AIAA Commercial Space Group

Ken Davidian
FAA Office of Commercial Space Transportation (AST-100)
Room 331
800 Independence Ave SW
Washington, DC 20591

January 6, 2010

Welcome Letter

Dear Industry Visit Member,

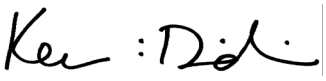
I would like to thank you for your interest in participating in the AIAA Commercial Space Group (CSG) Kennedy Space Center Industry Visit!

Our goal is to make today's activities as informative and interesting as possible. Your active participation will help us meet your needs and, therefore, maximize the benefits to you.

If there is any way that we can help make your experience better and more worthwhile, please don't hesitate to let us know.

Thank you, again, and we look forward to spending the day with you!

Sincerely,



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AIAA Commercial Space Group

AIAA is actively engaged in expanding its outreach to the commercial and entreprenurial space community.

The purpose of the AIAA Commercial Space Group (CSG) is to expose AIAA members and aerospace professionals to the different aspects, sectors, and people of commercial space, including (but not limited to):

- launch vehicles
- infrastructure
- telecommunications
- remote sensing
- ground stations
- PNT (position, navigation, and timing, aka GPS)
- other niche markets (e.g. small satellites, etc.)

The CSG is performing two primary functions: organizing activities, and discussing (and documenting) various topics of interest.

The first function includes activities such as conference sessions, meetings, site tours, communication tools, and sponsorship.

The second function, discussing various topics, involves developing informational papers on topics from multiple perspectives.

For more information, please contact Ken Davidian, or visit the AIAA CSG page on the Commercial Space Wiki on the web at the following URL: commercialspace.pbwiki.com/AIAA-Commercial-Space-Group.

AIAA Commercial Space Group

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Kennedy Space Center Industry Visit

Ken Davidian
EFP Program Lead
Office of Commercial Space Transportation
January 7, 2010

Federal Aviation Administration

Tour Schedule

07:00 Depart ASM Registration Desk Area
08:00 Screening at KSC Visitors Center
08:20 Tour of Space Life Sciences Lab (SLSL)
09:10 Tour of Atlas Spaceflight Operations Center
09:50 Tour of Atlas Vertical Integration Facility
10:00 Tour of Launch Complex 40 (SpaceX)
11:10 Tour of Orbiter Processing Facility Bay 1/3
12:30 Lunch at OSB II Building
13:30 Departure from KSC
14:30 Arrival at Orlando World Center Marriott

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

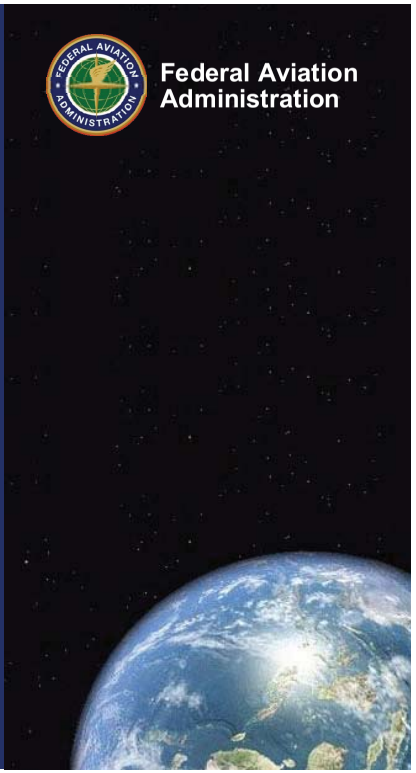
Who: Eleanor Aldrich

Eleanor Aldrich is currently a consultant for the American Institute of Aeronautics and Astronautics (AIAA). From 1988 until July 2005, Ms. Aldrich was the business development representative and director of the Technical Activities Division for AIAA. She is responsible for conception, planning, initiation, and management of the full range of products and services provided by the AIAA and for identifying industry direction and business opportunities in the U.S. commercial space launch industry and the aerospace industry as a whole. Mrs. Aldrich is also responsible for organizing, managing, and promoting over 26 national conferences each year that offer technical exchange between the aerospace and commercial launch industries, government, and academia, and receive active support from aerospace leaders worldwide. She also manages AIAA's 66 national technical committees, which provide aerospace technical expertise, innovative technological programs, and industry technical oversight.

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



Ken Davidian
EFP Program Lead
Office of Commercial Space Transportation
January 7, 2010

