

Input Devices Panel

Panelists:

Dr. David Diller, Senior Scientist, BBN Technologies
ddiller@bbn.com

Dr. Jim Templeman, Head of Immersive Simulation Section, NRL
templeman@itd.nrl.navy.mil

Michael Raphael, CEO, Direct Dimensions
mraphael@dirdim.com

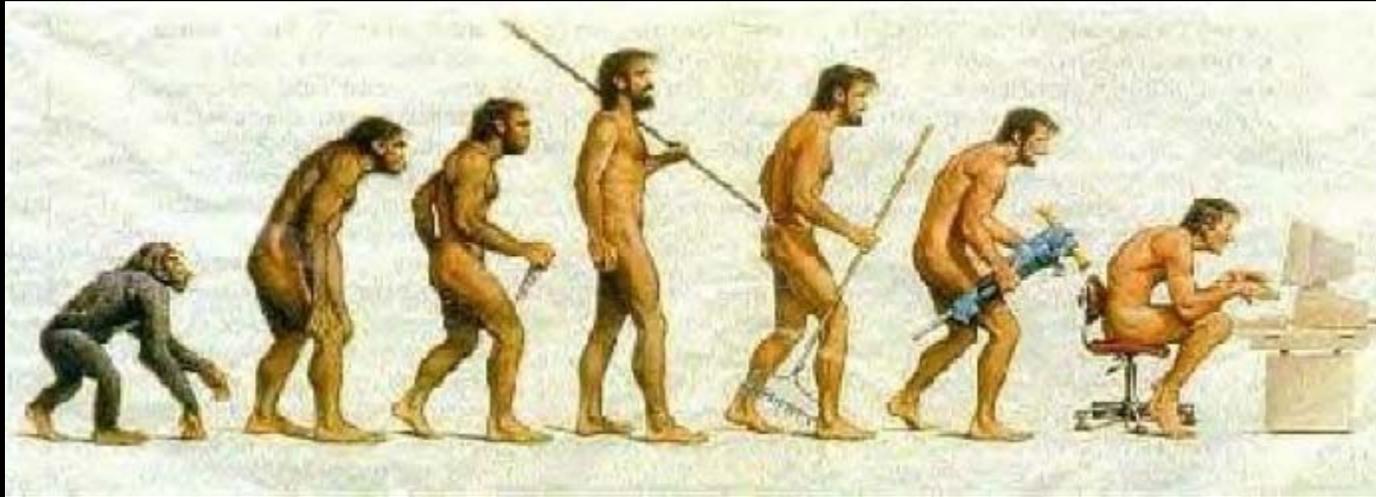
Michael Starkenburg, CEO, Image Metrics
michael.starkenburg@image-metrics.com

Moderator:

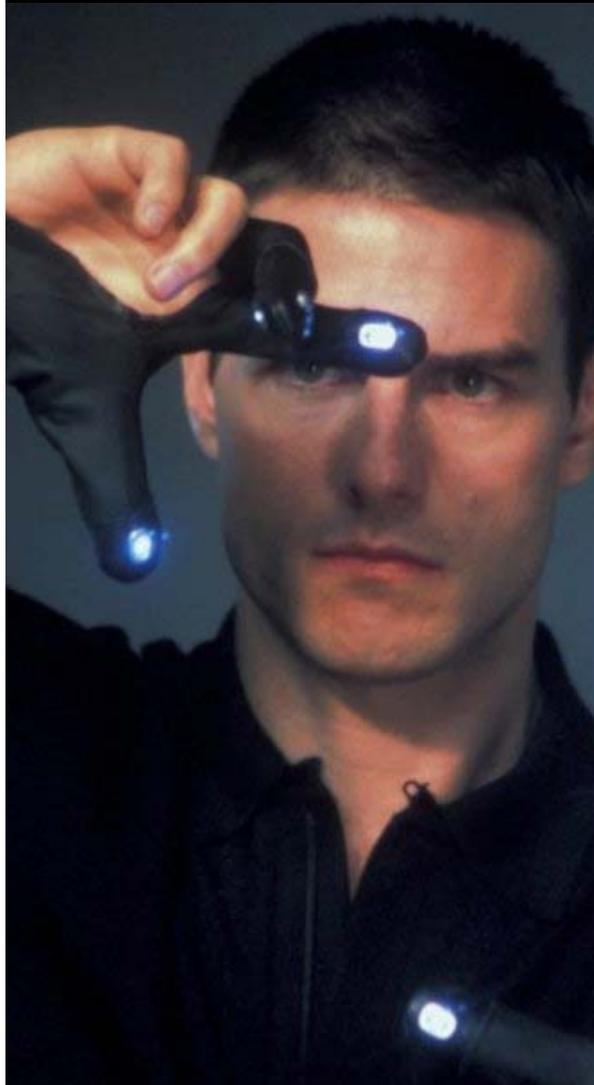
Bruce Joy, Chairman, VastPark
bruce.joy@vastpark.com

