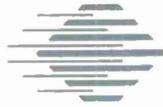Carnegie-Mellon University
Software Engineering Institute

Seeking the Balance Between Government and Industry Interests in Software Acquisitions
Volume I:
A Basis for Reconciling DoD and Industry Needs
for Rights in Software

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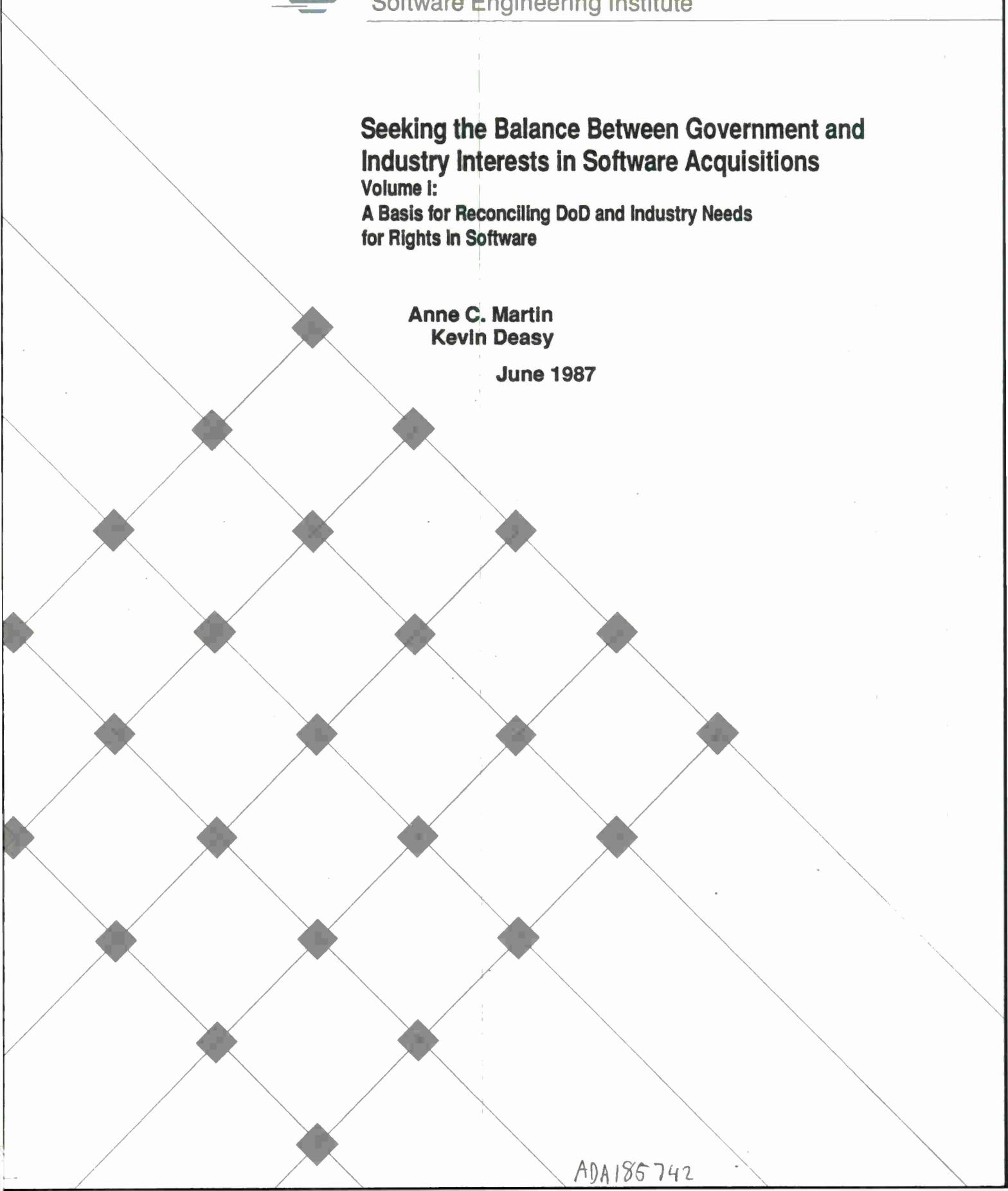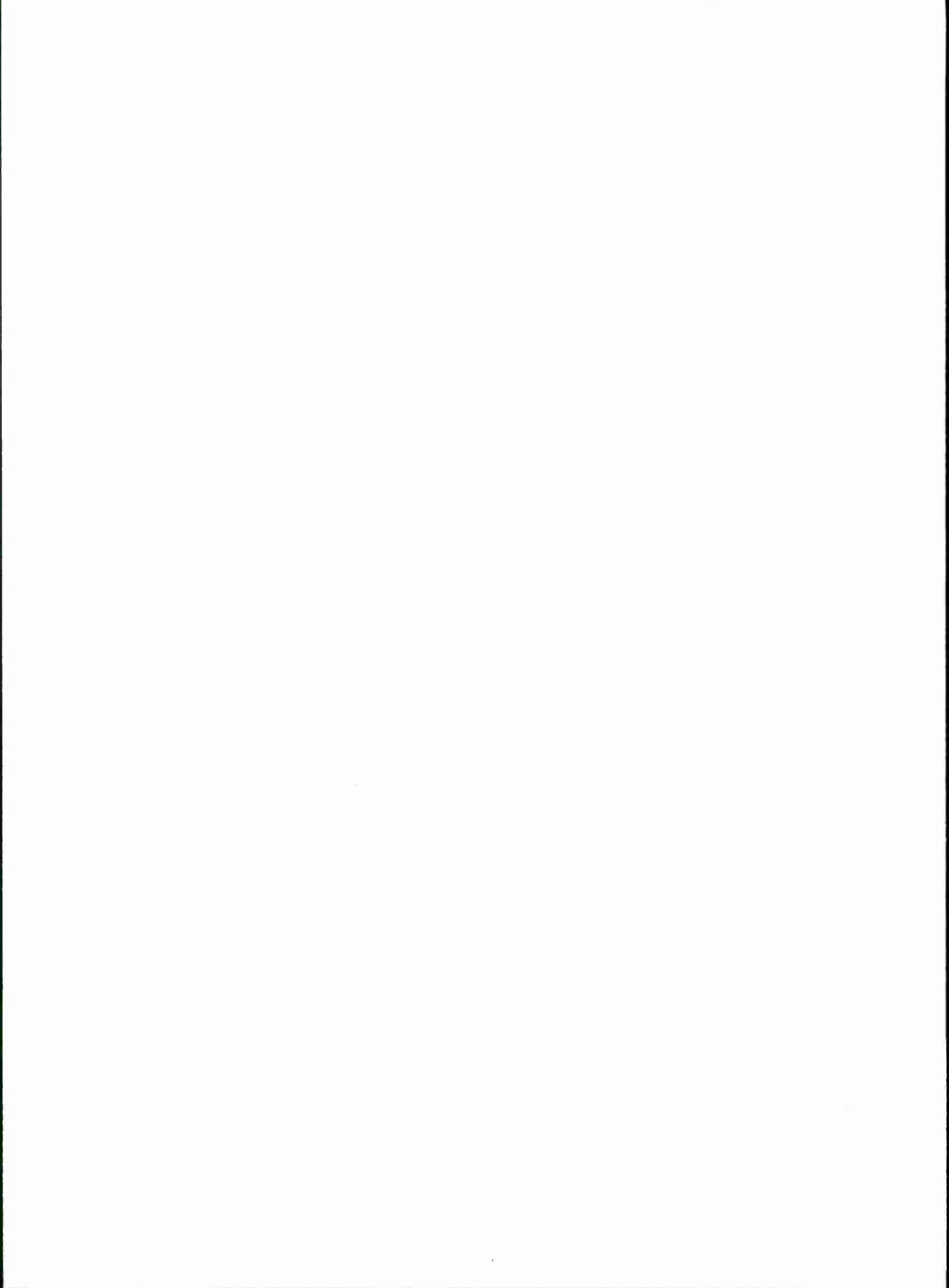# Seeking the Balance Between Government and Industry Interests in Software Acquisitions

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Anne C. Martin
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Software Rights
in Data Project

This technical report was prepared for the

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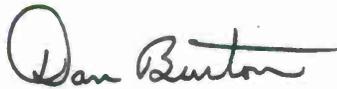Hanscom AFB, MA 01731

The ideas and findings in this report should not be construed as an official DoD
position. It is published in the interest of scientific and technical information
exchange.

Review and Approval

This report has been reviewed and is approved for publication.

FOR THE COMMANDER

Daniel Burton
SEI Joint Program Office

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Seeking the Balance
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Abstract: The policy under which the Department of Defense (DoD) acquires rights in software and technical data has, in the past, been imbalanced in the direction of obtaining more rights than necessary to meet its needs. As noted by the Packard Commission, a more balanced policy is in the interests of both the DoD and industry. The DoD has recently adopted a new policy for acquiring rights in technical data, and is developing a separate policy for acquiring rights in software. This report offers several recommendations for achieving a balanced policy as to government funded software, privately funded software, and mixed funding software that will meet the mission needs of the DoD while enabling contractors to protect their proprietary interests, and commercialize their software products.

