

**REIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
NASA GLENN RESEARCH CENTER
AND
OHIO BOARD OF REGENTS
AND
OHIO UNIVERSITY
FOR
USE OF THE
ADVANCED COMMUNICATIONS
TECHNOLOGY SATELLITE (ACTS)**

ARTICLE 1. AUTHORITY

This Agreement is entered into by the NASA Glenn Research Center, located at 21000 Brookpark Road, Cleveland, OH 44135 (hereinafter referred to as "NASA GRC") pursuant to 42 U.S.C. 2473(c)(5) and (6), section 203(c) of the National Aeronautics and Space Act of 1958, as amended, and the Ohio Board of Regents, (hereinafter referred to as "OBR") located at 30 East Broad Street, 36th Floor, Columbus, OH 43266-0417 and Ohio University [hereinafter referred to as "OU"] located at Stocker Center 333, Athens, OH 45701-2979. OBR represents and warrants that that it has the full power and authority to enter into this agreement.

ARTICLE 2. PURPOSE AND AGENCY COMMITMENT

NASA GRC, OBR and OU wish to use the Advanced Communication Technology Satellite (ACTS) as the foundation of a consortium created for education and research based activities related to Ka-band satellite communications systems and operations. Further, it is hoped that the consortium will enable economic invigoration in Ohio and the Nation by providing advanced technology and facilities to build the communication infrastructure needed for the future, and aid small businesses developing new Ka-band equipment and services.

NASA fully operated the ACTS system since its launch and throughout the NASA-organized Experiments Program that concluded on May 31, 2000. By October 2000, the spacecraft was parked at a retirement orbital slot of 105.2 degrees West where it will eventually be shut down and inerted. Although NASA's program plans with ACTS are complete, the system can still provide benefit to academia and the Nation through means of an education based consortium. This agreement signifies the intent of OBR to develop such a consortium and through the consortium provide the means for the system's operations, as well as determining the usage of the ACTS system for these purposes throughout the duration of this agreement. NASA's role will be minimized to providing technical oversight of operations and ensuring proper usage of the system as defined in Appendix A. NASA will maintain the fixed ground station, including LET, located in building 55. The consortium will have the opportunity to obtain proficiency in the ACTS operations and assume additional duties that will minimize NASA's involvement in payload operations. This will involve monitoring of spacecraft health and operation, as well as related near-term operations planning and managing the usage of the payload. In recognition of the fact that NASA did not plan for operating

the ACTS system beyond October 2000, NASA has a limited capacity to provide the on-going support of the associated infrastructure in order to maintain extended operations. OU agrees to provide funding to cover operation costs, including purchases, modifications and repairs of the fixed NASA ground station equipment and LET as provided herein.

There are two major portions of the program: the Basic Program and the Optional Program. In addition, the program has been structured into a series of options to coincide with the State of Ohio's fiscal year as follows:

Basic Program

Initial period	Signature of agreement until June 30, 2001
Option 1	July 1, 2001 until June 30, 2002
Option 2	July 1, 2002 until June 30, 2003

Optional Program

Option 3	July 1, 2003 until June 30, 2004
Option 4	July 1, 2004 until June 30, 2005

This agreement involves assets and services unique to NASA GRC, in recognition that NASA GRC does not compete with the U.S. private sector. In no case will NASA provide any support that is generally reasonably available commercially from the U.S. Private Sector.

ARTICLE 3. RESPONSIBILITIES

A. OBR will use reasonable efforts to:

1. Create the consortium to accomplish the purpose of this agreement. For the purposes of this agreement, "OBR and its related entities" shall include the consortium, its members and their related entities.
2. Require the consortium to accept a NASA appointed liaison.
3. By designating OU as the fiscal and management agent, OBR shall provide for management of the consortium consistent with the requirements of Appendix A and the purposes of this agreement.