Agenda

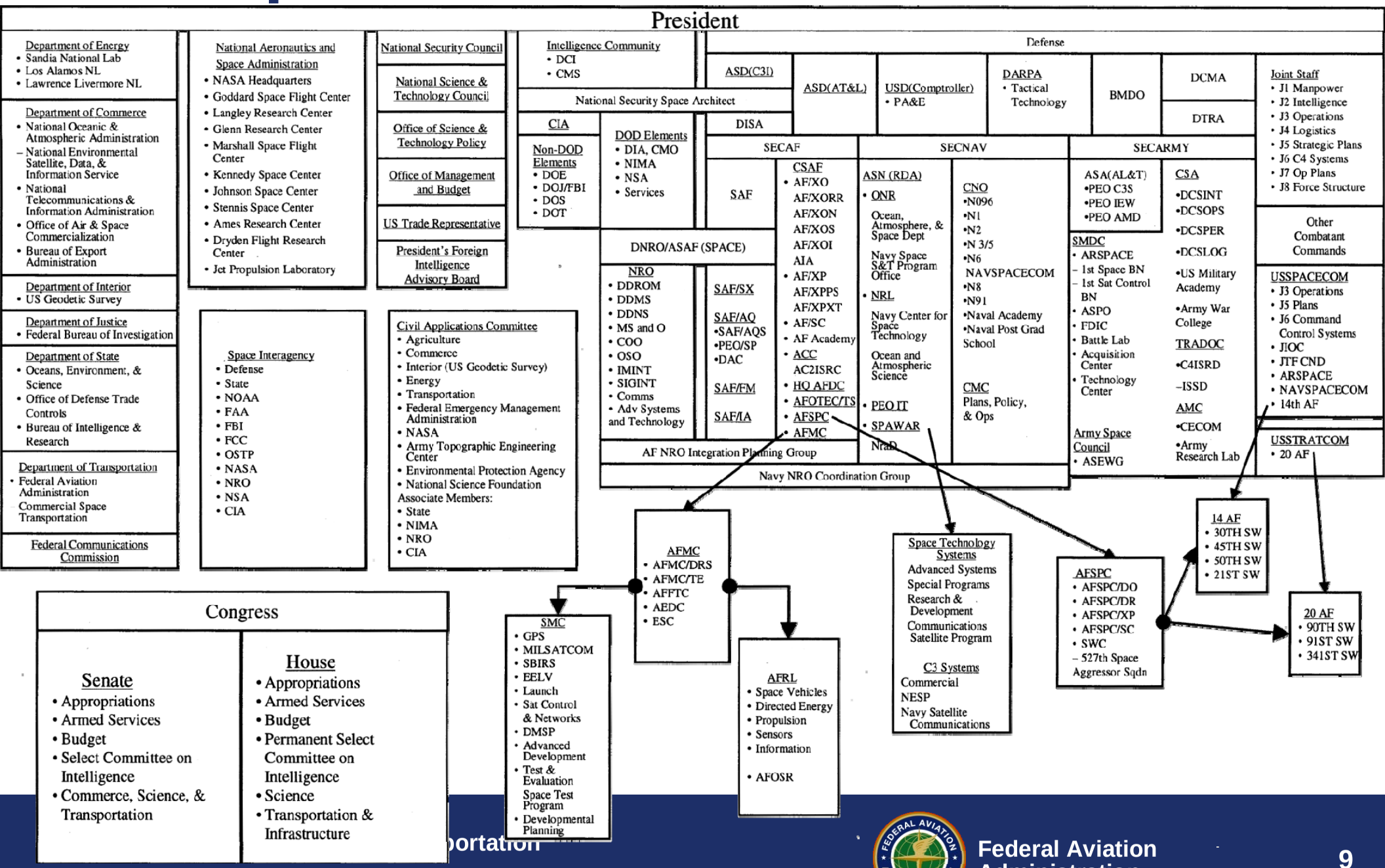
- **U.S. Space Policies**
- **The U.S. Space "Big Picture"**
- **Three Space Sectors**
- **Roles of Government Agencies**

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
Office of Commercial Space Transportation
January 7, 2010

Federal Aviation Administration

Agenda

- **Definitions of NewSpace**
  - Definition of Emerging Industries
- **Definitions of Commercial Space**
- **Definitions of Entrepreneur**

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.

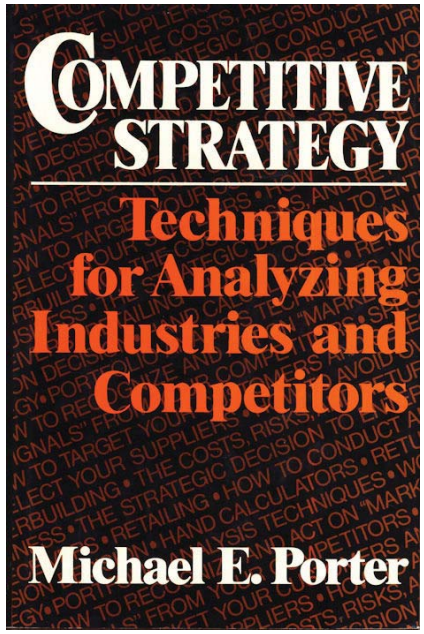
4Frontiers Corporation	E' Prime Aerospace	Optech	Space Propulsion Systems
62 Mile Club	Ecliptic Enterprises Corporation	Orbital Commerce Project	Space Resources, Inc.
AeroAstro	Epsori Space Systems	Orbital Expeditions	Spaceport Systems
Alien Landscapes	eSpaceTickets.com	Orbital Outfitters	Space Settlement 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.	tiSpace
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 Enterprises	Masten Space Systems	SPACEHAB	X-Rocket, LLC
Difinity, Inc.	Microcosm, Inc.	Space Island Group	XtraOrdinaryAdventures
Digital Globe	Odyssey Moon Limited	Spacepartnerships	Zero-G Corporation

HobbySpace Definition of NewSpace

- **Posess 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.