1. Introduction

The President's Blue Ribbon Commission on Defense Management (Packard Commission) and Congress in recent legislation have urged the Department of Defense (DoD) to reexamine its standard policy for acquiring rights in software and technical data that have been prepared at government expense, at private expense and with mixed funds to find the appropriate balance between government and industry interests in such acquisitions. Finding the "delicate and necessary balance" [Packard, p. 64] that will both foster innovation and meet the DoD's needs is difficult to implement. The DoD has recently adopted a new set of technical data regulations which strikes a more equitable balance between government and industry, and is now working on fine-tuning its software rights policy. This report is aimed at assisting the DoD in finding that delicate balance as to software. Because of significant differences between software and technical data, the balance for software may not be the same as for technical data [TR-2 87].

This report has been prepared by the Software Engineering Institute to provide input to the Software Subcommittee of the Defense Acquisition Regulatory (DAR) Council in its efforts to develop a new software rights policy for the DoD. The report consists of two volumes, and is based on an integration of the findings of the Software Rights in Data Project . Volume I summarizes research conducted to ascertain the respective needs and concerns of the DoD and private industry, while Volume II is the result of a consulting effort by the law firm of Shea and Gardner of Washington, D.C., and presents commercial models for protecting software in contracts with government agencies.

Research conducted by the project has included a broad-based survey in which the DoD and industry participants provided information regarding their needs and concerns with respect to rights in software and technical data. Interviews were conducted to follow up on points raised in the survey. Indeed, the project was able to build upon a research base of almost 200 interviews of both industry and government representatives compiled during the two-year existence of its predecessor, the Software Licensing Project. In addition, the project conducted a workshop at which more than 50 individuals, with balanced representation from the public and private sectors, addressed critical technical data/software rights issues in an effort to achieve a consensus as to ways in which their respective interests could be balanced.

In each of the sections below, this volume proceeds by first analyzing present DoD policy, then considering contrasting government and industry needs and finally, indicating ways in which the interests of government and industry can be balanced. The three sections deal respectively with policy as to software developed at government expense, software developed at private expense, and software developed with mixed funds.

Section 2.1 recommends that the DoD adopt a different standard policy as to software developed entirely or mainly with government funds. The DoD does not need more than government purpose rights to fulfill its mission, or achieve competition. The DoD should either adopt a policy making government purpose rights standard, or it should include sufficient flexibility to permit contracting officers to freely obtain less than unlimited rights when such rights are adequate to meet DoD's needs.

Section 2.2 recommends that the DoD retain "restricted rights" as the standard package of rights acquired in software developed at private expense, but with added flexibility to permit contracting personnel to accept less than the four minimum rights where appropriate to enable the DoD to obtain innovative proprietary technology. A directed license/escrow arrangement, which may be considered less than minimum rights, is suggested as an approach to supporting privately developed software. To further balance the needs of the DoD and industry with respect to proprietary software technology, it is recommended that the DoD acquire software documentation with the same set of rights as are applied to machine readable code.

Section 2.3 recommends that the DoD acquire no more than a government purpose license in software developed with mixed funds. Where public funds account for 90% or more of the development costs, software should be considered to have been developed at government expense. Conversely, where private funds make up 90% or more of the development costs, software should be considered to have been developed at private expense. Where government and industry contributions are more closely apportioned, mixed funding treatment would be appropriate. Additionally, with respect to defining the term "developed" for purposes of determining if software has in fact been developed at private expense, an approach is offered that involves testing, but provides that if testing under a government contract results in no significant modifications, the software will be considered to have been developed at private expense.

The recommendations presented in Volume I of this report would achieve the delicate balance between the interests of government and industry with respect to software developed with government funds, software developed with private funds, and software developed with mixed funding. Volume II presents background material that will aid the DoD in its implementation of a new software rights policy.

2. Issues

2.1. Software Developed at Government Expense

The Department of Defense does not need unlimited rights in software developed wholly at government expense. Government purpose rights will satisfy DoD's mission needs and allow the DoD to achieve competition for maintenance and enhancement. If the DoD chooses to retain a standard set of rights for software developed at government expense, it should make government purpose rights the standard. If, on the other hand, it is unwilling to adopt government purpose rights as the norm, it should provide the flexibility to permit procurement personnel to freely negotiate for fewer rights in order to achieve other goals. This will give industry greater incentive to do business with the DoD, and to commercialize the software, which will contribute to increased innovation.

2.1.1. Present Policy

The DoD currently claims unlimited rights in all software and related documentation that has been developed to any extent with government funds. Unlimited rights are defined as the "rights to use, duplicate, release, or disclose, technical data or computer software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so [DFARS, Sec 227.471]." This does not mean that the government acquires ownership of the intellectual property interests in software, but only a very broad license to use it (which includes the right to disseminate the software and its documentation to third parties outside the government for any purpose) [TR-1 86, p. 24-26]. Under the previous data rights policy, contracting officers had no flexibility to negotiate for less than unlimited rights, even when it would have been in the interests of both government and industry to do so, unless they obtained a deviation. Because unlimited rights essentially negate the probability of commercializing software, the software industry viewed the policy as imbalanced. Further, the fact that these exceptionally broad rights in the government were triggered in every case except where the development of the software had been 100% privately funded made the imbalance seem even more pronounced. The recent revisions to the technical data regulations [DFARS, Sec. 227.4] attempt to introduce flexibility in these areas. However, as noted below, these revisions may not be sufficient to balance government and industry interests in the software arena.

2.1.2. Competing Interests of the DoD and Private Industry

2.1.2.1. Government Needs

A primary need of the government is to obtain high quality software. The government also needs to be able to maintain and enhance (or support), as well as reprocure software. Because of software's highly modifiable nature, software support is not limited to correcting software errors or "bugs," but also includes adding new functions and adapting the software to environmental changes. The DoD thus needs a right to create derivative software [Proposal 86, Ch. 2]. The sophisticated nature of the support function increases the need

to transfer the developer's expertise, which is embodied in the software's source code, documentation, and development tools, to support personnel. (See Survey, Appendix D.) Since software support within the DoD may be carried out by third party support contractors as well as by DoD personnel, the DoD often needs sufficient rights to enable it to disclose support technology to third parties outside DoD.

Some DoD personnel have expressed concern that obtaining less than unlimited rights may pose an administrative burden for the DoD in that it would then be obligated to monitor and protect the proprietary interest created in the developer. It has also been noted that third party contractors may be reluctant to accept software with proprietary markings due to concerns that they may be exposing themselves to claims of misappropriation. Furthermore, unlimited rights may have some economic advantage to the DoD in that the ability to disseminate government funded software to other government contractors for later commercialization may provide the DoD some negotiating leverage. Nonetheless, a flexible policy under which procurement personnel would generally obtain government purpose rights would enable them to negotiate favorable arrangements while ensuring that the DoD has sufficient rights to meet its primary needs.

2.1.2.2. Industry Needs

The software industry needs to be able to recoup its investment in developing and commercializing software. Even if the developer obtains money from the government for software development, the developer will use its production facility, which may include tools, documentation and development expertise created with substantial private investment. In order to succeed, the contractor must be able to protect the competitive edge provided by its production facility, and recoup its investment through the sale or licensing of its products. (See Recommendations, Appendix A.)

Many software developers contend that DoD's broad claim of unlimited rights in government funded software serves as a disincentive to doing business with the DoD. They fear that, since unlimited rights confer upon the DoD the right to disclose the software and its related documentation to anyone, including their competitors, providing such technology to the DoD may lessen their competitive edge. Further, unlimited rights empowers the government to inject a contractor's trade secrets into the public domain, thus undermining the potential commercial market for the software.

Consequently, DoD's data rights policy reduces the developer's incentive to commercialize and market technology because the contractor does not hold the exclusive right to commercialize. Since the developer is generally in a better position than the DoD to transition this technology through commercialization, the DoD should confine its acquisition of rights in government funded software to those needed to meet its legitimate needs and goals, rather than being concerned with rights to disseminate technology.

2.1.3. Balancing of Interests

2.1.3.1. What policy goals justify dissemination of software developed at government expense?

The balancing of DoD's mission needs with industry's need to commercialize software technology requires an examination of DoD's underlying policy goals. There was consensus among participants at the Software Rights in Data Workshop that maintenance and enhancement, reuse and competitive reprocurement are appropriate policy goals for the DoD in acquiring government funded software. However, the DoD also has an interest in encouraging contractors to develop innovative software technology for possible government use [DFARS Sec. 227-472-1(b)].

While workshop participants recognized that there may be some cases in which dissemination of software developed at government expense may be an appropriate DoD goal, they also acknowledged that the original developer is generally in the best position to commercialize software because of its core of development expertise, and its greater incentive to do so. A policy allowing the developer to retain exclusive rights to commercialize software provides a powerful incentive for investment of venture capital required for further development, adaptation to commercial applications and widespread commercial use. Since it is in DoD's interest to stimulate private investment in the commercialization of government funded software and to encourage the development of innovative technology, it should adopt a government purpose license approach.

2.1.3.2. What Is the scope of rights the DoD requires in order to achieve its mission needs with respect to software developed at government expense?