B. OU will use reasonable efforts to:

1. Act as the fiscal and management agent of OBR.
2. Manage the consortium consistent with the requirements of Appendix A and the purposes of this agreement.
3. Develop payload and earth station usage schedules.
4. Provide operating funds on a reimbursable basis for ACTS per the schedule set forth in Article 5 entitled FINANCIAL OBLIGATIONS.

5. Demonstrate proficiency in ACTS payload operations that minimize NASA's involvement, and management of the ACTS payload for consortium purposes no later than April 28, 2001, and in accordance with Appendix A.
6. Provide annual plans to the GRC Space Communications Office, through the key person named in Article 16, detailing accomplishments of the prior year, and predicted use of the satellite for the upcoming year for information purposes, as defined in Article 4, SCHEDULE AND MILESTONES.
7. Maintain and move, as necessary, NASA-developed ACTS experimenter terminals after initial installation by GRC.
8. Request that NASA modify contractor staffing to support changing consortium needs.
9. Reimburse NASA as needed to cover purchases, modifications, and repairs of the NASA fixed Ground Station equipment and LET in building 55, including the VAX 8650, TDMA equipment for Base Band Processor (BBP) mode operation, and replacement of the 30 GHz High Power Amplifiers in accordance with Article 5.
10. Notify NASA if the consortium's intent is not to use BBP operations or the associated equipment on ACTS so that NASA may excess or dispose of the equipment, and reutilize the space.
11. Return all NASA-provided equipment upon completion of this agreement.

C. NASA GRC will use reasonable efforts to:

1. Operate the ACTS spacecraft in accordance with the purposes of this agreement and Appendix A.
2. Maintain the radio licenses to operate the ACTS spacecraft, the NASA-developed ACTS experimenter terminals, and the Link Evaluation Terminal and NASA ground station located at GRC. Provide at least 4, but no more than 12, ACTS experimental terminals.
3. Provide for installation of 4 NASA-developed experimental ground stations at sites to be determined by the consortium on a non-reimbursable basis.
4. Cost share the operation contractors cost at a level of 50% until April 28, 2001 as provided in Article 5.

5. Maintain the NASA Fixed Ground Station. NASA will make available an amount not to exceed \$10,000 per month for this maintenance. Expenses in excess of this amount will be estimated for reimbursement by OU in accordance with Article 5.
6. Provide civil service technical support and expertise on ACTS operations on an ad-hoc basis not to exceed 80 hours per month.
7. Provide the consortium with access to government equipment, documentation, and software for the development of payload and earth station usage in accordance with the accomplishment of the purposes of this agreement.
8. Maintain its contracts for satellite and fixed NASA ground station operations support.
9. Consider OU requests to modify Contractor staffing requirements and provide cost estimates, in accordance with Article 5, for any increase in level of contractor support requested by OU in a timely manner.
10. NASA, at its sole discretion, retains the right to remove equipment in support of BBP operations by providing 120 days prior notice to consortium.
11. NASA GRC agrees it will not discriminate, because of race, creed, color, religion, age, sex, handicap, national origin, or ancestry, against any citizen, or the employment of any person qualified and available to perform the work under this agreement.

ARTICLE 4. SCHEDULE AND MILESTONES

The scheduled major milestones for use of Advanced Communications Technology Satellite (ACTS) are as follows:

- | | |
|---|---|
| • Formation of the Consortium | 1 st Quarter
Calendar Year 2001 |
| • Assumption of Full Operational Duties | 2 nd Quarter
Calendar Year 2001 |
| • Submittal of annual plan | July 1 of each year
The consortium is
Active starting in
2001. |
| • Completion of effort under Basic Program | June 30, 2003 |
| • Completion of effort under Optional Program | June 30, 2005 |

NOTE: NASA reserves an amount of at least 200 hours annually of satellite time to be coordinated with the consortium.

ARTICLE 5. FINANCIAL OBLIGATIONS

There shall be a transfer of funds from OU to NASA GRC in connection with this Agreement. The parties agree that the terms of reimbursement for NASA GRC's participation shall be as specified below.

