



Managing Supply Chain Risks to Space Systems

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Supply Chain Risk Management (SCRM) Program

NASA Office of Safety and Mission Assurance (OSMA)

8th Annual Wharton DC Innovation Summit

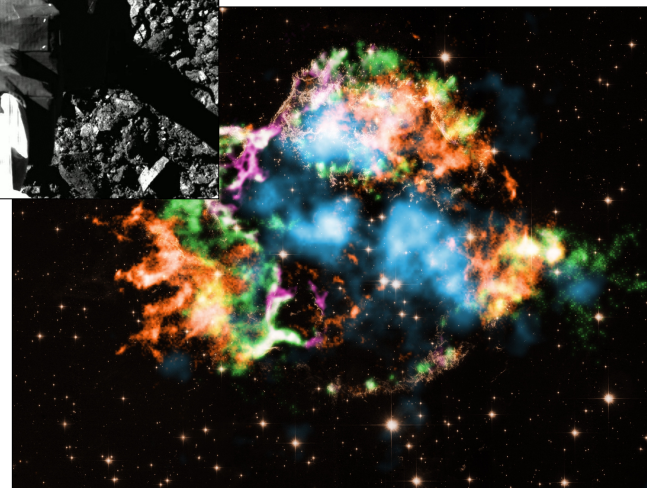
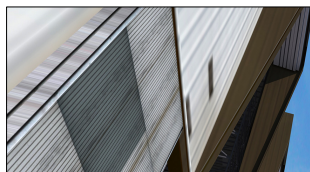
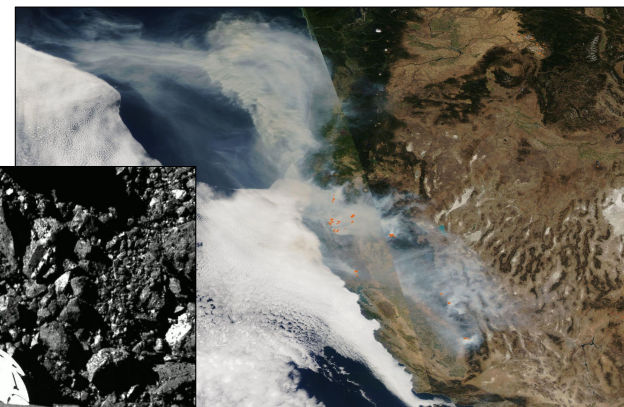
July 14, 2022



About NASA

Mission Directorates

- Aeronautics Research
- Exploration Systems Development
- Space Operations
- Science
- Space Technology





About the OSMA SCRM Program

- Launched October 2019
- Focal point for integrated solutions to SCRM challenges
- Holistic approach to solutions for sustainable, effective SCRM:

- Policy and processes

- Information systems

- Workforce expertise

- Organizational culture

**Multidisciplinary SCRM mindset,
integrated capabilities and
collaboration**

- Key initiatives:



- NASA Supply Chain Insight Central (SCIC) information and analysis services
- SCRM Policy, Processes and Partnerships (P³)
- SCRM Community-Discipline (CD) Building

Being strategic about supply risk management means thoughtfully and proactively leveraging policies, tools and practices to cost-effectively identify and mitigate risks before problems occur. Gartner, 2016 Strategic Roadmap for Supply Risk Solution Deployment



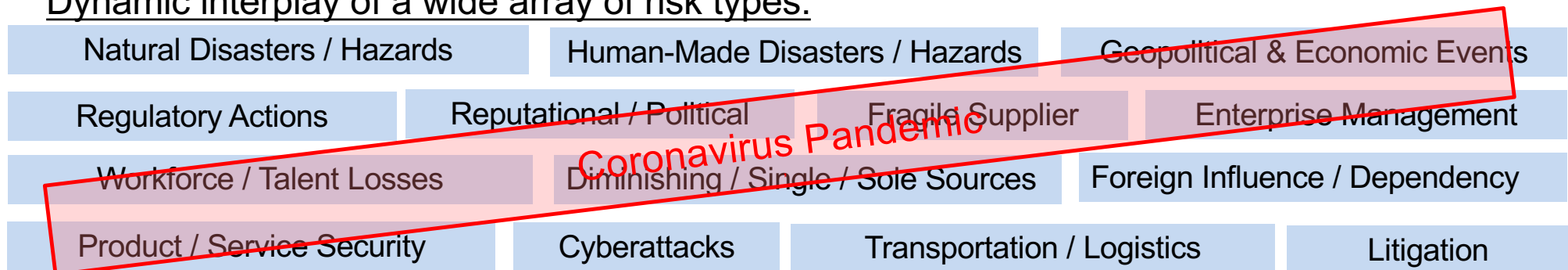
Why SCRM?

