

The Embassy of the United States of America presents its compliments to the Department of Foreign Affairs and International Trade and has the honor to refer to recent discussions between representatives of the Government of the United States of America and the Government of Canada concerning the terms and conditions whereby cooperation on the Canadian Microgravity Isolation Mount for flight on the space shuttle (STS-85) now scheduled for launch in August 1997, shall be implemented by the National Aeronautics and Space Administration (NASA), on behalf of the Government of the United States of America, and by the Canadian Space Agency (CSA), on behalf of the Government of Canada.

The Embassy proposes that cooperation between the two governments on the Microgravity Isolation Mount shall be in accordance with the terms and conditions set forth in the attached Memorandum of Understanding concluded between NASA and CSA.

If the foregoing proposal is acceptable to the Government of Canada, the Embassy proposes that this note, including the attached Memorandum of Understanding and the Ministry's note in reply shall constitute an agreement between the two governments which shall enter into force on the date of the

Ministry's reply and shall remain in force until terminated by either government upon twelve-months written notice.

The Embassy avails itself of the opportunity to renew to the Department of Foreign Affairs and International Trade, the assurances of its highest consideration.



Embassy of the United States of America,
Ottawa, July 31, 1997

**MEMORANDUM OF UNDERSTANDING
BETWEEN THE
UNITED STATES
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
THE CANADIAN SPACE AGENCY
ON THE
MICROGRAVITY ISOLATION MOUNT**

PREAMBLE

The United States National Aeronautics and Space Administration (NASA) and the Canadian Space Agency (CSA), are herein referred to as "the Parties," recognizing that the Parties have identified a mutual interest in the flight of the Microgravity Isolation Mount (MIM) for use on the U.S. Space Shuttle and note that such cooperation will produce benefits for both Parties,

Have reached the following understanding:

I. STATEMENT OF NEED

The Parties have cooperated on recent scientific missions for development of vibration isolation technology in microgravity. The results of this cooperative effort are expected to improve the degree of acceleration environment quality for science experiments on a variety of microgravity platforms. For the purpose of this Memorandum of Understanding (MOU), the referenced platform is the U.S. Space Shuttle orbiter.

Given the critical role that isolation technology will have in upcoming International Space Station (ISS) science activities, the need for research tasks of this nature is essential. Results from the MIM testing on STS-85, which is scheduled to launch in August 1997, will provide data that is useful in characterizing MIM onorbit performance and increasing the knowledge of microgravity isolation platform technology.

II. PROGRAM OBJECTIVE

This cooperative effort will result in the Shuttle flight demonstration of the operational capabilities of the Canadian-developed MIM.

III. GENERAL PROGRAM DESCRIPTION

To meet the above program objective, this MOU includes the following elements:

- o MIM Development

MIM mission simulations will be developed and conducted prior to flight operational tests. Testing of components to assess and verify their performance, both individually and as an integrated system, will be conducted by CSA.

- o Flight Mission with CSA Payload Specialist (PS)

MIM flight hardware, certified to NASA requirements, will be developed for use onorbit. A Canadian PS, with extensive background and expertise in the Canadian-developed MIM, will be onboard a Shuttle mission to conduct flight operations and to participate in such other activities as a member of the flight crew as may be agreed to by NASA in consultation with CSA.

o Postflight Data Processing and Analysis

Postflight data will be compared to the ground simulation outputs for further validation of the MIM capabilities and to identify potential upgrades/modifications required to achieve operational status. All flight data related to the MIM aspects of the mission will be mutually available to both NASA and CSA, and both Parties will assess and analyze their findings, with particular respect to system performance and ground simulation validation.

