Cyber Affordance Visualization in Augmented Reality

Cyberspace is unique in that it is intertwined with the other physical (air, land, sea, and space) warfighting domains. By providing soldiers with a greater awareness of specific lethal and non-lethal cyber tactics available to them, we can expand their arsenal and provide more options for ensuring mission success.

CAVIAR works through a head-worn device that displays virtual content to the soldier in the form of 3D graphics that are aligned and overlaid on the real world. The information identifies specific actions that the soldier could take related to objects in the soldier's field of vision such as download electronic information from a computer, exploit a network vulnerability in a router, disable an alarm system, etc.


Internet of Things Devices


Cyber Personas


Wireless Access Points

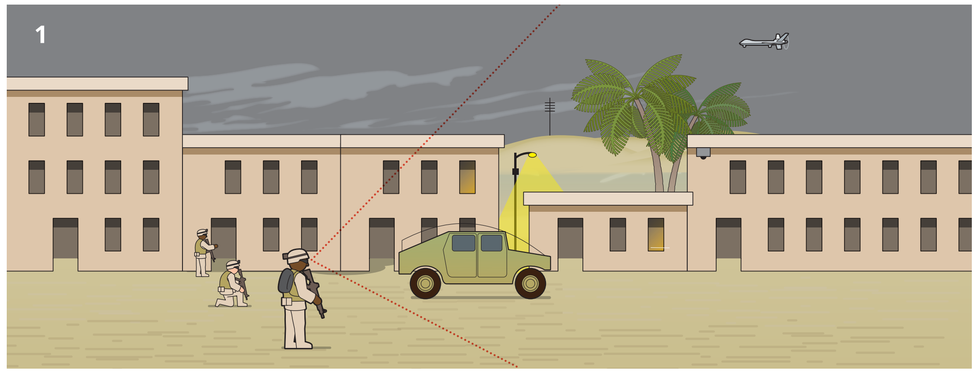

Consumer Electronics


RF Devices


SCADA/Industrial Control Systems

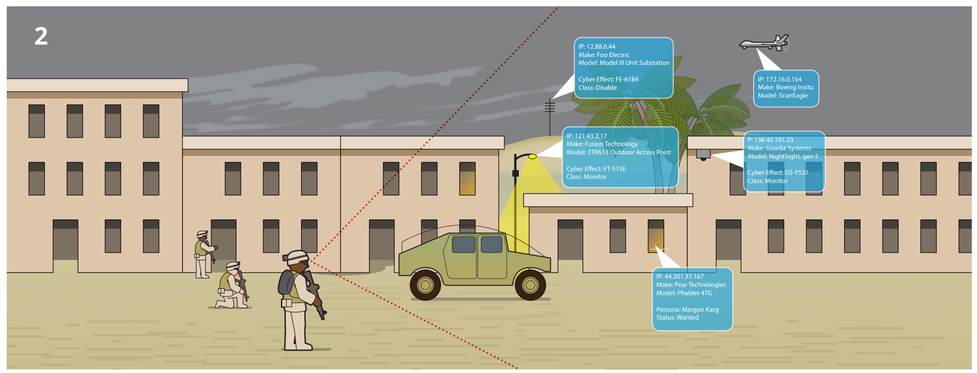
Affordances are opportunities presented by physical objects at the interface between individuals and the world. They are potential cyber actions that soldiers could take in their immediate geographical surroundings.

Natural View



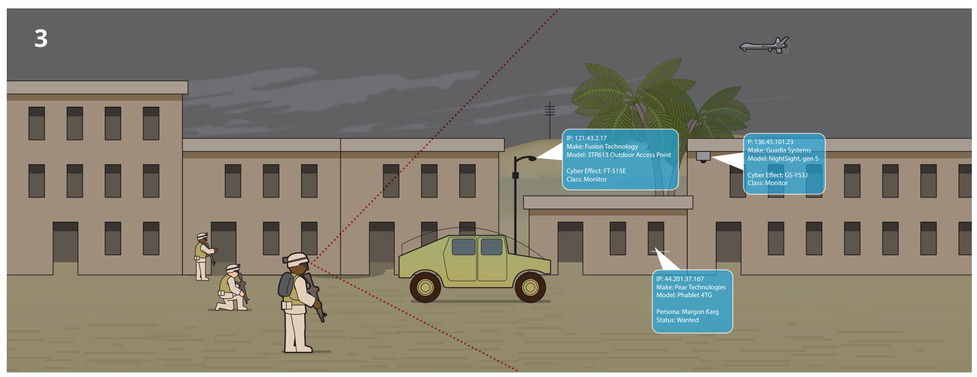
Soldiers navigate through an urban area in search of a person of interest. However, they are unaware of the cyber terrain in their vicinity.

