

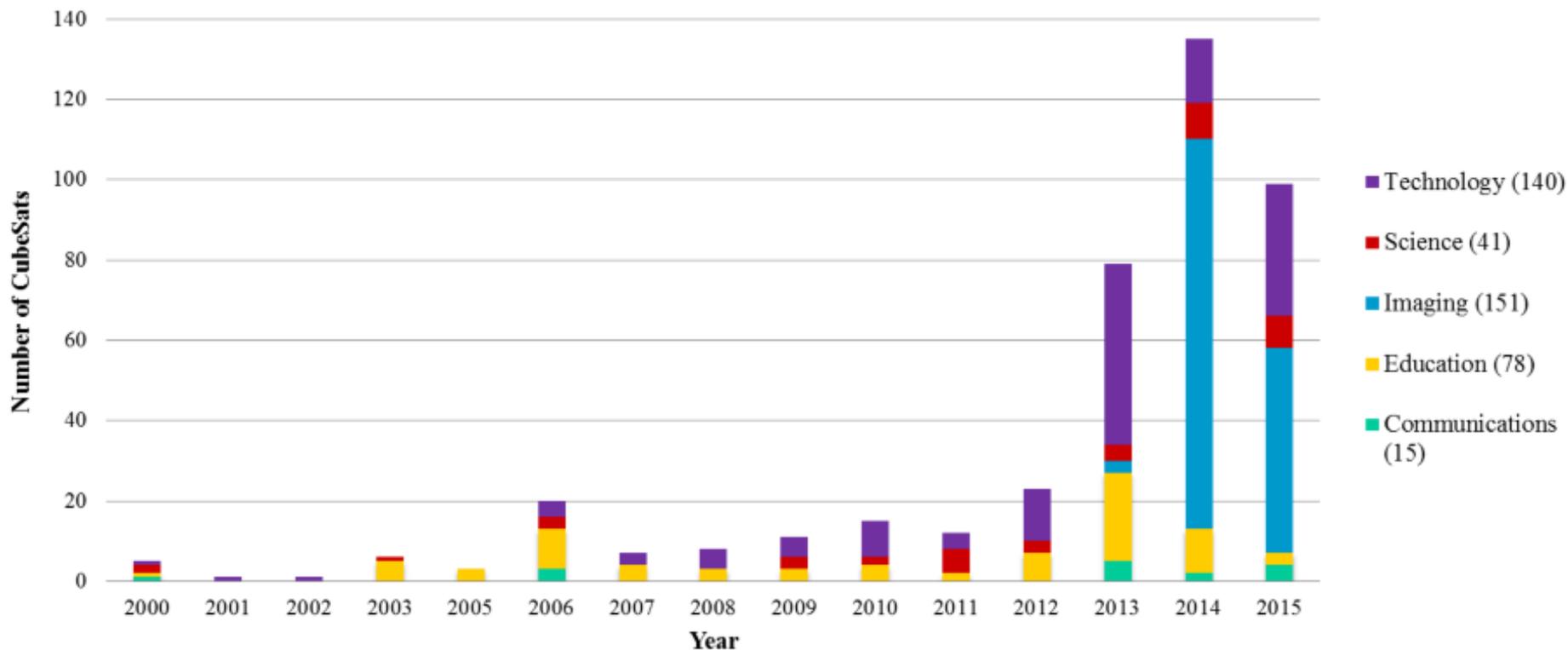


*Promoting Cooperative Solutions for Space Sustainability*

# Small Satellite Technology and Space Capability

Christopher Johnson  
Secure World Foundation

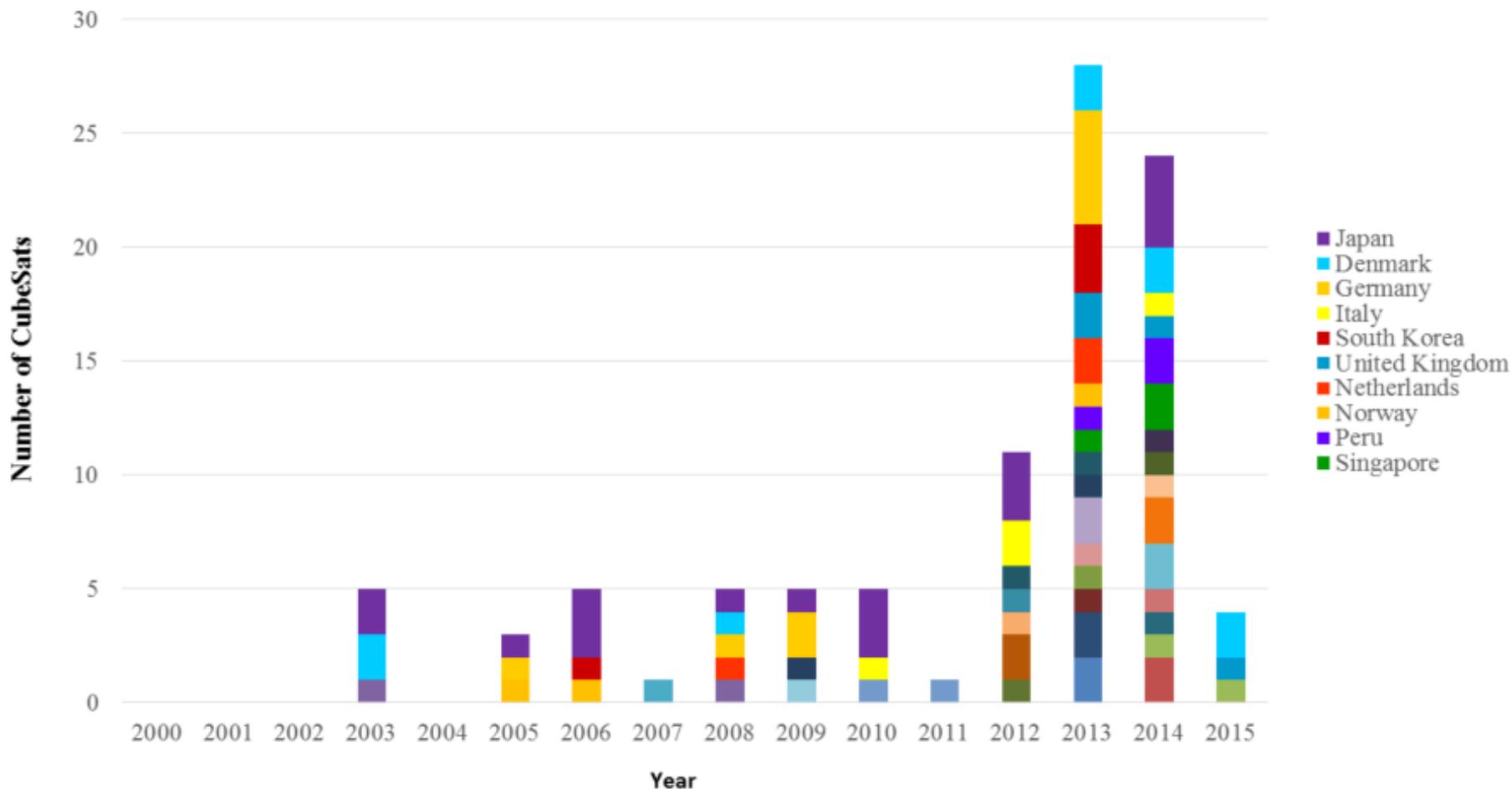
# Growth and diversity in cubesat missions



## Cubesats Launched by Mission

Source: [Achieving Science Goals with CubeSats, National Academy of Sciences \(2016\)](#)

# Growth and diversity in cubesat missions



**Cubesats Launched by Country**

Source: [Achieving Science Goals with CubeSats, National Academy of Sciences \(2016\)](#)

