Consumer Electronics
Augmented Reality in Military Operations

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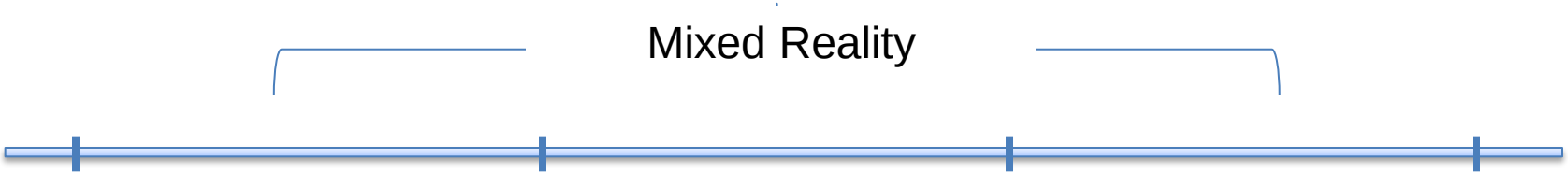
NATO
OTAN

Outline

- Augmented Reality overview
- Current state of technology
- Project EyeCatch - ITA MoD
  - Support to dismounted soldier program
  - Agile software development

Introduction

Views on Reality-Virtuality continuum



Real Environment

Augment Reality (AR)

Augment Virtual (AV)

Virtual Environment

[Milgram et al., 1994]

Helmet display systems

AR Display systems technology

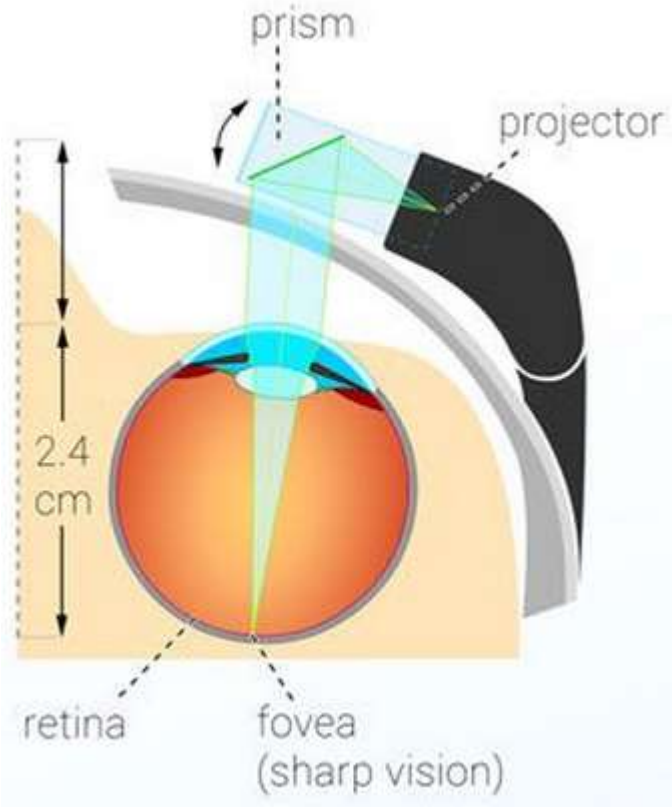
Combining real world with virtual objects information in real time.

AR display systems:

- Projectors/lenses/beam splitters
- Free-form optical waveguides
- Spatial light modulators