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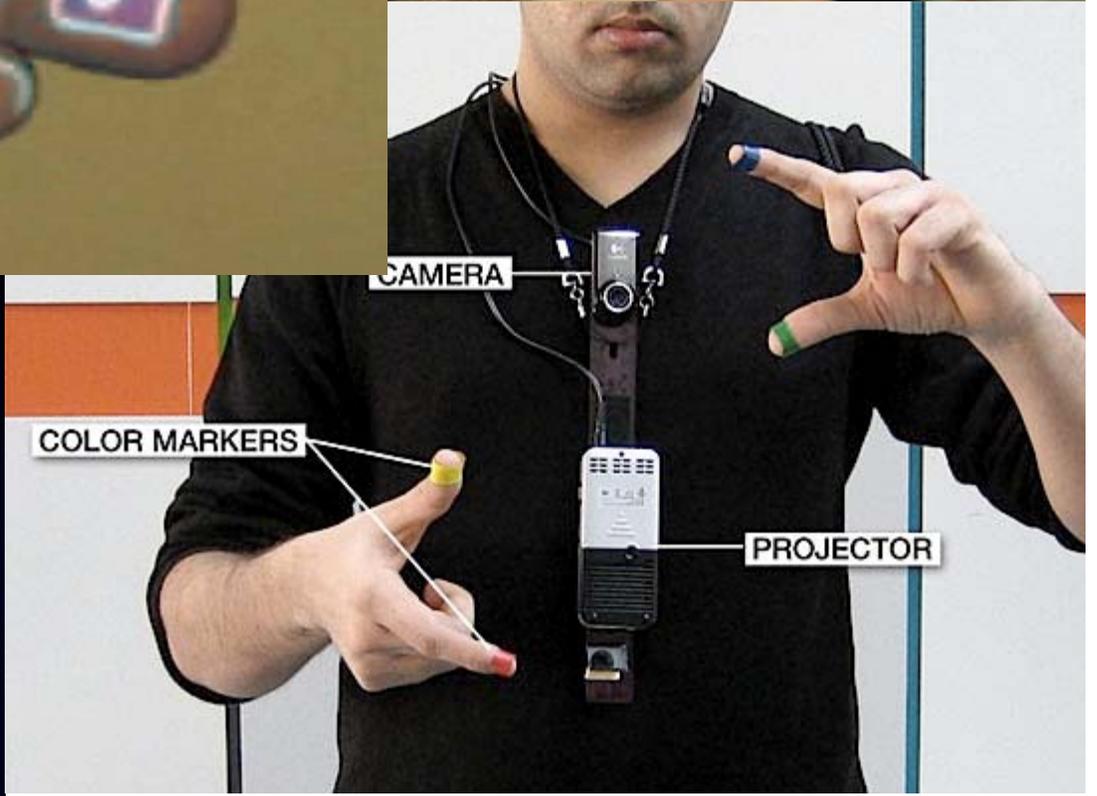
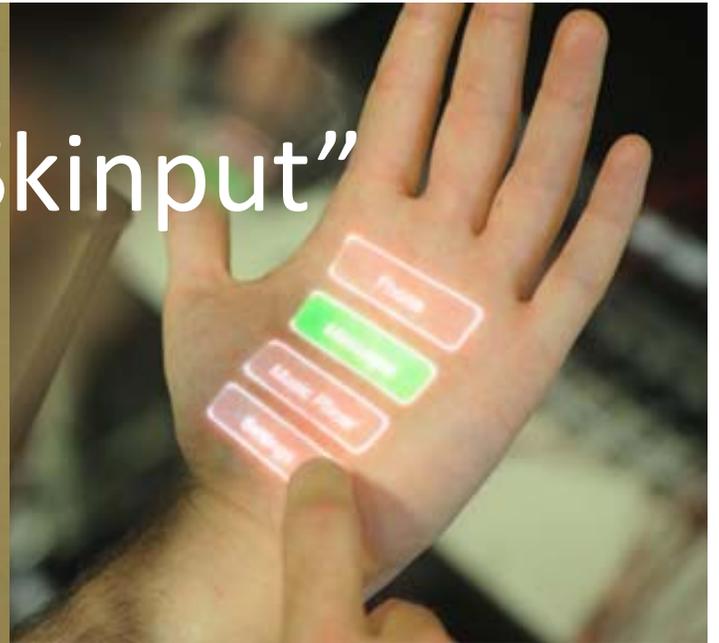
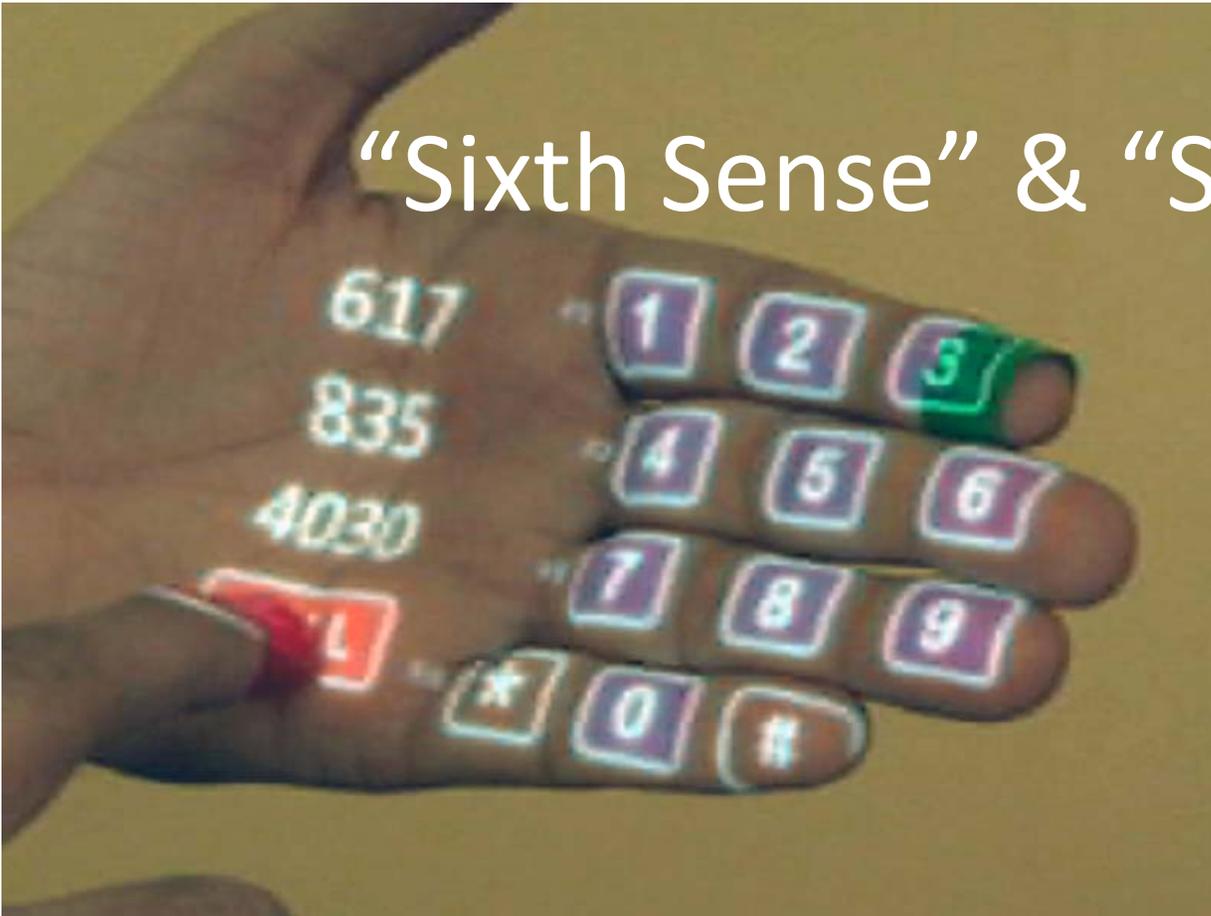
Mankind's input evolution