IV. PAYLOAD SPECIALIST MISSION AND TRAINING ACTIVITIES

A Canadian PS Candidate for the MIM mission was selected pursuant to NASA's P S regulations and the *Arrangements for Enhanced Cooperation in Space between NASA and CSA* which was signed on May 18, 1994 (hereinafter referred to as the "1994 Arrangements for Enhanced Cooperation in Space between NASA and CSA"). Flight of the Canadian PS is contingent upon successful completion of all aspects of the required training and any standard preflight crew certification procedures (e.g., medical) to the full satisfaction of NASA, prior to certification as a PS. The Canadian PS will participate in all mutually agreed activities in accordance with the mission flight plan.

NASA's provision of a PS flight opportunity on an MIM Flight Demonstration Mission is done in recognition of the Summary Report of the Steering Group on U.S.-Canadian Space Cooperation in the spring of 1994 (Final Report of the MSS Program Alternatives Working Group, section 3, paragraph d), provided in support of the *1994 Arrangements for Enhanced Cooperation in Space between NASA and CSA*. In consideration of CSA-provided MIM flight hardware, NASA will waive, for this mission, standard costs associated with non-U.S. PS training.

In preparing for the mission and postmission activities, NASA will be responsible for providing STS and mission-peculiar training. This will include the following:

1. Preparing a training plan and detailed schedules and procedures training;
2. Providing all equipment needed for training, including flight hardware and simulators;
3. Scheduling and providing all facilities for training, including scheduling training opportunities at investigator laboratories, and scheduling and providing NASA laboratories and facilities and,
4. Scheduling and providing briefings and instructors to aid in training.

CSA will be responsible for arranging the Canadian PS's travel schedule to meet the training requirements prescribed in the training plan and schedule provided by NASA.

V. MANAGEMENT AND PROGRAM COORDINATION

The MIM program will be managed through a joint effort by each Party's designated manager. The NASA ISS Phase I Risk Mitigation Experiments Team Leader will be located at the Johnson Space Center (JSC) in Houston, Texas, and will be named separately. The CSA Project Manager will be located at CSA in St. Hubert, Quebec, and will be named separately.

VI. FUNDING ARRANGEMENTS

Each Party will bear the costs of discharging its respective responsibilities under this MOU, including travel and subsistence of its own personnel and transportation charges for the equipment for which it is responsible.

Each Party's financial obligations under this MOU are subject to its funding procedures and the availability of appropriated funds. Should either Party encounter funding problems which may affect its ability to fulfill its responsibilities under this MOU, that Party will notify and consult promptly with the other Party.

VII. RESPONSIBILITIES

NASA will use reasonable efforts to carry out the following responsibilities:

1. Provide a Space Shuttle launch for the demonstration flight;
2. Provide 2.5 mid-deck lockers on the Space Shuttle mission designated STS-85 to accommodate the MIM and MIM science/demonstration experiments;
3. Provide to CSA in a timely manner the appropriate technical data on all relevant requirements such as interface drawings, analyses, safety requirements and schedules in accordance with which the CSA MIM will be delivered to the JSC and/or Kennedy Space Center (KSC) for integration into the Shuttle;
4. Integrate the MIM hardware into the Shuttle orbiter and provide flight certification for the overall aggregate payload complement that includes the MIM;
5. Attend, as appropriate, meetings in support of the NASA/CSA MIM activities;
6. Develop, maintain, and exchange coordinated implementation schedules with CSA that include the dates for major milestones--the schedules will be updated as necessary and formally controlled by the designated managers;

7. Participate with CSA in establishing a mutually agreed upon flight experiment plan identifying the investigations and experiments to be conducted with the MIM;
8. Provide mission/payloads flight operations support accommodations in a control center consistent with the needs of the CSA and NASA and in accordance with payload mission operations planning;
9. During prelaunch preparations, provide suitable accommodations for preparations of all experiments, CSA personnel, and equipment at the ground support facilities at NASA;
10. Provide required Space Shuttle training for the Canadian PS and fly the Canadian PS on the MIM demonstration flight;
11. Provide CSA with copies of relevant mission data for postmission data analysis; and,
12. Provide support for the performance of off-gassing and vibration testing, if required.

