

S&T Campaign: Human Sciences
Human Capability Enhancement
Training

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Research Objective

- Make terrain generation easy for non-experts
- Enable full synthetic database generation/editing capabilities on mobile devices
- Rapid data collection and processing in the field for geo-specific database enhancements

ARL Facilities and Capabilities Available to Support Collaborative Research

- Terrain representation and interchange format
- Terrain generation capabilities for geo-specific training environment production
- Rapid photogrammetry/Light Detection and Ranging (LIDAR) capture capability for terrain input and enhancements
- Mobile AR/Virtual Reality development



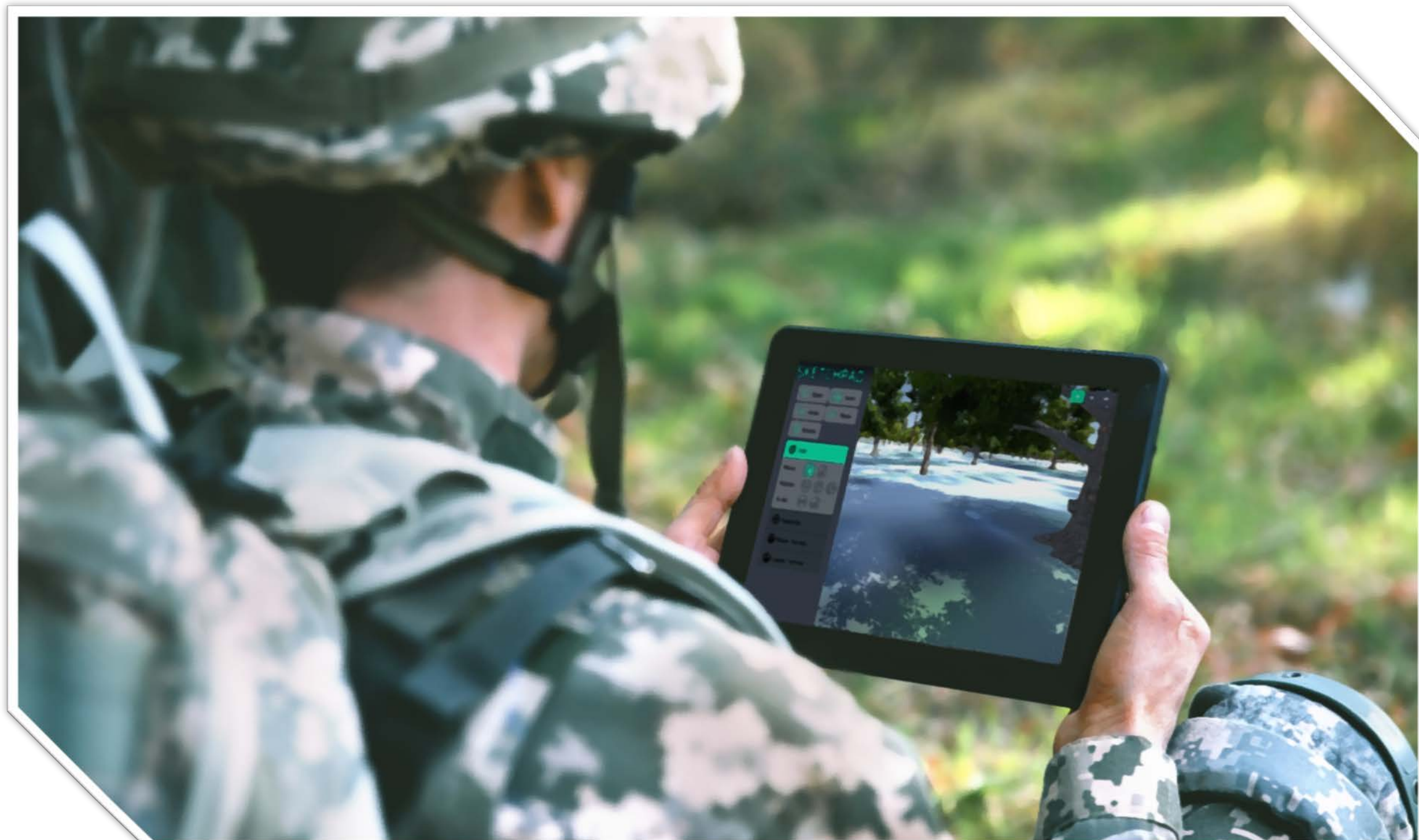
Illustration of the process pipeline. Data flows from Sketchpad editing (on left) through database generation tools into the runtime format. Updates to the runtime format are communicated back to Sketchpad.