The initial cost estimates (identified in Table 1) are based on the level of support needed for NASA to perform its obligations under Article 3. Estimates may be adjusted as operations, repairs, maintenance and/or usage requirements change. Estimates for each payment shall be delivered to OU, in the form of an invoice, 60 days prior to the start of each payment period. OU will have 30 days to review the estimate, and determine, in accordance with Article 15, whether they wish to deliver a check for payment in accordance with the due dates in Table 1, or terminate the agreement

In accordance with Article 3.B.9, NASA may also provide OU with an estimate of the costs to modify contractor staffing in support of changing consortium needs requested by OU under Article 3.B.9. OU may elect to either provide the additional funding or withdraw the request.

NASA will provide OU with estimates for additional maintenance of the fixed ground station pursuant to Article 3.C.5.

All payments shall be made in advance of initiation of efforts under this Agreement, in the form of a check payable to "NASA Glenn Research Center" and sent to:

NASA Glenn Research Center
Financial Management Division
Attn: Collection Agent
Mail Stop 500-303
21000 Brookpark Road
Cleveland, OH 44135

TABLE 1				
Payment No.	Option Period	Estimated Amount (\$1,000)	Due Date	Period it Covers
Basic Program				
1	Initial (sig – 6/30/01)	439	Upon Signing	January 1, 2001- June 30, 2001
2	1 (July 1, 2001 - June 30, 2002)	338	June 29, 2001	July 1, 2001 – September 30, 2001
3	1 (July 1, 2001 - June 30, 2002)	335	September 13, 2001	October 1, 2001 – December 31, 2001
4	1 (July 1, 2001 - June 30, 2002)	350	December 13, 2001	January 1, 2002 – March 31, 2002
5	1 (July 1, 2001 - June 30, 2002)	360	March 14, 2002	April 1, 2002 – June 30, 2002
6	2 (July 1, 2002- June 30, 2003)	360	June 29, 2002	July 1, 2002 – September 30, 2002
7	2 (July 1, 2002- June 30, 2003)	366	September 13, 2002	October 1, 2002 – December 31, 2002
8	2 (July 1, 2002- June 30, 2003)	366	December 13, 2002	January 1, 2003 – March 31, 2003
9	2 (July 1, 2002- June 30, 2003)	366	March 14, 2003	April 1, 2003 – June 30, 2003

Although NASA has made a good faith attempt to accurately estimate its costs, should the effort cost more than estimated, OU will be advised by NASA GRC as soon as possible. OU shall pay all costs incurred, and have the option of canceling the remaining effort or provide additional funding in order to continue the proposed effort under the revised estimate.

Should the agreement be terminated in accordance with the terms of Article 15, or the effort completed and cost less than the agreed to estimated cost, NASA GRC shall account for any unspent funds within one (1) year after completion of all effort under this Agreement, and promptly thereafter, return any unspent funds to OU.

In the event of termination for the specific reasons given below:

1. Impairment or loss of functionality of satellite or ground station that makes performance impossible, impractical or unsafe.
2. Breach by OU, OBR or their related entities of any agreement terms and conditions.
3. Termination by OU or OBR.

OU shall be liable for all costs, consistent with law and NASA policy, which are incurred by the U.S. Government in the provision of property and/or services, including termination costs associated with the Agreement activities. NASA agrees to make reasonable efforts to limit its costs in the event of termination.

ARTICLE 6. CERTIFICATION AND AVAILABILITY OF FUNDS

This agreement is subject to the provisions of Ohio Revised Code § 126.07. It is expressly understood by the parties that none of the rights, duties, and obligations described in this contract shall be binding on either party until all statutory provisions under the Ohio Revised Code have been complied with by OBR and OU, and until such time as all necessary funds are made available to OU, and forthcoming from the appropriate state agencies.

