

AIAA Commercial Space Group

Mojave Industry Visit #2

Ken Davidian

EFP Program Lead

Office of Commercial Space Transportation

September 17, 2009



**Federal Aviation
Administration**



Agenda

- **Tour Logistics**
- **Presentation Agenda**
 1. The Three U.S. Space Sectors
 2. Definitions of “NewSpace”
 3. Emerging Commercial Space Company Profiles



Tour Logistics

- 07:30 Assembly at Space 2009 Registration Desk**
- 08:00 Transit to Mojave, Intro Presentations**
- 10:00 Visit of XCOR Aerospace**
- 11:00 Overview of Mojave Air & Space Port**
- 12:00 Lunch at Voyager Restaurant; Group Picture**
- 13:30 Transit to NASA DFRC**
- 14:00 Visit of NASA DFRC**
- 16:30 Return to Space 2009 Registration Desk.**
- 18:30 End of Visit**



Who: Ken Davidian

• Education

- BS in Aero Eng at OSU
- MS in Mech Eng at CWRU

• Work

- 83-96: Liquid Rocket Design/Analysis, NASA LeRC
- 97-99: SSP Asst. Director, ISU (on-loan from NASA)
- 00-01: Plans & Programs Office, NASA GRC
- 01-02: Operations Director, PSDC (CargoLifter)
- 02-03: Operations Director, X PRIZE Foundation
- 03-04: Program Director, PSDC
- 04-08: Centennial Challenges/ESMD, NASA HQ
- 08-Now: EFP Program Lead, FAA AST

Who: Eleanor Aldrich



Who: AIAA Commercial Space Group

- The purpose is to communicate relevant and timely information regarding the established and emerging commercial space sector to target audiences.
- Specifically:
 - **To the public**, communicate **information** about the emerging commercial space sector for educational purposes.
 - **To AIAA members and all aerospace professionals**, provide them with timely and relevant **information** about the different aspects, sectors, and people of commercial space and provide volunteer opportunities in this new and dynamic aerospace sector.
 - **To the emerging commercial space sector**, provide the wherewithal to obtain **information** about, and access to, all of AIAA's available resources and demonstrate the benefits of AIAA Commercial Space Group membership and support.

The Three U.S. Space Sectors



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Agenda

- **U.S. Space Policies**
- **The U.S. Space “Big Picture”**
- **Three Space Sectors**
- **Roles of Government Agencies**



