

Mid-Atlantic Regional Spaceport (MARS) Implementation Plan

**Report of:
Joint
Maryland and Virginia
Working Group
on
Regional Spaceport
Implementation**

April 15, 2004



By Appointment:

Executive Summary

In July 2003, Governors Ehrlich and Warner signed a Memorandum of Agreement (MOA) that directed the Secretary of Commerce and Trade of Virginia and the Secretary of Business and Economic Development of Maryland to form a working group to develop a concept and implementation plan for joint governance, operation and administration of the commercial Spaceport at Wallops Island. The Spaceport, currently known as the Virginia Space Flight Center, has been developed, with a combination of federal, state and private sector funding, by the Virginia Commercial Space Flight Authority (VCSFA).

The MOA required the joint working group to submit a report of its findings and recommendations. Following extensive discussion and investigation by each of the states' working groups, a joint meeting was held on March 26, 2004 at the University of Maryland, College Park. This report details the results of the investigations and agreements reached by the working group, and is respectfully submitted to the Governors in response to that requirement.

The predominant issues addressed by the group related to the near-term business opportunities for the Spaceport, the benefits to both states to be derived from a joint endeavor, and the requirement and mechanism to transition to joint governance. The consensus of the group was that there is substantial benefit to be derived, in terms of legislative advantage, joint use of complementary resources and additional marketing power to make it a truly win-win situation. Each state will derive significantly enhanced economic development and educational opportunities as a result.

The group also reached agreement on the initial steps to be taken in implementation of the joint entity. The following actions, pending ratification by the Governors, are to be undertaken as soon as is practicable.

- Maryland will provide \$150,000 for FY05. For future periods Maryland will consider up to \$150,000 annually for an additional four year period. It is anticipated that after the fifth year the Center will be able to generate sufficient funds for its operating expenses.
- VCSFA will establish a Standing Spaceport Committee, with equal representation by Virginia and Maryland members, to make recommendations regarding the future organization and activities of the Spaceport.
- The Spaceport will be officially renamed to be the Mid-Atlantic Regional Spaceport (MARS).
- The Mid-Atlantic Institute for Space and Technology (MIST), an endeavor initiated in Maryland to promote education and technology development in disciplines that complement the MARS mission, will be adopted as an initiative of MARS and authorized to use that relationship to achieve its stated objectives.

It is the recommendation of the working group that the Governors ratify this report and the actions described herein, and direct the respective Secretaries to proceed with implementation.

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2.0 Purpose:

The purpose of this working group is to develop a concept for the establishment of a “Joint Authority” or other organizational structure for the joint governance, operation and administration of the commercial Spaceport at Wallops Island, Virginia, and to recommend the next steps to be taken in its implementation. The Spaceport was developed and is currently operated by the Virginia Commercial Space Flight Authority (VCSFA). This document encompasses the findings and recommendations of the working group to the Governors of Maryland and Virginia.

3.0 Merit:

MARS provides the following unique combination of advantages to federal government, domestic commercial and international launch customers:

- Unique orbital access afforded by a mid-latitude launch site
- Available capacity to responsively meet launch needs and absorb new business
- A Federal license to conduct commercial space launches
- A formal partnership with NASA that permits and enables use of the Wallops Flight Facility and its personnel
- User-friendly local, state, regional and federal synergistic infrastructure
- Range safety afforded by immediate coastal proximity to the over-water Atlantic range airspace complex
- Access to mid-Atlantic and national-capital area, federal and commercial technology organizations
- Available host facilities and industrial parks to host business growth
- Available local workforce
- Business friendly state government institutions willing to support development and expansion of technology firms
- A tradition of creativity and an open exchange of knowledge consistent with security needs.

4.0 Background

4.1 Significant Milestones

- Virginia Commercial Space Flight Authority Established - July 1, 1995
- Virginia Space Flight Center Concept Approved - September 18, 1995
- VCSFA Signs Enabling Space Act Agreement with NASA - March 4, 1997
- National Environmental Protection Act (NEPA) and State Environmental Clearances Granted - November 10, 1997
- U.S. Army Corps of Engineers Construction Permit Issued - October 6, 1997

- Federal Aviation Administration Associate Administrator for Space Transportation (FAA/AST) Issues Launch Site Operators License - December 19, 1997
- Pad 0-B Construction Completed - December 15, 1998
- Governors of Maryland and Virginia sign Memorandum of Agreement - July 2003

4.2 Investment

Virginia Infrastructure Funding – July 1, 1995	\$375,000
Virginia CIT Capital Project Funding – July 1, 1996	\$525,000
VCSFA wins Federal EDA Construction Grant – October 22, 1996	\$900,000
VCSFA wins NASA Infrastructure Grant – January 27, 1997	\$406,000
DynSpace Investment in Operations – 1999 to Present	\$1,500,000
VCSFA reinvests in new launch tower for Pad 0-B – August 18, 2003	\$1,200,000
VCSFA Operating budget 1995 – Present	<u>\$3,100,000</u>
Total	\$8,006,000

The first infrastructure improvement at the Space Flight Center was the construction of the new launch pad, Pad 0-B, which supports launch of the Castor 120™ based family of launch vehicles, the MinuteMan II vehicle, other solid fueled vehicles, as well as liquid fueled vehicles under development.

