S. Working Panel #2: Technology Transfer Within the Government

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The following participants in the workshop were members of this panel:

Individual	Organization
Christensen, Ms. Carissa Bryce	Princeton Synergetics, Inc.
Connolly, Dr. Denis	Lewis Research Center
Dula, Mr. Alex	Johnson Space Center
Freese, Dr. Kenneth	Los Alamos National Lab.
Holcomb, Mr. Lee	NASA Headquarters
Neeland, Dr. Roger	Department of Transportation
Reck, Mr. Gregory	NASA Headquarters
Russell, Col. John	Phillips Laboratory
Schneider, Mr. Stanley	NOAA

Col. Russell was the Chairman of the panel. No subtopic Rapporteurs were selected. Ms. Christensen was the Facilitator for the panel. The suggested subtopics for the panel were:

A. Transfer from non-NASA U.S. government technology developers to NASA space missions/programs.

B. Transfer from NASA to other U.S. government civil space mission programs.

The panel felt that the major issues associated with these subtopics were essentially the same for non-NASA and civil space transfer, and so the subtopics were not addressed separately. The panel also felt that the limitation of subtopic B to civil space was inappropriate, because DOD is an important potential user and in some cases provider of NASA technology.

Two presentations were made to the panel. Mr. Dula opened the panel discussion with a presentation entitled *Roles/Value of Early Strategic Planning Within the Space Exploration Initiative (SEI) to Facilitate Later Technology Transfer To and From Industry.* (Mr. Dula also provided the panel with a handout entitled Exploration Technology Prioritization. See section EE.) On Wednesday afternoon, Mr. Schneider presented *NOAA Satellite Programs and Technology Requirements*, highlighting the relationship between NOAA and NASA in the past and present, and identifying possible future interactions.

The panel discussion addressed the following major issues:

- DOD/NASA cooperation.
- Alternative mechanisms for interagency communication and interactions.
- Current technology transfer relationship among federal research agencies, and strategies for improving this transfer.
- Technology transfer mechanisms appropriate to intragovernment transfer.
- The importance of industry as a technology transfer conduit.
- Measures of merit.

Dr. Neeland provided an ITBC regarding the coordination of test facility construction and upgrade between industry and government.

The panel's discussion is directly reflected in its conclusions and recommendations, which were presented by Col. Russell to the plenary session on Thursday. The briefing charts used in the plenary session were for the most part developed as the relevant discussion occurred (see Section S.3 for these charts).

Conclusions and Recommendations

The conclusions and recommendations of the panel, as covered in the plenary session presentation, are summarized below.

Feasibility and desirability of DOD/NASA cooperation

The panel found that, while obstacles to cooperation (such as security concerns) existed for advanced development and technology applications research, cooperation could realistically take place between NASA and DOD at the basic research and (to some degree) focused technology levels. An enabling factor was that research be non-classified. The group also noted that technology was typically developed to different levels of maturity by different agencies.

Alternative mechanisms for interagency communication and interactions

The panel discussed the Space Technology Interagency Group (STIG) and its recent revitalization, and the DOD Joint Directorate of Laboratories (JDL). In particular, the structural commonalities between the Directorate of Space and Missile Technologies of JDL and STIG were identified as important factors for successful communication and interaction.

Technology transfer relationships among federal research agencies and strategies for improving transfer

Major federal agencies transferring technology to and from one another were identified, and recommendations for the success of such transfer were developed. These recommendations were: use the planning process to identify areas of commonality (and combine resources when appropriate); develop and (keep current) joint roadmaps of research and development plans and programs; recognize and act on the critical importance of communications (of which STIG is an example); and, include industrial partners early in the process.

Technology transfer mechanisms appropriate to intragovernment transfer

Important technology transfer mechanisms were categorized by the five strategic areas (communications and information; coordinated and/or cooperative research and research interchanges; institutional plans and activities; directed investments; and procedural and/or structural factors) identified early in the workshop. Important mechanisms and issues identified included facility utilization policies that permit sharing of facilities and particularly associated expenses; databases, strategic joint planning, and generally improved communications; structural mechanisms facilitating interactions between agencies (such as the JDL/STIG relationship; staff interchanges, prevention of flow down impediments, and personnel policies that encourage transfer.

Importance of industry as a technology transfer conduit

The panel agreed that industry plays an important role in intragovernment technology transfer, because of the large proportion of technology research performed by industry under government contract. The panel felt that this mechanism may not always work, in part because of the disconnect between industry R&D institutions and industry system design institutions (even within the same firm).

Need for measures of merit, and appropriate terms

The panel discussed the importance of evaluating the effectiveness of technology transfer efforts, and in particular the need to assess research as it occurs in terms of both its scientific quality and its applicability to potential user needs.

Summary

The panel concluded in general that some useful mechanisms (such as STIG) are in place, and that in some cases these mechanisms need to mature before they can be fully evaluated. However, the panel found that significant culture shifts may be necessary for enhancement of technology transfer to occur.

Roles/Value of Early Strategic Planning Within the Space Exploration Initiative (SEI) to Facilitate Later Technology Transfer To and From Industry

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Dula:afu:3/11/92

Agenda

- **Background**
- **Purpose**
- **Approach**
- **Conclusions**

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Background

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- NASA has been actively planning missions to return to the moon to stay and to explore Mars for the last four years
- Recently, the SEI Program has initiated an approach based on three strategic themes:
  - The approach will be evolutionary
  - The program must be economically viable
  - Management and organizational structure to yield low-cost, highly reliable, and successful programs
- Near-term strategy is to start small and use a management structure that will deliver on time and within budget
- NASA's Office of Exploration has been determining technology needs for SEI that will be satisfied by the technology development community

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Purpose

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Assess and develop technologies that will support the SEI Program needs and allow transition to the private sector for commercial exploitation in the future.

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Approach

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- First unmanned missions will involve no new technology initiatives in order to accomplished in the near-term
- Prioritization criteria were developed to define the critical technology areas that needed advancement for the planned missions
- One of the criteria used was transportability/spin-off to the commercial sector
- Technology needs for the First Lunar Outpost (FLO) (1992-1995 timeframe) have been identified and transmitted to NASA Code R for input into the Integrated Technology Plan (ITP)
- Technology needs for the permanent lunar base and initial manned Mars missions (timeframe 1995+) have also been identified and inputted to Code R
- Strategic planning involves defining those technologies that SEI will need but also can be synergistically needed and used by the commercial sector in the future.
- Planning needs to occur now to define the best way to work together to set the stage for later technology transfer by involving industry in the process

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Conclusions

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- By working with industry, NASA's technology needs for the future can be defined to support technology transfer to industry at a later date and in a manner that will improve our competiveness in the world economic market
- The SEI will require the cooperative effort of many government agencies to help develop the technologies to allow the United States to lead the way in the 21st Century for space exploration. colonization, and exploitation