Beyond The Storms

Operationalizing Critical Infrastructure Resilience

- *What* was Uncovered
- Strategic Objectives
- *How* to Implement
- Way Forward

Strategic independent CIP study

Identified *what* the systemic issues were…

- Building on exploratory research to:
  - Understand *how* to address the CIKR findings
  - Introduce new methodology to increase preparedness
  - Demonstrate utility to local, state, regional, federal players
  - Develop an adaptable Resilience Implementation Process (RIP)

"Officials face challenges every day that seem detached from national-level policies. This unique integration of collective action and interagency coordination bridges that gap with a resilience framework …"

Jim McDonnell, Chief of Police, City of Long Beach, CA

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National Preparedness Strategic Context

Functional resilience imbedded in public policies

Governance	Operations	Systems
• Doctrine • Policy • Guidance	• CONOPS • SOP/TTPs • DOTMLPF	• Control • Cognitive • Cyber • Communications

Develop a systematic framework to operationalize resilience

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Why Infrastructure Matters for the Future

We depend daily on these systems…

- Private sector: owns & operates 65-85% of the national infrastructure
- Electric grid: interconnected transmission systems and transformers reveal risks
- Bridges: over 25% are structurally deficient
- Dams: 85,000, average age over 50 yrs, some 4,000 at risk
- Transportation: 30% of roads in disrepair, 36% urban highways congested
- Oil: over 80% of US refined oil supply is distributed through a single hub
- Maritime: 361 major ports, 28M containers/year, world's largest trade ($645B)
- Pandemic Influenza: lack vaccines for virus outbreak impacting over 156M
- Global GDP: could double by 2030, resulting in… *
  - air passenger traffic doubling in 15 years
  - air freight tripling in 20 years
  - maritime container traffic quadrupling by 2030

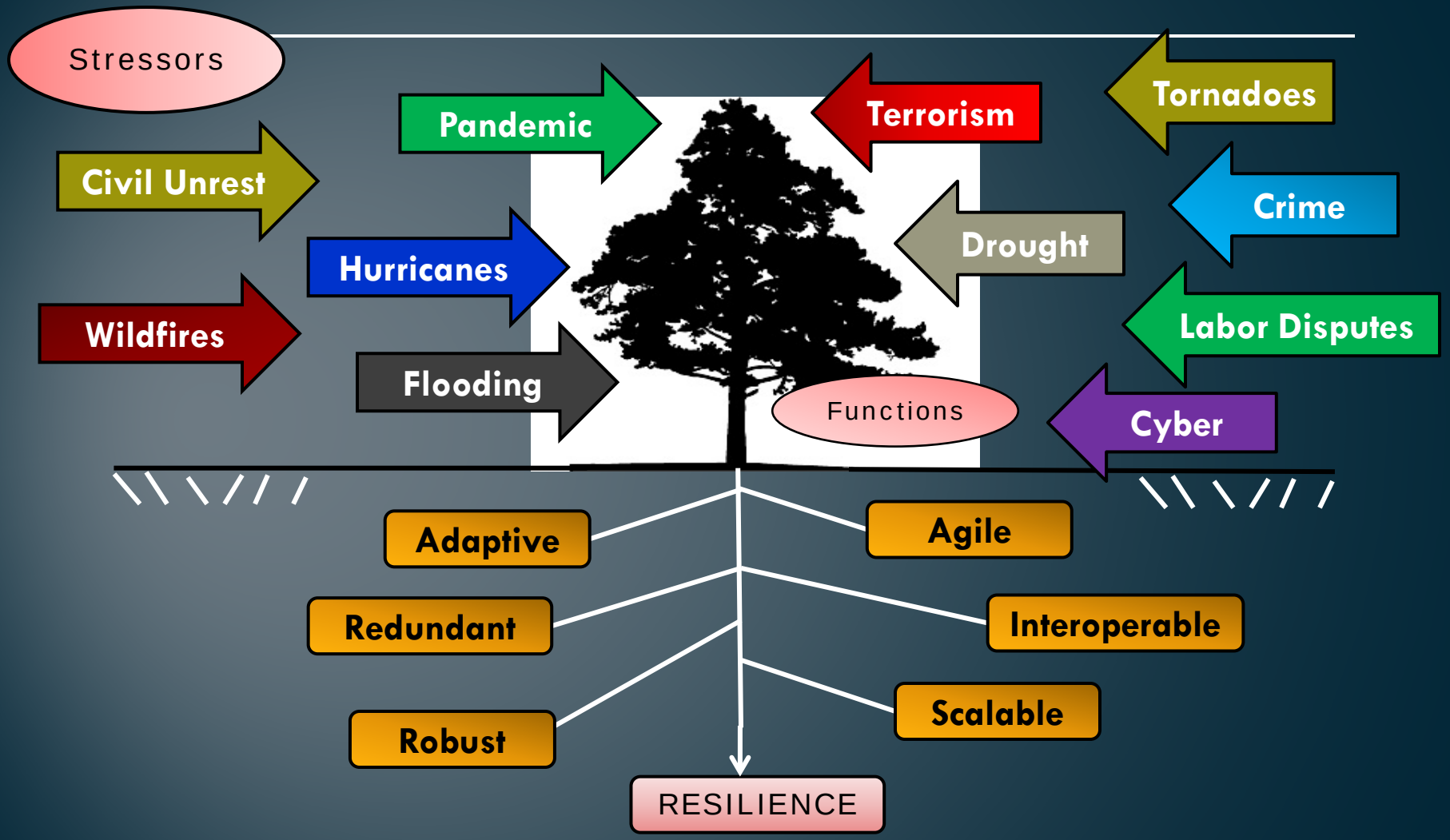
* Organization of Cooperation and Development (2013)

