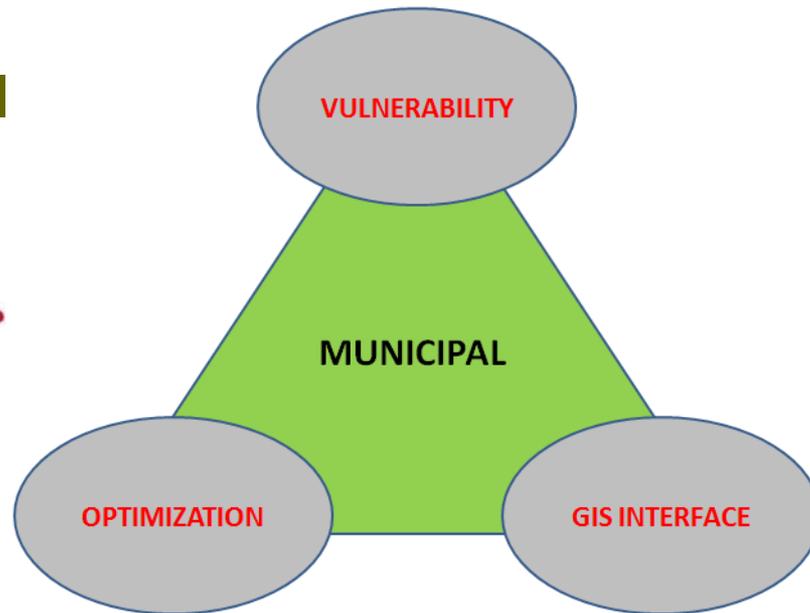


MUNICIPAL:

A Decision Technology to Support Mitigation, Response, and Restoration Decisions



Burak Cavdaroglu, Rensselaer Polytechnic Institute

**DHS SUMMIT 2011 – Student Day
March 29, 2011**

Project Overview



Project Overview



Project Overview



Project Overview

Develop decision technologies to support pre-disaster (mitigation) and post-disaster (restoration) decision-making