R&D field is beyond “Minority Report”

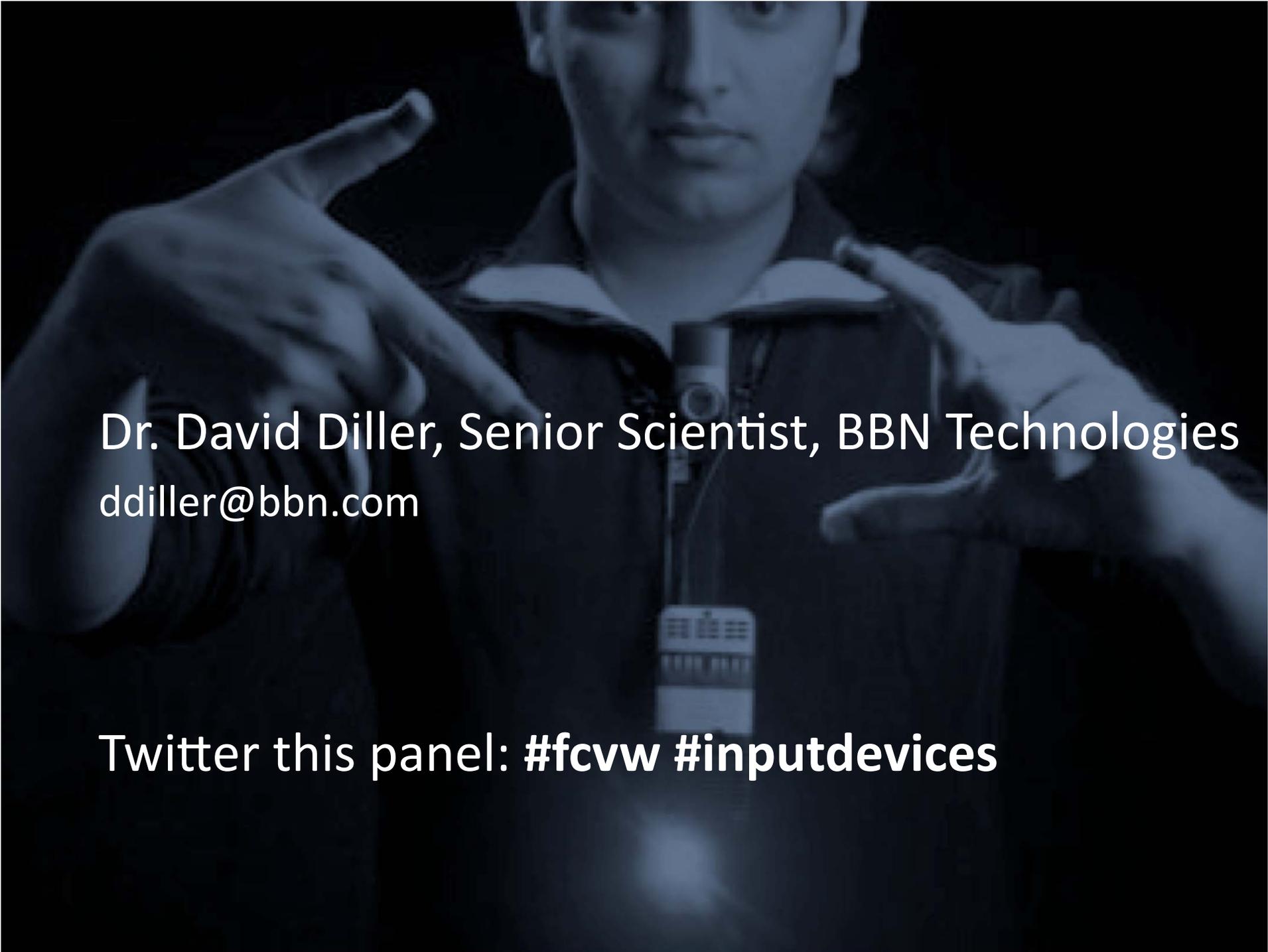


“Sixth Sense” & “Skinput”



Coming to the battleground and boardroom nearest you!

