



Cambridge Consultants ADSA Presentation - Accelerating Sensor / Model development and test with intelligent simulations

John Taibi – Vice President, USG Market Sector Lead

John.taibi@cambridgeconsultants.com

(303) 564-4319

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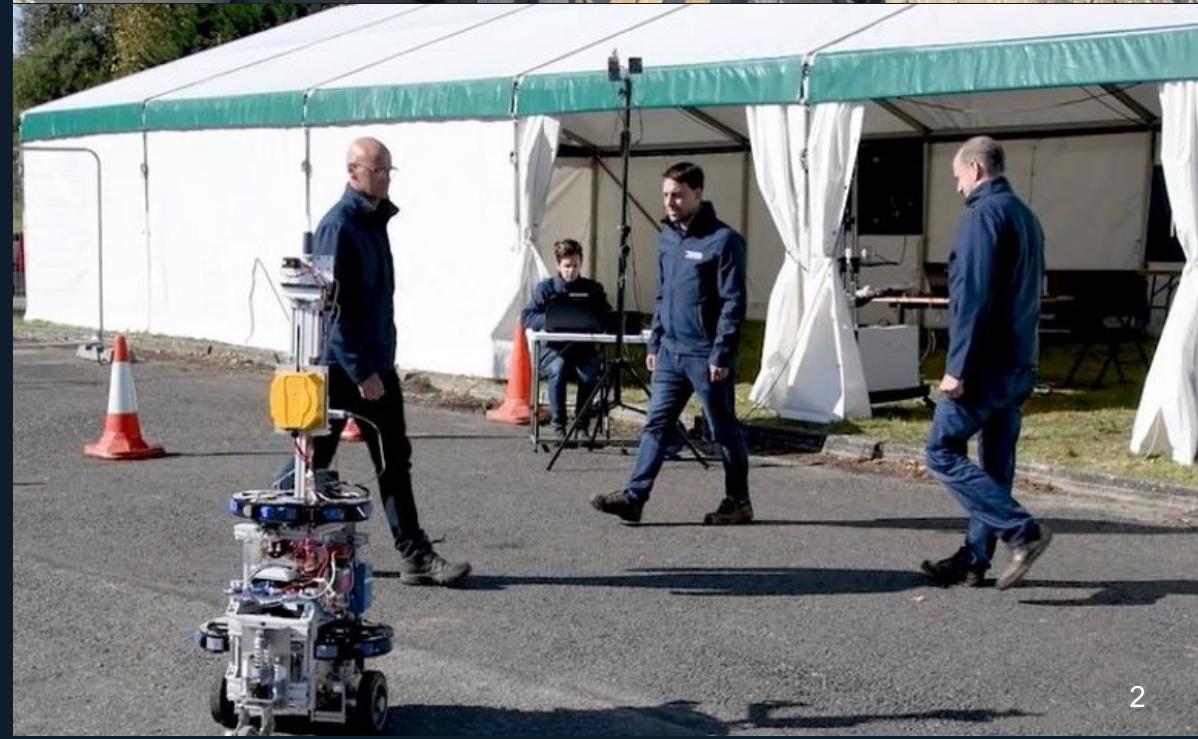
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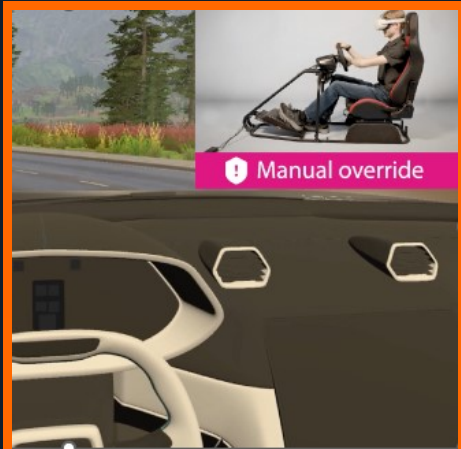
So What? Who Cares?

