National Aeronautics and Space Administration

# Utilizing Supply Chain Assessments to Achieve Excellence, Reduce Risks and Improve Processes


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American Supply Chain Summit
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# Agenda

- Goddard's Mission
- Supply Chain Management: Why it is important
  - Strategic Challenge: Supply Chain Risks
- History of supply chain assessments at Goddard
- Examining case studies on successes and lessons learned
- Enabling teams to develop tools to manage GSFC supply chain
- Gaining supplier insight through IT tools that combines supplier data and provides supplier alerts

# Goddard: NASA's first, and oldest, space center


# Goddard Installations Across the Country


Greenbelt Campus, MD


Wallops Island, VA


Katherine Johnson IV&V, WV


Columbia Scientific Balloon Facility (CSBF), TX


GISS, NY


White Sands Test Facility, NM

# Key Science Themes

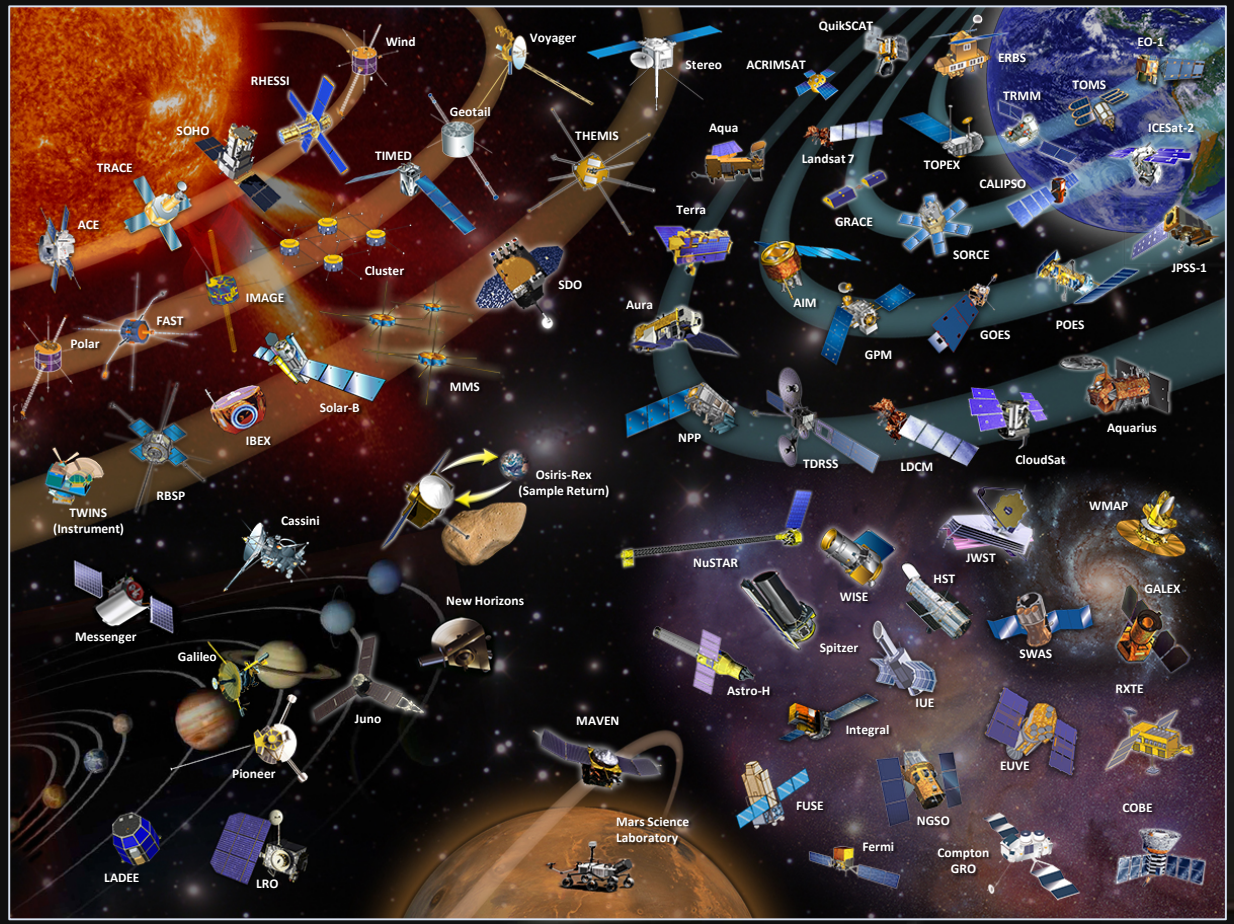
Discovering the Secrets of the Universe

Translate the knowledge and technologies derived from these areas of exploration to practical applications today.

