

University of Illinois
DRAFT
02/24/03 – ICs specification added 03/21/03

For consideration and discussion only.
This draft has not received final legal or administrative
approval.

COLLABORATIVE RESEARCH AND DEVELOPMENT AGREEMENT

This Collaborative Research and Development Agreement (“Agreement”) is entered into by and among the following entities:

- (1) The Board of Trustees of the University of Illinois (“Illinois”) a body corporate and politic of the State of Illinois with principal offices at 506 South Wright Street, Urbana, Illinois 61801, on behalf of its National Center for Supercomputing Applications (“NCSA”) on its Urbana-Champaign campus; and
- (2) The Regents of the University of Idaho (“Idaho”) with principal offices at P. O. Box 443020, Moscow, Idaho 83044-3020, on behalf of its Center for Advanced Microelectronic & Biomolecular Research (“CAMBR”); and
- (3) ICs, a company incorporated in New Mexico with principal offices at 721 Lochsa Street, Suite 8; Post Falls, Idaho 83854.

WHEREAS, Illinois, through NCSA and under the direction of Dr. Michael Folk, has developed and continues to develop and support data storage, archiving and distribution format libraries known as Hierarchical Data Format 4.x and Hierarchical Data Format 5 that are able to handle large amounts of data (collectively, “HDF”), which software is distributed by Illinois under an open source license; and

WHEREAS, Illinois has received funding under National Aeronautics and Space Administration (“NASA”) Cooperative Agreement No. NCC5-599 effective January 1, 2002 (“NASA Agreement”) for the purpose of further developing HDF and providing HDF support for NASA’s earth remote sensing missions;

WHEREAS, NASA owns certain patents covering the extended-Rice lossless compression method developed at the Jet Propulsion Laboratories and Goddard Space Flight Center (“NASA Patents”); and

WHEREAS, Jack Venbrux and Lowell Miles (the “Authors”) developed certain data compression software known as “szip” to implement the technology covered by the NASA Patents while employed at the University of New Mexico Microelectronics Center; and

WHEREAS, copyright to szip was assigned by the University of New Mexico to and is currently jointly owned by the Authors; and

WHEREAS, the Authors (i) are currently employed at CAMBR at Idaho and continue to develop szip within the scope of their employment duties at Idaho, and (ii) have transferred certain license rights in the szip copyright to ICs; and

WHEREAS, ICs has obtained certain non-exclusive license rights to the NASA Patents from NASA and ICs has obtained certain license rights to szip from the Authors; and

WHEREAS, NASA has requested Illinois to integrate HDF with szip (hereafter, “Integrated HDF/szip”) for Government purposes with such work supported by the NASA Agreement; and

WHEREAS, Illinois, through NCSA, is willing to develop Integrated HDF/szip on the condition that Integrated HDF/szip will be made available at no cost to producers and users of NASA earth science data in accordance with conditions set forth in Section 3.3.3(E) of this Agreement, and NASA encourages the actions necessary to effect such public access;

WHEREAS, Illinois, Idaho, NASA, and ICs have agreed informally that Integrated HDF/szip may be made available under an open source license for noncommercial and limited commercial purposes;

WHEREAS, the parties hereto want to formalize their collaboration so that Illinois and Idaho can develop Integrated HDF/szip and so that current versions of Integrated HDF/szip can be made available for public use on an ongoing basis under an open source license for noncommercial and limited commercial purposes;

NOW, THEREFORE, the undersigned parties hereto agree as follows:

1.0 RESEARCH PROJECT

1.1 Statement of Work. The parties to this Agreement understand and agree that Illinois and Idaho will be responsible for performing the collaborative research and development work described in Attachment A (“Project”), in accordance with the guidelines set forth in Attachment B. Any change to the Statement of Work, including the identity of the Principal Investigators as specified in Section 1.2, will be made effective only by written amendment to this Agreement in accordance with Section 7.2 that is signed by Illinois and Idaho.

1.2 Principal Investigators. The Principal Investigator assigned by Illinois for directing Illinois’ performance of the Project is Dr. Michael J. Folk, who directs the NCSA HDF Team. The Principal Investigator assigned by Idaho for directing Idaho’s performance of the Project is Dr. Jody Gambles.

