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**Eyeikon: Distributed
Augmented Reality for Land
Warrior/Objective Force
Warrior Teams**

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21CSITM
21ST CENTURY SYSTEMS INCORPORATED

Overview

- ◆ Who is 21CSI?
- ◆ What is EYEKON?
 - ◆ 21CSI's Augmented Reality Application for the LW/OFW
- ◆ A Quick Look

21st Century Systems, Inc.

- ◆ Founded 1996, woman-owned, growing revenue, low overhead
- ◆ Strong real-time & decision support background
 - ◆ Pioneered real-time intelligent agent-based decision aids for decision-makers under time- and mission-stress
- ◆ Government Customers:
 - ◆ DoD: US Army SMDC, CECOM, TACOM-ARDEC, AFRL; US Navy OPNAV, C3F, ONR; DARPA, OSD, SWDG...
 - ◆ Civil: DHS, DOE
- ◆ Transitions underway: OPNAV-PEO Carriers
- ◆ Commercial subsidiary: Agentkind™

21CSI's EYEKON Research Application

If you load a mud foot down with a lot of gadgets that he has to watch, somebody a lot more simply equipped – say with a stone ax – will sneak up and bash his head in while he is trying to read a vernier."

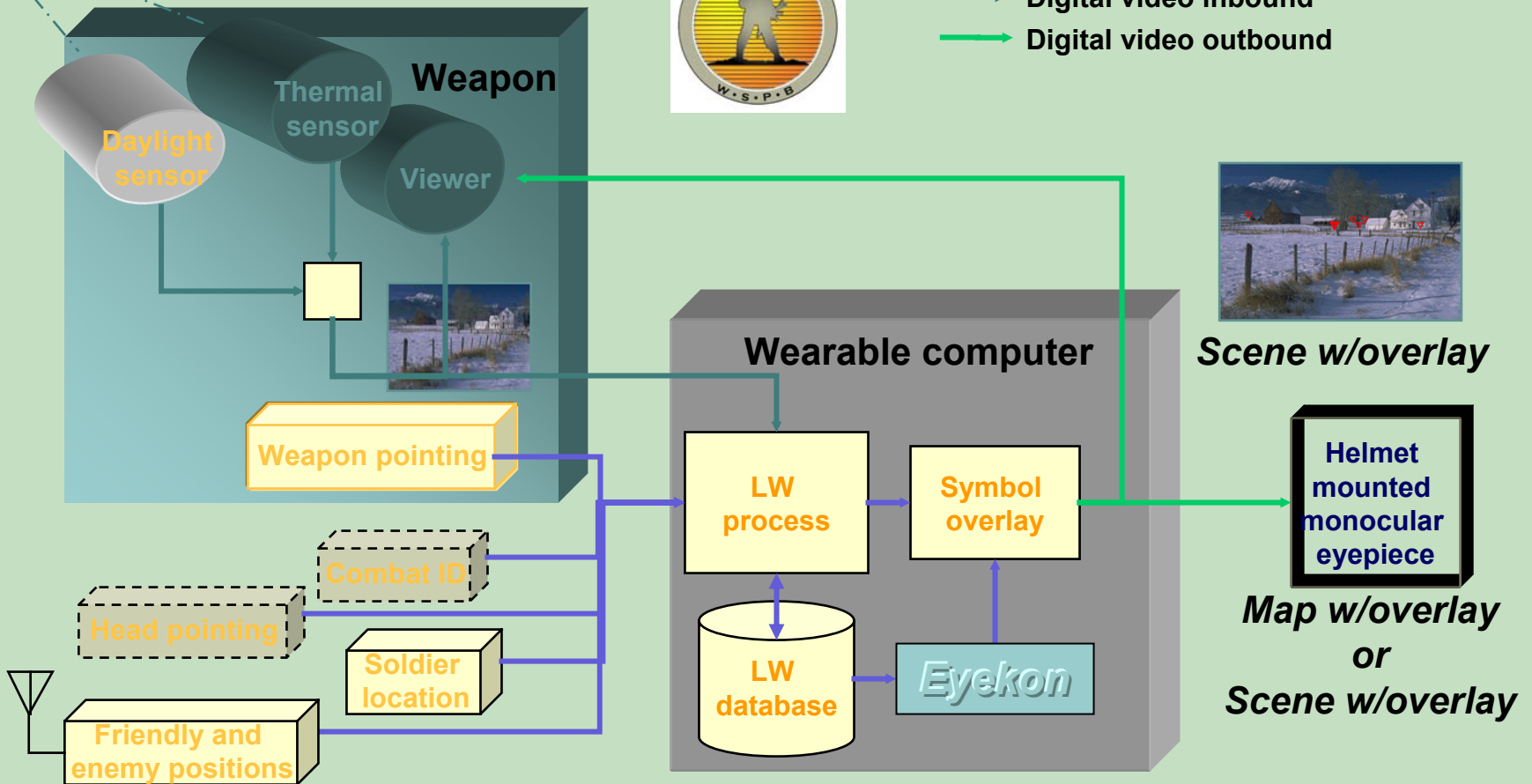
--Robert Heinlein, Starship Troopers

- ◆ Response to SBIR: Provide a HUD for the land warrior
 - ◆ Develop smart icons/designations superimposed on live video on land warrior weapon sight
 - ◆ Intelligent agents provide decision aids within weapon sight display and drive smart icons

Overall EYEKON Configuration



- ➔ Digital data
- ➔ Digital video inbound
- ➔ Digital video outbound



Heads-Up Situation Awareness

- ◆ History shows most successful land infantry combat is done by firing at anticipated areas from *OFFENSIVE* advantage ► *Requires tactical SA*
 - ◆ “*HEAD UP/EYES UP*” maneuver to SA
 - ◆ He who shoots first wins
- ◆ *With Eyekon*
 - ◆ Superimpose targeting icons over terrain features
 - ◆ Soldiers for the first time can see what the LEADER sees ► distributed battlefield SA
 - ◆ Bring effective fire to bear on the enemy ►
Cooperative targeting
 - ◆ Avoid fratricide

