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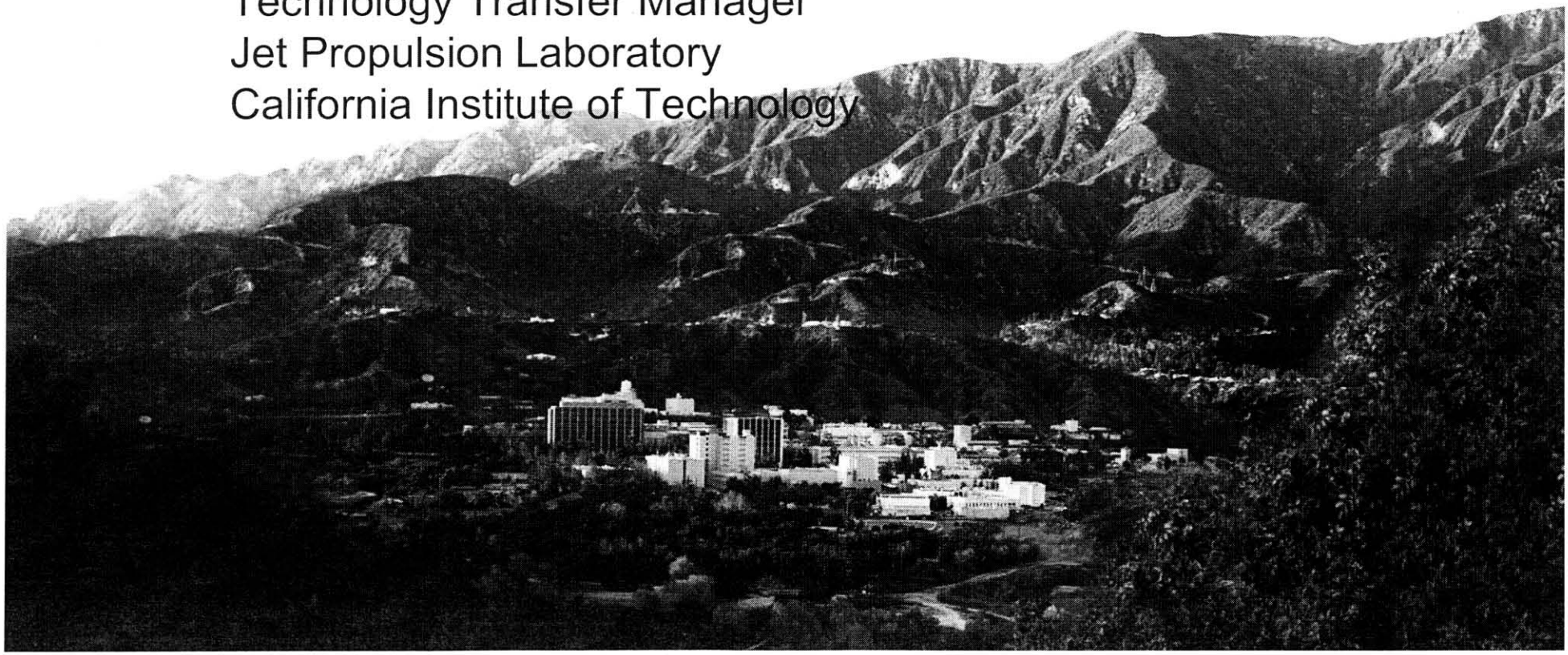
California Institute of Technology
Pasadena, California

Control of Technology Transfer @ JPL

Ronald Oliver

Technology Transfer Manager
Jet Propulsion Laboratory
California Institute of Technology



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Controlling Technology Transfer

- JPL
- General Definitions
- How is Technology Released
- Technology Control Process
- Building a Technology Control Team
- Key Elements
- Conclusions: Q & A

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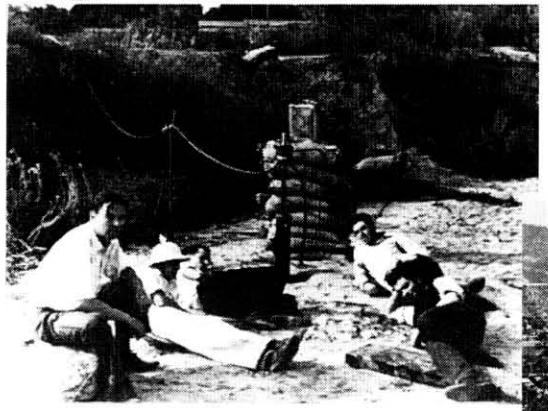
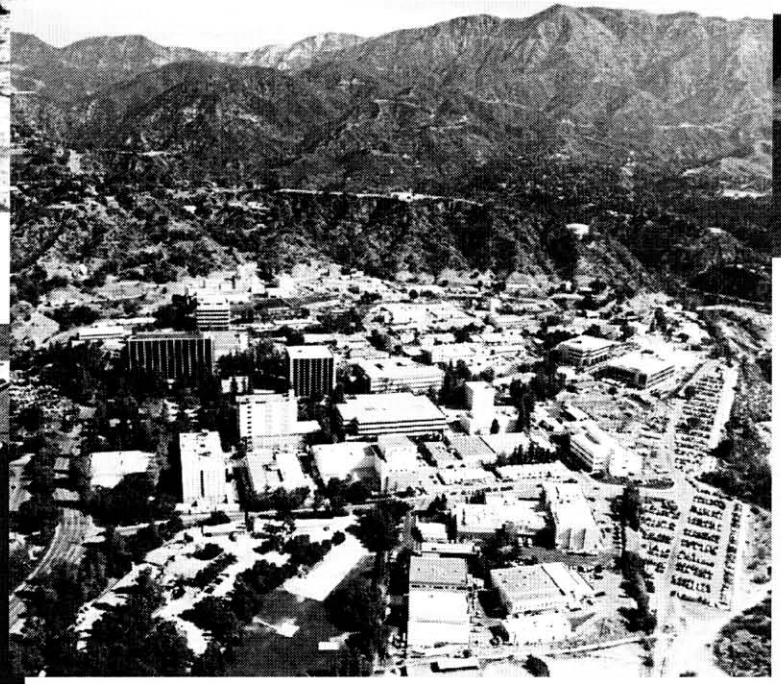
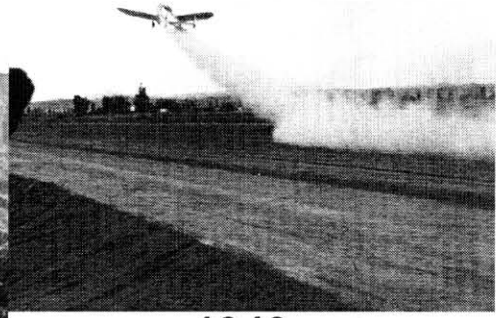
The Jet Propulsion Laboratory