ARTICLE 7. SCHEDULING CONFLICTS

The above schedule and milestones are estimated based upon the parties' current understanding of the projected use of NASA resources. In the event NASA GRC's projected usage changes, the consortium shall be given 30 days written notice of that change so that the schedule and milestones may be adjusted accordingly. The parties agree that NASA GRC's usage of the test facilities and equipment shall have priority over the usage planned in this Agreement should a conflict arise, and NASA GRC, in its sole discretion, shall determine whether to exercise that priority. Likewise, should a conflict arise between the consortium and NASA GRC, NASA GRC, in its sole discretion, shall determine the priority as between the two users.

ARTICLE 8. NONEXCLUSIVITY

This agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other U.S. private or public entities.

ARTICLE 9. LIABILITY AND RISK OF LOSS

In consideration of the use of NASA research facilities, equipment and/or services provided by NASA or NASA contractors under this agreement, OBR and OU waive and agree not to make any claims against NASA, its employees, their related entities, (e.g., contractors, subcontractors) or the employees of its related entities for damage arising from or related to activities under this agreement, whether such damage is caused by negligence or otherwise, except in the case of willful misconduct.

OBR and OU further agree to extend this unilateral waiver to their related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA or of its related entities for injury, death, damage or loss arising from or related to activities undertaken pursuant to this agreement.

To the extent an exception to the waiver of claims applies in this Agreement such party's liability to the other party, whether or not arising as a result of an alleged breach of this Agreement, shall be limited to direct damages only, and shall not include any loss of revenue or profits or other indirect or consequential damages. This clause shall not be construed to supercede, contradict or negate the expressed waiver of claims herein.

OU agrees to assume responsibility for any facility/equipment damage they or their related entities cause resulting from the activity under this Agreement and agree to pay all costs associated with the repair of such damage. Facility/equipment damage as used herein refers to any damage to U.S. Government facilities and equipment beyond the normal wear and tear reasonably to be expected as arising from the type of activity contemplated under this agreement.

ARTICLE 10. INTELLECTUAL PROPERTY AND RIGHTS IN DATA - RIGHTS IN DATA

I Definitions

The term "Participant", as used herein, means any non-U.S. Government entity that is a party to this Agreement. The rights in data set forth herein are applicable to any employees, contractors or subcontractors, or other entities having a fiduciary or contractual relationship with Participant that are assigned, tasked, or contracted with to perform specified Participant activities under this Agreement.

The term "data", as used herein, means recorded information, regardless of form, the media on which it may be recorded, or the method of recording. The term includes, but is not limited to, data of a scientific or technical nature, computer software and documentation thereof, and data comprising commercial and financial information.

II General

Data exchanged between NASA and Participant under this Agreement will be exchanged without restriction as to its disclosure, use, or duplication except as otherwise provided below in this provision.

III Participant Produced Data

In the event it is necessary for Participant to furnish NASA with data which either existed either prior to, was produced outside of, or is first produced by Participant in carrying out Participant's responsibilities under this Agreement, and provided such data embodies trade secrets or comprises commercial or financial information which is privileged or confidential and is so identified with a suitable notice or legend, the data will be maintained in confidence and disclosed and used by NASA and its contractors (under suitable protective

conditions) only for the purpose of carrying out NASA's responsibilities under this Agreement. Upon completion of activities under this Agreement, such data will be disposed of as requested by Participant.

IV Data First Produced by NASA

As to data first produced by NASA in carrying out NASA's responsibilities under this Agreement and which data would embody trade secrets or would comprise commercial or financial information that is privileged or confidential if obtained from Participant, such data will, to the extent permitted by law, be maintained in confidence and disclosed and used by NASA and its contractors (under suitable protective conditions) only for the purpose of carrying out NASA's responsibilities under this Agreement. Upon completion of activities under this Agreement, such data will be disposed of as requested by Participant.