1.3 Project Term. The Project is anticipated to be conducted during the period starting with the effective date of this Agreement through December 31, 2004. However, the term of the Project may be terminated or extended as specified in Section 4.1.

2.0 FUNDING

Unless otherwise provided in a separate agreement, all costs incurred by either Illinois or Idaho performance of the Project, including travel and accommodation costs of participating researchers, will be borne by the party incurring such costs. All parties to this Agreement acknowledge that performance of the Project is dependent upon receipt by Illinois of sufficient funding from NASA to perform the tasks set forth in Attachment A and such other tasks as may be subsequently added by mutual agreement between Illinois and Idaho. Illinois and Idaho will each work directly with NASA to secure the funding it needs in order to complete the tasks for which it is responsible.

3.0 INTELLECTUAL PROPERTY RIGHTS

3.1 Background Intellectual Property.

3.1.1 “Background Intellectual Property” (hereafter, “BIP”) means property and the legal rights therein owned or controlled by any party to this Agreement that (i) is required in order to develop and/or use Project Intellectual Property as specified in Section 3.2.1; and (ii) was or is created, developed, or reduced to practice outside the scope of the Project. For Illinois, Illinois BIP is further limited to BIP that was or is created, developed or reduced to practice by or under the direction of Illinois’ Principal Investigator. For Idaho, Idaho BIP is further limited to BIP that was or is created, developed or reduced to practice by or under the direction of Idaho’s Principal Investigator while employed by Idaho.

3.1.2 Any BIP owned or controlled by any party to this Agreement that is reasonably anticipated by the Principal Investigators to be required to perform the Project and/or to practice the results thereof will be specified in attachments to this Agreement as follows:

- Attachment C: Identification of Illinois BIP
- Attachment D: Identification of Idaho BIP
- Attachment E: Identification of ICs BIP

3.1.3 Any other background technology not in the public domain and owned or controlled by third parties (“Other Background Technology”) that is reasonably anticipated by the Principal Investigators to be required to perform the Project and/or to practice the results thereof will be specified in Attachment F.

3.1.4 Illinois hereby grants to Idaho the following license rights to Illinois BIP:

- A. A non-exclusive, royalty-free license as specified in Attachment G, University of Illinois/NCSA Open Source License, to use Illinois BIP that is HDF, for any purpose; and
- B. A non-exclusive, royalty-free license to use all other Illinois BIP specified in Attachment C (if applicable) to the extent necessary to perform the Project and to use and distribute Integrated HDF/szip as specified in Section 3.3.1.

3.1.5 Idaho hereby grants to Illinois the following license rights to Idaho BIP, if available:

A. A non-exclusive, royalty-free license to use all Idaho BIP specified in Attachment D to the extent necessary to perform the Project and to use and distribute Integrated HDF/szip as specified in Section 3.3.1.

3.1.6 ICs hereby grants to Illinois and to Idaho the following license rights to the ICs BIP:

A. A non-exclusive, royalty-free sublicense to use the NASA Patents to the extent required to perform the Project and integrate szip with HDF, and to use and distribute Integrated HDF/szip as specified in Section 3.3.1 under an appropriate license as determined in accordance with Section 3.3.3.

B. A non-exclusive, royalty-free sublicense to use szip, and to integrate szip with HDF, and to make derivative works to the extent required to integrate szip with HDF, and to distribute Integrated HDF/szip as specified in Section 3.3.1 under an appropriate license as determined in accordance with Section 3.3.3.

C. A non-exclusive, royalty-free license to use all other ICs BIP specified in Attachment E (if applicable) to the extent necessary to perform the Project and to use and distribute Integrated HDF/szip as specified in Section 3.3.1 under an appropriate license as determined in accordance with Section 3.3.3.

3.1.7 Illinois and Idaho are each responsible for securing the rights needed from the owner(s) of Other Background Technology that such party identifies in Attachment F, sufficient to perform the Project and to use and distribute Integrated HDF/szip as specified in Section 3.3.1. All parties to this Agreement acknowledge that performance of the Project may be dependent upon securing the necessary rights from the owner(s) of such Other Background Technology.

