

# USING MESSAGE ORIENTED MIDDLEWARE TO INTEGRATE LEGACY APPLICATIONS AND COMMERCIAL OFF-THE-SHELF PRODUCTS: THE RADIUM CASE STUDY

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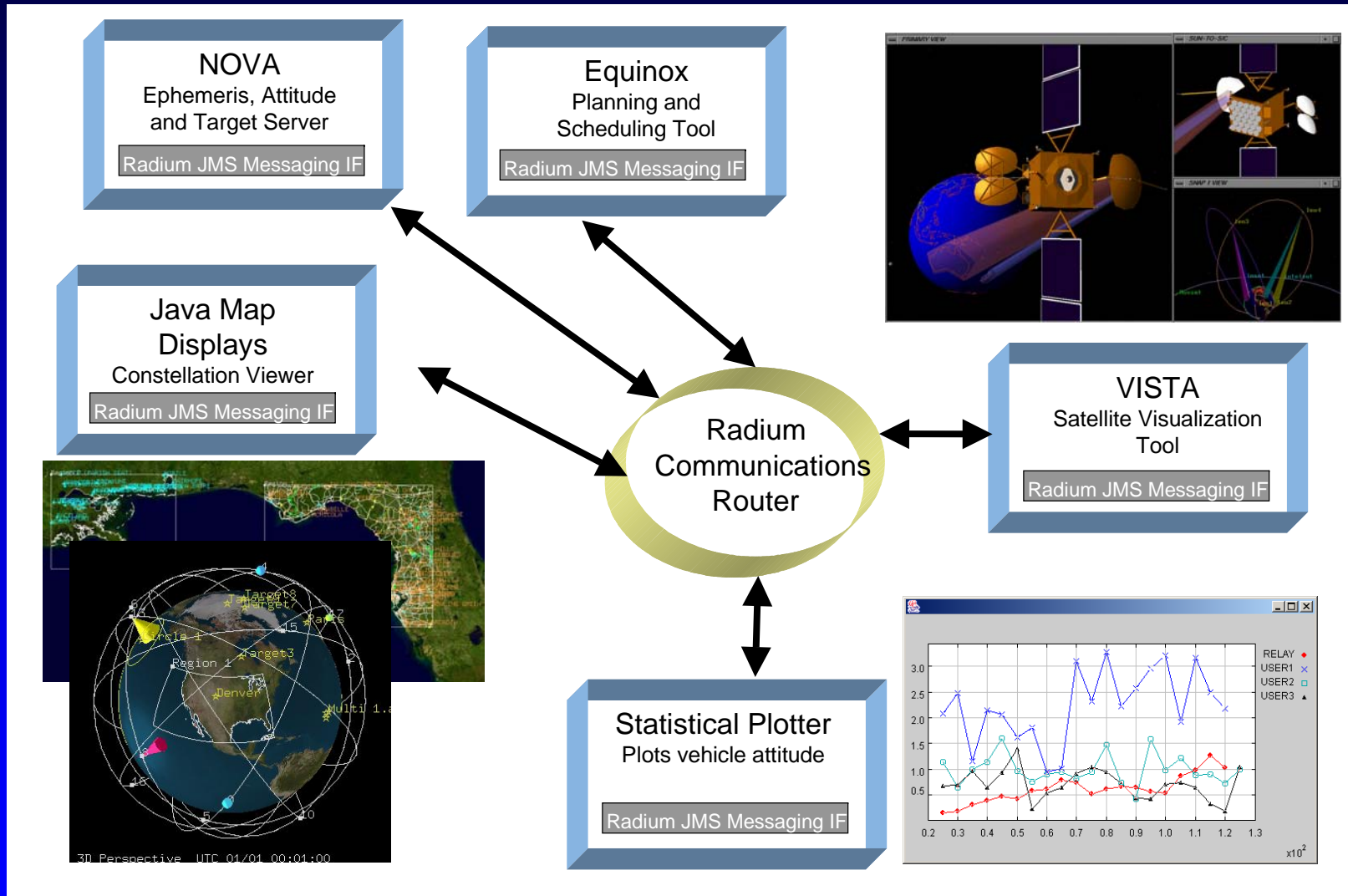
# Agenda

- **What we're doing.**
  - **Open Standards Interoperability Framework (OSIF) IRAD**
    - **Raytheon Ground System Toolset Integration**
    - **Modeling and Simulation Toolset Integration**
    - **OSIF IRAD – 2003 Conclusions**
    - **OSIF IRAD - Plans for 2004**
  - **Current and projected MOM usage**
  
