



Advanced Technology Laboratories

# TECH BRIEFS

March 1, 2006

Volume 1, Number 1

[www.atl.lmco.com](http://www.atl.lmco.com)

## Technology: Spoken Language Understanding

# “Yeah, Computer. I’m Talkin’ to You.”

### Introduction

The idea that humans will be able to interact with computers using conversational language has long been a favorite subject of science fiction. Hal 9000 (2001: A Space Odyssey), C-3PO (Star Wars), and the Enterprise computer (Star Trek) all communicated with computer precision while understanding and using the subtleties of spoken language.

This reflects the persistent belief that spoken dialogue is the most natural and powerful user interface to use with computers. There remain, however, significant technical challenges to be solved before we approach the human-computer conversational capabilities possessed by C-3PO.

### Challenges

The challenges of creating conversational computer systems are as great as understanding both the complexity and subtlety of natural spoken languages. Spoken language understanding engineers still face many challenges, including: (1) speech recognition (what the person said), (2) speech understanding (what the person meant in context), and (3) dialogue management (what is the appropriate response).

### ATL and Spoken Language Understanding

Lockheed Martin Advanced Technology Laboratories (ATL) has more than a decade of spoken lan-

guage understanding research experience, developing systems that have made significant progress solving these challenges. Included in this experience are nearly a dozen current or successfully com-

### WIRE

pleted programs for the Department of Defense and other Federal agencies. The Wearable Intelligent Reporting Environment (WIRE)—the first wearable,

self-contained spoken language understanding system—is an excellent, functional example of ATL’s spoken language understanding technology.

WIRE allows the warfighter to complete a field intelligence report as if he were talking to another person—using natural conversation consistent with the situation rather than having to use memorized commands and prompts. WIRE understands the context of a statement. When the warfighter says “I just saw five armed insurgents,” pauses and then says, “They were traveling east,” WIRE understands who “they” are and associates the direction of movement with the insurgents.

The system will also ask the warfighter for any additional information that is needed to complete the report.

The warfighter can mention observations in any order. The system assembles the observations into a standardized report format to be used by the command post to quickly assess the situation and respond if necessary—or plan future actions in a timely manner.

Other future applications for ATL’s spoken language understanding expertise include:

- Cockpit workload reduction in combat aircraft.
- Field casualty/medical reporting/logistics.
- Directed analysis of multi-source intelligence.
- Law enforcement reports and database access.



**Pilot:** “Computer, plot heading to the I.P. Check weapons status.”

**Computer:** “Roger, heading to I.P. is 278. All weapons on standby.”

**Pause**

**Computer:** “One aircraft 15 miles southeast headed south. Appears to be civilian aircraft.”

**Pilot:** “Roger.”

*In the cockpit of the future pilots will be able to talk with an onboard computer as if it were another crewmember because ATL is developing technology in spoken language understanding—today.*

guage understanding research experience, developing systems that have made significant progress solving these challenges. Included in this experience are nearly a dozen current or successfully com-

pleted programs for the Department of Defense and other Federal agencies. The Wearable Intelligent Reporting Environment (WIRE)—the first wearable,

self-contained spoken language understanding system—is an excellent, functional example of ATL’s spoken language understanding technology.

WIRE allows the warfighter to complete a field intelli-

For More Information:

Lockheed Martin Advanced Technology Laboratories  
Hugh Pearce, PhD, Director Business Development  
3 Executive Campus • 6th Floor • Cherry Hill, NJ 08002  
856.792.9810 • [hpearce@atl.lmco.com](mailto:hpearce@atl.lmco.com)