CSA will use reasonable efforts to carry out the following responsibilities:

1. Deliver the flight model MIM, a flight spare, and a training model to JSC and/or KSC, as appropriate, at a mutually agreed upon date for integration;
2. Provide data that supports verification of requirements for all hardware and operations;
3. Provide to NASA in a timely manner the appropriate technical documentation of the MIM such as the interface, safety and all other necessary documentation, in order to facilitate NASA integration of the MIM experiment into the STS-85 mission;
4. Support selected mission review/meetings as identified by the STS-85 Mission Manager (such as Integrated Payload reviews, and readiness/turnover meetings);
5. Develop, maintain, and exchange coordinated implementation schedules with NASA that include the dates for major milestones--the schedules will be updated as necessary and formally controlled by the designated managers;
6. Provide for preflight verification of U.S. and Canadian science/demonstration experiments integration into the MIM (ground-based at CSA);
7. Support MIM, and its secondary payload training, as required, to the Canadian Payload Specialist and the U.S. Mission Specialist (MS) who is assigned as the backup operator of MIM;
8. Support integrated crew training in the United States, and provide transportation of MIM ground and/or flight equipment as required to support that training;
9. Participate with NASA in the development and conduct of an appropriate training program using ground and/or flight equipment as required to support that training;

10. Provide experiment-unique hardware to carry out the selected Canadian investigations on the MIM;
11. Support integration of the MIM into the Shuttle orbiter with a system/payload engineer(s);
12. Locate CSA personnel and appropriate ground support equipment at JSC and KSC for preflight, flight, and postflight, as required, for activities such as review and board meetings, crew training, flight mission support, and pre and postflight hardware processing;
13. Provide a quick-look report of the experiment results to NASA within 15 days after mission completion; and
14. Issue a mission report within 1 year of mission completion;

VIII. SCHEDULE/MAJOR MILESTONES

In accordance with the MOU responsibilities described previously, NASA and CSA will develop, maintain, and exchange coordinated implementation schedules. These schedules, including the dates for the following major milestones, will be updated as necessary and formally controlled by the designated Program Managers.

IX. EXCHANGE OF TECHNICAL DATA AND GOODS

Each Party is obligated to transfer to the other Party only those technical data and goods necessary to fulfill the responsibilities of the transferring Party under this MOU. The parties will effect such transfer without restrictions as to use or disclosure, subject to the following:

- a. Interface, integration, and safety data (excluding detailed design, manufacturing, and processing data, and associated software) will be exchanged by the Parties without restrictions as to use or disclosure, except as otherwise restricted by national laws or regulations relating to export controls or classified information.
- b. In the event a Party, in carrying out its responsibilities under this MOU, finds it necessary to transfer technical data other than that specified in paragraph (a) above, that are proprietary, and for which protection is to be maintained, such technical data will be marked with a notice indicating that it will be used and disclosed by the receiving Party and its contractors and subcontractors only for the purposes of fulfilling the receiving Party's responsibilities under this MOU, and that the technical data will not be disclosed or retransferred to any other entity without prior written permission of the furnishing Party. The receiving Party agrees to abide by the terms of the notice, and to protect any such marked technical data from unauthorized use and disclosure.

c. In the event a Party, in carrying out its responsibilities under this MOU, finds it necessary to transfer technical data and goods that are to be protected for export control purposes, the furnishing Party will mark it with a notice or otherwise specifically identify such technical data or goods. The notice or identification will indicate that such technical data and goods will be used and such technical data will be disclosed by the receiving Party and its contractors and subcontractors only for the purposes of fulfilling the receiving Party's responsibilities under this MOU. The notice or identification will also provide that such technical data will not be disclosed, and such technical data and goods will not be retransferred, to any other entity without prior written permission of the furnishing Party. The Parties agree to abide by the terms of the notice of identification and to protect any such marked technical data and identified goods. Nothing in this MOU requires the Parties to transfer technical data and goods contrary to national laws or regulations relating to export controls or control of classified data.

d. The Parties are under no obligation to protect any unmarked technical data or unidentified goods. However, all technical data or goods exchanged are to be used exclusively for the purposes of fulfilling the Parties' responsibilities under this MOU.

