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PARTICIPANT VIEWS OF ADVANCED RESEARCH PROJECTS AGENCY
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PREFACE

This report presents the results of a survey of organizations that have participated in research projects conducted under the "Other Transaction" authority of the Advanced Research Projects Agency (ARPA). ARPA's General Counsel plans to prepare a report on ARPA's use of this special contracting authority and wishes to include the views of companies who have participated in these arrangements as to what the benefits have been. The work was performed under an ARPA-funded task entitled "Benefits Review of 'Other Transactions' Authority."

The authors wish to extend their appreciation to Dr. Harlow Freitag (formerly of IDA) for his invaluable assistance and to thank the reviewers of this paper, Mr. Herbert R. Brown, Dr. Marvin H. Hammond, Dr. Richard J. Ivanetich, Mr. Terry Mayfield, Dr. Robert M. Rolfe, and Dr. Richard H. White, for their help in improving its content and organization.

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EXECUTIVE SUMMARY

"Other Transactions" are a special form of contractual arrangement used by the Advanced Research Projects Agency (ARPA) with its private sector research and development (R&D) partners. Other Transactions are characterized by greater flexibility and reduced administrative burden when compared with typical Government procurement contracts. The Institute for Defense Analyses (IDA) was tasked by the Director and General Counsel of ARPA to survey organizations that have participated in Other Transactions. The results of this survey are to be included in a planned ARPA report on its use of the Other Transactions contracting authority.

IDA used an interdisciplinary team with experience in computer science, manufacturing practices, Defense research, public administration, and acquisition law and regulations. Letters describing the survey efforts and a set of discussion questions were provided to the participants in advance so they could prepare for the interviews, most of which were conducted by telephone. The results of the survey are largely anecdotal; the reported results were not quantified to avoid implying either numerical precision or statistical significance that was not in keeping with the survey's size or methods used. The questions and results centered on the following areas.

Effectiveness of Programs Conducted Under ARPA Other Transactions. In general, participants viewed "effectiveness" to mean increased flexibility, increased efficiency, and enabling new technologies and programs, all of which Other Transactions met in some way. Other Transactions were said to allow R&D to go forward with a minimum of bureaucratic encumbrance.

Program Administration. Participants reported that Other Transactions reduced contractor administrative overhead, simplified work reporting to ARPA, and increased researcher productivity.

Partnerships, Consortia, and Teamwork. Most ARPA Other Transactions have involved consortia. Some of these consortia have created new projects, relationships, and other business ventures as a result of the working relationships and rapport established

through the Other Transactions. But forming a consortium often proved to be difficult and time consuming. Clearly establishing the roles and responsibilities of all players as early as possible and choosing an appropriate consortium leader were critical to the success of the venture. The most likely areas of disagreement in consortia related to trade secrets or other intellectual property issues and it was often helpful to have ARPA or a Government laboratory as a non-voting member of a consortium to act as a neutral referee in inter-company clashes.

Mechanisms for Reviewing Progress and Making Payments. Researchers were pleased with the ability to establish milestones up front and to base progress payments on attaining milestone objectives instead of reporting cost as a payment metric with a set of fixed deliverables. The one area for criticism was payment promptness. Some participants suffered from extremely slow payments, while others reported unusually prompt payment.

Foreign Access to Technology. Some participants reported problems related to participation in their consortia by foreign-owned firms. ARPA requires a consortium to notify ARPA of proposed foreign access and to obtain prior consent. This provision generally allowed sufficient flexibility for the respondents to deal with changes in their plans for foreign access.

Intellectual Property Rights. In general, respondents reported either that the patent rights regime imposed under the Bayh-Dole Act posed no difficulty for them, or that ARPA showed sufficient flexibility to develop a different allocation of rights that was acceptable to all parties.

Potential for Fraud, Waste, and Abuse. Respondents generally saw no greater risk of fraud, waste, or abuse under an Other Transaction than under a standard procurement contract. Many said that the members of a consortium have the ability to monitor one another and, as a result, to minimize the risk for these types of problems. In addition, the general requirement that research under an Other Transaction be done on a cost shared basis was recognized as a significant inhibitor to waste. The flexibility, use of consortia, and cost sharing that characterize the use of an Other Transaction provide an effective mechanism to achieve accountability without recourse to rigid acquisition rules that are not appropriate in an R&D environment.

Cost Sharing. Cost sharing proved to be a true test of a company's commitment and weeded out some consortium members with marginal commitments. However, some respondents suggested that ARPA should be willing to vary the participants' required share

of costs when warranted by circumstances, such as the involvement of small companies or greater risk of the project.

1. INTRODUCTION

Since 1989 the Advanced Research Projects Agency (ARPA) has had the authority to enter into contractual arrangements called "Other Transactions" with its private sector research and development (R&D) partners. Other Transaction agreements are characterized by enhanced flexibility and reduced administrative burden when compared with the typical Government procurement contract. Congress granted ARPA this "Agreements Authority" in recognition that a procurement contract is not the appropriate type of agreement for every form of Government-supported science and technology project, a principle recognized in the Federal Acquisition Regulation (FAR) itself.¹ Grants and cooperative agreements are generally appropriate to support and stimulate public purposes like the advancement of science and technology. However, Congress has recognized that even the use of standard grants and cooperative agreements cannot provide sufficient flexibility for the needs of every appropriate ARPA research venture; hence the establishment of Other Transactions.²

ARPA's Director and General Counsel requested the Institute for Defense Analyses (IDA) to contact organizations that have participated in Other Transactions to elicit those organizations' views of the benefits and drawbacks of the Other Transaction. The results of this survey are to be included in an ARPA report on its use of Other Transactions. The goal of the survey effort is twofold: to have an independent assessment of the value of Other Transactions *vis-à-vis* other types of funding arrangements, and to make recommendations to improve the process.

IDA used an interdisciplinary team with experience in computer science, manufacturing practices, Defense research, public administration, and acquisition law and

¹ FAR § 35.003(a) reads: "Contracts shall be used only when the principal purpose is the acquisition of supplies or services for the direct benefit of the Federal Government. Grants or cooperative agreements should be used when the principal purpose is to stimulate or support research and development for another public purpose."

² Despite this legislative recognition of the need for flexibility, there has been persistent misunderstanding of ARPA's use of Other Transactions from the time the enabling legislation was first enacted. For example, press reports have often mistakenly referred to Other Transactions as "grants."

regulations. In addition, the team also benefited from access to information and expertise gained through IDA's assistance to ARPA with the use of Other Transactions in the context of the Technology Reinvestment Project (TRP), which began in October 1992.³

IDA researchers sought to elicit participants' views in nine specific areas:

1. Effectiveness of programs conducted under ARPA Other Transactions
2. Program administration
3. Partnerships, consortia, and teamwork
4. Mechanisms for reviewing progress and making payments
5. Foreign access to technology
6. Intellectual property rights
7. Potential for fraud, waste, and abuse
8. Cost sharing
9. Suggestions for improvements in the use of Other Transactions.

This document presents the results of IDA's survey.

In fiscal years 1990 through 1993, ARPA entered into 19 Other Transactions having a total award value of \$194 million. These 19 agreements represent 4% of the 471 ARPA projects initiated during that time period and this \$194 million represents 11% of the \$1.82 billion total award value of those 471 projects. For fiscal year 1994 and the first three quarters of fiscal year 1995, the comparable figures are 70 Other Transactions out of 174 projects (40%) and \$972.2 million out of \$1.276 billion (76%). These latter figures include many projects funded under the TRP.

