



INTRODUCTION

- Disaster preparedness is essential for community resilience in response to crises.
- Resilience requires integrating social, economic, environmental, and infrastructural factors.

CHALLENGES IN COMMUNITY RESILIENCE

- Complex interdependencies among community elements hinder resilience-building.
- Inadequate vulnerability assessments lead to inefficient resource allocation.
- Evacuation models lack robustness for dynamic disaster scenarios.
- Need for scalable, intelligent resilience frameworks adaptable to communities.

ADDRESSING WITH DIGITAL TWINS

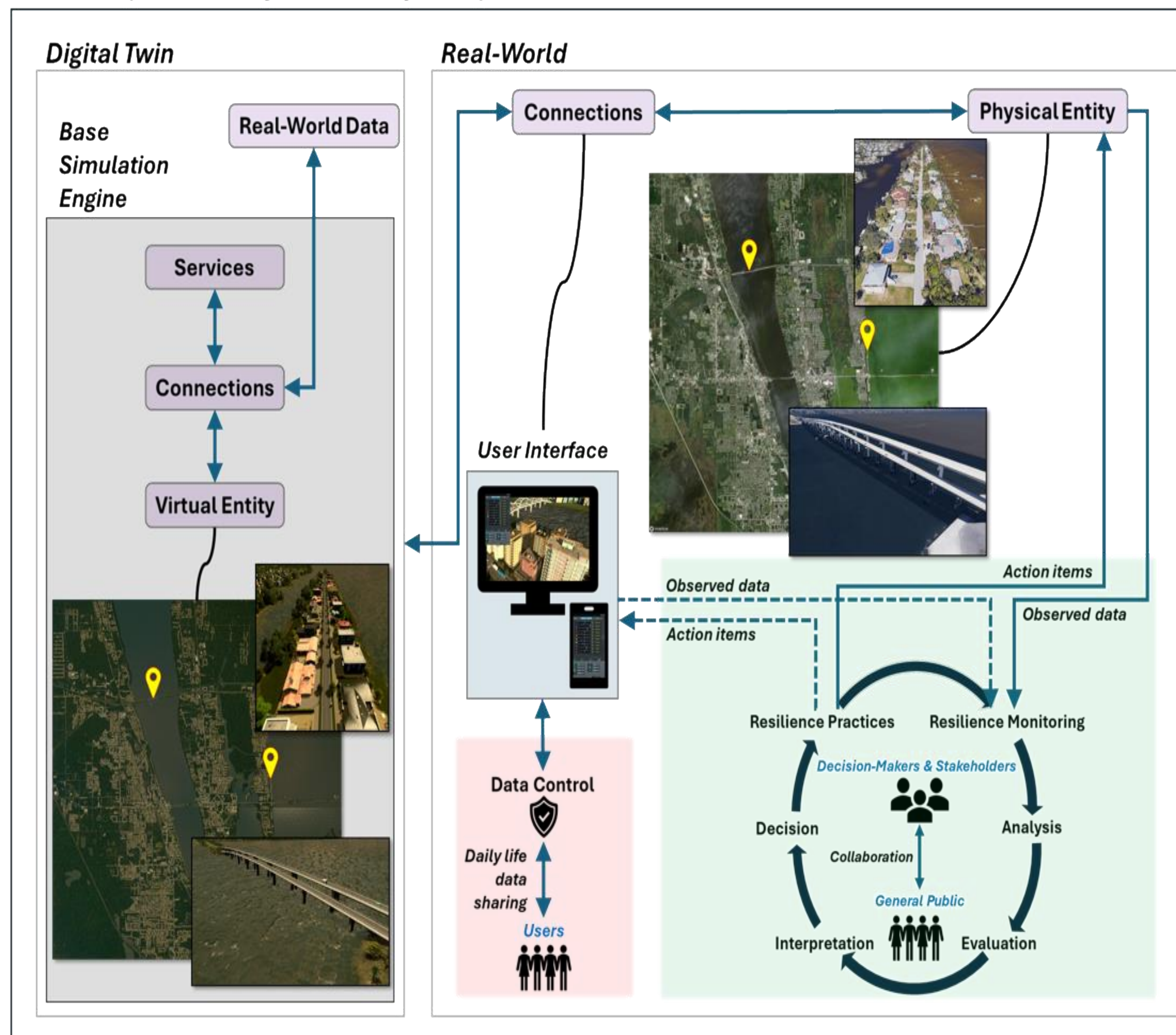
- DTs offer real-time simulation, predictive analytics, and scenario planning for resilience.
- COWIN^E** (Community Twin Ecosystem)
 - Community monitoring
 - Dynamic disaster simulations
 - Collaborative decision-making