- **What's the future?**
  - **Reuse, COTS and standards**
  - **Space Systems' Ground System Architecture vision**
  - **Standards?**

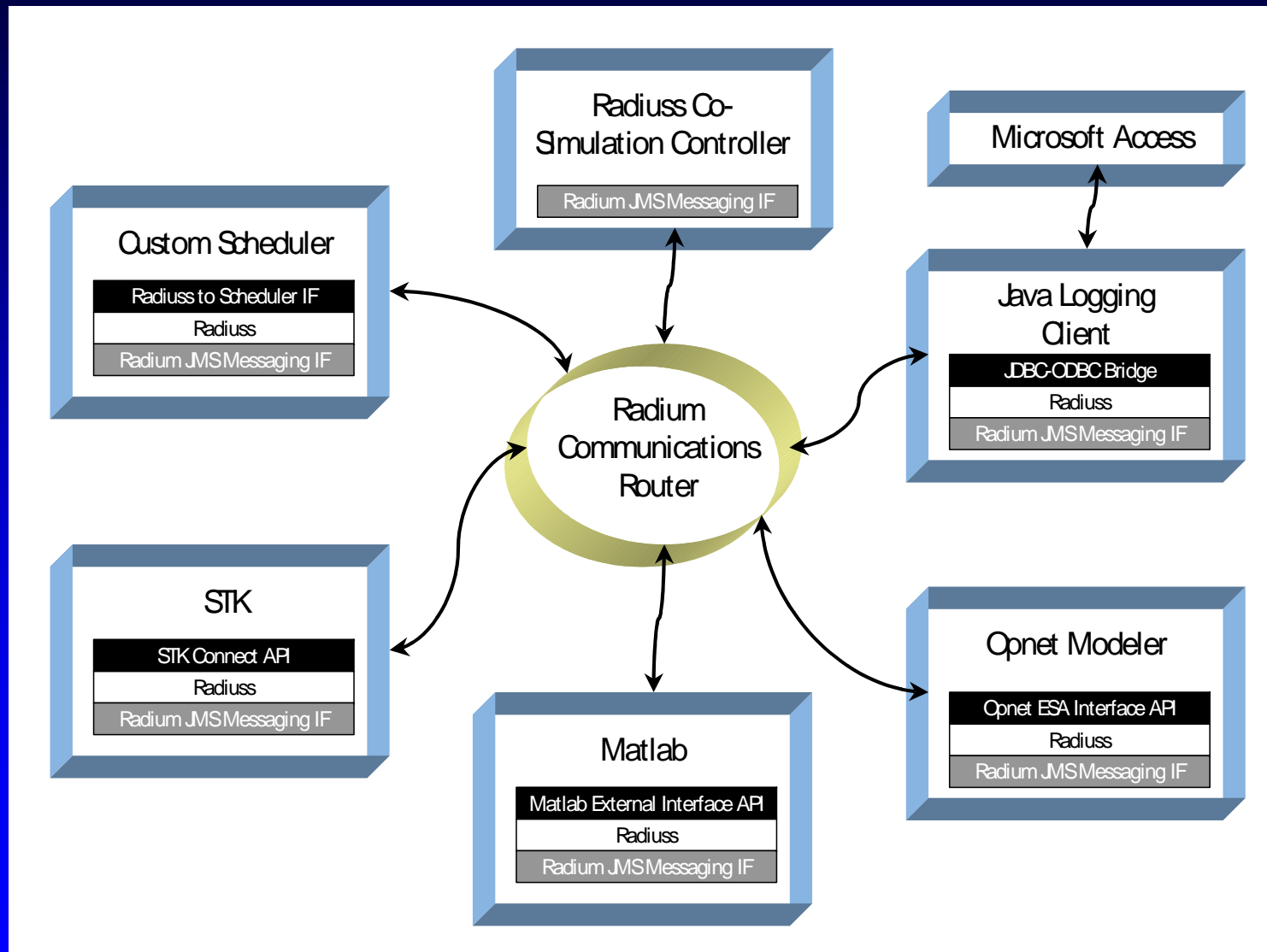
# Open Standards Interoperability Framework (OSIF) IRAD

- In 2003, IRAD funds were allocated to investigate use of MOM technologies for ground system software.
  - Surveyed existing technologies, standards, COTS solutions.
  - JMS (Java Message Service) – common among COTS and open MOM products.
  - Constructed a prototype JMS provider (called Radium) with Java and native C++ messaging interface.
  - Tested the prototype in 2 scenarios
    - Raytheon Ground System tool scenario
    - Modeling and Simulation scenario