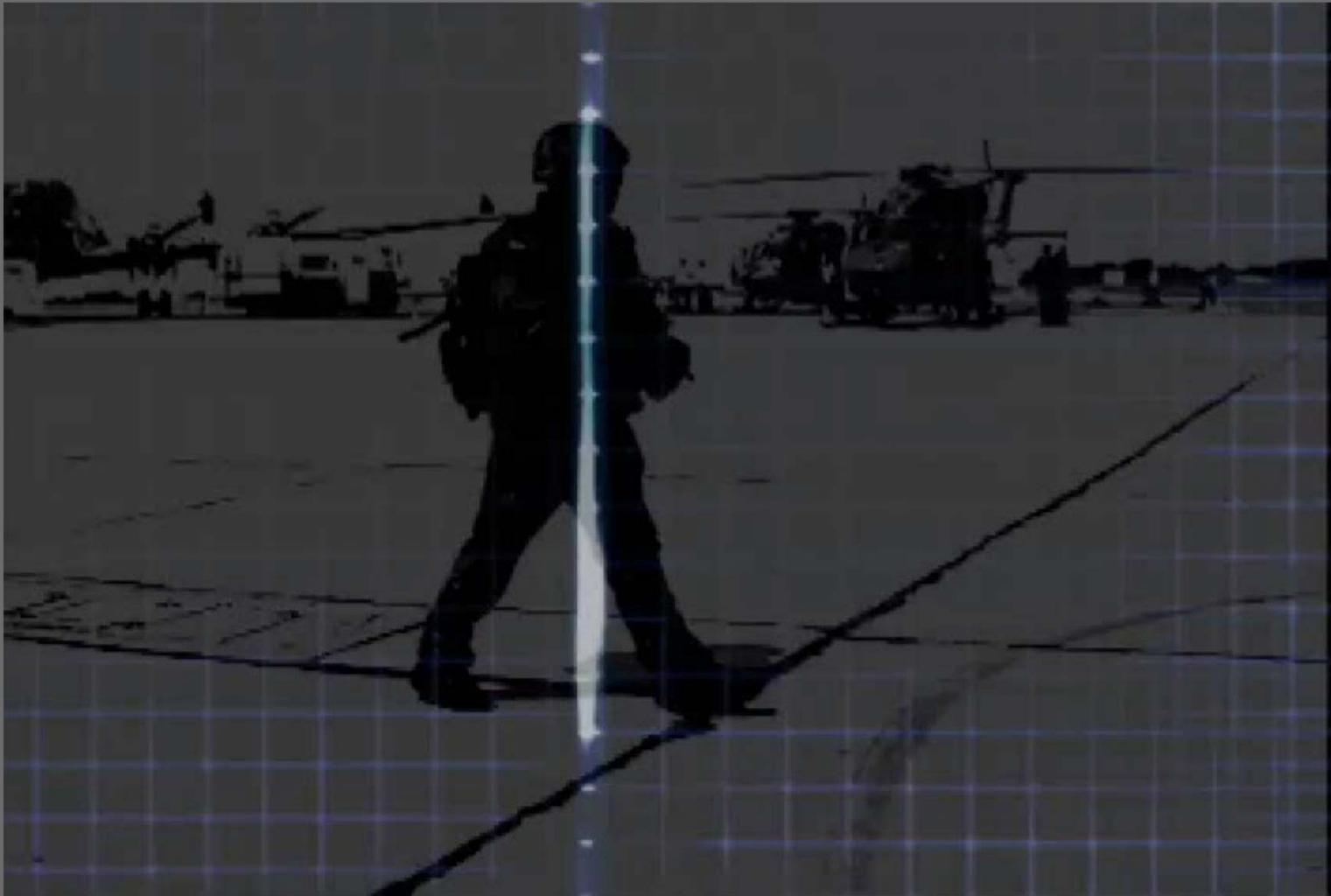
- Input devices are getting cheaper.
- Let's meet four proponents
- Find out what's hot
- What does this mean for how you train, collaborate and interface with virtual worlds.



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Raytheon BBN – Voice, gesture & A.I.



A blue-tinted photograph of Michael Starkenburg, CEO of Image Metrics. He is wearing a dark jacket and a lanyard with a badge. He is gesturing with both hands, pointing towards the camera. The background is dark.

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Image Metrics – Company Overview