KNOWLEDGE GAPS & CONTRIBUTION

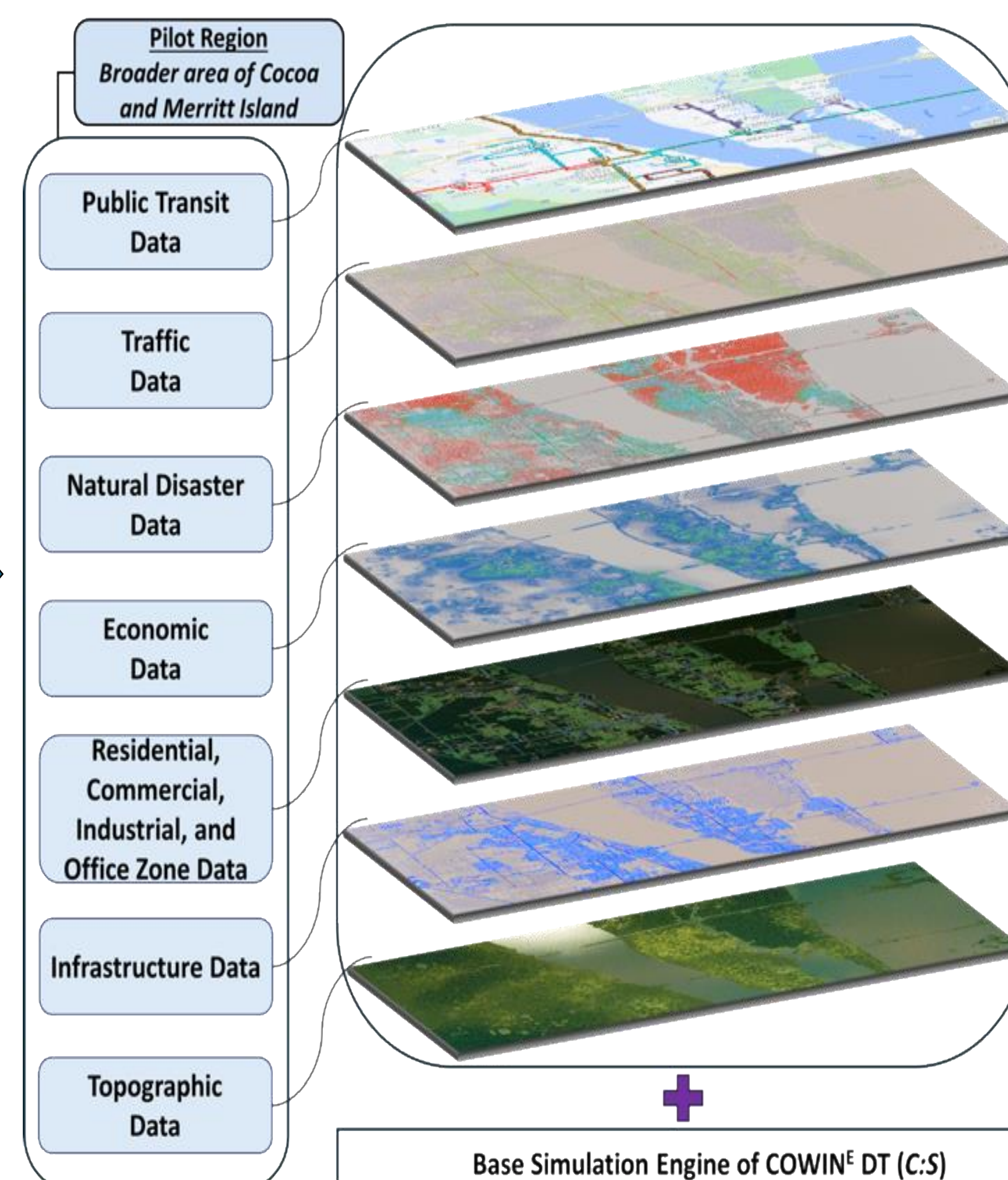
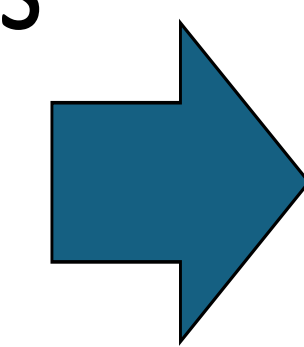
- Current resilience frameworks use static models that miss community dynamics.
- Most DT applications are conceptual and lack full interconnected community analysis.
- Existing DT visualizations lack interactivity, limiting stakeholder engagement.