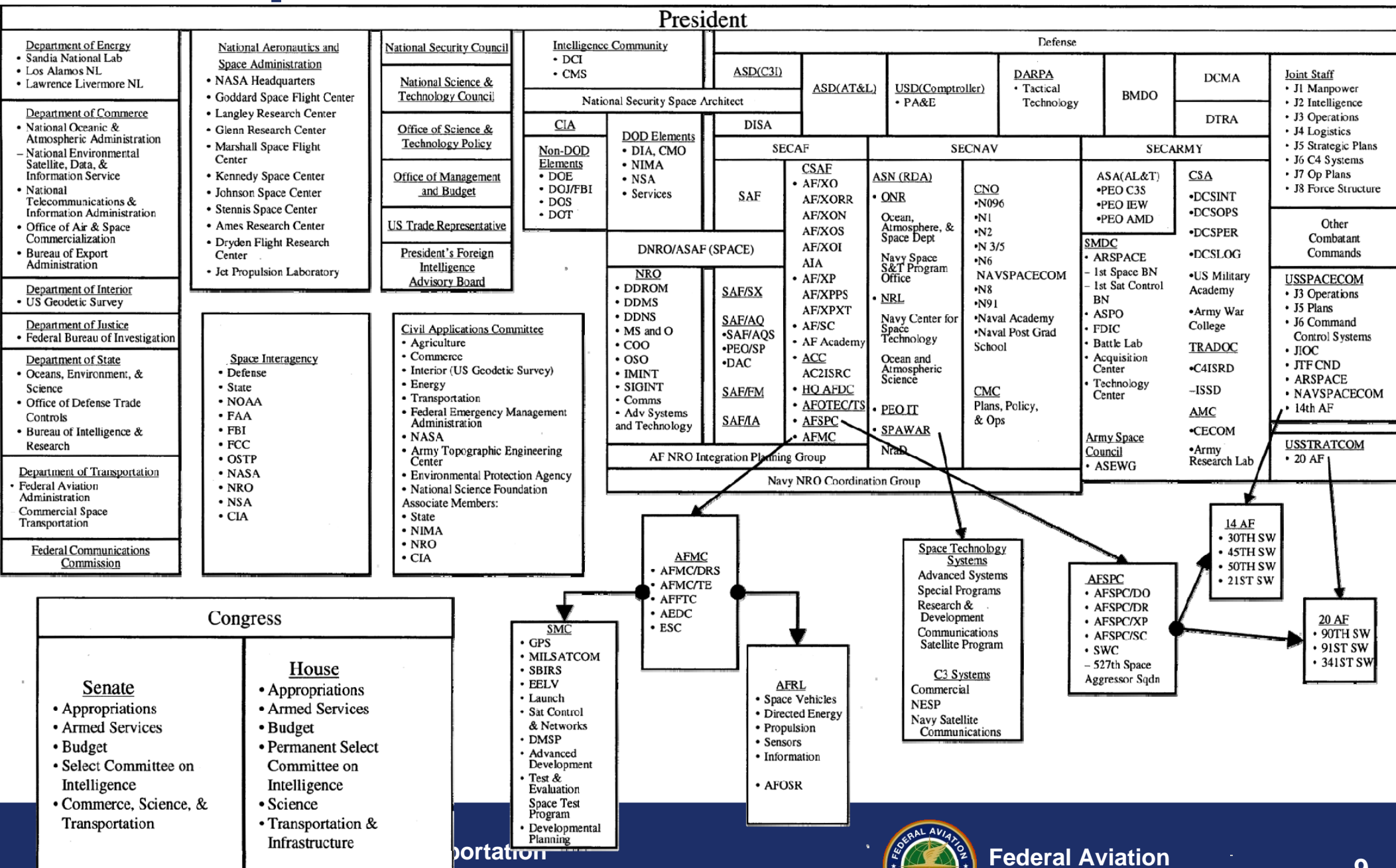
U.S. Space Policies

- **NSPD 27, 25 April 2003**
 - U.S. Commercial Remote Sensing Space Policy
- **NSPD 31 , 14 January 2004**
 - U.S. Space Exploration Policy
- **NSPD 39 , 08 December 2004**
 - U.S. Space-Based Position, Navigation, and Timing Policy
- **NSPD 40 , 21 December 2004**
 - U.S. Space Transportation Policy
- **NSPD 49 , 31 August 2006**
 - U.S. National Space Policy

NSPD = National Security Presidential Directives



USG Space: The BIG Picture



Military & Civil Space

- **Military Space**

- Defense-Related
- Intelligence Community (IC)

- **Civil Space**

- NASA
- NOAA
- More...

- **Commercial Space**

- Infrastructure
- Launch Vehicles
- Telecommunications
- Remote Sensing
- Position, Navigation, and Timing (GPS)
- Small Satellites
- “NewSpace”

Government Roles

- **DoD, NASA, NOAA**
 - Technology Developers
 - Customers
 - Encouragement
- **FAA AST**
 - Ensure Public Safety Through Judicious Regulation of, and ...
 - Encourage, Facilitate, and Promote...
 - a Safe and Successful Commercial Space Transportation Industry

Summary and Preview of Part 2

- **Summary**

- AIAA CSG Organizing Industry Visits To Inform Audiences About Commercial Space
- Three Sectors of U.S. Space

- **Preview**

- Next Up: “Commercial and NewSpace Definitions”
- Questions? Discussion?

Definitions of “NewSpace”

Ken Davidian

EFP Program Lead

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Administration**



Agenda

- **NewSpace Definitions**
- **Definition of Emerging Industries**



List of NewSpace Companies

92 NewSpace Companies and Organizations

Note: this is an informal list, meaning the only requirement to be here is an active website. If you see an error, or wish to add a company or organization, please inform us by using our [Comments page](#). Ultimately, the power of the marketplace will determine who remains listed.

