

# Our Key Questions

- What interdependencies do we have and how do we address them?
- What operations / customers are critical?
- How are criticality and interdependency linked?

*Goal: To share insights*

# NYU International Center for Enterprise Preparedness



- **Resilience / operational risk management**
- **Heterogeneous approach**
  - Cross-Discipline / Cross Job Title
  - Cross – Industry
- **Holistic engagement**
  - Private Sector Corporations
  - Governments
  - NGOs
  - Research / Subject Matter Expertise
  - Critical Infrastructure

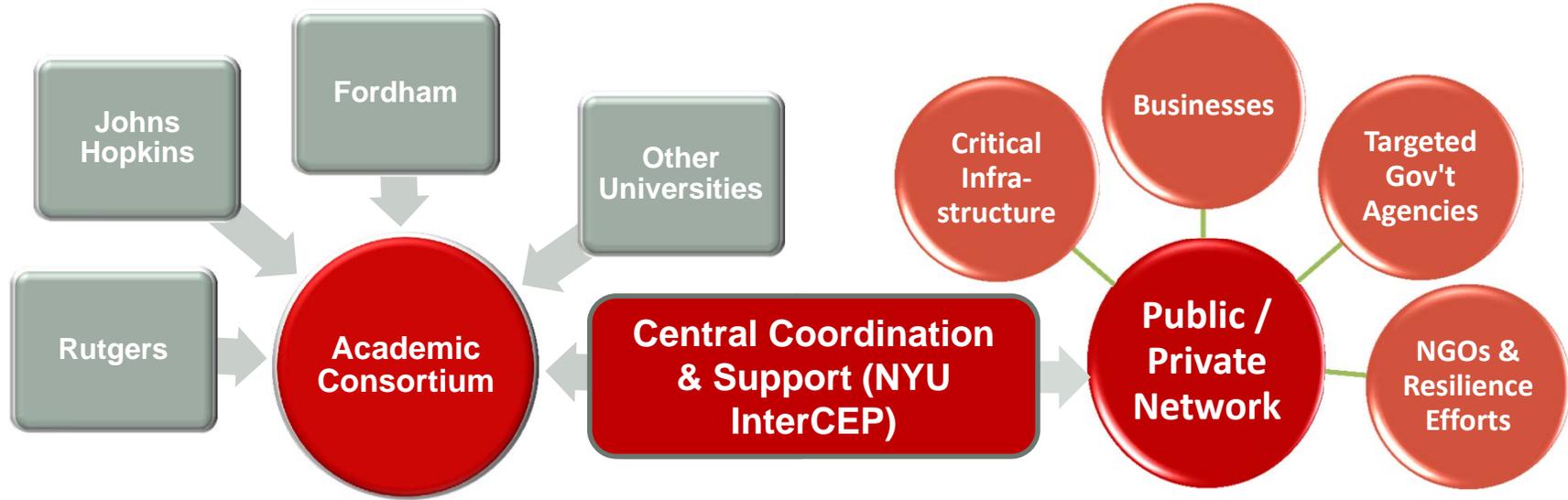
# Regional Resilience Project

- **Framework** for Resilient Risk Management (based on best practices & int'l standards)
- **Operational Picture** of Key External Relationships in the Goods Movement Domain
- **Regional Resilience Network** of public and private organizations to collaborate on shared risks (regional / cross-jurisdiction / cross industry)

# Regional Resilience Initiative

## University Engagement\*

## Business / Organizational Outreach



- *Framework Strategy*
- *Operational Picture*
- *Targeted Research / Special Projects*

- *Joint Planning & Exercises*
- *Best Practices / Lessons Learned*
- *Resources & Engagement in Crisis*

\*Participation is subject to final organizational commitment.



# June Global Risk Forum

- What is resilience?
- What are key drivers of resilience?
- How do you operationalize resilience?
- How do you measure it?