A World of Risks Threaten Supply Chains

Trends / conditions driving risks, including:

- Global markets, technology and industry with supply chains operating across geographical, political, social, cultural and economic environments
 - Supply chains yield advantages and exposure to risks
- Competition and conflicts (e.g. **war in Ukraine**)
- Climate change

Dynamic interplay of a wide array of risk types:



Limited Visibility into Supply Chains = Unknown Risk Exposure

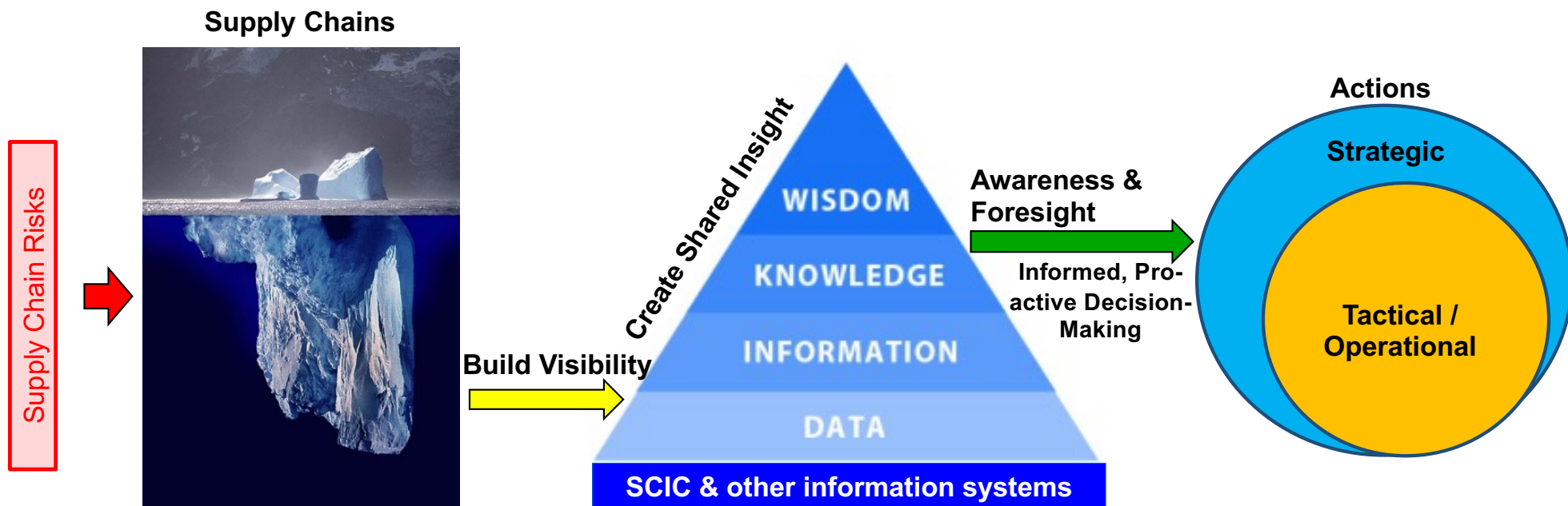


Strategic Situation

- NASA missions rely upon multitiered, interconnected and global supply chains of commercial, non-profit and government organizations to develop and operate complex, high-value and innovative systems for the nation
 - Dynamic array of technical, business, market and security risks threaten to disrupt or deny the timely, affordable provisioning of products and services as required for mission success
- Administration policy:
 - Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers (1/25/2021)
 - ... the United States Government shouldmaximize the use of goods, products and materials produced in, and services offered in, the United States.
 - Executive Order 14017, America's Supply Chains (2/24/2021)
 - The United States needs resilient, diverse and secure supply chains to ensure our economic prosperity and national security.
 - United States Space Priorities Framework (12/2021)
 - the United States will ... strengthen the resilience of supply chains across the nation's space industrial base.



