
• Speaker 2:
  - 3:00 – 3:15: Break – refreshments
  - 3:15 – 4:00: Capstone Discussion – Identifying Benefit
  - 4:00 – 5:00: Reception



86th International Astronomical Congress 2017

Paper ID: 37213

### BUSINESS INNOVATION SYMPOSIUM (BIS)

New space industry segments, firms, sector groups, and multiple programs: innovation, entrepreneurship & investment at the mesoscopic level of analysis (2)

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BROADENING BENEFIT AS A PATHWAY TO THE WIDELY-ACCEPTED DEVELOPMENT OF EXTRA-TERRESTRIAL RESOURCES

### Abstract

Innovative applications and business plans emerging from the commercial space sector will be the object of intense scrutiny by governments eager not to be left behind in the development of new economic activity in space. The results of participation in the benefits of such space activity is likely to play a significant role in the range of political support it enjoys. This paper seeks to explore this idea by asking at the specific challenges facing space mining. Considerable attention has been focused on the in-appropriation (Article 2) and exploration and use clause (Article 9) of the Outer Space Treaty (OST) and the common heritage language of the Moon Agreement (Article 11.1) when discussing this topic. Nevertheless, there are indications that the OST's benefit clause (Article 1) may emerge as a key to having broad international support for commercial mining operations beyond Earth. The multilateral idea of the benefit concept is evident in frequent references to it in such contexts as UNCOPUOS, GEO, or these Space Resource Governance Working Groups, and numerous international space conferences. These states will ultimately evaluate "benefits" in terms of its impact on their citizens and their willingness to act on the history of its use in legal proceedings, the study of the concept's potential to create equitable and equitable environment for commercial resource development of Earth is inherently vital and economic. Fortunately, there is a rich array of terrestrial experience bridging the aims and means perspectives that can help provide insight into how mining interests have been reconciled. Those of the communities in which they have operated. There are also insights to be drawn from successful examples. This paper will seek to highlight best practices from the terrestrial experience that illuminate the challenges of broadening the benefits from space mining. Additionally, it will offer initial assessment of the applicability of the terrestrial experience to the special context of extracting assets from objects in space. The paper will also draw on recent work of the Secure World Foundation, upon the understanding of value creation through space activity. This report will argue that the try to add and communicate value can increase the range of potential benefits that could flow from development of space resources. The paper will also leverage prior analysis that the authors have led examining the links between social benefit, space activity, and corporate strategy.

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# Let's improve one small neighborhood together.



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