# Dependency / Interdependency

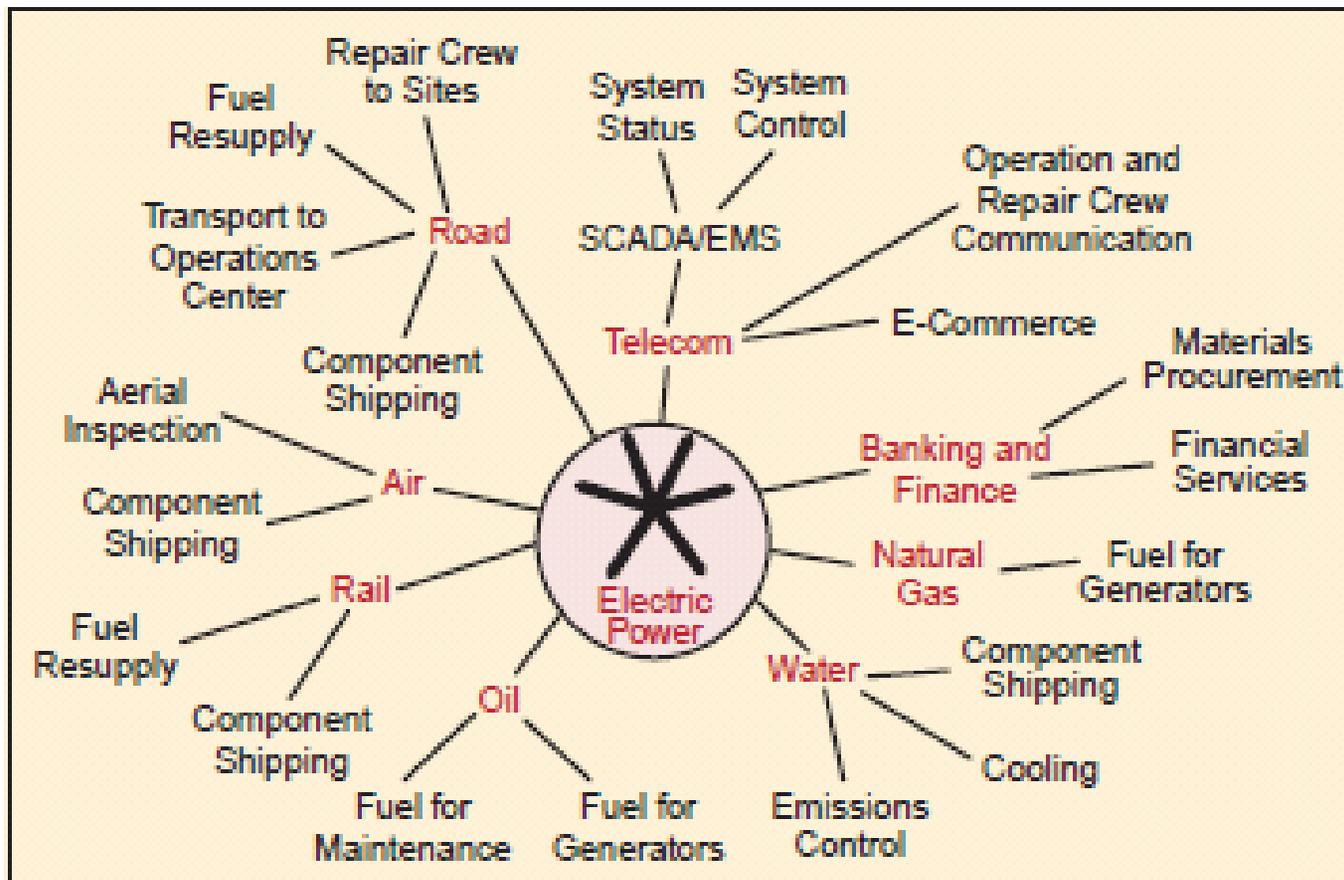
- What is
  - dependency?
  - interdependency?
- How are you determining (methodology) & who is determining?
- What are you doing to address?

# What is a dependency?

A linkage or connection between two infrastructures, through which the state of one infrastructure influences or is correlated to the state of the other.



Rinaldi, S.M.; Peerenboom, J.P.; Kelly, T.K.: "Identifying, understanding, and analyzing critical infrastructure interdependencies." *IEEE Control Systems Magazine*, Dec 2001



**Figure 2.** *Examples of electric power infrastructure dependencies.*

“Identifying, understanding, and analyzing critical infrastructure interdependencies”

Rinaldi, S.M.; Peerenboom, J.P.; Kelly, T.K.

