



# News Release

## Defense Advanced Research Projects Agency

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IMMEDIATE RELEASE

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### **DARPA AWARDS CONTRACTS FOR PIONEERING R&D IN COGNITIVE SYSTEMS**

The Defense Advanced Research Projects Agency (DARPA) has awarded contracts to Carnegie Mellon University's School of Computer Science (Pittsburgh, Penn.) and SRI International (Menlo Park, Calif.) to develop software that could significantly advance the science of cognitive systems and revolutionize how computers interact with humans.

The program, called Perceptive Assistant that Learns (PAL), is expected to yield new technology of significant value to the military, business, and academic sectors. It will spur pioneering research in cognitive information processing, including areas of artificial intelligence, machine learning, knowledge representation and reasoning, machine perception, natural language processing, and human-computer interaction. Through the PAL program, researchers will develop software that will function as an "enduring personalized cognitive assistant" to help decision-makers manage their complex worlds of multiple simultaneous tasks and unexpected events.

DARPA's Information Processing Technology Office (IPTO) manages the PAL program. IPTO is the DARPA office responsible for the ARPANet, the Internet, large-scale parallel processing, and many of today's critical computing technologies. Part of IPTO's current mission is to develop cognitive computing systems – systems that can reason, learn from experience, take advice, explain themselves, and respond intelligently to situations never encountered before.

Technologies developed in the PAL program will make important contributions far beyond the realm of smart assistants. If cognitive systems become a reality, we will have computer systems far better at adapting to their users' needs, and far better at coping with unexpected inputs than today's systems. In addition, cognitive systems will become more responsible for their own maintenance, do a far better job of warding off security attacks, manage internal resources more effectively, and have drastically reduced development and deployment costs.

Carnegie Mellon University's effort under PAL is called RADAR, for Reflective Agents with Distributed Adaptive Reasoning. The system will help busy managers to cope with time-consuming tasks such as organizing their E-mail, planning meetings, allocating scarce resources such as office space, maintaining a web site, and writing quarterly reports. Like any good assistant, RADAR must learn by interacting with its human master and by accepting explicit advice and instruction. The RADAR project draws on Carnegie Mellon's expertise in artificial

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intelligence, machine learning, natural-language understanding, and human-computer interaction. DARPA has awarded Carnegie Mellon \$7 million for the first phase of a five-year contract.

SRI has dubbed its project CALO, for Cognitive Agent that Learns and Observes. The name was inspired by the Latin word “calonis,” which means “soldier’s assistant.” The CALO software, which will learn by working with and being advised by its users, will handle a broad range of interrelated decision-making tasks that have in the past been resistant to automation. It will have the capability to engage in and carry out routine tasks, and to assist when the unexpected happens. DARPA has awarded SRI \$22 million for the first phase of their five-year contract.

The SRI contract includes subcontracts with 20 additional research institutions: Boeing Phantom Works, Carnegie Mellon University, Dejima Inc., Fetch Technologies Inc., Georgia Institute of Technology, Massachusetts Institute of Technology, Oregon Health and Science University, Stanford University, State University of New York - Stony Brook, University of California at Berkeley, University of Massachusetts at Amherst, University of Michigan, University of Pennsylvania, University of Rochester, University of Southern California and its Information Sciences Institute, The University of Texas at Austin, University of Washington, University of West Florida’s Institute for Human and Machine Cognition, and Yale University.

Researchers for both project teams will themselves use the PAL software during its development to ensure that it satisfies all of the important needs and requirements, including privacy, security, and trust. Technical progress will be assessed each year through a series of experiments and structured evaluations.

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