ARTICLE 11 - INTELLECTUAL PROPERTY AND DATA RIGHTS, PATENT AND INVENTION RIGHTS

(a) The term "Participant", as used herein, means any non-federal Government entity that is a party to this Agreement. The patent and inventions rights set forth herein are applicable to any employees, contractors or subcontractors, or other entities having a fiduciary or contractual relationship with Participant that are assigned, tasked, or contracted with to perform specified Participant activities under this Agreement.

(b) Title to inventions made (conceived or first actually reduced to practice) as a consequence of, or in direct relation to, the performance of activities under this Agreement will remain with the respective inventing parties (Participant or NASA), and no patent or invention rights are exchanged between or granted by such parties under this Agreement except that, NASA and the Participant agree to use reasonable efforts to identify and report to each other any invention which is believed to have been made jointly by employees of the Participant and employees of NASA (including employees of NASA contractors), and to consult and agree as to the responsibilities and costs of actions to be taken to establish and maintain patent protection (in any country) on such invention and on the terms and conditions of any license or other rights to be exchanged or granted by or between NASA and the Participant.

ARTICLE 12. DISCLAIMER OF WARRANTY

NASA does not warrant the satellite's availability or suitability for any particular use.

ARTICLE 13. TERM OF AGREEMENT AND OPTIONAL PERIODS

This Agreement becomes effective upon the date of the last signature below, and shall remain in effect until the completion of all obligations of both parties hereto or June 30, 2003 whichever comes first. This space act agreement may be extended by mutual written agreement of the parties for up to two additional one-year option periods, for a total potential term of this agreement of four and one-half (4½) years.

ARTICLE 14. RIGHT TO TERMINATE

NASA retains a unilateral right to cancel this agreement prior to April 28, 2001. NASA's decision to cancel is dependent on NASA's sole determination of the reasonable chance of success of the consortium.

Any party, upon a 30-day written notice to the other party, may terminate this Agreement, at any time and for any reason it deems substantial.

In the event of such termination, each Party shall return to the other party any data it furnished to assist the other in performance of this Agreement, but each party may retain any data generated by its partial performance under the Agreement, unless the Inventions and Data rights or other section of this Agreement provides otherwise.

NASA shall not be liable for any costs, loss of profits, revenue, or other direct, indirect or consequential damages incurred by OU, OBR, their related entities or customers as a result of termination.

This article is not intended to limit or govern the right of NASA, OU or OBR in accordance with law to terminate its performance under this agreement, in whole or in part, for OU's, OBR's or NASA's breach of a provision in this agreement.

ARTICLE 15. CONTINUING OBLIGATIONS

The obligations of the parties as set forth in Article 9, Liability and Risk of Loss, and Article 10, Intellectual and Property Rights shall continue to apply after the expiration or termination of this agreement.

ARTICLE 16. KEY PERSONNEL

The following personnel are designated as the key officials for their respective party. These key officials are the principal points of contact between the parties in the performance of this Agreement.

NASA Glenn Research Center

Robert Bauer
ACTS Project Manager
NASA Glenn Research Center
Mail Stop 54-6
Cleveland, OH 44135
Phone: 216-433-3431
Fax: 216-433-6371
Robert.a.bauer@grc.nasa.gov

Ohio Board of Regents

E. Garrison Walters
Vice Chancellor for Academic & Access Programs
Ohio Board of Regents
30 East Broad Street, 36th Floor
Columbus, Ohio 43266-0417
Phone: 614-466-0855
Fax: 614-466-5866
gwalters@regents.state.oh.us

Ohio University

Dennis Irwin
Professor and Chair, School of
Electrical Engineering and Computer Sciences
Ohio University
Stocker Center 333
Athens, OH 45701-2979
Phone: 740-593-1566
Fax: 740-593-0007
dirwin1@ohio.edu

ARTICLE 17. MODIFICATIONS

Any modifications or extensions to this agreement shall be executed, in writing, and signed by an authorized representative of each party, possessing original or delegated authority to make such a commitment.