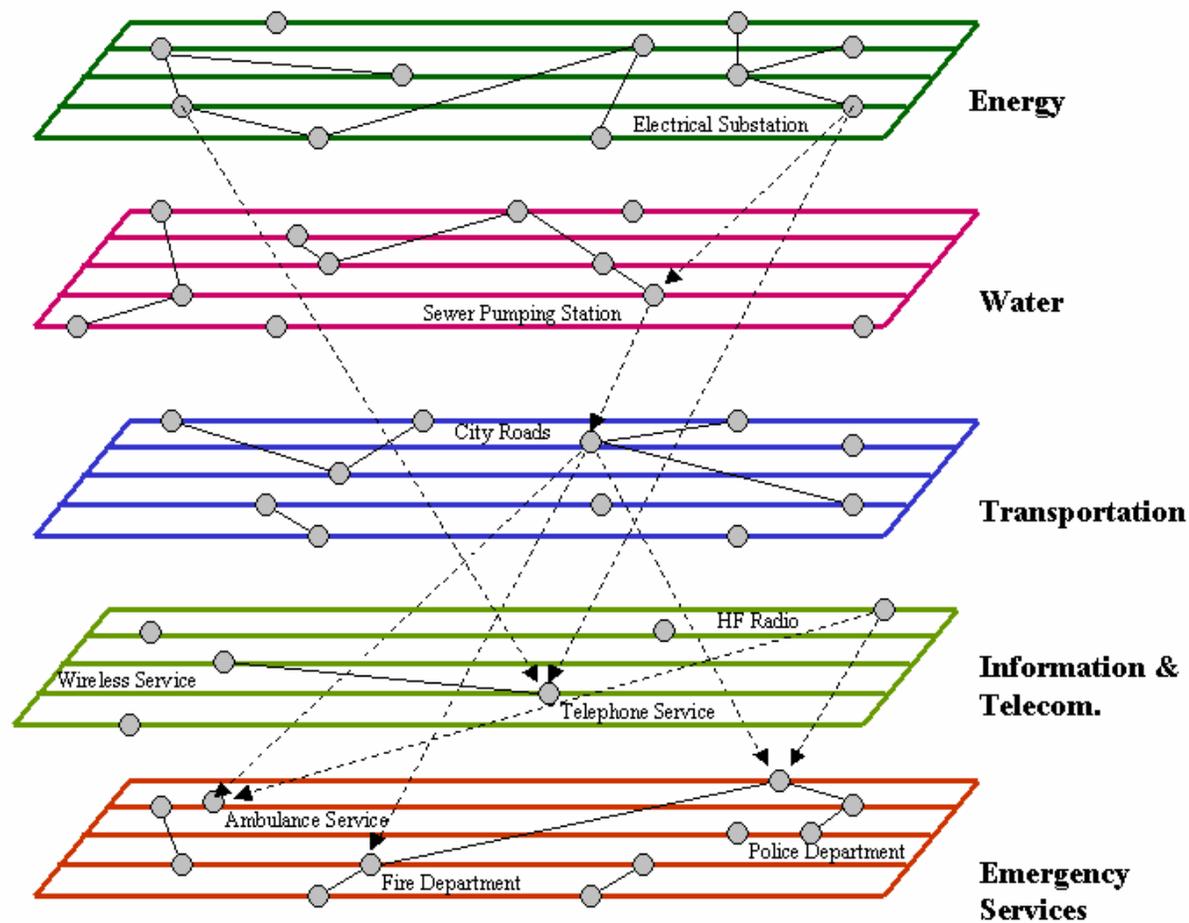
*IEEE Control Systems Magazine, Dec 2001*

# What is an interdependency?

A bidirectional relationship between two infrastructures through which the state of each infrastructure influences or is correlated to the state of the other. More generally, two infrastructures are interdependent when each is dependent on the other.