3.2 Project Intellectual Property.

3.2.1 Project Intellectual Property. Project Intellectual Property (hereafter, “PIP”) means property and the legal rights therein that Illinois and/or Idaho first create, develop or reduce to practice during the performance of the Project, including inventions, discoveries, tangible property, software, materials, mask works, methods, techniques, formulae, data, copyrighted works and processes.

A. Ownership and license rights in the subset of PIP that is embodied or incorporated in Integrated HDF/szip shall be determined in accordance with Section 3.3.

B. Ownership and license rights in all other PIP that is not embodied or incorporated in Integrated HDF/szip shall be subject to Sections 3.2.2 and 3.4.

3.2.2 Ownership of PIP.

3.2.2.1 Any PIP created, developed or reduced to practice solely by Illinois personnel will be owned by Illinois (hereafter, “Illinois PIP”).

3.2.2.2 Any PIP created, developed or reduced to practice solely by Idaho personnel will be owned by Idaho (hereafter, “Idaho PIP”).

3.2.2.3 Any PIP that meets one or both of the following criteria will be jointly owned by Illinois and Idaho (hereafter, “Joint PIP”):

- (1) PIP created, developed or reduced to practice jointly by Illinois personnel and Idaho personnel as determined by applicable U.S. law.
- (2) PIP created, developed or reduced to practice solely by one party’s personnel but through the significant use of the other party’s resources such as facilities, equipment, funds, or funds under the control of or administered by the other party.

3.2.3 Disclosure of PIP. A copy of all written disclosures of Illinois PIP or Joint PIP that are submitted by the Illinois Principal Investigator to Illinois will be promptly forwarded to Idaho. Likewise, Idaho will promptly forward to Illinois a copy of all disclosures of Idaho PIP or Joint PIP identified by the Idaho Principal Investigator. The party receiving

such disclosure agrees to hold it in confidence and will not further disclose or use the invention in ways not previously agreed under this Agreement or in a separate written agreement between the parties.

3.3 Regarding the Subset of PIP that is Integrated HDF/szip

3.3.1 Project Goals. All of the parties to this Agreement mutually agree that the principal goals of this collaborative Project are:

A. To be responsive to NASA's request and facilitate incorporation of the szip data compression software and associated NASA Patents into the HDF file formats and software libraries, which will result in an integrated and interdependent software application that is referred to herein as Integrated HDF/szip; and

B. To facilitate license arrangements that will permit distribution of Integrated HDF/szip under open source license arrangements by NCSA at Illinois. Such open source license arrangements will permit free use of Integrated HDF/szip for noncommercial and limited commercial purposes by any party, while protecting the rights and interests of the respective owner(s) to their BIP or PIP embodied or incorporated in Integrated HDF/szip.

3.3.2 All parties to this Agreement agree that ownership of PIP consisting of modifications to or derivative works of HDF, and/or modifications to or derivative works of szip, and/or inventions that are improvements to the NASA Patents will be determined in accordance with Section 3.2.2. Each of the parties agrees not to assert any rights in such PIP which could prevent any third party from using Integrated HDF/szip as permitted consistent with Section 3.3.1(B) under an appropriate license as determined in accordance with Section 3.3.3.

3.3.3 Criteria for licensing Integrated HDF/szip. The parties to this Agreement agree that Integrated HDF/szip, including encoder and decoder szip source modules, and all documentation such as user guides and reference manuals, will be made available for public use by Illinois, through NCSA, in accordance with the following criteria.