The DoD can meet its needs, in most cases, by acquiring government purpose rights. Workshop participants concluded that DoD's primary needs with respect to government funded software are maintenance and enhancement (support), and reprocurement. The sophisticated nature of software support, in conjunction with DoD's unique mission, and the requirement for competition, often necessitates the dissemination of the developers' technology to meet these needs. Because software developers want to retain the exclusive right to commercialize the technology, they are reluctant to give the DoD broad unlimited rights to disclose and disseminate it to whomever and for whatever purpose the DoD might choose.

Industry's needs are not, however, inconsistent with the government's needs with respect to software developed at government expense. Workshop participants reached consensus that the DoD does not always need broad unlimited rights for purposes of maintenance, enhancement, and reprocurement of government funded software. (See Recommendations, Appendix B.) Although it was not recommended that the unlimited rights concept be eliminated, participants advocated the adoption of a more flexible approach to acquiring rights in software developed at government expense. It was recommended by one of the working groups (Working Group A) that procurement personnel be given the flexibility to negotiate for less than unlimited rights, (for example, rights restricted to a particular agency or project) in order to achieve other goals in a software procurement.

There was consensus that a government purpose license would enable the DoD to meet its needs, provided the developer agrees to permit dissemination to third parties for maintenance, enhancement and competitive reprocurement. Working Group B defined this as a license granting the government the rights to copy, disclose, enhance, maintain, modify, prepare derivative works or otherwise use the software for government purposes. Government purposes would exclude any action, including unrestricted public dissemination, that would detract from the commercial value to the developer. (See Recommendations, Appendix B.)

Thus, a government purpose license would not preclude dissemination to third parties for competitive purposes, provided they agreed not to use the software for commercial purposes. There was considerable discussion as to how to enforce an agreement by a third party contractor not to commercialize or further disclose software technology in its possession. Although it was agreed that associate contractor nondisclosure agreements were the preferred method of enforcing a government purpose license, it was recognized that in some instances the developer's retention of a copyright in the software would sufficiently protect his or her interests.

2.1.3.3. What approach should the DoD adopt for obtaining rights in software developed at government expense?

The acquisition of unlimited rights as a standard, inflexible policy for software developed at government expense should be eliminated. Such a policy is incompatible with commercialization of publicly funded software because the government is in a position to undercut the developer's exclusive rights to commercialize the technology. Since commercialization is likely to result in better quality software for the DoD, and government purpose rights will enable the DoD to satisfy its primary needs, it is recommended that if the DoD desires one standard approach for obtaining government funded software, it adopt government purpose license rights as the standard. This does not require that the unlimited rights concept be wholly eliminated. The policy could be flexible enough to allow contracting officers to negotiate for unlimited rights when an express determination has been made that these rights are needed. Thus, the DoD can still acquire unlimited rights when they are essential to meet its needs.

In the event the DoD chooses not to adopt government purpose rights as its standard, it is recommended that greater flexibility be incorporated into the unlimited rights concept to permit the contracting officer to negotiate for less than unlimited rights. For example, in those instances, where the government does not need unlimited rights, government purpose rights would be acquired. In those cases where the government acquires a government purpose license in publicly funded software which is later successfully commercialized, there could be flexibility for the DoD to negotiate to receive benefits from subsequent sales. (See Recommendations, Appendix A.)

The adoption of a flexible approach, which retains "unlimited rights" as the norm could pose some problems. Under such a policy, inexperienced or cautious contracting personnel may be reluctant to depart from the norm. Thus, it is possible that this approach, as implemented by procurement personnel, may be little improvement over an inflexible unlimited rights stan-

dard, unless incentives are provided to encourage contracting personnel to take advantage of the added flexibility where appropriate.

The new technical data regulations take the first step toward a flexible approach in providing that in those cases where the DoD would normally obtain unlimited rights, it may agree to waive those rights provided that it receives, as a minimum, a royalty-free government purpose license. However, a balanced approach for government funded software will require more than a waiver provision. The policy, provisions, procedures and implementing instructions must be crafted so as to encourage procurement personnel to acquire only the rights which are essential to meet government needs. The adoption of government purpose license rights as the standard for government funded software or, alternatively, a more flexible acquisition policy would successfully balance public and private sector interests. The government purpose license would afford the DoD the wide range of rights needed to accomplish its mission objectives. At the same time, it would limit these rights so as to exclude any action which would detract from the software's commercial value to the developer, thereby preserving his or her incentive to transition the technology. It is in the DoD's interest to provide such incentives to software developers to continue to produce, and license to the DoD, the most innovative software technology [TR-2 87].

2.1.3.4. Conclusion
Although the technical data policy retains unlimited rights in government funded software as the norm, its recognition that the DoD may not always need unlimited rights in every acquisition is a first step toward striking the balance advocated by the Packard Commission. Given the unique nature of software, the attainment of this balance is even more critical in the software rights policy. The adoption of government purpose rights as the standard set of rights for publicly developed software would be a fresh approach which would meet the DoD's primary needs while fostering further development and commercialization of publicly developed technology. The alternative approach could also balance the DoD and industry needs provided the policy is carefully structured so as to encourage flexibility in software acquisitions.

2.2. Software Developed at Private Expense

The viability of privately developed software as a commercial product depends on the developer's ability to restrict access to that software. Although industry is concerned with limiting the distribution of proprietary object code, it is especially sensitive about protecting the software source code, documentation and development tools. These items, which are created at substantial private investment, are regarded as the developer's "crown jewels" which afford him his competitive edge. The current policy, under which the DoD may claim government wide rights in documentation, threatens the trade secrets incorporated therein. The resulting imbalance significantly impedes the DoD's acquisition of the most innovative developed software. As a means of rectifying this imbalance, this section offers a directed licensing/escrow clause which will satisfy DoD's need for assurance of adequate software support, while protecting industry's proprietary technology.

In addition to encouraging the structuring of creative support arrangements, this section also recommends that software documentation and object code be governed by the same set of rights, and that more flexibility be injected into the policy. Since these recommendations represent a more balanced treatment of DoD's and industry's needs, it is urged that they be incorporated in the new software policy.

2.2.1. Present Policy

The current regulations provide that software which has been developed at private expense is acquired by the DoD with restricted rights. These rights restrict the software's use to the computer for or with which it was acquired, and allow modification, copying for safekeeping and use with a back-up computer. While the regulation allows the government to negotiate to acquire additional rights which are not inconsistent with the four minimum rights, it precludes negotiation below this minimum "floor" without a DAR Council deviation [DFARS Sec. 227.481-2].

Under existing policy, restricted rights apply only to privately developed machine readable code. Since documentation is treated as technical data, it is not subject to the same set of restricted rights as the machine readable code but rather is subject to limited rights. These give the DoD the right to use, duplicate and disclose the software throughout the government. Moreover, the DoD claims broader unlimited rights in manuals or instructional materials necessary for installation, operation, maintenance or training purposes [DFARS Sec. 227.472-5(d)(3)]. Since virtually all software documentation may be construed to fall within this clause, potentially all documentation may be subject to an unlimited rights claim, even when developed entirely with private funds [TR-1 86].

The policy's lack of flexibility to enable the structuring of creative arrangements to acquire state of the art technology, and its treatment of software documentation as technical data fail to recognize that software by its very nature generates different DoD and industry needs than does technical data. Accordingly, a policy that will balance those needs must recognize the unique, evolving nature of the product that shapes them.

2.2.2. Competing Interests of the DoD and Private Industry

2.2.2.1. Government Needs

The DoD increasingly relies on software in order to successfully perform its worldwide mission. Because much of software's product potential is still untapped, the software industry, spurred by increasing demand, is constantly producing new improvements and applications, rendering earlier technology obsolete. Many of these innovations are capitalized with private funding. Although the DoD has a need for the latest "leading edge" software technology in many mission critical areas, it has become increasingly evident, in recent years, that the DoD has not been able to access the most innovative privately developed software technology to the extent it would like.

DoD's need to acquire the best state of the art technology is not always compatible with its need to maintain and enhance that technology. Reconciliation of these two needs is difficult to achieve within the context of a software policy that does not recognize software's unique characteristics. Unlike technical data, software is a dynamic product which evolves to meet new user needs throughout its life cycle. Thus, a successful software support effort requires access to the developer's expertise which is incorporated into his documentation and development tools [TR-2 87]. Consequently, developer support may, in many cases, be the most cost effective, efficient means of maintaining privately developed software.

While DoD personnel recognize the advantages of developer support for privately developed software, many feel that the DoD should retain an organic support capability. Additionally, the Competition in Contracting Act [CICA 84], as implemented, tends to limit developer support and increase the use of third party support contractors [TR-2 87]. Moreover, even if a developer support concept is chosen for a system, provision must be made for such contingencies as a developer's failing to perform satisfactorily, discontinuing the product line, or going out of business. Thus, in order to assure the DoD of adequate support, a mechanism must exist to make the developer's support technology available to those who will assume the support role.

A software rights policy that is more consistent with software's technical and economic realities will enable the DoD to more effectively reconcile its need for the best software with its need to support that technology. The key to resolution is a policy that is flexible enough to accommodate these dual interests, while at the same time satisfying the private sector's need for proprietary protection.