Rinaldi, S.M.; Peerenboom, J.P.; Kelly, T.K.: "Identifying, understanding, and analyzing critical infrastructure interdependencies." *IEEE Control Systems Magazine*, Dec 2001



### Infrastructure Interdependencies

“CIMS: a framework for infrastructure interdependency modeling and analysis”

Donald D. Dudenhoeffer, Mary R. Permann, Milos Manic

*WSC '06 Proceedings of the 38<sup>th</sup> conference on winter simulation, 2006*

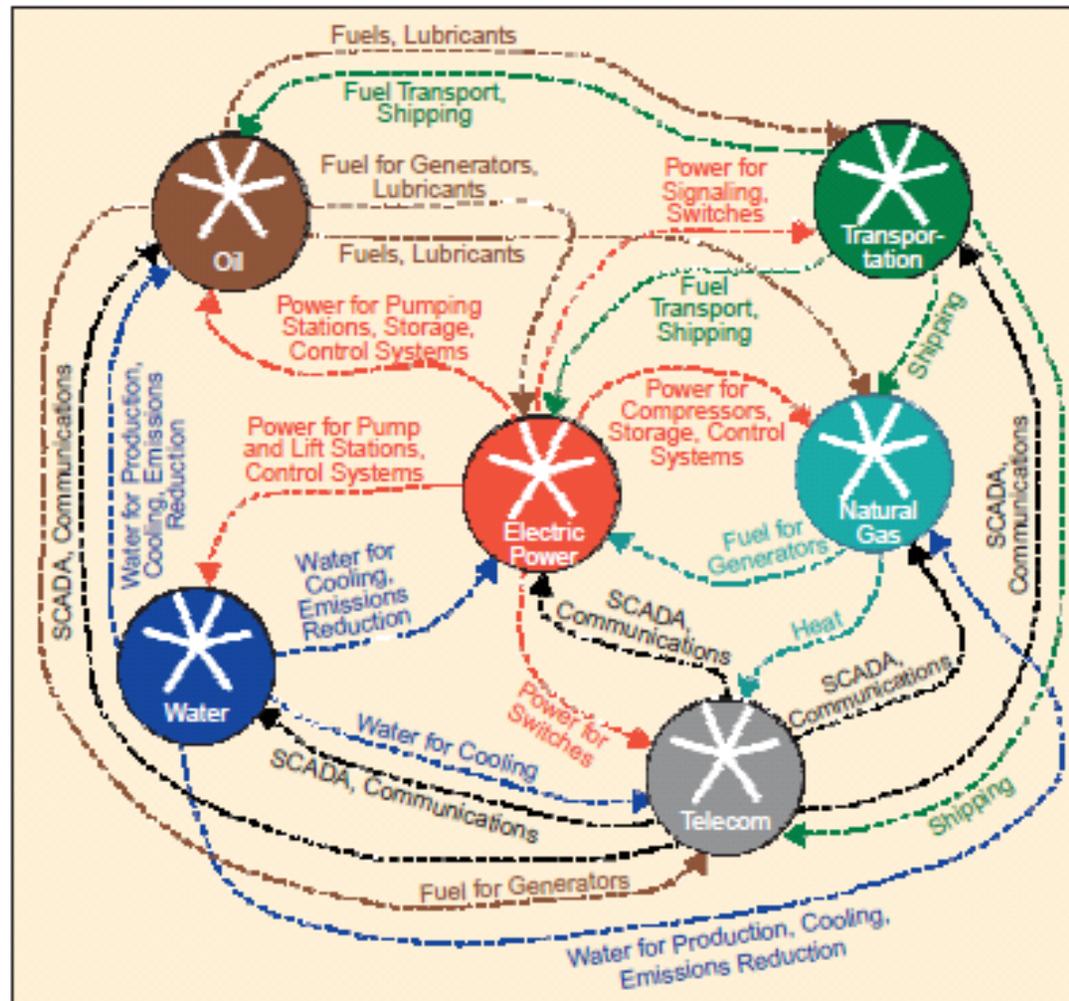


Figure 3. Examples of infrastructure interdependencies.

**“Identifying, understanding, and analyzing critical infrastructure interdependencies”**

Rinaldi, S.M.; Peerenboom, J.P.; Kelly, T.K.

*IEEE Control Systems Magazine, Dec 2001*

# Dependency / Interdependency

- In your world, what is
  - dependency?
  - interdependency?
- How are you determining (methodology) & who is determining?
- What are you doing to address?