These completed improvements include orbital launch capability for small to mid-sized launch vehicles, with full command, control, and communication connectivity to the launch range as well as all other pad support services.

4.3 Virginia Commercial Space Flight Authority

The Federally licensed commercial Spaceport at Wallops (currently known as the Virginia Space Flight Center (VSFC)) was created to provide low cost, responsive, safe and reliable space access as well as stimulate economic development and education on the Eastern Shore. While there have been significant accomplishments, a shortfall in the predicted demand for commercial orbital access has delayed fulfillment of the economic development objectives. Today, the federal government is beginning to make investments in programs that will stimulate the commercial market through the creation of lower cost, higher reliability launch systems for small to medium sized payloads, a niche market for which the spaceport is ideally suited.

The Spaceport supports these programs and promotes the capabilities of Wallops to play a significant role in the development and delivery of rapid response low cost space access services for small to medium sized payloads. For example, the development of a low-cost space launch vehicle capable of delivering small to medium sized payloads to low earth orbit for the United States Air Force as part of the Force Application and Launch from CONUS (FALCON) Program is being developed at Wallops. The system developed under this program will also provide cost effective access to space for underserved scientific, commercial and R&D applications.

As the supply of low-cost space access opportunities manifests itself, it will stimulate demand for more unique space-based applications. It is the objective of the Spaceport to not only be a catalyst for this development, but to capture a significant share of the collateral business and activity.

Due to its location, the economic impact of the Spaceport is evident throughout the mid-Atlantic Region, but most directly on the Eastern Shore of Virginia and Maryland. The two states executed a Memorandum of Understanding (MOU) to initiate and define roles for a jointly governed entity. Joint participation in further development and operation of the Spaceport will stimulate underdeveloped capabilities, assets and opportunities in Government, commerce and academia.

4.4 Enabling Documentation and Agreements

The Virginia Commercial Space Flight Authority offers many assets that benefit the Spaceport at Wallops, including a number of significant enabling documents, licenses and agreements. First, the Virginia Space Flight Center is one of four FAA Licensed spaceports in the United States. The Virginia Commercial Space Flight Authority renewed its launch site operator's license on December 18, 2002; VCSFA/VSFC License No. LSO 02-007. As such the VCSFA/VSFC is authorized to operate Launch Complex 0-A and 0-B at NASA Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, VA. Issued under 49 U.S.C. §§70101-70121, and the Commercial Space Transportation Licensing Regulations, 14 C.F.R. Ch III, the current license expires on December 18, 2007.

4.5 Reimbursable Space Act Agreement

The Commercial Space Launch Act requires government agencies to support commercial space entities, with excess capacity of services, to the extent that the support does not interfere with federal government activities. In March of 1997, a Reimbursable Space Act Agreement established a formal relationship between NASA and VCSFA. Subsequently, sub agreements were finalized which define the working relationships and responsibilities of the parties. In addition, the sub agreements allowed VCSFA to access NASA services and construct necessary infrastructure on government property.

4.6 Virginia Space Flight Center

VSFC is, and has been the primary initiative of VCSFA. Its objective is to provide low cost, responsive, safe and reliable space access to commercial, Government and academic users.

VSFC is a FAA licensed full service Spaceport located at the NASA Wallops Flight Facility on the U. S. mid-Atlantic coast. The Spaceport provides low cost access to mid-inclination and sun synchronous orbits for: small-to-medium class Expendable Launch Vehicles (ELVs) carrying payloads up 10,000 pounds; sub-orbital launchers; RLV launch and landing; and recovery support for ballistic and guided re-entry vehicles.

VSFC and DynSpace, the spaceport operations contractor and equity partner, offer two FAA-licensed, commercial-use launch pads, sub-orbital launch rails, vehicle/payload storage and processing facilities, co-located airport, flexible mission support, and an accommodating schedule to commercial, military, scientific, and experimental launch customers. Since 1995, 34 orbital satellite payloads have been launched from the VSFC.

4.7 Foreign Trade Zone

The Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, VA is authorized to operate under the provisions of Foreign Trade Zone Board Order Number 1113 as part of the Virginia Port Authority FTZ Number 20.

4.8 Public/Public Partnership

NASA and the Commonwealth of Virginia, through the Reimbursable Space Act Agreement, offer combined resources to enable a wide variety of space access opportunities to commercial, Government and scientific/academic users.