Facing Inevitable Stressors

The emerging threat environment requires new innovations…

- Globalization and technology improve speed, efficiencies and access, but also reveal vulnerabilities
- Natural disasters and climate change yield disruptive events with greater frequency and intensity
- Demographics show urban mega-communities in more coastal regions, exposing population and GDP
- Terrorism continues to assert a vexing domestic and international asymmetric threat
- Aging Infrastructure is eroding, exposing the homeland's most fragile points of failure

Functional Resilience



Major Findings (93)

18 themes from policies, SME interviews, and case studies…

- Strategic Vision
- Cultural Factors
- Public-Private Partnerships
- Whole-of-Nation Challenges
- Capabilities Approach
- Information Sharing
- Operational Application
- Measurements & Metrics
- Maritime Security
- Resilience
- Cyber Security
- Risk Assessments
- Mitigation
- National Framework
- Intelligence
- Legislation Changes
- Policy Factors
- Global Supply Chains

…from local, state, regional, national level, public-private sectors

Recommendations

Total of 20: 13 strategic & 7 operational

- Introduce a functional resilience framework that serves as a catalyst for change at the personal, local, community as well as national level

- Operationalize "whole community" vision through grassroots local, regional, and state initiatives

- Incentivize private sector investments w/existing business hooks (banks, suppliers, customers, insurance, distributors, etc)

- Transform risk assessment methods beyond R = f(T,V,C) w/ capabilities-based modeling iso functional resilience v. "fixing things"

- Map complex dependencies and interdependencies across regional mega communities and global supply chains

- Leverage data and legislation to create new "markets" via insurance industry, indemnification, FOIA waivers, equity investors

- Invest in critical infrastructure resilience as a national imperative—interconnected solutions for interdependent systems

National Resilience Framework

A cross-domain scalable continuum… but how to implement?

… but how would you operationalize the framework?

Project Methodology

Integrated 3-phase approach

1 Risk Map... Understand current state

Based on collective action principles, examine a bounded geographic area (PANYNJ/POLALB/TEXAS) with complex intermodal infrastructures to study *connectedness* via dependencies and interdependencies

2 Functional Resilience Framework... Analysis

Based on the risk map, develop a systematic approach based on criticality and capabilities—across critical infrastructure sectors—that is scalable and adaptable to any geographic region

3 Action Plan... Capabilities Analysis Exercise (CALEX)

Based on the BTS study findings, risk map, and functional resilience framework conduct a collaborative exercise informed w/local, state, regional, and national-level preparedness reps... building consensus for a new approach

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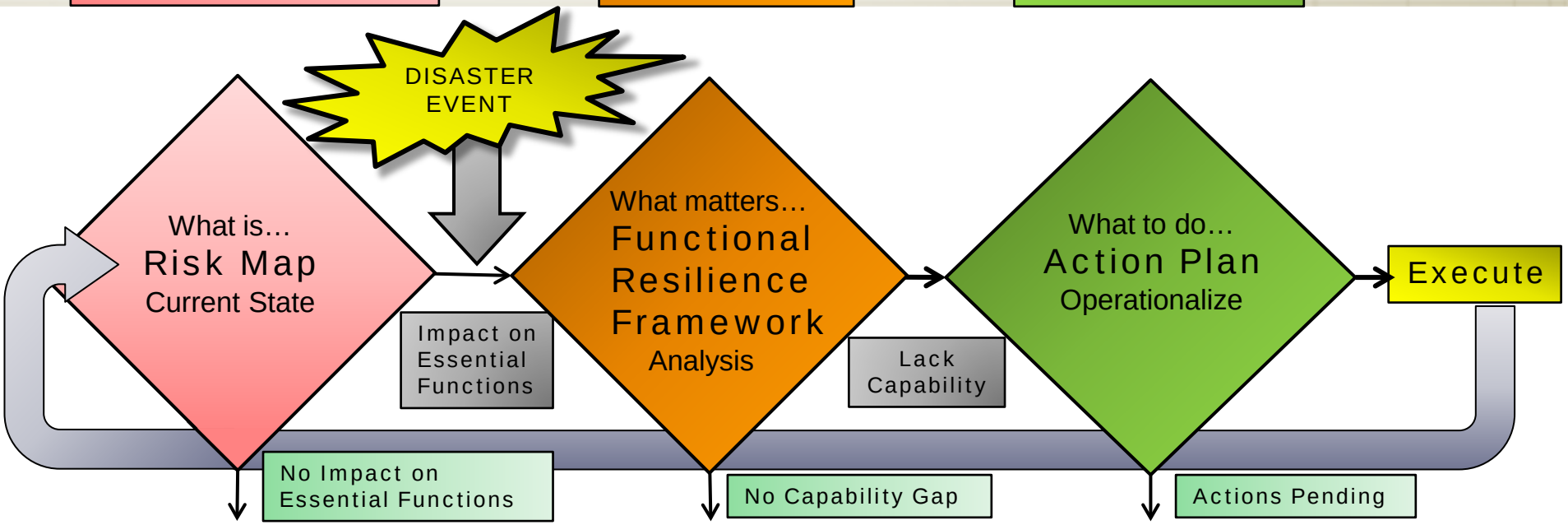
Resilience Implementation Process (RIP)

Phase 1	Phase 2	Phase 3
Function Based	Event Based	Priority Based
What are the Relationships?	*Is it a Problem?*	*How to Remedy?*



Connectedness	Assessment Criteria	Solutions	Operating Variables
Physical & Virtual	Qualitative & Quantitative	Materiel & Non-materiel	
Dependencies	Criticality	Governance, Operations, Systems	
Interdependencies	Capabilities	Time, Cost, Scope	

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