

“Grounded”

1.) Consumer Influence / Life Style Considerations

- Fear of Travel & Large Congregations Drives Marketplace:
 - Production: regional production
 - Distribution: localized network
 - Service Industries
- Identification technology - personal security paramount
- Impacts
 - Electronic Access to Everything
 - Global Virtual Culture/Regional Physical Culture
 - Personal & Family Security Big Industry
- How does consumer utilize Global Transportation System
 - Leisure commercial travel down
 - Business travel only as necessary
 - No Hub System - Point to Point Service
 - Small Commercial Airliners - perhaps Tilt Rotor Craft
- Emphasis on Cargo Distribution and Time Delivery - more time critical
- Space
 - Communication Satellites will proliferate
 - Distributed communication
 - Low cost access to LEO
 - Remote sensing Satellites
 - Intelligence Satellites

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2.) Business Activities and Influences

- Distributed regional production
- Emphasis on distribution systems to end user
- Automation of Production
- Perishable goods produced locally
- Cargo Air transportation in growth phase
- Half-Life of a given style will be short (red sneakers)
- Agility in manufacturing
- Electronic/Virtual Service (Financial/Entertainment/Education/
- Education - many small schools directed to specific groups
- Specially designed cargo airplanes
- Technology for safety and security

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3.) Role of local, national, regional, and/or global governmental and regulatory authorities

- Share Security and Safety Technology Globally
- Control other Technology for National Competitiveness
- No Trade-Off of Safety for Security
- Conflicts of trade and safety considerations
- Aircraft noise - now more local, but not relaxed (Noise is more important than emissions)
- Increased Security Costs Passed onto Traveler
- Economic Regulations to Insure Minimal Route Structure
- Trend to privatization
- Private Airport Security Force complying with Federal Specifications

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4.) Global Civilian Aeronautics Products and Service Industry Operations

- Pull Production of Large Cargo Aircraft back to USA
- International Competition for Production of Small Aircraft
- Products Designed for this Environment (For our specific needs), i.e. specialized cargo airplanes
- Export products designed for their specific needs and environments
- More Private and Corporate Airlines
- Current Major Scheduled Airlines will be in Trouble, perhaps just operations (schedulers)
- Demand Scheduling will Prevail
- Free flight will be the air traffic control paradigm
- World Leaders in Avionics
 - Flight Control
 - Navigation
 - Communications

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5.) Military Security Environment, Impact of International or Domestic Terrorism, U.S. Role - Security / Military (Aeronautics components) Importance to Access to Space

- Small Policing Actions: i.e. infiltration
- Security of Military Facilities Critical
- Intelligence on Terrorist Operations
- Surveillance of potential Terrorist Operation
- Rapid Deployment Products
- Impact of Terrorism is a major driver
- U.S. Leader of World Security Organization, U.S. supplier of High Technology, specialized rapid deployment Aircraft, Unloader and Supply Handling
- No Expanded role for Strategic Bombers

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6.) System Level Needs

(=> & **BOLD** are robust elements)

- Specialized Cargo Aircraft
 - Dedicated Cargo Service
 - ⇒ **Time Critical Cargo**
 - ⇒ **Large Payload**
 - Dual Use - Civ/Mil
 - ⇒ **Fast Distribution System Interface**
 - Lower Survivability Hardening Requirements
- Special Operations Forces (SOF) Operations
 - ⇒ **Small, Fast, Stealthy, Long Range**
 - ⇒ **Short Unimproved Field Operations; VTOL/STOL**
- Survivable Aircraft Technology
 - ⇒ **Retrofit Market and New Designs**
 - ⇒ **Threat Detection, Mitigation**
 - ⇒ **Survivable Aircraft**
 - ⇒ **Threat Avoidance Operations**
 - ⇒ **EMI/Laser Aircraft Hardening**
 - ⇒ **Affordability of the Above Issues**

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- **Efficient, Lower Capacity Long Range Airplanes**

