Public- Private Partnerships and Space Weather:

The Solar Wind Case

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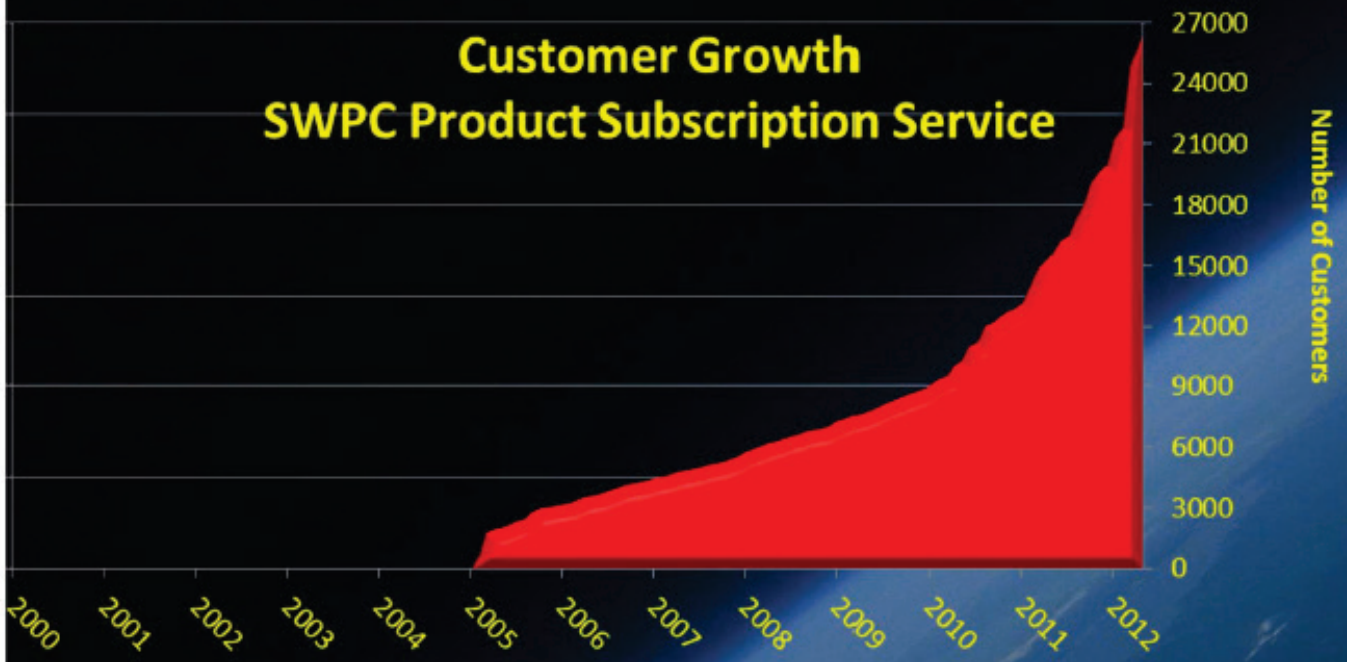
Concept

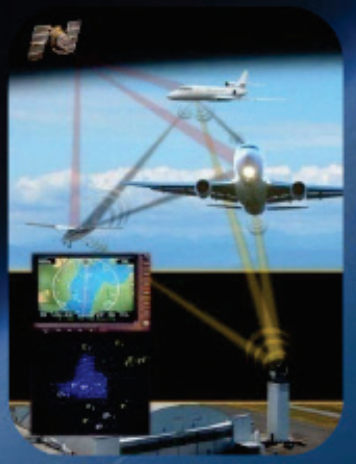
- A Commercial Satellite Platform at L1 combining multiple users can meet NOAA solar wind requirements at lowest cost while maintaining inherently governmental function of solar monitoring and warning
- Cost sharing of space assets, launch, and certain operations means savings vs. dedicated system
- Use of insurance, private capital, and commercial procurement and construction techniques result in competitive, market-driven pricing
- Structure of data purchase relationship ensures payment upon performance, creating incentives and requirements for data continuity

