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WORKING PANEL 1

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TECHNOLOGY TRANSFER

WITHIN

NASA

WILLIAM ST. CYR

SUBTOPICS

- A) THE "CLASSICAL" PROBLEM:
TECHNOLOGY TRANSFER WITHIN AN
ORGANIZATION (AND ACROSS
ORGANIZATION LINES/CODES)

- B) SPACE SCIENCE/INSTRUMENT
TECHNOLOGY & THE ROLE OF
UNIVERSITIES IN THE TECHNOLOGY
DEVELOPMENT/TRANSFER PROCESS

ASSESSMENT OF TECHNOLOGY TRANSFER PROCESS

- HIT & MISS
- NO INTERNAL RECOGNIZED/CONSISTENT TECHNOLOGY TRANSFER PROCESS IN PLACE
- NO MEASUREMENT/REWARD SYSTEM
- RISK AVERSION PROJECT MANAGEMENT
- RTOP PROCESS HAS NO TECH TRANSFER OBJECTIVES

TECHNOLOGY BEING TRANSFERED

- ROBOTICS
- ANALYTICAL TOOLS
- MODELING TECHNIQUES
- SENSORS
- ELECTRO-OPTICAL
- ADVANCEC MATERIALS
- SOFTWARE (HARWARE SPECIAL^{FK}, ALGORITHMS, COSMIC)
- PERFORMANCE DATA

ISSUES AND BARRIERS

- COMMUNICATIONS
- TURF/PAROCIALISM/NIH
- PRIORITIES/WORK LOADS
- SENSITIVITY TO MISSION NEEDS/REQUIREMENTS
- RISK AVERSION
- LACK OF SYSTEMS ENGINEERING

OBSERVATIONS & SUGGESTIONS

- ITP PROCESS IS A GOOD BEGINNING; NEEDS VIGOROUS IMPLEMENTATION
- PROMOTE TECH TRANSFER WITHIN NASA AS AGGRESSIVELY AS TECH UTILIZATION OUTSIDE NASA
- TOP DOWN INPLEMENTATION (EG. METRIFICATION)
- NASA TO NASA TECH TRANSFER SHOW (EG. TECHNOLOGY 2000)
- ESTABLISH REWARD SYSTEM
- BUILD TECH TRANSFER INTO DEVELOPMENT PROCESS AT FRONT END OF PROGRAM (CONCURRENT PROCESS)
- SYSTEM ANALYSIS APPROACH FOR TECHNOLOGY INSERTION

STATEMENT OF PROBLEM:

TRANSFER WITHIN ORGANIZATION:

NASA TECHNOLOGIST TO (OPERATIONAL) MISSION APPLICATION

HENRY PLOTKIN

KEY ISSUES & BARRIERS

- **DISINCENTIVES FOR RISK-TAKING, FOR TECHNOLOGY - INSERTION**
 - UP-FRONT COSTS
 - NO REWARD FOR LIFECYCLE COST REDUCTION

- **BENEFIT OF NEW TECHNOLOGY MUST BE MADE CLEAR TO USER**
 - SYSTEMS ANALYSIS/TRADE-OFF DURING PHASE A
 - VALIDATED COST-ANALYSIS

TECHNOLOGY TRANSFER APPROACHES

- IMPROVE COMMUNICATIONS BETWEEN TECHNOLOGIST AND USERS EARLY IN MISSION DEFINITION
- CREATE BUDGETARY INCENTIVES FOR NEW TECHNOLOGY
 - ALLOWANCE (10%?) FOR NEW TECHNOLOGY TO EXCEED BASIC PERFORMANCE
 - MINIMIZE LIFE-CYCLE COSTS
- ALLOW USE OF PARALLEL (OFF-LINE) NEW TECH IN OPERATIONAL ENVIRONMENT
- INCREASE BUDGET FOR "BRIDGING" ACTIVITIES
 - TEST BEDS
 - FLIGHT DEMONSTRATIONS
 - GAS CANS
 - CHEAP S/C
- ESTABLISH RESPONSIBILITY (&ACCOUNTABILITY) FOR TRANSFER

PROBLEM: INSUFFICIENT INTERACTION BETWEEN CODE R SENSOR DEVELOPMENT PROGRAM AND CODE S

CURRENT PROGRAM: SENSOR WORKING GROUP REVIEWS PROGRAM STATUS, ACCOMPLISHMENTS, FUTURE PLANS. USER ORGANIZATIONS INVITED TO ATTEND.

BARRIERS: NOT ALL USER CODES HAVE ATTENDED: AS A RESULT, PERCEPTION PERSISTS THAT

- A) SENSOR TECHNOLOGY PROGRAM MAY NOT OPTIMUM
- B) CODE S MAY NOT ACCEPT THE NEW TECHNOLOGY

APPROACH: ENHANCE CODE S ATTENDANCE

ACTOR: CODE R & CODE S

SUB-TOPIC

SPACE SCIENCE INSTRUMENT TECHNOLOGY
AND THE ROLE OF UNIVERSITIES IN THE
TECHNOLOGY DEVELOP/TRANSFER PROCESS

MARIO ACUNA & MARTIN ZOMBECK

The reward is the transfer --
the publication

CURRENT SPACE PROGRAMS

- FUNDAMENTAL PROBLEM IS THE HIGH COST OF DOING SIMPLE THINGS - OFTEN HIGH TECHNOLOGY IS NOT NEEDED
- PROGRAM DEVELOPMENT CYCLE IS TOO LONG - OFTEN TWO GENERATION OF GRADUATE STUDENTS

LESSONS - LEARNED

- IMAGE RESTORATION TECHNIQUES - HST
- ^{A2} GREYING INCIDENCE X-RAY MIRROR DEVELOPMENT - AXAF
- DEVELOPMENT OF METROLOGY TECHNIQUES FOR HIGH PERFORMANCE MIRRORS - SURFACE FINISH AND SURFACE CONTOUR
- IUE - mission operations development,
- undergraduate and graduate student programs
- microcalorimeter development

BARRIERS TO DEVELOPMENT/TRANSFER

- **INTELLECTUAL PROPERTY RIGHTS**

**COMPETITION FOR FUNDING FOR
INFREQUENT OPPORTUNITIES FOR
SCIENTIFIC INVESTIGATIONS IN SPACE**

- **FUNDING IS USUALLY TIED TO A SPECIFIC
FLIGHT PROGRAM**

APPROACHES

- **NASA ISSUES AO'S FOR SCIENTIFIC INVESTIGATIONS - ALL
POTENTIAL RESPONDERS SHOULD BE GIVEN DESCRIPTION
OF RELEVANT TECHNOLOGY**
- **UNIVERSITIES SHOULD HAVE OPPORTUNITY TO
PARTICIPATE IN NEW TECHNOLOGY DEVELOPMENT AT
NASA CENTERS - HELP TO DEFINE DIRECTION OF
DEVELOPMENT**
- **UNIVERSITIES SHOULD BE ENCOURAGED TO USE NASA
FACILITIES - LABORATORY, TEST, COMPUTER FACILITIES AS
A NATIONAL RESOURCE**
- **THROUGH VISITING PROFESSOR PROGRAM NEW
TECHNOLOGY IS DISSEMINATED TO THE CLASSROOM**
- **FACILITATE CLOSER INTERACTION BETWEEN UNIVERSITY
AND NASA SCIENTISTS AND TECHNOLOGISTS BEYOND
CONFERENCES**