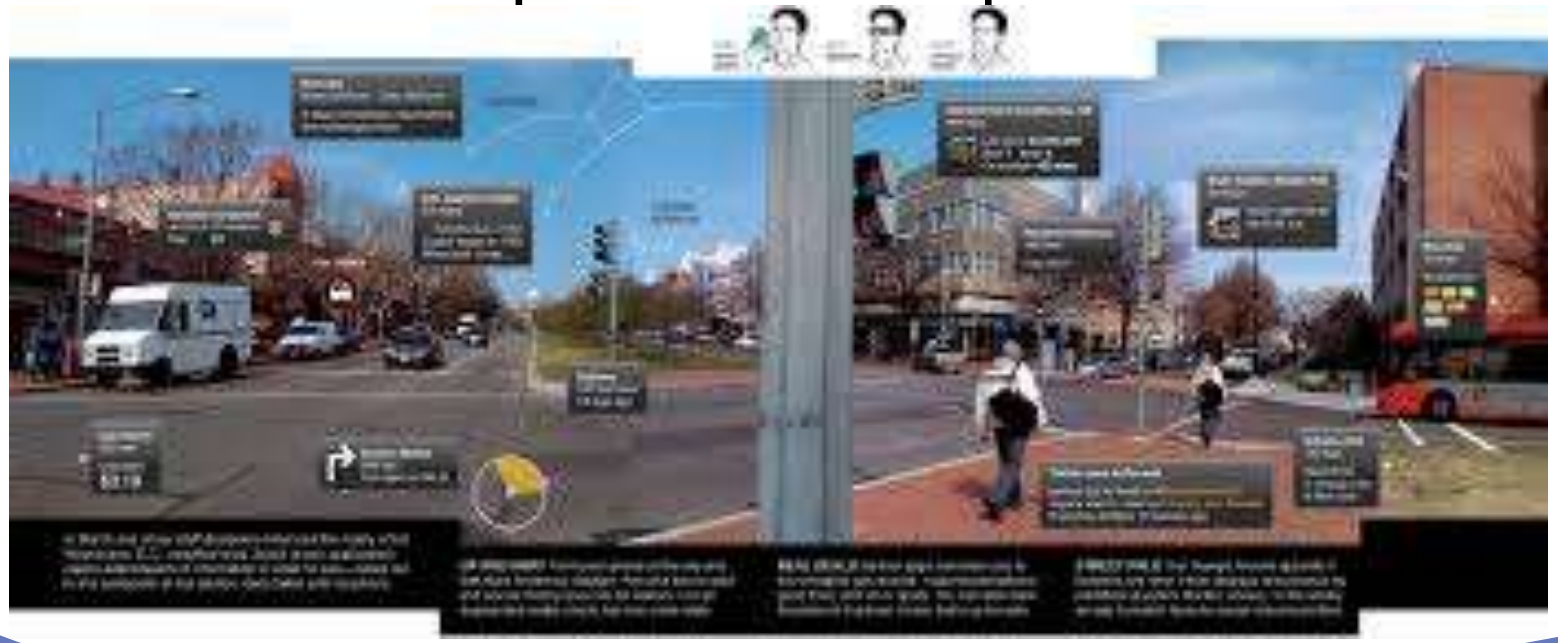
Common methods:

- Geospatial registration
- Video/sensor registration



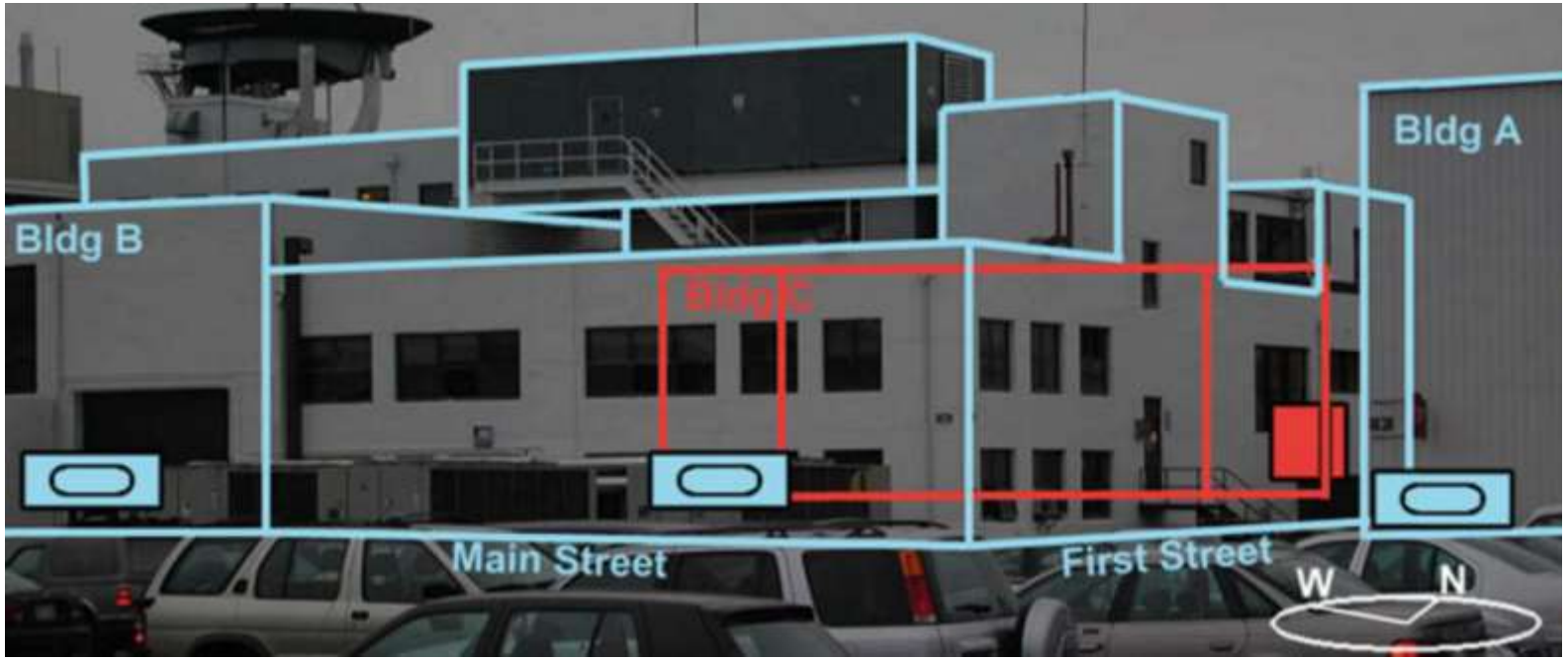
Geospatial Registration

- Useful when the range to location of augmenting information is large (10-500m)
- Need a database of geolocated information relevant for the dismounted operation
- Indicate vulnerable points or hot spots



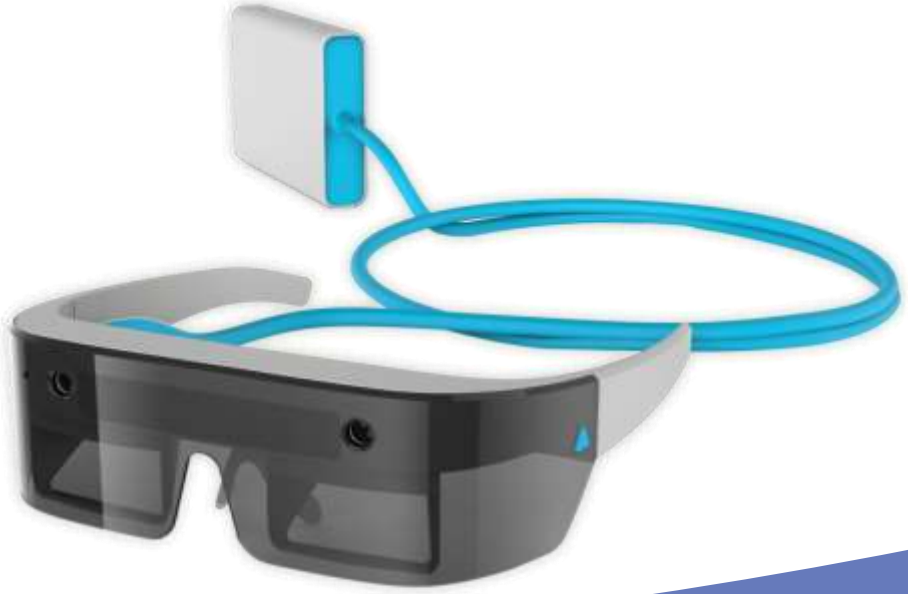
Video registration

- Relies on image processing to
  - Automatic detection of object of interest
  - Augment the visual perception of these object with drawings and labels