ARPA's authority to enter into Other Transactions in support of basic, advanced, and applied research projects that are not feasible or appropriate for standard contracts, grants, or cooperative agreements is granted by a statute, 10 U.S.C. § 2371. ARPA is not required to include the customary FAR and Defense FAR Supplement (DFARS) clauses in Other Transactions, but is free to negotiate provisions that make sense for the particular project being supported by each Agreement and that are mutually agreeable to both the Government and the performer or consortium of performers.

³ The TRP represents the widest use of ARPA's Agreements Authority thus far. The limited use of such authority by other agencies acting on ARPA's behalf in negotiating TRP agreements was a large part of the impetus for this study.

Under 10 U.S.C. § 2371, Other Transaction authority may be used:

- whenever the use of a standard contract, grant, or cooperative agreement is not feasible or appropriate;
- for transactions whose principal purpose is to stimulate or support research and development for an authorized purpose, subject to the limitation that it may not be used to sponsor basic research at a single university or non-profit research corporation (since standard grants were used for that purpose when Other Transactions were first made available in 1989); and
- in situations that are clearly neither "procurement" nor "assistance," as those terms are customarily used to categorize Government contracts (for example, advancing the state of the art in some field, demonstrating technology, developing standards, transferring technology, encouraging collaboration, and fostering exchanges of information do not fall into either category).

The authority may not be used:

- in situations where the principal purpose of the transaction is to acquire goods and services for the direct benefit or use of the acquiring agency, although some incidental acquisition of property or services is impliedly acceptable; or
- for research that duplicates work under any existing Department of Defense (DoD) programs.

The statute also requires that the amount of Government funds provided under an Other Transaction must be matched by an equal amount of funds from the other participants in all instances in which such cost sharing is practicable.

Authorized or public purposes for which Other Transactions may be used are determined by DoD's mission as specified in its organic statutes, authorizing and appropriations legislation; by other legislation such as the Technology Transfer Act; or by pertinent Presidential directives and Government-wide regulations.

Examples of some of the types of Other Transactions ARPA may enter into include:

1. Bailments involving the lending or borrowing of equipment, typically with a sharing of research or test results.
2. Parallel or coordinated research involving ARPA sponsorship of a research project that is related to one or more research projects funded by others and

involving an arrangement to share results or to coordinate the research so as to enhance the end result of each project.

3. Consortium agreements with multiple parties, when those parties have agreed to join together to perform research as a consortium. The consortium need not be a legal entity with the power to contract. A contractor, grantee, or subcontractor relationship may not be appropriate.
4. Joint funding arrangements with others to finance a third party to conduct research.
5. Reimbursable arrangements that involve ARPA providing services (such as transportation services on an experimental space launch vehicle, or experimental air or undersea vehicle). The recipient would typically provide one or more of its own experiments to be conducted during a test mission. The amount of reimbursement to ARPA could be fixed, depending on the extent to which the user's experimental data is to be shared with ARPA and the extent to which it supports an ARPA program.

Since being given its Agreements Authority, ARPA has entered into nearly 100 Other Transactions. Most of these have involved partnerships or consortia, either already existing or formed specifically to conduct a particular ARPA-sponsored research or development effort. As a consequence, much of the response to IDA's survey addressed the formation and operation of consortia. Projects surveyed include the Display Materials Consortium, Investment Casting Cooperative Arrangement, and Integrated High-Performance Turbine Engine Technology (IHPTET) Fiber Development Consortium.

2. METHODOLOGY

Using contacts identified by ARPA Program Managers who had worked with participants in Other Transactions signed in fiscal years 1990-1993, IDA conducted interviews with as many participants as possible. The projects and organizations included in the survey are listed in Appendix A. Letters describing the survey effort and a set of discussion questions were provided to the participants in advance so they could prepare for the interview. These letters and questions are reproduced in Appendices B, C, and D. In some cases it proved impossible to make a connection in a timely way, so some participants and some projects are not represented in the survey results (see Appendix A).

Most interviews were conducted by telephone; some were conducted face to face. When it seemed appropriate, IDA researchers contacted a participant a second time for follow-up or clarification. The results of the interviews were then collected and interpreted and prepared for presentation as a set of briefing slides and this report.

This survey results are largely anecdotal. We have avoided quantifying the reported results so as not to imply either numerical precision or statistical significance that is not in keeping with the survey's size or the methods we used. However, we believe that the participants we contacted are typical of the body of ARPA-funded researchers and organizations and that they—and their responses—are representative of those who have been involved in Other Transactions.

3. STRUCTURE AND CONTENTS OF AN OTHER TRANSACTION AGREEMENT

The typical ARPA Other Transaction agreement is much simpler and shorter than a procurement contract. While there is no one format for such agreements (because they can be used for such a wide variety of differing transactions), ARPA does have a "Model Consortium Agreement" that is fairly typical. This model consists of a cover sheet, thirteen articles (most of them quite brief), and five attachments.

Articles

1. Scope of the Agreement
2. Term
3. Management of the Project
4. Agreement Administration
5. Obligation and Payment
6. Disputes
7. Patent Rights
8. Data Rights
9. Foreign Access to Technology
10. Officials not to Benefit
11. Civil Rights Act
12. Order of Precedence
13. Execution

Attachments

1. Statement of Work
2. Report Requirements
3. Schedule of Payments and Payable Milestones
4. Funding Schedule
5. List of Government and Consortium Representatives

Article I, "Scope of the Agreement," typically contains a vision statement for the project that is worked out jointly by the consortium and Government representatives. This vision statement is critical in giving the parties a clear joint understanding of what they are undertaking from the very beginning.

4. PARTICIPANT RESPONSES

This chapter sets out the responses of survey participants to the discussion questions posed by the IDA investigators. The initial set of these questions—three were added later in the course of the interview process—is included in Appendix D. *The reported opinions in this chapter are those of the various participants, not of IDA or any individual member of the IDA study team.* No attribution is given for particular statements because the participants were promised anonymity in exchange for their open and candid participation.

4.1 EFFECTIVENESS OF PROGRAMS CONDUCTED UNDER ARPA “OTHER TRANSACTIONS”

IDA asked participants to consider their experience under the Other Transaction in comparison to other Government contracts (if the organization had any) or similar commercial arrangements. In particular, we asked them to consider:

1. the reasons why the Other Transaction worked or did not work for their organization;
2. their interactions with ARPA—or with another agency acting as an “ARPA Agent” for the Other Transaction; and
3. both strong points and problems encountered using the Other Transaction agreement in terms of business issues (the agreement itself and its administration), managerial issues (the consortium and research project and their administration), and technical issues (the performance of the technical tasks under the Other Transaction).

Participants were generally very enthusiastic when asked about the effectiveness of programs conducted under Other Transactions. Effectiveness in this context tended to mean:

- the program would not have occurred, and the work would not have been undertaken, without the use of the Other Transaction;
- it would not have produced equally meaningful and useful results; or

- it was more efficient or less expensive than it would otherwise have been.

The remainder of this section presents some of the specific issues respondents discussed regarding effectiveness.

4.1.1 Project Management

Flexibility was cited most by participants as the key element of Other Transaction effectiveness. Management by a steering committee with ARPA consent and oversight allowed necessary and appropriate changes of scope and technical direction to be made easily and fostered free and open sharing. Participants were able to easily restructure the research when a change of course was necessary, making mid-course corrections under the guidance and oversight of the ARPA Program Manager as they learned from research results. The flexibility of ARPA Program Managers and contracting officers made changing the schedule in response to changing research needs easy.

The power of a consortium is in its steering committee, which can run the consortium like a commercial program, making changes as needed. This power means less administration and more flexibility for the consortium members. One participant described the Other Transaction as “an order of magnitude” more effective at allowing this kind of agility than a procurement contract. One consortium found that for technical reasons, it had to completely redo its program early on. All the members had to do, once they had agreed on the revisions that were needed, was send the new plan to the ARPA Program Manager for approval. Most changes are done within the team by telephone calls.

