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WORKING PANEL #3

TECH TRANSFER BETWEEN NASA
AND THE AEROSPACE COMMUNITY

ROBERT SACKHEIM & DENNIS DUNBAR

TECHNOLOGY TRANSFER BETWEEN THE
GOVERNMENT AND THE AEROSPACE INDUSTRY

OVERVIEW

THE OBJECT OF THIS WORKING GROUP PANEL IS TO REVIEW QUESTIONS
AND ISSUES PERTAINING TO TECHNOLOGY TRANSFER BETWEEN THE
GOVERNMENT AND THE AEROSPACE INDUSTRY FOR USE ON BOTH
GOVERNMENT AND COMMERCIAL SPACE CUSTOMER APPLICATIONS.

TRANSFER BETWEEN NASA AND INDUSTRY

TEAM LEADER - ROBERT SACKHEIM - TRW
PRESENTER - DENNIS DUNBAR - GD CLS

SUBTOPIC A - GOVERNMENT CUSTOMER
RAPORTEUR - WALT OSTAD - LOCKHEED

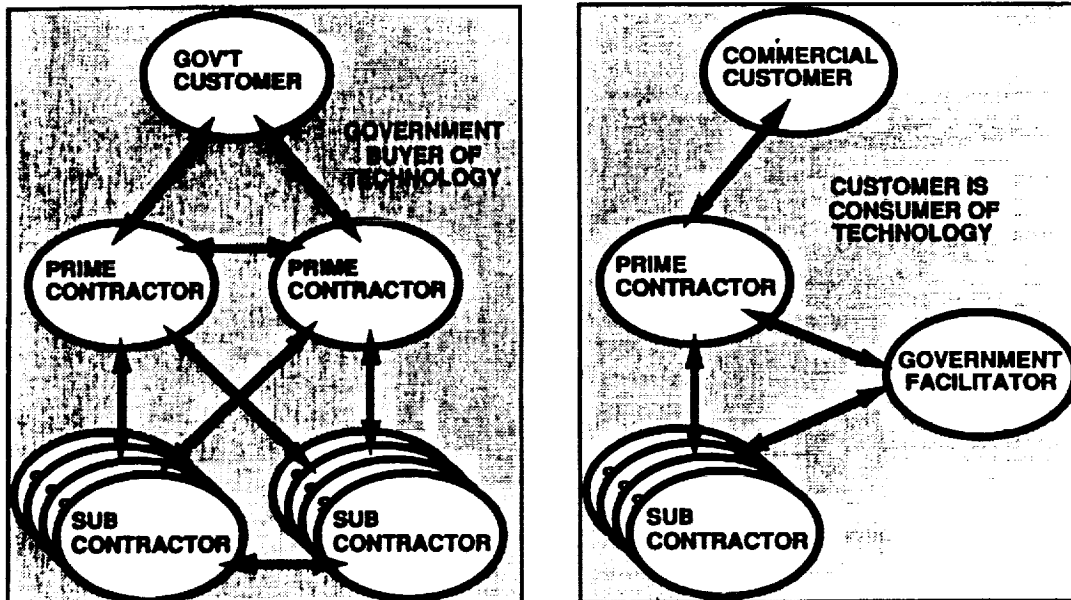
SUBTOPIC B - COMMERCIAL CUSTOMER
RAPORTEUR - NEVILLE MARSWELL - JPL

MEMBERS

HAROLD ADELSON - TRW
JOE GERNAND - RI
JOHN JENNINGS - NASA C
NORM BOWLES - DOT OCST
JOE FULLER - FUTRON
LEE HOLCOMB - NASA R

RON MARINZEL - BDM
DENNIS MCGOVERN - MD BSC
WILLARD WEAVER - NASA LANGLEY
LARRY PALMER - HUGHES HNS
DON THURMAN - NASA MSFC
DAMON WELLS - DOT OCST

TWO TECHNOLOGY PARTNERSHIP
MODELS FOR CONSIDERATION



SUCCESSFUL TEAMS SHARE INFORMATION

GOVERNMENT TO AEROSPACE INDUSTRY

KEY ISSUES AND QUESTIONS

1. DOES THE GOVERNMENT EXERT TOO MUCH CONTROL?
2. DOES NASA HAVE A CHARTER AND/OR AN INTENT TO SUPPORT / ENHANCE U.S. INDUSTRY COMMERCIAL COMPETITIVENESS?
3. TO WHAT EXTENT SHOULD INDUSTRY DEPEND ON THE GOVERNMENT?
4. ARE FUNDING PRIORITIES COMPATIBLE WITH NATIONAL PRIORITIES FOR COMMERCIAL COMPETITIVENESS?
5. HOW FAR SHOULD THE GOVERNMENT TAKE TECHNOLOGY FOR COMMERCIAL USE?
 - a) R&T BASE AND FOCUSED (LEVEL 5 & 6)
 - b) BRIDGE TECHNOLOGY (LEVEL 7, 8 & 9)
 - c) HOW TO FUND BRIDGE TECHNOLOGY
 - DIRECT GOVERNMENT FUNDING (CRAD)
 - INVESTMENT TAX CREDITS (BASED ON SALES)
 - CRADA / CRDA
 - MANDATED POLICY & INCENTIVES
 - GOVERNMENT FUNDED DEMO'S AND FLIGHT TESTS
 - "ANCHOR TENANT" OR "BLOCK BUY" PQMTS