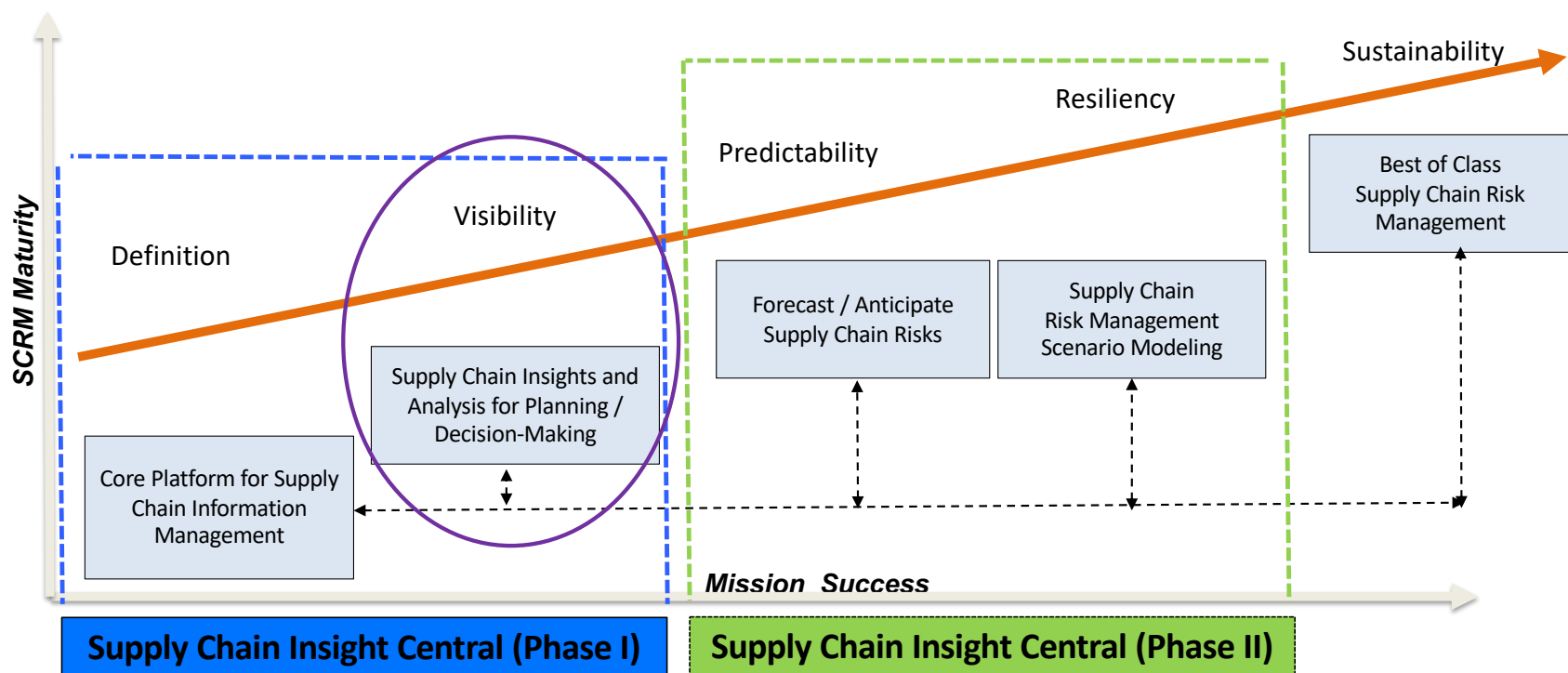
NASA Supply Chain Insight Central (SCIC) Approach



As we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know. Donald Rumsfeld, Secretary of Defense, 2002



NASA Supply Chain Insight Central (SCIC) Information and Analysis Services



Integrated Management of Supply Chain Visibility Information Key to Advancing SCRM



Transiting Exoplanet Survey Satellite (TESS)

