RESEARCH AGREEMENT

This agreement regulates contract research to be carried out by Research Institute for Symbolic Computation (hereinafter referred to as "the RISC-Linz") under commission by the Research Institute for Advanced Information Technology (hereinafter referred to as "AITEC"), with offices at Shiba Tokyo Kaijo Bldg. 2F 3-3, Shiba 2-chome, Minato-ku Tokyo 105, Japan. The purpose of the contract research shall be to advance scientific knowledge and technology in the area of parallel symbol processing and knowledge processing.

This agreement shall become effective as of the date of the last signature by and between the RISC-Linz and AITEC.

This contract research shall be carried out by AITEC as part of the "Survey and Research on Creation and Sharing of New Generation Intelligent Software Resources" sponsored by Mechanical Social Systems Foundation in FY 1997.

Article 1: The Purpose of the Research Project

The purpose of the research project is to perform research on the software described in Attachment A in knowledge processing and parallel processing and contribute to the advancement of computer science and application, through cooperation between the RISC-Linz and AITEC.

The RISC-Linz agrees to perform for AITEC the research activities described in Attachment A hereto under the direction and supervision of Professor Bruno Buchberger.

Article 2: Contract Period

This contract shall become effective on the date of the last signature, and the research shall be completed by February 28, 1998. This contract shall automatically terminate on said date unless a subsequent time extension, supplement, continuation or renewal is mutually agreed upon in writing between the RISC-Linz and AITEC.

Article 3: Compensation

AITEC agrees to compensate the RISC-Linz for the research services performed under this agreement in the amount of one million five hundred thousand (1,500,000) Japanese yen, one-half payable within thirty (30) days of the execution of this Agreement, and one-half after receipt of the report specified in Article 4 and at the same time before the end of March, 1998.

Article 4: Research Report

The RISC-Linz shall provide a single report of about thirty (30) pages of the research and a summary of about ten (10) pages.

The report and its summary shall reach AITEC no later than February 28, 1998.

ARTICLE 5: Intermediate Report

The RISC-Linz shall provide a single intermediate report of about 250 words describing the research on the request of AITEC.

ARTICLE 6: Release of the Software and Related Information

The RISC-Linz agrees that any software and related documents produced as part of this research project shall be placed in the public domain, free of charge and with no warranty, using the same conditions as those of ICOT Free Software, even if the software and related documents are produced after the formal date of termination of the contract. The RISC-Linz shall provide one copy of the software and related documents placed in the public domain to AITEC for evaluation and distribution no later than February 28, 1998.

ARTICLE 7: Confidentiality

No proprietary information shall be disclosed by either party.

ARTICLE 8: Equipment

The RISC-Linz agrees that the RISC-Linz shall not purchase equipments to become the property of the RISC-Linz using funds provided under this agreement.

ARTICLE 9: Assignment

Each party shall perform its respective duties, and such duties shall not be transferred to any third party.

ARTICLE 10: Intellectual Property

The RISC-Linz agrees to assign the copyright (if any) of the reports and the summary to AITEC and/or Mechanical Social Systems Foundation for publication and dissemination of information. AITEC shall grant the RISC-Linz permission to produce copies of the reports and the summary for its internal educational or research purposes without limitation as to duration or quantity.

ARTICLE 11: Notices

Any notice, offer, acceptance, demand, request, consent or other communication required or permitted under this Agreement shall be made in writing. A communication shall be deemed to be properly addressed as follows:

If to the RISC-Linz:

Wolfgang Schreiner
Assistant Professor
RISC-Linz

If to AITEC:

Shunichi Uchida
Director
AITEC

Johannes Kepler University
A-4040 Linz, Austria

Shiba Tokyo Kaijo Bldg. 2F
3-3, Shiba 2-chome,
Minato-ku, Tokyo 105, Japan

ARTICLE 12: Changes and Amendments

There are no understandings, agreements, or representations, whether oral or written, not specified herein regarding this contract. No amendment, consent, or waiver of terms of this contract shall bind either party unless made in writing and signed by all parties. Any such amendment, consent, or waiver shall be effective only in the specific instance and for the specific purpose given. The RISC-Linz and AITEC, by affixing the signatures hereto of their authorized representatives, acknowledge that they have read and understood this contract, and that the RISC-Linz and AITEC agree to be bound by its terms and conditions.

In WITNESS WHEREOF, the parties hereto have executed this Agreement.

The RISC-Linz:

RISC-Linz
Research Institute for
Symbolic Computation
Johannes Kepler University
A-4040 Linz, Austria

By:________________________
Bruno Buchberger Date
Chairman and Full Professor

AITEC:

AITEC
Japan Information Processing
Development Center
Shiba Tokyo Kaijo Bldg. 2F
3-3, Shiba 2-chome,
Minato-ku, Tokyo 105, Japan

By:________________________
Takashi Ichikawa Date
Managing Director

Attachment A

1 Research Project

This research pursues the development of a distributed software system consisting of

- a functional logic language interpreter on one machine,
- a number of constraint solving engines running on other machines.

The interpreter is based on an already existing (sequential) implementation of a functional logic language on the computer system Mathematica extended in two directions:

- the possibility to specify (non-linear) constraints over real numbers;
- the possibility to specify OR-parallelism among different clauses of a predicate.

The OR parallel features of the interpreter allow the decomposition of the solution space into different subspaces denoted by various sets of constraints; the individual sets are solved by different constraint solving engines in parallel and joined together to form the total solution set. This allows to investigate problems with large solution spaces using the computational power available in large computer networks.

2 Research Method

This research shall be carried out by a group at RISC-Linz directed and supervised by Professor Bruno Buchberger.

3 Research Period

June 1, 1997 to February 28, 1998

4 Research Schedule

- September 1997–October 1997: adaption and extension of the functional logic language interpreter.
- November 1997–February 1998: implementation of prototype of scheduler and communication interface for constraint solving engines.

5 Project Organization

	Name	Title	Affiliation	e-mail address
Principal Investigator	Dr. W. Schreiner		RISC-Linz	schreiner@risc.uni-linz.ac.at
Coop. Researcher	Prof. T. Ida		Tsukuba	ida@score.is.tsukuba.ac.jp
Coop. Researcher	Dr. H. Hong		RISC-Linz	hong@risc.uni-linz.ac.at

6 Deliverables

Deliverables: The Research Report and its summary

Date: February 28, 1998