GOVERNMENT TO AEROSPACE INDUSTRY (CONTINUED)

KEY ISSUES AND QUESTIONS

6. CAN THE GOVERNMENT PROVIDE OTHER BROAD INCENTIVES FOR TECHNOLOGY TRANSFER?
7. TO WHAT LEVEL SHOULD THE GOVERNMENT TRANSFER TECHNOLOGY?
 - AS A FUNCTION OF DEVELOPMENT RISK (ACTS)
 - AS A FUNCTION OF GOVERNMENT BENEFITS AND PAYBACK (ELV'S)
8. SHOULD THE U.S. MULTI-NODE TECH TRANSFER ORGANIZATION BE MODIFIED IN THE JAPANESE MITI STYLE?
9. ARE SBIR'S COST EFFECTIVE FOR LARGE AEROSPACE FIRMS? CAN THERE BE MORE EFFECTIVE UTILIZATION?

OBSERVATIONS & SUGGESTIONS

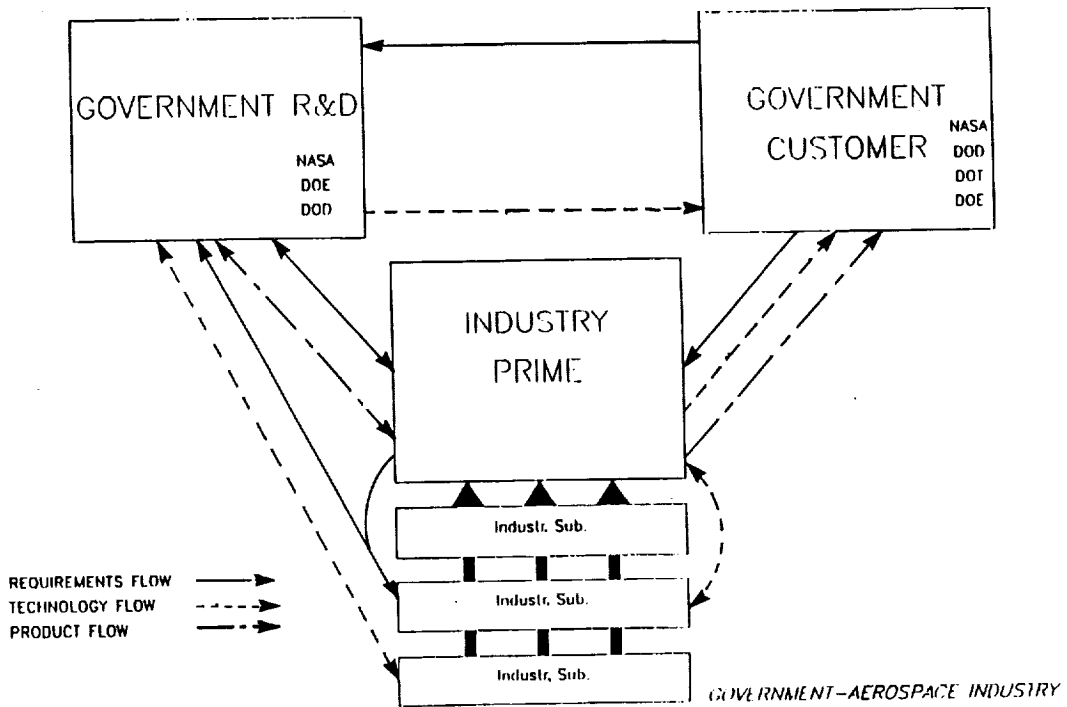
1. NASA, OMB, NS,C ETC. NEED TO AGREE ON A CHARTER FOR SUPPORTING U.S. COMMERCIAL COMPETITIVENESS.
2. NASA AND INDUSTRY NEED A PLAN FOR "BRIDGE" TECHNOLOGY FUNDING.
3. COMMERCIAL COMPETITIVENESS NATIONAL PRIORITY VS. FUNDING PRIORITY IS OUT OF BALANCE: MORE FUNDS NEEDED.
4. NEED TO REVISIT "OVER-INSTITUTIONALIZATION" OF THE TECH TRANSFER PROCESS BY TOO MANY FEDERAL AGENCIES. THIS IS BOUND TO RESULT IN NON-VALUE ADDED COST BURDENS TO THE TECHNOLOGY IMPLEMENTATION PROCESS - ESPECIALLY FOR THE AEROSPACE INDUSTRY.
5. NEED MORE FINANCIAL INCENTIVES FOR INDUSTRY TO TAKE THE RISKS NECESSARY FOR EFFECTIVE TECHNOLOGY TRANSFER TO LARGE SPACE SYSTEMS. (EG: THE NACA - AIRCRAFT INDUSTRY MODEL)