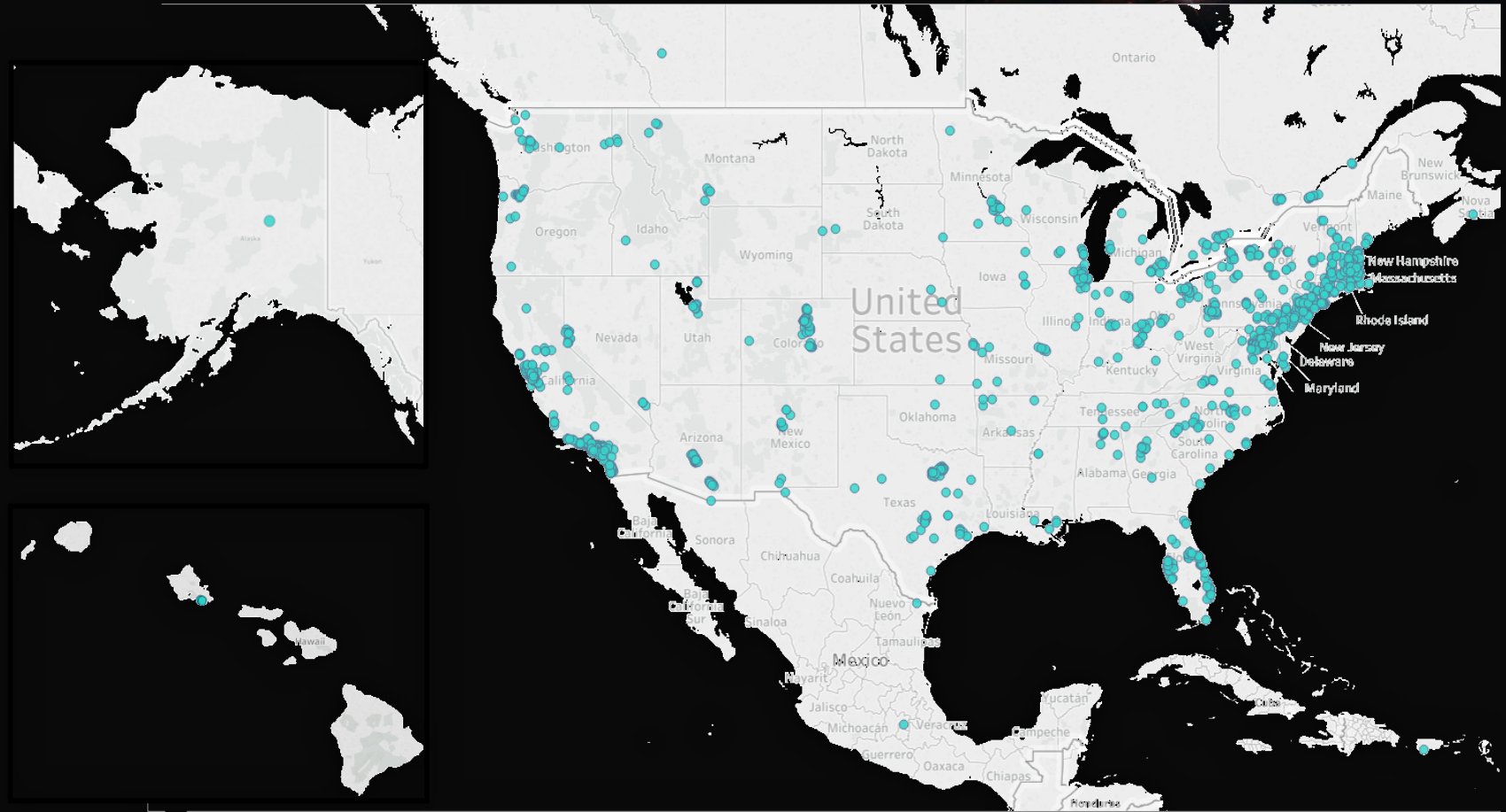
Searching for Life Elsewhere

Safeguarding and Improving Life on Earth

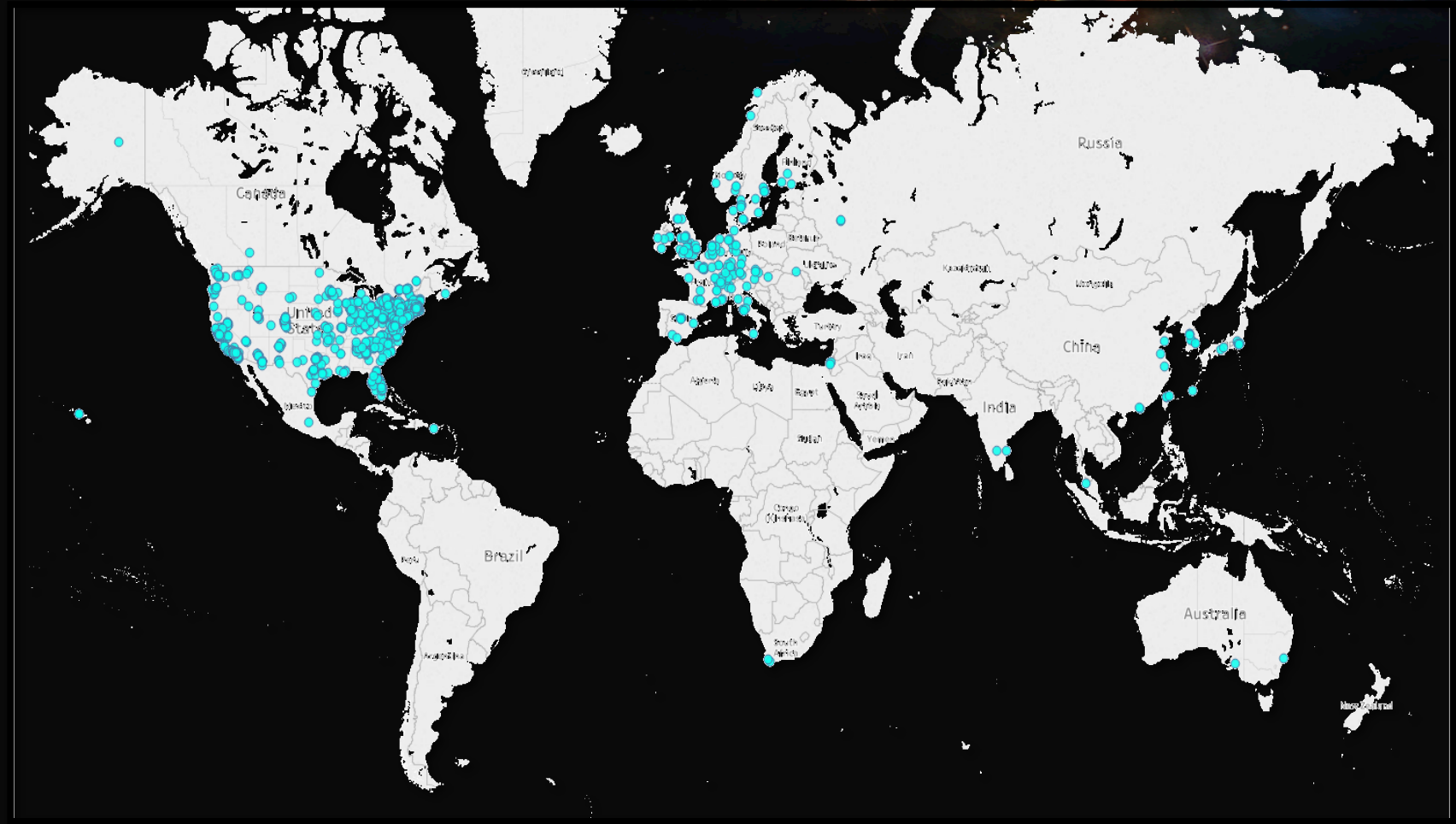
# GSFC: a Diverse Mission Portfolio



# North America Locations of Goddard Suppliers



# Worldwide Locations of Goddard Suppliers



# Supply Chain Management

Goddard Space Flight Center

## Mission Performance

Spacecraft, Science Instruments, Ground Systems

= Safety & Mission Assurance
= Flight Projects Management
= Engineering & Technology
= Procurement

## Outcomes

- Quality Products and Services
- On-Time Delivery at Acceptable Cost
- Innovative Problem-Solving / Continual Improvements
- Risk Reduction

## Core Functions

### Supplier Development

- Technology Investments
- Procurement Policy
- Small Business Program / Outreach

### Acquisition

- Acquisition Strategy
- Proposal Team Building
- Procurement (direct and indirect)

### Performance Management

- Project Management / Contract Oversight
- Mission Assurance Requirements
- Surveillance, Inspections and Alerts
- Parts to System-level Testing

### Evaluation & Risk Management

- Project Lifecycle Reviews
- Internal Management System Assessments
- **Supply Chain Assessments**, Research & Analyses
- Project and Enterprise Level Risk Management

Meta and other Information Systems for Process / Data Management and Informed Decision-Making

# Example: What happens when Supply Chain Management is not done well?

**Issue**: Sole Source Supplier for the Space Shuttle Thermal Blankets gave notice that they were going out of business.

Task: One month to determine what blankets we would need for the next 20 years and get them made.

I was part of a small team sent to negotiate more time. It was obviously not going to happen. Our recommendation was to do it ourselves.

**Result**: Prime took over the manufacturing and moved manufacturing operation to Kennedy Space Center

# Reviewing a History of GSFC Supply Chain Quality Assessment Program

| | Current | Prior |
|---|---|---|
| **Role of Supply Chain Quality Lead (SCQL)** | The Supply Chain Quality Lead (SCQL) is an active member in Project SMA Team and participates in the Project meetings to contribute to discussions related to suppliers and vendors who may provide hardware and services to the Project.<br><br>Adviser to the Project Team on supplier:<br>• Past Performance<br>• Capabilities,<br>• Risk assessment and management. | The Supply Chain Manager was a support resource that would be requested to help as needed and Primes were assessed every 3 years. |
