Agenda

- History of the Space Test Ranges and TRMC
- Acquisition Shift
- Where we are headed
- Relevant Guidance, Policy and Regulations
- What TRMC offers today
- Going forward
Historical Eastern Range
New Business Model on Space Ranges

• Commercialization of launch
• Commercial Provider carries a risk burden
• USG retains some launch and strategic and missile defense collocated activities that use the infrastructure
Current and Coming Space Launch Access on the ER and WR

Current NSS Launch Capabilities Mature and in RDT&E
ER and WR Launch and Test: New Concepts, New Acquisition Strategies
THE "EASTERN RANGE"

CCAFS/KSC/PAFB
COMMAND
RADAR
TELEMETRY
RANGE SAFETY
DATA PROCESSING
SATCOM
SURVEILLANCE
WEATHER FORECASTING
MOBILE OPTICS

WALLOPS ISLAND (NASA)
RADAR
TELEMETRY

LAUNCH AREA SUPPORT SHIP
TELEMETRY
MTIS (GPS TRACKING)
SATCOM

LAUNCH AZIMUTH
37° to 114°

HIGHLY INCLINED ORBIT

EQUATORIAL ORBIT

SLBM CORRIDOR

JONATHAN DICKINSON
MISSILE TRACKING ANNEX
COMMAND
TELEMETRY

SATELLITES
SATCOM
TDRS
GPS

ASCENSION
TELEMETRY
SATCOM

AIRCRAFT
OPTICS
SMILS

15 Million Sq Miles

10/9/2016
Launch and Test Range Capabilities

Range Clearance
- Weather
- RF Monitoring
- Air & Sea Surveillance
  *Leverage other Govt systems*

Mission Comm
- Infrastructure
  - Voice, video, data
  - External interface
    - *IP-based data transport*
    - *Common interfaces*
    - Cyber defense

Imaging
- Vehicle imaging
  - Engineering sequential
    *Customer options*

Positive Control
- Traditional FTS
  - *EFTS*
- External processes - *AFSS*

Vehicle Tracking & Assessment
- Vehicle data
- Vehicle tracking
- Range safety
  - *Situational awareness – AFSS*
- Debris tracking
  - *Customer owned*
  - *Customer options*
- Data products

Timing
- Reference
- Correlation
- Launch Sequencing

Maint Activity
- Centralized
  - *FD/FI*
  - *Management*
  - *Troubleshooting*

Daily Operations
- Weather
  - *Multiple operations*
- Communications

Expectations of a Space Launch Infrastructure
National Rocket Propulsion Test Alliance

Hydrocarbon Boost Pre-Burner
National Space Policy, June 2010:

“A robust and competitive commercial space sector is vital to continued progress in space. The United States is committed to encouraging and facilitating the growth of a U.S. commercial space sector…”

“Ensure that USG space technology and infrastructure are made available for commercial use on a reimbursable, noninterference, and equitable basis to the maximum practical extent…”

“U.S. shall invest in the modernization of space launch infrastructure to enhance operational efficiency, increase capacity, and reduce launch costs
National Space Transportation Policy

• **Space Launch Ranges** (November 21, 2013)

  The Secretary of Defense and the Administrator of NASA shall operate the Federal launch bases and ranges in a manner that accommodates users from all sectors. Departments and agencies, consistent with their responsibilities and in consultation with private sector and state entities as appropriate, shall:

  • Enhance the operational efficiency, capacity, responsiveness, and cost effectiveness of Federal space launch infrastructure, including investing in the modernization of current infrastructure to meet evolving space transportation needs and capabilities, and seeking to improve current launch range scheduling procedures and practices;

  • Encourage private sector and state and local government investment and participation in the development, improvement, and sustainment of space infrastructure, including both Federal launch and reentry sites, as well as those operated and maintained by private, state, and local entities; and

  • Provide stable and predictable access to United States Government space launch bases and ranges, and other related government facilities and services, for commercial launch and reentry purposes on a direct-cost basis or other agreed partnership. The United States Government will reserve the right to use such facilities and services on a priority basis to meet national security and critical civil mission requirements.
Increased Activity > Increased MRTFB Use

The MRTFB assets must be affordable, agile, and effective
Moving the Ranges to the 21\textsuperscript{st} Century

Needed input from commercial launch providers:

Does each commercial operator want to build and maintain the enabling T&E support infrastructure to develop, validation, certification, and inventory surveillance and recovery?