Multi-Network Interdependent Critical Infrastructure

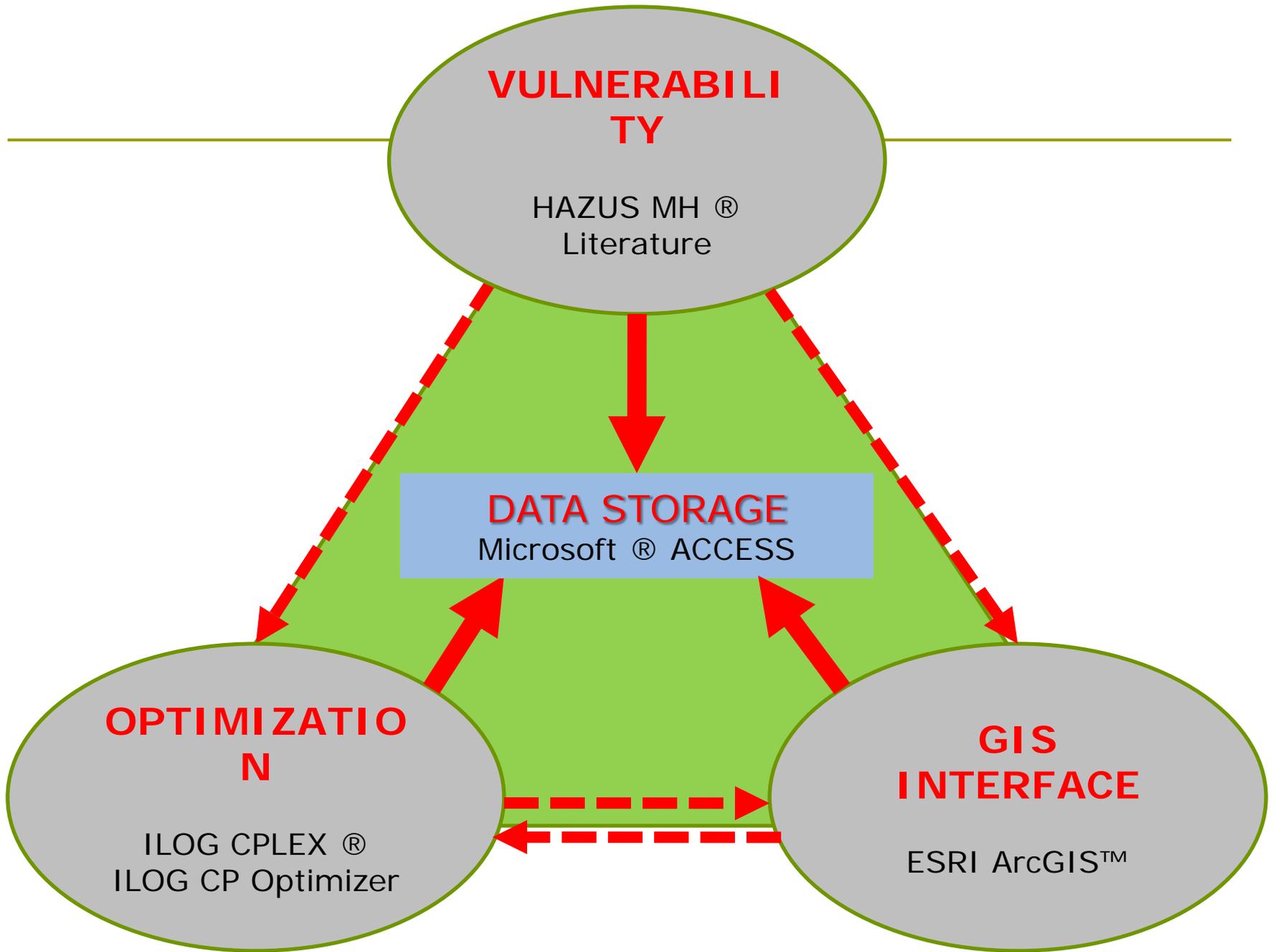
Program for the Analysis of Lifelines

Project Relevance to DHS S&T Mission

- The first objective of “Strategic Goal 3” in Department of Homeland Security Strategic Plan
 - to protect and strengthen the resilience of the nation’s critical infrastructures and key resources

- The second objective of “Strategic Goal 4”
 - to strengthen response and recovery

Source: U.S. Department of Homeland Security Strategic Plan Fiscal Years 2008–2013