A. For any party to this Agreement that owns or controls BIP or PIP that is embodied or incorporated in Integrated HDF/szip, the specific terms and conditions for the license(s)

governing the open source distribution of Integrated HDF/szip will be coordinated, negotiated and approved by the following entities, on behalf of each of the parties to this Agreement (“Licensing Agents”):

For Illinois: By its technology transfer office on the Urbana-Champaign Campus, for which the contact information is as follows:

University of Illinois
Attention: Director
Office of Technology Management (OTM)
319 Ceramics Building
105 South Goodwin Avenue
Urbana, IL 61801

Telephone: (17) 333-6782
Fax: (217) 265-5520

For Idaho: By its technology transfer agent, Idaho Research Foundation, for which the contact information is as follows:

Idaho Research Foundation
Attn: Director of Technology Licensing
P. O. Box 443003
Moscow, ID 83844-3003

Voice: 208.885.4550
Fax: 208.882.0105
e-mail: irf@uidaho.edu

For ICs:

ICs
721 Lochsa Street, Suite 8
Post Falls, ID 83854

Voice: (208) 262-2008
Fax: (208) 262-2001

B. Illinois intends to distribute the Illinois BIP and/or Illinois PIP embodied in Integrated HDF/szip using an open source license essentially in the form of Attachment G, University of Illinois/NCSA Open Source License.

C. Illinois, through NCSA, will notify potential licensees that certain intellectual property embodied in Integrated HDF/szip is owned or controlled by (1) Idaho, and/or (2) ICs and/or (3) third parties, as applicable, and advise potential licensees regarding any license rights to use such intellectual property that must be obtained from such party(ies). Such

intellectual property ownership determinations will be made by the Licensing Agents as applicable for each version of Integrated HDF/szip resulting from performance of the Project that is deemed ready for release by Illinois and Idaho.

D. Illinois, through NCSA, will either make the license agreement terms and conditions of the party(ies) directly available to potential licensees, or provide a hyperlink or other contact information so that the potential licensee can contact each party's Licensing Agent to obtain the license rights required to use Integrated HDF/szip as specified in Section 3.3.1(B).

E. Each of the parties to this Agreement understands and agrees that, as a condition of its participation in this collaborative project, ICs requires the following terms to be applicable to the open source license(s) for Integrated HDF/szip:

- (1) Licensees that are not commercial entities or their agents will be allowed to use Integrated HDF/szip for encoding and decoding.
- (2) Licensees that are commercial licensees will be allowed to use Integrated HDF/szip for decoding only.

F. Each of the parties to this Agreement will be responsible for enforcing the terms and conditions of any license(s) applicable to its own BIP or PIP embodied in Integrated HDF/szip.

G. Consistent with the Project Goals, each of the parties to this Agreement agrees not to assert any rights in its BIP or PIP which could prevent any party hereto or any third party licensee from using Integrated HDF/szip consistent with Section 3.3.1 and/or as authorized under appropriate license(s) as contemplated in this Section 3.3.3.

H. In the event of termination of this Agreement for any reason, Illinois, through NCSA, will endeavor to find arrangements to keep the then-current version of Integrated HDF/szip available for public use from NCSA. The other parties to this Agreement agree to reasonably cooperate with Illinois to facilitate such continued public availability for that version of Integrated HDF/szip.

3.4 License Rights in PIP That is Not Integrated HDF/szip. Except as specified in Section 3.3 for Integrated HDF/szip, each party to this Agreement will be solely and independently responsible for protecting and licensing its own intellectual property, whether BIP or PIP, whether solely owned or jointly owned, without consultation with any other party and without any accountability to any other party. No party to this Agreement acquires any license or other intellectual property rights from the other parties to this Agreement except as explicitly provided herein.

3.5 Government Rights. Ownership of and license rights in and to BIP and/or PIP subject to this Agreement may be subject to the rights, conditions and limitations imposed by U.S. Government grants and/or contracts associated with support of the research that funded, in part, the creation, development and/or reduction to practice of such BIP and/or PIP, as defined under applicable provisions of the United States Code and/or federal regulations and/or applicable U.S. Government licenses for Federally-owned patents.

4.0 DISCLAIMER OF WARRANTIES AND LIMITATION AND RELEASE OF LIABILITIES

4.1 Disclaimer of Warranties. NO PARTY TO THIS AGREEMENT MAKES ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, REGARDING ITS PERFORMANCE UNDER THIS AGREEMENT. EACH PARTY TO THIS AGREEMENT DISCLAIMS ANY WARRANTY OF MERCHANTABILITY, USE OR FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO INTELLECTUAL PROPERTY AND/OR OTHER PROJECT RESULTS PROVIDED UNDER THIS AGREEMENT.