| **Project Team Support** | Support Project Team at every Phase of the project Development life cycle. | Mainly independent of Project Development Life Cycle |
| **Basis of assessment** | A Focused assessment tailored to the Projects issues, concerns, and requirements. A more detailed analysis is performed prior to the assessment. Primes are still required to be assessed every 3 years per NASA and FAR requirements. | Focus of assessment was usually general primarily based on ISO9001 or AS9100 and often lacking the insight and background from the associated project(s). |

# Reviewing a History of GSFC Supply Chain Quality Assessment Program

| | Currently after Enhancements | Was |
|---|---|---|
| **Findings written against** | "Findings" paired against Project requirements and/or against ISO9001, AS9100 or internal requirements and are classified as an Observation or Nonconformance | "Findings" paired against ISO9001 or AS9100 requirements and are classified as an Observation, or Non-Compliance. |
| **Size of assessment team and duration** | Range from 2 to 6 member Team for 2 – 4 days | Range from 2 to 6 member Team for 2 – 4 days |
| **Post Assessment Interface with Project Team** | Out Brief given at Suppliers in addition to a face to face Post Assessment briefing presented to the Project team and GSFC Management, providing opportunity for greater insight, more candid questions and immediate feedback. | Out Brief given at Suppliers and Assessment Report provided to Project Team for review and SCQL received very little feedback. |
| **Project Team Support** | Support Project Team at every Phase of the project Development life cycle. | Mainly independent of Project Development Life Cycle |
| **Resource Support** | Resources for SCQL activities are included in the annual Project budget up front and creates legitimate role within the Projects. | All supported costs were considered outside the scope of project. Funding to support assessments had to be secured independently by each SCQL. |
| **Storage of and Access to Supply Chain Assessment Reports** | Reports are stored in Meta and data are integrated with all other supplier data. Access is readily available to all who have Meta access. | Reports were kept in SAARIS with limited access and within Code 382 (Branch) files. |