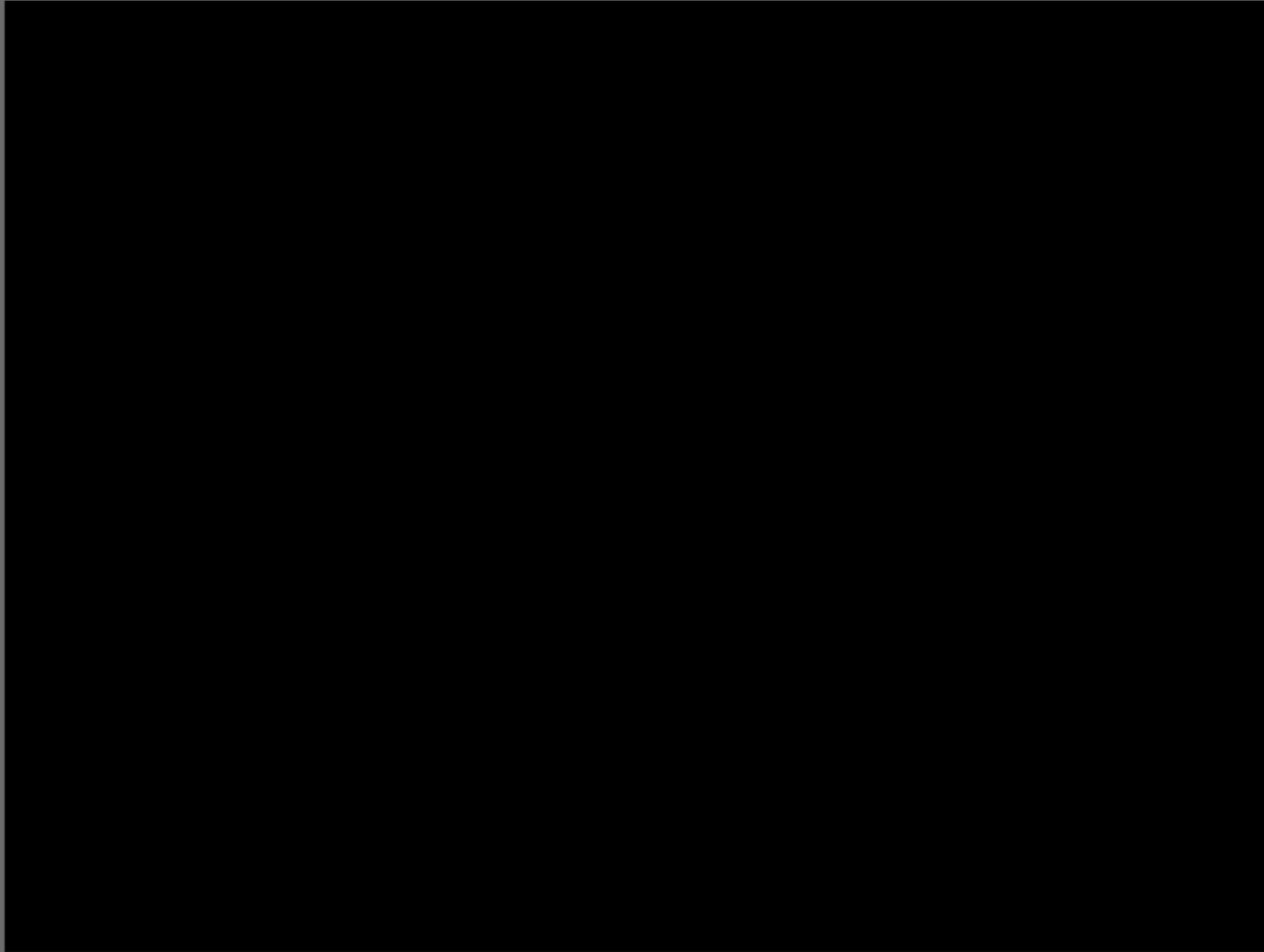
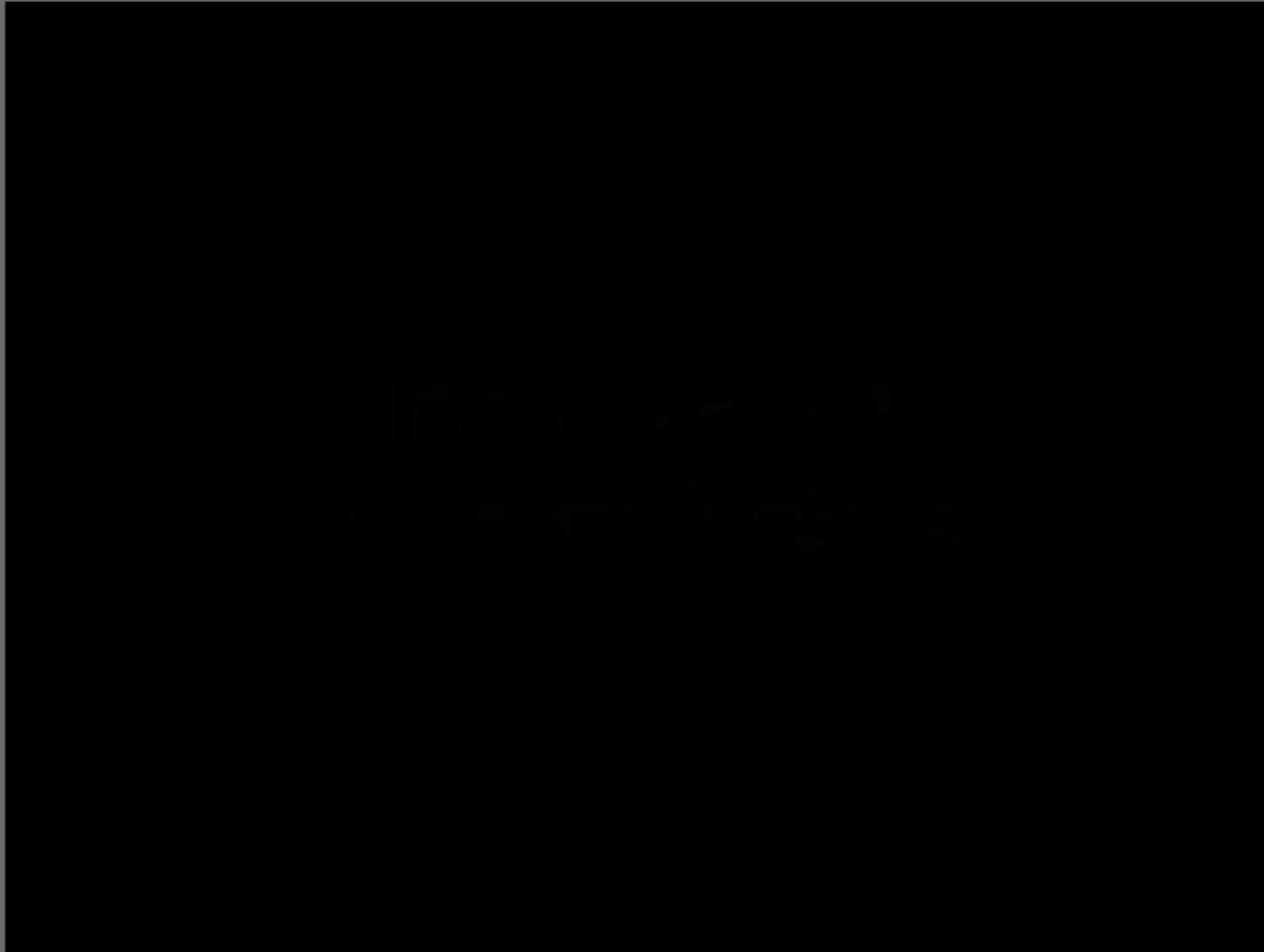