1936
1958



JPL today



1940s
1950s

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Institutional background

- U. S. government (NASA)-owned "Federally-Funded Research and Development Center" (FFRDC)
- University (Caltech)-operated
- $1.5 billion business base
- 5000 employees and contractors
- 177 acres
- 134 buildings and 57 trailers
- 670,000 net square feet of office space
- 860,000 net square feet of non-office space (e.g., labs)

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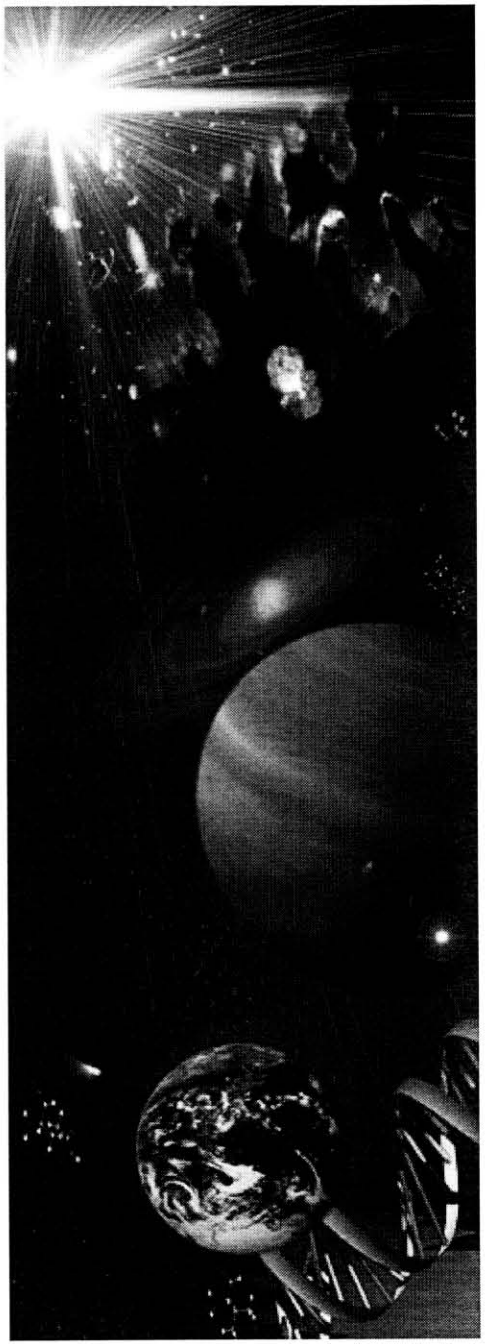
JPL Technology

- NASA Contractor.
- Similar but different from Industry
  - ITAR Category XV Defense Articles
  - Other ITAR items
  - EAR and New Technology Reports (NTRs)
  - DoE considerations



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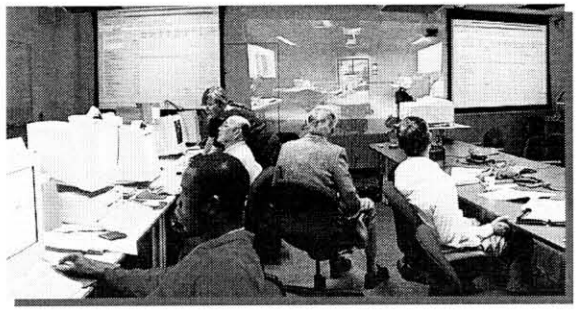
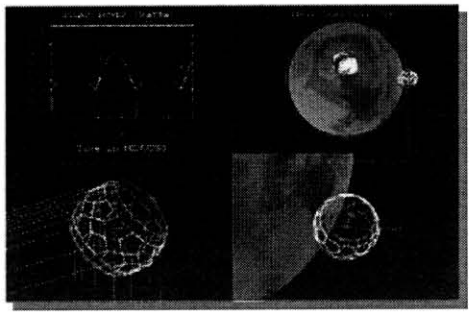
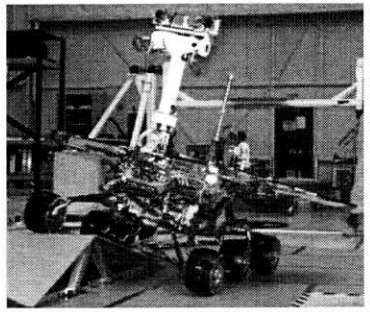
JPL Technology