View with Cyber Affordances



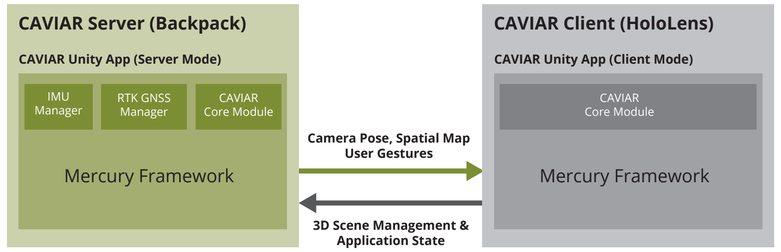
Cyber affordances make the soldiers aware of the cyber terrain in their immediate surroundings and of the potential cyber effects that can be deployed. The cyber affordances show that the person of interest is located in one of the buildings and that there is a power substation nearby.

Call For Cyber Effects



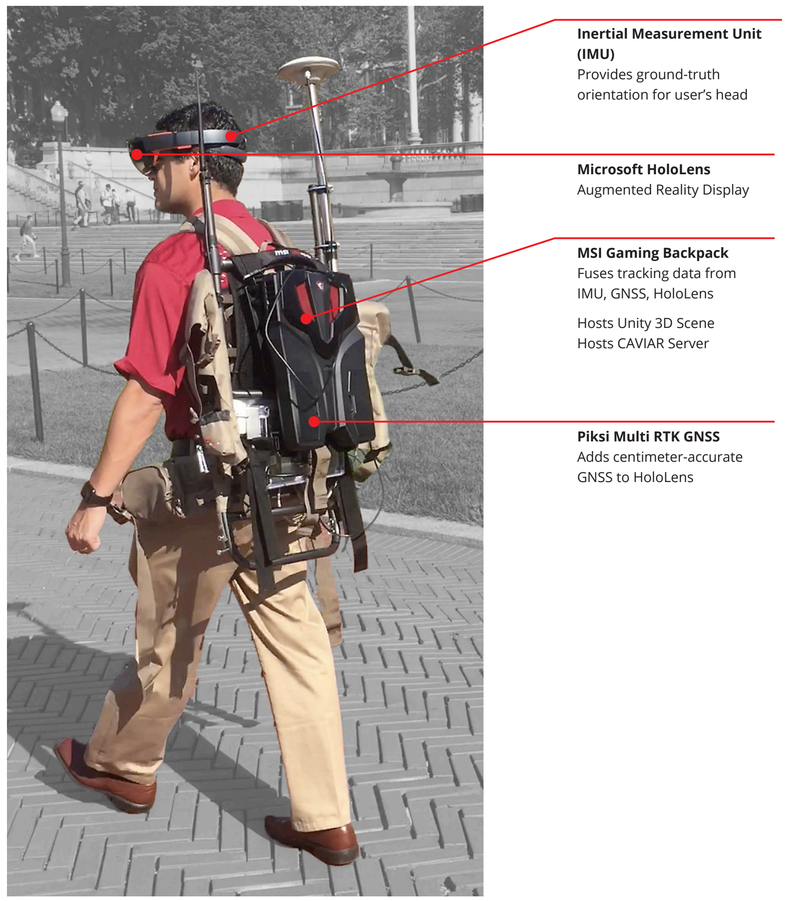
The soliders call in a cyber effect against the power substation to disable lighting in the area so that they can enter the building under the cover of darkness.

Software Architecture



The CAVIAR software architecture consists of both a client and server. The purpose of the server is to fuse tracking data from GNSS, the IMU and other data sources and to prepare scenes for the surrounding area. The client loads the scenes prepared by the server and displays it on the CAVIAR headset.

Hardware



Outdoor test of CAVIAR backpack and visor

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