One participant, reflecting a view shared by others, said that flexibility allows timely decision making. The steering committee for this participant’s particular project works very well with the ARPA Program Manager. When they determine that a change is appropriate, they frequently can get the ARPA Program Manager’s approval and immediately implement the change. This saves time and money. Both major and minor changes of direction are easily accomplished with no need to go to a Contract Officer and negotiate a contract modification as might be required under the FAR.

4.1.2 Contractual Requirements

Participants in a number of projects reported that their programs were only possible under Other Transactions and would never have been attempted under the FAR. There were several reasons given for this. Commercial companies and other organizations vital to the success of some programs were not able or not willing to function under FAR rules.

Particular problems cited included the rigidity of mandated schemes for intellectual property sharing and protection, the intrusiveness and complexity of DoD-required accounting systems, and onerous requirements imposed on supplier-subcontractor relationships.

Companies who customarily protect their new inventions as trade secrets have difficulty with the requirements of the Bayh-Dole Act¹, applicable to procurement contracts, grants, and cooperative agreements, that all patentable inventions be disclosed and patented by the inventor or made available to the Government for it to patent.

Companies who operate in the commercial sector using accounting systems based on generally accepted accounting principles (so-called "GAAP systems") are not often willing to create separate, parallel, cost-based accounting systems for R&D contracting that comply with FAR-mandated cost accounting standards (CAS).

Companies with established long-term relationships with suppliers and subcontractors are reluctant to operate under requirements that suppliers and subcontractors be competitively selected at each step in an R&D effort where they are needed.

4.1.3 Consortium Organization

Participants consistently commented that getting a new consortium started is often difficult. Some early delays are due to lack of understanding by the participants about how to set up a consortium. Careful, deliberate planning of inter-company communications is needed. Care and time must be spent early in resolving difficult issues, such as intellectual property rights.

Program effectiveness was particularly affected by the initial start-up. Several respondents pointed to start-up problems leading to initial delays, poor administration, and reduced effectiveness in attaining program goals. Several suggested ARPA take a more active role in the start-up process by providing leadership and suggesting models for consortium structure and management. ARPA could have been a little more assertive up front, they said, to cut down on some of the early problems in getting things started.

Start-up delays were not always reported as a problem. In some cases, consortium members pointed to slow start-up as a necessary part of getting organized. One reported that in the beginning there were delays getting started because nobody knew how to get

¹ 35 U.S.C. §§ 201-212.

organized, but once the research effort got started, progress was good, implying—at least to this one respondent—that this was due in part to the time and care spent at start-up. Another reported that member companies spent a long time carefully defining the information content of each inter-company transaction. This effort smoothed the way for all levels of cooperation among the member companies of the consortium. It took a lot of up-front discussion covering such areas as intellectual property rights so that everyone would finally sign the agreement.

4.1.4 Administrative Requirements

An efficient program is one that costs less, progresses more quickly, and attains its goal better than others of the same magnitude. Many of the participants interviewed said the work of their research consortia was more efficient than similar programs performed under the FAR. Technical progress is more rapid. Instead of spending project funds on non-value-added reports, they said they were able to spend them on the technical work. Some recipients reported having goals near the utmost limit of what they could expect to achieve—and they were able to reach them.

One researcher said he had never seen a group work so well together. They were able to conduct their investigations at a much faster pace. Another said the Other Transaction “is a wonderful way to fund research efforts when you do not know in advance where you are going to end up.” It allows participants to concentrate on getting the work done, not on program administration. This researcher’s project reported the common experience under an Other Transaction that time is spent on technical work, not on non-value-added reporting. If the consortium works well together, the members can proceed at a much faster pace.

4.2 PROGRAM ADMINISTRATION

Participants were asked to consider how the use of an Other Transaction affected the way their organization administered its program. Program administration in this context chiefly meant managing the flow of funds, maintaining project schedules, and organizing deliverables and reports. We asked them to tell us if and how program administration was reduced and whether there were any areas where it was greater than they believed it should have been. We requested specific consideration of contract administration, overhead, accounting practices, reporting issues, and cost savings.

4.2.1 Administrative Procedures

A typical FAR contract requires a contractor to provide for specialized contract administration as well as project-specific administration. One of the key aspects of the project administration requirements is a CAS-compliant cost accounting system. The Other Transaction mechanism eliminates the need for specialized contract administration, and substantially reduces the scope of project-specific administration.

Firms that have CAS-compliant cost accounting practices, methods, and tools typically continue to use them to support their work performed under an Other Transaction, simply because those systems are available. Firms that do not have CAS-compliant systems need not acquire them. One respondent reported that his firm chose to use its existing CAS-compliant system because the firm's accountants insisted on it, although it might have been easier to administer the project using a simple system developed on a personal computer using Microsoft Excel. While use of such a customized system might have added some development costs in the short term, it would have saved money in the long term through its simplicity and ease of use. Moreover, the development costs could have been recovered through use of the system in later consortia involving some or all of the same participants. The accountants' chief concern seemed to be allowing for a possible Defense Contract Audit Agency (DCAA) audit (even though the agreement did not provide for such an audit). This respondent reported that his firm knows that DCAA can audit non-conforming accounting systems because it has done so in other contexts.

Interview respondents universally praised the great flexibility in reporting work progress and status to ARPA as a large point in favor of the use of Other Transactions.

The participants who were contacted in this survey enthusiastically endorsed the administrative simplicity engendered by the Other Transaction vehicle. It clearly reduces contractor overhead, which straightforwardly translates into cost savings, when compared to a traditional Government procurement contract.

4.2.2 Researcher Productivity

Research scientists and engineers stated that the very nature of Other Transactions is such that the contract vehicle does not get in the way of conducting the research. The lack of a predetermined, overly detailed, rigid, and immutable Statement of Work is helpful. An experienced research team should begin with a Statement of Work that is appropriately detailed; the advantage of Other Transactions is that the Statement of Work can easily be

altered as needed as the research progresses and the obtained results suggest new avenues for investigation.

4.2.3 Project Administration Paradigms

The consortia examined in this study employed three different ways for doing the basic administrative tasks. Two of the three paradigms—administration by team member and administration by “outside” contractor—were satisfactory. The third—administration by a university that was not otherwise a consortium participant—was barely acceptable, chiefly because it appeared to add cost without adding much value.

4.3 PARTNERSHIPS, CONSORTIA, AND TEAMWORK

Because most ARPA Other Transactions have involved consortia, participants were asked to consider how operating under an Other Transaction affected their relations with other members of their partnership or consortium. They were to consider:

1. Up-front “team building”
2. Management of the consortium
3. ARPA participation, whether as a partner, advisor, or customer
4. Mechanisms for resolving intra-consortium disagreements
5. Selection of partners
6. Sharing of information
7. Willingness of partners to do their assigned tasks
8. Level of trust
9. Commercialization implications

Participants indicated that a Memorandum of Agreement (MOA) needs to be worked out early on. The selection of partners is an important part of the process and must be part of the team-building effort. This is time consuming and should be completed prior to project initiation. If time is not allocated for this process, the first couple of months after project initiation become devoted to getting everyone on board and the real work of the consortium is delayed. When new members enter the partnership, they must be willing to sign up to the existing MOA.

Because the leader of the consortium plays an extremely important role, consortium organizers generally expend a great deal of effort to find the right organization or agency

to lead the group. There appear to be instances where it is better to have an existing member of the consortium act as the leader if everyone else agrees. If this is not possible, then it becomes necessary to go outside the consortium to find a leader. This role as the leader of the consortium can sometimes be played effectively by a Government laboratory. These laboratories usually possess the necessary technical capability and can also act as an "honest broker" for ARPA and the Government. In some cases, two steering committees were established—a management group and a technical group. The management group conducted scheduled meetings or conference calls while the technical group met informally on an as-needed basis to solve day-to-day problems.