# Case 1: Improving Supplier Performance Through Understanding

**Finding**: While performing an assessment of a Prime Supplier for the James Webb Space Telescope (JWST), it was discovered they were still using silicone contaminated syringes. A GIDEP had been issued over a year earlier to stop use of silicone contaminated syringes. The Prime had a finding written a year earlier but they had failed to remove the syringes from use.

They were unsuccessfully trying to remove the silicone. I explained the silicone could not be removed and explained the consequences of using the contaminated syringes.

**Results**: The supplier now understood the criticality of the requirement. The Supplier had to rework all hardware that had been processed with those syringes.

**Lesson Learned:** Take the time to ensure understanding of requirements and advisories related to products that are being used.

# Case 2: NASA Centers Collaboration on Supplier Audits fosters the sharing of resources and reduces duplication of efforts.

In the interest of gaining audit efficiencies, NASA Centers teamed up to conduct a supply chain assessment of one a shared Prime Contractor.  GSFC Supply Chain led this collaborative assessment.

**Results**:  A more comprehensive and mutually beneficial audit process

**Benefits and Lessons Learned:**

- Reduce overall auditing costs by combining resources (people, time, travel, etc.).
- Share NASA expertise
- Identify common issues and opportunities for improvement to benefit the NASA Field Centers and the Prime
- Eliminates need for multiple assessments of the same Prime
- Reduce cost and time burden to NASA Centers and Prime by reducing repetitive customer audits.
- Reduce supplier work interruptions related to multiple audits.

# Case 3: Results of Thorough and Experienced Assessments

Assessment performed at a sub-supplier producing RF detectors. There were concerns from Prime and NASA concerning quality and workmanship issues with the Detectors. The NASA/GSFC Assessment Team spent two days at this facility, performing a Full Assessment with the Prime's Mission Assurance Manager (MAM) as an observer.

**Findings:** 13 Findings, including one against the Prime and several significant deficiencies including:

- Lack of ESD Controls,
- Lack of adequate documentation,
- Lack of tracking and control of customer property,
- No processes for managing their sub-suppliers

**Results:** Stop Work Order was directed to the sub-supplier to resolve their issues before being allowed to resume work .

NASA and the Prime supplier are still waiting for the corrective actions to be completed. NASA Supply Chain Quality Team to immediately return to the sub-supplier to evaluate the effectiveness of the corrective actions once completed.

# Case 4: When Suppliers Don't Cooperate

Scope of this visit was to assess the capabilities of this company for performing printed circuit board (PCB) coupon testing to certify the lab facility for NASA to use during peak times.

**Findings:** 5 Findings recorded, 3 being non-conformances. No major deficiencies to resolve.

All of the Findings were presented to the company and timelines negotiated for corrective actions. Though multiple notices and attempts were made and continued to escalate the issue , the company never provided corrective actions.

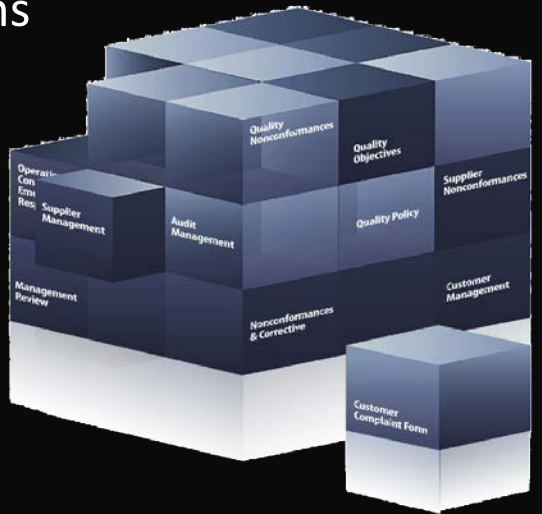
**Results:** Though NASA believed they had the potential to perform the tasks, due to their refusal to respond, they were eventually rejected and placed on the Not to Use List.

**Lessons Learned:** Improved our process of accountability toward Correction Actions. New Meta processes are now in place to catch any corrective actions not received.