- Space: The creation of a common Modeling and Simulation env that can be leveraged across soft target research areas
- Problem: Most soft target research areas require software simulations of sensors and algorithms which are costly / timely.
 - Current sims have different levels of sophistication, granularity, and varying degrees of flexibility for scenarios and environmental conditions
- Solution: Cambridge Consultants can develop state-of-the-art software simulation environments where collaborators can model sensor performance in different environmental conditions (scenarios, crowd movement, anomalies, etc.)
- Results: Having a state-of-the-art simulation solution that all soft target resources can leverage will:
 - Reduce cost and time of data collection
 - Accelerate product dev with virtual testing on full autonomous stack
 - Increased safety by testing edge-cases and assuring AI systems
 - Faster decision making as entire ecosystem can leverage sim env
 - High level of sensor fidelity through state-of-the-art simulations
- TRL: 9





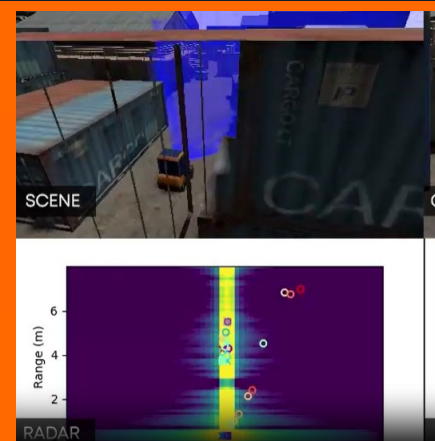
We develop simulation environments that enable generation, evaluation and testing for soft target protection



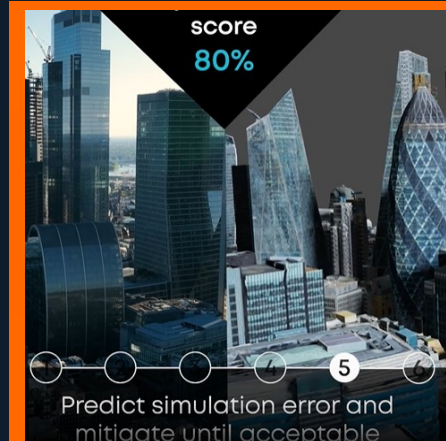
Synthetic data and environments



AI algorithms (perception, planning, decision and control)



High-fidelity sensors (radar, camera, LIDAR...)