The degree of ARPA Program Manager involvement was considered just about right by most survey participants. In several cases when a Government laboratory was the leader of the consortium, the ARPA Program Manager had very little interaction with the consortium except at quarterly reviews. This degree of involvement was generally said to be adequate in most circumstances. When a member of the consortium was selected as the leader, the ARPA Program Manager would typically spend more time becoming involved in the process. This was especially true at the start up of the consortium. Some participants indicated that the ARPA Program Manager should have been more involved in their particular projects or should have interacted with a wider range of consortium members (not just the lead organization), but realized that the Program Manager's workload and involvement in other issues might have precluded greater involvement. Another important attribute of the ARPA Program Manager is the capability to remain flexible and allow for changes in the milestones as the research agenda changes. This capability enables ARPA Program Managers to work with consortium management committees to restructure an R&D effort easily when necessary and to improve the overall scheduling process in real time.

Consortium governing agreements generally provided a formal mechanism for resolution of disputes among partners. These procedures were seldom used. In most instances, discussion and persuasion leading to consensus were the preferred form of conflict resolution.

Partner selection was recognized as a critical element in every consortium, but identification and selection of the right partners were not regarded as problems. Each consortium evolved methods for determining who to include, some with guidance from an ARPA Program Manager about a source for a particular capability that was needed.

The overall sharing of information and level of trust were reported to be generally excellent. Careful planning of inter-company activities in the initial stages of a consortium allowed for some creative solutions for this potential problem area. From the standpoints of cooperation between traditional competitors and the pooling of resources, Other Transactions worked extremely well once the initial negotiations were completed and an MOA was signed by all the members of the team. As time went on, concern about competitive information seemed to diminish as the consortium began to build a level of trust that enabled the sharing of necessary information.

Respondents reported no particular problems with consortium members being either unable or unwilling to do their assigned tasks. Where such problems arose, they were handled within the consortium management framework by applying appropriate forms of persuasion or by reassigning the work to other members and giving the non-performing partner other appropriate work to do instead.

Consortia have spawned new projects, relationships, and other business ventures as a result of the working relationships and rapport that have been established by virtue of Other Transaction agreements. A high level of trust usually develops among the members of a consortium that makes the sharing of information much easier. Most of the participants felt that the learning curve required to conduct the team building efforts would be minimized the second time around. As a result of their experience participating in consortia under Other Transactions, some universities and companies are becoming pro-active in setting up working agreements to allow students the opportunity to observe how companies operate in the real world and even obtain part-time employment that could lead to future full-time employment.

4.4 MECHANISMS FOR REVIEWING PROGRESS AND MAKING PAYMENTS

Participants were asked to consider:

1. the mechanism by which the ARPA Program Manager monitored the progress of their project,
2. the importance of "payable milestones",
3. the method of receiving payments,
4. the timeliness of payments, and
5. other possible mechanisms to review progress that they might recommend.

Researchers were pleased with the ability to establish milestones up front and to base progress payments on attaining milestone objectives instead of reporting cost as a payment metric with a set of fixed deliverables. Milestones were established within each consortium by members with expertise in the research area. As research progressed, future milestones were adjusted to reflect knowledge gained in previous phases.

4.4.1 Milestone Flexibility

Unlike fixed deliverables, milestones are easy to change when required by an evolving research agenda. They are more compatible with researchers' application of "best engineering judgement" than are fixed deliverables. Participants reported that the flexibility of their agreements made it easy to change the schedule and milestones when it was necessary. Some respondents said they rewrote the schedule each year based on the prior year's results. If changes were needed, they simply worked them out through the consortium management process and then with the ARPA Program Manager.

4.4.2 Payable Milestones

Most said payable milestones are far better than cost-based payments tied to fixed deliverables. Milestones can be a driver, the drumbeat, keeping the work on track, creating a series of "mini-fixed-price contracts." Some respondents said payable milestones forced them to produce on time. They liked the fact that they could set tasks early with clear milestones and a set of deliverables instead of cost-based work.

While payable milestones were generally lauded, one respondent pointed out that they must be carefully designed to provide an adequate flow of funding as research progresses. Payments must be both reasonable and timely.

4.4.3 Reporting Requirements

Participants said that reporting progress was much more important and appropriate than reporting costs. Other Transactions allow organizations to report what they have done in the way of productive work—what has been accomplished during the reporting period. Reporting becomes aligned to the goals of the program, and becomes a meaningful summary of progress. Reporting of costs incurred is not important because the organization is being paid for progress in research, rather than simply being reimbursed for its expenditures.

ARPA reporting requirements, characterized by participants as minimal but adequate, yield cost savings. Respondents see overhead savings from less-than-extensive

reporting requirements and regard this as a more efficient way to operate. Once every few months was deemed by respondents to be about the right frequency for face-to-face meetings with the ARPA Program Manager.

4.4.4 Payment Promptness

This is an area that could use some correction. While some participants reported extremely prompt payment, others suffered from extremely slow payments. Where there have been problems, some have been with a consortium administrator, some with ARPA, some with a payment office elsewhere in DoD or in some other Government agency. Reports about the promptness of payments ranged from glowing praise to bitter complaints. All these seem to point to policy and practice problems and not disagreements between ARPA and participants over milestone completion.

Both Government and private sector administrators unfamiliar with milestone payments under Other Transactions were cautious and sometimes slow in paying. At the same time, lead companies and Government agencies in some of the programs were praised for their payment promptness. As part of its defining model, some respondents suggested ARPA should include guidance for organizations and agencies that process payments to consortia and their members.

4.5 FOREIGN ACCESS TO TECHNOLOGY

Each ARPA Other Transaction agreement includes a provision limiting foreign access to technology developed under the agreement and requiring participants to disclose any planned foreign access to ARPA for review and consent. The purpose of this provision is to assure that the principal economic benefit of ARPA funding accrues to the economy of the United States. Respondents were asked to assess the effect of the restriction on their project by considering four questions:

1. Did you have plans for foreign access to technology—including, possibly, having non-U.S. firms in your partnership—before entering into the agreement?
2. Were any restrictions on foreign access imposed on you by ARPA? Were they onerous? Did they require changes in project plans?
3. Did your plans for foreign access change during the project?
4. Did you have occasion to negotiate with ARPA over foreign access issues? Were the negotiation process and the results satisfactory?

The ARPA provision described previously does not address the use of foreign nationals as researchers, a common occurrence when universities participate in projects under an Other Transaction. Some respondents noted this as an area of concern to them that was apparently not of concern to ARPA, despite ARPA's general concern that the benefits of its research funding accrue principally to the U.S. economy.

Some participants reported problems related to participation in their consortia by foreign-owned firms. In at least one case, a foreign-owned firm that initially planned to participate ultimately dropped out because issues related to its foreign ownership would not permit it to agree to limit foreign access. In another, a participant was being acquired (at the time IDA interviewed participants) by a foreign firm after the consortium's project was well under way and other consortium members were anticipating problems as a result. In a third case, a major consortium participant was a Japanese-owned firm that conducted all of its business in the United States, which caused some concern on the part of other participants.

Because the ARPA-required provision provides a mechanism for a consortium to notify ARPA of a proposed foreign access and obtain ARPA's consent, it appears to have afforded sufficient flexibility to allow the respondents to deal with changes in their plans for foreign access. In at least one case, the strong business interests of one participant in transferring consortium-funded software overseas were recognized first by the consortium and then by ARPA. The result was an agreement allowing the software to be sold overseas earlier than the original Other Transaction would have allowed, subject to a restriction that it be provided solely as object code.