# Designing a System For Data & Information Management

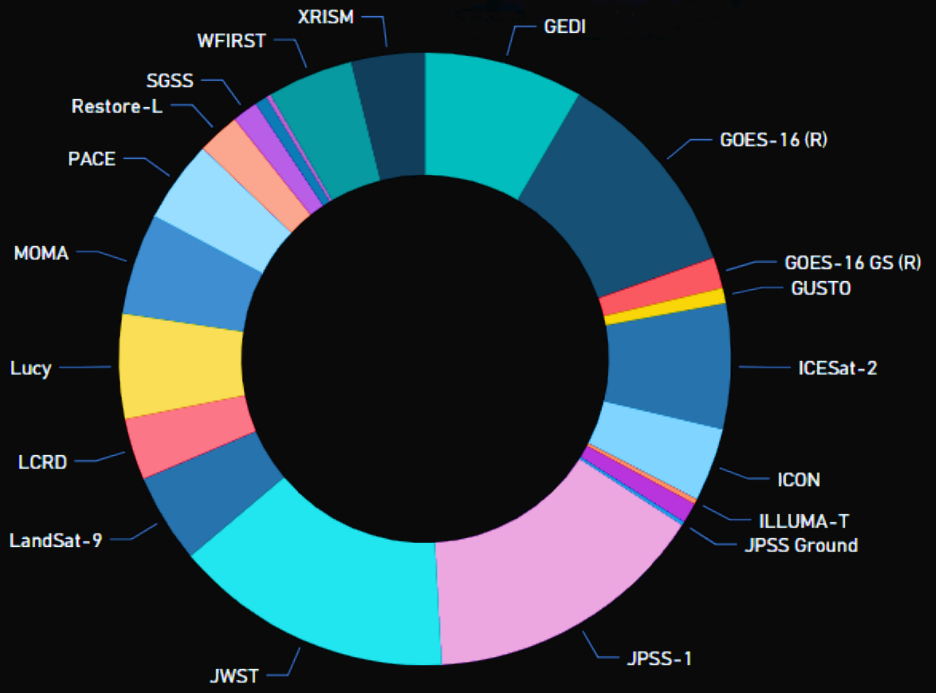
Silo Approach: traditional thinking +
+ fragmented IT software solutions

Meta Approach: systems thinking + integrated, scalable architecture + configurable IT software solutions



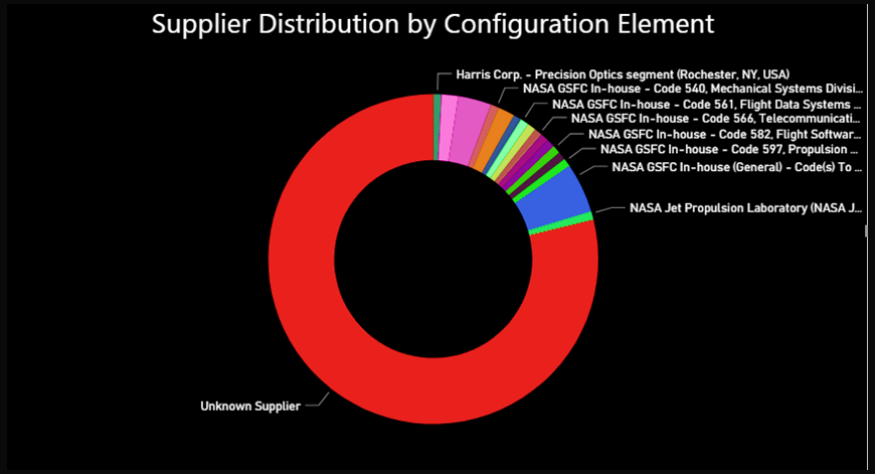
# Distribution of Suppliers by Project

- 2,200 suppliers identified in Meta
- This graph displays the number of suppliers per project.
- The segment size for each project is determined by total count of suppliers.
- For example: JPSS-1 has the most number of unique suppliers recorded in Meta (166 count).

