Exoskeletons, Robots and System Software: Tools for the Warfighter?

Paul Flanagan, Tuesday, April 24, 2012 11:15 am– 12:00 pm

“The views expressed in this presentation/article are those of the author and do not reflect the official policy or position of the National Defense University, the Department of Defense, or the U.S. Government.”
Emerging technologies such as exoskeletons, robots, drones, and the underlying software are and will change the face of the battlefield. Warfighters will be able to carry more and cover longer distances, but with less effort. Robots and drones greatly decrease exposure to hazardous situations while augmenting human capabilities. Join us for an enlightening session where we expose the power of these technologies in an interactive session and where we think they are headed.
Premise

• Robotics is in 2004 at the same place that computers were in 1978. In 1978 computers were expensive, owned by large organizations, notably the military, and performed tedious, routine functions. Since that time computers have become small, inexpensive, commonplace and are used in ways never imaged in 1978.
An exoskeleton is a wearable robot suit that basically does any lifting for the wearer, enabling him or her to do the work of two or three soldiers.
Robotic Assisted Humans

HAL-3

Backbag
Controller (PC)
Wireless LAN

Battery

Power Unit
For Power up of
Lower Limb

Angle Sensor
Detection of joint
angle

EGM Sensor
Detection of slight human
body voltage that is
transferred from the brain
to the muscle

Counteraction force
sensor
Detection of gravity center of the
wearer

Figure 2: HAL3
Robotic Assisted Humans

Figure 3: HAL5

Figure 4: HAL5 demonstration at EXPO 2005

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• http://www.ted.com/talks/eythor_bender_demos_human_exoskeletons.html
DARPA Challenges


http://link.brightcove.com/services/link/bcpid1374481183/bctid1377895007

“The global hub for educating, informing, and connecting Information Age leaders.”
Google’s Robot Car

• http://www.youtube.com/watch?v=bp9KBrH8H04
DoD robots in the air 2004?

<table>
<thead>
<tr>
<th>Features</th>
<th>J-UCAV X-45 System</th>
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<tr>
<td><strong>Air Vehicle</strong></td>
<td><strong>UCAV</strong></td>
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<tr>
<td>• ~36,500 lb Gross Weight</td>
<td><strong>F-16</strong></td>
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<td>• ~18,000 lb Empty Weight</td>
<td><strong>F-117</strong></td>
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<tr>
<td>• ~0.8 Mach / 40,000 ft altitude</td>
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<td>• 1100-1300 nm combat radius</td>
<td>49 ft.</td>
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<td>36 ft.</td>
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Air Force special operations forces from the 22nd and 23rd Special Tactics Squadrons prepare to launch a Pointer UAV from the deck of USS Alabama.

http://www.time.com/time/specials/packages/article/0,28804,2074830_208013_2080115,00.html
Questions and Comments