Equivalence levels – measure against real-world



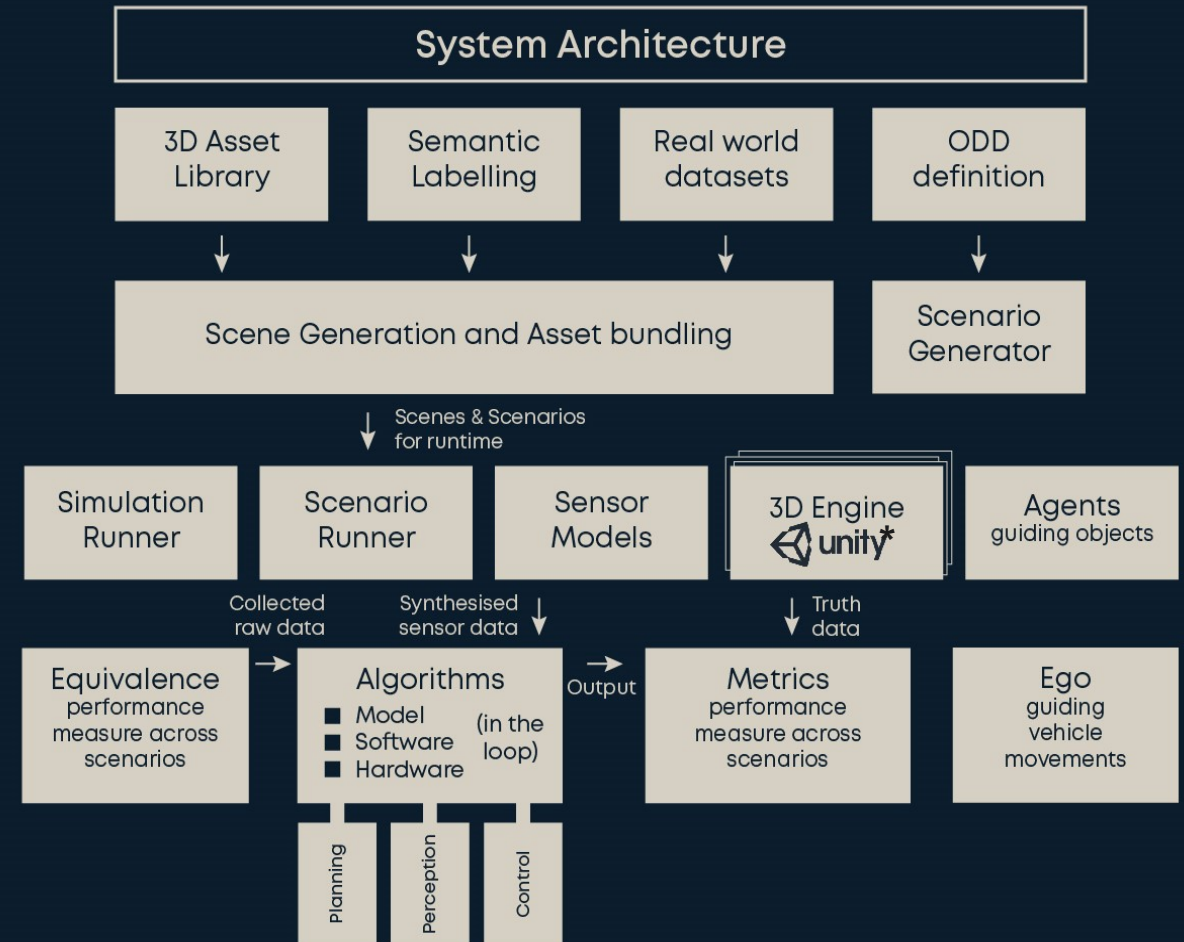
Custom performance metrics

We have developed a Simulation Framework that is modular, adaptable, and customizable to soft target use cases

Framework consists of all components necessary for state-of-the-art simulations

Key Features include:

- Cloud-native architecture
- Modular to custom use-cases
- Closed loop simulation across system
- Simulations for human behaviours
- Safety critical design
- Custom metrics for specific needs (inc AI assurance)
- Flexibility to connect to large-scale data
- Flexibility to scale from design to deployment in field
- Open standards based





Cambridge Consultants would like to develop state-of-the-art simulations to accelerate soft target research goals

Environments and data generation (inc. sensors)

Measure equivalence against real-world data

Crowd dynamics and behavior modelling

'What-if' scenario generation

Custom venue, use-case scoring and early virtual testing





Simulation pilot project for soft target protection for benchmarking sensors

Our project process

Define

- Understand requirements, boundaries and constraints
- Scenes, Layout, Geography (stadium, building etc.)
- Simulation Framework Architecture custom to soft target needs

Design

- Collect real world (RW) data for use-case (sensor input, scene, etc)
- Scene Re-simulation from RW inputs
- Scenario definition and Design models for equivalence and metrics

Develop

- Develop framework and 3D engine customizations
- Measure sensor effectiveness in nominal conditions vs anomaly/event
- Performance custom metric implementation – understand improvements

Transfer

- Full code handover and implementation in final infrastructure
- Training for soft target research and simulation team
- Quarterly simulation review for new improvements and updates



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Safe Navigation of Complex Environments





Accelerating Sensor and Model development and test with intelligent simulations

For more information contact
john.taibi@cambridgeconsultants.com
tarika.george@cambridgeconsultants.com



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