# Criticality

- How do you define a “critical” user?
- Who determines the “criticality” of users?
- How do you treat critical customers?  
*(including sub-prioritization)*

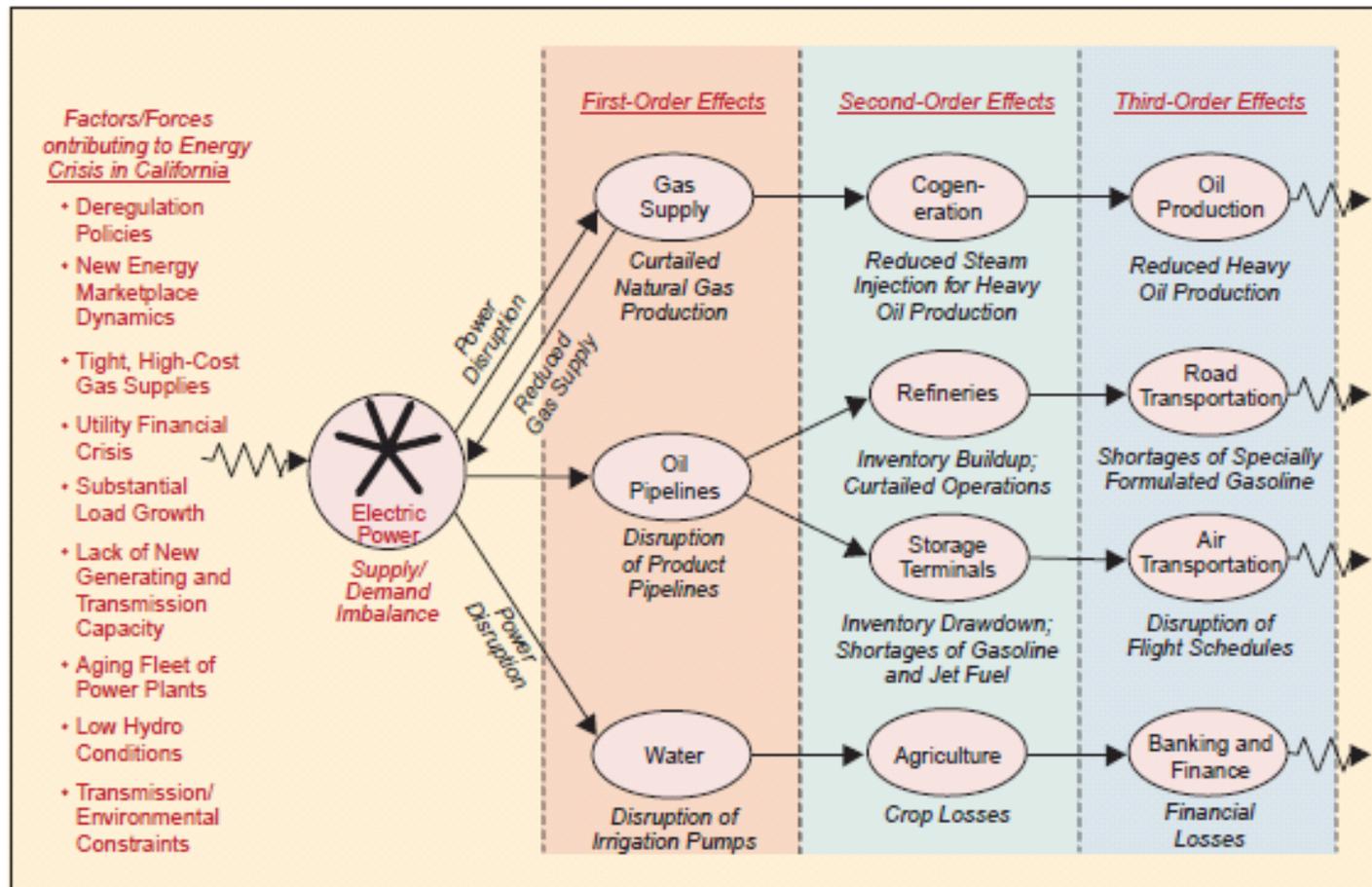


Figure 4. Examples of *n*th-order interdependencies and effects.