4.9 Public/Private Partnership

DynSpace is a wholly owned subsidiary of Computer Sciences Corporation, a 90,000 employee, \$15 billion corporation. VCSFA and DynSpace entered into a formal partnership in 1999, through creation of Flight Center One, LLC (FCO). FCO is

a "manager-member" limited liability corporation that conducts commercial space launch business activities of the VSFC. VCSFA is identified as the Manager of FCO, and DynSpace is a Member. This arrangement allows VCSFA to retain its authority over its legal obligations to NASA, FAA and the Commonwealth of Virginia. It consummates the role of DynSpace as the private sector investor and operator of the facility. Through an associated management contract, DynSpace provides operations and marketing resources and private sector jobs.

5.0 Mission

Develop and operate a multi user spaceport at the NASA Wallops Flight Facility which provides low cost, safe, reliable, "schedule friendly" space access to commercial, government, and academic users.

5.1 Vision

**To be the premier Commercial Spaceport for rapid response
low-cost access to Space**

6.0 Transition to Joint Governance

6.1 Background Summary

The Memorandum of Agreement (MOA) signed by the Governors of Maryland and Virginia engaged the two states in a process to explore joint governance of the Spaceport.

The Virginia Commercial Space Flight Authority (VCSFA) is a legal entity that can:

- Enter into contracts
- Own real property
- Sue and be sued

The Virginia Space Flight Center (the Spaceport) is an initiative of the VCSFA VSFC is not a legal entity and therefore, cannot:

- Enter into contracts
- Own real property
- Sue and be sued

Virginia requested Maryland's involvement in the Spaceport to:

- Help support the Spaceport initiative
- Share in the economic benefit
- Enhance the political strength of the spaceport
- Strengthen the region's efforts to attract and capture appropriate aerospace jobs and opportunities.

Virginia achieved numerous milestones in the development of the Spaceport and made significant investment in operations and real property improvement. As a sign of commitment to the success of Spaceport and its economic benefit to the region, Virginia requested Maryland provide funds to support operations at the Spaceport, both long term and during the transition period.

The immediate advantages to the Spaceport as a result of Maryland's participation include:

- Salary Support
- Political Support
 - Support of two States and two Governors
 - Establishment of an influential Federal Caucus

- Establishment of a regional approach to marketing, promotion and development of rapid response, low cost access to space for small to medium sized payloads related industry and applications.
- Technical education and training support for local workforce development.

The advantages to Maryland include:

- Direct access to business development opportunities
- Direct assistance to institutes of higher education
- Direct insight to Wallops and Spaceport developments
- Economic stimulus for professional, technical and service labor force

6.2 Implementation

The Memorandum of Agreement (MOA) signed by the Governors of Maryland and Virginia engaged the two states in a process to explore joint governance of the Spaceport. The Working Group has agreed to the following provisions as a first phase of implementation.

6.2.1 Spaceport Elements

The following is a list of assets that are included as elements of the jointly operated Spaceport:

- Infrastructure owned by VCSFA, for purposes consistent with the goals and legal requirements of the Spaceport;
- Privileges and responsibilities embodied in all contracts, agreements and licenses currently held by VCSFA that may be used to develop future business opportunities or augment existing business throughout the region;
- Intellectual property, including trademarks, technical data, marketing and business development data, registered websites, copyrighted materials and other data

6.2.2 Oversight and Governance

Joint Governance of the Spaceport will continue to be provided by the Virginia Commercial Space Flight Authority (VCSFA) Board of Directors. Under a Phase I implementation, representation and governance shall be revised as follows:

- Two seats on the VCSFA Board of Directors will be offered to Maryland. Maryland will assign the seats through the Secretary, Department of Business and

- Economic Development to the Governor of Maryland for forwarding to the Governor of Virginia...
- Following addition of the Maryland representation to the VCSFA Board of Directors, the Board shall create a Spaceport Standing Committee. This Committee will have equal representation by Maryland and Virginia Board members and be chartered to investigate and make recommendations to the VCSFA Board of Directors regarding future Spaceport organization and activities.
 - The Spaceport standing committee shall also recommend a process by which fiscal performance of the Spaceport shall be reported to the VCSFA Board of Directors.

6.2.3 Cost Sharing

- Maryland will contribute \$150,000 to support the overall operations of the Spaceport. Funding of the support will be subject to satisfactory terms and conditions acceptable to the Maryland Department of Business and Economic Development (DBED).