4.6 INTELLECTUAL PROPERTY RIGHTS

Respondents were asked to discuss the effect of working under an Other Transaction on the allocation of rights in intellectual property (such as patents and copyrights), and how this vehicle affected their ability to protect existing proprietary property used in the performance of work with program partners.

They were specifically asked to consider:

- the ability (or inability) of the consortium to allocate and share intellectual property,
- the process by which the allocation was determined,
- the consortium's ability to address problems in this critical area, and
- access to technologies that would otherwise not have been available.

Also relevant to this area was the relationship between consortium materials and the Freedom of Information Act (FOIA). Some respondents noted that ARPA and other Government agencies involved went to some lengths to arrange for the proprietary information of consortium participants to be protected from disclosure under FOIA. This was usually accomplished by avoiding actual delivery of such materials to the Program Manager, although provision was made for the Program Manager to review them on the premises of some consortium member.

In general, respondents reported either that the patent rights regime imposed under the Bayh-Dole Act (which is the mandated regime in all contracts, grants, and cooperative agreements) that is the "ARPA default" for Other Transactions posed no difficulty for them, or that ARPA showed sufficient flexibility to develop a different allocation of rights that was acceptable to all parties. For those consortia that included participants who customarily chose to protect their intellectual property as trade secrets, the availability of an intellectual property rights regime that did not require patenting was the key provision of an Other Transaction that made the particular project possible at all.

4.7 POTENTIAL FOR FRAUD, WASTE, AND ABUSE

ARPA's Contracts Management Office asked IDA to query participants about their view of the risk of fraud, waste, and abuse under Other Transactions as compared to the risk under agreements governed by the FAR. All who responded said that the level of risk involved in operating under Other Transactions was no greater than operating under the rules of a Government procurement contract.

4.7.1 Effects of Consortium

One common response was that in a consortium made up of many entities including universities, Government laboratories, and industrial firms, there is less of a chance for potential fraud, waste, or abuse violations since there is always someone "looking over each participant's shoulder." Respondents generally said that the members of a consortium have the ability to monitor one another and, as a result, to minimize the risk for these types of problems.

Requiring members of a consortium to share the costs of the project was recognized as a great inhibitor to waste. Organizations are less likely to tack on costly overhead activities when they have a financial stake in the process. Although cost sharing presented a financial hardship for a number of companies, it has proven to be a true test of a

company's commitment and has weeded out some consortium members who were unwilling to back up their "commitment" with funding.

4.7.2 Use of Outside Administrator

Bringing on board an "outsider" just to act as an administrator for the consortium appeared to be a wasteful choice. In one consortium this was done because none of the members wanted the task of consortium administrator. Several companies in this consortium nevertheless felt that the addition of this "outsider" was an expensive way to conduct business and not money well spent.

4.7.3 Accountability

The flexibility offered to researchers by the use of an Other Transaction is viewed by the participants as a real advantage over traditional Government R&D contracting methods. A research direction can be changed by a simple decision of the consortium governing body, concurred in by an ARPA Program Manager, without time-consuming and costly contract modifications. Unfortunately, "unfettered" flexibility—that is, increased flexibility not balanced by an appropriate degree of accountability—may increase the risk of waste. Many participants share the view that provisions of the FAR and DFARS substitute adherence to a set of rigid rules for real accountability as a way to reduce the potential for fraud, waste, and abuse. The price for this kind of regulation, however, is greatly limited adaptability. As participants indicated, true accountability requires that decision makers exercise judgment rather than following rules and substantiate their decisions on some basis more relevant to each particular situation than just having recourse to the "rule book."

Instead of rigid rules, ARPA provides accountability through the use of self-policing consortia, cost sharing that gives participants a strong incentive to avoid waste, the involvement of ARPA Program Managers in their projects, and appropriate oversight of those Program Managers by ARPA management. Further, ARPA "arms" itself with a walkaway termination clause to make it easy to end an unproductive project with a minimum of waste and bother.

4.8 COST SHARING

Cost sharing emerged in participant responses as a significant area of concern, even though it was not explicitly addressed in the discussion questions sent out by IDA. The burdens and benefits of cost sharing reveal a wide range of attitudes on the part of

consortium members. There were many reports of praise for the practice and many complaints.

Cost sharing is generally regarded as a test of commitment. Respondents suggested that if an organization is not interested in an area enough to share costs, then perhaps it should not pursue opportunities in that area. This was seen as a question of “putting your money where your mouth is.” For some, cost sharing was deemed appropriate because, they said, the effort was a “worthy project” for their company.

4.8.1 Drawbacks

Companies and laboratories that had to come up with matching funds had a problem if the money was not available. Even some larger companies have trouble in this area. One company suggested ARPA consider a liberal interpretation that allows for a prorated share for small companies.

Larger companies sometimes had to “foot the bill” for their smaller consortium partners. In return, in some cases, they wanted some form of *quid pro quo*. This put the smaller companies at a disadvantage because such “paybacks” can sometimes create uncomfortable “debts.”

One traditional Defense contractor reported that funds for cost sharing in his company could only come from profit (fee) or internal R&D. Profits in cost-type Government contracts are limited by law. There is much competition within such companies for internal R&D funds, and these funds are often reserved for those research programs that are expected to lead to Government production contract opportunities. This limits the amount of funds available to traditional Defense contractors for cost sharing on other kinds of research efforts.

4.8.2 Advantages

Some participants reported that cost sharing can help keep highly talented company employees busy at times when the company’s own research efforts are not sufficient to occupy them. Involvement in a cost-shared project allows a company to keep its staff productively occupied *on projects of value both to it and to ARPA* for “half price.”

One participant reported that this approach can backfire if a project is outside of a company’s core competence. Companies working outside their core competence, and therefore without a strong vested interest, lose their intensity. Their work and the cost

sharing arrangement simply cover otherwise idle employees. Their contribution is then of less value to the Government and to the consortium.

Participants reported that company R&D dollars can go much farther if they are cost shared with the Government. Companies can undertake needed research programs and the Government foots half the bill. Some smaller companies can stretch even farther by using the resources of their larger partners. Cost sharing can be a great advantage for small companies that usually do not have a large R&D budget because they are oriented toward production. This process allows these companies to utilize the resources of large companies to assist them to participate in the R&D arena.

4.8.3 In-Kind or Cash

There were several calls for flexibility in allowing in-kind (non-cash) cost share. According to one respondent, his management is overly sensitive to hardware cost vs. software cost and cash cost sharing vs. in-kind cost sharing. The company spent \$50,000 to solve a problem using people and software instead of buying hardware, even though they knew the hardware would cost a lot less. This participant suggested ARPA buy hardware and let companies provide people.

In several programs, ARPA received more cost share value than it required. In one case, ARPA initially committed to put up about 12% of the cost of the project. The consortium collected the rest from its other members. *An important difference in this program is that the costs shared by participants were only in the form of cash.* Most members also provided in-kind contributions, effectively reducing ARPA's share of costs, but none of them was counted in calculating cost share to meet the contractual (or statutory) requirement.

Another frequent occurrence was the provision of additional resources by consortium members after the project was in progress, reducing the ARPA share below initial estimates and statutory requirements.

4.8.4 Adjustment for Risk

Some respondents suggested that where an organization's risk is higher, its share of cost should perhaps be lower so that the Government takes on more of the risk. A consortium member, willing to participate, may bring a valuable expertise to the program. In some cases, the cost share may be great and the benefit to the program valuable but the return for the participant carries considerable risk. Some suggested the Government take

this into account and reduce the required share of cost to offset the risk. Ratios other than 50/50 may be appropriate in higher risk projects and some exceptional cases should perhaps require no cost sharing.