Homework: Read ***Chapter 10. Competitive Strategy in Emerging Industries***

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

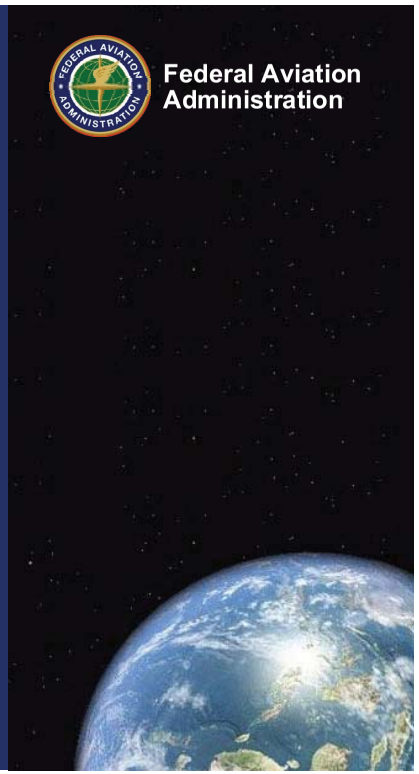
Early Mobility Barriers

- **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**."

Definitions of "Commercial Space"



Ken Davidian
EFP Program Lead
Office of Commercial Space Transportation
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What Is Commercial Space?

- **A NASA Lawyer's Definition**
  - Any commercial activity that is done by non-governmental organizations.
- **A NASA HQ Manager's Definition**
  - Those economies where the marketplace is dominated by private demand (e.g., comsats, gps...)."
    - A 'monopsony' is a market where demand is dominated by one customer — that's the flip side and clearly characterizes the current state of our space economy well.

What Is Commercial Space?

- **A Space Policy Commentator's Definition**
  - sell consumer products and services to individuals, companies, and governments.
  - The configuration and design of the cushions does not change because it is sat on by a senator or a salesman.
- **An Entrepreneur's Definition**
  - First, "commercial" initiatives are allowed to fail.
  - Also integral to this concept is the requirement of firm, fixed pricing.
  - Does not mean small and unproven.

U.S. Commercial Space Policy Guidelines

- **Aka NSPD-3, February 1991**
- **Commercial space sector activities are characterized by the provision of products and services such that:**
  - private capital is at risk;
  - there are existing, or potential, nongovernmental customers for the activity;
  - the commercial market ultimately determines the viability of the activity; and
  - primary responsibility and management initiative for the activity resides with the private sector.

Non-Commercial Activities

- **Inherently Governmental**
  - The government bears substantial risk through an explicit guarantee of third party financing;
  - All of the risk incident to ownership of the asset does not remain with the lessor (excepting circumstances in which the government is at fault);
  - The asset is designed for a special purpose of the government rather than for a general purpose;
  - No private market for the asset exists; and
  - The asset is constructed on government-owned land (more applicable to office buildings and housing projects than to the development of new space-launch systems).

FAR Subpart 2.1 - Definitions

- **"Commercial item" means (1) Any item, other than real property, that is of a type <u>customarily used by the general public or by non-governmental entities for purposes other than governmental purposes</u>, and—**
  - (i) Has been sold, leased, or licensed to the general public; or
  - (ii) Has been offered for sale, lease, or license to the general public;

Summary and Preview

- **"NewSpace" Companies**
  - Are Not "New"
  - Closely Resemble Emerging Markets
- **Commercial Space**
  - Transactions That Are Not "Inherently Governmental"
- **Questions? Discussion?**

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Feedback Form

Dear Industry Visit Member,

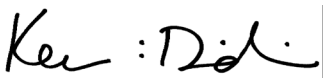
It is our goal is to make today's activities as informative and interesting as possible.

If you have any comments from which we could benefit, please don't hesitate to tell us.

To make it as easy as possible for you, we would be happy to accept this information in any one (or more) of the multiple ways described below.

Your input is appreciated and always welcome!

Sincerely,



Ken Davidian

Ways To Submit Your Feedback

1. Right Now! You can write your comments on the back of this piece of paper and hand it to me at any time.

2. By US Postal Service: Please send your written comments to the following address: Ken Davidian, FAA Office of Commercial Space Transportation, AST-100 Space Systems Development Division, Room 331, 800 Independence Ave SW, Washington DC 20591.

3. By Email: Please send your written comments to the following email address: ken.davidian@faa.gov.

4. By Fax: Please send your written comments to the following fax number: 202-267-5463.

5. By Phone: Please give me a call and speak with me directly at the following phone number: 202-267-7214. If I'm not there, you can leave your suggestions and ideas in my voicemail if you want. If not, I'll call you back as soon as I can.

6. In Person: This isn't the ideal way to provide information, just because I might forget it or I might not remember it correctly. Although written communication is preferred, if this is the way you'd prefer to provide the information, then I'll be happy to accommodate you as best I can.