Response to NASA Questionnaire by University of Wisconsin-Madison (10/16/00).

Introduction. The University is appreciative of the opportunity to provide comments on this crucially important issue. Before answering the specific questions posed by NASA, we offer a few comments. First of all, the University personnel who are involved in satellite research at the University consider themselves good citizens and/or loyal employees and do not question the general need for laws and regulations to safeguard national security. However, the University and other public research institutions have been working on NASA and NOAA projects since the beginning of the space age, and many of the instruments developed at the University have led to major discoveries and useful operational technologies. These were the fruits of open, collaborative research of the type most threatened by the inappropriate application of export control regulations (particularly the ITAR) to University research.

Secondly, this is not the first time these issues have been raised. University researchers have always worked in an open environment, but have been mindful of the on-going discussions within the Government regarding the balance between encouraging unfettered scientific research and safeguarding national security. However, the University researchers thought that the issue had been resolved during the Reagan Administration by the issuance of National Security Decision Directive 189 (which stated that the products of fundamental research should remain unrestricted, and the appropriate method for restricting sensitive technology is through the classification process). This policy, and the fundamental research exemption in the EAR and ITAR, constituted the framework under which satellite research has been openly conducted during the last 15 years or more. Thus, the current issues are less the result of a change in law, than the result of the abandonment of the policy of interpreting the existing regulations in a way that fosters open, fundamental research without jeopardizing legitimate national security interests. It seems that any action short of returning to the policy and spirit espoused in NSDD 189 will have negative consequences on the ability of many prestigious universities to participate in satellite research, and on the advancement of science in general.

I. Procedures, etc. at UW-Madison

1. How does the University disseminate information on the requirements of the EAR and ITAR?

When a particular research grant or contract document contains a provision indicating a responsibility to comply with export control regulations (EAR or ITAR), or a university researcher otherwise has a reason to believe that research they are engaged in might implicate export control regulations, the matter will be referred to University legal counsel for review. University legal counsel will work with the impacted researchers to educate them on the provisions of the regulations, to assess if any exceptions might apply, and to assist with compliance issues. The EAR and ITAR impact relatively few departments on campus. The University s Space Science and Engineering Center (SSEC), which is the department primarily involved in satellite research, has developed a website which contains information regarding the ITAR, and has sent a letter communicating basic ITAR information to its employees.

2. What procedures are in place to promote compliance with U.S. export control regulations? What changes were made following the 1998 transfer of jurisdiction for commercial communications satellite export controls from Commerce to State, and follow NASA s February, 2000, change in its licensing policy.

Contract review personnel in the University s Research and Sponsored Programs office review incoming awards for references to export control regulations, and refer to legal counsel as appropriate. Legal counsel works with researchers to ensure compliance, and information regarding export controls is disseminated as described above. However, it should be emphasized that the University has a strong policy prohibiting the conduct of research the results of which cannot be freely published. Thus, in almost all circumstances, the public domain exceptions to the EAR and ITAR for the fruits of fundamental university research are believed to apply to the University s research activities.

No changes were made to the above procedures upon the transfer of jurisdiction for commercial communications satellite export controls from Commerce to State. Virtually none of the University s research activities involve commercial communications satellites, and at the time of the transfer of jurisdiction there was no notice to, or understanding among, the university research community that this transfer would result in a dramatic shift in governmental policy regarding the applicability of export controls to university research involving satellites. Similarly, no changes were made to the University s procedures following NASA s February, 2000 change in its licensing policy. This is primarily because the nature of the changes in the licensing policy have not been communicated to the University.

II. Specific Project: Algorithm Development, Measurement, Concept Validation, Data Processing and Education/Public Outreach for the Geostationary Imaging Fourier Transform Spectrometer (GIFTS) Project.

A. Setting.

1. Who funds the project? NASA Langley Research Center.

2. If a company, is there already an export license covering it? N/A.

3. Is there a government-to-government agreement for the project? No.

4. Are there any restrictions in the agreements with the research sponsors that restrict public release of any of the data or technology?

No, although only because the University objected to the restrictive clauses included in drafts of the contract. For example, a late draft of the final contract included a clause which required prior approval for any dissemination of technical data resulting from the research, but the University was able, after several rounds of negotiation, to get the clause removed. The University, like most public research institutions, has a policy which prohibits the acceptance of research agreements which contain restrictions on publication. If a granting agency were to insist on prior

approval of publication with respect to a research project, the University (like many of its peers) would be effectively prevented from participating in that activity. The University has signed non-disclosure agreements with private industries who are participating in or supply information or equipment for the project, but these agreements do not prevent the University from publishing the results of its own research.