6.2.4 Underlying Agreements and Understandings

- The parties agree to ratify changes to the official name of the “Spaceport” to the Mid-Atlantic Regional Spaceport (MARS).
- All contracts, agreements and licenses existing at the time of execution of this agreement shall be retained in the name of VCSFA
- The operating and management agreements between VCSFA and CSC-DynSpace shall remain intact and in force.
- The parties agree that they shall jointly and collaboratively develop and promote Spaceport business and educational activities.
- All revenues that would have accrued to VCSFA had this agreement not been executed, shall continue to accrue to VCSFA, until further definitive agreements are entered into by the parties.
- The parties agree that all future intellectual property developed jointly under the auspices of the Spaceport shall be available for use by either or both parties to further the objectives of the Spaceport.
- The parties agree that neither shall establish any state-supported entity that implies affiliation with, or utilizes any of the agreements, licenses or contracts of the Spaceport, without authorization of the VCSFA Board of Directors.
- The parties agree that this agreement does not limit or restrict, in any way, the conduct of other economic development activities in the respective states.

7.0 Summary of Benefits of Prior Virginia Activity

- Revitalization of the Wallops Flight Facility, the largest high-tech employer on the economically depressed Eastern Shore. In 1995 there was serious consideration by NASA to close the facility (thereby eliminating 1,200 jobs and \$135 million annual funding flow to the region). VCSFA interceded on behalf of the facility and played a major role in its salvation and restoration of jobs from a low of 800 to a current level of 1,450.
- Leverage of Virginia's \$900K investment with \$1.3M of federal grants and billions of dollars in existing launch range infrastructure to create commercial orbital launch capability.
- International recognition for Virginia as a legitimate player in the orbital launch marketplace.
- Working relationships (executed MOU/MOA) with existing and emerging entrepreneurial launch companies that will bring launch business (and private investment in additional facilities and jobs) to the region as the market recovers.
- Opportunities for the region to compete for other aerospace-related business opportunities (e.g. large jet engine maintenance/test, regional transport basing) at Wallops.
- Establishment of unique agreements with NASA that allow VCSFA to occupy, make and own improvements on Federal property, make NASA/NASA contractor facilities and expertise available to launch range users on a per use charge basis, and work in partnership on NASA-funded design and development of infrastructure that enhances the competitive position of Wallops and the region.
- Award, by FAA, of one of only four U.S. land-based Launch Site Operator's Licenses required to host commercial space launch activities.
- Establishment of a legal partnership with a private company (DynSpace a CSC Company) that enables investment of "at-risk" private capital to leverage state/federal funding of infrastructure.
- Awarded IDIQ contract from U.S.A.F. (\$6M ceiling) to launch Air Force scientific payloads.
- Establishment of Virginia Space Flight Academy, offering week-long residential and weekend "space camps" to middle school aged children. VSFA has grown in three years from a one-camp, 18 student pilot program to a six-camp, 168 student program with additional weekend sessions.
- Worked with Federal legislators to secure a \$10M FY02 directed appropriation from NASA for technology development and infrastructure enhancement at Wallops/VSFC. These funds have filtered into the local economy over the past two years, and have in part flowed through VCSFA
- Establishment of formal relationships with major research universities and community colleges to develop research proposals and educational/workforce development plans.
- Established a program plan with NASA to facilitate launch of small science payloads for which there is inadequate funding for commercial launches.

- Developed significant industry partnerships to pursue Federal Development contracts aimed at bringing industry and business to the region and benefiting existing Maryland and Virginia companies and institutions.

7.1 Regional Impact

The Mid-Atlantic Regional Spaceport (MARS) builds upon existing state and federal infrastructure to attract new capabilities and opportunities to Wallops Flight Facility.

Wallops Flight Facility is the oldest, most prolific launch site in the world in continuous operation. With over 15,000 launches, Wallops has a tremendous heritage with much to offer a space-fairing nation. MARS compliments and builds upon the Wallops capabilities providing orbital launch capabilities and diligence to develop a rapid response, low cost method to access space.

MARS will create an image of the Maryland/Virginia Eastern Shore region as the world leader in rapid response, low cost access to space for small to medium sized payloads.

7.2 National Role and Objectives

Rapid response, low cost access to space is a national strategic and economic objective. As other nations continue to develop their space lift capabilities, it is essential that the United States utilize space-based assets to protect and maintain strategic space based capabilities.

The United States needs to regain lost market share in the commercial space lift business and the ability to conduct micro gravity research and manufacturing in low earth orbit. The United States is no longer number one in commercial space. World wide the number of commercial launches has exceeded and continues to rival the number of launches conducted for government purposes.

The MARS initiative will serve to rectify this imbalance and develop new jobs that can not be exported.

7.3 Regional Universities

Our regional institutes of higher education provide essential infrastructure and support necessary to provide workforce training, continued education for professionals, and the research development necessary to advance the objectives and capabilities of MARS.