Subtopic A

Technology Transfer Associated With A Projected Government Application

Dr. Walter Olstad

TECHNOLOGY TRANSFER MODEL



EFFICIENCY OF TECHNOLOGY TRANSFER

$$\eta_{TT} = (P_{a_U} - P_{T_D}) \frac{(T_{DI}/T_{TPO})}{N_p \cdot N_o (1 + N_{TTI})}$$

WHERE

P_{a_U} , P_{a_D} = PASSION OF "HANDS-ON" USER, TECH. DEVELOPER
 T_{DI} = DIRECT INTERACTION TIME BETWEEN DEVELOPER & USER
 T_{TPO} = TOTAL PRODUCT DEVELOPMENT TIME
 N_p = NUMBER OF VALUE-ADDING PLAYERS IN PROCESS
 N_o = NUMBER OF DISTINCT ORGANIZATIONS INVOLVED
 N_{TTI} = NUMBER OF TECH. TRANSFER INTERMEDIARIES

LESSONS LEARNED / INSIGHTS

APOLLO

- NASA - INDUSTRY TEAMWORK
- CLARITY OF NASA AND INDUSTRY ROLES
- RESOURCES AND PASSION OVERCAME OBSTACLES
- TRADITIONAL TRANSFER MECHANISMS PROACTIVELY USED
- STRONG ROLE FOR NASA FACILITIES AND FLIGHT EXPERIMENTS

SSY

- NASA AND INDUSTRY LESS OF A TEAM
- MORE CONFUSION THAN CLARITY ABOUT TECHNOLOGY ROLES
- UNSTABLE REQUIREMENTS DISRUPT TECHNOLOGY DEVELOPMENT
- TRADITIONAL TRANSFER MECHANISMS FORGOTTEN
- UNCERTAIN RESOURCES AND WAVERING PASSION

GOVERNMENT - AEROSPACE INDUSTRY

KEY ISSUES / BARRIERS

- MANAGEMENT LACKS UNDERSTANDING OF TECHNOLOGY TRANSFER IMPORTANCE / PROCESS
- INDUSTRY ISN'T ANY BETTER
- INADEQUATE PERSONNEL MOBILITY
- GROWTH OF INHIBITING LAWS / REGULATIONS
- KNEE-JERK REACTIONS OF R&T TO PROGRAMMATIC INSTABILITIES
- LOSS OF PASSION IN NASA AND INDUSTRY

GOVERNMENT - AEROSPACE INDUSTRY

TRANSFER MECHANISMS THAT WORK BETWEEN.....

NASA R&T - INDUSTRY

- PROFESSIONAL/TECHNICAL INTERCHANGE
- PUBLISHED TECHNICAL MATERIALS
- IRAD REVIEWS
- PERSONNEL EXCHANGES
- SHARING OF FACILITIES
- CONTRACT R&D
- CONTRACT CONCEPT/SYSTEMS STUDIES
- SBIR

INDUSTRY - NASA CUSTOMER

- TECHNICAL MARKETING/WHITE PAPERS
- SOLICITATIONS/PROPOSALS
- CONTRACT CONCEPT/SYSTEMS STUDIES
- PERSONNEL CO-LOCATIONS/LIAISONS
- USE OF GOVERNMENT FACILITIES
- DATA DELIVERABLES
- PRODUCT DELIVERABLES (TEST ARTICLES/PROTOTYPES/FINAL)

GOVERNMENT - AEROSPACE INDUSTRY

ENHANCEMENT OPPORTUNITIES

- CLARIFY NASA VS. INDUSTRY ROLE IN TECHNOLOGY DEVELOPMENT/TRANSFER
 - WHAT TECHNOLOGY READINESS LEVEL AND WHY?
 - WHO'S THE CUSTOMER?
- INSTILL PASSION IN NASA FOR TECHNOLOGY TRANSFER
 - CLARIFY OAST/RESEARCH CENTER CHARTERS FOR TECHNOLOGY TRANSFER
 - PROVIDE POSITIVE INCENTIVES
- INCREASE "WIN-WIN" PERSONNEL EXCHANGE
 - DEVELOP ASSIGNMENTS
 - MANAGEMENT COMMITMENT AND FOLLOW THROUGH
 - CAREER CHANGES
- INSTITUTE NATIONAL SPACE TECHNOLOGY FACILITIES POLICY
 - GROUND-BASED SIMULATION (LARGE SCALE, HIGH COST)
 - SPACE-BASED FACILITIES (QUICK ACCESS, AFFORDABLE)
- MANAGE TECHNOLOGY TRANSFER
 - RECOGNIZE INDUSTRY'S ROLE IN THE ITP
 - BUILD CONNECTIVITY AMONG ALL TECHNOLOGY PLANS
- STREAMLINE PROCUREMENT PROCESS FOR CRAD