X. CUSTOMS CLEARANCE AND MOVEMENT OF PERSONNEL

The Parties shall facilitate waiver of all applicable duties and taxes for entrances to, and exits from, the respective countries for materials (including equipment) required for implementation of this MOU. Such arrangements shall be fully reciprocal.

Also, subject to its laws and regulations, each of the Parties will facilitate provision of the appropriate entry and residence documentation for the other Party's nationals and families who enter, exit, or reside within its territory in order to carry out activities under this MOU.

XI. PUBLIC INFORMATION

NASA and CSA may release public information regarding their respective efforts in connection with this joint project. However, NASA and CSA each agree to coordinate in advance with the other any public information activities which relate to the other's responsibilities or performance. Information which has been previously cleared and has not changed will not require re-coordination.

XII. LIABILITY

a. The Parties hereby establish a comprehensive cross-waiver of liability between the Parties and the Parties' related entities, in the interest of encouraging participation in space exploration, exploitation, and investment. This cross-waiver of liability will be broadly construed to achieve this objective.

b. As used in this cross-waiver, the term:

1. "Related Entity" means:

- i. A contractor or subcontractor of a Party at any tier;
- ii. A user or customer of a Party at any tier; or
- iii. A contractor or subcontractor of a user or customer of a Party at any tier.

The term "Related Entity" may also apply to a State, or an agency or institution of a State, having the same relationship to a Party as described in subparagraphs b.1.i. through b.1.iii. above or otherwise engaged in the implementation of Protected Space Operations as defined in subparagraph b.4. below

"Contractors" and "Subcontractors" include suppliers of any kind;

2. "Damage" means:

- i. Bodily injury to, or other impairment of health of, or death of, any person;
- ii. Damage to, loss of, or loss of use of any property;
- iii. Loss of revenue or profits; or
- iv. Other direct, indirect, or consequential damage;

3. "Payload" means any property to be flown or used on or in the Space Shuttle.

4. "Protected Space Operations" means all Space Shuttle and payload activities on Earth, in outer space, or in transit between Earth and outer space done in implementation of this MOU. Protected Space Operations begin at the signature of this MOU and end when all activities necessary for implementation of this MOU are completed. It includes, but is not limited to:

- i. Research, design, development, test, manufacture, assembly, integration, operation, or use of: the Space Shuttle, transfer vehicles, payloads, related support equipment and facilities and services;
- ii. All activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services. "Protected Space Operations" excludes activities on Earth which are conducted on return from space to develop further a payload's product or process for use other than for Space Shuttle-related activities necessary to complete implementation of this MOU.

- c. 1. Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed below based on Damage arising out of Protected Space Operations. This cross-waiver shall apply only if the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for Damage, whatever the legal basis for such claims, including but not limited to delict and tort (including negligence of every degree and kind) and contract, against:
 - i. The other Party;
 - ii. Any party who has signed a NASA agreement that includes Space Shuttle services;
 - iii. A Related Entity of any party in paragraph c(1)(i) and c(1)(ii) in this Article;
 - iv. The employees of any of the entities identified in c(1)(i) through c(1)(iii) above.
2. In addition, each Party will extend the cross-waiver of liability as set forth in paragraph c(1) of this Article to its own Related Entities by requiring them, by contract or otherwise, to agree to waive all claims against the entities or persons identified in c(1)(i) through c(1)(iv) above.
3. For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of liability arising from the Convention on the International Liability for Damage Caused by Space Objects of March 29, 1972 (Liability Convention) where the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.
4. Notwithstanding the other provisions of this Article, this cross-waiver of liability will not be applicable to:
 - i. Claims between a Party and its own Related Entity or between its own Related Entities;
 - ii. Claims made by a natural person, his/her estate, survivors, or subrogees for injury or death of such natural person, except where a subrogee is one of the Parties;
 - iii. Claims for damage caused by willful misconduct;
 - iv. Intellectual property claims;