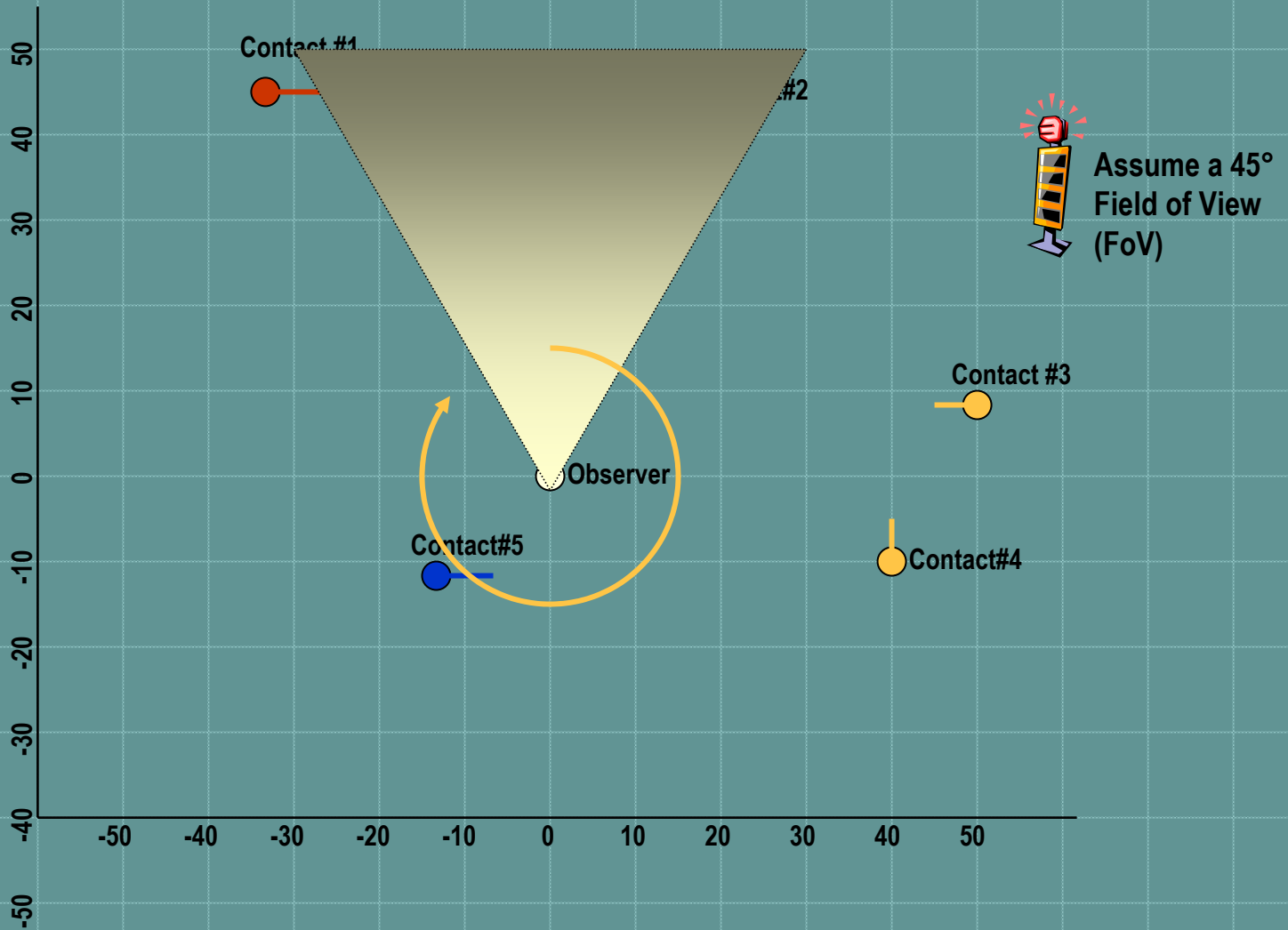
Targeting Decision Aid

- ◆ Using position reports, *rank enemy most dangerous* based on LOS distance and threat
- ◆ Adjust *icon perspective view* based on assessed threat, ROE, etc.
- ◆ Provide pointers to *next target cue*
 - ◆ Target inside current FOV: Icon directs to maximum threat
 - ◆ Target outside FOV: Arrow points in closest threat direction (left/right, up/down); arrow length is proportional to the angular difference

EyeKon Agents

- ◆ Human-Assistant
 - ◆ Provide advice
 - ◆ Provide AR
- ◆ Coordinator/Referee
 - ◆ Arbitrate conflicts
 - ◆ Agents of agents

