
IMT Technology Development Roadmap

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Strategic Goals for IMT

- **Top priorities:**

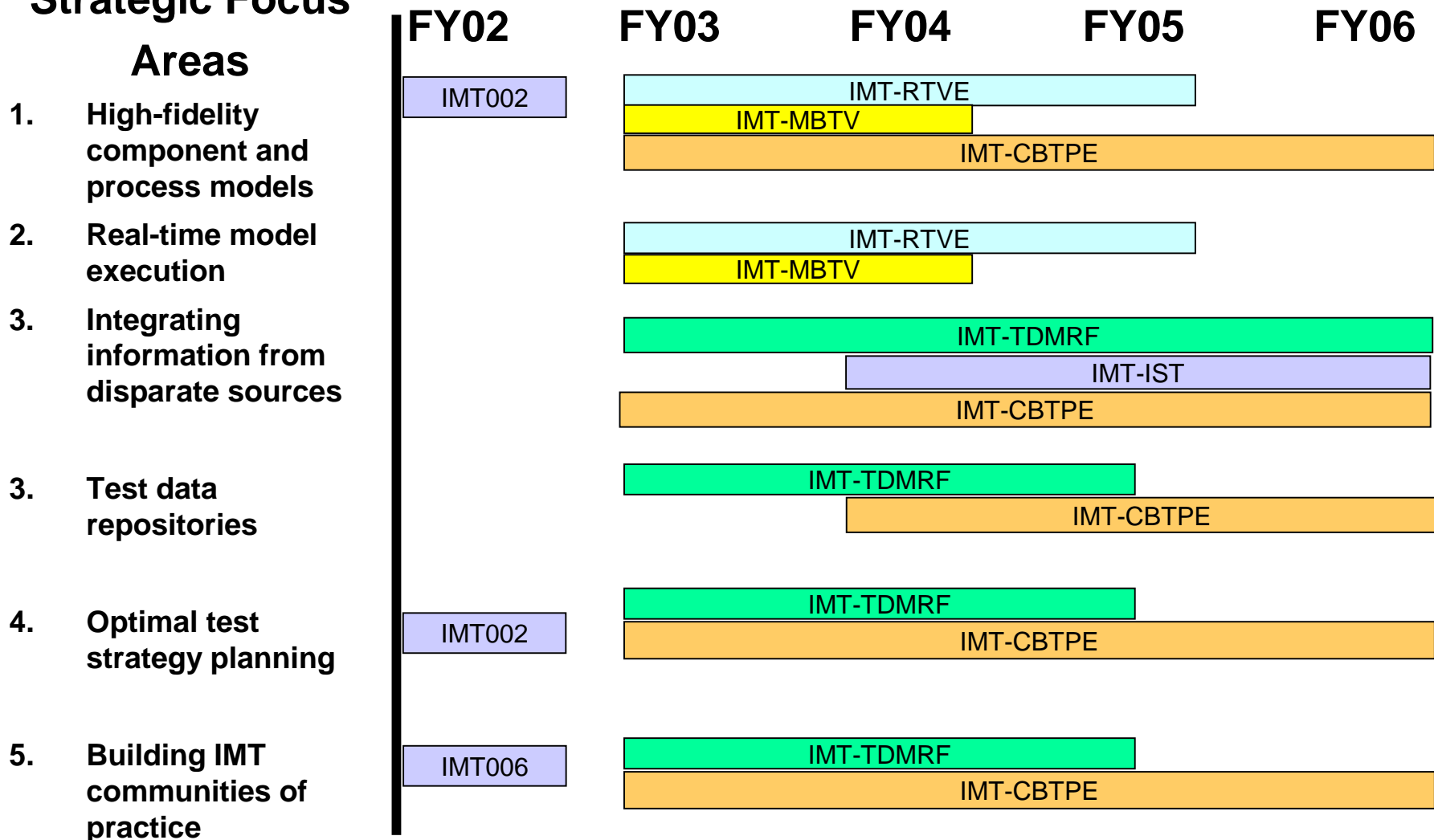
- Application of HPC software tools and techniques with live tests and hardware-in-the-loop simulations for test and evaluation.
- Tools for collecting, organizing, and combining diverse information sets to optimally guide T&E decision making.

- **Concentrate on:**

- High-fidelity component and process models
- Real-time model execution
- Integration of information from disparate sources
- Test data repositories
- Optimal Test Strategy Planning
- Building IMT Communities of practice
- Training in new software tools & methodologies (Core)

Functional Area: IMT

Strategic Focus Areas



IMT FY03-06 Project Areas

- **IMT-RTVE: Real-Time Virtual Experimentation**

Developing and integrating high-performance computing techniques and software tools with live tests and hardware-in-the-loop simulations for test and evaluation of DoD weapons, components, and subsystems. Achieving high-fidelity representations in virtual and virtual-real environments is a key to achieving faster, more cost-effective development and acquisition and will require DoD to develop variable fidelity sensor/scene/target models, component models, and unique test configurations and facilities. These requirements will drive the needs for linking and integrate disparate models and simulations, embedded system-HPC interfaces, and real-time scene rendering.

- **IMT-MBTV: Model-Based Test Validation**

Using verified models to monitor the performance of new concepts under test by comparing predicted trends of key parameters with test data. Variances are used to interrupt testing for safety of the test article and/or facility and to maintain integrity of the test data. Models can be used for diagnostic analyses to determine anomalies in either the article or instrumentation that can produce the undesirable variance. Reaching these capabilities will require development of high capacity processing and data network resources, high-fidelity component models that can be executed in real-time, and reliable model-data comparison tools.

IMT FY03-06 Project Areas

- **IMT-TDMRF: Test Data Management, Retrieval, and Fusion**

Providing uniform integrated access, visualization, and fusion of diverse test and evaluation data from multiple sources, (computational models, ground tests, and flight tests), to T&E communities. To provide these capabilities DoD must develop techniques for automated data archiving, retrieval, and long-term storage; complex data query processing; links to performance data, documents, system specifications, and test incident reports; and seamless availability to developers, testers and evaluators. Achieving these goals will require advanced approaches in networking technologies, storage area networks, meta-data management and indexing, and distributed data mining.

- **IMT- IST: Interoperability and System of Systems Testing**

System of Systems operation is becoming increasingly important as DoD strives to gain revolutionary new operational capabilities with components (sensors, platforms, weapons) of maturing development potential. To support the development of SoS capabilities the T&E community must quickly and cost-effectively enable Interoperability among test ranges, facilities, and simulations; develop tools for verification and validation of Interoperability; and provide simulation support for distributed real, virtual, and constitutive simulations around ranges and across geographic areas. Key to providing these capabilities will be advances in high-speed mobile and fixed networks, and Interoperability at the M&S level, .e.g., HLA.

IMT FY03-06 Project Areas

- **IMT - CBTPE: Computational-Based Test Planning and Execution**

Using verified model and simulation to: separate critical from non-critical conditions, select configurations and parameters for test, support a logical buildup approach for choosing ground or flight-test conditions, and support optimally modifying test plans as test results accumulate. Achieving these capabilities will require DoD to develop tools to: define and validate decision metrics; rigorously define the logical and causal structure of weapon systems and test requirements; and integrate information resources from theoretical models, simulation results, test experience, and on-going test results. Providing the computational capacity to satisfactorily define distributions of model performance and retrieve test experience will severely stress HPC resources.

IMT User Advisory Panel

- **Jere Matty (AEDC, Govt CTA Lead)**
- **Jeff Highland (ARL)**
- **Guy Williams (AFFTC) representing the Range Commanders Council Modeling and Simulation Sub-Group (Tri-Service)**