Image Metrics – Creative process



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Gaiter: Fully immersive infantry simulator

Developed at NRL 1999-2004

- Full-Body tracking: 6 degrees-of-freedom per segment
- ***Virtual Locomotion***: user steps in place to walk through VE
- One-for-one weapons handling



3rd-Person View

- Real Time Interaction
- *Look - Move - Shoot*

Physical Set-Up

- Cameras track markers
- Head-Mounted Display



User Interfaces for Dismounted Infantry Simulation

Dr. Jim Templeman

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Federal Consortium for Virtual Worlds

May 13, 2010



Dismounted Infantry Simulation



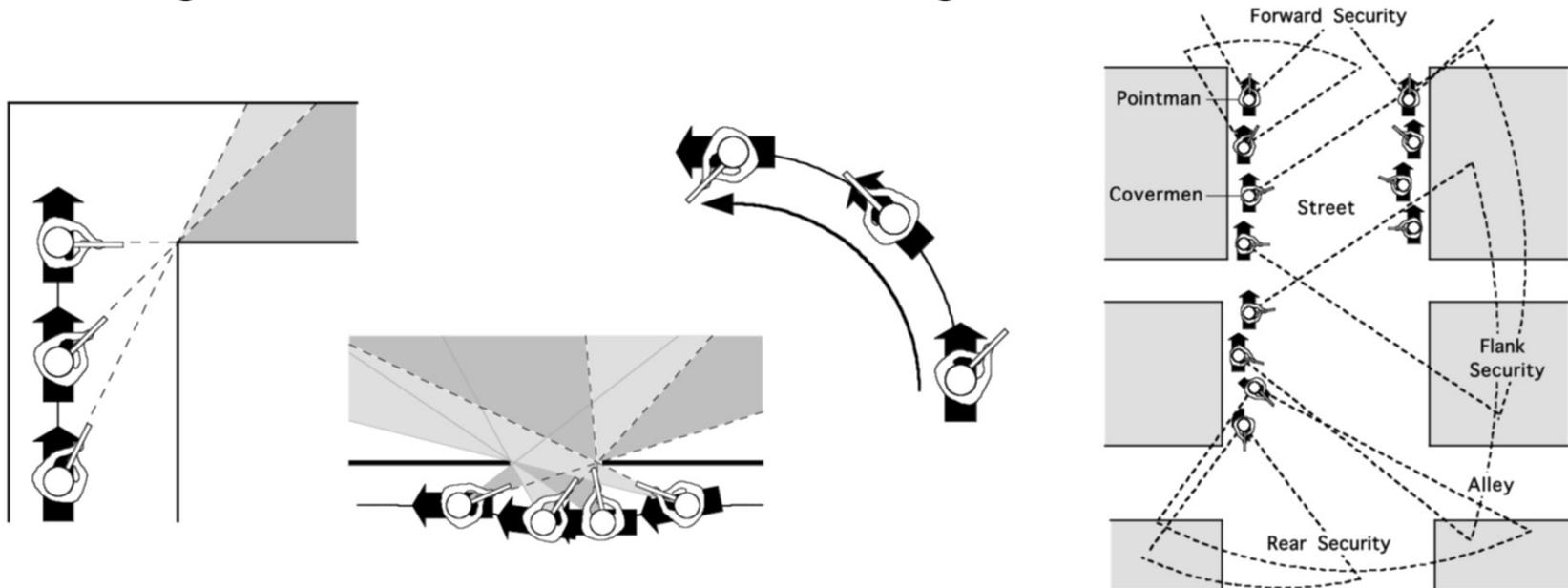
- **Goal:** Give the user a high degree of control over the avatar to facilitate moving as they would in the real world
- Move Tactically
 - Direct course & heading independently
 - Course: direction of movement
 - Heading: direction body faces
 - Take measured steps
- Quickly take cover
 - Move quickly to cover
 - Dive behind cover
 - Adopt posture to ‘make yourself small’
- Look out & shoot from behind cover
 - Leaning out to the side
 - Raise up just as much as needed



What Is Missing from Current Controls?