4.8.5 Test of Commitment

Although cost sharing for Government-sponsored R&D appears to be widely disliked, it generally appears to fulfill its purpose of requiring non-Government participants to demonstrate their commitment to an R&D effort, and there seems to be no better alternative mechanism for assuring such commitment. However, small businesses claim that having to match the Government dollar for dollar makes it all but impossible for them to participate. The unpopularity of cost sharing does not mean that ARPA should not continue to require it. Still, variances from a rigid requirement for 50/50 cost sharing may be appropriate in some cases either to attract certain entities such as cash-poor small businesses to participate, or because the technical or business risk is greater than usual, making a greater Government share of the cost burden more appropriate. There is some risk, however, of weakening the usefulness of cost sharing as a test of commitment by accepting "in-kind" forms of cost sharing that are of questionable value to the R&D project or whose value may be difficult to assess.

4.9 SUGGESTIONS FOR IMPROVEMENTS IN THE USE OF OTHER TRANSACTIONS

A number of suggestions were made by persons interviewed about possible improvements. This is not to imply that the Other Transaction was believed to be ineffective. Rather, the suggestions were offered in order to make something they perceived as being good even better.

4.9.1 Outsider Role in Consortia

Some interviewees expressed a belief that having an outsider, for example, ARPA or a Government laboratory, as a non-voting member of a consortium could help to keep the playing field level by acting as referee in inter-company clashes with respect to trade secrets or other intellectual property issues. This could be a good role for a Government laboratory, either one of the Defense Department laboratories (such as Wright, Rome, the Army Research Laboratory, or the Naval Research Laboratory), or one of the Energy Department Laboratories (such as Sandia, Los Alamos, or Argonne).

ARPA sits as a non-voting member in both the management oversight committee and the technical oversight committee of one consortium. As always, the real value brought to the table depends heavily on the skills, education, and experience of the person or persons selected to represent the Government. In addition to having the ARPA Program Manager on the oversight committees to serve as a referee, the management oversight committee for one consortium also makes use of a support contractor to perform purely administrative functions. This contractor collects reports, distributes funds, and arranges for teleconferencing and multi-media conferencing. In this particular case, although not in all, the presence of such a support contractor also helps to reduce or eliminate resentment among the team members.

4.9.2 Prorating Small Firm Cost Sharing

The interviews indicated that small firms often have difficulty in matching Government funds. Several persons interviewed expressed the opinion that ARPA could relieve this problem by using a prorating scheme, requiring less than 50% of costs from small businesses.

4.9.3 ARPA Program Manager Participation

Several organizations interviewed would have preferred to see the ARPA Program Manager more often. In some consortia the ARPA Program Manager dealt with the lead firm but not with the non-lead firms; some of these firms would appreciate being able to discuss technical and programmatic issues with the ARPA Program Manager on a relatively regular basis.

4.9.4 ARPA Role in Consortium Start-Ups

Several organizations expressed the opinion that ARPA should have a generic MOA available for distribution to all members of a consortium, and, further, that ARPA should get involved and get project information flowing early on. Most successful consortia have clearly and succinctly defined their information sharing transactions; in fact, this is the essence of any workable collaboration. Many participants believed that ARPA should initiate and facilitate this definition process from the beginning.

5. FINDINGS AND PARTICIPANT SUGGESTIONS

5.1 POSITIVE FINDINGS

Other Transaction participants who responded to IDA's request for information reported a number of areas in which they viewed the Other Transaction as a superior funding vehicle for Government-sponsored R&D efforts. In general, IDA found these responses to be credible in light of IDA's experience with ARPA-sponsored research efforts and other Government-funded R&D.

There was almost universal praise for the effectiveness of the Other Transaction at allowing R&D to go forward efficiently. Most respondents reported that program administration was generally simpler than under procurement contracts or cooperative agreements. Other Transactions increased researchers' efficiency by reducing the degree to which administrative burden intruded on the actual R&D effort. A number of respondents reported that the use of an Other Transaction enabled research efforts that the participants involved would not otherwise have undertaken. Respondents also noted the flexibility of the arrangement, which made re-directing research efforts easy when it was necessary. They also frequently reported that it was easier to become more efficient under an Other Transaction than in their other Government-funded research efforts.

Participation in an Other Transaction has generally also meant participation in a partnership or consortium. While some participants found the collaboration experience difficult, they did note that the consortium structure made possible information sharing based on mutual trust. Consortia can be self-governing and resolve their own problems without recourse to contract dispute mechanisms. Learning how to operate in a consortium framework as the result of an Other Transaction has sometimes led to new business opportunities. Most also felt that the level of ARPA program manager involvement in their consortia was just about right.

ARPA's use of payable milestones as the mechanism for progress review and payments was universally well regarded. Participants particularly took note of the flexibility of the mechanism and its tendency to keep a project moving forward, much like

a "series of 'mini-fixed-price contracts.'" Generally, payable milestones and the flexible reporting requirements used with them were regarded as allowing participants to report *progress*, as opposed to "merely" reporting expenditures.

Foreign access to technology was generally not an issue for the responding participants. Either the issue did not arise in the context of their particular project, or ARPA's standard approach and agreement language were sufficiently flexible to meet the participants' needs. IDA is aware that ARPA's experience in some later projects not included in the survey indicates that there can be serious problems in this area, particularly with large multi-national manufacturing firms. ARPA considers its policy on foreign access to be required by law and an otherwise prudent approach for an R&D funding agency that wants to ensure that the principal economic benefit of its efforts accrues to the United States economy.

ARPA's flexible approach to the allocation of intellectual property rights, based in the legislative exemption of Other Transactions from the requirements of the Bayh-Dole Act, made a favorable impression on most participants. In general, Other Transaction participants either could operate within the requirements of Bayh-Dole or were able to reach an accommodation with ARPA that allowed a different intellectual property rights regime for their projects. ARPA's flexibility with respect to the delivery of reports containing proprietary information also met with favor among respondents because it allowed them to avoid potential difficulties raised by the Freedom of Information Act.

Participants viewed Other Transactions as no more likely to encounter waste, fraud, or abuse than other kinds of Government agreements. They saw the use of consortia as creating a self-monitoring environment that tends to prevent "misbehavior" by individual participants. They saw cost sharing as an inhibitor to waste, and they saw no increased risk of fraud, waste, or abuse resulting from the absence of the many "protective" rules applicable to procurement contracts.

Cost sharing also drew favor as an effective mechanism for assuring some level of commitment on the part of project participants. It can allow a firm to have higher-quality employees than it could afford using only its own funds, and it can provide a way to do research of interest to the company, with ARPA "paying half the cost."

5.2 NEGATIVE FINDINGS

The largest area of complaint among respondents was that forming a consortium is difficult and time consuming. Partnering is a relatively new concept for American industry,

no less in the Government-funded R&D arena than in any other. Participants particularly noted that critical decisions needed to be made early, that a detailed MOA was important to clearly establish the roles and responsibilities of all players, and that the choice of a consortium leader was critical to the success of the venture.¹

Respondents often complained of difficulty in finding the right entity to perform the needed project administration tasks, whether that entity was a consortium participant, a non-participating interested firm, or a disinterested third party such as a university or Government laboratory.

Prompt payment was commonly reported as a problem, despite the flexibility of the billable milestone payment method. Problems were reported with ARPA and with various disbursing agents in the consortia themselves or in Government agencies performing this function on ARPA's behalf.

Some participants had concerns about participation of foreign entities in their consortia in light of ARPA policy with respect to foreign access to technology. Some expressed concern about the participation of foreign students and foreign employees of consortium participants, despite the lack of ARPA concern with this particular aspect of the foreign access issue.