Visions of the Future…

Evolving Customer Base



NEXTGEN



Commercial Space

Climate Change
– Arctic interests

GPS Applications

Credit NOAA

SSI Solar Wind and Telecommunications System Architecture*

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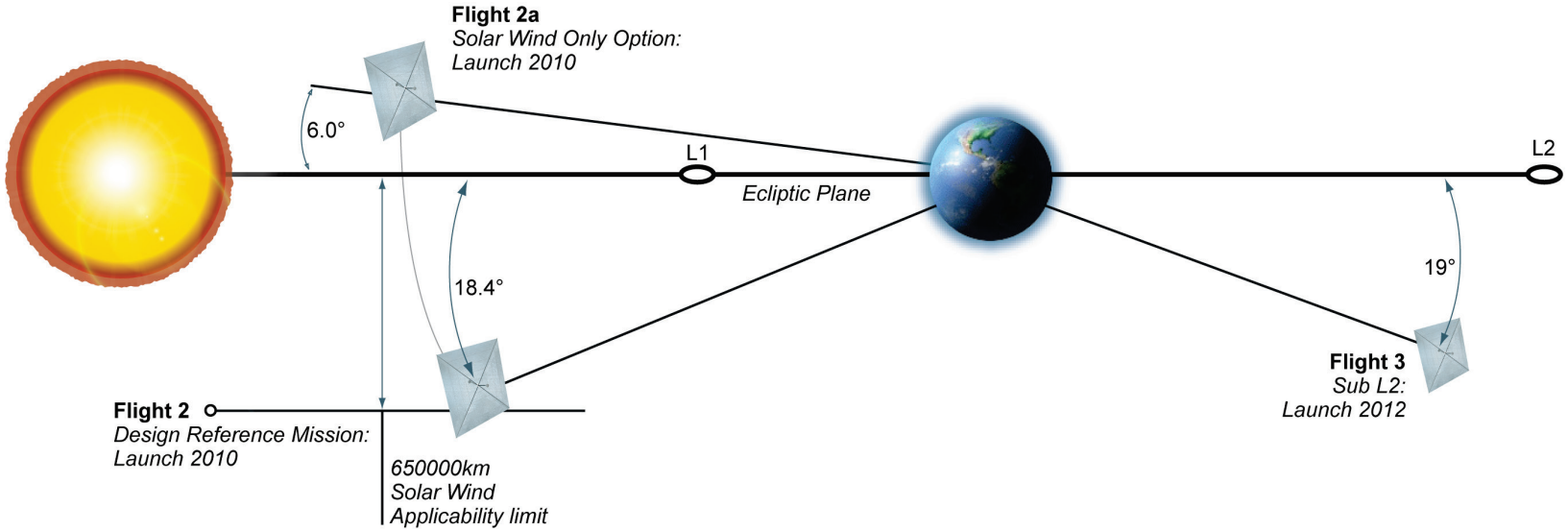

Mission	Flight 2	Flight 2A	Flight 3
Solar Wind	X	X	
Earth South Pole Comm	X(9.5 mos)		X (All)
NPOESS Data Relay			X
Lunar South Pole	X(6 mos)		X (All)
Inclination	18.4° South of L1	6° North of L1	19° South of L2
Range	>2 (106)km	2.1 (106)km	1.1 (106) km

** As presented in "final Report, NOAA NEEK-0000-5-00274, March 7, 2006"*

Who we are?

SPACE SERVICES, INC.

Space Services Holdings, Inc.

- Privately held, Houston based, with more than $20 million in heritage and current investments in mission development, commercial infusion, technology R&D, and mission execution.

Near Earth LLC

- Near Earth, LLC (Stamford, CT) - Business Case Assessment and Financial Advisory Services
- Specialists in satellite, telecom, and aerospace investment banking. Clients include Space Systems Loral/MDA, Orbcomm, Universal Space Networks, and NanoRacks.
- Assists in building the solar wind business model, producing a draft investment prospectus, and locating candidate investors.

Review of Efforts to Date

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NOAA Conclusions/Findings

2006:

"A profitable business case exists for the government private partnership - a clear benefit exists for the government from this approach."

Review of Efforts to Date (cont.)

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NOAA Conclusions/Findings 2014:

- Since 2003, NOAA has been working with Commercial Service Providers on mission concepts, prices, and business plans.
  - 2003: Request for Information
  - 2005: Broad Area Announcement
    - SSHI, Lockheed, NRL, SWRI
      - Genesis of CCOR
    - Booz Allen Hamilton – assessed the commercial business case
      - Assessed the risks
      - Identified mitigation strategies (which NOAA has incorporated)
  - 2007: RFI
  - 2008-2009: RFQ

- There is substantial evidence that commercial providers could take on the risk of building, launching, and operating a mission to meet NOAA's Requirements.