Medium Class Explorer

NASA GSFC performed project management

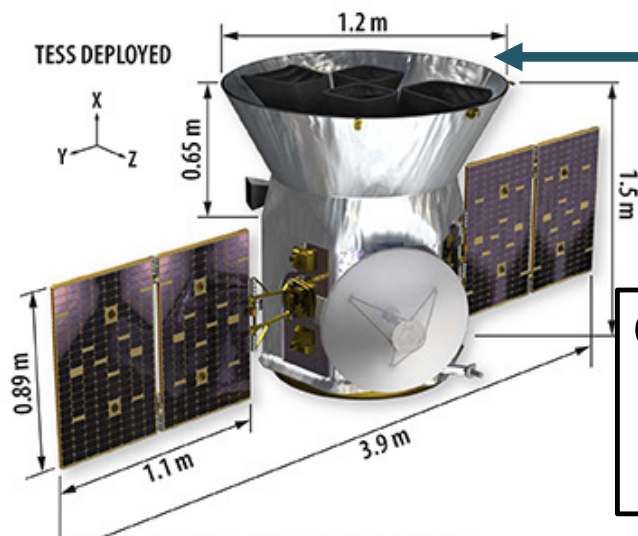
Launched April 18, 2018





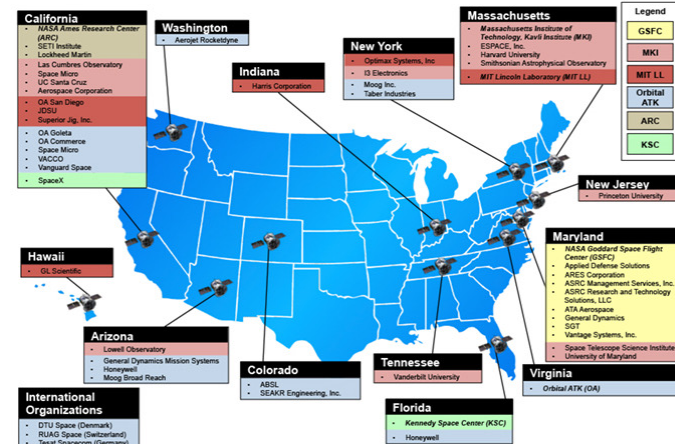
System / Supply Chain Complexity

Transiting Exoplanet Survey Satellite (TESS)



Observatory (system) = spacecraft + instrument

- Subsystems, assemblies, components, parts, materials
- 329 products tracked
- 67 suppliers, located in U.S and five other countries





Supplier Overview

Supplier Name

- ☐ BAE SYSTEMS SCIENCE & TECHNO...
- ☐ Baja Technology LLC (FACILITY CLO...
- ☐ Ball Aerospace & Technologies Corp.
- ☐ Ball Corporation
- ☐ Bandwidth Solutions, Inc.
- ☐ Banphil Photonics, Inc.
- ☐ Barnes Group Inc.
- ☐ Barnes Group, Inc. (DBA Associated...
- ☐ BARNHARTT MANUFACTURING C...
- ☐ Bartol Research Institute at Univers...
- ☐ BASF CORP
- ☐ Bass Machining Company, Inc.
- ☐ Battel Engineering, Inc.
- ☐ Bay Area Circuits
- ☐ BC MACHINE INC.
- ☐ BE AEROSPACE INC
- ☐ Beacon Systems Inc.
- ☐ Bearing Engineers, Inc. (dba Motion...

Project

- ☐ GUES-0 (J)
- ☐ GUES-9 (J)
- ☐ GUES-T
- ☐ GUES-U
- ☐ GOLD
- ☐ GPM
- ☐ GTOSat
- ☐ GUSTO
- ☐ GXRE (for SAC-8)
- ☐ HALO
- ☐ HaloSat
- ☐ HaloSat

Mission Directorate

- ☐ Not Associated
- ☐ HEOMD
- ☐ SMD

State

- ☐ Not Associated
- ☐ Alabama
- ☐ Alaska
- ☐ Arizona
- ☐ Arkansas
- ☐ California

Country

- ☐ Argentina
- ☐ Australia
- ☐ Austria
- ☐ Belgium
- ☐ Bermuda
- ☐ Brazil

Record Link	Supplier	Project	Center/Facility	Mission Directorate	# of Assessments	# of Analyses	# of Other Reports
		ICESat-2, Roman, SWFO-L1	GSFC	SMD	0	0	0
	Supplier Names				0	0	0
					1	0	0
					0	0	0
					0	0	0
					0	0	0
Total					3570	190	16

Project/Supplier Relationships (Beta)

An **orange** node represents a project and a **green** node represents a supplier. The size of the nodes increases proportionally with the number of project / supplier relationships as measured by a Work Breakdown Structure (WBS) element connection for which a supplier provides a product or service for a project.