2.2.2.2. Industry Needs

If the DoD wants to be able to acquire the most innovative software that industry has to offer, it must develop a software policy that will accommodate industry's need to protect its substantial investment in its proprietary technology. In order to forge such a policy, the DoD must recognize that software, by virtue of its intrinsic qualities, gives rise to a set of developer needs substantially different from those related to technical data. Unlike technical data, which is ancillary to a hardware product, software is often an end product in itself. Moreover, the design documents, requirements documents, source code and other data

which are generated during software development are an integral part of that software product, representing significant capital investment. Since these documents embody the essence of the software's design and structure, their unrestricted disclosure or dissemination could deprive the developer of his competitive edge and even jeopardize his existence.

The current regulatory treatment of software documentation as technical data ignores the commercially sensitive nature of source code and other documentation. The risk of having their valuable proprietary documentation widely disseminated may deter many companies from licensing such documentation to the DoD. Industry survey participants identified source code, design documents, and designer's notes as the documentation they were least likely to license. (See Survey, Appendix D.) Moreover, both workshop and survey participants expressed considerable reluctance to license privately developed tools and documentation to third party support contractors without being able to negotiate license terms directly with such contractors. This underscores the need for a policy which provides flexibility to negotiate more creative arrangements to enable privately developed software to be adequately supported.

The existing policy's failure to recognize industry's software specific needs not only impacts how the DoD may support software it has already acquired, but also whether it can access the newest state of the art technology. Some companies are only willing to license their proprietary software under very restrictive terms. If these terms fall below the floor of "minimum rights", the contracting officer must obtain a DAR Council deviation authorizing such a procurement. This requirement is viewed by some industry representatives as unduly restrictive and time consuming. The net effect is to discourage such "deals" which could allow the DoD to gain access to state of the art software technology.

The extent to which DoD's inflexible data rights policy is costing it access to the most innovative technology was examined in our survey of industry representatives. (See Survey, Appendix D.) Survey results indicated that industry is often unwilling to license privately developed software tools, applications software, CAD/CAM programs, and artificial intelligence programs to the DoD because of its data rights policy. However, an overwhelming majority (88% of respondents) expressed their willingness to license software to the DoD under certain conditions. These were:

- Limitations preventing the DoD from permitting parties outside of the DoD to make use of or see the software or documentation,
- Limitations restricting DoD's use to a particular site,
- Limitations on DoD's access to a particular type of technology or documentation.

While these results confirm the private sector's acute sensitivity to disclosure of their privately developed technology, they also reflect industry willingness to make this technology available to the DoD under certain conditions. The challenge in developing a balanced policy for privately developed software lies in formulating a policy that is flexible enough to allow the DoD to acquire the most innovative software technology while protecting industry's interests in such technology.

2.2.3. Balancing of Interests

The first step in balancing DoD's needs with those of industry is to recognize that these needs stem, in part, from the intrinsic nature of the software product. Because of the nature of its development process, software's structure and functions are embodied in its source code and other documentation, which may be the very "life blood" of the developer. This generates a private sector need to protect this valuable proprietary material from wide-spread dissemination. However, the DoD needs access to development documentation and tools in order to benefit from another one of software's properties - its adaptability. In order to maintain and enhance the software, support personnel require access to the very technology which the developer is most reluctant to disclose [TR-2 87].

In order to accommodate these public and private sector concerns, a software rights policy must adopt a more balanced approach which is attuned to the software product's unique characteristics. This approach can be implemented by providing a directed licensing/escrow option to meet DoD's support needs, eliminating the differential treatment of software and documentation and injecting more flexibility into the policy.

2.2.3.1. How can a software rights policy be structured to allow the DoD to acquire access to proprietary technology?

At the Software Rights in Data Workshop, the maintenance and enhancement working group (Group A) was tasked with formulating a fresh approach to supporting privately developed software. There was consensus that a major advantage to the government in acquiring privately developed commercial software is that the developer, rather than the government, can be held responsible for supporting the software. Accordingly, the DoD generally will not need to take delivery of source code and other support technology although it will need assurance that the software can be adequately supported by the original developer or a responsible third party. The solution offered to meet this need was the development of an optional conditional directed licensing clause which includes an escrow of support material.

The basic principle underlying this clause Is the software developer's agreement to license the software and escrowed material to a responsible third party to perform support functions if the original developer is unwilling or unable to do so: The licensing provision would be triggered by the developer's unwillingness or inability to perform support functions at a reasonable price. Upon notification to the developer, the government can transfer the support functions to a third party and a license will implicitly be granted to that party to perform those functions. The scope of the third party's rights in the software will not exceed that of the government under the original contract and the developer retains the right to sue the third party directly under the license if the latter abuses it.

The directed licensing clause is structured to work in conjunction with an escrow arrangement. All materials necessary to regenerate or modify the software, which were not delivered to the government, are placed into escrow at the time the object code is delivered. The developer will be required to update the escrowed documentation. When a developer is unwilling or unable to support the software he may direct release of the escrowed materials.

If the developer contests the government's claim that the conditions for escrow release are met, there must be a finding by the agency head that the DoD has a valid claim for release of the materials. Upon such a finding, the developer will be notified of the party to whom the materials were released and instructed to negotiate to provide technical assistance to that party.

This approach balances DoD's need for assurance of adequate support with industry's need for protection of proprietary information. The DoD is protected in securing an agreement from the developer to license and provide transition assistance to a third party. Most importantly, provision is made to enable that third party to obtain access to critical support documentation. Moreover, this methodology can be tailored to meet DoD's need to establish an organic support capability. In addition to assuring that DoD's needs are met, this approach protects the developer's interests in that he is not initially obligated to deliver his proprietary documentation and tools to the DoD. Third parties will only obtain access to it under certain specified conditions. It was felt that, in practice, the DoD may have little need to invoke its rights under this clause since its very existence creates a powerful incentive for the developer to seek a consensual support arrangement.

In addition to offering creative methodologies to meet DoD's need to access proprietary support technology, a new software policy should also provide the flexibility for the DoD to acquire innovative software technology. Workshop participants recognized that situations may arise where in order to license a privately developed tool or artificial intelligence program, the DoD may have to waive one of its four minimum restricted rights. Under current policy, the contracting officer must go through the time consuming process of seeking a DAR Council deviation in order to consummate such a deal. Some industry representatives viewed this process as too cumbersome and urged the adoption of an intra-agency approval process for such deviations. Government representatives expressed concern over allowing field personnel to exercise too much discretion in waiving a standard minimum right. Although no consensus was reached on this issue, a policy providing for a more expedited intra-agency approval process for "special deals" would demonstrate an appreciation of industry's need to protect its proprietary technology, while encouraging arrangements which would increase DoD's access to such innovative technology. The policy should also contain enough flexibility to allow the DoD to acquire rights restricted to a particular program.

A software rights policy that encourages the use of escrow, directed licensing, program restricted rights and other creative arrangements would facilitate DoD's acquisition and support of innovative technology while protecting industry's proprietary interests. The incorporation of these methodologies into a regulation will inject a new flexibility into the policy that can lead to a better balancing of industry's and DoD's needs.

2.2.3.2. Is there a set of minimum rights that the DoD always needs to acquire in privately developed software and its documentation?

One of the primary reasons for the current policy's imbalance stems from its failure to treat software documentation as a vital component of the software product which industry has strong interests in protecting. Our survey indicated significant industry and government con-

sensus that source code, user manuals, design and requirements documents be included within the definition of the term software. Working Group B concurred that software documentation should be treated in the same manner as the related software, but differentiated between documentation which the DoD needs broad rights to disseminate, and documentation which includes source code, algorithms, process formulae and flow charts. It was recommended that user manuals (which do not include source code, algorithms, processes, formulae, or flow charts) be acquired under a broad government purpose license. However, other privately developed documentation is to be acquired with the same restricted rights as its related software.

There was consensus among the DoD and industry workshop participants that the present set of minimum restricted rights meets both sectors' needs. However, it was recommended that DoD's right to use the software be expanded to include use with an upwardly compatible replacement computer in those instances where the software is licensed alone instead of as part of a system.

2.2.3.3. Conclusion

A software policy which balances DoD's need to acquire and support proprietary technology with industry's need to protect such technology must recognize the unique nature of the software product which shapes those needs. Allowing software documentation to be governed by the same set of rights as object code would more accurately reflect the technical and economic importance of documentation to the developer. This opens the door for the structuring of an optional directed licensing/escrow clause which effectively balances DoD's support needs with industry's proprietary needs. The incorporation of this methodology into a software policy, in conjunction with the flexibility to negotiate creative licensing arrangements, will improve DoD's ability to access leading edge technology, which in the long run, will enhance our defense capability.

2.3. Software Developed Using a Mix of Government and Private Funds

Both the Packard Commission and Congress have recommended that the DoD foster private investment by adopting a more balanced approach for allocating rights in software that has been developed using a mix of government and private funds [Packard, p. 64] [National Defense Authorization Act for Fiscal Year 1987, Sec. 953(a)(2)(E)]. There are various situations that should be considered in structuring a mixed funding approach. For example, a software product may have been brought to a particular point of development at private expense, and then be further developed or modified for DoD use at government expense. This section recommends that the DoD obtain government purpose rights in mixed funding software, with the flexibility to negotiate for lesser rights where appropriate, and suggests an approach, different from that adopted in the recent revision of the technical data regulations, for determining when software should be treated as having been developed at government expense, at private expense, and with mixed funds.