B. Origin of the Problem.

5. Is the area of concern interactions with collaborators at foreign institutions, interacting with foreign personnel at U.S. institutions, export of equipment, a combination, or other?

There are many areas of concern. Specifically: (a) the chilling effect on the interactions with foreign personnel at U.S. institutions, and of most concern, uncertainty as to the ability to involve an institution s own foreign students, post-doctoral researchers, and employees in NASA-funded research projects without first obtaining export licenses (which take great effort to prepare, many months to obtain, and require unrealistic powers of prescience in predicting precisely what information will be exported to an individual over the course of a long-term research project); (b) the chilling effect on the interaction with collaborators at foreign institutions or companies, which results in less collaboration with these partners and thus deprives universities and the U.S. Government of their valuable scientific contributions; (c) the vague and arcane nature of the export control regulations makes it extremely difficult for universities to determine what and what is not covered; (d) federal agencies practice of placing the burden on universities to determine if and to what extent export controls apply, and the corresponding transfer of the risk of noncompliance to the universities; (e) where agencies do provide input as to the application of the ITAR, the agencies tend to indiscriminately categorize all information from a project as subject to the ITAR, due to an extremely conservative approach to ITAR within the federal government (for example, the University was told informally that the ITAR applies to the information generated under the GIFTS project such that we could not collaborate with a Canadian company without an export license, yet the GIFTS contract issued the University contains a significant outreach and public education component which requires the University to widely disseminate the GIFTS technology and data); (f) concern that federal agencies are subjecting non-classified information to controls comparable to that required of classified information; (g) the demoralizing effect on foreign students and employees, who in effect are being told they cannot be trusted; and (h) uncertainty about what sort of security requirements are expected of universities, and concern that any such security requirements would be extremely costly to implement and would become the target of campus opposition as incompatible with the traditions of academic freedom and open, collaborate research on university campuses.

6. Was the activity conducted under some regulatory authority before March, 1999, when the ITAR was changed to reflect transfer of comsats?

Again, the satellites at issue at the University are not communications satellites, but meteorological and astronomical research satellites, so the issue is much broader than communications satellites. With respect to regulatory authority, the specific GIFTS project currently at issue began about the time of the transfer of regulatory authority, so it was not being conducted at all prior to the transfer of authority. However, the University has been offering

courses and conducting research into satellites, including activities pertaining to meteorological and astronomical satellites with remote sensing capabilities, for decades without any indication from NASA, industrial partners, or anyone else, that the ITAR was even an issue. University research has always been understood to be exempt from the ITAR and EAR due to the broad fundamental research exemption. Thus, it appears that it is not the nature of the activities which have changed, nor the nature of the regulations, but instead the application of these regulations to activities which have long been understood to be the normal and desired scholarly and educational activities of colleges and universities, as well as their international faculty, staff, students and collaborators.

7. If the concern is that licensing approvals that were not sought, or were not thought to be necessary, when the project began are now thought to be required, who or what made the university believe the requirements had changed? Does the problem stem from increased awareness of regulations that had actually been in effect before the events listed in I.2? If so, what caused the increased awareness?

Indeed, part of the problem with the GIFTS project is that restrictions not thought necessary during the proposal development stage have been imposed as the project progresses. For example, the initial GIFTS proposal, with a NASA LaRC employee as Principal Investigator, indicated that the technical results of this effort will reside in the public domain and were intended to be widely disseminated. The proposal specifically states: There are no special security measures required for this activity. (The proposal is set forth on the NASA website at <<http://spacetech.larc.nasa.gov/GIFTS/>>.)

When the University s portion of the proposal was funded for further development (NASA Contract No. NAS1-99117), the contract did not contain any reference to export controls nor restrictions on publication. Yet, at about that time, NASA first informed the University of the ITAR issue. The issue arose in the context of the revocation of the Canadian exemption from the ITAR. The University s proposal included obtaining services from a Canadian company, Bomem (the international expert on interferometers). Mid-way through the proposal development, the University was informed by NASA that it would need to obtain an export license (Technical Assistance Agreement or TAA) in order to supply the information to Bomem necessary to enable it to provide the services to the University. Due to the time constraints, administrative burden and significant University policy issues involved (obtaining a TAA would require registering with State as an armaments manufacturer), Bomem was simply dropped from the collaboration, thereby depriving the University and NASA of their significant expertise.