- ⇒ **High End Premium Service**

- Smaller Commercial Transports (50 - 200)
 - ⇒ **High Speed for Long Range Routes, Dual Use**
 - ⇒ **Low Noise**
 - ⇒ **High Volume/Lean Manufacturing**
 - ⇒ **Agile Customer Customization**
 - Advanced Business Jets (15-30)
 - Advanced General Aviation (Fixed Wing or Rotor Craft)
 - ⇒ **User Friendly Operations, “Like a Car”**
 - ⇒ **Adverse Weather Operations**
 - ⇒ **Low Cost**
 - Recovery Systems
 - ⇒ **Reliable Propulsion systems**
 - ⇒ **Low Noise**
 - ⇒ **Training @ Home**

- **Low Cost LEO Launch Capabilities**

- ⇒ **Establish/Maintain Many Communication Satellites**
 - ⇒ **Rapid Response**
 - < 1000 lbs. payloads
 - ⇒ **Not Man Rated**
 - ⇒ **Order of Magnitude Cost Reduction**
 - Smaller Requirement for Intelligence/Recon
 - ⇒ **Lower weight Satellites**

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- Distributed Airspace System
 - ⇒ **Support Point to Point Operations**
 - ⇒ **Geographically distributed populations**
 - Avoid risk of terrorist targets
 - Automated Distributed Decision Making (including Air Traffic Management)
 - ⇒ **User Friendly**
 - ⇒ **Secure/Reliable Computing, Data Link**
 - ⇒ **Decision Aids, Situation Awareness**
- Security System, More Convenient and Affordable
 - Opportunity:
 - Airport Security: Perimeter, Personnel/Passengers, Cargo/Baggage
 - ⇒ **Intelligence: Personal Profile**

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7.)

- New Energy Source (Energy Rich)
 - Low Cost
 - Less Poluting
- New Propulsion Concept
 - High Performance Batteries
 - Gravity System
 - Extremely Low Friction Technology
- Identification of High Risk Potential Terrorist
- Detection of Dangerous Bio-Agents
- Improve Individual Freedom Without Reduction in Security

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8.)

Opportunity Technology	Cargo	Long Range, Small Transports	General Aviation	Survivable Technology	Low Cost LEO	Distributed Airspace	Security	SOF Transports	Modeling & Simulation
Manufacturing Technology	Large Scale Structures	Advance Composite Structures	Advance Composite Structures, Low Cost	Electronic System	Advanced Composites		Sensors	Rapid Proto-type	Process Modeling
Communication Security			Internet			Secure, Reliable Data Link	Secure		
Propulsion Technology	Large, Efficient Subsonic	Advanced Sub/Supersonic	Low Cost, very reliable Engine, Health Monitoring		High Specific Impulse			Low Signature, Powered Lift	Physics Modeling
Structures and Materials	Efficient Structures Types, Health Monitoring	Light Weight, Low Cost, High Temp. , Health Monitoring	Light Weight, Health Monitoring	Survivable, Health Monitoring	Light Weight			RAM/RAS, Health Monitoring	Physics Modeling
Aerodynamics Technology	Advanced Concepts	Advanced Concepts		High Lift	High Mach			High Lift and Powerd Lift	Physics Modeling
Guidance and Control	Reconfigurable	Reconfigurable	Semi-Antonymous, Reconfigurable		Auto			Passive, Reconfigurabl, Accurate Digital Maps	Physics Modeling
Automation and Human Factors		Advanced Flight Deck	Advanced Flight Deck, (Decision Aids)			Decision Aids			Physics Modeling
Air Traffic Technology						Decision Aids			Human Modeling
Noise Control		Jet Noise Suppresion	Community Noise Suppresion						Phys /Process Modeling & RT Simulation
Sensor Technology			Collision Avoidance	Low Cost, Reliable			High Performance		
Information Technology			Distributed Training (Network Ed)			Reliable Maintainable Software	Intelligence		Physics Modeling

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ELEMENTS ADDED: (to system level needs for Grounded)

- Health Monitoring, fault tolerant, reconfigurable controls
- Distributed Training (Networked -Gnet- to users)
- Modelling & Simulation
 - Real Time Simulation
 - Physics-based models
 - Process models
 - Human modeling