- Actual tactical infantry movements rely on **scanning** while moving to cover all immediate danger areas



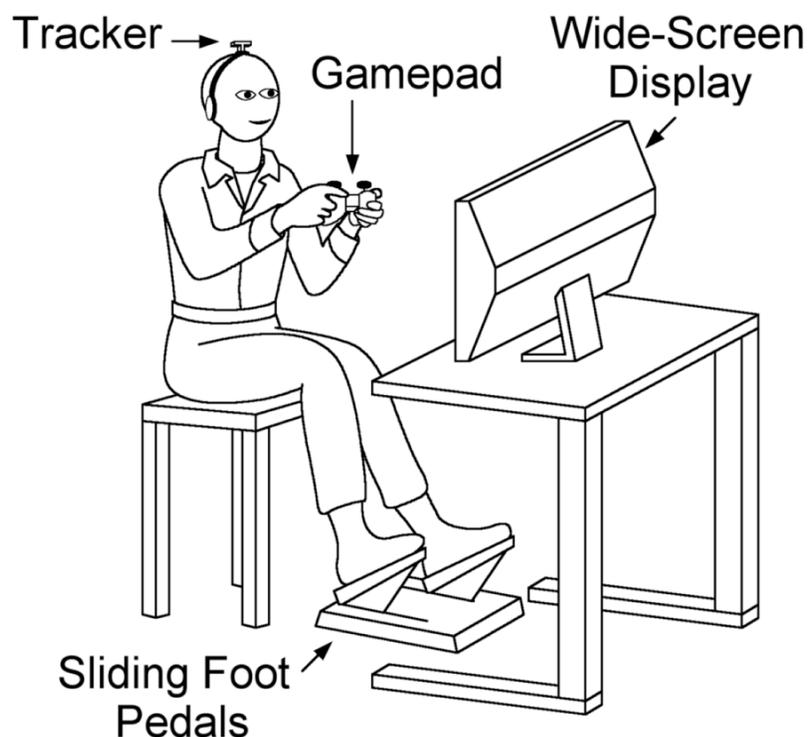
- Movement strategies adopted in first-person-shooter games do not match actual infantry tactics
 - Typical gamepads & mouse-keyboard controls emphasize **strafing**

Pointman

Low Cost, Small Footprint, Deployable



- Add 6-DoF head tracking & sliding foot pedals to provide more natural control

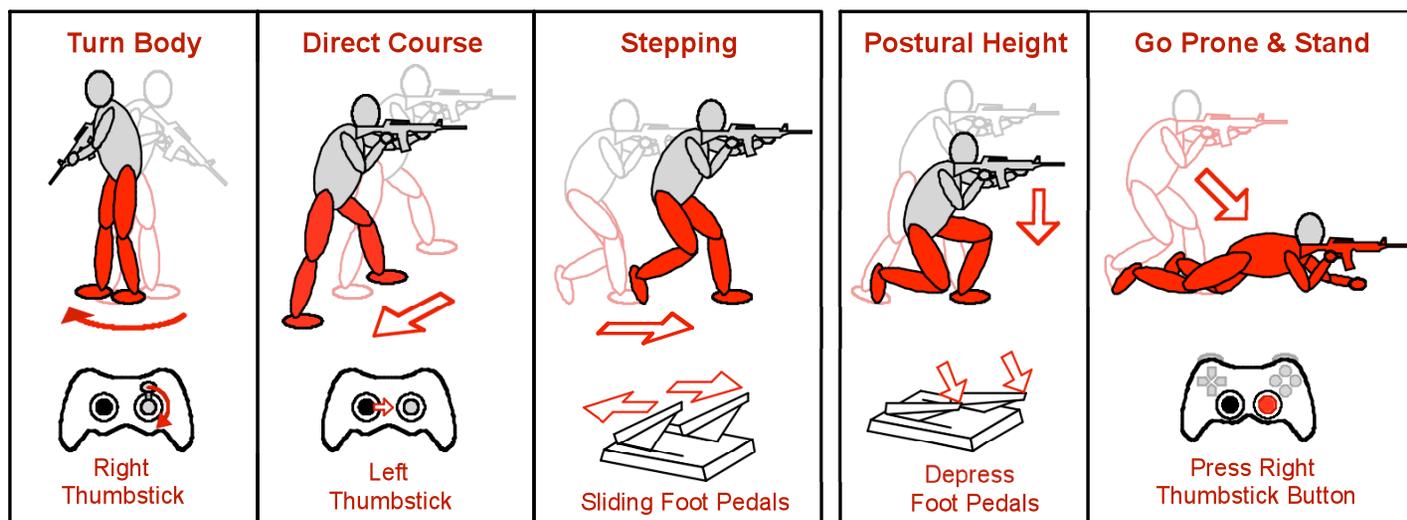


Total cost of input devices is less than \$400

Lower Body Control



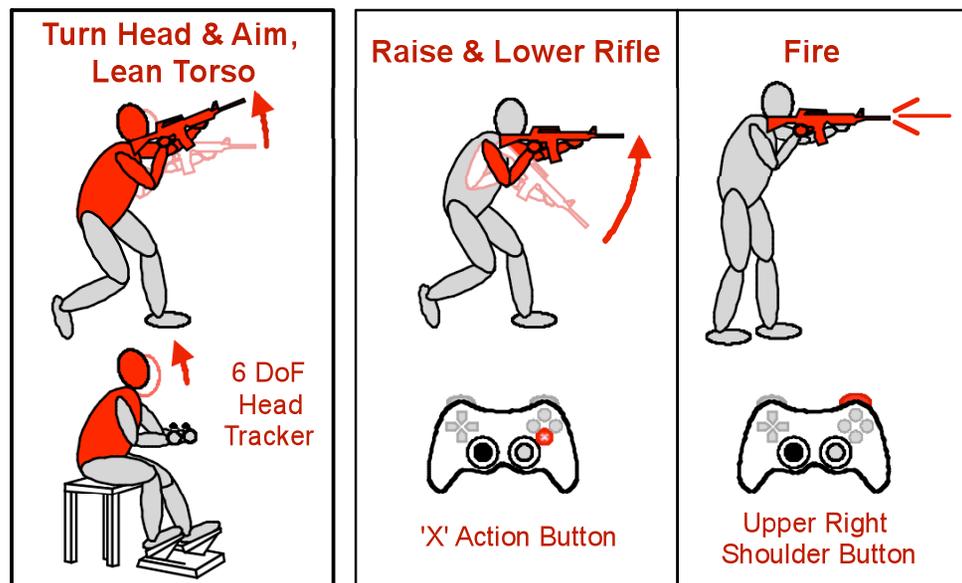
- Avatar's lower body is controlled by user's thumbs & feet
 - Virtual locomotion
 - Right thumbstick - turns the body
 - Left thumbstick - sets the direction in which the avatar steps
 - Slide the foot pedals - moves the avatars legs back & forth to take steps
 - Control over posture
 - Push pedals down - lower the body by flexing the avatar's legs
 - Gamepad buttons - transition between body postures (stand-prone-seated)