University Maryland College Park
University Maryland Eastern Shore
Salisbury University
Old Dominion University

7.4 Competitive Advantages

The recently renewed “Reimbursable Space Act Agreement” between VCSFA and NASA provides the authority to permit MARS to use existing facilities and services at WFF, and for the development of new launch facilities on NASA property at WFF. The Agreement will remain in effect for five-year intervals, with five renewal options, for a total period of 30 years. The Authority entered its second five-year interval with the 2002 renewal of its agreement with NASA.

The facilities available to MARS under the Agreements include: processing facilities; the Range Control Center; various fixed and mobile tracking and command and control facilities; airport; machine shops; and support equipment, among others. The assistance and services provided under the Agreement include: safety, radar and optical tracking equipment; telemetry; communications equipment; utility services; weather services; resource management; health services; security; mail; fire protection; custodial services; materials handling; purchasing and property maintenance, among others. Services are offered on a cost-reimbursable basis, thereby eliminating the need for heavy investment in the development of duplicate infrastructure and services. The ability to leverage the existing facilities and services at Wallops provides MARS with a significant cost advantage.

In addition, compared to other national launch ranges, Wallops offers facility capacity and relatively unencumbered range schedule. Coupled with a comparable low cost of operations, MARS is ideally positioned to develop and support low cost rapid response space lift operations.

7.4.1 Teaming and Proposal Management Summary

1. Alternative Access to Station (AAS) Logistics Re-supply Service Concept – MSFC funded study to define the concept for ISS Re-supply. VCSFA is on two teams (Orbital and Microcosm) selected for award to provide technical expertise related to spaceport infrastructure requirements in response to proposed system concept (Task Ordering Agreement subcontractor).
2. Space Launch Initiative, Crew Escape and Survival System Development – Phase II procurement request from MSFC. VCSFA teamed with Northrop Grumman/Orbital to provide launch pad infrastructure for test and development of prototype systems (Anticipate Task Ordering Agreement subcontract).
3. Support NASA WFF in Construction of Dual-use Payload Processing Building – NASA funded from WFF FY02 Special Appropriation. Provide technical expertise for the design and construction of a 10,000 ft² dual-use, payload processing building to support future government and commercial programs and business (NASA/VCSFA Cooperative Agreement).
4. Support NASA WFF in Development of a Liquid Fueling Capability – NASA funded from WFF FY02 Special Appropriation. Provide technical expertise for the design

- and construction of a launch vehicle liquid fueling system to support small to mid size vehicles (NASA/VCSFA Cooperative Agreement).
5. Develop a Small Launch Capability to Support MSFC Space Products Development Program Clients – New business development activity to foster the development of a low cost, small launch vehicle and payload delivery/return system for micro-gravity research payloads.
 6. Pursue Launch Services Contracts to Support USAF Programs – Advocate for funding of USAF RSLP programs leading to the procurement and award of launch services contracts to the VSFC.
 7. Advocate for Directed SLI/AAS Test and Development Language – Worked with industry to secure directive language in the FY03 NASA Appropriations Bill to conduct rocket powered, vertical launch vehicle testing for SLI/AAS programs at the VSFC.
 8. Expand Advocacy to the NASA Langley Research Center – LaRC is a valuable resource in the Commonwealth that supports its aeronautical and space systems expertise. They are major participants in SLI technology development that support Authority initiatives. Facilitate and participate in aerospace technology development and demonstration.
 9. Maintenance of Regional “Brand Recognition” in Aerospace – Virginia and the Authority are an internationally recognized name in aerospace and access to space as a result of VCSFA initiatives and accomplishments. Virginia holds seats on several national aerospace advisory and policymaking boards and in renowned aerospace organizations. Work to maintain and expand the regions “aerospace branding” and embrace Maryland as a partner.
 10. Support of Emerging Launch Companies – Act as proponent for proposed low-cost space access systems that, due to current market conditions and lack of Federal support, are unable to fully finance system development. Any of these companies that become successful in entering the market will bring significant economic activity to Virginia.
 11. Seek Revenue Producing Launch Contracts – Continue marketing efforts to secure contracts as launch opportunities emerge, by maintaining interfaces with payload developers, launch operators, government agencies, the science community and Federal/State legislators.
 12. Seek and Pursue Related Aerospace Business Opportunities – Develop business opportunities that fit the capabilities of Wallops/MARS. Development and operation of Unmanned Aerial Vehicles (UAV) for remote sensing, law enforcement, and aircraft related maintenance and modification and homeland security applications are currently under investigation.