4.2 Limitation of Liability. EACH PARTY TO THIS AGREEMENT SHALL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, PUNITIVE, INCIDENTAL OR OTHER DAMAGES (INCLUDING LOST REVENUE, PROFITS, USE, DATA OR OTHER ECONOMIC LOSS OR DAMAGE) HOWEVER CAUSED AND REGARDLESS OF THEORY OF LIABILITY (WHETHER FOR BREACH OR IN TORT, INCLUDING NEGLIGENCE) ARISING FROM, RELATED TO, OR CONNECTED WITH ANY PARTY'S USE OF INTELLECTUAL PROPERTY AND/OR OTHER PROJECT RESULTS PROVIDED BY ANY PARTY, EVEN IF THE PROVIDING HAD BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

4.3 Release from Liability. Each party to this Agreement agrees to release each other party and its employees and agents from, and agrees to be responsible for, any and all costs, damages, and expenses, including attorney's fees, arising from any claims, damages, and liabilities asserted by third parties arising from, related to, or connected with such party's use of intellectual property and/or other Project results provided by any other party.

5.0 TERM AND TERMINATION

5.1 This Agreement will be effective upon the date of execution by the last of the parties to sign below, and shall remain in effect until Illinois' NASA Agreement terminates on December 31, 2004. In the event Illinois' NASA Agreement is extended, this Agreement will be automatically extended to terminate concurrently with the extended NASA Agreement. In the event Illinois' NASA Agreement is not extended, the parties to this Agreement may mutually agree to extend this Agreement under the same terms and conditions or such other terms and conditions as may be mutually agreed by written amendment to this Agreement in accordance with Section 7.2.

5.2 This Agreement may be terminated by any party by providing sixty (60) days advance notice to each of the other parties hereto.

5.3 Upon termination, Illinois and Idaho will provide for the timely and orderly wind-up of, and/or transfer of responsibility for, Project activities in progress at the time of termination. The following provisions of this Agreement will survive until their purposes are fulfilled: Sections 3.1.4, 3.1.5, 3.1.6, 3.2, 3.3.3, 3.4, and 3.5; Article 4; and Sections 5.3 and 7.6.

6.0 NOTICES

6.1 Addresses. Any notice given under this Agreement will be in writing and will be deemed given (a) when delivered personally; (b) when sent by confirmed facsimile; (c) three (3) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (d) two (2) days after deposit with a commercial overnight carrier with confirmed verification of receipt. All communications will be sent to the addresses set forth below or to such other address as may be designated by a party by giving written notice to the other parties pursuant to this Section 6.1:

A. Illinois:

For matters related to the Collaborative Research and Development Agreement:

University of Illinois
Attn.: Director
Grant and Contract Administration
109 Coble Hall
801 South Wright Street
Champaign, IL 61820-6242

Telephone: (217) 333-2187
Fax: (217) 333-2189

For matters related to intellectual property and licensing:

To the Office of Technology Management at the address specified in
Section 3.3.3(A)

With a copy of all notices provided to the Illinois Principal Investigator:

University of Illinois
Attn.: Dr. Michael J. Folk, Principal Investigator
National Center for Supercomputing Applications
69b Computer Applications Building
605 East Springfield
Champaign, IL 61820

Telephone: (217) 244-0647
Fax:

B. Idaho:

For matters related to the Collaborative Research and Development Agreement:

University of Idaho
Attn: Manager, Grants and Contracts
Grants and Contracts
P. O. Box 443020
Moscow, ID 83844-3020

Voice: 208.885.2560
Fax: 208.885.5752

For matters related to intellectual property and licensing:

To the Idaho Research Foundation at the address specified in Section 3.3.3(A)

With a copy of all notices provided to the Idaho Principal Investigator:

Dr. Jody Gambles
CAMBR
University of Idaho
721 Lochsa Street
Post Falls, Idaho 83854

C. ICs:

ICs
721 Lochsa Street, Suite 8
Post Falls, ID 83854

Fax: (208) 262-2001

7.0 GENERAL PROVISIONS

7.1 Relationship of the Parties. Illinois and Idaho will each have sole control over the work performed by its own personnel under this Agreement. Each of the parties to this Agreement is an independent contractor, and none of the parties to this Agreement intend that any agency, joint venture or partnership relationship will be created between or among them by this Agreement. Nothing in this Agreement will be construed as authorization for any party to this Agreement to act as agent for any other party.