2.3.1. Present Policy

Until May 18, 1987, the DoD had no mixed funding policy. Since May 18, the DoD has had a mixed funding policy for technical data. The question is whether the policy adopted for technical data should apply to software, or whether there should be a different mixed funding policy for software.

Historically, even the most minor amount of government money spent on software development has been deemed sufficient to give the DoD unlimited rights. The approach adopted for technical data in the revised DFARS provides that only those situations in which a contractor contributes more than 50% of the development costs can be treated as mixed funding [DFARS, Sec. 227.472-5(b)]. The inflexibility of this approach raises a question as to whether it is appropriate for software that has been developed with a mix of government and contractor funds.

2.3.2. Competing Interests of the DoD and Private Industry

2.3.2.1. Government Needs

One of the strongest needs of the DoD is to obtain good technology. As was noted by the Packard Commission, the DoD has an interest in encouraging private investment that might lead to the development of innovative software technology useful to the DoD. Additionally, it is in DoD's interest for firms to commercialize software products because it improves the incentives for delivering quality products. The encouragement of greater private investment and commercialization is likely to result in more mixed funding situations.

With respect to mixed funding software, as with software developed at government expense or at private expense, it is in the DoD's interest to obtain technology that can be maintained and enhanced. Further, the DoD needs, where possible, to have the capability to perform, or achieve competition for, the maintenance and enhancement of software so as to avoid being locked into a sole source position with the original developer. The DoD thus needs a right to disseminate software for competitive purposes, but does not need a right to generally disseminate software technology.

Moreover, the DoD has an interest in minimizing the administrative burdens that accompany restrictions on the use of software. The administrative burden associated with safeguarding the proprietary interests created in the contractor where the government takes less than unlimited rights was noted in the recent revision of the DFARS technical data regulations [DFARS, Sec. 227.472-5(b)].

2.3.2.2. Industry Needs

The DoD may disseminate software and software documentation in which it has unlimited rights outside of the government for any purpose. Most contractors strenuously object to such dissemination because of fear that software technology they have developed will come into the possession of their competitors, thus lessening their edge in the marketplace. Consequently, many contractors refuse to make their most innovative technology available to the DoD, and are unwilling to modify their technology so as to make it useful to the DoD.

Further, the harshness of a policy under which mixed funding situations have resulted in the DoD obtaining the same set of inflexible unlimited rights as has been acquired in software developed exclusively at government expense has led to a reluctance on the part of developers to invest private resources into technology that might benefit the DoD. This disincentive is particularly true with respect to the development of innovative design and development tools which might make the development process more effective and efficient. (See Recommendations, Appendix A, regarding suggested treatment of software tools.)

The critical point is that the DoD is losing access to innovative software technology which could be extremely valuable to it in meeting its mission needs. For example, contractors participating in the survey conducted by the project indicated that approximately 65% of the time they are unwilling to make privately developed software tools available, and that 49% of the time they are unwilling to make privately developed applications programs available due to DoD's data rights policies. This indicates that the present policy is not serving the best interests of the DoD.

Representatives of private industry have also expressed considerable dissatisfaction with respect to DoD's treatment of technology that has been developed to a point at private expense and is then modified or further developed using public funds. The DoD policy (at least until the recently released revision of the technical data regulations) has been to claim unlimited rights in such situations, unless the modification is severable from the privately funded portion.

2.3.3. Balancing of Interests

Increased private investment in the development of software products is in the interests of both the DoD and industry. Such private investment will result in a greater amount of software that is developed using a mix of government and private funds. It is, therefore, essential to the fostering of increased private investment that the DoD adopt an equitable policy for obtaining rights in mixed funding software.

2.3.3.1. Is the recently implemented mixed funding alternative for technical data appropriate for software?

The mixed funding alternative implemented in the new technical data regulations provides that if 1) the contractor contributes more than 50% of the development costs and agrees to commercialize the item, and 2) the contracting officer does not determine that the government requires unlimited rights, the DoD will obtain "Government Purpose License Rights" [DFARS, Sec. 227.471]. Government purpose license rights appear to give the government rights similar to unlimited rights, with a qualification, similar to that placed on software that has been copyrighted by the contractor, that any use, duplication, or disclosure must be for government purposes only. The government purpose license rights provision states explicitly that government purposes include dissemination for obtaining competitive procurement, but do not include permitting a third party to use the item for commercial purposes [DFARS, Sec. 227.471].

The proposed technical data provisions of the Federal Acquisition Regulation (FAR) also include a mixed funding alternative [FAR, Subpart 27.4, Sec. 27.408]. The FAR mixed funding provision, like the DFARS, speaks of private contributions of "approximately 50%" as the point at which mixed funding treatment might be indicated. The FAR provision is, however, much more flexible than the DFARS in that it uses "approximately 50%" merely as a guideline, leaving considerable flexibility to contracting personnel to determine when and how use of the mixed funding alternative might be appropriate. The FAR provision also permits individual agencies to regulate the use of the mixed funding alternative in their supplements.

Because the revisions to the DFARS and the FAR have only recently been released, neither mixed funding approach has yet been tested in practice. The DFARS provision, however, appears to be too inflexible to be applicable to software.

Software is a product, unlike technical data which is generally produced ancillary to the development of a product. The investment in developing a software product is generally substantial, and must be recouped through the sale or licensing of the software product. Indeed, the very existence of the company may depend on the successful marketing of the software product. The cost of producing technical data, on the other hand, is generally recouped through the sale of the product for which the data has been produced.

Contractors are, therefore, very reluctant to invest their own funds into the development of innovative software technology, be it an applications program or design and development tools to aid in the production of such programs, unless they can feel confident of their ability to adequately recoup such investment. A rigid application of a 50% formula would not take into account these economic realities of software development. A more flexible approach is required to create the necessary incentives to encourage private investment into the development of innovative software technology.

2.3.3.2. Under what circumstances should a mixed funding alternative apply?

A question addressed at the Software Rights in Data Workshop was whether a percentage based formula would be appropriate for software. There was some agreement that the use of terms such as "substantial" or "material" in lieu of a specific percentage might be too subjective, and would probably create conflict and ultimately evolve to a point where the term was generally associated with a certain percentage anyway.

A suggestion raised at the workshop that appears to have considerable promise was that rather than setting a particular percentage as a dividing line between government funding and mixed funding, it might be appropriate to take a particular percentage at both ends of the government-private continuum, and designate the area in between as mixed funding. For example, the policy could establish that where less than 10% of the development is privately funded (i.e., greater than 90% government funded), the item will be considered to have been developed at government expense. Where less than 10% of the development has been government funded (i.e., greater than 90% privately funded), the item will be considered to have been privately funded. Finally, where government and private funds each

account for greater than 10% of the development costs, the item will be treated under the mixed funding alternative.
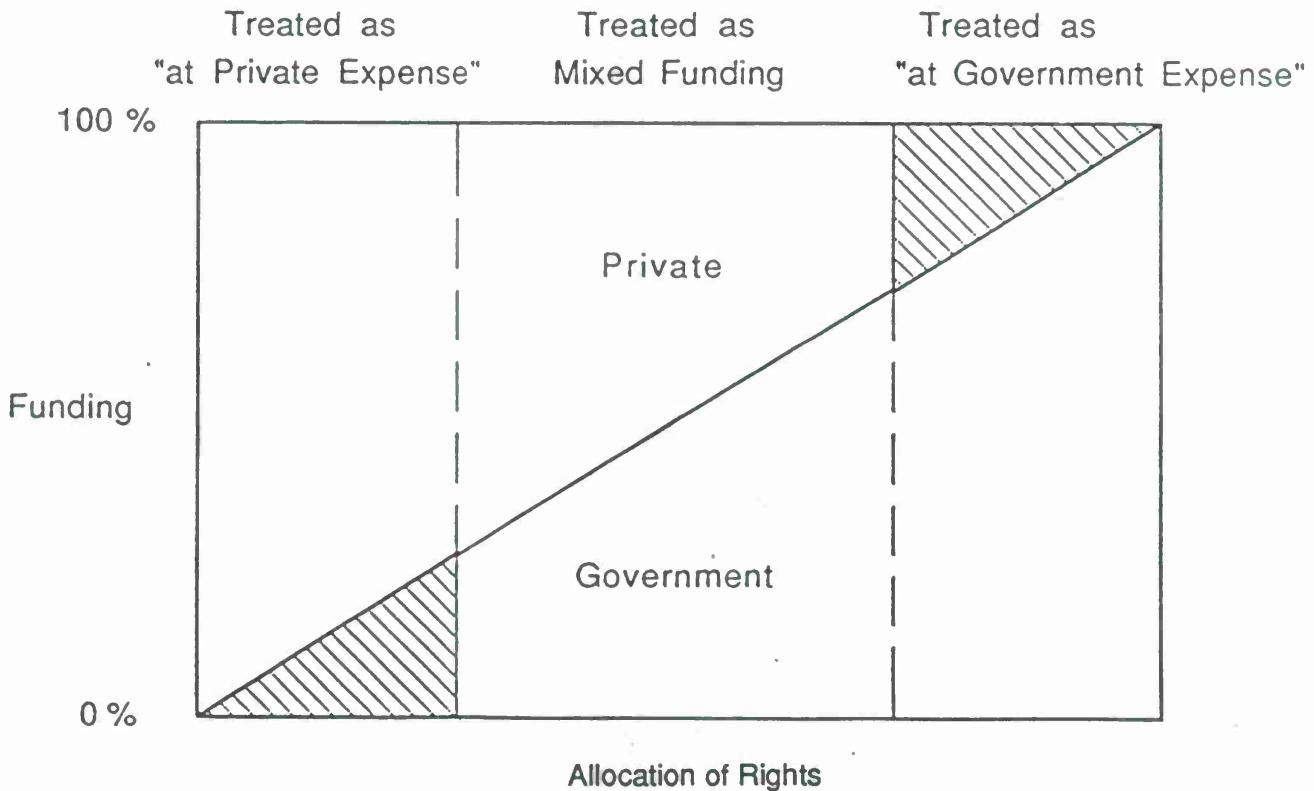
Figure 2-1: Proposed Mixed Funding Approach