Are there economies of scale for things that are expensive such as rocket test stands, long-range imaging radars, Hi-res IR imagery, recovery assistance?

Are there opportunities for improved or lower cost instrumentation services through the launch ranges?

Is it beneficial to have the government operate tracking and detection equipment such as used in T&E to support launch recovery and contingency assistance if \textit{economically} performed on the space ranges?
Backup Slides
MRTFB use guidelines

• Scheduling of the MRTFB shall be based upon a priority system that gives equitable consideration to all DoD Components and accommodates DoD acquisition program priorities.

• When a test requires the support of more than one MRTFB activity, a lead activity will serve as the principal point of contact with the user for planning, execution, and reimbursements, and will coordinate with other activities to obtain total support for the test.
Space Range Cyber Vulnerabilities

- **NDAA 16 Sec 1647**: The Secretary of Defense shall, in accordance with the plan under subsection **complete an evaluation of the cyber vulnerabilities of each major weapon system** of the Department of Defense by not later than December 31, 2019.

  (2) **PRIORITY IN EVALUATIONS**.—The plan under paragraph shall accord a **priority** among evaluations based on the **criticality of major weapon systems**, as determined by the **Chairman of the Joint Chiefs of Staff** based on an assessment of employment of forces and threats.

  (d) **RISK MITIGATION STRATEGIES**.—As part of the evaluation of cyber vulnerabilities of major weapon systems of the Department under this section, the Secretary shall **develop strategies for mitigating the risks of cyber vulnerabilities** identified in the course of such evaluations.

  (e) **AUTHORIZATION OF APPROPRIATIONS**.—Of the funds authorized to be appropriated by this Act or otherwise made available for fiscal year 2016 for **research, development, test, and evaluation**, Defense-wide, not more than **$200,000,000** shall be available to the Secretary to **conduct the evaluations** under subsection

10/9/2016
Government Rocket Test Centers And Test Launch Centers

Naval Air Warfare Center
Ms. Bettye Moody

Arnold Engineering Development Center
Dr. Edward “Ed” Kraft

Air Force Research Laboratory
Mr. Shawn Phillips

NASA Headquarter
Mr. Benjamin “Benjy” Neumann

TRMC
Mr. Ashton Burke
DoD SSG Co-Chair

Redstone Test Center
Mr. T. David Byrd

NASA/Stennis Space Center
Mr. Roger Simpson NASA SSG Co-Chair
National Space Policy - 2010

The Secretary of Defense, in conjunction with the NASA Administrator as the launch agents for civil and national security space missions, shall:

• Assure access to space for United States Government departments and agencies, taking into account risk management, affordability, competition among providers, and measures for enhancing transparency regarding United States Government space transportation needs;

• Rely upon U.S.-manufactured space transportation vehicles as the foundation for access to space;

• Acquire space transportation capabilities and services, and ensure the ability to develop, operate, and enhance space transportation-related capabilities, infrastructure, and support activities; and

• Work with each other and other departments and agencies, and with the private sector, as appropriate, to pursue research and technology development activities regarding alternative launch capabilities to improve responsiveness, resiliency, and cost effectiveness for future space launch alternatives.
(8) space transportation, including the establishment and operation of launch sites, reentry sites, and complementary facilities, the providing of launch services and reentry services, the establishment of support facilities, and the providing of support services, is an important element of the transportation system of the United States, and in connection with the commerce of the United States there is a need to develop a strong space transportation infrastructure with significant private sector involvement;

(9) the participation of State governments in encouraging and facilitating private sector involvement in space-related activity, particularly through the establishment of a space transportation-related infrastructure, including launch sites, reentry sites, complementary facilities, and launch site and reentry site support facilities, is in the national interest and is of significant public benefit;
Title 51, National and Commercial Space Programs

Chapter 509 – Commercial Space Launch Activities

Section 50903. General Authority

The Secretary of Transportation (FAA Office of Commercial Space) carries out this chapter with assistance as necessary from heads of executive agencies (i.e., NASA, DoD, DoC)

The Secretary takes actions to facilitate private sector involvement in commercial space and promote public-private partnerships. Involves USG, State governments, and private sector to build, expand, modernize, or operate space launch/reentry infrastructure.