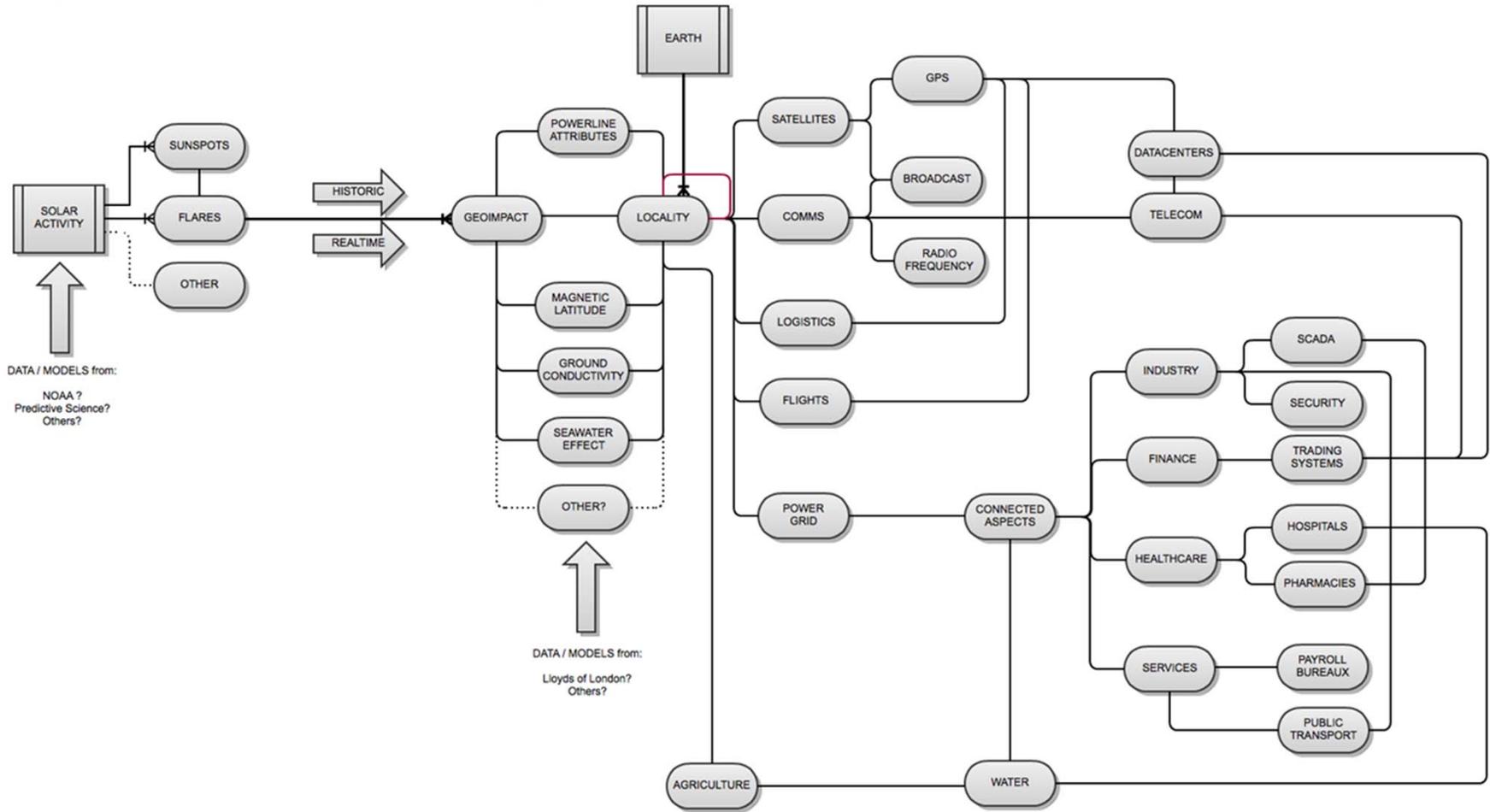
“Identifying, understanding, and analyzing critical infrastructure interdependencies”

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*IEEE Control Systems Magazine*, Dec 2001

### Solar Cascade:

A (Very!) Brief Indication of the Causal Mesh Impacted by Solar Events



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Cascade Platform  
Xuvasi

# Criticality

- How do you define a “critical” user?
- Who determines the “criticality” of users?
- How do you treat critical customers?  
*(including sub-prioritization)*

# Linkage?

- Is there value in linking interdependency and criticality?
- If so, how can this best be done?

# THANK YOU

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