7.2 Entire Agreement. This Agreement and the attachments hereto embody the entire understanding of the parties to this Agreement and will supersede all previous or contemporaneous communications, either verbal or written, between or among the parties relating to this Agreement. No modification, alteration or amendment will be effective unless confirmed in a written agreement signed by an authorized representative of each party (as applicable).

7.3 Assignments. This Agreement may not be assigned by any party to this Agreement without the prior written consent of the other parties, which consent will not be unreasonably withheld.

7.4 Force Majeure. Each party to this Agreement will be relieved of its obligations hereunder to the extent that fulfillment of any such obligation is prevented by acts beyond the reasonable control of the party affected thereby.

7.5 Compliance with Laws. The parties to this Agreement will comply with all United States (federal), state and local laws, regulations, rules, and orders applicable to the performance of the Project and use of Project results, including but without limitation to, those laws applicable to export control.

7.6 Resolution of Disputes. The parties to this Agreement agree that if any of the terms herein are subject to questions of intent or interpretation or if the parties identify other issues that are not addressed in this Agreement, they will enter into good faith negotiations to resolve any such issues. For Illinois and Idaho, resolution of disputes includes actions described in the “Problem identification and resolution” section specified in Attachment B, as applicable. Resolution of any such issues will be confirmed by a written amendment to this Agreement in accordance with Section 7.2.

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

For THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ILLINOIS

Authorized Signature

Stephen K. Rugg, Comptroller
Name and Title – printed or typed

Date _____

ATTEST:

Michele M. Thompson, Secretary

Approved for form by University Legal Counsel: _____

UNDERSTOOD AND AGREED
BY ILLINOIS PRINCIPAL INVESTIGATOR:

Michael J. Folk, Illinois Principal Investigator

For THE REGENTS OF THE UNIVERSITY OF IDAHO

Authorized Signature

Ted Mordhorst – Manager, Grants & Contracts

Name and Title – printed or typed

Date _____

UNDERSTOOD AND AGREED
BY IDAHO PRINCIPAL INVESTIGATOR:

Jody Gambles: Idaho Principal Investigator

For ICs

Authorized Signature

Name and Title – printed or typed

Date _____

- Attachments:
- Attachment A – Statement of Work
 - Attachment B - CAMBR-NCSA Working Model (Guidelines for Collaboration)
 - Attachment C – Identification of Illinois Background Intellectual Property
 - Attachment D – Identification of Idaho Background Intellectual Property
 - Attachment E – Identification of ICs Background Intellectual Property
 - Attachment F – Identification of Other Background Technology
 - Attachment G – Template for University of Illinois/NCSA Open Source

License

Attachment A

Statement of Work

Overview

The goal of this project is to facilitate the incorporation of the szip data compression software into the HDF4 and HDF5 file formats and software libraries.

Szip is a software implementation of the patented extended-Rice lossless compression method developed at the Jet Propulsion Laboratories and Goddard Space Flight Center. NASA is the patent owner.[□]

HDF4 and HDF5 (hereafter jointly referred to as “HDF”) were developed at NCSA. HDF is a data storage, archiving and distribution formal library that is able to handle very large amounts of data. The group that developed HDF and continues to support HDF is hereafter referred to as “the NCSA HDF team.” This work is endorsed and supported by the National Aeronautics and Space Administration (NASA), which has recommended that szip compression be available to producers and users of NASA earth science data. HDF-EOS is a specialized form of HDF for storing data from NASA’s Earth Observing System.

The goals of this work are as follows:

- to enable data producers to store HDF-EOS data objects that are based on the HDF formats in an szip compressed form
- to enable data producers to store HDF data objects in an szip compressed format
- to enable data users to retrieve data that is encoded in szip in HDF-EOS (based on HDF), HDF4 or HDF5.