Challenges

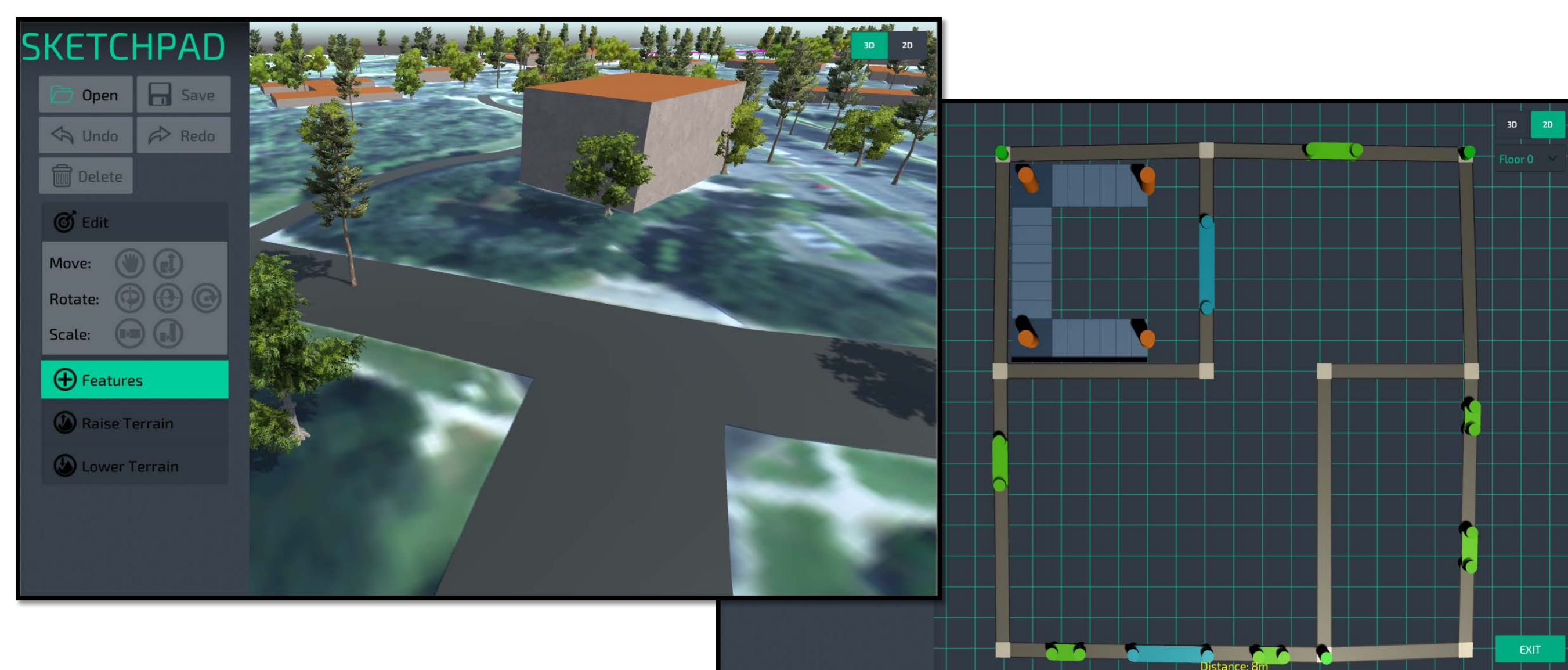
- Ease of use
- Touch interface versus keyboard and mouse
- Limited resources on mobile devices
- Accurate portrayal of real-world 3D environment
- Performant terrain reasoning planning aids
- Accurate device position and orientation
 - Correlate virtual and real world
- Real-time data capture, processing, and integration with existing virtual database
- User annotations to support orders, recon, Augmented Reality (AR), etc.

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- Leverage Office of Naval Research Rapid Synthetic Environment Tool (RSET) Sketchpad research
- Commercial and academic data capture and point cloud/photogrammetry processing
- COTS mobile devices with advanced sensor capabilities (Google Tango, Intel RealSense)
- Improved position tracking capabilities on mobile device
- Commercial and Government off the shelf drone solutions for terrain data collection and processing



Soldier in the field using Sketchpad to edit virtual database.



Sketchpad supports editing terrain components (roads, trees, terrain height, etc.) and interiors of buildings.