Low Cost Virtual Reality Welder Training System

NSRP Joint Panel Meeting

21 April, 2010
Overview

• Background
• Foreground
• Current project
• Status
• Plans
• Demo
Background

• Welding training is a big deal
  – Annual Electric Boat welder training
    • 35,000 hours
    • > $600K
  – Shipbuilding Industry estimate
    • $5M
  – All industries estimate
    • $18M
Background

“Can’t we use virtual reality to help train welders?”

John Holmander, 2001
Background

• 2001 Virtual Environments
  – 10 years of experience in virtual design at EB
  – Early weld monitoring
    • DataWare STTR (WeldWare, AccuData)
    • ManTech proposal, DataWare
  – Early virtual welding systems
    • TEREBES, WAVE

Benardos & Olszewski, carbon arc welding
Background

• 2003 ManTech Virtual Welder
  – VRSim, EB, EWI
  – Prototype system developed
    • Real-time neural network weld simulation
    • Real weld torch
    • 6 DOF tracking
    • Haptic feedback
Foreground

- NSRP 2008 project
  - Low Cost Virtual Reality Welder Training System
- Team members
  - Bender Shipbuilding & Repair
  - Native American Technologies
  - Electric Boat
Foreground

• NSRP 2008 project
  – 2 Phase, 2 year project
  – Phase 1 completed, March 2009
  – Project management issues
Current Project

• NSRP 2010 project
  – Phase 2 of original 2008 project

• Team members
  – Electric Boat
  – Native American Technologies
Current Project

• Goal: low cost system
  – Target cost < $10K
Current Project

• Key technologies
  – Robust welding simulation system
    • Based on commercial weld monitoring system
    • Real-time neural network
    • Trained with range of weld samples
  – Low cost tracking system
    • Based on gaming technology
Status

• Basic weld simulation completed
  – Limited amount of sample data loaded
• Prototype system developed
  – Weld torch
  – Tracking
• Preliminary graphics and display
Phase 2 Plans

• Further develop simulation model
  – Additional sample data
• Complete graphics and display
• Develop set of prototype welding units
• Deploy to shipyards for testing/evaluation
• Plans for commercialization
Demo
Questions

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