Cost sharing also was regarded as having negative aspects. It is often very difficult for small firms to come up with their share of costs. Traditional defense contractors also felt disadvantaged by the need to share costs. Some complained that the pool of money available in their companies for research was limited to internal R&D and some portion of fee. This pool was subject to many competing demands, and priority was often given to projects that were deemed likely to lead to future production contracts. There was a concern that the availability of the Government's share of costs could lead a company to seek participation in an area outside of its "core competencies" just to get the Government share of funds.

¹ Consortium formation is clearly an area that the participants believe needs greater attention. ARPA's later experience in the TRP reinforces this belief. When ARPA set out to provide information in lieu of debriefing to the 2,500 unsuccessful proposers in the first TRP solicitation in 1993, it did so by enlisting private sector experts on partnering and consortia to present a two-day conference on that subject. The lack of appropriate attention to partnership formation and structure was the single most common deficiency in TRP proposals at that time. What is not clear is whether assistance in consortium formation should appropriately come from ARPA.

5.3 PARTICIPANT SUGGESTIONS

Participants suggested some improvements in ARPA's use of Other Transactions. Chief among these were the consistent use of an outside entity (ARPA program manager or Government laboratory representative) as a non-voting consortium member who can "referee" disputes. Many suggested a relaxation of cost sharing requirements either to enable more small business participation or to more appropriately allocate risk between the Government and the consortium. To ease the starting up of new consortia, several suggested greater ARPA involvement in consortium building and ARPA-provided start-up guidance for new consortia.

APPENDIX A. PROJECTS INCLUDED IN IDA SURVEY

Those participants who responded to the IDA survey appear in italics.

Projects Included in IDA Survey

Consortium	Project	Participants
Investment Casting Cooperative Arrangement	Precision Investment Cast Components	<i>Howmet Corporation</i> <i>General Electric Aircraft Engines</i> <i>Precisions Castparts Company</i> <i>Pratt & Whitney</i> <i>Universal Energy Systems</i>
Ferrite Development Consortium	Micromagnetic Components	<i>George Washington University</i> <i>EMS Technologies</i> <i>Raytheon</i> <i>Trans-Tech, Inc.</i> <i>Westinghouse</i> <i>MIT Lincoln Laboratory</i> <i>National Institute of Standards and Technology</i> <i>Naval Research Laboratory</i>
Smart Materials Consortium	Insertion of Smart Materials into Military Systems	<i>AVX Corporation</i> <i>Martin Marietta Laboratories</i> <i>Martin Marietta Astronautics Group</i> <i>Lockheed Missiles & Space Center</i> <i>BDM, Inc.</i> <i>Clemson University</i> <i>University of Maryland College Park</i> <i>Johns Hopkins University</i> <i>University of Denver</i> <i>TIMET Corporation</i> <i>Virginia Polytechnic Institute and State University</i> <i>Pennsylvania State University</i> <i>Naval Research Laboratory</i>
N/A	a	<i>3M Corporation</i>

a. 3M was not a participant in any of the ARPA-funded Other Transactions included in this survey. However, it has been involved in subsequent Other Transactions and its legal staff has been particularly forthcoming in addressing in meetings and publications the difficulties a commercial company encounters in trying to do Government-funded R&D. 3M was included in this survey at the suggestion of the ARPA General Counsel.

Projects Included in IDA Survey (Continued)

Consortium	Project	Participants
Affordable Polymeric Composite Materials	Affordable Polymeric Composite Materials	<i>McDonnell Douglas</i> <i>BP Chemicals</i> <i>Production Products, Inc.</i> <i>Virginia Polytechnic Institute and State University</i> <i>Washington University</i> <i>Zoltek Corporation</i> <i>Naval Research Laboratory</i> <i>Heath Techna Aerospace</i>
N/A	Active Matrix LCD Manufacturing	<i>Optical Imaging Systems</i>
Materials Synthesis Consortium	Advanced Molecular Beam Epitaxial Technology	<i>Hughes Research Laboratories</i> <i>Texas Instruments</i> <i>EPI/Chorus Corporation</i> <i>Superior Vacuum Technology</i> <i>J.A. Woollam Company</i> <i>University of Colorado</i> <i>University of New Mexico</i> <i>University of Southern California</i> <i>University of Virginia</i> <i>Sandia National Laboratory</i>
(Unnamed)	Advanced Photorefractive Nonlinear Optical Material	<i>Optitek</i> <i>IBM</i> <i>GTE</i> <i>Hughes Aircraft Company</i> <i>Hoechst-Celanese</i> <i>Rockwell International</i> <i>Stanford University</i> <i>SRI International</i>
Optical Network Technology	Ultra-Fast, All-Optical Communications Systems	<i>NORTEL Federal Systems</i> <i>BellSouth Telecommunications</i> <i>Georgia Tech Research Corporation</i> <i>Columbia University</i>
Display Materials Consortium	Visible Vertical Cavity Surface Emitting Laser Materials	<i>Bandgap Technology Corporation</i> <i>Brown University</i> <i>Purdue University</i> <i>Colorado State University</i> <i>Photonics Research, Inc.</i> <i>Sandia National Laboratory</i>
U.S. Display Consortium	High Definition Display Manufacturing Technology	<i>AT&T</i> <i>Xerox Palo Alto Research Center</i> <i>Optical Imaging Systems, Inc.</i> <i>Standish Industries, Inc.</i> <i>American Display Corporation</i>

Projects Included in IDA Survey (Continued)

Consortium	Project	Participants
IHPTET	Advanced Ceramic Fibers for High Temperature Engine Components	<i>General Electric Aircraft Engines</i> <i>United Technologies - Pratt & Whitney</i> <i>Allied Signal Garrett Engine Division</i> <i>GM Allison Gas Turbine Division</i> <i>Textron - Lycoming Division</i> <i>Williams International</i> <i>Teledyne CAE</i>
(Unnamed)	Massively Parallel Supercomputers	<i>Cray Research Corporation</i> <i>Sandia National Laboratory</i>
(Unnamed)	Concurrent Supercomputing	<i>Intel</i> <i>California Institute of Technology</i> <i>NASA Jet Propulsion Laboratory</i>

APPENDIX B. TEXT OF LETTER SENT TO POTENTIAL STUDY PARTICIPANTS BY ARPA DIRECTOR

Dear [OT Participant]:

Since 1989 ARPA has had the authority to enter into contractual arrangements—called Other Transactions—with its private sector R&D partners that offer greater flexibility and reduced administrative burden when compared with the typical Government contract. Congress granted ARPA this authority in recognition that procurement contracts are an inappropriate vehicle for science and technology contracting, a principle recognized in the Federal Acquisition Regulation (FAR) itself. Grants and cooperative agreements are generally suited for public purposes like the advancement of science and technology. However, Congress recognized that there are situations faced by ARPA in which even the availability of these agreements does not provide sufficient flexibility for every ARPA research venture.

Since being given its other transaction authority, ARPA has entered into some forty such agreements, including at least one involving your organization. Most of these have involved partnerships or consortia, either already existing or formed specifically to conduct a particular ARPA-sponsored research or development effort.

In these times of shrinking Defense budgets, it is imperative that ARPA make the most effective use possible of its resources to fund the development of technologies crucial to national security. I believe that other transaction authority is a vital cornerstone of ARPA's ability to do this. I have asked the Institute for Defense Analyses (IDA) to

undertake a survey of organizations that have participated in other transactions to elicit those organizations views of the benefits (and drawbacks, if any) of this extremely valuable tool. Because of your experience as a participant, your opinions and any supporting information you can provide are vital to this effort. We need to understand and document the efficacy of other transactions so that we can continue to sponsor private-sector research in the best possible way.