GOVERNMENT - AEROSPACE INDUSTRY

WHO SHOULD DO WHAT

- OAST / RESEARCH CENTER MANAGEMENT / INDUSTRY MANAGEMENT...
 - CLARIFY UNDERSTANDING OF TRANSFER PROCESS
 - CLARIFY ROLES FOR OPTIMUM TRANSFER
- OAST - GAIN LONG-TERM COMMITMENT FOR TECHNOLOGY PLAN
- OAST - INCLUDE TRANSFER (AND RECOGNIZE INDUSTRY'S ROLE) IN THE ITP
- OAST / RESEARCH CENTERS / INDUSTRY - INCREASE INTERACTION AND BECOME A TEAM
- EVERYONE - FIND WAYS TO RECREATE THE PASSION

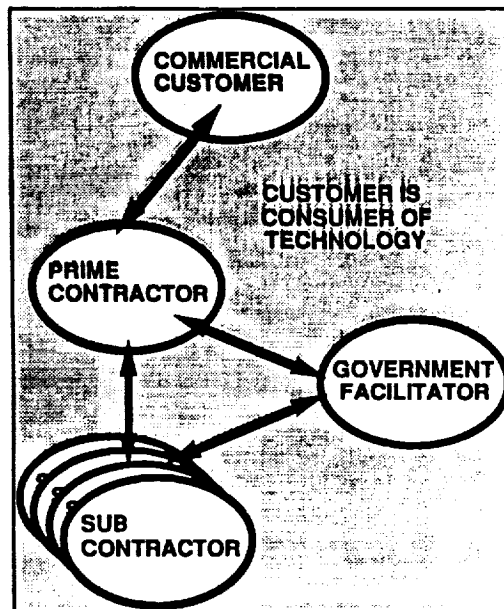
GOVERNMENT - AEROSPACE INDUSTRY

Subtopic B

Technology Transfer Associated With A Commercial Space Sector Application

Dr. Neville Marzwell

TWO TECHNOLOGY PARTNERSHIP MODELS FOR CONSIDERATION



SUCCESSFUL TEAMS SHARE INFORMATION

TECHNOLOGY TRANSFER BETWEEN GOVERNMENT AGENCIES AND
THE COMMERCIAL SPACE SECTOR

FACTORS INFLUENCING TECH-TRANSFER

- **TECHNO-ECONOMIC FACTORS**
QUALITY OF INFORMATION, MATURITY OF THE TECH. AVAILABILITY OF QUALIFIED / MOTIVATED PERSONNEL, AVAILABILITY OF RESOURCES
- **ORGANISATIONAL FACTORS**
CLIMATE, SMOOTHING IN JOINT-DECISION MAKING DONE AT LOWER LEVEL
- **COMMUNICATION FACTORS**
LEVEL OF COMMUNICATION DEPENDENT ON THE "GAP" BETWEEN BASIC RESEARCH AND READINESS FOR ENGINEERING PROTOTYPING
- **TECHNOLOGY MATURITY**
INCREASED MATURITY IMPLIES LESS RISK AND THEREFORE GREATER PROBABILITY OF SUCCESS
- **CULTURAL DIFFERENTIAL**
BUSINESS AND PROFESSIONAL PRACTICE

JPL

Robotic Technology Evolution and Transfer

FACTORS AFFECTING TECH-TRANSFER

FORMAL FACTORS

METHOD OF INFORMATION DOCUMENTATION
THE DISTRIBUTION SYSTEM
FORMAL ORGANIZATION OF THE USER
SELECTION PROCESS FOR PROJECTS
(USERS' CONTRIBUTION)

INFORMAL FACTORS

CAPACITY OF THE RECEIVER
INFORMAL LINKER IN THE RECEIVING ORGANIZATION
CREDIBILITY AS VIEWED BY THE RECEIVER
PERCEIVED REWARD TO THE RECEIVER
WILLINGNESS TO BE HELPED

SOURCE
OF
KNOWLEDGE
(SUPPLIER)

UTILIZATION
OF
KNOWLEDGE
(USER/
RECEIVER)

TYPES OF BARRIERS IN TECH-TRANSFER

- **ENVIRONMENT BETWEEN THE R&D GENERAL SYSTEM (FEDERAL LAB, UNIV OR PRIVATE LAB) AND THE COMPANY GENERAL SYSTEM (USER TO WHOM THE TECHNOLOGY IS TO BE TRANSFERRED)**
- **ENVIRONMENT BETWEEN THE DEPARTMENTS AND DIVISIONS WITHIN THE LABORATORY OR COMPANY WHICH REPRESENT THE SUBSYSTEMS OF BOTH GENERAL SYSTEMS**
 - **BETWEEN THE GENERAL SYSTEMS**
 1. NO FORMAL TRANSFER POLICIES
 2. COST BARRIERS
 3. TIME HORIZON CONFLICT
 4. INFRINGEMENT PROBLEMS
 - **BETWEEN SUBSYSTEMS**
 1. INERTIA BARRIER
 2. LACK OF AN INCENTIVE STRUCTURE
 3. COST BARRIER
 4. COMMUNICATION
 5. TIME BARRIER
 6. GEOGRAPHIC DISTANCE
 7. NON-EXISTENT TRANSFER MANAGEMENT STRUCTURE
 8. TECHNOLOGY BARRIER
 - **BETWEEN ELEMENT**
 1. LACK OF AN INCENTIVE STRUCTURE
 2. HIGH RISK OF BEING BLAMED FOR FAILURE
 3. INSECURITY OF RETAINING JOB IF NOT SUCCESSFUL
 4. MUTUAL DISRESPECT
 5. UNIQUE REQUIREMENTS OF EACH SUBSYSTEM
 6. UPDATING OF TECHNOLOGY NEEDS
 7. TIME BARRIER
 8. LACK OF TRANSFER ORGANIZATION MANAGERS