Record Link	Supplier	Projects	Center/Facility	Mission Directorate	# of WBS Connections	# of Assessments
🔗	Supplier Names	GOES-16 (R), GOES-17 (S), GOES-T, GOES-U, JPSS-2, Landsat-9, Lucy, MMIS, OSIRIS-BEP - B67C, PSP	GSFC	SMD	36	4



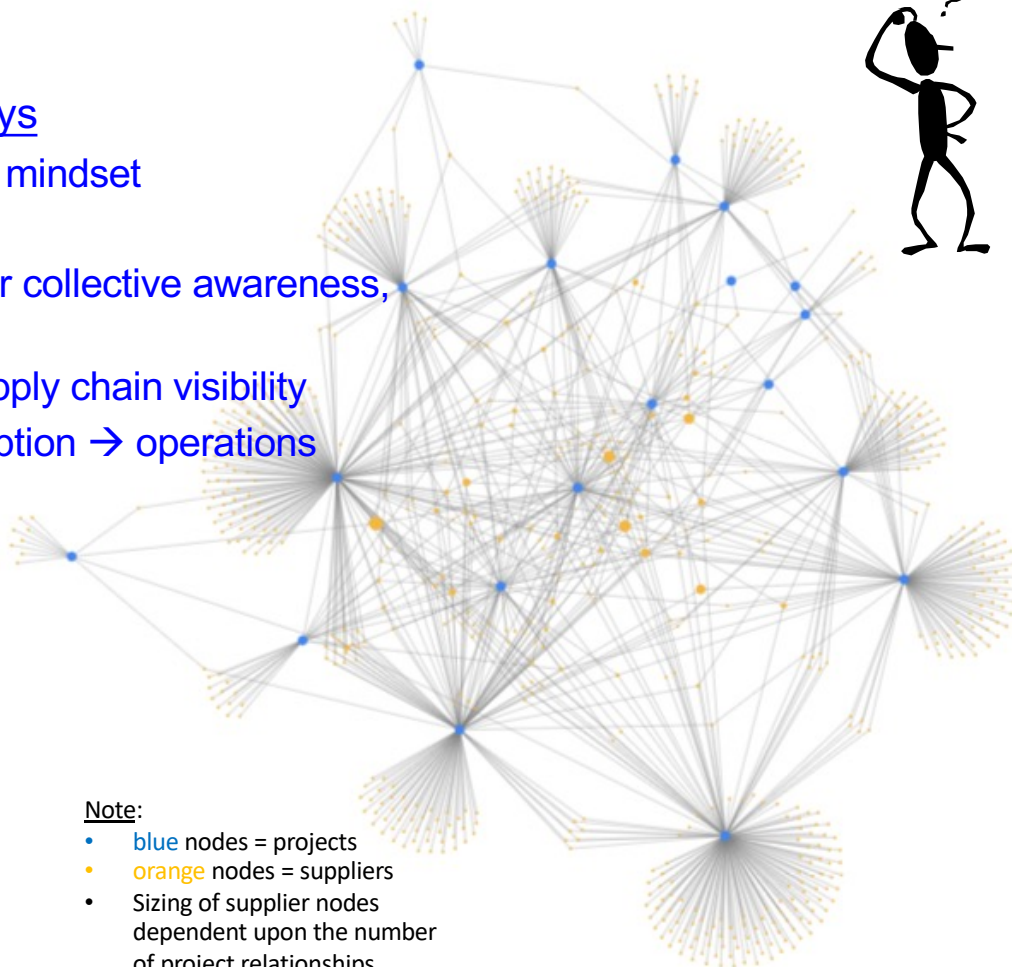
Discussion

Some Take-Aways

- Broad view of risks / multidisciplinary mindset
- Holistic solutions
- Bring data and processes together for collective awareness, insight and action
- Systematically build and maintain supply chain visibility
- Pro-active SCRM from project conception → operations

An Old Proverb

*For want of a nail the shoe was lost;
For want of a shoe the horse was lost;
For want of a horse the rider was lost;
For want of a rider the battle was lost;
For want of a battle the kingdom was lost;
And all for the want of a horseshoe nail.*



Note:

- blue nodes = projects
- orange nodes = suppliers
- Sizing of supplier nodes dependent upon the number of project relationships

