<u>Research Agreement</u>

Agreement effective this 31st day of December, 1973, by and
between the Massachusetts Institute of Technology (hereinafter
referred to as "the Institute") a corporation organized under
the laws of the Commonwealth of Massachusetts, having its principal
place of business in Cambridge, Massachusetts; and Honeywell
Information Systems, Inc., (hereinafter referred to as "the Sponsor,")
a Delaware corporation having a place of business within the
Commonwealth of Massachusetts at 200 Smith Street, Waltham,
Massachusetts.

Whereas Sponsor desires, and Institute is willing to undertake
a research program for the Sponsor in the field of computer systems
security; and

Whereas, this Research Agreement shall be executed simultaneously
with the execution of Amendment I to the MULTICS Software Agreement
dated February 13, 1973;

Now, Therefore, in consideration of the premises and mutual
covenants herein contained, the parties hereto agree as follows:

1.   THE FIELD OF RESEARCH.   The field of research will be
computer systems security as defined in Attachment I.

2.   PERIOD.   This Agreement will continue for six (6)
months from January 1, 1974, and will be subject to renewal at
six (6) month intervals until July 1, 1977, contingent on the
availability of related Department of Defense funds to the Sponsor.
The Sponsor will inform the Institute by April 1, 1974, of its
ability to renew this Agreement on July 1, 1974.

3.   TERMINATION.   This Agreement may be terminated by either
party by written notice at least ninety (90) days prior to each
renewal date as described in Section 2, above, subject to conditions
and/or restrictions imposed by the use of U.S. Government funds.
In the case of termination by the Institute, the Sponsor will be
reimbursed all prepaid funds unspent under Section 4.

4.   SPONSOR'S COMMITMENTS.   The Sponsor will pay the cost of
the research and development to be conducted under this Agreement
(Research hereinafter) as follows:

(a)   that portion of salaries paid by the Institute to
staff properly chargeable to the Research and the wages of any
others used by the project.

(b)   the cost of all materials, serivces, equipment and
travel contracted for in conducting the Research.

(c) a charge for indirect costs in accordance with the Institute's customary accounting methods.

Upon the execution of this Agreement, Sponsor shall provide consideration in the amount of Two Hundred Thousand Dollars ($200,000.00) as prepaid funds to pay for such costs.

Program coordination and technical guidance within the scope of this Agreement will be provided by the Sponsor's Program Manager.

5. INSTITUTE'S COMMITMENTS.

(a) The Research will be under the supervision of Professor Jerome H. Saltzer, Principal Investigator for this Research.

(b) The scope and tasks of this Research are defined generally in Attachment I, Statement of Work for Computer Systems Security Research. The Statement of Work will be amended within 60 days of the execution of this agreement to more definitively describe the scope and tasks, such amendment to be in writing and signed by the Principal Investigator and the Program Manager, and modified by mutual written agreement prior to each renewal period as may be required.

(c) The cost of the Research as defined in Attachment I has been generally established in a mutually agreed upon budget included as Attachment II to this agreement. This budget will be amended within 60 days of the execution of this agreement to more definitively describe the budgeted itens, such amendment to be in writing and signed by the parties. The Institute will not exceed this budget in total without specific written authorization subject, however, to the ceiling imposed as recited in Attachment II herein. Prior to each renewal period, the budget will be reviewed by the Principal Investigator and the Program Manager and may be modified by mutual written agreement to reflect changes to the Statement of Work and/or other new conditions. The estimated cost of the initial six (6) month period of this program is $200,000.00.

(d) The Institute shall conduct monthly review meetings, as required by the Program Manager. The Institute will present reports of progress and projected tasks for completion of the effort.

(e) All data and reports required under this agreement are specified in the Statement of Work. The Institute will forward a copy of all reports produced during the Research directly to the Program Manager: Randall R. Spitzer, Honeywell (G1169), 2701 Fourth Avenue South, Minneapolis, MN. 55408

6. PATENTS

(a) Title to any invention (Invention hereinafter) made in the performance of this Research shall jointly vest in the Institute and the Sponsor, whether such Invention was made solely by Institute personnel, or solely by Sponsor personnel, or jointly by both Institute and Sponsor personnel.

(b) With respect to Inventions made in the performance of the Research, the parties shall promptly and fully disclose in writing to each other each such Invention. The Institute shall have the first election to file a patent application on an Invention and to be responsible for the prosecution thereof, provided, however, that the Institute's election to prosecute must be conveyed to the Sponsor in writing within six months after an Invention disclosure is made by either of the parties. If the Institute elects not to prosecute a patent application either in the United States or foreign countries or to discontinue the prosecution of maintenance thereof, the Institute shall timely inform the Sponsor and the Sponsor may elect to so prosecute or maintain.

(c) The cost of securing a patent, and any maintenance fees, hereinafter called prosecution costs, for each Invention shall be determined and agreed to by consultation between the parties prior to the commitment or expenditure of funds, and such prosecution costs shall be apportioned equally between the parties. If the parties fail to agree on the prosecution costs for a particular Invention either in the United States or in foreign countries, then the party electing to proceed with the prosecution per paragraph (b) above shall bear all the costs thereof.

(d) (i) All income and/or royalties earned by licensing, leasing, and/or selling during the first seven (7) years after the CHANGEOVER DATE as defined in the MULTICS Software Agreement dated February 13, 1973, of Rights to an Invention on which a patent has issued or a patent application is pending shall be apportioned between the Institute and the Sponsor according to the schedule of paragraph 2 (ii) of said Amendment I to the MULTICS Software Agreement dated February 13, 1973.