- NOAA continues to examine all information from commercial providers
  - In 2014 released a 'Request for Information' with due dates of March 28.
  - NOAA received proposals that have provided very valuable information

Benefits of Commercial

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Business Model Demands Redundancy/Insurance

Benefits of Commercial (cont.)

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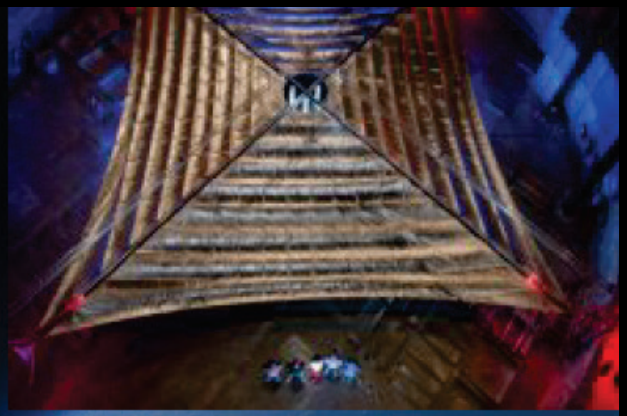
Technology Innovations



Visions of the Future…

Sailing on sunlight!

Sunjammer Solar Sail Technology Demonstration Mission (TDM)

- NASA mission to prove the viability and value of the solar sail technology *(launch ~2015)*
- NOAA working with NASA and other partners exploring options for solar wind measurements
- **Potential game-changer!! Add hours to warning lead time of geomagnetic storms!**

Credit NOAA

Benefits of Commercial (cont.)

SPACE SERVICES, INC.

Multi User Platforms Reduce Costs to Govt.

- Emerging Commercial Markets for Deep Space Platforms
  - Data, Communications, and Imagery Requirements today
  - Resource assay, capture, and utilization ventures are developing and flying precursor systems
  - Test beds for Energy, new propulsion, and robotic systems
  - Entertainment, Competition and Exploration missions in works

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Benefits of Commercial (cont.)

SPACE SERVICES, INC.

Fulfills multiple policy commitments spanning decades

National Policy Encourages Public-Private Partnerships

"*Actively explore the use of inventive, non-traditional arrangements for acquiring commercial space goods and services to meet United States Government requirements, including measures such as public-private partnerships, hosting government capabilities on commercial spacecraft, and purchasing scientific or operational data products from commercial satellite operators in support of government missions.*"

-National Space Policy, June 29, 2010

Congressional Recognition

"…the committee is also aware of commercial data purchase solutions that could meet the Government's space weather (solar storm warning) data needs…."

- H. Rept. 112-78 (House Armed Services Committee Report to accompany H.R. 1540, National Defense Authorization Act of FY2012)

15 U.S.C. Section 5806 (Derived from NASA Auth Act, FY 93, P.L. 102-588)

"Authorizes NASA or NOAA Administrator to enter into multi-year anchor tenancy contracts, with termination liability, for the purchase of a good or service.

Barriers and Issues

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Institutional concerns

Why are you better vs. traditional procurement?

Access to NOAA assets - tracking/frequencies

Pilot Program

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Weather Research and Forecasting Innovation Act of 2017 April 18 authorizes data purchases for space weather services.

- Among the bill's provisions is language formally authorizing the National Oceanic and Atmospheric Administration to purchase weather data from commercial satellite systems. The bill authorizes NOAA to spend $6 million a year in fiscal years 2017 through 2020 for a pilot program of data purchases to evaluate the effectiveness of commercial data to support weather forecasting.

- The bill directs NOAA to enter into an agreement by the end of fiscal year 2018 with the National Academies to study future weather satellite systems. That study, due two years after the agreement is reached, would examine both the observational needs of scientists to improve weather forecasts and means to collect that data. It explicitly calls for assessment of the use of constellations of small satellites, standard bus designs and alternative sources of data, including commercial systems.

Pilot Program (cont.)

SPACE SERVICES, INC.

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2 - Extend the pilot notion to foster next generation solar wind systems for post DSCOVR services.

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