13. NASA Wallops Range Infrastructure and Technology Upgrades – NASA funded from WFF FY02 Special Appropriation. In cooperation with NASA, VCSFA will provide technical expertise and upgrade needs assessment for those improvements that will assure the capability of the flight safety systems to provide support for orbital launches into the next decade.
14. “Commercialization” of NASA Facilities and Functions – As NASA seeks to reduce the amount of secure facilities at Wallops, several buildings/activities may be moved “outside the gate.” VCSFA (as a governmental, not-for-profit entity) can support the transition and act as operator of these facilities for commercial and government “dual-use.” In cooperation with NASA, VCSFA will seek to shift functions that are currently, but do not necessarily have to be performed by Government employees, to the private sector.
15. Development of Management Software Tools – VCSFA has and is developing management tools that provide efficient interface between NASA and external range users that have relevance as a part of a NASA initiative to develop an integrated MIS. VCSFA will pursue NASA funding to support MIS module development and integration.
16. Further Development of AAS/SLI/Commercial Space Access Infrastructure – It is anticipated that additional funding will be made available from NASA MSFC to continue the launch range upgrades. VCSFA will provide additional support to ongoing development under the NASA/VCSFA Cooperative Agreement

8.0 Mid-Atlantic Institute for Space and Technology (MIST)

MIST is an entity established to create and enhance opportunities in higher education and develop and deploy technology and products that enable rapid, low-cost access to space. MIST is adopted as an initiative of MARS and authorized to use that relationship to achieve its stated objectives.



8.1 MIST Vision

“To be the National center of excellence for rapid, low-cost space access, research and education.”

8.2 MIST Mission

As a technology and educational institute MIST is committed to education and technology development to incubate and advance spaceport operations, small satellite manufacturing and capabilities, micro-gravity biotechnology and material science research, and related system and discipline technologies.

8.3 Background

The formation of the **Mid-Atlantic Regional Spaceport (MARS)**, current Federal Government Small Launch Vehicle (SLV) development programs, and broad recognition of the roles and benefits of small satellites is bringing new companies, institutions and opportunities to the development of MARS, the Spaceport at Wallops Flight Facility. Couple these industry needs with the inherent geographic, operational, and cost advantages of conducting demonstration, development and launch programs from MARS and it is clear that our region is on the threshold of a significant window of opportunity. With the establishment of **the Mid-Atlantic Institute for Space and Technology (MIST)**, this region stands ready to take full advantage of the opportunities the MARS provides.

The establishment of **MIST** is an important next step for our region and the advancement of small, low cost rapid response spacecraft, spacecraft systems, ground operations, and low earth orbit micro-gravity research.

MIST's unique value is that it will combine education and industry in leading edge, technical, real-world experience. **MIST** will rely on its industry contacts for timely product development and delivery while providing educational opportunities through a variety of means: student internships, basic research opportunities and hands-on laboratory experience where students are working with actual instruments, sensors and platforms to internships in fabrication, integration and testing.

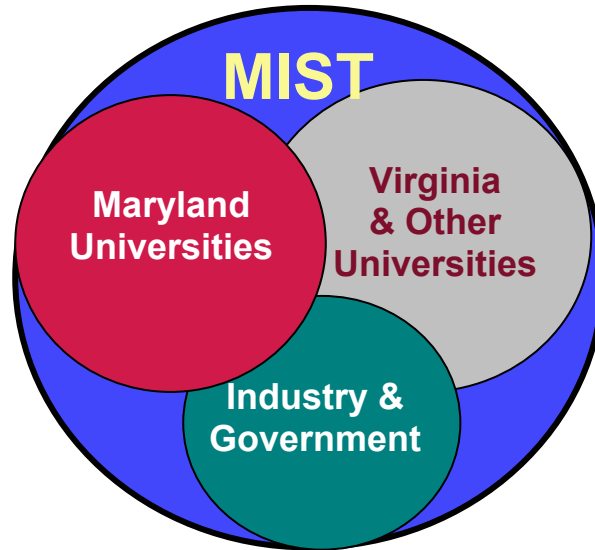
Committed to higher education, **MIST** will provide engineering, technology, and system development for small to medium sized payloads and orbital launch vehicles. **MIST** developments will lead to advanced, standardized, low cost payload systems and spaceport operations for utilization by NASA educational and science missions, commercial and academic research, and rapid response access to space for DoD and other government agencies. All **MIST** programs and projects will contribute to the development of practicum, curriculum, and/or internship experiences for students of its member Universities.

8.4 Transition of LEO Micro-Gravity Experimentation

As NASA proceeds forward with its new Moon-Mars mandate, **MIST** developments will ensure, sustain and enable US capacity to conduct LEO μ -gravity experimentation, and observational science by enabling a transition from NASA support to other public and private sector support through **MARS/MIST**.

8.5 MIST Structure/Organization

The **Mid-Atlantic Institute for Space and Technology** is expected to be formed as a non-profit entity.



MIST Board of Directors will possibly include representatives from:

- a. University of Maryland Eastern Shore
- b. Salisbury University
- c. University of Maryland College Park
- d. Old Dominion University (reserved)
- e. Local government
- f. Industrial-based business
- g. Mid-Atlantic Regional Space Port

Technical Advisory Committee serves as the Advisory Committee to the **MIST** Board of Directors. Members serve by invitation only. Government and corporate entities will be invited and are expected to participate on the Technical Advisory Committee to **MIST**.