The work will require close collaboration between the CAMBR and NCSA HDF teams. It will also require NASA support and advice. The following sections spell out areas of responsibility for each site.

Areas of Responsibility

I. Integrating szip with HDF

The goal of this work is to include support for szip compression in HDF4.1 Release 6 and HDF5 Release 1.6, both of which are planned for Spring 2003. The following list describes necessary tasks to complete szip integration with the HDF Library. These tasks will be carried out by the NCSA HDF team, in collaboration with the CAMBR team and according to the CAMBR-NCSA working model described in Attachment B to the Collaborative Research Agreement. All can be carried out by the NCSA HDF team with currently proposed resources, and are to be completed during NASA FY 2003 (October 2002-September 2003). Other tasks will be determined by further discussions between NASA and the NCSA HDF and CAMBR teams.

[□] Copyright to the szip software is jointly owned by Lowell Miles and Jack Venbrux, who are presently members of the staff of the Center for Advanced Microelectronic & Biomolecular Research (CAMBR) at the University of Idaho. Performance of this Statement of Work depends upon Illinois and Idaho obtaining the appropriate rights to use the szip software and NASA’s patented method that is implemented by the szip software.

- 1. Investigation of image applicability.** The NCSA HDF team will implement HDF4 library support for szip compression of HDF4 8-bit and 24-bit images.
- 2. Test platforms for NCSA.** In consultation with NASA, the CAMBR and NCSA HDF teams will agree on a set of test platforms for delivery of the HDF packages that will include szip.
- 3. Integration of szip modules with HDF libraries.** The NCSA HDF team will integrate the szip compression modules with the current versions of the HDF libraries, using the “external library” model for integration.
- 4. HDF szip module test implementation.** The NCSA HDF team will write and integrate szip tests into HDF test suites.
- 5. Integration of szip utilities.** The NCSA HDF team will integrate the szip utilities with the current versions of the HDF Libraries, so that they will become part of the HDF source trees.
- 6. HDF szip utilities test implementation.** The NCSA HDF team will write and integrate szip utilities tests into the HDF test suites.
- 7. Documentation.** The NCSA HDF team will document szip compression support in the “HDF4 Specification Guide”, “HDF4 User’s Guide”, “HDF4 Reference Manual”, “HDF5 Specification”, “HDF5 User’s Guide” and “HDF5 Reference Manual.”

II. Software maintenance

The CAMBR and NCSA HDF teams will jointly agree on requirements for maintaining the szip code within the HDF library. This will include the following:

With each new release of HDF, the NCSA HDF and CAMBR teams will work together to make certain that the latest version of the szip code and test suite run correctly on all operating systems and compilers that HDF-EOS runs on.

If more than one szip release occurs between HDF releases, the NCSA HDF and CAMBR teams will be obliged to port and test only the latest release.

This will involve the following activities to be carried out:

- The NCSA HDF and CAMBR teams will work together to resolve any errors found in the code.
- The NCSA HDF and CAMBR teams will work together to modify the szip code to satisfy platform-specific requirements.
- The NCSA HDF team will integrate any szip changes into the HDF documentation suites.
- The NCSA HDF team will document HDF code changes that are made in order to incorporate the use of szip.
- The NCSA HDF team will test the implementation on all platforms using the HDF szip test suite.

Attachment B

CAMBR-NCSA Working Model (Guidelines for Collaboration)

To insure a smooth collaboration between the CAMBR and NCSA teams, the following guidelines are agreed to by both teams:

Points of Contact. The points of contact (POC) for the CAMBR and NCSA HDF teams will be the Principal Investigators specified in Section 1.2 of the Collaborative Research Agreement. These two POCs will be responsible for technical discussions between the two groups.

Sharing of code. The ICs will make copies of the encoder and decoder modules available to the NCSA HDF POC and CAMBR POC through ftp or some other medium as mutually agreed.

Problem identification and resolution. There may be occasions when one of the two teams finds a problem with the software of the other. For instance, the CAMBR team may determine that the HDF4 library is incorrectly compressing a certain kind of data, or the HDF4 test suite may indicate that an szip decoding module does not return correct results on certain platforms. When this occurs, the POC for team that finds the problem will report it to the POC of the other team, providing full particulars on the platform and other circumstances in which the problem occurs.