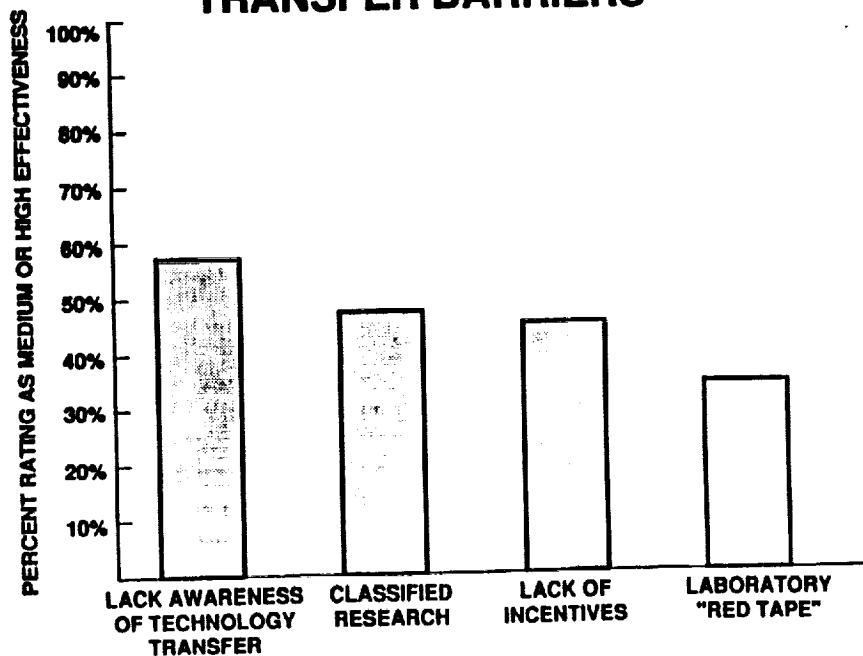
MAJOR BARRIERS AND HINDRANCES TO TECH-TRANSFER

1. A TENDENCY TO ASSUME WITHOUT PROOF THAT THERE IS A RECEIVER FOR THE TECHNOLOGY, THAT IS, THAT SOMEBODY ACTUALLY WANTS IT AND WILL ACCEPT IT
2. LACK OF INTEREST AND SUPPORT BY TOP MANAGEMENT, THAT IS, THOSE WHO MAKE POLICY AND CONTROL THE NECESSARY RESOURCES
3. LACK OF INTEREST OR EFFORT BY MANAGERS AT THE LEVEL WHERE TECHNOLOGY TRANSFER WILL ACTUALLY BE IMPLEMENTED
4. FAILURE TO FIX RESPONSIBILITY AND ACCOUNTABILITY FOR GETTING THE JOB DONE
5. LACK OF AWARENESS OF THE VALUE OF TECHNOLOGY TRANSFER
6. LACK OF FUNDING FOR THE TRANSFER EFFORT
7. LACK OF PERSONNEL ASSIGNED TO THE TASK OR LACK OF SUFFICIENT TIME AVAILABLE TO THOSE WHO ARE ASSIGNED TO THE TASK
8. LACK OF NECESSARY KNOWLEDGE AND TRAINING FOR THOSE ASSIGNED THE TASK
9. RESTRICTIONS ON MOBILITY OF PERSONNEL
10. INDIFFERENCE TO TECHNOLOGY TRANSFER

MAJOR BARRIERS AND HINDRANCES TO TECH-TRANSFER (Cont'd)

11. POWER GAMES INTENDED TO MAINTAIN OR PROMOTE PERSONAL AMBITIONS, SUCH AS JOB PROTECTION, COMMERCIAL INTEREST, POLITICAL AMBITIONS, STATUS, OR CONTROL OF THE WORK SITUATION. USUALLY TAKES THE FORM OF SECRECY. (Hawthorne 1978)
12. POOR INTERPERSONAL RELATIONS - THE PARTIES REACT NEGATIVELY TO EACH OTHER
13. EXPECTATIONS OF ONE PARTY ARE NOT SHARED BY THE OTHER PARTIES
14. LACK OF CONTINUED ORGANIZATIONAL COMMITMENT TO THE EFFORT
15. PROMISING MORE THAN CAN BE DELIVERED
16. SOMEONE TAKING OFFENSE, WHERE NONE WAS INTENDED, AT A SUGGESTION THAT SOME ACTIVITY THEY ARE RESPONSIBLE FOR COULD BE IMPROVED
17. CULTURAL DIFFERENCES: ETHNIC, REGIONAL, NATIONAL, OR ORGANIZATIONAL
18. EMPLOYMENT SENIORITY SYSTEMS OR FEATHERBEDDING
19. DOCUMENTS TOO TECHNICAL FOR THE POTENTIAL USER TO UNDERSTAND
20. EXCESSIVE GOVERNMENT REQUIREMENTS FOR PRODUCT TESTING AND APPROVAL