When the draft final award document arrived on campus (NASA Contract No. 00072), it contained an export control clause (NASA 1852.225-70), a Rights In Data Clause with publication restrictions which by its terms is inapplicable to agreements with colleges and universities (NASA 1852.227-14), as well as a Security Program/Foreign National Employee Access Requirements (LaRC 52.204-91) clause which can only be described as Orwellian in the context of unclassified university research. The University objected to the LaRC Security Program clause, and the Rights in Data clause, and they were taken out as admittedly inappropriate for research conducted at universities. However, in the next version of the draft contract, NASA included a clause entitled Advance Approval for Release of Technical

Information. The University once again objected, and the clause was replaced with a similarly-worded clause likewise unacceptable to the University. Only after the University objected yet again did NASA finally remove the clause requiring prior approval for publication.

So, in terms of the question above, the University pursued a research opportunity which appeared at the time of solicitation to be compatible with the University s status as a public research university, and only very far into the process, after the University devoted considerable resources into developing a viable proposal which was funded, did increasingly onerous restrictions begin being imposed on the contact. Only through persistent, time-consuming negotiations were the inappropriate and unnecessary restrictions removed. We should emphasize at this point that we do not blame NASA for this dilemma. It is evident that NASA is operating in a climate of suspicion and paranoia, and has been directed to strictly enforce security requirements. Thus, NASA has a great disincentive to determine that export controls do not apply to NASA-funded programs, even in situations like GIFTS where the results and technology were intended to be widely disseminated through outreach and public education.

8. If the project is funded by NASA, a NASA Center, or another governmental agency, what advice has that agency provided on the use of its exemption authority under ITAR? Is the problem related to the NASA statement of March, 2000 that it would not be responsible for obtaining any necessary licenses or other change in guidance from another agency?

Very little information about the exemptions has been provided, and the information provided has not been at all helpful. For example, at the time the University was informed that the ITAR may apply to the work with Bomem, it was informed by NASA in a letter dated June 8, 1999 that The contracting officer, or designated representative, may authorize the University of Wisconsin to export ITAR-controlled technical data pursuant to the exemption set forth in 22 CFR 125.4(b)(3) where an international agreement provides for the export of such data and the data does not disclose the details of the design, development, product or manufacture of any defense article. The University responded to this letter with an e-mail stating: Regarding your letter of 8 June, under the provision in section (c) [reference to the exemption], we request your authorization to continue our teaming relationship with Bomem for GIFTS.

The reply from NASA was: As long as the University of Wisconsin is in compliance with applicable export laws/regulations, nothing else is required of the University (i.e, no written approval is required from the Contracting Officer) regarding exports. However, if the University intends to export covered items, then this could be a violation of U.S. export laws/regulations. In such a case, authorization for the export may be requested by the University, and approval of that request by the Government, IF given, would be required BEFORE any such export can take place. Please note that it may result that authorization would not be timely approved by the Government, or would ultimately be completely denied, depending upon the details of the requested export situation. Such delay or denial would not affect the requirements or provisions, including the estimated cost and completion schedule, of subject contract NAS1-99117. Thus, the University was given no useful information about the exemption, and in essence was told it is on its own with respect to ITAR.

The problem at the University is not specifically related to NASA s March, 2000 statement, although such statement does exemplify the trend among federal agencies to pass on the universities the responsibility to determine what aspects of federally-sponsored research are subject to the ITAR, what if any exemptions might apply, and what obligations exist in terms of compliance.

C. Status and Nature.

9. Has the University a Commerce Classification Statement from the Commerce Department, a State Commodity Jurisdiction Determination from the Department of State, of a license application being processed on this project or a related activity?

No.

10. Please describe briefly the project and its scientific purpose. Please indicate whether the university considers all aspects of the work to be fundamental research (and hence in the public domain) and why?

The statement of work in the GIFTS contract describes the project: The goals of the GIFTS mission are to demonstrate and validate selected advanced technologies, to provide revolutionary improvements in meteorological observations and forecasting, and to measure certain atmospheric chemical constituents. The GIFTS measurement concept will provide, from geostationary orbit, profiles of key atmospheric trace species (i.e., water vapor (H2O), carbon monoxide (CO), and ozone (O3)), produce temperature and moisture profiles, and derive altitude-resolved water vapor winds . GIFTS will fly new and emerging sensor and data processing technologies to make geophysical measurements that will contribute to NASA s Earth Science Enterprise (ESE) goals. This mission will conclusively prove the GIFTS breakthrough measurement concept for altitude-resolved water vapor winds and demonstrate revolutionary technologies for future research and operational systems. The infusion of GIFTS technologies into operational instrumentation is critical for optimizing this nation s next generation geostationary severe weather and climate observing systems. The GIFTS payload will be commanded and controlled by a Payload Operations and Control Center (POSC) located at NASA LaRC. Payload data will be downlinked to ground data processing facilities and delivered to LaRC for storage, processing and distribution. The satellite will be launched aboard a NASA-identified and provided launch vehicle.