Section 50913. Acquiring USG property and Services

Sec of Transportation facilitates and encourages private sector and State acquisition of excess/unneeded USG launch/reentry property. Also facilitates acquisition of USG launch/reentry services not needed for public use.
TRMC Commercial Space Guidelines

• Congressional Legislation
  • Commercial Space Launch Act passed in 1984 (P.L. 98-575) and updated in 1988 (P.L. 100-657)
  • U.S. commercial space launch industry is essential to assure access to space for Government users
  • Federal Government should encourage, facilitate, and promote the use of the U.S. commercial space launch industry in order to continue U.S. aerospace preeminence

• Presidential Action
  • National Space Policy originated by President Clinton in 1996 and updated by President Obama in 2010
  • U.S. shall invest in the modernization of space launch infrastructure to enhance operational efficiency, increase capacity, and reduce launch costs
  • Work jointly to acquire space launch services arrangements that are reliable, responsive to U.S. needs, and cost-effective
Federal Management Regulations
DoD 7000-14R

• DOD SUPPORT TO UNITED STATES COMMERCIAL SPACE ACTIVITIES

• 1301 PURPOSE
• This chapter provides reimbursable policy and procedures for the sale of DoD support to U.S. commercial space activities.

• 1302 BACKGROUND
Title 15 of the U.S.C., section 5807, authorizes DoD to allow commercial activities to use its space related facilities provided that DoD is reimbursed for its direct costs accrued in supporting the commercial space activities.

Terminology:
“commercial” - private capital at risk, and primary financial and management responsibility for the activity residing with the private sector.
“direct costs” - directly attributable to the use of the facility or resource for support provided to a particular commercial space program or customer, over and above the indirect costs with respect to the facility or resource.
“indirect costs” - costs of maintaining, operating, upgrading and modernizing the facility or resource. Indirect costs are overhead costs of the MRTFB activities and are not to be charged to commercial space customers.
(Refer to Volume 11A, Chapter 12 for further discussion on reimbursement policy)
MRTFB Management

- The Assistant Secretary of Defense for Networks and Information Integration/DoD Chief Information Officer (ASD(NII)/DoD CIO) and the Secretaries of the Military Departments shall:
  - Manage and operate their designated MRTFB activities.
  - Structure the MRTFB to (1) maximize the use of existing T&E capabilities, (2) complement existing T&E capabilities with new T&E capabilities, and (3) avoid unnecessary duplication.
  - Plan, program, and budget for institutional costs of operation, maintenance, and sustainability of the MRTFB; and for capability improvements, modernization, and recapitalization in accordance with Reference (h).
  - Implement a reimbursement system to define and collect user charges in accordance with Reference (h).
  - Coordinate investment strategies that provide new or modified T&E capabilities, and plans to close or reduce T&E capabilities or capacity of the MRTFB with other cognizant DoD Components.
  - Submit requests to change (e.g., add, close, or reduce) the T&E capability of the MRTFB to the Director, TRMC.
National Rocket Propulsion Test Alliance

• “To expand cooperation between the Parties and to facilitate the Parties’ efficient and effective utilization of the U.S. Government’s rocket propulsion test investments aimed at satisfying the Nation’s rocket propulsion developmental and operational testing needs.”
Purpose of NRPTA

• Enhance knowledge sharing to strengthen NRPTA rocket test community of expertise

• Continue to posture NRPTA as a critical interface between NASA, DoD and commercial rocket propulsion test programs

• Continue to identify rocket propulsion test requirements and their impact on NRPTA facilities

• Further develop relationships with industry in support of the NRPTA Mission

• Develop and pursue initiatives to further cooperation between NASA and DoD
  – Equipment Transfers and Sharing
  – Budget
  – Personnel Cross Utilization

• Test Technology to enhance facility safety, operability, and efficiency