AR commercial displays

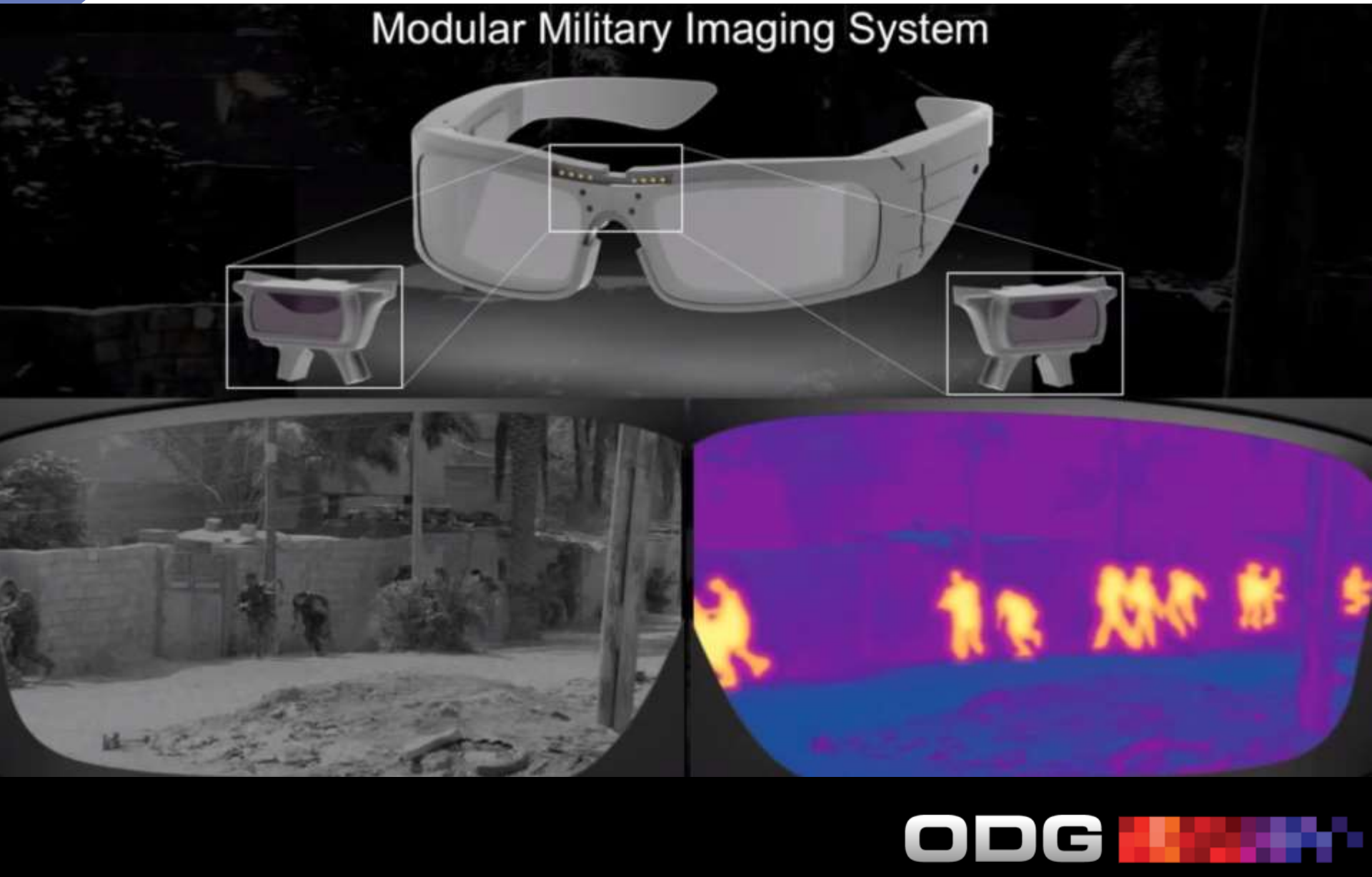
AR display advances near future



Military AR display systems

General Dynamics - Land Warrior (2007)

Military AR display systems



Military AR display systems

Operational Considerations
support to the dismounted soldier

Ongoing project **EyeCatch**:

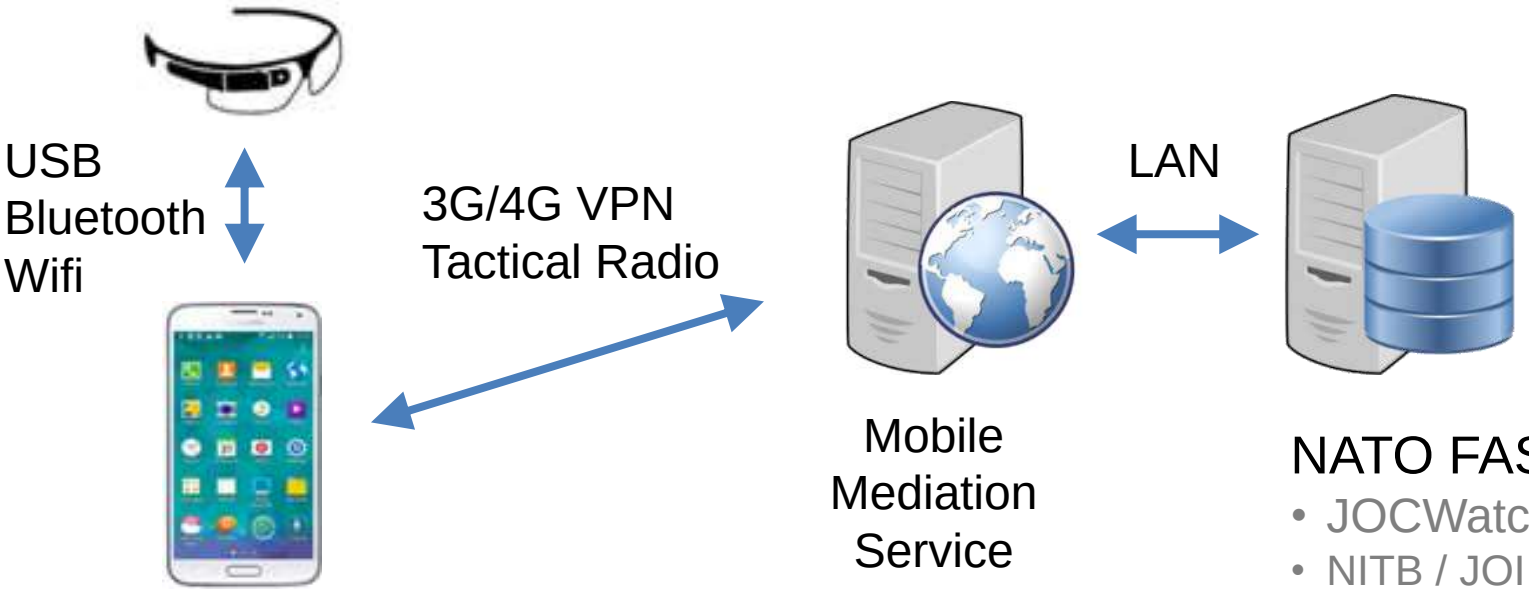
- Requirements elicitations through fast prototyping
- Agile software development practice
- Utilization of commercially available AR and mobile solutions: DRS Scorpion H2, Selex ES *Soldato Futuro*

Project EyeCatch

Prototype backlog:

- Display JOCWatch events as Points of Interest (POI) on 'Smart Glass'.

