# R & D Status Report

March 15, 1995

**ARPA Order No.:**

A407

**Contractor:**

Adaptive Solutions, Inc.

1400 NW Compton Drive, Suite 340

Beaverton, OR 97006

**Contract No.:**

N00014-93-C-0234

**Contract Amount:**

$1,299,714.00

**Effective Date of Contract:**

November 8, 1993

**Expiration Date of Contract:**

June 7, 1996

**Principal Investigator:**

Wendell A. Henry

**Telephone Number:**

(503) 690-1236



**Title of Project:**

High Performance Hardware and Software for Pattern Recognition and Image Processing

**Title of Work:**

R&D Status Report

**Reporting Period:**

December 1, 1994 through February 28, 1995

## Disclaimer

**The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Advanced Research Projects Agency of the U. S. Government.**

## Project Summary:

The CNAPS Development Environment consists of several software tools required by the software developer. These are:

CNAPS application program interface
CNAPS-C compiler
CNAPS assembler
CNAPS source-level debugger (command-line interface)
CNAPS source-level debugger (graphical interface)
CNAPS Backpropagation Neural Network function library

The CNAPS compiler, assembler, application program interface, and Backpropagation Neural Network function library have been ported to the Windows 3.x environment and CNAPS/PC hardware and integrated with the source-level debugger. These tools are now in Beta test. The port of the graphical interface for the source-level debugger is still in progress.

At the time of this report, the project has been authorized to spend $292,215.00 for the Phase 2 tasks and has accumulated expenses of $193,249.79. The contract stipulates $492,893.00 are required for the completion of the Phase 2 tasks, therefore, an additional $200,678.00 of funding must be authorized to complete the Phase 2 tasks.

## Description of Progress:

The previous Project R&D Status Report stated the following as the objectives for this reporting period:

1. *Porting of the command-line version of the CNAPS source-level debugger will be completed. The debugger will be in Beta test.*
2. *Porting of the graphical version of the CNAPS source-level debugger will continue. The debugger will be ready for preliminary testing and bug fixing.*
3. *The new version of the CNAPS/PC board which solves the current incompatibilities with many PC motherboards and its Control Software will be completed. This new board and the Control Software will be in Beta test.*

The following sections discuss the specific progress made in this reporting period in the hardware and software areas towards the stated objectives.

### Hardware

Design:

To resolve some PC platform compatibility issues Adaptive Solutions changed the method of mapping the CNAPS/PC board into the ISA bus memory map. This required modifications to be made to existing CNAPS/PC boards. The CNAPS/PC slave image occupies a 16 KB memory space and contains the local registers and memory. The host computer communicates with the board through a memory window in the upper memory area (UMB space). This slave image starts at a movable location defined by a slave base address. This base address is a multiple of 16 KB between 0x000C0000 and 0x000EC000 and is switch selected.

Testing:

Beta testing of the CNAPS/PC, Revision-level 2 board has commenced. The boards sent to ARPA at the end of Phase 1 will be replaced with Revision-level 2 boards.

Software

Design and Implementation:

The port and implementation of the command-line version of the source-level debugger has been completed. This version of the debugger has been integrated with the CNAPS-C compiler and the CNAPS assembler. The command-line version of the source-level debugger is now in Beta test.

The port and implementation of the graphical interface for the source-level debugger has continued. The graphical interface is being built upon the Galaxy windowing library. Most of the functionality has been completed and internal testing has begun.

The Neural Network application software (formerly called BuildNet) has been implemented as a Dynamic Link Library (DLL). This software allows a software developer to create application programs which utilize Backpropagation Neural Networks as a part of its algorithms. This neural network tool (BP.DLL) is a set of functions that support BP training and classification on the CNAPS/PC board. These functions can be called a Windows Visual C++ or Visual Basic application.

Testing:

System-level Beta testing of the CNAPS-C compiler and the Control software has continued. The Control software has been changed to reflect the new ISA bus mapping of the CNAPS/PC board and is now being Beta tested.

Beta testing of the command-line version of the source-level debugger has started.

Beta testing of the BP.DLL neural network function library has started.

Issues and/or Concerns

None.

## Plans For Next Reporting Period:

During the next three months work will continue on Phase 2 of the contract and the following are expected to be achieved:

1. Porting of the graphical interface for the CNAPS source-level debugger will be completed. The debugger will be in Beta test.
2. Support of all software tools, including bug fixes, during Beta testing will continue.
3. Phase 3 efforts will begin. This includes the start of definition of a C and C++ callable image processing and neural network emulation function library.

**Fiscal Status:**

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|---|---|
| Amount currently provided on contract: | $1,299,714.00 |
| Expenditures and commitments to date: | 501,034.00 |
| Funds required to complete work: | $798,680.00 |

| | |
|---|---|
| Authorized Phase funding: | $600,000.00 |
| Expenditures and commitments to date: | 501,034.00 |
| Authorized Phase 1&2 funds remaining: | $98,966.00 |

At the time of this report, the project has expenditures and commitments totaling 84% of the funds allocated for Phases 1 and 2 of the contract.

Wendell A. Henry 3/15/95

Wendell A. Henry Date

UNCLASSIFIED
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# REPORT DOCUMENTATION PAGE

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| 4. PERFORMING ORGANIZATION REPORT NUMBER(S): | 5. MONITORING ORGANIZATION REPORT NUMBER(S): N/A |
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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

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