The primary function of the Technical Advisory Committee is to identify long term strategic objectives to be presented to the **MIST** Board of Directors with a series of targeted development milestones, and discrete near term initiatives designed to support long term strategic objectives.

Technical Advisory Committee membership is composed of corporate affiliates which currently include:

- ATK, Elkton, MD
- Swales Aerospace
- Computer Sciences Corporation

- Lockheed Martin Michoud Operations *
- Universities Space Research Association
- Innovative Business Solutions
- General Dynamics
- Ecliptic*

*Letters pending

8.6 MIST Facility

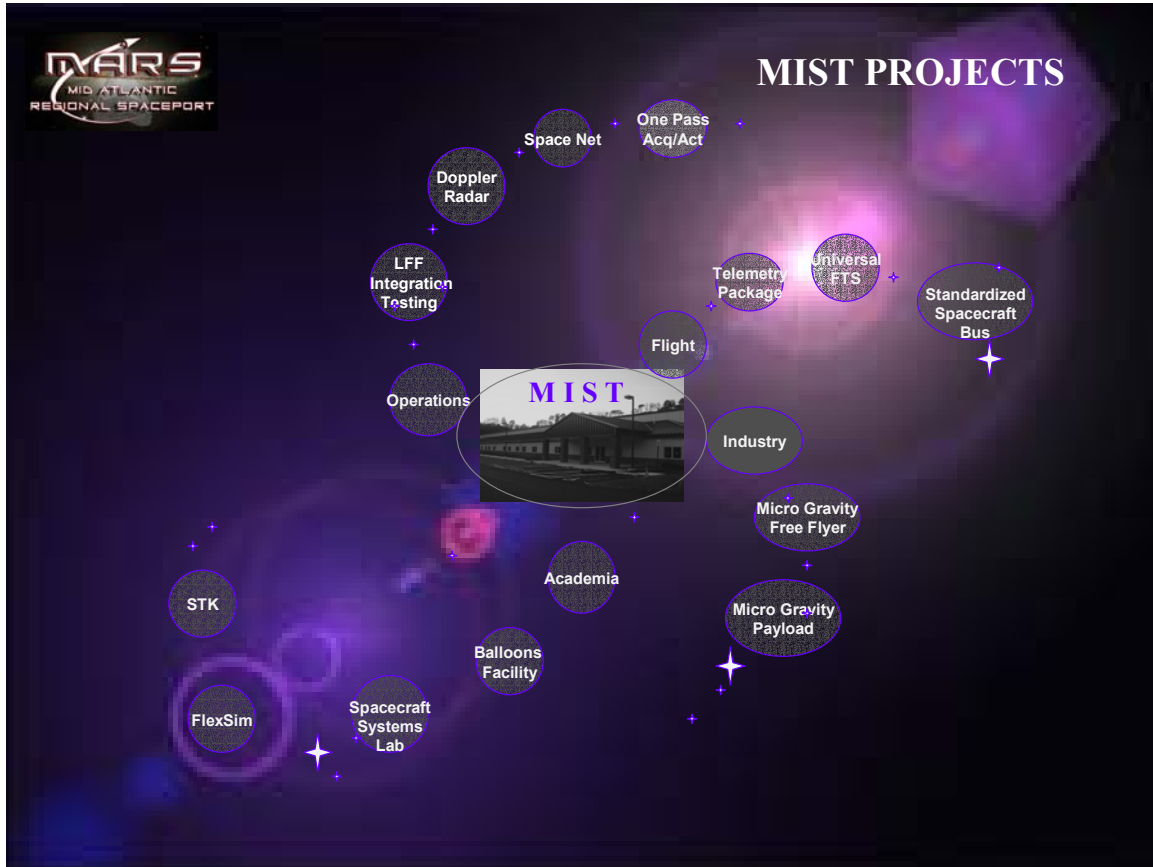


Consideration of space for **MIST** in the new One Maryland Building in Pocomoke, MD is under advisement. This space facilitates rapid start-up of **MIST** with the project cost for space being determined by formula.

The following page provides a table summarizing key interests, capabilities, and programs of **MARS** and **MIST**.