4Frontiers Corporation	E' Prime Aerospace	Optech	Space Propulsion Systems
62 Mile Club	Ecliptic Enterprises Corporation	Orbital Commerce Project	Space Resources, Inc.
AeroAstro	Epsori Space Systems	Orbital Expeditions	Spaceport Systems
Alien Landscapes	eSpaceTickets.com	Orbital Outfitters	Space Settlement Institute
ARCASpace	Flometrics	Orbital Recovery	Space Studies Institute
Airlaunch LLC	Forever Bound	Orion Propulsion	The Spaceship Company
Andrews Space	Garvey Spacecraft	Paragon Space Development Corp.	Space Tourism Society
Armadillo Aerospace	GeoEye	PlanetSpace	Sprague Astronautics
Apogee Books	High Altitude Research	ProSpace	Tethers Unlimited
AstroVision	HMX Inc.	Rocket Lab Ltd.	TGV Rockets
Aurora Aerospace	Interorbital Systems	Rocketplane Ltd.	t/Space
Benson Space Company	Institute for Space Law and Policy	Scaled Composites	TransLunar Research
Beyond-Earth	IPX Entertainment	Space Access Society	TransOrbital
Bigelow Aerospace	JP Aerospace	Space Adventures	Universal Space Lines
Blue Origin	Kelly Space	Space Angels Network, LLC	Universal Space Network
Canadian Arrow	LiftPort Group	Space Channel	UP Aerospace
Caribbean Spaceport	Lunar Enterprise	SpaceCruiseNews	Virgin Galactic
Constellation Services International	Lunar Resources	SpaceDev	WonderWorks Inc.
Copenhagen Suborbitals	Lunar Transportation	SpaceX	XCOR Aerospace
Da Vinci Project	ManSat	Space Frontier Foundation	X Prize Foundation
DestinySpace	Masten Space Systems	SPACEHAB	X-Rocket, LLC
Enterprises	Microcosm, Inc.	Space Island Group	XtraOrdinaryAdventures
Difinity, Inc.	Odyssey Moon Limited	Spacepartnerships	Zero-G Corporation
Digital Globe			

HobbySpace Definition of NewSpace

- **Possess Some, Many, All Characteristics**
 - Low Cost Focus
 - Incremental Development
 - Operations Are Key
 - Small Teams
 - Humans in Space
 - Demand Elasticity
 - Consumer Markets
 - Innovation
 - Fixed-Price Only
- **Not Necessarily Low TRL Technology Development**
 - *KD addition, not from HobbySpace*

Tauri Group Definition of NewSpace

- ***“New Space includes companies that are likely to be flatter, flexible organizations that are consumer-focused, innovative, willing to take risks, and focused on new technology solutions.”***
 - *“Global Space Industry: Refining the Definition of New Space”, by Jason Hay, Paul Guthrie, Carie Mullins, Elaine Gresham, and Carrisa Christensen. Presented on 14 September at AIAA Space 2009, Pasadena, CA.*