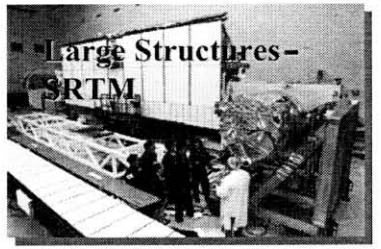
Project Formulation - Team X

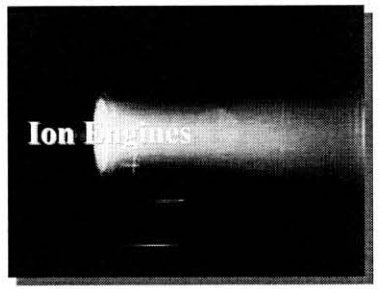


Mission Design

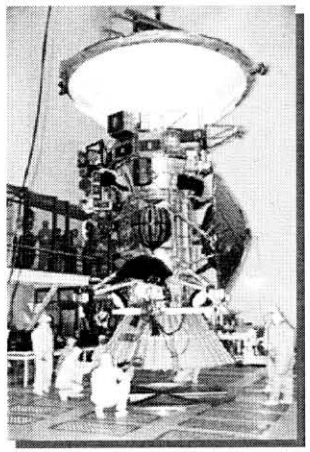


Mars Rovers

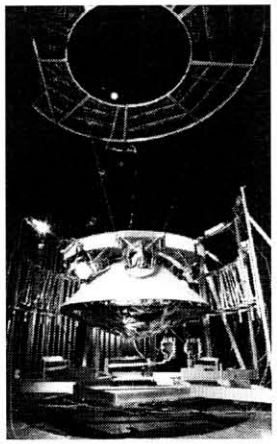




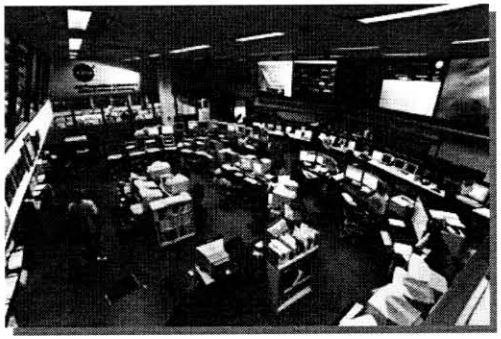
Spacecraft Development



Integration and Test

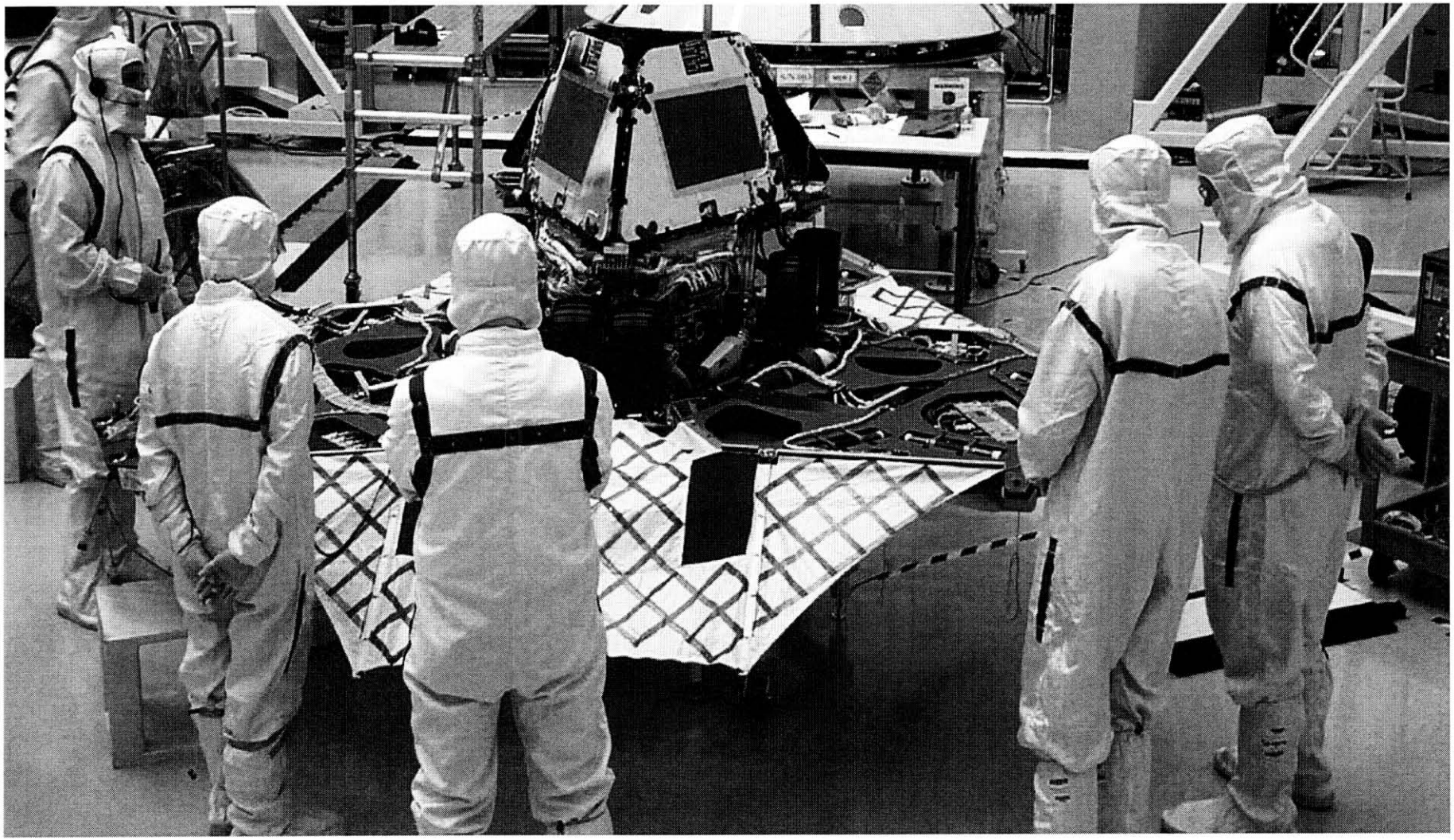


Environmental Test



Real Time Operations

"Spirit" Prepared for Enclosure



General Definitions

- Commodity – **material, equipment, and services (i.e., computers, information, tools).**
- Dual Use – **EAR-controlled items that can be used both in military and commercial applications.**
- End User – **The foreign person/entity that receives and ultimately uses the exported commodity.**
- End Use – **A detailed description of how the foreign person intends to use the commodities being exported.**
- License – **a legal authority to export, reexport, or temporarily import an article controlled by the ITAR or EAR.**
- Public Domain – **information, which is published and generally accessible or available to the public.**

Definitions (Continued)

- Release – **technology is "released" for export to foreign persons/entities through visual inspection of U.S. origin equipment and facilities or through oral exchanges of information with foreign persons/entities, either in the U.S. or abroad.**
- U.S. Munitions List (USML) **– articles, services, and related technical data designated as defense articles and defense services under ITAR.**
- **A** Defense Article **is any item or technical data designated on the United States Munitions List (USML)**

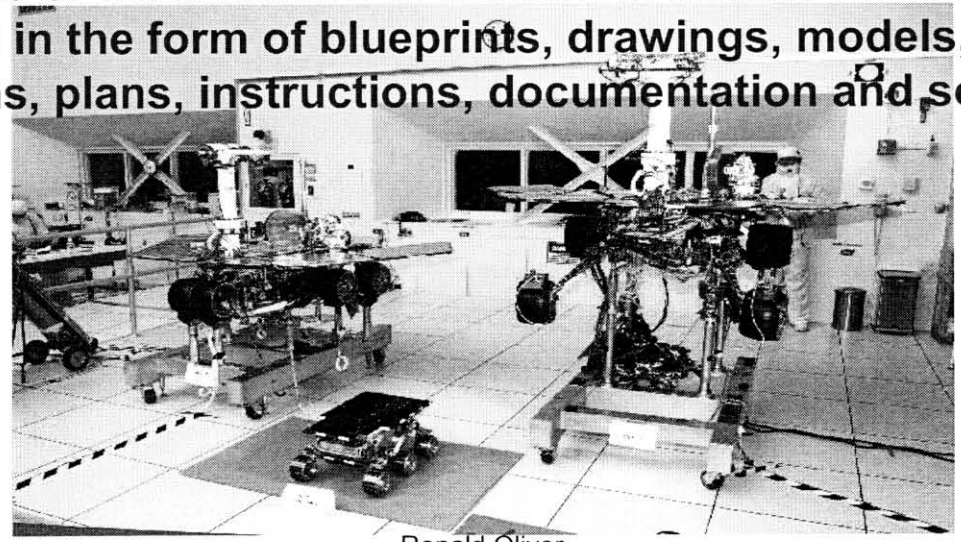
Definitions (Continued)

- **An** Export **is any transfer of a commodity, technology, or software to any person or entity, by physical, electronic, oral, or visual means with the knowledge or intent that the item will be shipped, transferred, or transmitted to a foreign person/entity.**

- **An** Export **may occur by disclosure of technical data or information to any foreign person/entity, by any means, inside or outside of the United States.**

Definitions (Continued)

- A "foreign person" **is any person who is not**:
  - **A U.S. citizen or**
  - **A U.S. lawful permanent resident (green card holders) or**
  - **A protected individual (granted asylum, refugee or amnesty status).**
- Technical Data **is information required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of a defense article. Including information in the form of blueprints, drawings, models, photographs, plans, instructions, documentation and software.**



