

# Safety and Feasibility of a Fully Autonomous Shuttle on a University Campus



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& The State University of New York at Buffalo*



**UB** | University at Buffalo  
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# Region Background

- NITTEC: Multiagency Transportation Operations Coalition
  - Transportation agencies
  - Public safety and border enforcement
  - Emergency services
  - Municipalities
- University at Buffalo
  - Cross-disciplinary Institute for Sustainable Transportation and Logistics (ISTL)



# Project Background

- Interest in AV & Benefits
- Legislation in New York State
- What is Olli:
  - 3 Lidar sensors
  - 5 Radar sensors
  - 6 Cameras
  - GPS/location device
  - Onboard data recorder



# NYSERDA Grant

- New York State Energy Research and Development Authority grant awarded in 2017
- Funds established for AV procurement and efforts toward three inter-operable objectives:
  1. Evaluate feasibility, safety, and reliability of Olli
  2. Research public policy changes needed to allow AVs to be driven on NYS public roads
  3. Estimate costs and benefits of AV technology implementation using BNMC as a test case



# Project Tasks

1. Project Management
2. Acquire and Customize Olli for WNY
- 3. Technical and Safety Evaluation**
4. Research Public Policy Changes
- 5. BNMC Case Study Evaluation**



# Technical and Safety Evaluation

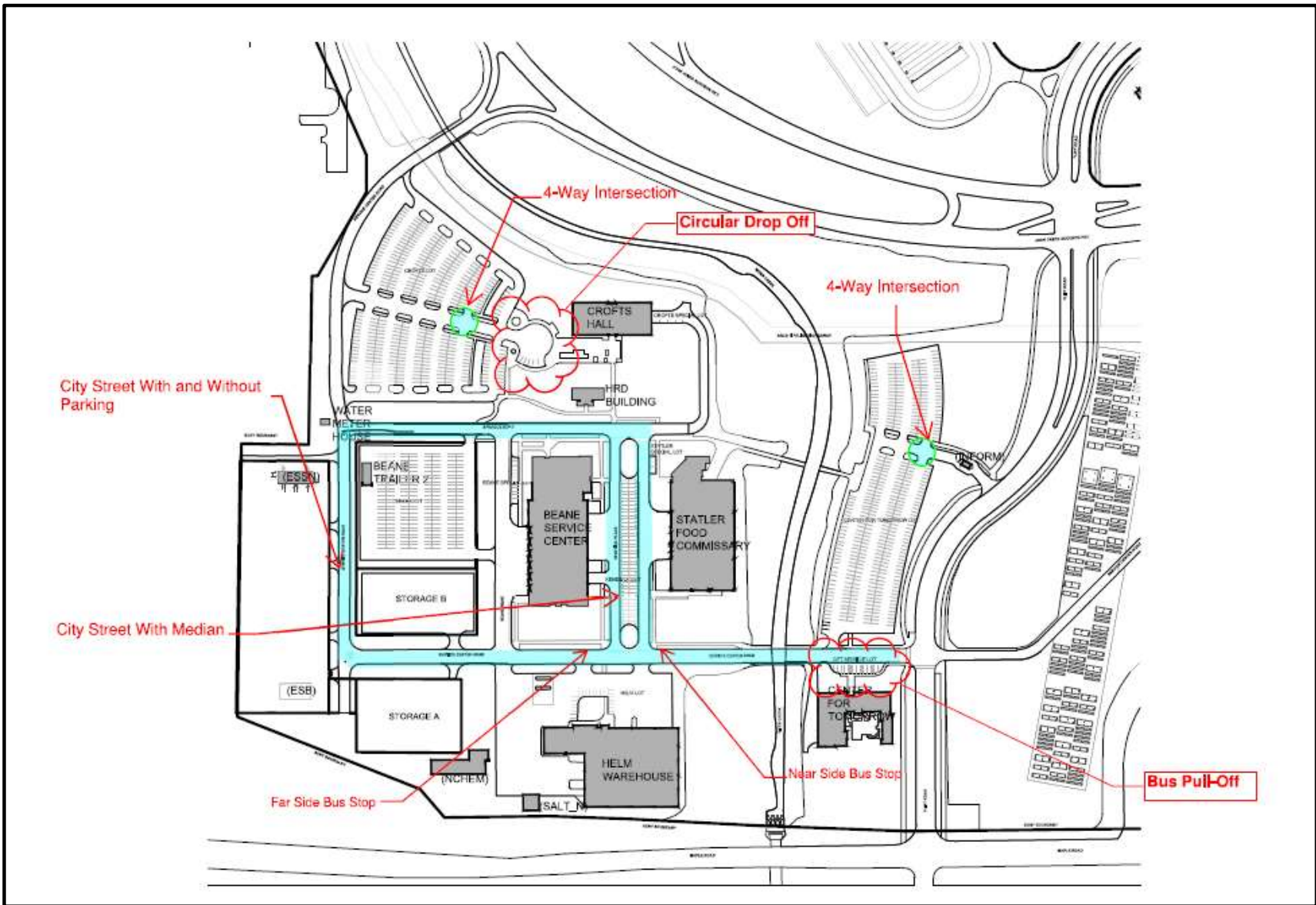
- Four dimensions of AV testing
- Overall operation studied under multiple combinations of these dimensions
- Our interest:
  - Comparison of performance under baseline and inclement weather conditions
  - Integration with existing network