KEY TECHNOLOGY TRANSFER BARRIERS



THE ABOVE CONDITIONS WERE PERCEIVED BY THE RESPONDENTS TO BE THE GREATEST BARRIERS TO TECHNOLOGY TRANSFER

SPECIFIC BARRIERS TO COMMERCIALIZATION

- GOVERNMENT PROCEDURES, REGULATIONS, DOCUMENTATION AND CONTROLS.
- LACK OF DIRECTION, DEFINITION, ROLES, RESPONSIBILITY AND ACCOUNTABILITY OF GOVERNMENT AGENCIES IN TECHNOLOGY TRANSFER.
- LACK OF LONG-TERM STRATEGIC GOALS FOR GOVERNMENT AGENCIES WHICH RESULTS IN UNCERTAINTIES, TURBULENCES, FLUCTUATIONS AND PRIORITIES FOR SPACE SYSTEMS.
- GOVERNMENT DOES NOT TAKE R&D BASE TO HIGH ENOUGH LEVEL OF READINESS TO REDUCE RISK TO INDUSTRIAL/COMMERCIAL SECTORS.
 - SIMULATION MODEL IS FAR FROM BEING AN ENGINEERING PROTOTYPE OR A FLIGHT TESTED SUBSYSTEM
 - INFRASTRUCTURE TO SUPPORT BRIDGING
 - ECONOMICAL INCENTIVES
 - LACK OF POLICY AND STRATEGY
- LACK AND MAGNITUDE OF CAPITAL REQUIREMENTS RENDERED INDUSTRY DEPENDENT ON GOVERNMENT FOR SPACE MARKET NEEDS AND DEFINITION.
- GOVERNMENTAL AGENCIES FUNDING STRUCTURE OF BASE R&D FOCUSED TECHNOLOGY BUT NO CLEAR FUNDING FOR ENGINEERING PROTOTYPING, QUALIFICATION AND FLIGHT VALIDATION.
- HIGHER AND MORE COMPLEX TECHNOLOGY LEVEL BEING DEVELOPED WHICH HAS NOT BEEN MATCHED BY INCREASED HUMAN COMPETENCE, TRAINING AND EDUCATION.
- MULTI-MODI TECH. TRANSFER ORGANIZATIONS HIGHLY DISORGANIZED, INEFFICIENT WHEN COMPARED TO JAPAN'S CONSORTIUM OF GOVERNMENT AGENCIES, BANKS, INDUSTRY AND UNIVERSITIES.
- SBIR EFFECTIVENESS RECOGNIZED FOR SMALL SUBSYSTEMS BUT HAS NO IMPACT ON SPACE SYSTEMS DEVELOPMENT DUE TO SHORTAGE IN CAPITAL BORROWING CAPABILITIES.

<i>Development of</i> EVOLUTION MODEL		(Cont'd) Tech. Transf. Infrastr	
STAGE	DONOR	BOTH	RECIPIENT
(ADAPTATION)			
DECISION: GO/NO GO			
IMPLEMENTATION	CONSIDER CAPITAL AND HARDWARE OVERCOME PREJUDICE PROVIDE TRAINING OVERCOME RESISTANCE TO CHANGE	RECRUIT RESOURCES RUN PILOT OPERATION	CONSIDER PEOPLE AND EMOTIONS BUILD COHESIVE ORGANIZATION PROVIDE SUPPORTING ELEMENTS ENSURE BUREAUCRATIC SUPPORT
DECISION: GO/NO GO			
MAINTENANCE	DELEGATE AUTHORITY ASSIST IN TROUBLE-SHOOTING IDENTIFY DIVERSIFICATION POSSIBILITIES EVALUATE NET BENEFITS	RUN FULL-SCALE OPERATION EVALUATE SUCCESS	ENSURE COMPATIBILITY WITH SUPPORTING ELEMENTS EVALUATE SIDE EFFECTS PERFORM CONCURRENT R&D EVALUATE NET BENEFITS
DECISION: GO/NO GO			