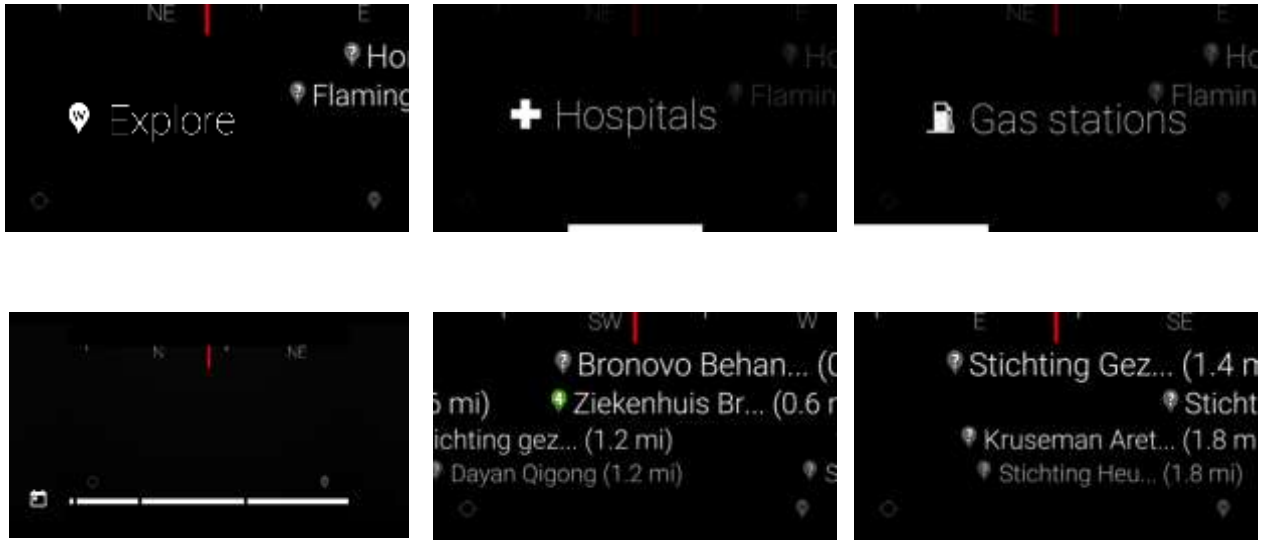
- Patrol reporting functionality based on AR technology



