

Applications of Real-Time 3D Visualization & World-Building

Chris Brown
Business Development Manager
Autonomous Solutions, Inc.
Petersboro, Utah



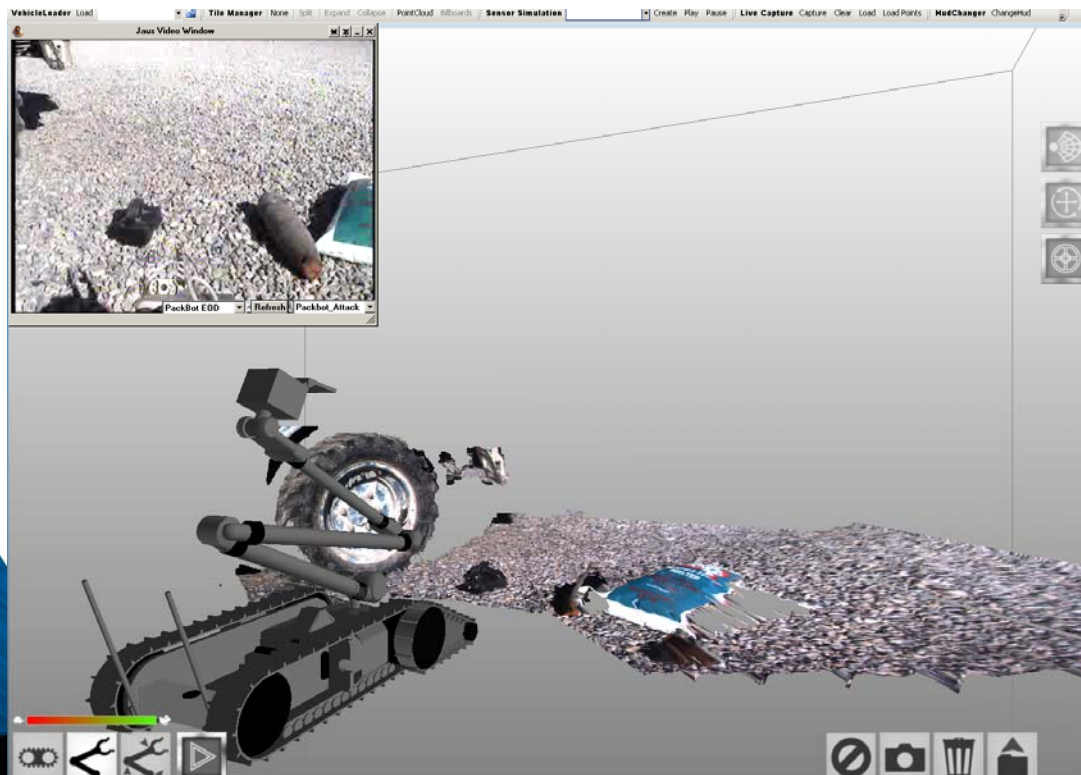
Company Overview

- Company Started in 2000 with John Deere
- Located in Petersboro, Utah
- Established business in military, mining, and agriculture markets
- Business from autonomous vehicles for end users to advanced R&D in robotics



Advanced R&D – 3D Visualization

- Capture 3D data fast (stereovision, lidar, etc)
- Apply texture to point cloud (ie, make it look like a 3D photo)
- Place robot in the view



3D Visualization - Applications

- Robotic Manipulation
 - Enhance depth perception
- Robotic Mobility
 - Characterize terrain/surroundings
 - Enabling technology for autonomy
- Mapping (Robotic or Manned)
 - Efficient searching
 - Situational Awareness
 - Information sharing
- Change Detection (Robotic or Manned)
 - Large or small scale