# Raytheon Ground System Toolset Integration



# Modeling and Simulation Toolset Integration



# OSIF IRAD – 2003 Conclusions

- **MOM technologies are not only feasible, but a desirable technology for Ground System architectures:**
  - **Increase flexibility of the overall architecture**
  - **Increase reusability of components**
  - **Increase agility of components**
  - **Provides for interoperability between new, COTS, legacy and other applications**
  - **Simplifies interfaces within a system**
  - **Provides Application Programming Interface (API) for application developers**

# OSIF IRAD - Plans for 2004

- The OSIF IRAD was continued this year to investigate MOM requirements within an enterprise architectures, separate from the JMS messaging interface.
  - Load Balancing
  - Fail Over/Error Recovery
  - Performance
  - Security

# Current and Projected MOM Usage

- Limited Radium usage in NPOESS ground system software.
- Eclipse (Raytheon Aurora TT&C product) uses Talarian SmartSockets MOM tool. Investigating making a change to a standards based (JMS) messaging middleware. (Radium or COTS)
- Modeling and Simulation using Radium to create distributed simulations that leverage COTS, and custom models.
- Multiple IRAD projects are using MOM software as a framework for horizontal integration activities.
- Multiple proprietary programs are prototyping the partial or complete replacement of existing messaging frameworks (CORBA, sockets, etc.) with MOM technologies.
- Future programs investigating messaging requirements and how MOM technologies could provide their customers better solutions:
  - SBR
  - GPS III
  - ORCA



# What's the Future?

*“The two truly transforming things might be information technology and information operations and networking, connecting things in ways that they function totally differently than they have previously.”*

*Hon. Donald Rumsfeld*

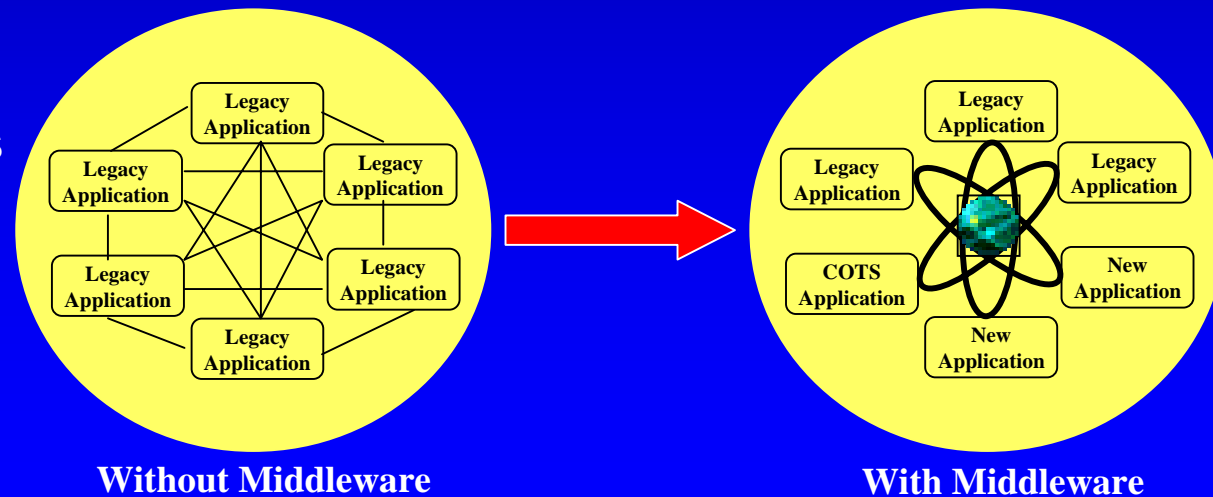
# Reuse, COTS and Standards

- In order to stay competitive, we must provide our customers the most cost-effective solutions available.
  - Reuse means less cost, and more robust solutions
  - COTS tools provide functionality quickly and easily
  - Standards means anyone can come play in the sandbox
- MOM technologies enable integration of reused components, allows for the creation of reusable components, simplifies COTS integration and guides new development:
  - More opportunities for reuse, reuse is less painful
  - Many COTS tools already working with MOM technologies.
  - With components built to messaging standards, can more easily swap components in and out.

Industry is already investigating and utilizing MOM or similar technologies in order to provide their customers better, cost-effective solutions to stay competitive.

# Ground System Architecture Vision

- Use Message Oriented Middle to Integrate Legacy Applications, COTS, and new development
  - Reduce the amount of unique software to software interfaces required by establishing well defined interfaces to each major component
  - Provide for seamless interoperability between components
    - Well defined interfaces provides for a “plug-n-play” environment for swapping in and out components providing similar capabilities
  - Products adhere to standards



# Questions?

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