Such an approach would have the effect of setting an objective, measurable standard for determining the appropriate treatment in each particular case, and would avoid the potential harshness of a strict dividing line approach. Further, it would establish an equitable policy for dealing with those situations in which the contribution of one of the parties has been relatively slight, such as those instances in which privately developed software is slightly modified at public expense. This approach would thus avoid the rigidity of the strict 50% formula, while providing somewhat greater structure for contracting personnel than would the highly flexible FAR approach. It thus seems to provide a reasonable approach to balancing the respective interests and concerns expressed by the DoD and private industry.

It should be noted, however, that software is not a seamless whole, but rather is often composed of separable units. Indeed, a goal of the Ada language initiative is to increase the use, and reuse, of separable software modules. Contractors may be able to use and reuse privately developed modules as part of a larger program. Such modules may constitute only a small portion of the total program, especially where the program is large, but the module may nonetheless contain extremely valuable proprietary technology. It is recommended that separable modules that have been developed at private expense, and are incorporated in deliverable software, be treated as privately developed software. To protect DoD's needs,

the contracting officer should have the flexibility to negotiate, where determined necessary, for greater rights (for example, program restricted rights) in privately developed modules, or for incorporation of only those modules subject to at least government purpose rights.

2.3.3.3. How should rights be allocated in software that has been developed with a mix of government and private resources?

Private and public sector participants at the Software Rights in Data Workshop were widely divided over what should be the appropriate allocation of rights in mixed funding software. Both agreed that negotiation is desirable in mixed funding situations, and that the government should have certain clearly defined minimum rights in all such situations. As to the extent of those minimum rights, however, there was considerable disagreement.

DoD representatives felt that something close to unlimited rights would be useful for the government to achieve competition as to reprocurement, and maintenance and enhancement. These participants felt that a package such as government purpose rights might be adequate to meet DoD's needs with respect to competition, but could be administratively burdensome since the government might then have to monitor use of the software by a third party.

Industry participants advocated a set of rights closer to the four minimum rights that the government obtains in restricted rights software. They felt, however, that rights to disclose for competitive purposes should not be a minimum right of the government in mixed funding software in that it might result in widespread dissemination of their software technology.

The recent revision to the DoD technical data regulations adopted government purposes license rights as the set of rights acquired by the government in mixed funding situations. Under this set of rights the government would have the right to disseminate software and software documentation for purposes of achieving competition, but would not be have the right to permit a third party to commercially use the technology. Although the revised DFARS are as of yet untested, this type of approach appears to hold some promise of striking a reasonable balance between the respective views of the DoD and private industry. The government would obtain sufficient rights to fulfill its competitive maintenance and enhancement needs, while contractors would be protected against having technology they have developed being generally distributed. The benefit to the government, in terms of increased availability of quality software, would seem to outweight any administrative burden the DoD might experience. The contracting officer should, nonetheless, have the authority to negotiate for a less broad set of rights, such as rights restricted to a particular program, in those situations where government purpose rights would not be necessary to meet DoD's needs.

2.3.3.4. When is software "developed" for purposes of determining if it has been developed at private expense?

Another important issue related to mixed funding is ascertaining when software is developed for purposes of determining if it has been developed at private expense. This definition determines the dividing line between software treated as developed at private expense, and that which will be treated as mixed funding software.

The recent revision to the DoD technical data regulations defines the term "developed" as meaning that "the item, component, or process exists and is workable. . . that the item or component has been constructed or the process practiced." The standard set forth for determining "workability" requires that the "item, component, or process has been analyzed or tested sufficiently to demonstrate to reasonable people skilled in the applicable art that there is a high probability that it will operate as intended" [DFARS, Sec. 227.471]. With respect to the software development process, it appears likely that such a standard will result in a requirement that the software have reached the testing phase in its life cycle. This would generally occur somewhere subsequent to implementation or writing of the code, but prior to deployment or reduction to practice.

Discussions at the Software Rights in Data Workshop focused on whether a testing requirement should be included in the definition of the term "developed" as applied to software. Industry participants seemed to feel that such a requirement did not reflect the technical realities of the software development process. Their position was that a major portion of the investment in a software product occurs prior to testing. This position was confirmed by technical participants in the working group. The DoD participants were concerned, however, that by accepting less than unlimited rights in software in which the DoD currently receives unlimited rights, the government's ability to achieve competition for software maintenance and enhancement would be lessened.

Significantly, despite the differing views of public and private sector participants, a compromise position, in the form of a proviso to be appended to a definition of the term "developed" proposed by the DoD participants, was drafted. The proviso states that if computer software exists, and no significant modifications are performed in order to satisfy subsequent applicable tests under a government contract, the software will be considered to have been developed at private expense. With the addition of this proviso, the full text of which is included, along with government and industry proposals, in Appendix C, the industry participants were willing to accept the government view. This appears to be a realistic, workable approach to defining the term "developed" for purposes of determining whether software has been developed at private expense in that it addresses the primary concerns of both the public and private sector participants.

It was also noted at the workshop that an adequate mixed funding alternative might obviate the importance of defining the term "developed." An equitable allocation of rights in software developed with a mix of public and private funds would eliminate the harshness of the dichotomy wherein software must either be developed exclusively at private expense or be treated as though developed exclusively at public expense.

2.3.3.5. Conclusion
The formulation of an equitable mixed funding policy is in the interests of both the DoD and industry. Government purpose license rights provide the DoD sufficient rights to meet its needs, while allowing industry to recoup its investment. An approach that treats other than slight contributions of either government or private resources as mixed funding arrangements appears to have the greatest likelihood of providing an incentive for private invest-

ment, and making industry's most innovative ideas available to the DoD. Separable modules, developed at private expense, should, however, be treated as having been privately developed.

3. Conclusion

The DoD needs to obtain high quality software. It also needs to be able to use and support the software it acquires, and to achieve competition on reprocurement. Private industry, on the other hand, needs to be able to protect its proprietary technology and commercialize its products in order to recoup its investment in the development of software, including software tools.

The DoD data rights policy has, in the past, been imbalanced in the direction of often obtaining more rights than were necessary to meet its mission needs. DoD's broad claims of rights in software have been at the expense of losing access to some of the most innovative technology the software industry has to offer. The DAR Council has, at the urging of both the Packard Commission and Congress, revised its policy with respect to acquiring rights in technical data so as to provide greater balance between the interests of the DoD and industry. A new policy for acquiring rights in software is currently under consideration. Because of its unique, evolving nature, a separate policy for acquiring rights in software is appropriate.

A more balanced policy for acquiring rights in software developed at government expense, software developed at private expense, and software developed with mixed funds is in the interests of both the DoD and private industry. This report makes several recommendations for achieving a balanced policy that will meet the mission needs of the DoD while enabling contractors to protect their proprietary interests, and commercialize their software products. Generally, it is recommended that the DoD obtain only government purpose rights, with an option to acquire unlimited rights where needed, in government funded software; restricted rights in privately developed software and related documentation, with an option to acquire less than the minimum restricted rights in some innovative software technology; and government purpose rights, with the flexibility to negotiate for lesser rights where sufficient to meet DoD's needs, in mixed funding software. By limiting its acquisition of rights to those needed to meet its mission needs, the DoD can gain access to the innovative software technology it needs, and provide incentives for the continuing development of useful software products. In this way, the DoD will not only be fostering the interests of both industry and itself, but also those of the nation.

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Appendix A: Working Group A, Intellectual Property Requirements for Software Maintenance and Enhancement

Issues

OVERVIEW

The focus of this working group is to define an appropriate level of rights in software that would meet DoD's software maintenance and enhancement needs while respecting the proprietary interests of industry. Since the documentation and tools needed to perform these tasks embody material which may be proprietary to a software developer, it is in the maintenance and enhancement context where many of the most critical software rights issues arise.

In addressing this complex area, the working group may wish to focus on the following issues:

- What is the scope of rights in software documentation that the DoD requires in order to maintain publicly and privately developed software?
- What type of licensing arrangements will enable the DoD to compete contracts for maintenance and enhancement?
- How can flexibility be built into a software rights policy to reflect variances from acquisition to acquisition in DoD's needs for documentation and tools to maintain and enhance software?
- What should be the respective rights of the DoD and industry in software that has been developed at public expense and copyrighted by a contractor?