Upper Body Control



- Avatar's upper body is driven by the user's tracked motion
 - Avatar's head turns & torso leans based on tracked head motion
- Virtual weapon is controlled by the head & hands
 - Direction avatar faces - aims the virtual weapon (when it is raised)
 - Gamepad buttons - raise/lower, fire, & reload the virtual weapon



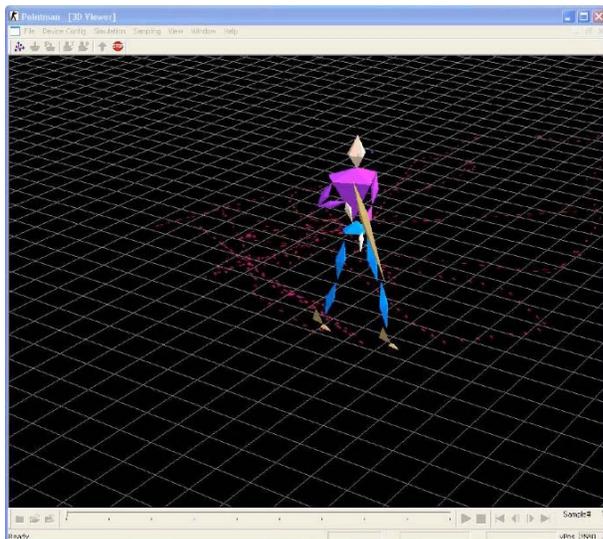
- Head-Coupled Viewing: View is based on where avatar faces



ONR Rapid Technology Transition



- Fully integrated Pointman with VBS-2 (Virtual Battlespace-2) for use by the Marine Corps



NRL
UI Development



PM-TRASYS
Transition Sponsor



Pointman at Camp Pendleton

with an Organic Marine Fire-Team, Dec. 7-10, 2009



- Training Required: 2-hours \Rightarrow Break \Rightarrow 2-hours
 - They started functioning as a team: moving & communicating as a unit
 - Their leader took charge of directing the team
 - Performance got better: fulfilling objectives with fewer casualties

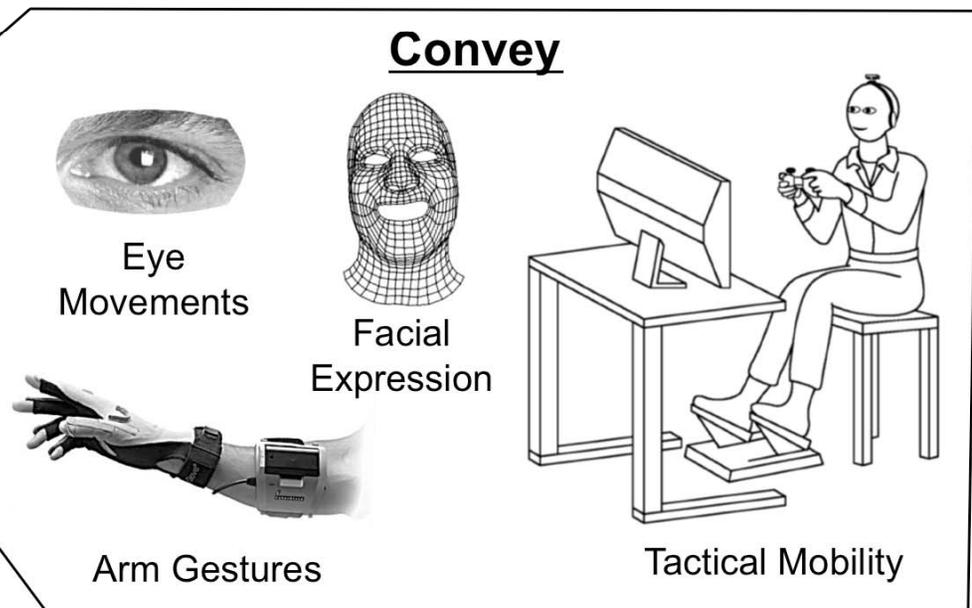


- Giving Marines a UI that affords correct tactical movement allowed them to perform missions the way they are trained!

Expressive Interaction for Desktop VR



- **Goal:** Train cultural interaction skills alongside warfighting skills
- **Approach:** Extend immersive interfaces to include the non-verbal communications needed to support team & cross-cultural interaction



- Training scenarios pose a mix of tactical, cultural, & ethical challenges
- Access instructors & role-players at remote sites



Please Check Out the Pointman Demo in the Exhibits



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Tools: Past vs Future



- Input devices have come of age
- New methods are now affordable and practical
- Input devices can deliver better training & have virtual world applications that will change how we collaborate

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Thanks for coming



For more information, please come talk to the panelists.

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