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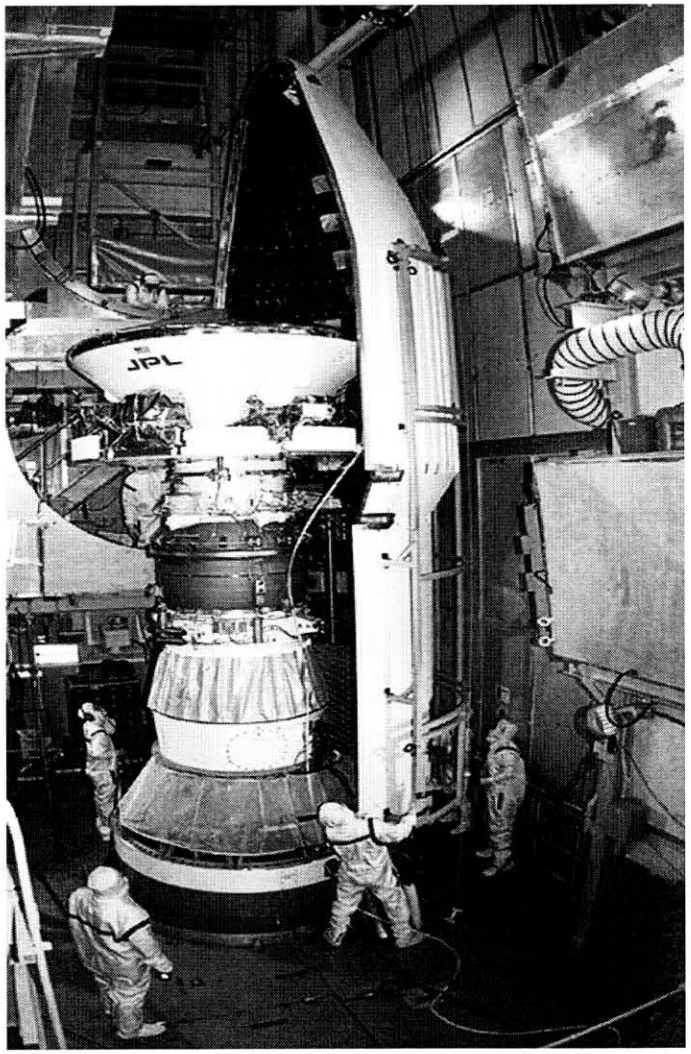
What is a Defense Service (Technical Assistance)

Defense Service (technical assistance) is the furnishing of assistance (including training) to foreign persons, whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing, or use of defense articles.

- **Examples of defense services (technical assistance), whether the article was made in the United States or abroad, include:**
  - **Discussions of technical data or manufacturing data**
  - **Ongoing technical exchanges with foreign persons or foreign entities**
  - **Compiling information and know how available in the public domain for foreign use**
  - **Collaborating with foreign persons**
  - **Installation, servicing or repair of an ITAR controlled item**
  - **Providing training or assistance pertaining to a defense article**
  - **Conducting studies or performing analysis of a defense article**

How is Technology Transferred

- ***Release*** **of technical data, hardware or software to a foreign person in the U.S. or outside.**
- **Also known as an *Export* of technical data, hardware or software.**
- **Defense Service provided to a foreign person.**



Technology Control Process

- **In this case technology control refers to an export prohibition or an export restriction.**
- **Under DoS the Department of Defense Trade Controls (DDTC) establishes these prohibitions or restrictions for ITAR.**
- **Under DoC the Bureau of Industry and Security set these prohibitions or restrictions for EAR.**

Technology Control Process (Continued)

- Identify technical data or technology classification
- Identify Foreign participation
  - Need for technical assistance agreement (TAA)
  - No license situation
- Develop Technology Control Plan
  - No license situation
- Develop Technology Transfer Control Plan
  - With TAA (license)
- Recordkeeping of all technical data, hardware, software, and defense service.

Identifying Controlled Technology Data

- Technical Data: (ITAR Definition).
  - Information Required for:
    - Design, Development, Production, Manufacturing, Operations, Repair, Test Data, Maintenance and Modification.
- Technology (EAR Definition).
  - Specific information necessary for the development, production, or use of a product. The information takes the form of technical data or technical assistance.

Controlled Technology

- Design: **preliminary or critical design data, schematics, technical flow charts, S/W code/diagnostics, logic flow diagrams, wirelist, ICDs, detailed specifications or requirements.**

- Development: **constraints, computations, configurations, technical analyses, acceptance criteria, anomaly resolution, detailed test plans, detailed technical proposals.**

Controlled Technology (Continued)

- Production: **process or how-to: assemble, operated, repair, maintain, modify.**
- Manufacturing: **technical instructions, specific parts, specific materials, specific qualities, specific processes, specific flow.**
- Operations: **how-to operate, contingency or standard operating plans, Ops handbooks.**

Controlled Technology (Continued)

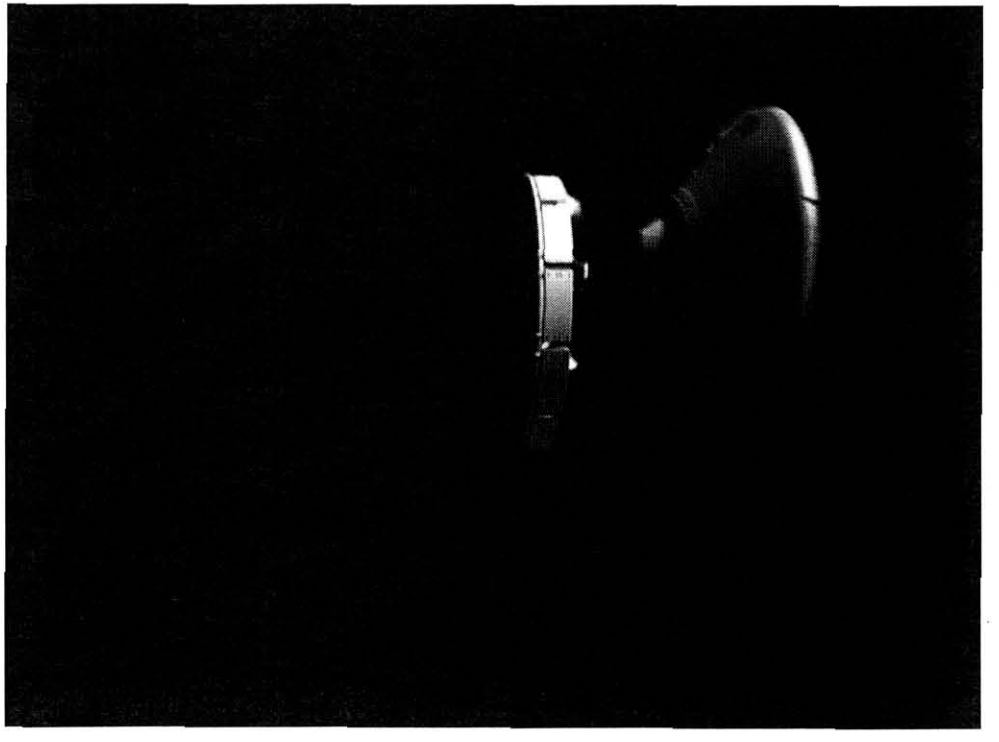
- Repair: **repair instructions, troubleshooting schemes, detailed schematics.**