(http://www.dhs.gov/xlibrary/assets/DHS_StratPlan_FINAL_spread.pdf)



Optimization

ESRI ArcGIS™
VISUALIZATION OF THE RESULTS

Selection **OPTIMIZATION**

Selection
Assignment
Scheduling **RESTORATION**

ILOG OPL DEVELOPMENT STUDIO ®
(ILOG CPLEX® + Constraint Programming)
OPTIMIZATION

Microsoft® ACCESS
DATA STORAGE

Output the results

Retrieve the input data

Transfer the results to ArcGIS

GIS Interface



Insert video here

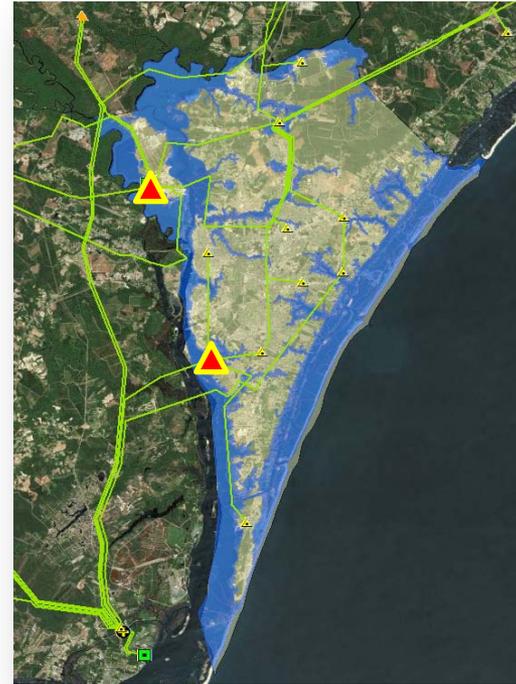
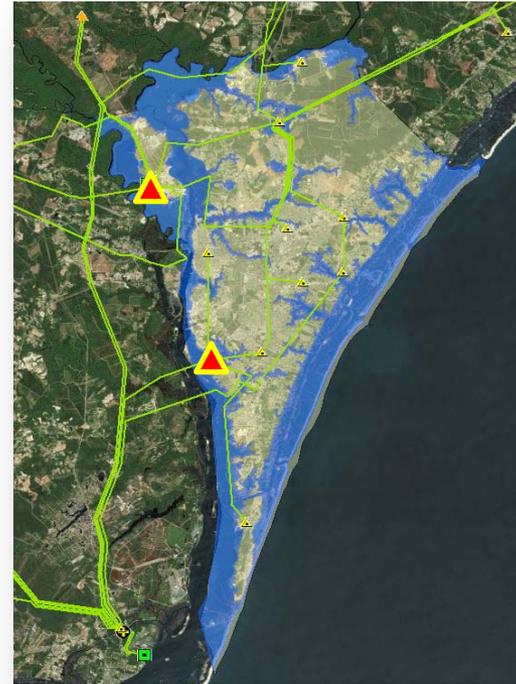
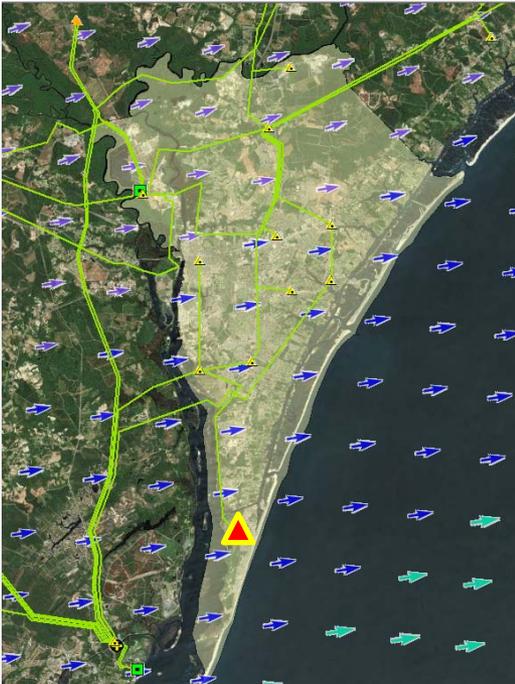
Vulnerability

