Personal Spaceflight Industry Summary

Prepared by The Tauri Group
for the
Personal Spaceflight Federation
May 27, 2008

PERSONAL SPACEFLIGHT FEDERATION

THE TAURI GROUP

Objective

Define and characterize the emerging **personal spaceflight industry** with dependable, authoritative quantitative data on the businesses and organizations enabling commercial human spaceflight

Contents

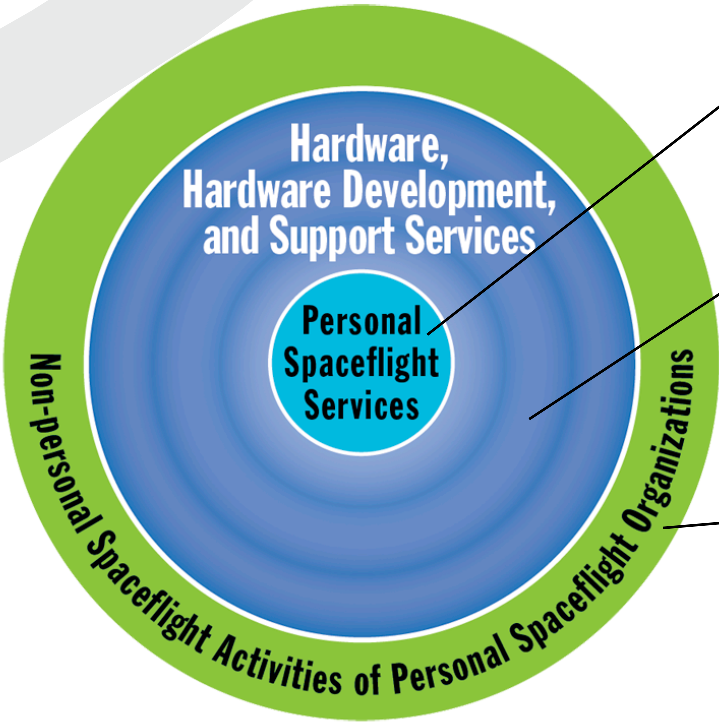
Methodology

- Data collection
  - Interviews with Personal Spaceflight Federation member companies, supplemented with external research
  - Exclusive, proprietary dataset
  - Comprehensive coverage of US industry
  - Dataset includes 2006 and 2007
- Data analysis
  - Aggregated to protect proprietary data
  - Structured to reflect investment, employment, facilities and different types of revenue to present a detail picture of industry activities
- Findings

US Personal Spaceflight Industry Organizations

- Air Launch, LLC
- Armadillo Aerospace
- Bigelow Aerospace
- Benson Space Company
- Blue Origin
- Excalibur Almaz
- Mojave Aerospace and Test Center
- Oklahoma Space Industry Development Authority (OSIDA)
- Rocketplane, Inc.
- Scaled Composites, LLC
- Space Adventures
- SpaceDev, Inc.
- Spaceport America
- Space Exploration Technologies Corporation (SpaceX)
- Space Florida
- Transformational Space (t/Space)
- Virgin Galactic
- XCOR Aerospace
- X PRIZE Foundation

Types of Personal Spaceflight Industry Revenue



1 Deposits and revenue for commercial human spaceflight

2 Revenue for personal spaceflight-related hardware sales, hardware development, and support services

3 Non-personal spaceflight revenue of personal spaceflight organizations

Revenue Definitions

1 Personal spaceflight services

- Deposits and revenue received for commercial human spaceflight

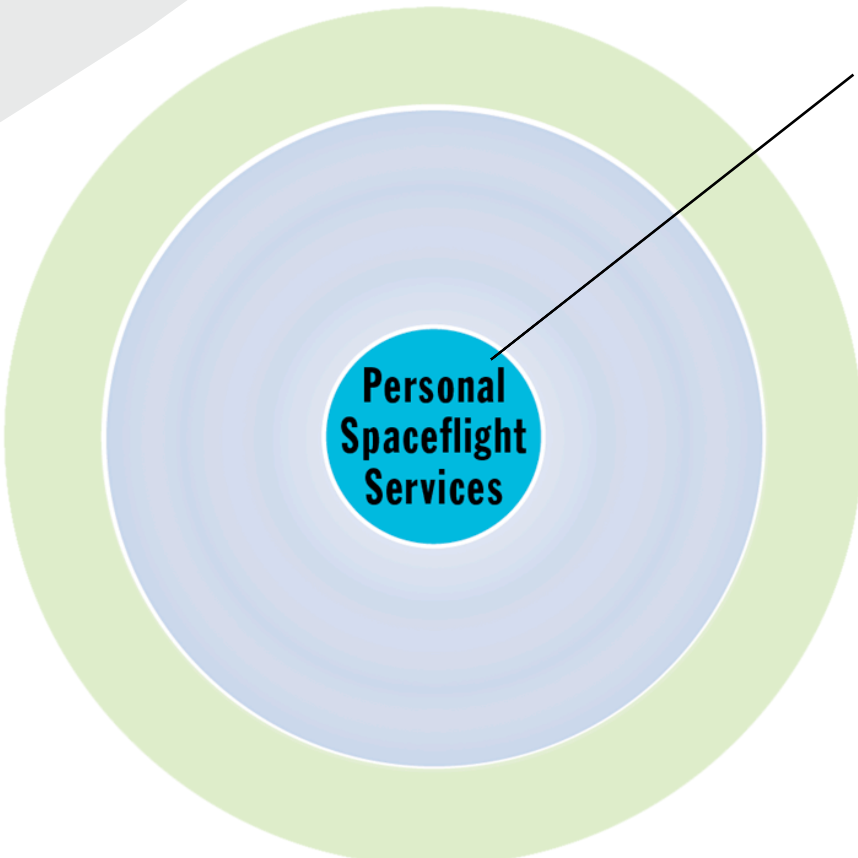
2 Hardware sales, hardware development, and support services