Tactical Operation	Operational Conditions
Parking, speed control, car/lane following	Physical environment, environmental conditions
Object and Event Detection	Failure Cases
Detect and respond to pedestrians/cyclists, debris, stop signs/signals, potential collisions	Sensor failure, connectivity loss, reduced SSD

# Technical and Safety Evaluation

- **Stage 1:** Basic testing and calibration in a controlled environment
  - Baseline operational and safety performance
- **Stage 2:** Advanced testing in a limited access environment
  - Performance under inclement weather conditions
  - Performance when interacting with the network







# BNMC AV Deployment

- Interconnected urban environment
- Proximity to transit hubs
- Desirable location for future AV deployment

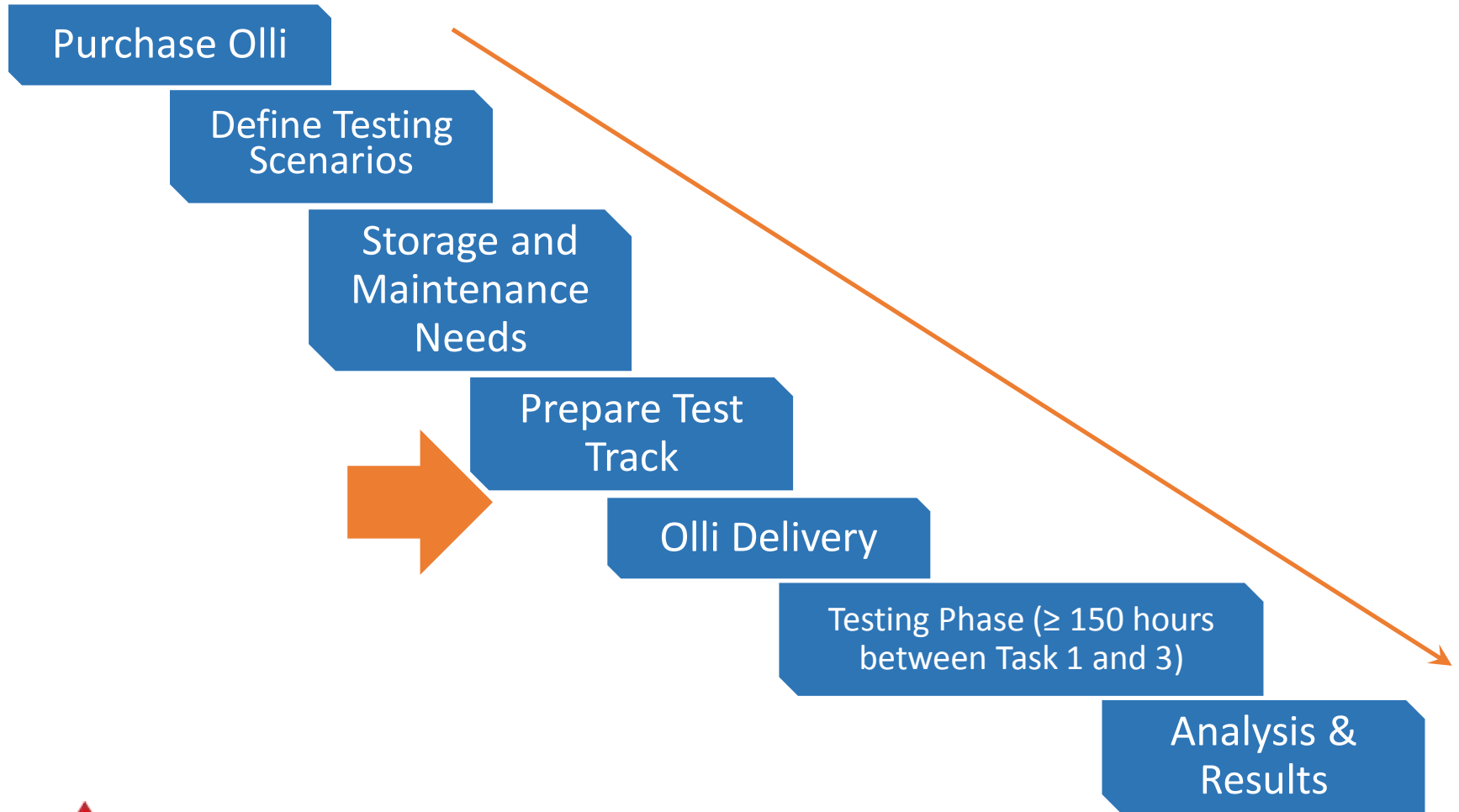


# BNMC Case Study

- Identification of test cases
  - First/last mile connection to transit
  - Off-peak circulator shuttle (MaaS)
- Replication of environment on North Campus (roundabout, four way stop, shuttle behavior)
- Testing in Replicated Environment
- Analysis of Technical and Financial Feasibility



# Project Progress



# Thank You!

- Questions