- Test: **specific procedures, data, analysis, detailed test plan and retest plans, detailed anomaly resolutions, detailed failure causes and corrective actions, troubleshooting, trended test data, flight readiness data.**

Controlled Technology (Continued)

- Maintenance: **maintenance schedules and plans, methods for regular upkeep, overhaul instructions.**

- Modification: **modification instructions, upgrades kit parts, including software.**



Technology Not-Controlled

- **Top level technical content:**
  - General scientific information.
  - Basic marketing information.
    - **"Basic marketing information" is that descriptive technical information which would typically be required for a buyer to decide whether or not the object meets his needs – in terms of essence and/or content.**
  - General systems descriptions.
    - **"General systems descriptions" is descriptive technical information which, presents a convincing case to the buyer that detailed technical requirements will be met by the system or instrument. Such information would include descriptions of key subsystems and components and their operation, subsystem and major component internal block diagrams and associated expected performance.**
  - Public domain information.

Technical Data Not Controlled

- **Top Level Technical Proposals.**
  - **Top-level drawings.**
  - **Top-level narrative descriptions.**
  - **Top-level summaries of performance req'ts.**
  - **Summary descriptions of key subsystems.**
  - **Demonstration of compliance with req'ts.**
  - **Descriptions of design capabilities.**
  - **Descriptions of manufacturing facilities.**

Technology Not ITAR

- Top-Level Description of Control Subsystems.
- Top-Level Proposals
- Top-Level Summary of Control Capabilities.
- Top-Level Descriptions of Subsystems.
- Programmatic Data.

Top Level v. Detailed

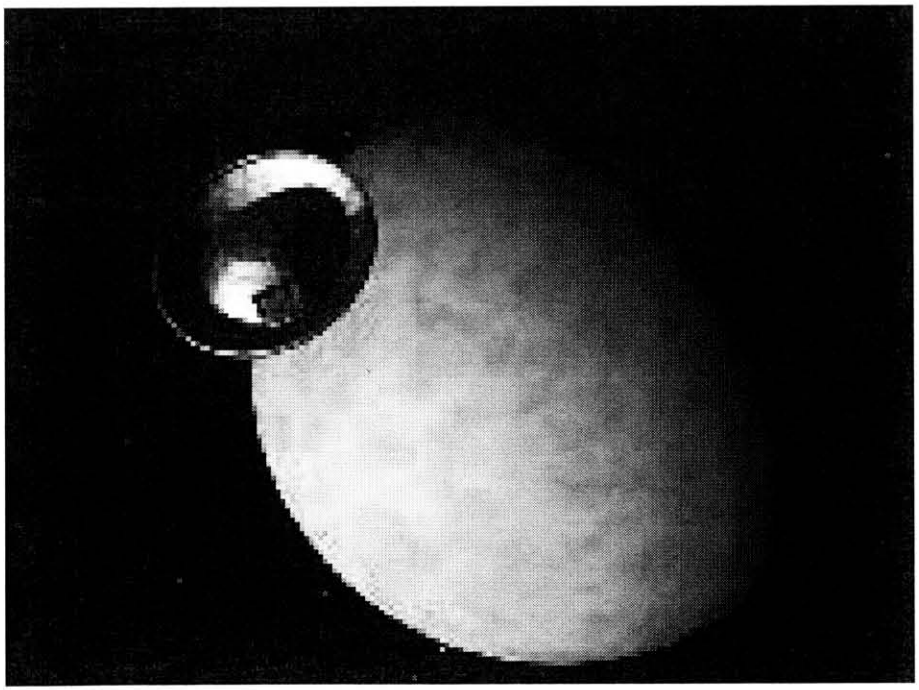
- "Top level": **descriptions, drawings, or summaries are defined as top level if they provide basic or minimal information about an item. This would include fundamental data which provide basic outline dimensions, a general picture of component arrangement, a pictorial representation of a sequence of events, a general description of the object's function, and the like. Top level data would not convey information for anyone to learn how-to design or construct the item in whole or in part.**

Technology Requiring a License

- **Technical Proposals containing Detailed information such as technical specifications.**
- **"How-to" Design, Manufacture, Test.**
- **Design, Manufacture, Test Methodology or Philosophy.**
- **Technical Trade-off Methodology or Detailed Alternatives.**
- **Detailed Test Data or Test Procedures.**

Technical Data Requiring a License

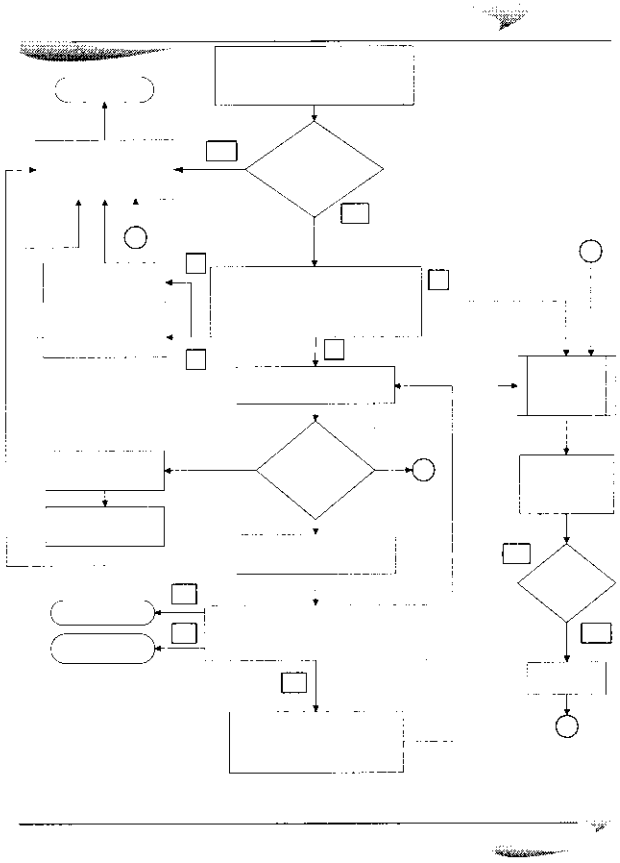
- **Detailed Integration and Test Plans.**
- **Detailed Schematics Diagrams.**
- **Manufacturing or Assembly Processes.**
- **Detailed Interface Information.**
- **Analytical Methods or Technical Analysis.**



Technology Determination

- **Tools Processing Technology**
  - **Document Review Process.**
  - **Document Review Record Format.**
  - **Technology Transfer Control Plan (TTCP)**
  - **Master License Report Format.**
  - **Guidelines for Technical Discussion (No License Situation).**
  - **Export Control Training**

Document Review Process



Start Review Process

- **Documents**
  - **Determine whether they contain controlled information.**
- **Hardware/software**
  - **Determine the classification or category of these items.**
- **Defense services**
  - **All technical discussions (especially between engineers) lead to a defense service.**

Export Considerations

- **Determine Jurisdiction**
  - **ITAR vs. EAR**
- **Is there an Active License that applies?**
  - **Review against applicable license.**
- **Is there an exemption or license exception?**
  - **Review against applicable exemption/exception.**

Export Consideration (continued)

- **Documents**
  - **Can the Author Edit document to conform to ITAR, license, exemption, or exception.**
    - **Work directly with author to reduce doc content.**
  - **Author can not (will not) edit content**
    - **Send to the Directorate for Freedom of Information and Security Review (DFOISR).**

"Spirit" Enters Mars Atmosphere!