Compass

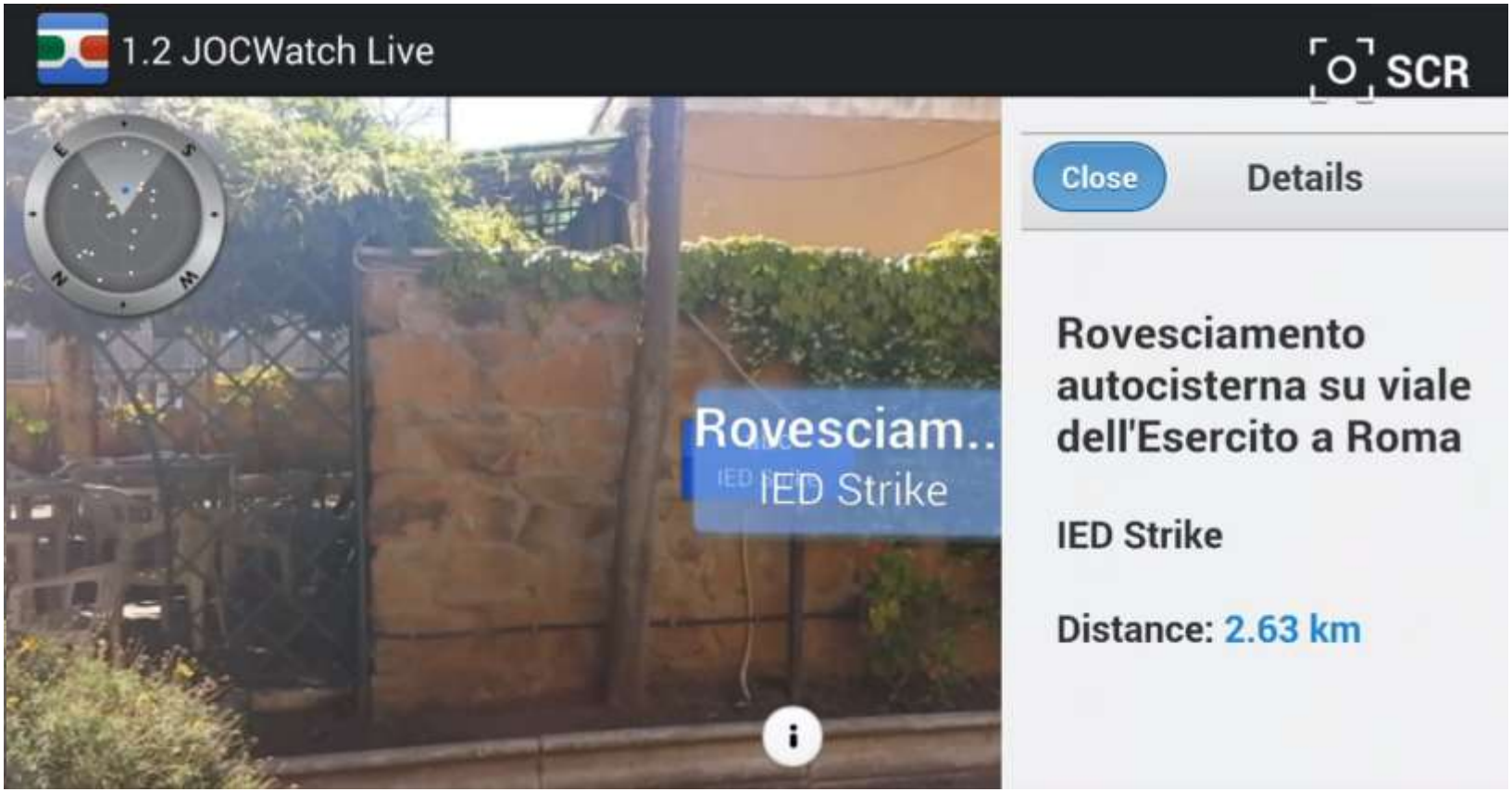
The military operations where such an application could be used include:

- Area patrolling, waypoint navigation
- Military search teams



AR Display Points of Interest

NATO JOCWatch



Patrol report

Route guidance example

Emerging Augmented Reality

Human Computer Interface (HCI) opportunities:

- Present information in a contextual relevant view
- Minimizing the user interaction
- Development of *hands-free* solutions
- Provide near real-time battlefield information to provide situational awareness
- Customized information to individual soldier

AR Challenges

- Information overload becomes counter-productive
- Realism:

Conventional
Monoscopic
Textual / wireframe

Real time 3D
Animated
Photorealistic

- Perception: Color / contrast (acuity)
- Effectiveness (SA / Training)
- Human factors / ergonomics
- Military domain: Constrained use of services

Links

Project Eyecatch Livestreams:

http://livestream.com/accounts/13534507

Everyday Augmented Reality

http://everydayaugmentedreality.com/

Wikitude	http://wikitude.com
Metaio	http://metaio.com
Layar	http://layar.com

Thank you

Additional: Manual Input Controls examples