The product of the working group should be a series of recommendations reflecting the group's consensus as to the regulatory treatment of each of the four primary issues. If possible, a rationale for each recommendation should be included. If consensus cannot be reached on a particular topic, a description of the problems as to why the group could not agree should be provided. Members should feel free to submit minority position statements.

In analyzing these issues, the group may find it useful to attempt to address the subissues set forth below. Please note that these subissues are suggested only as a starting point and that members of the group should feel free to formulate their own approaches to addressing these areas.

I. WHAT IS THE SCOPE OF RIGHTS IN SOFTWARE DOCUMENTATION THAT THE DOD NEEDS TO MAINTAIN AND ENHANCE SOFTWARE?

A. SOFTWARE DEVELOPED AT PUBLIC EXPENSE

1. *Does the DoD always need unlimited rights to maintain and enhance software in-house?*

One of the primary reasons for DoD's broad claim of unlimited rights in publicly funded software and its associated documentation is to enable it to maintain and enhance the software both in-house or through private firms by competitive bidding. Our investigation has revealed that there is a strong preference within the DoD for organic maintenance of software. This involves performance of the maintenance function by government personnel, sometimes augmented by outside support contractors, at a government facility.

Does the DoD always need unlimited rights in publicly funded software and its documentation to enable it to maintain and enhance the software in-house?

2. *Would a government purpose license allow the DoD to maintain and enhance its software in-house?*

It has been argued that a government purpose license in publicly funded software is sufficient to meet DoD's needs. Such a license could be defined as the right to use, duplicate, disclose, distribute, prepare derivative works and publicly display software for government purposes, and authorize others to do the same when doing so would fulfill a legitimate government function.

(a). If the DoD were to obtain a government purpose license in publicly funded software and its documentation in lieu of unlimited rights would this allow it to maintain and enhance such software in-house?

(b). In what circumstances, if any, would such a license not allow the DoD to meet its maintenance and enhancement needs.

3. *Does the DoD need a derivative works right?*

An important issue that affects DoD's rights to modify and enhance software developed at public expense is whether the DoD has the right to prepare derivative software. It has been argued that the DoD should follow the example of the Federal Acquisition Regulations which includes the derivative works right within the scope unlimited rights. Some DoD personnel have argued that an explicit derivative works right is unnecessary since it is implicit in the present regulations.

Should DoD regulations include a derivative works right within unlimited rights?

B. SOFTWARE DEVELOPED AT PRIVATE EXPENSE

1. *What rights does the DoD need to perform In-house maintenance and enhancement on privately developed software?*

Under the current regulatory structure, software documentation is treated as technical data. This means that documentation which has been developed at private expense is acquired by the DoD with limited rights (giving the government the right to use, disclose and duplicate the documentation throughout the government). Thus, the DoD may acquire a broader set of rights in documentation for non-commercial restricted rights software than it acquires in the software itself. This is true even though the restricted rights license may limit use of the software to the computer for which or with which it was acquired.

(a). Does the DoD need rights to disclose and duplicate the documentation throughout the government to maintain and enhance software the use of which is restricted to the computer for or with which it was acquired or a backup computer?

(b). What rights does the DoD need to acquire in privately developed software and its associated documentation to enable it to maintain and enhance the software in-house?

(c). Should these rights be different for privately developed <u>commercial</u> software?

II. WHAT TYPE OF LICENSING ARRANGEMENTS WILL ENABLE THE DOD TO COMPETE CONTRACTS FOR MAINTENANCE AND ENHANCEMENT?

A. SOFTWARE DEVELOPED AT PUBLIC EXPENSE

1. *What Is an appropriate means of competitively maintaining and enhancing publicly developed software?*

Although organic maintenance appears to be the preferred method of maintaining and enhancing software, the DoD will sometimes contract all or a portion of the software maintenance and enhancement tasks to third party contractors who did not develop the software. The Competition in Contracting Act (CICA) requires that these contracts be reopened for competition periodically, unless the criteria justifying a sole source procurement are met. The requirement to competitively procure maintenance services is one of the primary rationales for DoD's broad-based claim of unlimited rights in software and its documentation.

(a). Does the current set of unlimited rights provide sufficient rights in software and its documentation to enable the DoD to competitively maintain and enhance publicly developed software?

(b). Are there any situations in which the DoD may not need to acquire unlimited rights in software and its documentation to enable it to competitively maintain software? Please specify.

B. SOFTWARE DEVELOPED AT PRIVATE EXPENSE

1. *What is an appropriate means of competitively maintaining and enhancing restricted rights software?*

Under the current regulatory structure the DoD has experienced difficulty in competitively maintaining software which is acquired with restricted rights. In order to competitively maintain such software, it appears that the DoD would need to negotiate to acquire the following rights from the developing contractor:

  (i) the ability to sublicense its software modification right or a commitment by the contractor to license another company to modify the software;

  (ii) the ability to sublicense the documentation about the software, or a commitment by the contractor to license the other company to have access to the documentation;

  (iii) very detailed documentation; and possibly

  (iv) rights in the software tools, or a commitment from the developing firm to license a competitor's access to the tools.

  a. Under what circumstances is it feasible for the DoD to compete the maintenance and enhancement of privately developed software?

  b. Should a software rights policy provide for a developing contractor to agree to enter into a license agreement with a support contractor to license that contractor to modify the software and to have access to documentation and tools needed to maintain and enhance the software? How would such a provision be structured?

  c. Are there any other arrangements that could be made to enable third party support contractors to maintain and enhance privately developed software?

III. HOW CAN FLEXIBILITY BE BUILT INTO A SOFTWARE RIGHTS POLICY TO REFLECT VARIANCES FROM ACQUISITION TO ACQUISITION IN DOD'S NEEDS FOR DOCUMENTATION AND TOOLS TO MAINTAIN AND ENHANCE SOFTWARE?

How can the regulations be structured to allow for tailoring to more accurately reflect DoD's true needs with respect to software documentation and tools?

There is increasing recognition within the DoD of the importance of planning early in acquisition process for the maintenance and enhancement of software. This entails the early identification of the documentation and tools needed to support software as well as the intellectual property rights needed to be acquired in such technology. It has been argued that DoD's needs for certain types of tools and documentation and the rights in such technology will vary from acquisition to acquisition in accordance with several variables. This creates a window of opportunity for the crafting of a software rights policy that will be flexible enough to take into account all of the variables affecting DoD's needs for software documentation and tools.

A. SOFTWARE DOCUMENTATION

1. Do DoD's needs for documentation to maintain and enhance software vary with:

   - the type of software acquired? (e.g., application software, operating system software)?
   - the complexity of the software?
   - who will maintain and enhance the software?
   - other technical variables?

2. Should a software rights policy distinguish among different types of documentation needed for maintenance and enhancement? Please specify.

3. How can a software rights regulation provide flexibility to software acquisition personnel to enable them to structure the acquisition to obtain only the documentation critical to the maintenance and enhancement of the particular software being acquired?

B. SOFTWARE TOOLS

Throughout our field research, DoD personnel identified access to various software tools as vital to software maintenance and enhancement. However, such tools are often among the most innovative of technological developments and may involve substantial private investment. Developers of such tools are often reluctant to use them to perform DoD contracts because the DoD may attempt to claim rights in these tools under the current standard data rights clause. There are some who argue that the present policy discourages even the development of innovative tools because of these proprietary concerns.

1. Do DoD's needs for software tools to maintain and enhance software vary with:

   - the type of software acquired?
   - the complexity of the software to be maintained?
   - who will maintain and enhance the software?
   - other technical variables?

2. Under what circumstances does the DoD require access to a developer's design and development tools in order to maintain and enhance software acquired from that developer?

3. Is it possible to structure a provision to give the DoD access to privately developed design and development tools for maintenance and enhancement?

(a). Is an escrow arrangement allowing the government access upon the meeting of certain specified conditions feasible?

(b). Is providing an option for the DoD to negotiate to take less than the minimum restricted rights in proprietary software tools feasible?

4. How can a policy be structured to give the DoD access to commercially available proprietary tools?

IV. WHAT SHOULD BE THE RESPECTIVE RIGHTS OF GOVERNMENT AND INDUSTRY IN SOFTWARE THAT HAS BEEN DEVELOPED AT PUBLIC EXPENSE AND COPYRIGHTED BY THE CONTRACTOR?

1. *What should be the policy with respect to copyrights in software?*

There is an ambiguity in the present data rights regulations concerning the extent of the government's rights in copyrighted software developed at public expense. One part of the regulations seems to give the DoD unlimited rights in such software because it was developed at public expense while another part gives the government only government purpose rights if the contractor decides to retain a copyright in the software.

It appears that the government will typically not know the extent of its rights until the software is delivered to the government, with or without a copyright notice attached. This could raise some complexities with respect to software maintenance and enhancement since modifications of software are derivative works that may qualify for copyright protection.

(a). Should the developing contractor be required to give notice to the DoD of his intent to copyright software developed at public expense?

(b). Should the contractor be required to seek permission to copyright such software?

Recommendations of Working Group A on Maintenance Needs

I. AS TO PRIVATELY DEVELOPED SOFTWARE

A. The set of things the government will ordinarily acquire for itself

1. Software & standard user documentation

The government will normally acquire standard user documentation along with object code. Software should be defined to include such standard user documentation (as well as code). The government should get the same standard minimum restricted rights in both object code and standard user documentation.