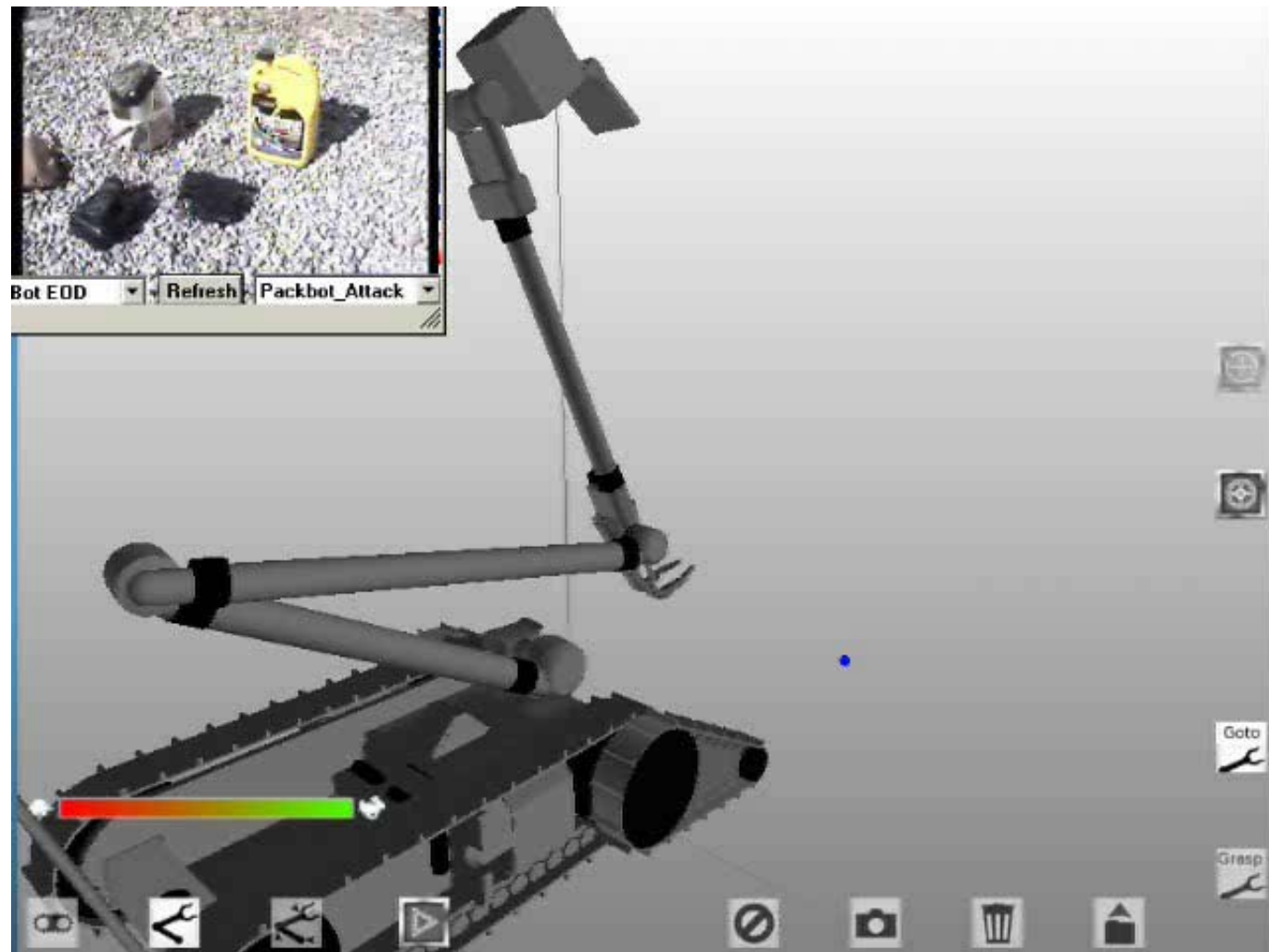


Initial Impetus - Current EOD Operations

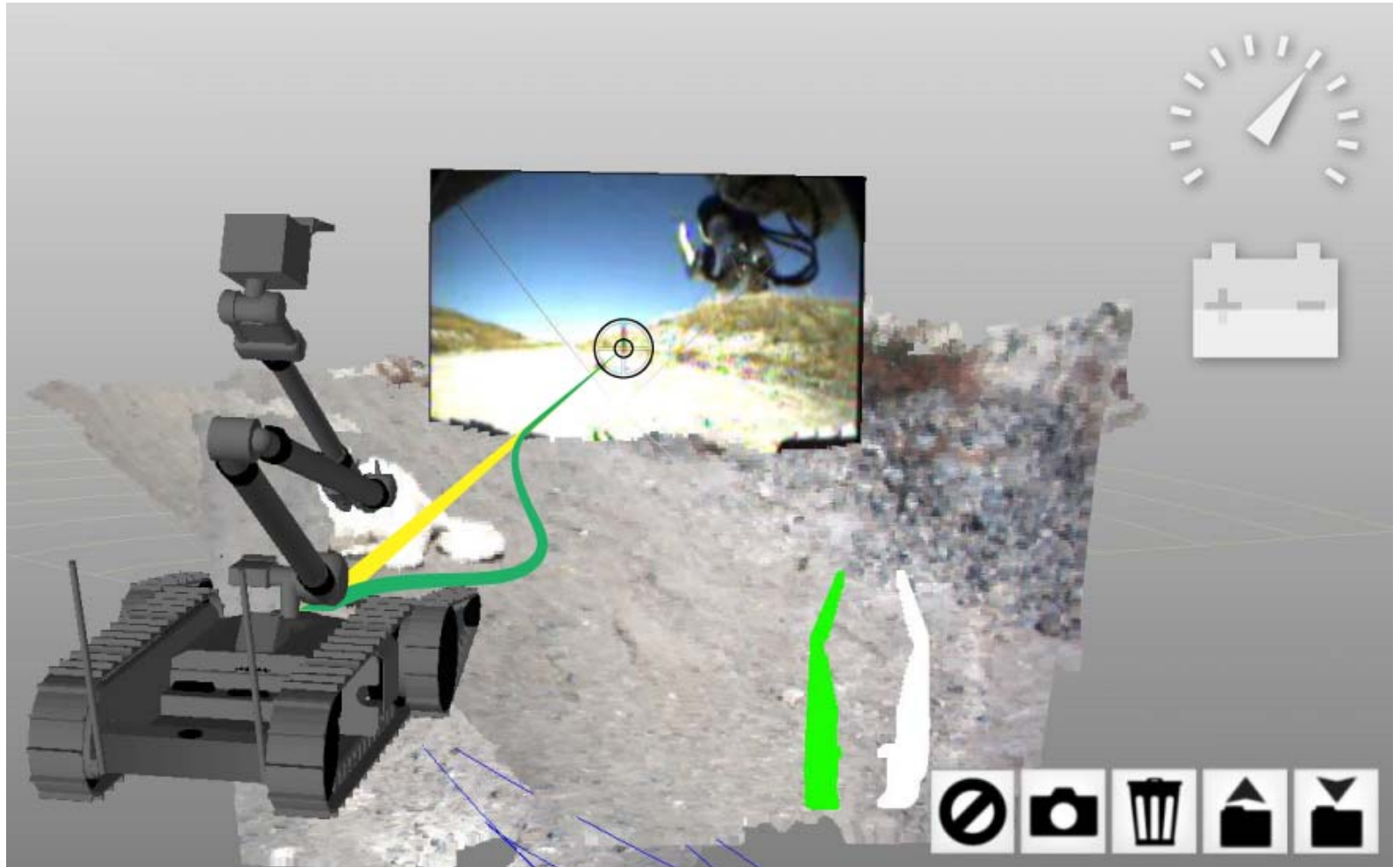
- Lack of depth perception
- Lack of a sense of scale
- Inability to see parts of the robot in the world around it
- Confusion of context
- Want a “God’s-eye view”



Enhancing Depth Perception



Improving Mobility & Enabling Autonomy



Mapping & Situational Awareness



Data Fusion & Change Detection



A Priori data (aerial photo)



Real-time data (human driven)



Data Fusion & Change Detection



Fused Data

3D Visualization – Technology Challenges

- Sensors
 - Get accurate, high resolution data fast
- Visualization
 - Render for the user fast, apply texture
- Data management
 - Render at different resolutions, memory management
- Data registration
 - Fusing a priori and real time data, different scales, resolutions, accuracies