If the two POC agree on the problem, they will work together to resolve it, possibly with the help of other team members. If they are still not able to resolve the problem, advice will be sought from NASA on how to proceed.

If the two POC do not agree on the problem, other representatives of the two teams, including the PI, will become involved, and if necessary meet to try to reach agreement on the problem. If they are still not able to resolve the problem, advice will be sought from NASA on how to proceed.

Timing of releases and szip code availability. NCSA releases new versions of the HDF libraries approximately once every year. The NCSA HDF team will inform the CAMBR team of any impending release at least four months prior to any new release, and the CAMBR team will provide its latest version of the szip encoder and decoder modules no later than two months prior to the proposed release date.

Distribution and license protection. The NCSA HDF team will distribute the encoder and decoder source modules as part of the HDF library distributions as specified in Section 3.3.3 of the Collaborative Research Agreement.

Attachment C

Specification of Illinois Background Intellectual Property (“BIP”)

Illinois Background Intellectual Property (“Illinois BIP”):

Specification of HDF:

HDF stands for Hierarchical Data Format. There are two versions of HDF: HDF 4 is based on the original version that was first developed in 1988; HDF 5 is a completely new version that was first introduced in 1998. Although the two versions are completely different in their specification and software support, they share the following characteristics.

- Each is both a file format and accompanying software designed for high performance computing and scientific data management.
- They can store scientific and engineering objects, such as multidimensional arrays, tables, and computational meshes.
- HDF objects can be mixed together in any way that suits a particular application.
- The information stored in an HDF file is encoded in a self-describing manner that easily allows for future extensions of the format.
- HDF objects can be stored within HDF files in ways that can enhance data management and access. For instance, arrays can be compressed using a variety of compression methods.
- HDF supports cross platform portability of the library and format, making both available on a wide range of computing platforms.
- The HDF formats and software are free for both commercial and non-commercial use.

HDF4 and HDF5 are both widely used by scientists and engineers in many different disciplines in academia, government, and by commercial firms. One of the primary users of HDF is the NASA Earth Observing System, which adds approximately two terabytes of HDF data to its archive every day.

Attachment D

Specification of Idaho Background Intellectual Property (“BIP”)

Idaho Background Intellectual Property (“Idaho BIP”): (If none, so indicate.)

None

Attachment E

Specification of ICs Background Intellectual Property (“BIP”)

ICs Background Intellectual Property (“ICs BIP”):

U.S. Patent No. 5,448,642, for an invention entitled “METHOD FOR CODING LOW ENTROPY DATA” which issued on September 5, 1995; and U.S. patent 5,687,255, for an invention entitled “PRE-CODING METHOD AND APPARATUR FOR MULTIPLE SOURCE OR TIME-SHIFTED SINGLE SOURCE DATA AND CORRESPONDING INVERSE POST-DECODING METHOD AND APPARATUS” which issued November 11, 1997; and U.S. Patent 5,822,457, for an invention entitled “PRE-CODING METHOD AND APPARATUR FOR MULTIPLE SOURCE OR TIME-SHIFTED SINGLE SOURCE DATA AND CORRESPONDING INVERSE POST-DECODING METHOD AND APPARATUS” which issued October 13, 1998; all of which are assigned to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration (NASA) and further licensed by NASA non-exclusively to ICs.

Szip software provides lossless compression and decompression of sampled data such as images, audio, and scientific instruments that provide a source of spatially correlated samples. R. F. Rice at Jet Propulsion Laboratories developed the fundamental algorithm which is held in the Public Domain. The code includes patented extensions to the algorithm with the addition of two low entropy options. All rights associated with Registered Copyright Number Txu 945-231 have been released by the Science & Technology Corporation @ UNM and the University of New Mexico to the szip authors, Lowell Miles and Jack Venbrux. The authors have licensed ICs to grant sublicenses for the use and distribution of szip.

Attachment F

Specification of Other Background Technology

Other Background Technology: (If none, so indicate.)

Identified by Illinois: None

Identified by Idaho: None

Attachment G

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