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Document Review Record

YourCompany EXPORT ADMINISTRATION
DOCUMENT REVIEW RECORD

LOG # _____

Program Name _____ _____
Person Requesting or Initiating Expor

Date Received _____

Document Title/Description

_____

_____

For Release to:
(include name, address, country) _____

_____

_____

1: **Public Domain Information (Ref ITAR Section 120.11)**

2: **Qualifies for ITAR Exemption** _____

3: **Covered by Department of State License/Agreement Number** _____

4: **Covered by Department of Commerce validated license or exception** _____

5: **New License Required**

6: **Does not contain export-controlled information. May be released/disclosed as requested subject to Company guidelines on protection of proprietary information (if applicable).**

7: **Other (specify)** _____

Comments: _____

_____

_____

_____ _____
Export Administration Signature **Date**

Record-Keeping

- **DRR to track all technical data, hardware, software, and defense services reviewed for proposed release.**

- **DRR contains details about the item being reviewed and its specifics. The requestor name, the date of the request, and to whom he/she wants to release the item to, and method of release.**

Record-Keeping (Continued)

- **Based on the requestor's details the reviewer dispositions the request with either:**
  - 1: Public Domain Information (Ref ITAR Section 120.11)
  - 2: Qualifies for ITAR Exemption _____
  - 3: Covered by Department of State License/Agreement Number _____
  - 4: Covered by Department of Commerce validated license or exception __
  - 5: New License Required
  - 6: Does not contain export-controlled information.
  - 7: Other (specify)

Know your Foreign Partner

- **Who is the foreign partner/country?**
  - **Denied parties list**
  - **Designated country**
  - **Embargoed country**
- **Evaluate the transaction**
- **Decide whether there are "red-flags"**

TTCP vs. TCP

- **TTCP (Technology Transfer Control Plan)**
  - **Used with TAA or EAR License.**
  - **Provides guidelines on how controlled technology will be controlled and release.**

- **TCP (Technology Control Plan)**
  - **Used in particular "no license" situations to provides guidelines and rules of engagement to ensure controlled technology is not released.**

TTCP vs. TCP (Continued)

Technology Transfer Control Plan (TTCP)

- **1.0 INTRODUCTION**
- **2.0 SCOPE**
- **3.0 ODTC PROVISOS AND ADDITIONAL LIMITATIONS**
- **4.0 TECHNOLOGY TRANSFER REQUIREMENTS**
  - **4.1 Categories of technical data transferred to FN**
  - **4.2 Training Requirements**
  - **4.3 Hardware, Software, Technical Documentation/Data, Intellectual Property, and Know-How Transfer Control**
  - **4.4 Work Location**
  - **4.5 Allowable Hardware, Software, Documentation, Intellectual Property and Know-how Transfer**
  - **4.6 In-Company Control of FN personnel**
- **5.0 SUMMARY**
- **APPENDIX A: Matrix of Foreign Partners, Applicable Licenses/TAAs, & Provisos**
- **APPENDIX B: Document Review Record**
- **APPENDIX C: TTCP Change Record**
- **APPENDIX D: POINTS OF CONTACT**

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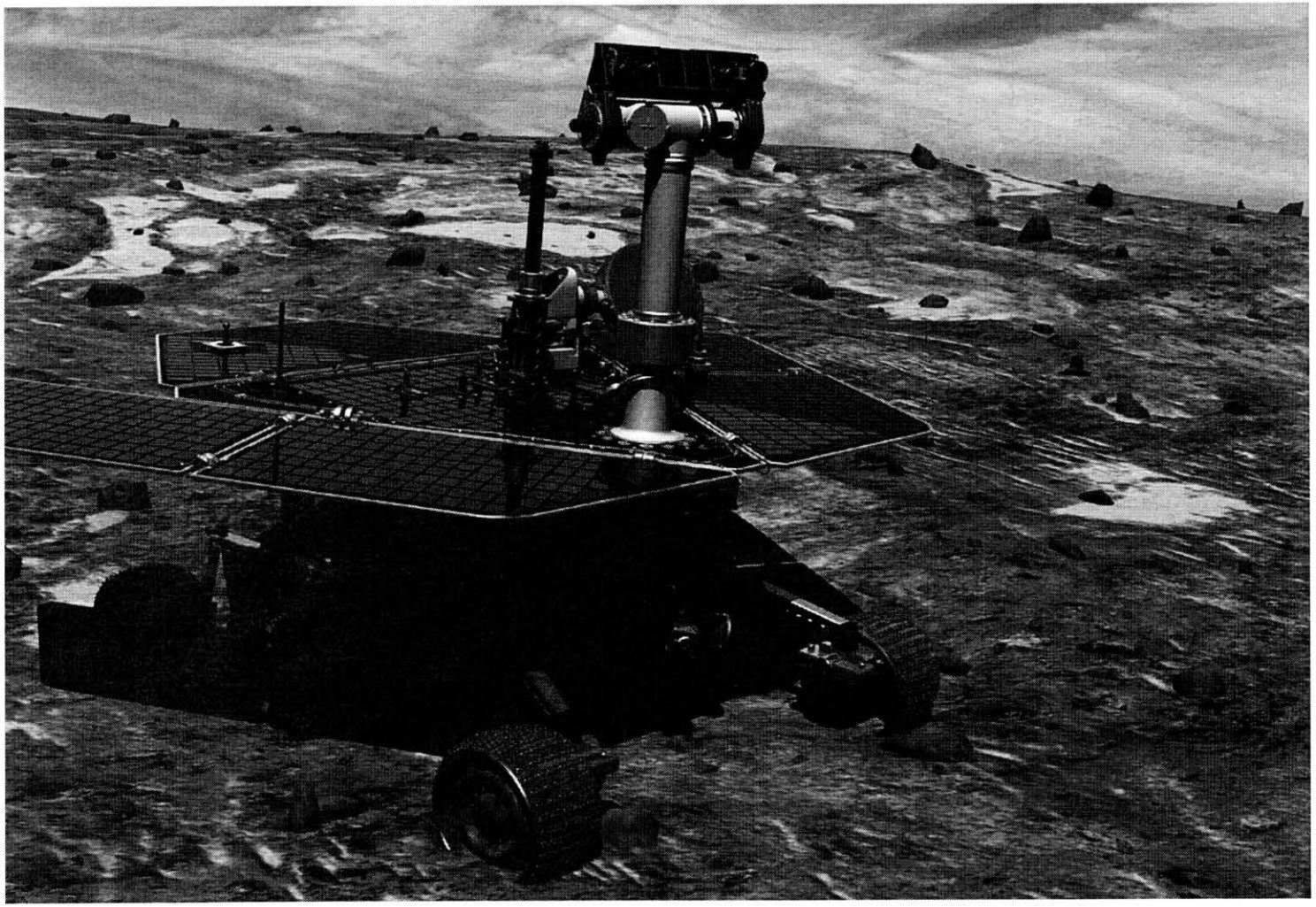
The Mars Rover "Spirit"