# Small package, big potential

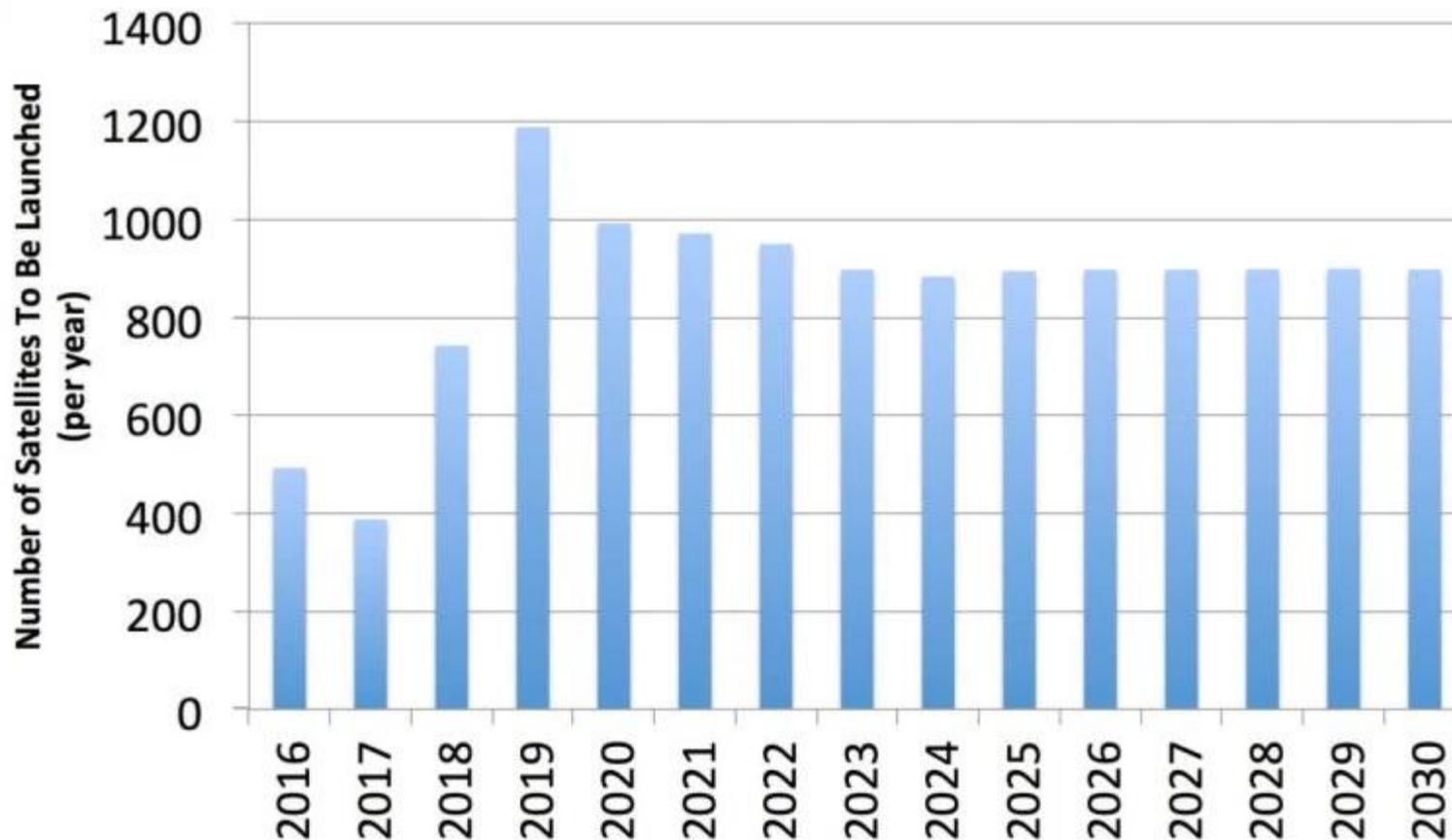


Planet co-founder Will Marshall  
Source: [SpaceNews](#) (2015)