Development of Tech

EVOLUTION MODEL

Transfer Infrastructure

STAGE	DONOR	BOTH	RECIPIENT
SEARCH	IDENTIFY CAPABILITIES	UNRECOGNIZED TT OPPORTUNITY	IDENTIFY NEEDS
	ESTABLISH POLICIES AND PRIORITIES		ESTABLISH POLICIES AND PRIORITIES
	DEVELOP INCENTIVES TO SEARCH FOR NEEDS		DEVELOP INCENTIVES TO SEARCH FOR CAPABILITIES
	PROVIDES CHANNELS FOR CONTACT		PROVIDE CHANNELS FOR CONTACT
		ESTABLISH VIABLE CONTACT	
		DECISION: GO/NO GO	
ADAPTATION	LEARN ENVIRONMENT OF RECIPIENT	FORMULATE TT PROJECT	EVALUATE SOCIO-ECONOMIC IMPLICATIONS
	EVALUATE ADAPTATION REQUIREMENTS		EVALUATE EFFECTIVENESS
	EVALUATE COST		EVALUATE OTHER ALTERNATIVES
	EVALUATE FEASIBILITY		EVALUATE DESIRABILITY
			ANALYZE COST EFFECTIVENESS
	DECISION: GO/NO GO		
(IMPLEMENTATION)			

ENHANCING FACTORS TO TECH-TRANSFER

INTERPERSONAL RELATIONSHIP

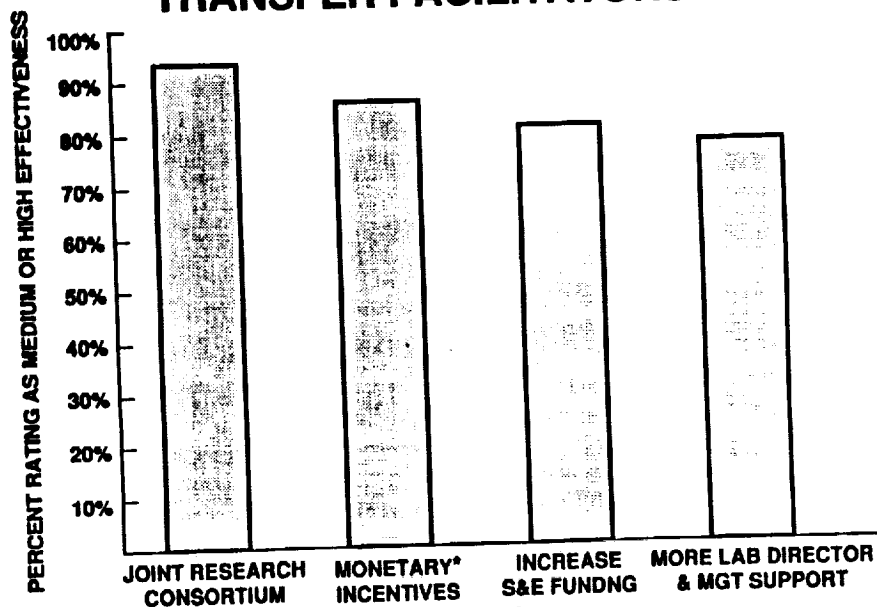
... THE MECHANISM OF TECHNOLOGICAL TRANSFER IS ONE OF AGENTS, NOT AGENCIES; OF THE MOVEMENT OF PEOPLE AMONG ESTABLISHMENTS, RATHER THAN OF THE ROUTING OF INFORMATION THROUGH COMMUNICATION SYSTEMS (Burns, 1969:12).

THE NATIONAL REFERRAL CENTER, A SERVICE OPERATED UNDER THE LIBRARY OF CONGRESS, HEARTILY SUBSCRIBES TO THE CONVICTION THAT SCIENTIFIC AND TECHNICAL INFORMATION IS MOST EFFECTIVELY TRANSFERRED FROM PERSON TO PERSON, NOT FROM MEDIA TO PEOPLE (Timmons, 1978: 34).

STRATEGIES FOR PROMOTING TECH-TRANSFER TO PRIVATE SECTOR

TECHNOLOGY TRANSFER STRATEGY	PURPOSE	TRANSFER MECHANISMS
PASSIVE	TO MAKE INFORMATION ACCESSIBLE TO THOSE INDIVIDUALS AND ORGANIZATIONS SEARCHING FOR SOLUTIONS TO CUSTOMER/SOCIETY PROBLEMS	TECHNICAL DATABASES NTIS PROFESSIONAL JOURNALS TRADE PUBLICATIONS CONFERENCES WORKSHOPS
ROLE-DIRECTED	TO ACTIVELY PROMOTE AWARENESS OF NEW TECHNOLOGY TO INDIVIDUALS OCCUPYING BOUNDARY-SPANNING ROLES IN ORGANIZATIONS	PROFESSIONAL JOURNALS AND SEMINAR PRESENTATIONS TARGETED TO CERTAIN DISCIPLINES TRADE PUBLICATIONS AND SEMINAR PRESENTATIONS TARGETED TO INDUSTRY GROUPS OR NATIONAL ASSOCIATIONS TECHNOLOGY FAIRS INDUSTRY TEAMS
ORGANIZATION DIRECTED	TO ACTIVELY PROMOTE THE ADOPTION OF NEW PRODUCT OR PROCESS CONCEPTS TO INNOVATOR FIRMS IN AN INDUSTRY	TRANSFER OF R&D PERSONNEL DEMONSTRATION PROJECTS PERSONAL CONTACTS ONSITE VISITS JOINT VENTURES TAX INCENTIVES