ARTICLE 18. ASSIGNMENT OF RIGHTS

Neither this agreement nor any interest arising under it will be assigned by OU, OBR or NASA without the express written consent of the officials executing the agreement.

ARTICLE 19. ANTI-DEFICIENCY ACT

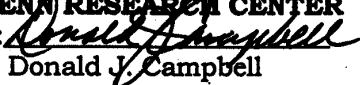
All activities under or pursuant to this agreement are subject to the availability of appropriated funds, and no provision shall be interpreted to require obligation or provision of funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1341.

ARTICLE 20. APPLICABLE LAW

U.S. Federal law governs this agreement for all purposes, including, but not limited to, determining the validity of the agreement, the meaning of its provisions, and the rights, obligations and remedies of the parties.

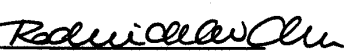
ARTICLE 21. SIGNATURE BLOCK

**NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
GLENN RESEARCH CENTER**

BY: 
Donald J. Campbell
Director
21000 Brookpark Road
Mail Stop 3-2
Cleveland, Ohio 44135

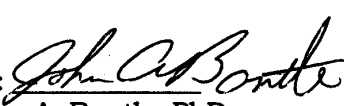
DATE: 3-19-01

OHIO BOARD OF REGENTS

BY: 
Roderick G. W. Chu
Chancellor
30 East Broad Street, 36th Floor
Columbus, Ohio 43266-0417

DATE: 3/9/01

OHIO UNIVERSITY

BY: 
John A. Bantle, PhD.
Vice President for Research
102 RTECH Building
Athens, Ohio 45701

DATE: 3/7/01

APPENDIX A

CONSORTIUM REQUIREMENTS FOR USE OF ACTS SPACECRAFT

The ACTS spacecraft is parked in the orbital gravity well at 105.2 degrees W. Its current long term stability is 105.2 plus or minus 0.2°. It is estimated that the satellite has at least 4 years fuel for momentum control and drift stabilization. Attitude stability will be adequate for bent-pipe steerable beam communication links.

NASA's requirements for consortium's continued operation of the spacecraft are as follows:

1. The ACTS satellite is being provided to the consortium for the sole purpose of education and research activities, and economic invigoration by OU and OBR and the consortium members. In no event will ACTS be used in competition with commercial satellite providers or involved in illegal activities.
2. During the consortium formation and transition of operations, NASA oversight will be provided for payload operations continuity.
3. As licensee for the spacecraft, NASA may intervene or direct payload operations of the spacecraft at anytime it deems necessary, or is directed to by the Federal Government.
4. The consortium will cease and desist transmission from the ground terminals used with ACTS upon notification by NASA or other regulatory government agency (e.g., FCC, NTIA)
5. The spacecraft is to remain at the 105.2 degrees W. orbital location where it will permanently remain when the payload is eventually shut-down and inerted. No operations are permitted that will corrupt the parking of the satellite at this location.
6. Upon termination of the consortium's usage of the spacecraft, the spacecraft will be inerted on-orbit according to NASA's direction.
7. The consortium shall recognize that ACTS is a national asset made possible by the US taxpayers and shall ensure operations and usage of the payload that are consistent with a positive national image. The consortium shall publicize its activities giving due recognition to NASA, consortia members and contributors.
8. The operation and use of the ACTS satellite falls under the export control laws of the United States.
9. OU, OBR and their related entities shall comply with all applicable laws

and regulations.

10. OU, OBR and their related entities shall coordinate with the spacecraft and control station operations contractors to obtain technical operations information beyond that which NASA makes available.
11. OU, OBR and their related entities shall be responsible for radio licenses of any ground stations not developed by NASA as part of the ACTS program.
12. NASA and OU will develop an operations plan, consistent with this agreement, for the consortium by April 28, 2001, that will define the working relationship between the consortium and NASA.