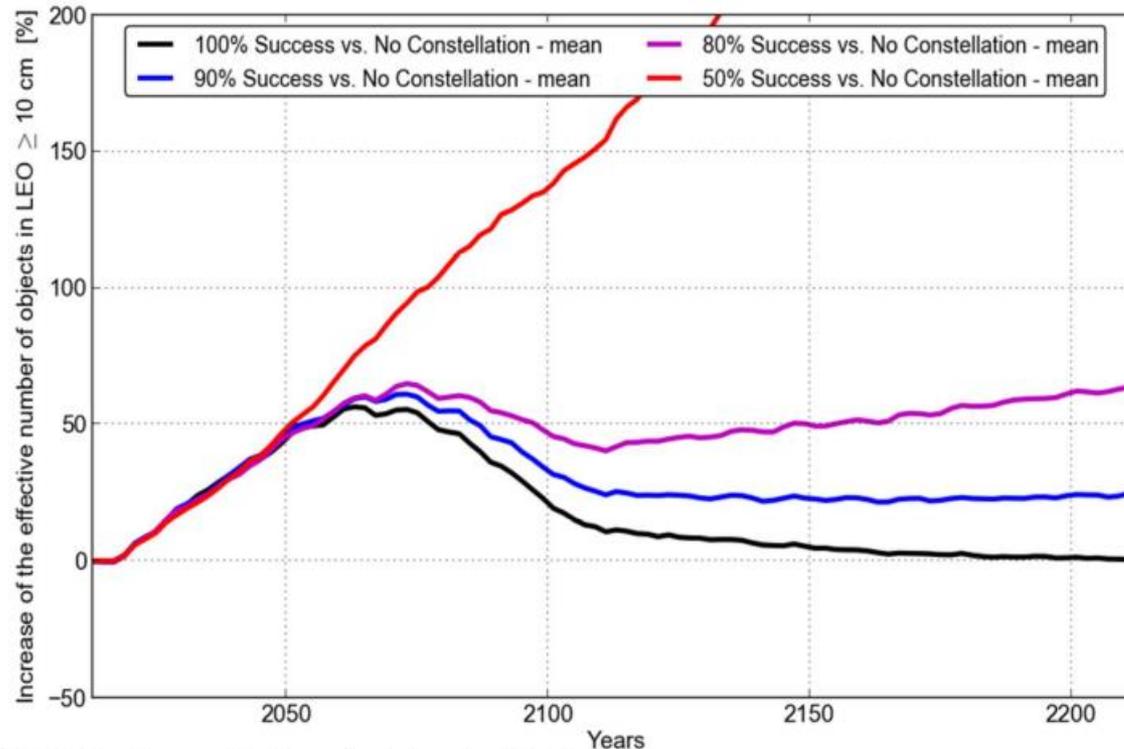
Planet imagery of Haiti pre-Hurricane Matthew  
Source: [Planet](#) (2016)

# Predicted future launch rate



Source: Karacaliolu (2015) courtesy of [Space Safety Magazine](#)

# Impact of non-compliance with post-mission disposal guidelines



- 50%PMD → population doubles by 2071
- 90%PMD → population increase by 25% at end of simulation period
- 80%PMD → population increase by 63% at end of simulation period (and steeper slope)

*Relative increase in LEO population as a result of PMD success rate for large constellations*

Source: [Bastida Virgili, Dolado, Lewis, Radtke, Krag, Revelin, Cazaux, Colombo, Crowther, and Metz \(2016\)](#)

- **Chapter 1 - The International Framework for Space Activities**
  - Principles of freedom and responsibility
  - International frequency management
  - Remote sensing and broadcast communications
  - International standards, export control, and liability
  - Space environmental Issues
- **Chapter Two - National Space Policy and Administration**
  - Policy rationales, objectives, and principles
  - Government relationship with the private sector
  - National oversight of public and private sector space activities
- **Chapter Three - Responsible Operations in Space**
  - Pre-launch licensing, payload integration, and launch mission assurance
  - Launch operations, safety, and risk mitigation
  - Orbit determination and tracking, conjunction assessment, collision avoidance
  - Post-mission disposal, controlled and natural atmospheric re-entry



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# Thank you. Questions?

[cjohnson@swfound.org](mailto:cjohnson@swfound.org)