Vulnerability

Wind

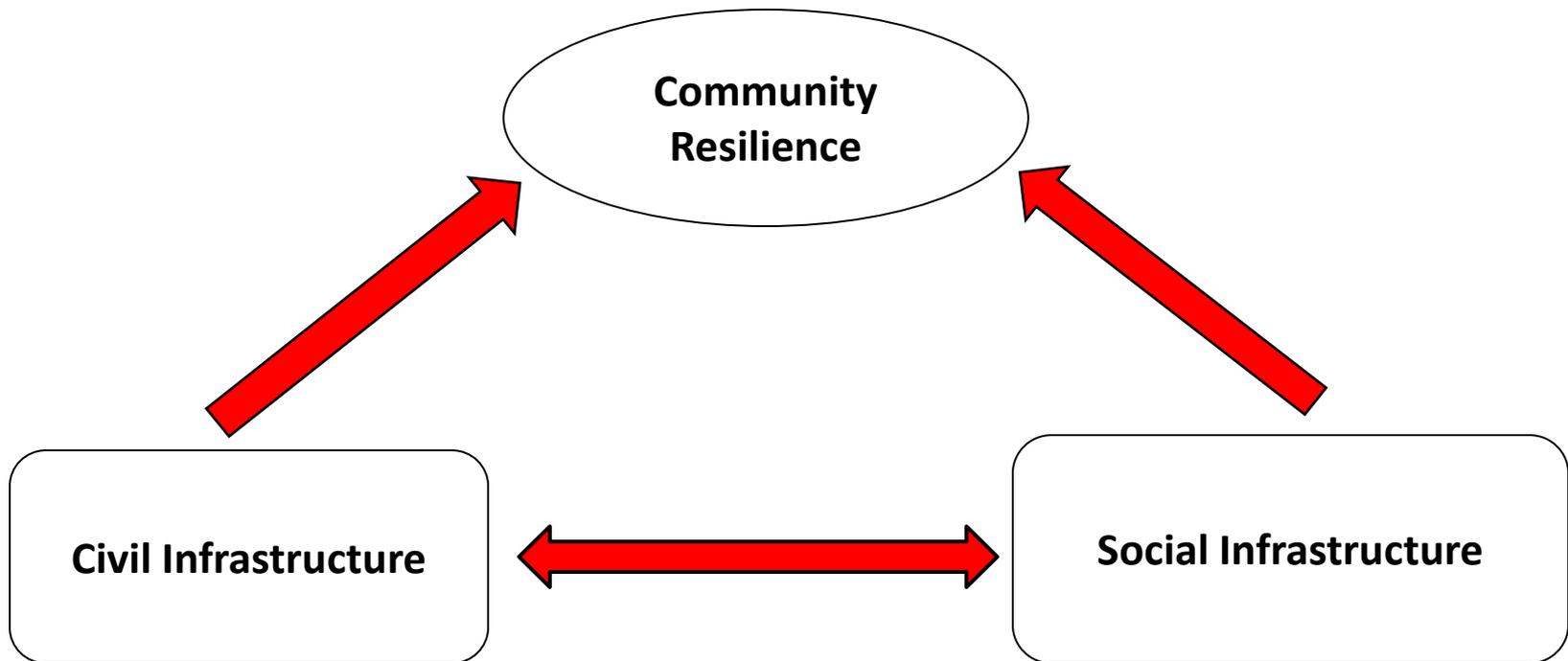
Flood

Storm Surge

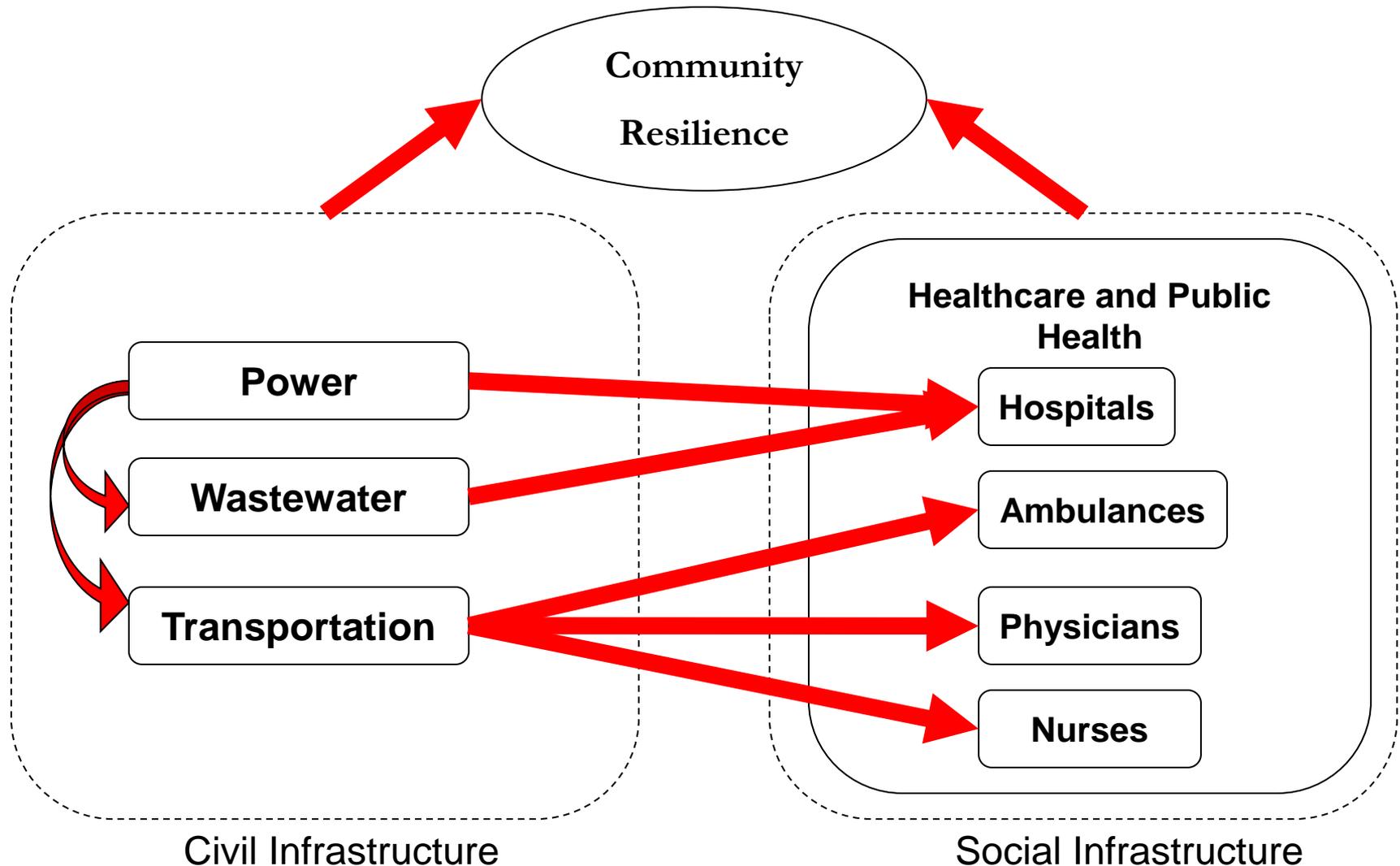


Next Step:

Community Resilience and Social Infrastructure



Interdependencies between civil and social infrastructures



Social Infrastructure

- How do we optimize the restoration of *civil* infrastructures to minimize the disruptions in *social* infrastructure?
- How do we optimize the restoration of *social* infrastructures to minimize the disruptions in *civil* infrastructure?

For a resilient community, disruptions to social and civil infrastructures *must be mitigated* and services *must be restored*.

Project Participants

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□ Students

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Rensselaer

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