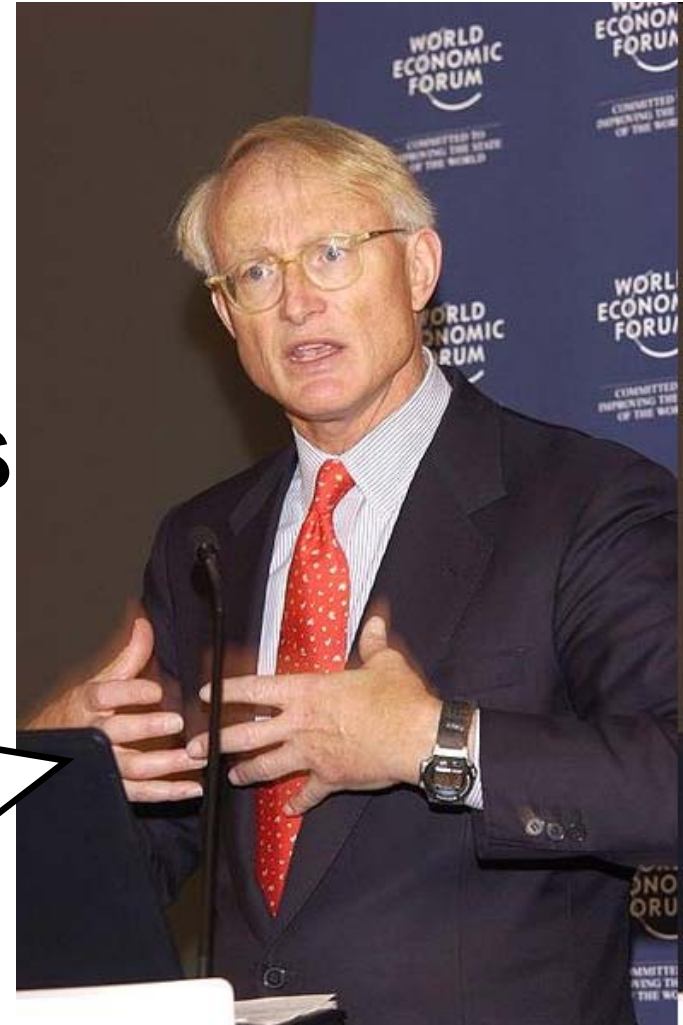
COMPETITIVE STRATEGY

Techniques for Analyzing Industries and Competitors

Michael E. Porter

Chapter 10. Competitive Strategy in Emerging Industries

That's Porter



Common Structural Characteristics

- **Technological Uncertainty**
- **Strategic Uncertainty**
- **High Initial Costs but Steep Cost Reduction**
- **Embryonic Companies and Spin-Offs**
- **First-Time Buyers**
- **Short Time Horizon**
- **Subsidy**

Early Mobility Barriers

- **Common Early Barriers**
 - Proprietary Technology
 - Access to Distribution Channels
 - Access to Raw Materials & Other Inputs of Appropriate Cost and Quality
 - Cost Advantages Due to Experience
 - Enhanced by Uncertainties
 - Risk (Raises Effective Capital Barriers)
- **Usually Not Capital, Economies of Scale, Brand ID**

EMs: Strategic Choices - Externalities

“The overriding problem for the industry is inducing substitution and attracting first-time buyers, and it is usually in the firm’s interest during this phase to help promote standardization, police substandard quality and fly-by-night producers, and present a consistent front to suppliers, customers, government, and the financial community. Industry conferences and associations can be a useful device, as can the avoidance of strategies that degrade competitors.”

Summary and Preview

- **Summary**

- “NewSpace” Companies Are Not New
- “NewSpace” is part of an
“Emerging Commercial Space Industry”

- **Preview**

- Next Up: “Emerging Commercial Space Company Profiles”
- Questions? Discussion?

Emerging Commercial Space Company Profiles

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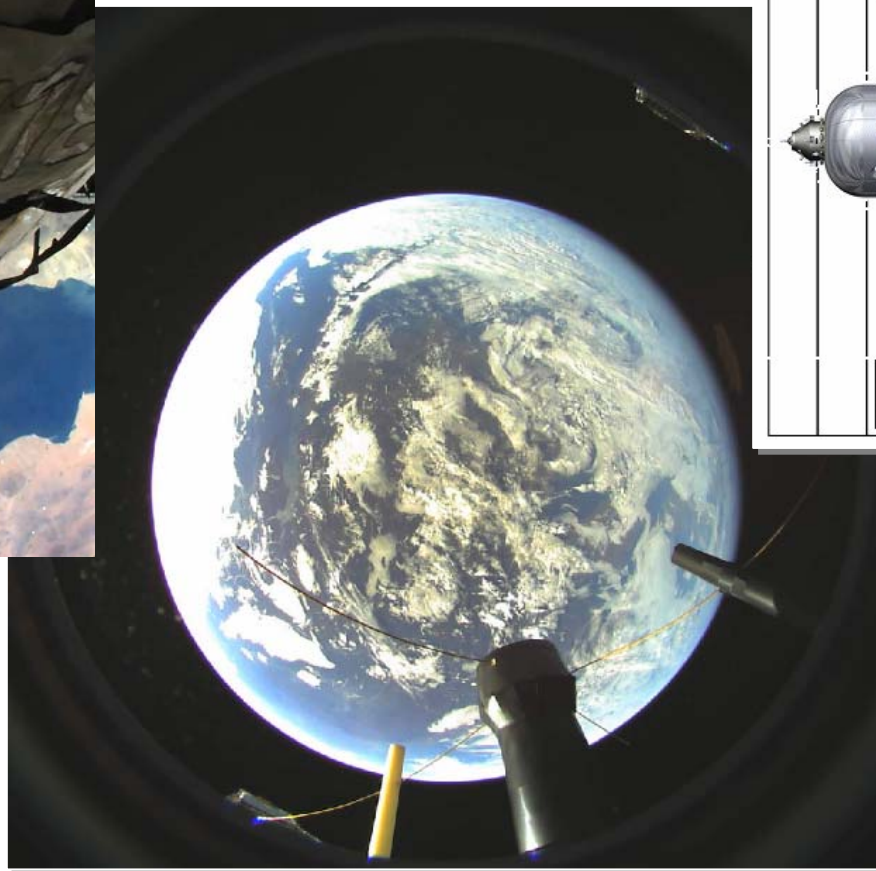
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Company Profiles: ZeroG