Sample: Initial Placement of Entities



Initial Setup with EYEKON Overlays

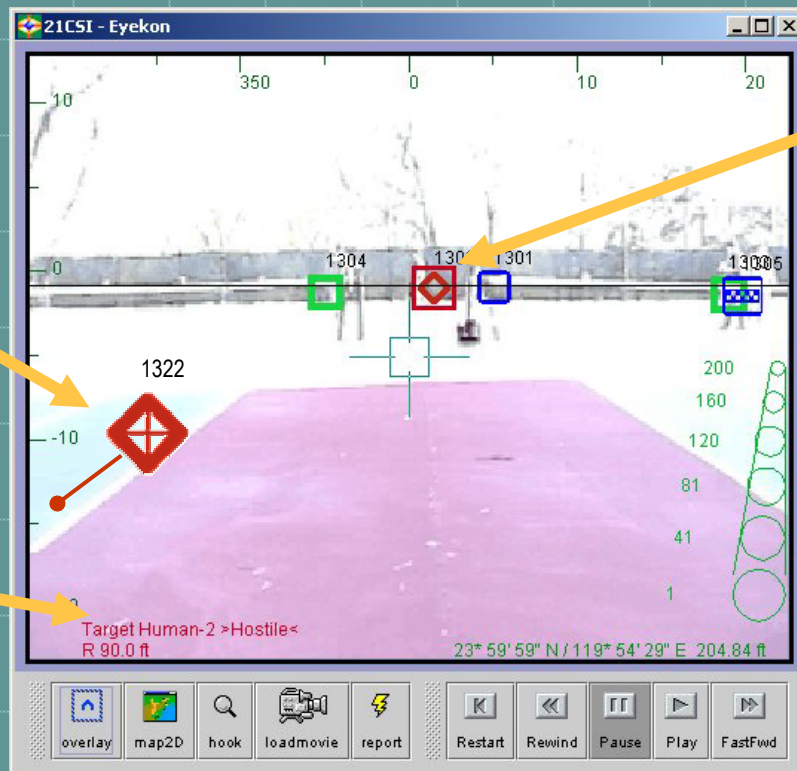


EYEKON Overlay Following Contacts

Target
outside
FOV

Hooked
Target
Information

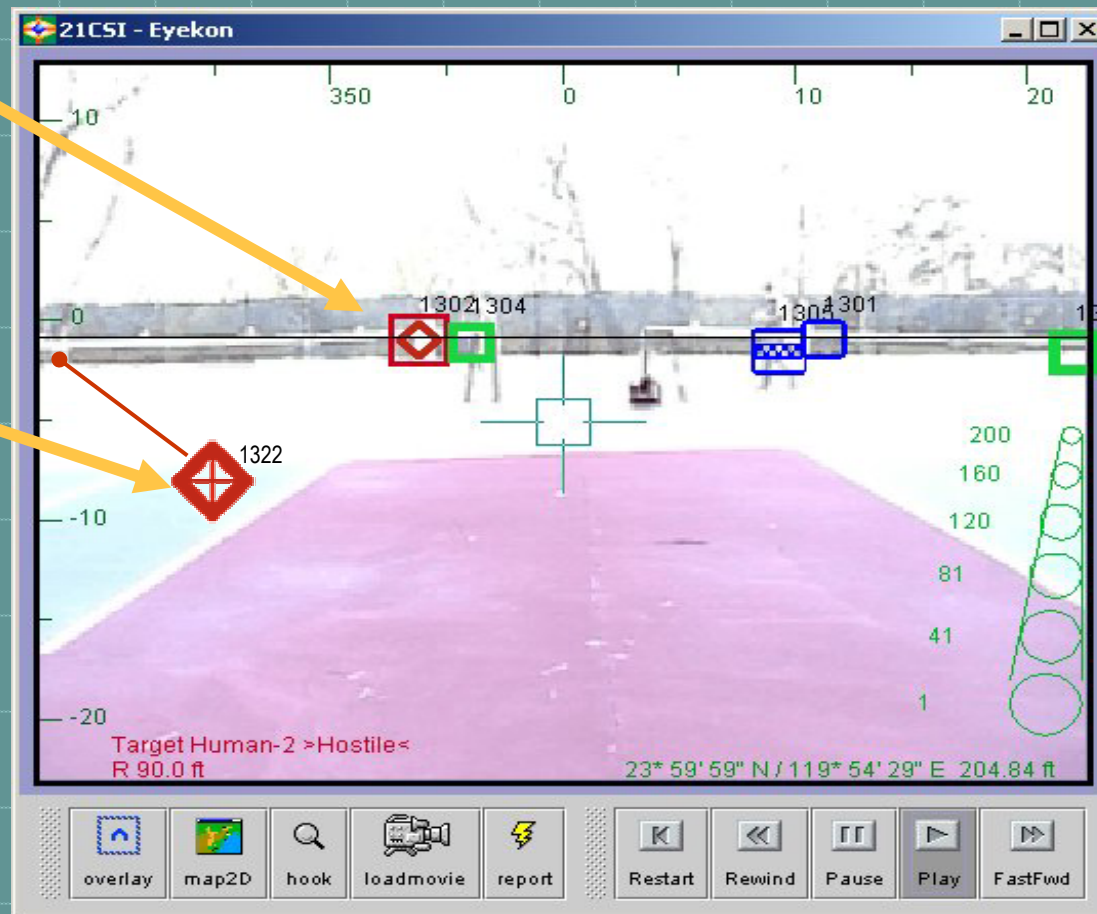
Hooked
Target



EYEKON Overlays Following Contacts

Hooked
Contact
(Moved)

Target
Out of FOV
(Moved)



Eyeikon Concept Extended

- ◆ Fire team-level support
 - ◆ Self-organizing
 - ◆ Adaptable, responsive
 - ◆ Leader “immortality”
- ◆ Non-combat (OOW)/Spin-offs
 - ◆ Law enforcement
 - ◆ Fire fighting
 - ◆ Disaster management
 - ◆ Maintenance operations
 - ◆ Intelligence gathering

Conclusions

- ◆ Eyekon will directly enhance Land Warrior/OFW lethality through better SA by:
 - ◆ Quickly and intuitively locating high-threat enemy targets in the weapon sight
 - ◆ Reduce own force vulnerability by aiding in the designation of highest threat(s) and identifying teammates
- ◆ Result: Battlefield information dominance ► More enemy casualties; less friendly casualties

Thank you!

◆ Questions?

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