MARS Mid-Atlantic Regional Spaceport	Government Programs	Commercial Development	MIST Mid-Atlantic Institute for Space and Technology
<p>Demonstration & Development</p> <p>Low-Cost Access to Space</p> <p>Rapid Response</p> <p>Key Facilities</p> <ul style="list-style-type: none"> • Pad 0-A • Pad 0-B • MPF (Payload Processing) • LFF (Liquid Fueling Facility) <p>Key Agreements</p> <ul style="list-style-type: none"> • Reimbursable Space Act Agreement • FAA Launch Site Operator's License 	<p>FALCON (DARPA/AF)</p> <p>ORS (AF)</p> <p>NGLT (NASA/AF)</p> <p>RSLP (AF/MDA) Minotaur P.K.</p> <p>HASR (NASA)</p>	<p>Demonstration & Development</p> <p>Low-Cost Launch Vehicles</p> <p>Universal Payload Bus</p> <p>Free-Flyer</p> <ul style="list-style-type: none"> • Micro-Gravity <ul style="list-style-type: none"> ○ Material Science ○ Biotechnology <p>Assured Access to Space (Alternative Access to Space)</p>	<p>Engineering Dev.</p> <ul style="list-style-type: none"> • Common Payload Bus • Power • Telemetry • Payload Interfaces <p>Technology Dev.</p> <ul style="list-style-type: none"> • Micro-Gravity <ul style="list-style-type: none"> ○ Material Science ○ Biotechnology <p>Rapid Response</p> <ul style="list-style-type: none"> • Range • Vehicle • Payload <p>Systems Development</p> <ul style="list-style-type: none"> • Space Net • Rapid Satellite Acquisition and Activation <p>Fabrication</p> <ul style="list-style-type: none"> • Thermal Blankets • Balloons <p>Educational Payloads</p>

8.7 MIST Initiatives



8.7.1 Unfunded MIST Initiatives

Develop standard spacecraft design for DARPA FALCON small launch vehicle (SLV), AF/OSP/RSLP Minotaur and Peacekeeper vehicles

Doppler Radar

Develop Spaceport/launch site rapid response process modeling laboratory (FlexSim)

Spacecraft Systems Laboratory

Universal FTS

1. Develop Receiver
2. Built-in Auto FTS Interface
3. FTS –Certification

Develop standard DARPA FALCON small launch vehicle telemetry package

1. Austere Range Launch Vehicle
2. Demonstration flight vehicle performance monitoring

Develop One Pass Satellite Acquisition/Satellite Activation

1. Standard spacecraft rapid acquisition/acknowledgement sub-systems
2. Standard spacecraft rapid activation, verification and calibration sub-systems
3. Space Net Interface
4. Rapid Pass Instrument Calibration

Small Launch Vehicle mission planning, analysis, modeling laboratory (STK)

Small Launch System μ -gravity Free Flyer Re-entry/Recovery System

1. Re-entry system administrative and licensing
2. μ -gravity Free Flyer Development
 1. Experiment Module Development
 2. Re-entry System Development
 3. Recovery System Development
 4. μ -gravity payload laboratory

Development of Space Net low cost rapid access, secure Internet satellite communication utilizing Wallops Flight Facility ground data acquiring hardware

Component manufacturing of:

1. Multi Layer thermal blankets with UMES students
2. A scientific balloon manufacturing facility
3. Liquid Fueling Facility - Integration and Testing

Definitions & Terms:

- **Commercial Space Launch Act** – requires government agencies to support commercial space entities to the extent that the support does not interfere with government activities.
- **Foreign Trade Zone** – refers to where a special customs procedure that may apply to U.S. plants engaged in international trade-related activities. Items produced in foreign trade zones receive duty-free treatment. Duty payment is deferred on items until they are brought out of the foreign trade zone for sale in the U.S. market. The Goddard Space Flight Center at Wallops Island in VA is authorized to operate under the foreign trade zone as part of the Virginia Port Authority #20.
- **Joint Authority** – the organizational structure of the MARS working group to provide joint governance and operation of the commercial space flight facility at Wallops Island, VA.
- **MARS** – Mid-Atlantic Regional Spaceport. Also known as VSFC, the Virginia Space Flight Center, and “Spaceport.” MARS refers to the FAA licensed, full service spaceport located at the NASA Wallops Flight Facility. Oversight and governance is provided by a Board of Directors composed of Maryland and Virginia representatives.
- **MIST** – Mid-Atlantic Institute for Space and Technology. MIST is a non-profit organization. MIST is limited to educational institutions. MIST’s mission is to act as a technology and educational institute which advances the small to medium-sized satellite manufacturing, micro-gravity biotech R&D, and related technology development. MIST is in the process of becoming a legal entity.
- **Spaceport** – also referred to as MARS and VSFC *See: MARS; VSFC*
- **VSFC** – Virginia Space Flight Center. VSFC is the primary initiative of the Virginia Commercial Space Flight Authority (VCSFA). The purpose of VSFC is to provide commercial, government and academic sectors with the opportunity to access space through a low cost, reliable means (ie: Wallops Island). *See also: MARS.*
- **VCSFA** – Virginia Commercial Space Flight Authority. *See also: VSFC.* The VCSFA promotes the capability of Wallops Island to deliver rapid response, low cost small to medium sized payloads into space.