Company Profiles:



Company Profiles: **SPACEX**

SPACE EXPLORATION TECHNOLOGIES

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FALCON 1

SUCCESSFULLY DELIVERS
RAZAKSAT TO ORBIT

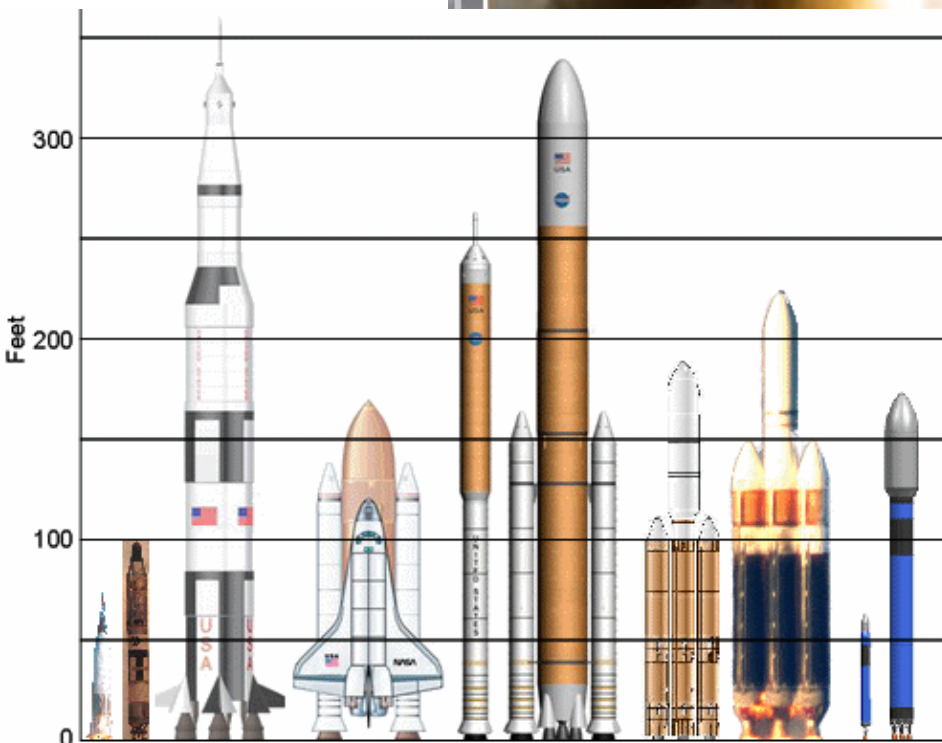
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FALCON



Company Profiles: Armadillo



ArmadoAerospace™

Company Profiles: Orbital Outfitters/Flagsuit

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"Have Space Suit – Will Travel." – Robert A. Heinlein

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New – [Orbital Outfitters Selected for NASA Space Suit Work](#)



Orbital
outfitters

The Mission
quality space s



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Conclusion

- **Summary**
 - Many Examples Of Viable Emerging Commercial Space Companies
- **Questions? Discussion?**