The UW s role in the project is identified as: UW will provide algorithm development, measurement concept validation, processing to produce Level 2 meteorological dataproducts, and education/public outreach associated with the Mission. The statement of work further provides that: The Education and Public Outreach task shall be considered a success if GIFTS technology and measurement concept information and data products reach nationwide dissemination. The GIFTS activities shall reach the general public, K-16 school systems, children s organizations, professional education associations, museum and science center networks, and science and technology enthusiasts. In addition, international participation in conferences is desired.

Given the above statement of work and intended dissemination of the technology and data arising from GIFTS, one wonders how the ITAR can even be an issue, let alone a source of terrible consternation at NASA and the University. The University considers all data and information resulting from its work under the project to be the products of fundamental university research under 22 CFR 120.11(a)(8), since the University has not accepted restrictions on publication of research results, and the U.S. Government has not imposed specific access and dissemination controls on the research results. The only restrictions accepted by the University have to do with maintaining the confidentiality of certain information provided by industrial partners, but these restrictions do not restrict the publication of the scientific and technical information resulting from the project. The University also believes the exemption at 22 CFR 120.11(a)(6) applies, since, unless informed that it may not, the University intends to distribute the research results to the scientific community and even school children via conferences, seminars and the like per the outreach and public education requirements of the contract. However, 22 CFR 120.11(a)(6) poses a dilemma which exemplifies the contradictory and confusing nature of these regulations - how can this provision be relied upon if the act of disseminating information at a public conference could itself be a prohibited export?

11. If the regulatory issue centers on technical information, please indicate the extent to which the information at issue involves satellite performance parameters, satellite design parameters, other equipment on the munitions list, or other technical data (please indicate type).

This is the rub. The information at issue in the GIFTS project has nothing to do with satellite performance or design parameters - GIFTS has to do with a piece of scientific measuring equipment which will be housed in a satellite. The University has never been informed which components or data related to the GIFTS project are subject to the ITAR, or which provisions of the munitions list apply to the GIFTS components or data. However, Category XV of the ITAR (Spacecraft Systems and Related Equipment, which includes scientific and research satellites) is so broad that virtually any conceivable item or data related to a satellite apparently falls under the ITAR. Paragraph (e) of Category XV includes all specifically designed or modified systems, components, parts, accessories, attachments, and associated equipment for the components, parts and accessories. Paragraph (h) includes Components, parts, accessories, attachments and associated equipment (including ground support equipment) specifically designed or modified for the articles in paragraphs (a) through (e) of this category, excluding aircraft tires and propellers used with reciprocating engines. Paragraph (i) includes Technical data and defense services directly related to the defense articles enumerated in paragraphs (a) through (h) of this category, except for hot section technical data associated with commercial aircraft engines.

12. For issues involving equipment items, please indicate whether the work is likely to lead to patents. If possible, please indicate any ways in which one could see that the equipment does not have any potential military use.

The University s role in the project may generate patents, since the creation of algorithm software is one of the deliverables. To the extent that prediction of the weather is a potential military use, then the algorithms and software developed by the University do have a potential military use, as does the advanced weather-detecting equipment produced under GIFTS. It is

hard to think of a single item, including a paperclip, which does not have any potential military use. However, we should note that potential for military use is irrelevant for purposes of the ITAR as long as the article or service has a predominantly civil application. 22 CFR 120.3, Policy on designating and determining defense articles and services, states: An article or service may be designated or determined in the future to be a defense article or defense service if it: (a) Is specifically designed, developed, configured, adapted or modified for a military application, and (i) Does not have predominant civil applications, and (ii) Does not have performance equivalent (defined by form, fit and function) to those of an article or service used for civil applications; or (b) Is specifically designed, developed, configured, adapted, or modified for a military application, and has significant military or intelligence applicability such that control under this subchapter is necessary.

Here, the GIFTS satellite is clearly not specifically designed, etc., for a military application, and it has a predominantly civil application. This begs the question: why are scientific and research satellites, and their components and associated technical data, etc., on the U.S. Munitions List when they do not fall within the criteria for inclusion as a defense article or service?