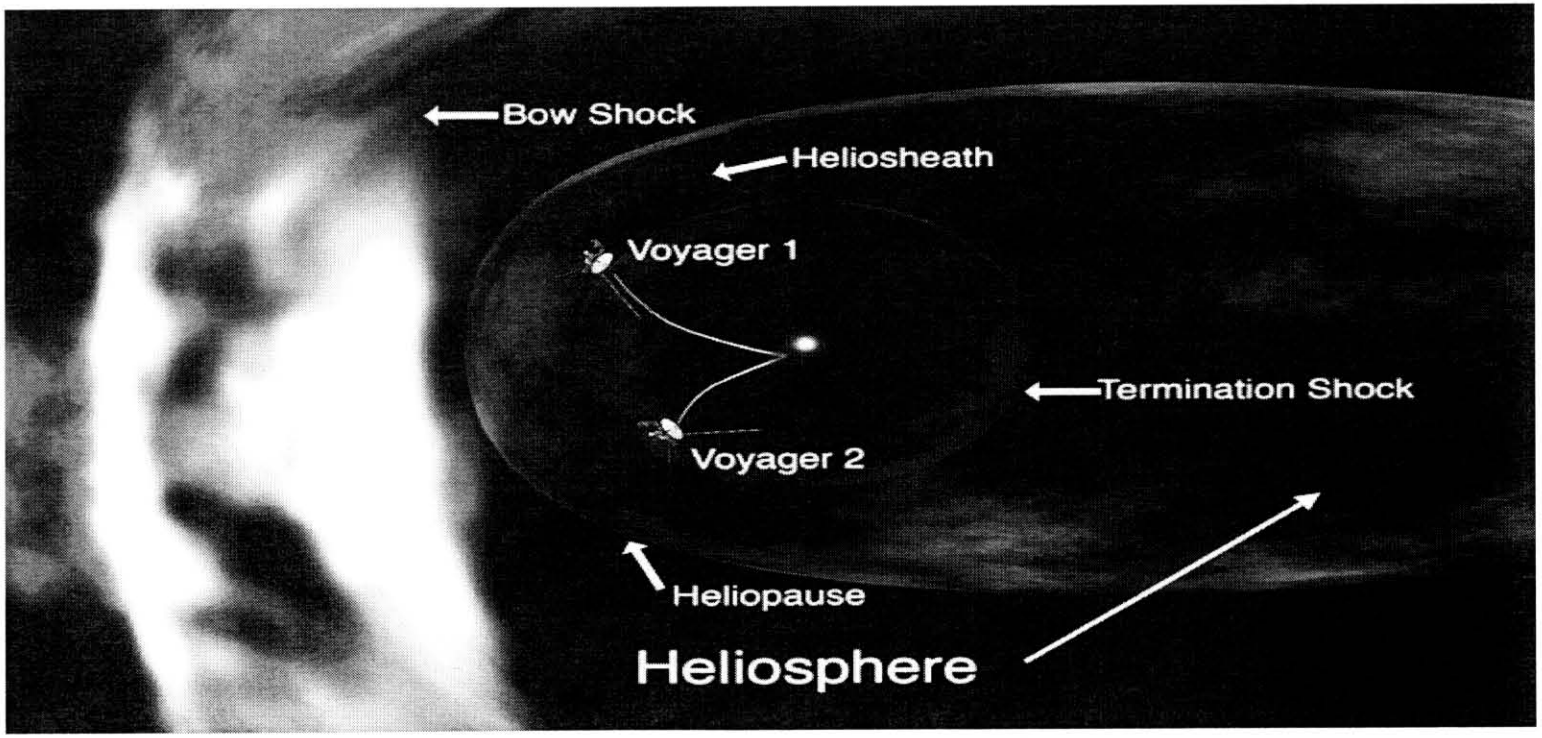


TTCP vs. TCP (Continued)

- **4.0 TECHNOLOGY TRANSFER REQUIREMENTS**
  - **4.1 Categories of technical data transferred to FN**
  - **4.2 Training Requirements**
  - **4.3 Hardware, Software, Technical Documentation/Data, Intellectual Property, and Know-How Transfer Control**
  - **4.4 Work Location**
  - **4.5 Allowable Hardware, Software, Documentation, Intellectual Property and Know-how Transfer**
  - **4.6 In-Company Control of FN personnel**