- Hardware and services directly intended for personal spaceflight
- Sales of personal spaceflight-related products and services to non-personal spaceflight customers
  - E.g., rocket motors to a military client
- Sales and services that develop organizational capabilities and technologies that can leveraged for personal spaceflight applications
  - E.g., small satellite development

3 Non-personal spaceflight activities of personal spaceflight organizations

- Revenue to personal spaceflight companies unrelated to commercial human spaceflight

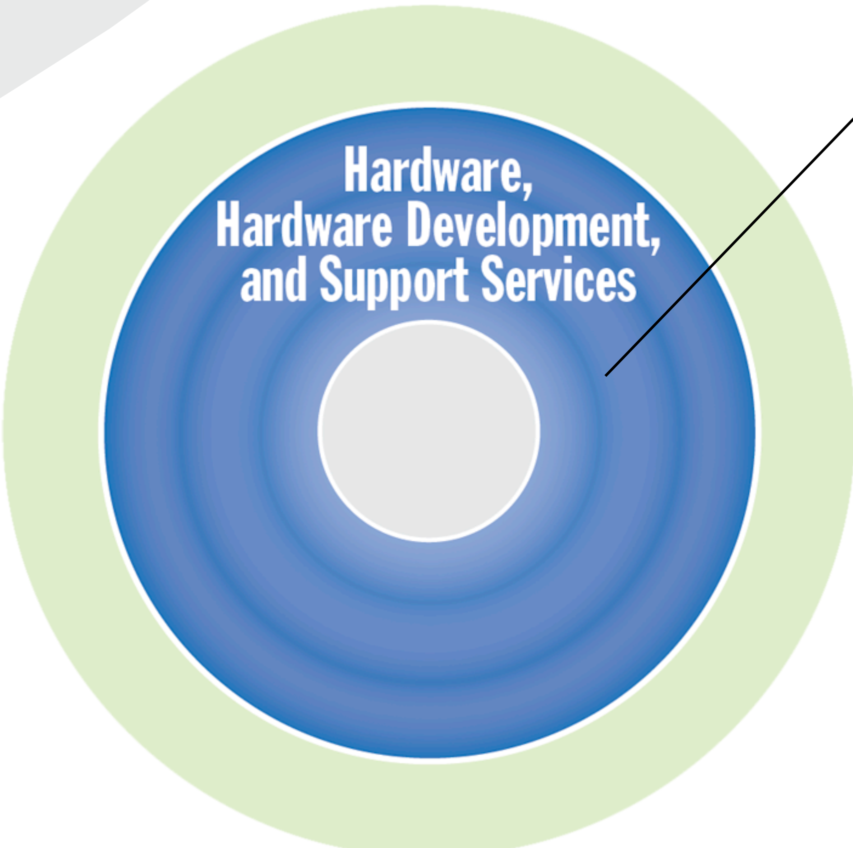
Industry Revenue: Personal Spaceflight Services