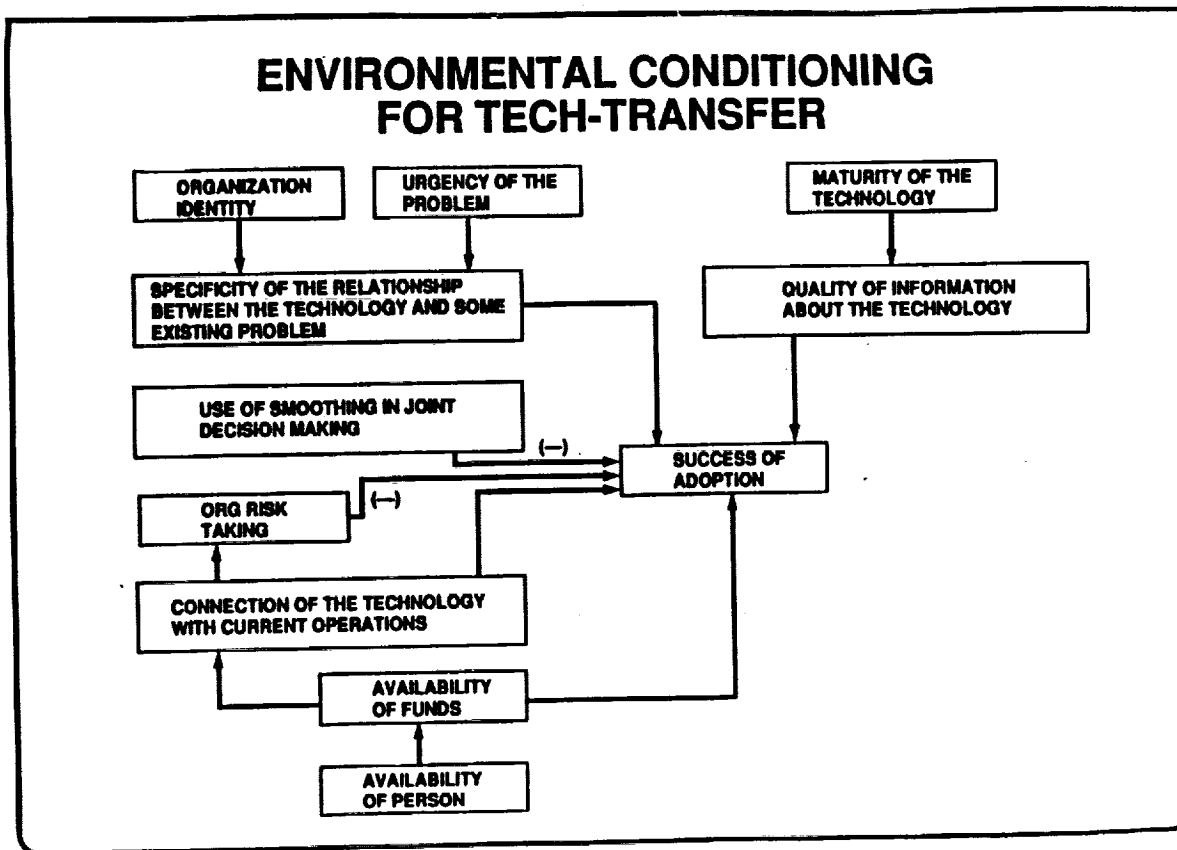
KEY TECHNOLOGY TRANSFER FACILITATORS



CONDITIONS
THE ABOVE CONDITIONS WERE PERCEIVED BY THE RESPONDENTS TO BE THE GREATEST FACILITATORS OF TECHNOLOGY TRANSFER

* LACK OF INCENTIVES WAS A KEY BARRIER

ENVIRONMENTAL CONDITIONING FOR TECH-TRANSFER



RECOMMENDATIONS

- DEFINE A QUANTIFIABLE PROCEDURE WITH MEASURABLE OBJECTIVES FOR GOVERNMENT / INDUSTRY TECHNOLOGY TRANSFER.
- DEVELOP A CULTURE FOR DOING BUSINESS BASED ON COST EFFECTIVENESS AND TECH TRANSFER IN BOTH GOVERNMENT AND COMMERCIAL SECTORS... "USE OF NASA FACILITIES... NASA PERSONNEL."
- MORE MONEY IS NOT THE MAIN ISSUE BUT A METHODOLOGY, AN APPROACH AND A NEW WAY OF LIFE IS NEEDED... "A FORUM... A FACILITATION IS NEEDED."
- PERSONNEL EXCHANGE, COST EFFECTIVE / GOAL ORIENTED CONSORTIUMS ARE THE MOST PROMISING ENDEAVORS. (TAX DEFERMENT/INITIATIVES FOR MONEY EARNED FROM TECH TRANSFER FOR 2 TO 3 YEARS)
- JOINT TECHNOLOGY FAIRS/SHOWS ARE MORE EFFECTIVE THAN PUBLICATIONS ALONE WHERE "HANDS-ON" IS ENCOURAGED.