DEVELOPING COWIN^E

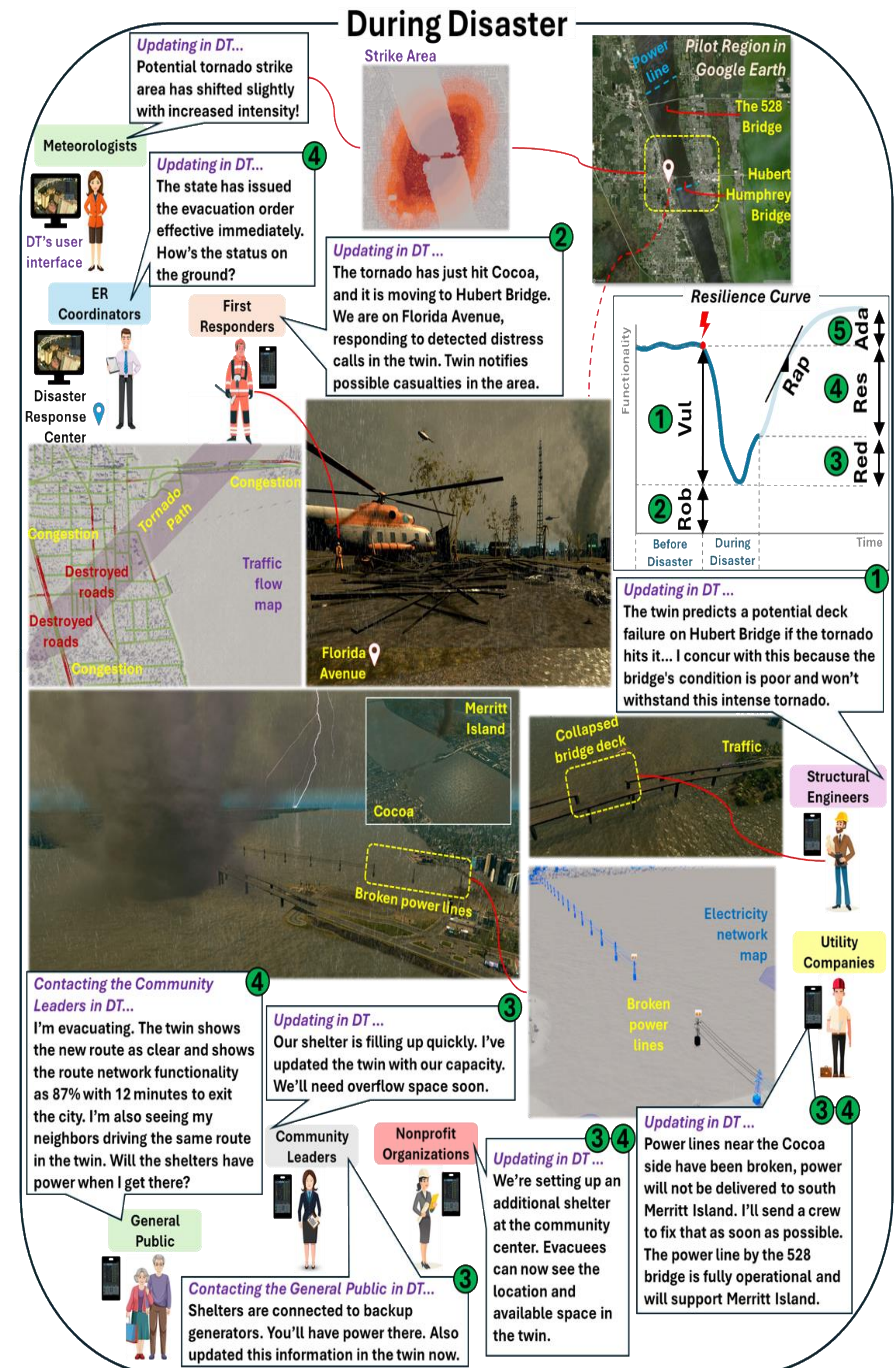
COWIN^E (Community Twin Ecosystem)



Data sources
used in
developing
COWIN^E



CASE STUDY: COLLABORATIVE RESILIENCE PLANNING



Further details available in: Luleci, F.; Sevim, A.; Ozguven, E.E.; Catbas, F.N. Community Twin Ecosystem for Disaster Resilient Communities. Smart Cities 2024, 7, 3511-3546