You will be contacted shortly by a representative of IDA to request your cooperation in this review. I, and all my colleagues at ARPA, would greatly appreciate your taking the time to respond to IDA's questions as fully and as expeditiously as possible.

Regards,

Dr. Gary L. Denman
Director

APPENDIX C. TEXT OF LETTER SENT TO POTENTIAL STUDY PARTICIPANTS BY IDA

Dear [OT Participant]:

ARPA has statutory authority to enter into agreements for research and development that are not standard Government contracts, grants, or cooperative agreements. These agreements, known as Other Transactions, are outside the normal procurement system. Your organization participated in one of these agreements as part of the [Program].

ARPA has tasked the Institute for Defense Analyses (IDA) to contact organizations who have participated in other transactions to see what these organizations believe the benefits and drawbacks (if any) have been. The results of these efforts may be included as part of a report being prepared by ARPA. IDA and ARPA would greatly appreciate your help.

Enclosed is a list of suggested topics with a little discussion on each to help get us started. Because we would like your response to encompass the broadest possible range of benefits your organization derived and drawbacks you may have noted, we encourage you to discuss these questions with people in other areas of your organization who were affected, perhaps including your contracts, finance, or legal staffs. The suggested topics are:

Effectiveness of programs conducted under ARPA other transactions,

Program administration,

Partnership, consortia, and teamwork,

Mechanisms for reviewing progress and making payments,

Foreign access to technology, and

Disposition of intellectual property rights.

IDA researchers will contact you beginning the middle of February to set up a convenient time to review the discussion topics. If you have any questions, please call me.

ARPA needs to know your detailed opinion of these other transactions so that they can generate the best and most efficient vehicle for sponsoring research efforts. We greatly appreciate your taking the time to participate in the study.

Sincerely,

Michael S. Nash
Institute for Defense Analyses

Enc: Copy of letter from Dr. Gary L. Denman
Suggested Discussion Topics

APPENDIX D. DISCUSSION QUESTIONS SENT TO POTENTIAL STUDY PARTICIPANTS BY IDA

Suggested Discussion Topics

We have developed the following six topics to help start our discussions with you and your organization. Each topic is presented separately below, along with a brief statement of what we mean by the topic and a few ideas to start the conversation. *We strongly encourage you to add topics for our consideration. We believe you, as a participant in one of the actual ARPA agreements, are in a very good position to uncover important ideas that we should consider.*

Please go over these topics and, if appropriate, discuss them with some of your colleagues. When we set up our discussion with you, you are welcome to include other people as you feel appropriate. We look forward to hearing what you have to say.

1. Effectiveness of Programs Conducted Under ARPA “Other Transactions”

We want to know how well you and your organization feel the ARPA “Other Transactions” work compared to the more traditional contracts under the Federal Acquisition Regulation (FAR)¹. We are interested in your experience using “Other Transactions” and your opinion about other possible uses of this type of agreement.

To help focus your thoughts, consider the following ideas as a point of departure:

- The reasons the “Other Transactions” agreement seemed to work (or not work) for you.
- Your involvement with ARPA—and with any agencies other than ARPA—with this type of arrangement, as compared to traditional contracts governed by the FAR.

¹ If you or your organization have no other Government contracts, then please consider this topic and your “Other Transactions” in the context of similar commercial arrangements.

- Both the strong points and problems encountered utilizing the “Other Transactions” agreement in terms of business issues (the contract and its administration), managerial issues (the consortium and research project and their administration), and technical issues (the performance of the technical tasks).

2. Program Administration

We would like to know how the use of “Other Transactions” affected the way your organization administered your program. We want to know how program administration burden was reduced and whether there were areas where more administrative effort was required.

Areas to consider under this heading include:

- Contract administration,
- Overhead,
- Accounting practices,
- Reporting issues, and
- Cost savings.

3. Partnerships, Consortia, and Teamwork

If your organization’s “Other Transaction” called for work by a partnership or consortium, we want to know the impact of using the “Other Transaction” on the way your organization worked with other members of the partnership. In what ways were relations improved and in what ways otherwise affected?

Considerations should include but not be limited to:

- “Team building” up front to make for a more efficient process,
- Management of the consortium,
- ARPA participation as a “partner” or a “customer” as far as involvement and supervision, and the nature and appropriateness of ARPA’s role,
- Mechanisms for resolving intra-consortium disagreements,
- Selection of partners (to be included or excluded),

- Sharing of information,
- Each partner "pulling" his load,
- Level of trust, and
- Commercialization implications.

4. Mechanisms for Reviewing Progress and Making Payments

We want to address methods of establishing and measuring program milestones and how they are used in determining progress payments in programs under "Other Transactions" compared to those under the FAR.

In this regard, you should consider:

- The mechanism by which the ARPA program manager monitored the progress of the project,
- Importance of payable milestones,
- Method of receiving payments—directly from the Government or through the consortium,
- Timeliness of payments to allow work to proceed, and
- Other possible mechanisms to assess progress.

5. Foreign Access to Technology

Working under an ARPA agreement required you to limit foreign access to technology developed under the agreement and to disclose any planned foreign access to ARPA for review and consent.

- Did you have plans for foreign access to technology—including, possibly, having non-U.S. firms in your partnership—before entering into the agreement?
- Were any restrictions on foreign access imposed on you by ARPA? Were they onerous? Did they require changes in project plans?
- Did your plans for foreign access change during the project?
- Did you have occasion to negotiate with ARPA over foreign access issues? Were the negotiation process and the results satisfactory?

6. Disposition of Intellectual Property Rights

We want to know the impact on the allocation of intellectual property derived from work conducted under “Other Transactions.” We are interested in how this vehicle affected your ability to protect existing proprietary property used in the performance of your work with program partners.

Considerations should include:

- The ability (or inability) of the consortium to allocate and share intellectual property,
- The process by which the allocation was determined,
- The consortium’s ability to address problems in this critical area,
- Access to technologies that would otherwise not have been available, and
- Realizing that this area can be one of the most difficult for the consortium to agree upon, we are interested in any thoughts you may have regarding disposition of intellectual property rights.

LIST OF ACRONYMS

ARPA	Advanced Research Projects Agency
CAS	Cost Accounting Standards
DoD	Department of Defense
DCAA	Defense Contract Audit Agency
DFARS	Defense Federal Acquisition Regulation Supplement
FAR	Federal Acquisition Regulation
FOIA	Freedom of Information Act
GAAP	Generally Accepted Accounting Principles
IDA	Institute for Defense Analyses
IHPTET	Integrated High Performance Turbine Engine Technology
MOA	Memorandum of Agreement
PC	personal computer
R&D	research and development
TRP	Technology Reinvestment Project
U.S.C.	United States Code

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13. ABSTRACT (Maximum 200 words) IDA was tasked by the Director and General Counsel at ARPA to contact organizations that have participated in a special form of contractual agreement called an Other Transaction, and to document their opinions of the benefits and drawbacks of Other Transactions. These agreements are characterized by enhanced flexibility and reduced administrative burden when compared with the typical Government procurement contract. Letters describing the survey effort and a set of discussion questions were provided to the participants in advance so they could prepare for the interviews, most of which were conducted by telephone. The results were largely anecdotal, and were not quantified so as to avoid implying either numerical precision or statistical significance. The questions, findings, and conclusions centered on the following areas: the effectiveness of programs conducted under ARPA Other Transactions; program administration; partnerships, consortia, and teamwork; mechanisms for reviewing progress and making payment, foreign access to technology; intellectual property rights; potential for fraud, waste, and abuse; cost sharing; and suggestions for improvements in the use of Other Transactions. The results are to be included in a planned ARPA report on its use of the Other Transactions contracting authority.				
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