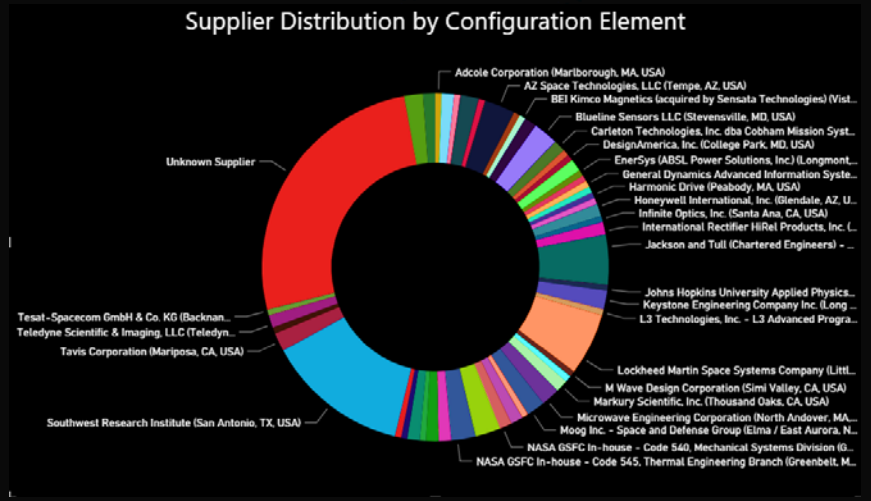


# Larger Supplier Responsibility = Larger Risk

## WFIRST

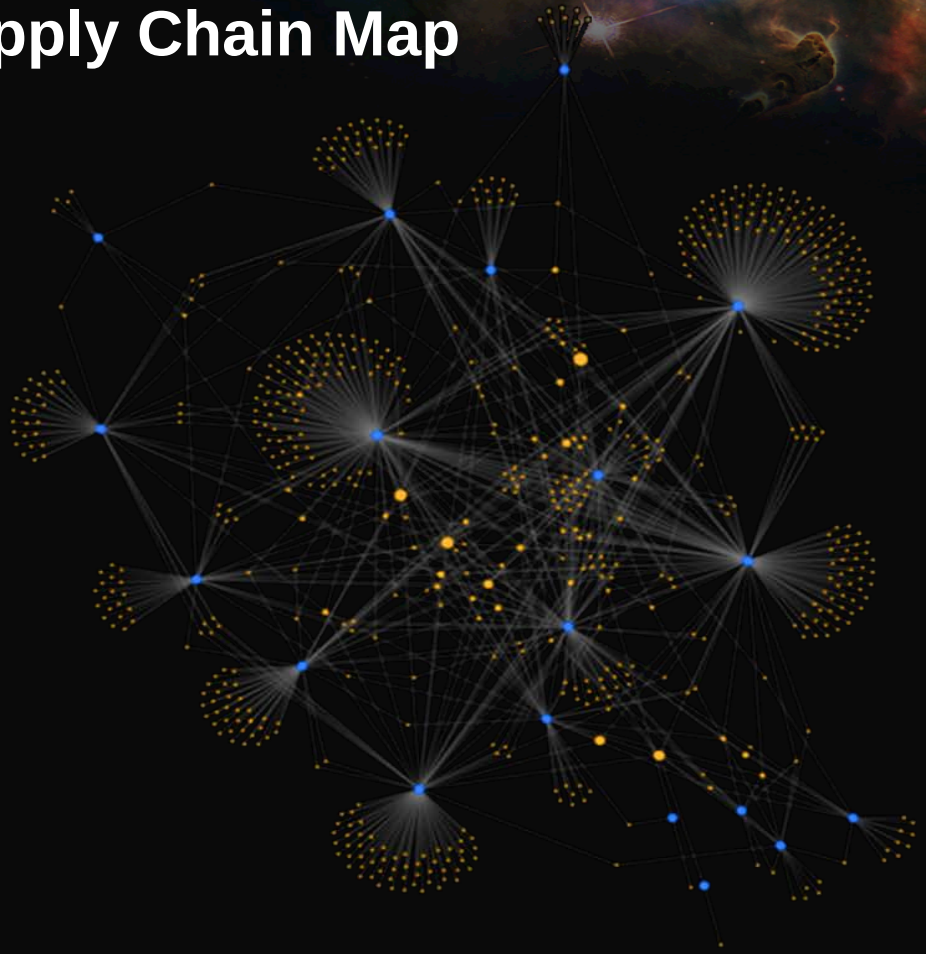



## Lucy / L Ralph



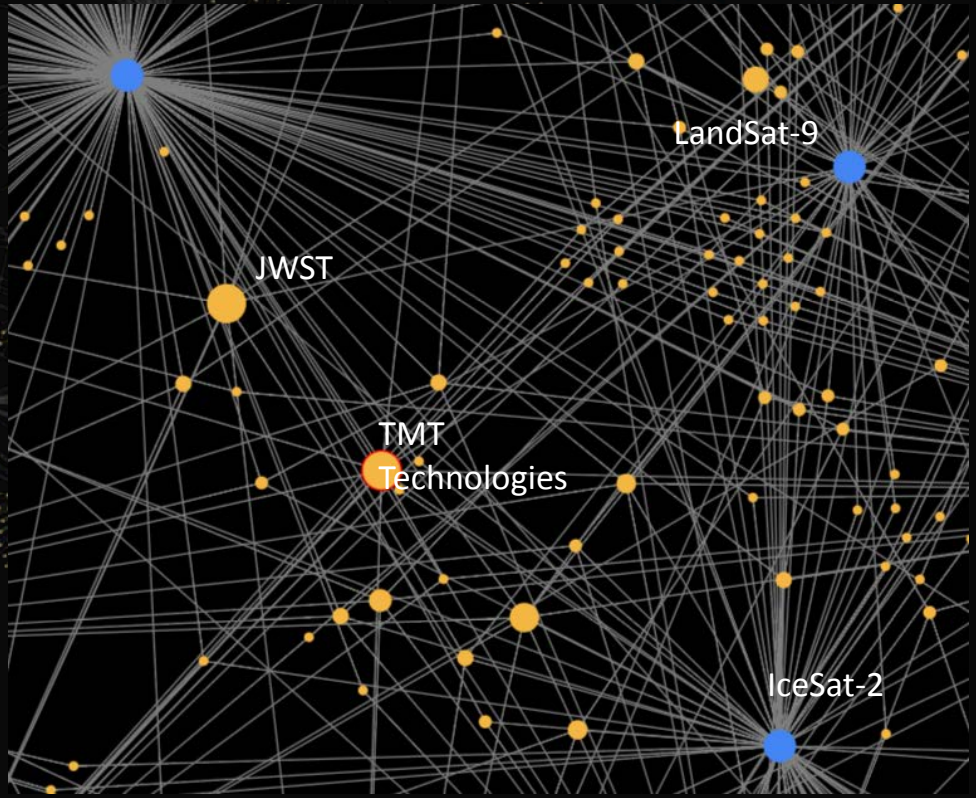

- These graphs illustrate the distribution of suppliers per the project's configuration line items (products & services).
- The segment size for each supplier is determined by the number of line items for which the supplier is contractually responsible.
- The red segments labeled '"unknown suppliers" represent configuration line items for which the supplier is not yet known (e.g., contract may not yet be issued or not recorded in Meta).