(ii) During the eighth and following years expiring with the expiration of any patents issuing on Inventions, all income and/or royalties earned by licensing, leasing, and/or

selling during such eighth and following years of **Rights to an Inventio**
on which a patent has issued or a patent application is pending
shall be apportioned equally between the Institute and the
Sponsor, provided that such parties have equally shared the
prosecution costs as provided in paragraph (c) in this Section
6.

    (iii) During the eighth and following years expiring
with the expiration of any patents issuing on Inventions, all
income and/or royalties earned by licensing, leasing and/or
selling during such eighth and following years of **Rights to an Inventio**
on which a patent has issued or a patent application is pending
shall be apportioned between the Institute and the Sponsor in
proportion to the extent such parties have shared the prosecu-
tion costs as provided in paragraph (c) in this Section 6.

    (iv) The income and/or royalties earned by Sponsor
as provided in this paragraph (d) of this Section 6 shall not
be apportioned between the parties if such licensing, leasing
and/or selling of **Right** to such Inventions on which a patent has issued
or a patent application is pending is incidential to the sale,
lease, or otherwise supplying or licensing to manufacture of
computer hardware by the Sponsor.

    7. PUBLICATION. The Institute and the Sponsor shall be
free to publish papers dealing with results of Research under
this Agreement, after giving a copy of the paper to the other
party. Both parties shall use their best efforts to provide
such papers to the other party promptly so that patent appli-
cations based thereon may be considered.

    8. COPYRIGHTS. All copyrightable material, including
software, developed in the performance of this Research shall
jointly vest in the Institute and the Sponsor and shall be
marked with statutory copyright notices jointly in the names
of the Institute and the Sponsor, and such notices applied to
each separately copyrightable element shall have the form
specified in Appendix B to the MULTICS Software Agreement of
February 13, 1973

    9. SOFTWARE. All Software developed in the performance
of this Research shall be considered to be jointly developed
by the Institute and the Sponsor and the rights thereto shall
be disposed of according to the terms of Amendment I to the
February 13, 1973, MULTICS Software Agreement, said Amendment
I to be executed simultaneously with the execution of this
Research Agreement, and the terms and conditions of which are
incorporated herein by reference.

10. USE OF THE NAME OF THE INSTITUTE. The Sponsor agrees not to use the name of the Institute or any member of its staff in sales promotion work or advertising, or in any form of publicity without the written permission of the Director of the Division of Sponsored Research, which permission shall not be unreasonably withheld.

In witness whereof the parties have affixed their hands and seals the date above written.

HONEYWELL INFORMATION SYSTEMS INC.   MASSACHUSETTS INSTITUTE
                                            OF TECHNOLOGY

By_____   By_____
                                                   Stuart H. Cowen
                                            Vice President for Financial Operations
Title_____   Title_____

Date_____   Date_____

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Institute Tasks

The Institute shall develop, maintain, and submit a detailed set of technical working notes relating to each of the following specific tasks throughout the course of the project.

A) Review Security Kernel

The Institute shall perform a detailed review of a set of security kernel functions and primitives to be developed in conjunction with associated participants identified by the Sponsor. The Institute shall attempt to insure, based on its experience with Multics, that the primitives form a complete set for security, but do not unnecessary functions. The Institute shall prepare as a product of this review a technical report identifying unnecessary functions in the kernel supplied, functions that should be added to the kernel, and proposed restructuring to improve interfaces between the kernel and the remainder of the operating system.

B) Define Operating System Interfaces

The Institute shall define a revised organization for the Multics operating system to interface with the security kernel. He shall identify design and structural techniques by which the operating system may simplify the kernel's organization and functions. These techniques include but are not limited to restructuring for parallel processing, replacing bulk memory with large primary memory and using ARPANET techniques for input/output. If the ARPANET interface is used as the front-end I/O processor, then the evaluation of the security kernel for Multics must consider the security implications of the ARPANET.

C) Definition of Non-Kernel Security Functions

The Institute shall define those non-kernel security related functions (e.g., user password authentication) which are required in the Multics operating system. The definitions of these functions shall include considerations of ease of certification, simple user interface, and efficient interface with security kernel.

Estimated Budget

Period 1/1/74 - 6/30/74

Salaries and Wages	Number	Full time Equivalent	Cost
Faculty	5	1.0	$ 18,925
Staff	5	1.7	20,300
Graduate Students	6	1.6	13,460
Undergraduate Students	5	.5	3,120
Support Staff (secretarial)	3	.5	3,695
Total			$ 59,500
Overhead	63.0%		37,485
Employee Benefits	17.3% (excluding students)		7,425
Total Salaries and Wages			$ 104,410

Computer time, to be purchased from M.I.T. Information Processing Center

	Cost per month	
On-line computing - 750 hr/mo. X $ 12/hr	$ 9,000	
On-line storage - 8 records X $.50/rec/mo.	4,000	
	$ 13,000 X 6	78,000

Other:

Terminals	9,000
Travel	2,000
Reproduction	2,500
Telephone	1,500
Miscellaneous	2,590
Total of "other" category	$ 17,590

Total estimated budget for period 1/1/74 - 6/30/74	$ 200,000

Ceiling:

M.I.T. agrees not to expend more than 35% of said total estimated budget during the first 60 days from the date of this agreement or until a final budget is agreed to, whichever occurs first.

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