- v. Contract claims between the Parties based on the express contractual provisions of this MOU;
 - vi. Claims for Damage based on a failure of the Parties or their Related Entities to flow down the cross-waiver.
5. Nothing in this Article will be construed to create the basis for a claim or suit where none would otherwise exist.

d. The Parties further agree that, except as provided for in this Article, they will remain liable under the Liability Convention. In the event of a claim arising out of this Convention, the United States and Canada will consult promptly on any potential liability, on any apportionment of such liability, and on the defense of such claim.

XIII. PATENT AND INVENTION RIGHTS

Nothing in this MOU or in the mission-unique documentation will be construed as granting or implying any rights to, or interest in, patents or inventions of the Parties or their contractors or subcontractors.

XIV. REGISTRATION OF SPACE OBJECTS

In accordance with the Convention on Registration of Objects Launched into Outer Space of January 14, 1975, the United States will register the Space Shuttle.

XV. TERMINATION

Either Party may terminate this MOU at any time upon at least twelve months written notice of its intent to terminate. Termination by either Party will not affect that Party's continuing obligations under this MOU with regard to liability and the protection of data and goods. This MOU will also cease to have effect upon termination of the Exchange of Notes between the Government of the United States of America and the Government of Canada on the Microgravity Isolation Mount Program.

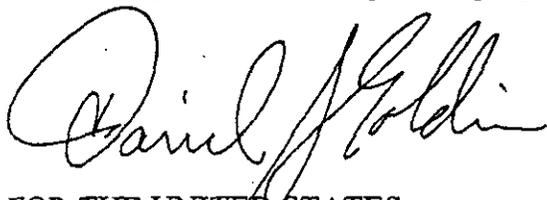
XVI. AMENDMENTS

This MOU may be amended upon written concurrence of the Parties.

XVII. ENTRY INTO FORCE AND DURATION

This MOU will become effective upon signature and pursuant to the Exchange of Notes referenced above. It will remain in effect for 5 years, provided the Exchange of Notes remains in effect. It may be extended by written agreement of the Parties, pursuant to an extension of the Exchange of Notes.

Done in duplicate in the English language.



FOR THE UNITED STATES
NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION:

JUL 24 1997
DATE

Washington, DC
PLACE



FOR THE CANADIAN
SPACE AGENCY:

28 July 1997
DATE

OTTAWA, ONTARIO
PLACE

Department of Foreign Affairs
and International Trade



Ministère des Affaires étrangères
et du Commerce international

Note No. JLAB-0155

The Department of Foreign Affairs and International Trade presents its compliments to the Embassy of the United States and has the honour to acknowledge receipt of the Embassy's note No. 305, dated July 31, 1997 outlining the proposal concerning an experiment of the Microgravity Isolation Mount to take place during the upcoming Space Shuttle Mission (STS 85).

The Department of Foreign Affairs and International Trade has the honour to inform the Embassy that the proposal contained in its Note is acceptable to the Government of Canada, and further, to confirm that the Embassy's Note, and this reply, done in English and French, each version being equally authentic, shall constitute an Agreement between our two Governments on this matter which shall enter into force on this date.

The Department of Foreign Affairs and International Trade avails itself on the opportunity to renew to the Embassy of the United States the assurances of its highest consideration.

OTTAWA, July 31, 1997

A handwritten signature in black ink that reads "Victor G. Bradley".

Victor G. Bradley,
Special Advisor
Investment, Science and
Technology Division (TBRIS)

Marc-Claude