# Goddard’s Supply Chain Map



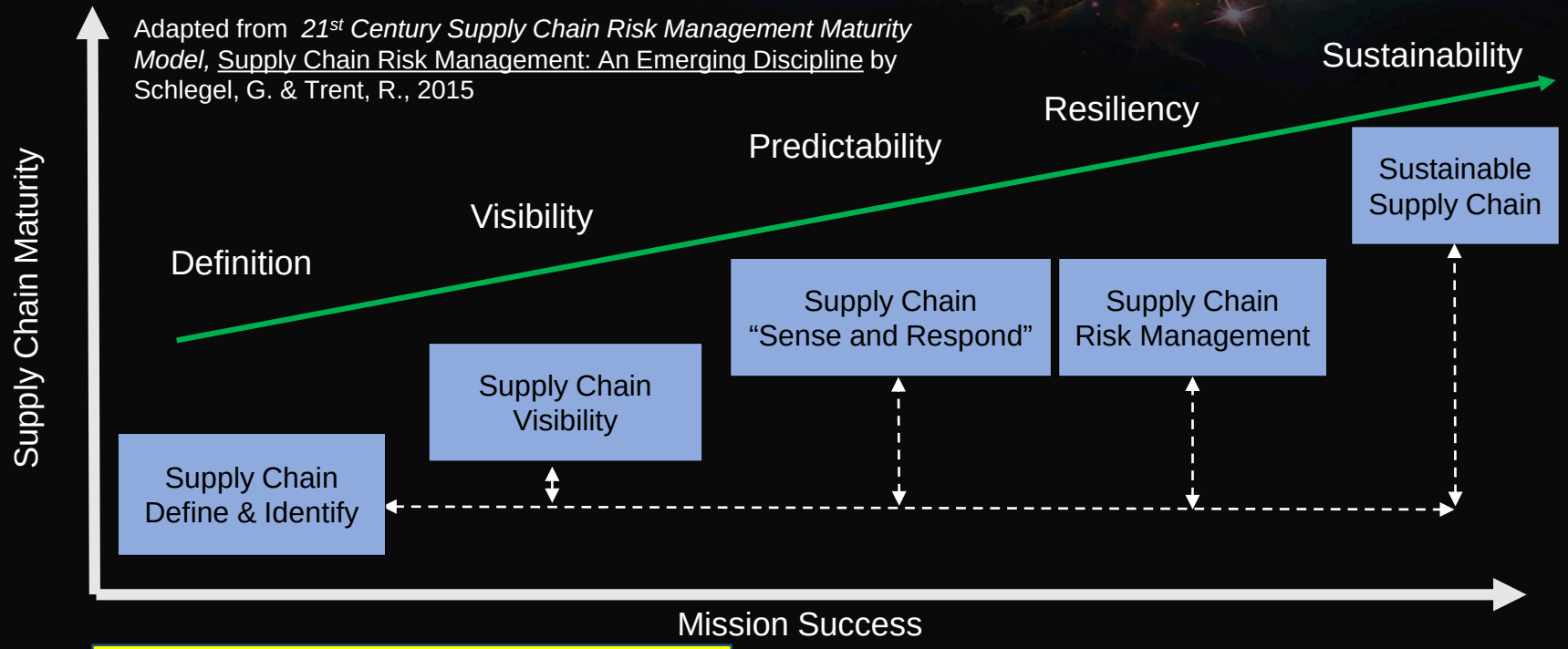
# Drill Down Capability

| Project | Supplier Name, City, St |
|---|---|
| GEDI | TTM Technologies, Inc. |
| GOES-16 (R) | TTM Technologies, Inc. |
| ICESat-2 | TTM Technologies, Inc. |
| ICON | TTM Technologies, Inc. |
| JPSS-1 | TTM Technologies, Inc. |
| JWST | TTM Technologies, Inc. |
| LandSat-9 | TTM Technologies, Inc. |
| LCRD | TTM Technologies, Inc. |
| MOMA | TTM Technologies, Inc. |
| PACE | TTM Technologies, Inc. |
| Restore-L | TTM Technologies, Inc. |
| XRISM | TTM Technologies, Inc. |



