ART/Ada Design Project - Phase I Task 3 Report: Test Plan

Status Report

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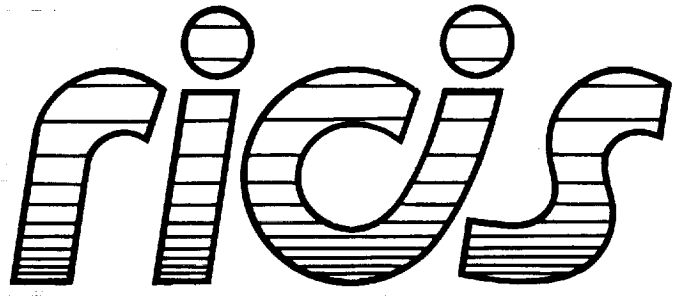
Inference Corporation

October 24, 1988

Cooperative Agreement NCC 9-16
Research Activity No. SE.19

NASA Johnson Space Center
Information Systems Directorate
Information Technology Division



Research Institute for Computing and Information Systems
University of Houston - Clear Lake

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The RICIS Concept

The University of Houston-Clear Lake established the Research Institute for Computing and Information systems in 1986 to encourage NASA Johnson Space Center and local industry to actively support research in the computing and information sciences. As part of this endeavor, UH-Clear Lake proposed a partnership with JSC to jointly define and manage an integrated program of research in advanced data processing technology needed for JSC's main missions, including administrative, engineering and science responsibilities. JSC agreed and entered into a three-year cooperative agreement with UH-Clear Lake beginning in May, 1986, to jointly plan and execute such research through RICIS. Additionally, under Cooperative Agreement NCC 9-16, computing and educational facilities are shared by the two institutions to conduct the research.

The mission of RICIS is to conduct, coordinate and disseminate research on computing and information systems among researchers, sponsors and users from UH-Clear Lake, NASA/JSC, and other research organizations. Within UH-Clear Lake, the mission is being implemented through interdisciplinary involvement of faculty and students from each of the four schools: Business, Education, Human Sciences and Humanities, and Natural and Applied Sciences.

Other research organizations are involved via the "gateway" concept. UH-Clear Lake establishes relationships with other universities and research organizations, having common research interests, to provide additional sources of expertise to conduct needed research.

A major role of RICIS is to find the best match of sponsors, researchers and research objectives to advance knowledge in the computing and information sciences. Working jointly with NASA/JSC, RICIS advises on research needs, recommends principals for conducting the research, provides technical and administrative support to coordinate the research, and integrates technical results into the cooperative goals of UH-Clear Lake and NASA/JSC.

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Preface

This research was conducted under auspices of the Research Institute for Computing and Information Systems by Inference Corporation. Dr. Charles McKay served as RICIS research coordinator.

Funding has been provided by the Information Systems Directorate, NASA/JSC through Cooperative Agreement NCC 9-16 between the NASA Johnson Space Center and the University of Houston-Clear Lake. The NASA technical monitor for this activity was Robert T. Savely, of the Software Technology Branch, Information Technology Division, Information Systems Directorate, NASA/JSC.

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for

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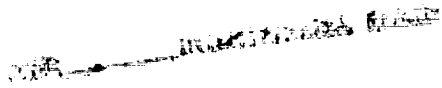

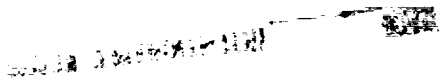

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1. Introduction

This chapter describes the plan for the integrated testing and benchmark of Phase I of the Ada-Based ESBT Design Research Project.

1.1 Overall Objectives

The integration testing is divided into two phases: Integrated Testing I and II.

- Integrated Testing I: In this phase, the modules that do not rely on the Ada code generated by the Ada Generator are tested before the Ada Generator is implemented.
- Integrated Testing II: In this phase, all modules are integrated and tested with the Ada code generated by the Ada Generator. Its performance and size as well as its functionality is verified in this phase.

1.2 Target Platform

The target platform is a DEC Ada compiler on VAX mini-computers and VAXstations running the VMS operating system.

1.3 Resource Requirement

The integrated testing and benchmark requires the following resources:

- One principal investigator: Bradley P. Allen (BPA)
- Two researchers: James T. Badura (JTB) and S. Daniel Lee (SDL)
- Hardware: one VAXstation II, one Sun 3/260, and one IBM PS/2 Model 50 or 70.
- Ada compilers: one copy of the DEC Ada compiler for a VAXstation, one copy of the Verdix Ada compiler for a Sun, and one copy of the Alsys Ada compiler for an IBM PS/2
- C compiler: one copy of the VAX C compiler for a VAXstation, and one copy of the Microsoft C compiler for an IBM PS/2
- ART-IM Version 1.5
- ART/Ada Test cases: an extensive test suite similar to the ART-IM test suit, a small-size benchmark program (less than 100 rules), a medium-size benchmark programs (a couple of hundred rules), and other small test cases.

1.4 Effort

The effort of Integrated Testing I and II is specified in the project plan.

1.5 Schedule

The schedule of Integrated Testing I and II is specified in the project plan.

2. Integrated Testing I

2.1 Objectives

The objectives of Integrated Testing I are as follows:

- To facilitate the individual module testing before the Ada Generator is implemented.
- To integrate and test the modules that do not rely on the Ada code generated by the Ada Generator.

2.2 Success Criteria

The success criteria of Integrated Testing I are as follows:

1. To assert a fact from an Ada main program.
2. To retract a fact from an Ada main program.
3. To watch facts while the fact is being asserted and retracted using the user interface.
4. To use other features in the user interface.
5. To have the exception handler handle errors correctly.

2.3 Integration Plan

In this phase, the modules that do not rely on the Ada code generated by the Ada Generator are integrated and tested before the Ada Generator is implemented.

The Verdix Ada compiler on a Sun 3/260 workstation will be mainly used for the integration and debugging because of its superior performance and the make facility. The final system should run on the DEC Ada compiler on a VAXstation as well.

2.4 Testing Methodologies

Extensive debugging messages will be implemented and enabled. These facilities include built-in facilities in ART/Ada such as "watch facts", and internal debugging facilities which will be taken out in the final system.

3. Integrated Testing II

3.1 Objectives

The objectives of Integrated Testing II are as follows:

- To integrate and test all modules with the Ada code generated by the Ada Generator.
- To verify the functionality of the whole system.
- To compare the performance and size of the system with that of ART-IM.

3.2 Success Criteria

The success criteria of Integrated Testing II are mainly to verify functionality.

1. To run small test cases.
2. To run a test suite to completion.
3. To run a small-size benchmark program, Monkey-and-bananas.
4. To run a medium-size benchmark program, Medium.

The performance and size are estimated as below, but will not be considered as the success criteria:

1. To run a little slower than ART-IM on both benchmarks when compiled with the runtime constraint check disabled.
2. To run with about the same size as ART-IM on both benchmarks.

3.3 Integration Plan

In this phase, all modules are integrated and tested with the Ada code generated by the Ada Generator.

The Verdix Ada compiler on a Sun 3/260 workstation will be mainly used for the integration and debugging because of its superior performance and the make facility. The final system should run on the DEC Ada compiler on a VAXstation as well.

3.4 Testing Methodologies

In this phase, the functionality of the whole system is verified mostly using test cases. Small test cases will be used initially to get the easy bugs out. Then, a extensive test suite will be implemented and used to verify a variety of features.

After the functionality is verified, the performance and size of system will be measured using two benchmark programs: one small-size benchmark program and another medium-size one. These results will be compared with those of ART-IM.