1 Revenues for sales of personal spaceflight services

- 2006: **$28.8M**
- 2007: **$38.8M**

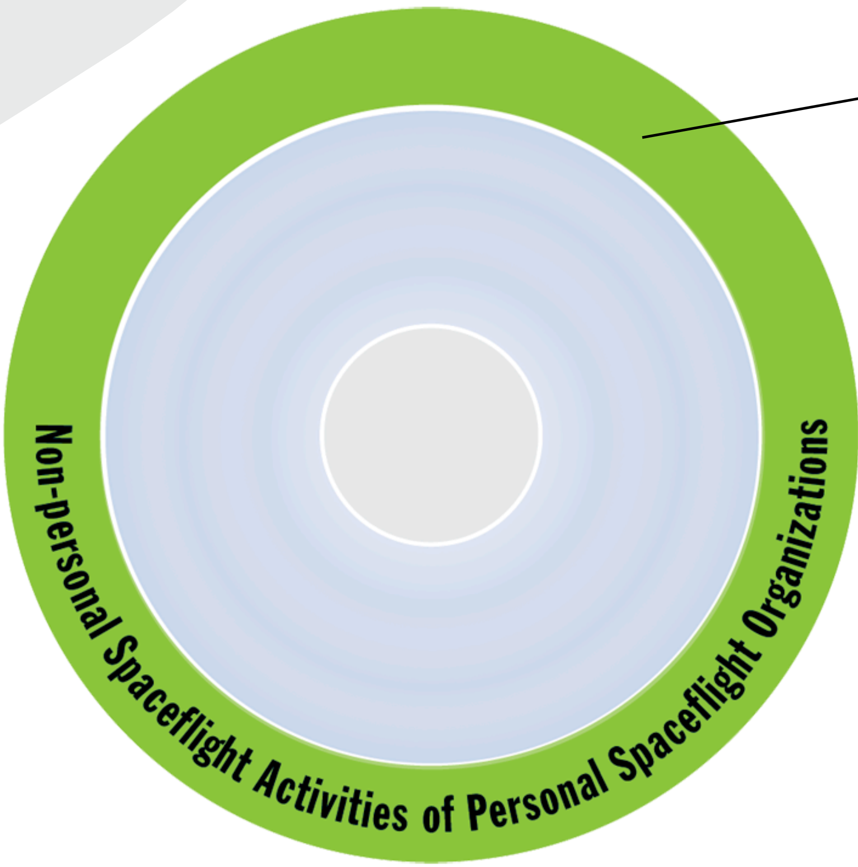
Industry Revenue:
Hardware Sales, Development and Support Services



2 Revenue from sales of personal spaceflight hardware, sales of related hardware and hardware development services, and other activities leveraged for industry development

- 2006: **$123M**
- 2007: **$206M**

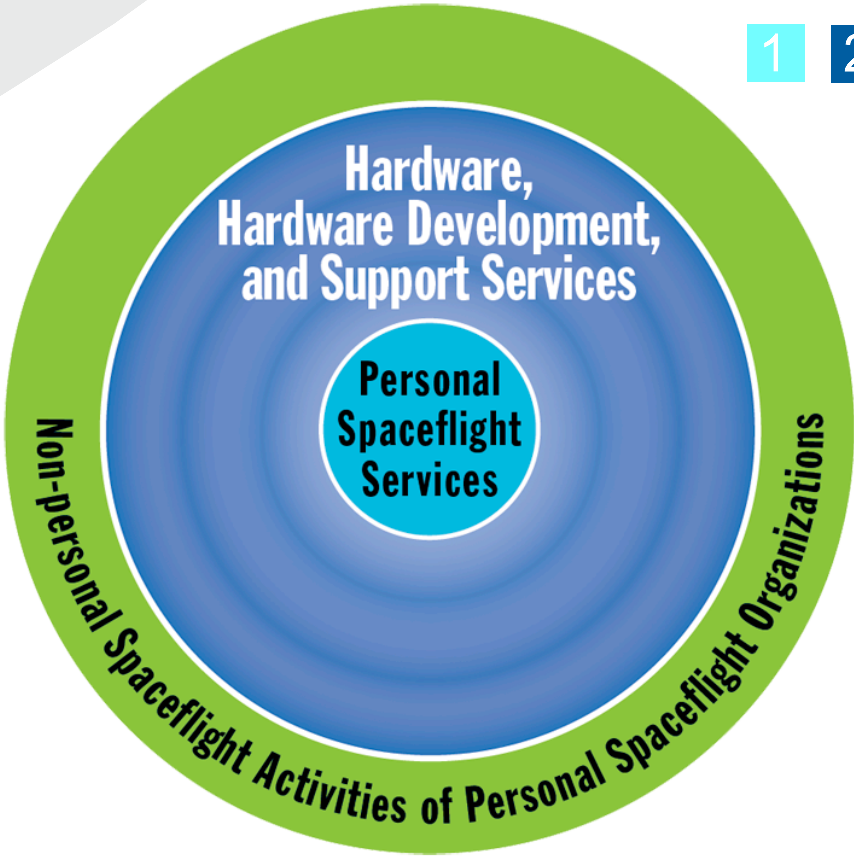
Industry Revenue: Other



3 Non-personal spaceflight activities of personal spaceflight organizations

- 2006: **$24M**
- 2007: **$24M**

Types of Personal Spaceflight Industry Revenue



1 2 3 Total industry revenue:

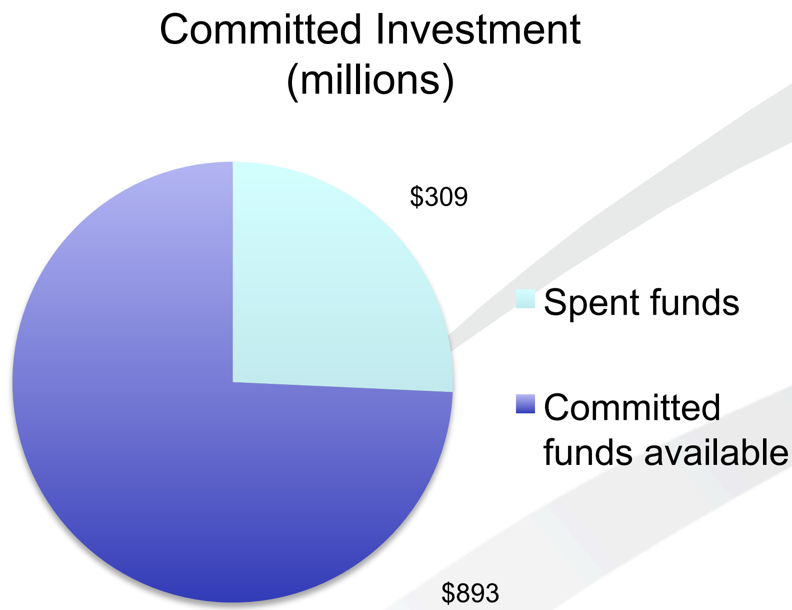
- 2006: $175M
- 2007: $268M

2007 US Personal Spaceflight Industry Employment

- Spaceflight services: < 50 employees
- Hardware sales, hardware development and support services: 993 employees
- Non-spaceflight activities of personal spaceflight organizations employment: 184 employees
- Overall industry employment: 1,227 employees

Investment in the Personal Spaceflight Industry

- Total investment committed to the personal spaceflight industry: **$1.2B**
- About 25% has been spent
- Estimates are through the end of 2007



Vehicles in Development

Vehicle Intended for Personal Spaceflight Market	Company	Prototype/Test/ Precursor Vehicle	Partner Vehicles (Company)
Suborbital Vehicles			
Lynx	XCOR		
New Shepard	Blue Origin	Goddard	
RocketPlane XP	Rocketplane		
"Six Pack"	Armadillo Aerospace	MOD-1	
SpaceShipTwo	Virgin Galactic	SpaceShipOne	
Orbital In-Space Vehicles			
Crew Transfer Vehicle	t/Space		LongReach (AirLaunch)
Dragon	SpaceX		Falcon 9 (SpaceX)
Dream Chaser*	SpaceDev		Atlas V (United Launch Aliance)
TKS Capsule	Excalibur Almaz		
Orbital Platforms			
Almaz Space Station	Excalibur Almaz		
BA 300	Bigelow Aerospace	Genesis I Genesis II Sundancer	Atlas V (United Launch Aliance), Falcon (SpaceX)
Orbital Launch Vehicles			
Falcon 9	SpaceX	Falcon 1	Dragon (SpaceX) BA 300 (Bigelow)
LongReach	Air Launch	QuickReach	Crew Transfer Vehicle (t/Space)
*Note: Dream Chaser will also be capable of suborbital missions			

Hangar and Factory Floor Space

762,100 square feet facility space
~ Over **13** football fields

- SpaceX facility accounts for **65.6%** of the industry space
  - SpaceX contribution: **500,000 sq ft**
  - Non-SpaceX facility space: **262,100 sq ft**
- Bigelow is constructing an additional **200,000 square feet** of space, estimated to be built-out by 2010

Summary

- Emerging US personal spaceflight industry is largely in the investment and development stage
- Meaningful investment ($1.2B) committed, driven by individual and private equity investors
- Personal spaceflight service offerings
  - Orbital services have been available since 2001, using heritage systems and infrastructure; about one launch per year
  - Suborbital service offerings in development
    - Deposits for future launches received by 3 providers
    - Growth in deposits from 2006 to 2007
- Personal spaceflight-related revenue is growing
  - $268M in 2007 with 50% growth from 2006
  - Driven by hardware development for government
  - Employment exceeds 1,000

Contact

- Prepared for the Personal Spaceflight Federation by The Tauri Group
  - Technical Lead: **Carissa Christensen, Managing Partner**
  - Lead Analyst: **Paul Guthrie**
  - Study Team: **Elaine Gresham, Jason Hay, Susie Johnson, Carie Mullins**
  - www.taurigroup.com
- Personal Spaceflight Federation
  - President: **Brett Alexander**
  - Executive Director: **John Gedmark**
  - www.personalspaceflight.org