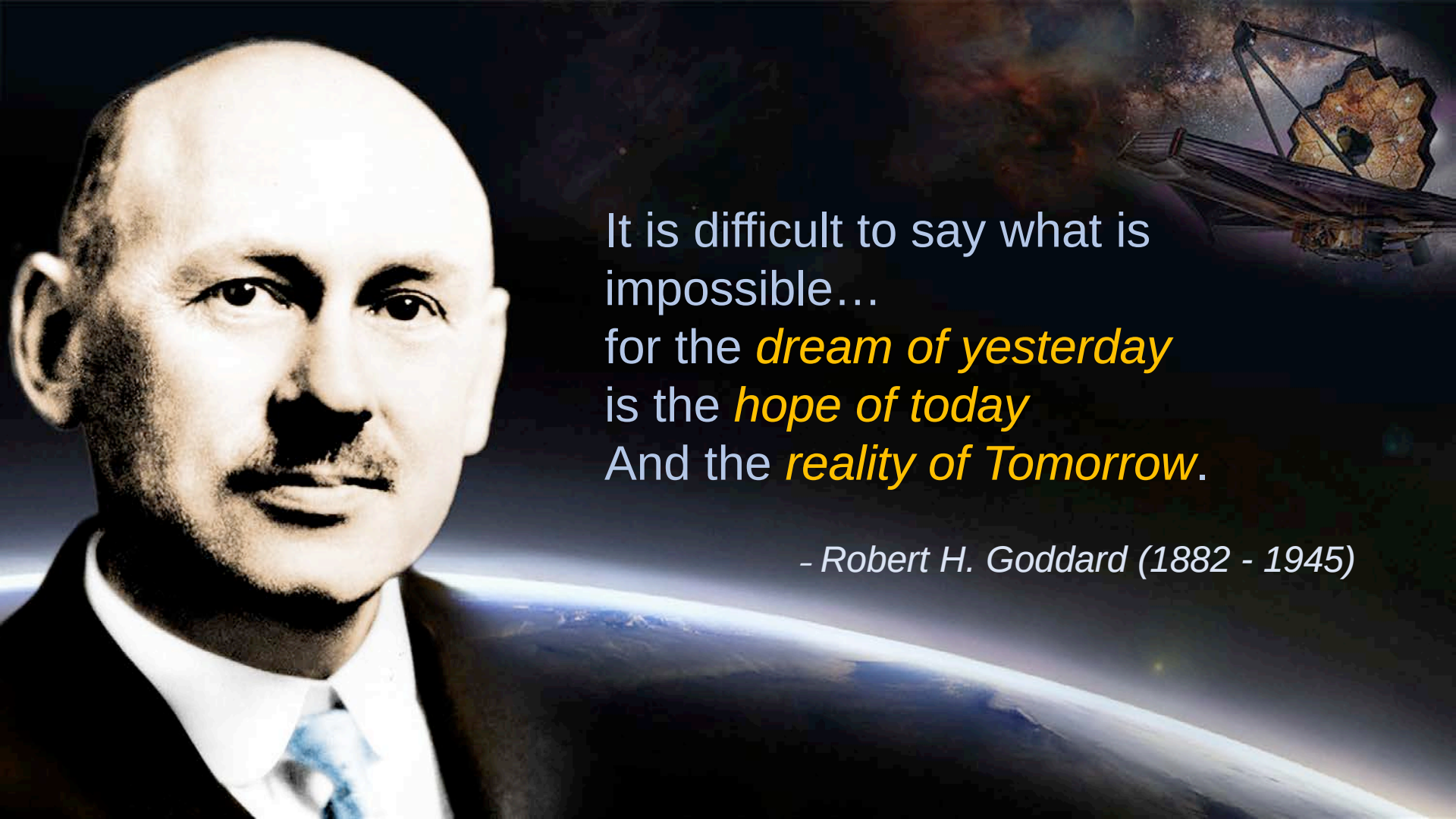
# Supply Chain Risk Management

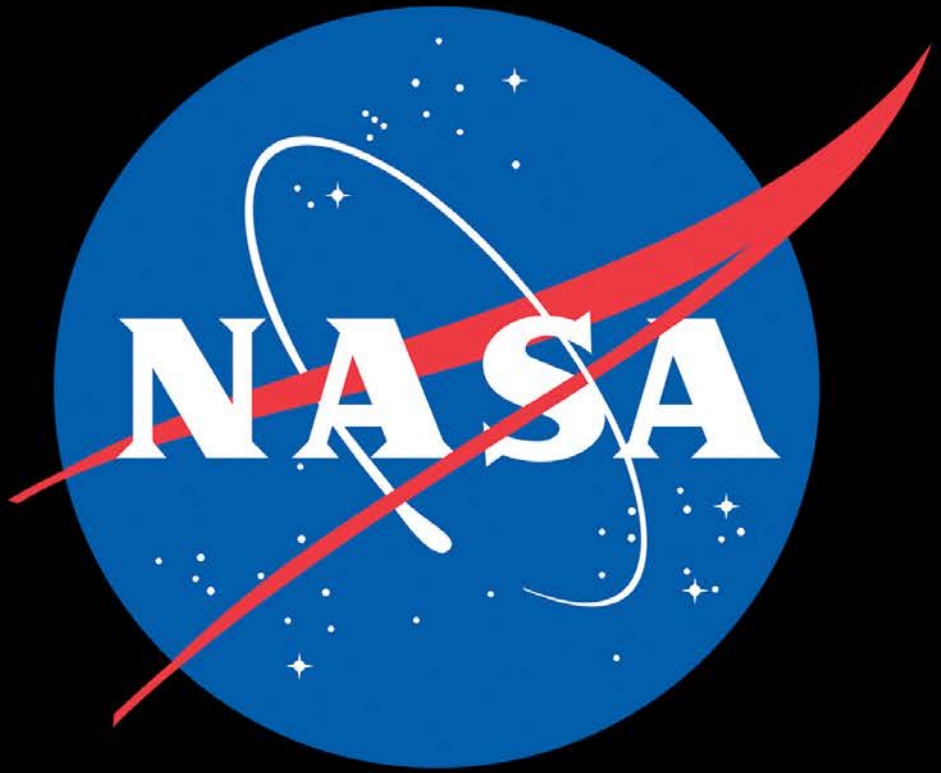
Goddard Space Flight Center




- *Project Management & Procurement*
- *Project Lifecycle Reviews*
- *Internal Management System Assessments*
- *Supply Chain Assessments, Research & Analysis*

- *Supply Chain Mapping & Analytics*
- *Integrated Risk Management*
- *Meta Information System*
- *Digital Transformation*


It is difficult to say what is impossible…
for the dream of yesterday
is the hope of today
And the reality of Tomorrow.
– Robert H. Goddard (1882 - 1945)




For more information, please visit our web site:
**www.nasa.gov/goddard**