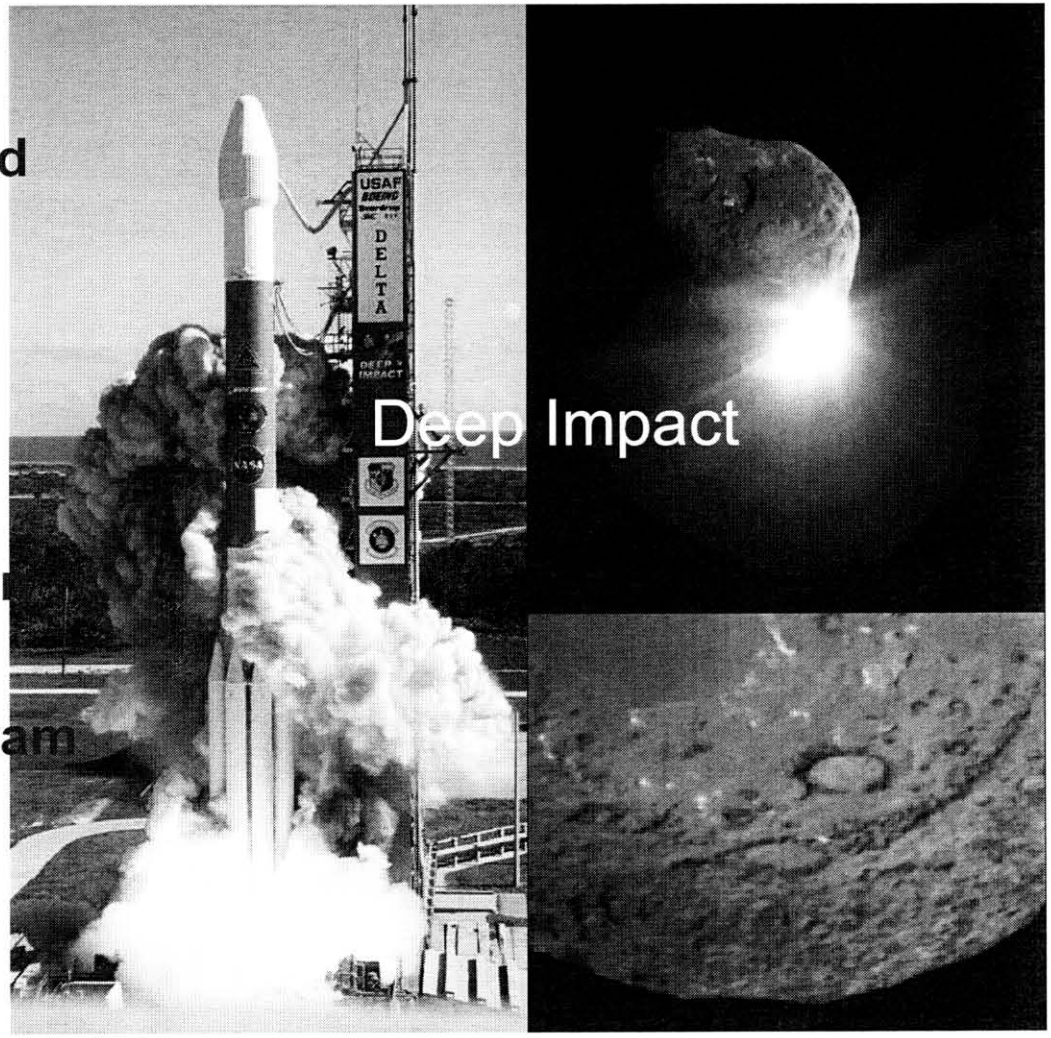
Establishing Effective Export Control

- **Three Primary Elements to Effective Compliance.**
  - **Export Control Office**
    - **Licensing Department**
    - **Technology Transfer Department**



Establishing Effective Export Control

- The Export Control Office
  - Knowledgeable Empowered Official
    - Full backing of Corporation and Legal Office
  - Policy and Compliance Pla
  - Continuous Training Program



Establishing Effective Export Control

- The Licensing Department
  - Effective Mapping of Technology and Partners for Comprehensive Technical Assistance. Agreements (TAA).
  - Coordinate Effectively with Government Officials.
  - Manage Active Licenses.

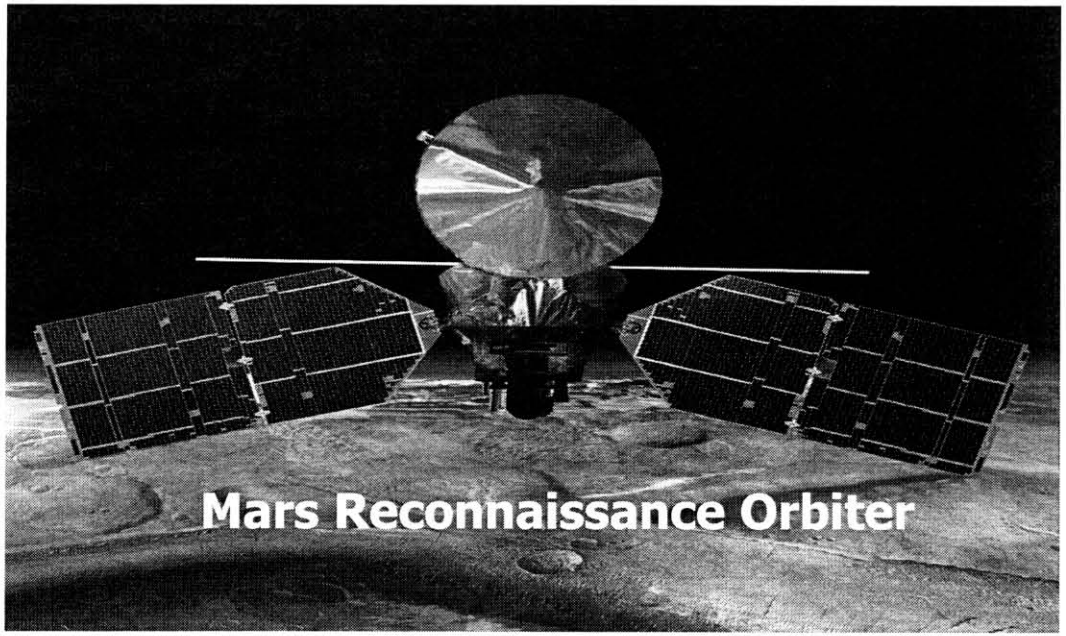
Establishing Export Compliance

- The Technology Transfer Department
  - Provide Technical Support for Identifying ITAR Controlled Technology
  - Manage Process for Release of Technical Data and Defense Services.
  - Support Developing Licensing Request.
  - Provide Technical Discussion Guidelines
  - Project Monitoring.

Mars Sunset

Key Elements

- **Begin export control process early.**
- **Establish an project cooperative and educational environment.**
- **Get TAAs Early – Establish technology transfer control plan (TTCP).**
- **Proactively manage licensed activities, support and monitor projects.**



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Key Elements

Master License Report Format

PROGRAM	Customer/ Company	USG ISSUED NO.	TYPE	Country	Commodity/ Product Coverage	Program Coverage	TTCP Req.	Comments/ Status	Appli. to ODTC	U.S.G. Aprv'd. Date	EXP DATE	PREC/ CROSS -REF	Export Admin Cite No.	Pgrm. Mgr & (S)CON.
B. PENDING APPLICATIONS														
Next Star	NASA ESA	TA xxx-00	TAA	Israel/ France	To participate as a subcontractor for related equip.	Flight F1, F2	Y	see TAA Tracking Report.	2/2/2000	5/19/2000	12/31/2010		AB1000-JQ-00-0030	John Q.
C. ACTIVE LICENSES / APPROVALS														
D. FOREIGN NATIONALS														
FOREIGN NAT'L	**Doe, John**	AG xxx-96A	TAA Amend No.1	Canada	Adds program to authorized work scope.			On site in Rome- John Q. wants to bring him back before the end of work	8/28/1998	12/17/1999	12/31/2003	AG 901-96	3AB000-JQ-98-0052	John Q.
E. TERMINATED/ EXPIRED/ RWA														
Flight Prog	ESA, Com Dev, & EMS	TA xxx-99	TAA	England Canada France	JQ to discuss the proposal for delivery, negotiate sales contract and subcontracts, manufacturer-customer- supplier interchanges regarding delivery and implementation program	Flight F1, F2			4/9/1999	8/7/2000	12/31/2005		3AB000-JQ-99-0068	John Q.

Key Elements

Document Markings (Sample)

- **When transferring ITAR-controlled technical data or technical information (not ITAR-controlled) where an active license applies, place the following notice on all documents or technical data to be transferred to Foreign Persons or foreign companies:**
- ***"Information included herein is controlled under the International Traffic in Arms Regulations ("ITAR") and is being released under U.S. Department of State export license # _____. Retransfer of this information to any other Foreign Person or foreign entity requires an export license issued by the U.S. State Department."***

Conclusions