2. Source code, design documentation, tools, and other things necessary to support software.

The government ordinarily does not need to take delivery of source code and other support materials for commercially available (with some specific exceptions) software. It may need the option to acquire rights in such materials when it desires to perform a support function internally. In general, an important advantage to the government in acquiring privately developed software is not having to perform support functions for it.

B. The need to have assurance of adequate support for the software

A major concern of the government is to be able to have assurance that software developed at private expense can adequately be supported either by the original developer or by a responsible third party.

To achieve a balance between the government's needs to be assured of adequate support and industry's need for proprietary protection, the group recommends that a conditional directed licensing clause be developed as an option to be included in government contracts, which would include an escrow of support material. (It would be a variation on an existing DOE clause, but tailored as described below.)

The basic principle of such a clause would be an agreement that the original developer would agree to license the software and escrowed material to a responsible third party to perform support functions if the original developer was unwilling or unable to do so. There was disagreement within the group about whether the government should perform support functions in place of a responsible third party.

1. Triggering mechanism
   There would be a provision that the government can notify a contractor that if the contractor is unwilling or unable to perform support functions for the software in a reasonable manner, and at a reasonable price, the government will invoke its rights to transfer the support functions to a third party, and the license will implicitly be granted to that third party to perform the support functions.

2. The scope of the third party's rights
   The third party will only have the scope of rights in the software necessary for support of the software within the scope of the original contract that the government had. As to the support documentation that will be released from escrow, the third party will be able to use it only for purposes of supporting the software for the government in accordance with the scope of the original contract. The original contractor will have the rights to sue the third party directly under the license if the third party abuses the license to the disadvantage of the contractor.

3. Technical assistance
   To be able to support the software, the third party will often need technical assistance from the original developer. The directed licensing clause should obligate the contractor to provide technical assistance to the third party.

4. Escrow for documentation & tools

   (a). What to escrow
   All materials that are needed to regenerate or modify the software and that were not delivered to the government under the original contract should be placed in escrow so that if the contractor is unwilling or unable to perform support functions, the government will be able to obtain the support materials either for itself or for a responsible third party maintainer.

   Among the software materials that may be needed for regeneration and modification are software elements such as source code, relocatable object code, and system/linker directives, executable load image and software documentation, such as flow charts, design specifications, and implementation specifications. Tools may also be escrowed.

   (b). Escrow agent
   There was consensus that an agent acceptable to both parties would be needed to act as escrow agent. Both sides need adequate protection that the escrow is bonafide. The escrow agent should be selected accordingly.

   (c). When to escrow
   All such support materials should be placed in escrow at the time the object code is delivered to the government. Whenever updates within the scope of the original contract are issued, the escrow agent should receive updated documentation to reflect changes in the code. The source code should be certified when placed in escrow.

(d). <u>Circumstances under which the government could obtain release of the escrowed materials</u>
When the contractor is unwilling or unable to continue to perform support for software, the contractor may be willing to notify the escrow agent to have the escrowed material released to the responsible third party maintainer. If the contractor contests the government's claim that the contractor is not supporting the software in a reasonable manner (or whatever), it will take a finding by the head of the government agency that the government has a valid claim to get escrowed materials released to the third party maintainer. The contractor shall be notified of the release from escrow, to whom the escrowed material has been given, and who the third party maintainer is, and instructed to negotiate transition assistance with the third party.

(e). <u>Damages for improper release from escrow</u>
If litigation later reveals that the government did not meet the standard to get the materials released from escrow, the government will be liable for necessary damages for improper release. The group differentiated this situation from the validation challenge procedure because even when released from escrow, the support materials will be subject to restrictions on the third party's use, and will not be distributed to the public the way that technical data whose restrictive legends have been removed would be.

(f). <u>Directed license vs. sublicense</u>
The group recommends that the government adopt a directed license approach instead of a sublicense so that disputes between the original contractor and the third party can be fought without direct government involvement. The protection for the government comes from the fact that the contractor will have agreed upfront to license a responsible third party to perform support functions if the is unable or unwilling to do so, and once a finding has been made by the head of the agency that the standard for escrow release has been achieved, a license will be deemed to have been granted by the developer to the third party. The government may have little need to invoke the rights under the directed licensing provision because the power to invoke the third party license creates a powerful incentive for the contractor to seek a more consensual arrangement.

(g). <u>Software documentation for software that isn't commercially available</u>
Documentation for software that is not commercially available may be more sparse or incomplete than documentation for commercial software. The government may sometimes need to pay for the creation of additional documentation for the software it will need to support the system.

II. AS TO GOVERNMENT FUNDED SOFTWARE

A. Completely funded by the government

1. Set of rights in the government

> (a).   Unlimited rights vs government purpose rights
> In order to maintain and enhance software, the government may not need the broad set of rights that the present unlimited rights policy provides. Government purpose rights may adequately protect the government's interest so long as the government is able to compete for maintenance services. However, the broad unlimited rights policy does have an economic value for the government which the government may wish to preserve unless given an incentive to relinquish this (e.g., a lower price for the development contract or other compensation).
>
> (b).   The degree of flexibility for contract officers
> There was consensus that contract officers should have flexibility to negotiate for less than unlimited rights (for example, rights restricted to a particular agency or project) in order to achieve other goals in a software development competition.
>
> Industry may have more incentives to achieve broader technology transition than the government. It may be in the government's broader interest for this technology transition to occur. It may be necessary for the government to relinquish its broad rights (which include the power to put trade secrets which confer a commercial advantage to the contractor in the public domain) and to allow enough exclusivity to create incentives to commercialize the software.
>
> (c).   Definition of unlimited and government purpose rights
> The government shall have the rights to use duplicate, disclose, distribute, modify, & make derivative works of software developed wholly at government expense and to have or permit others to do so. These are unlimited rights. When the government negotiates for government purpose rights, the same set of terms applies except that they are limited to government purposes.

2. The government's interest in competing maintenance & enhancement for publicly funded software.

> (a). Policy statement
> There exist situations when the government may benefit by acquiring less than unlimited rights in software. To accommodate this situation, there should be flexibility to conduct limited competition, rather than full and open competition, in the procurement of software maintenance and enhancement services.

(b). Rationale
This option allows the government to achieve the benefits of competition for software enhancement and maintenance.

It also permits protection for the software developer's proprietary information in which the government has rights by distributing it only to limited set of bidders (with appropriate safeguards) rather than to the public at large.

3. Subsequent commercialization of software developed at public expense

If the government takes less than unlimited rights, and the contractor derives additional revenue from that or derivative products, there should be flexibility for the government to negotiate to receive benefits from subsequent commercial sales.

4. Documentation as to software developed at government expense

The government will acquire such documentation in software developed at public expense as is necessary to comply with requirements of the DoD standard 2167 or other appropriate government standards. The government will acquire normally the same rights in the documentation as the software.

5. Tools developed at private expense used in performance of contract

The government or its contractors need possession of the tools that are required for the purpose of use in life cycle maintenance and/or enhancement of the deliverable software.

The government should obtain a license that is restricted to this need and adequately protects the tool developer's proprietary intellectual property rights.

6. Tools or software components developed at private expense during the performance of contract and used in the development of government funded software

If required to support the software, tools or software components developed at private expense during performance of the contract and used to develop government funded software should be treated the same as if the tools were preexisting privately developed tools.

7. Tools or software components proposed to be developed at government expense which can be used in developing government funded deliverable software

Contract officers should have the flexibility to negotiate to acquire less than unlimited rights in innovative alternative tools or software components that are not already required to be delivered under the contract, but that are proposed to be developed during the performance of the contract.

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Appendix B: Working Group B, The Scope of a Software Rights Policy

Issues

OVERVIEW

The focus of this working group is to examine the scope of coverage of a new software rights policy. This entails an evaluation of the rationales underlying the current policies for publicly and privately developed software, and a determination as to the extent to which they are meeting DoD's needs.

In addressing this topic, the group may wish to focus on the following issues:

- Does the DoD always need unlimited rights in publicly funded software?
- What set of minimum rights does the DoD need in software that has been developed at private expense?
- How broad should the software rights policy be?

The product of the working group should be a series of recommendations reflecting the group's consensus as to the regulatory treatment of each of the three primary issues. If possible, a rationale for each recommendation should be included. If consensus cannot be reached on a particular topic, a description of the problems as to why the group could not agree should be provided. Members should feel free to submit minority position statements.

In analyzing these issues, the group may find it useful to attempt to address the subissues set forth below. Please note that these subissues are suggested only as a starting point and that members of the group should feel free to formulate their own approaches to addressing these areas.

I. DOES THE DOD ALWAYS NEED UNLIMITED RIGHTS IN PUBLICLY FUNDED SOFTWARE?

1. *Does the DoD need to claim unlimited rights in a broad spectrum of software and documentation?*

The DoD currently claims unlimited rights in a broad spectrum of software developed at public expense. This includes:

(i) software and documentation resulting directly from performance of experimental, developmental or research work specified in a government contract.

(ii) software and documentation required to be originated or developed under government contract or generated as a necessary part of performing a contract.

> (iii) software and documentation constituting corrections or changes to government furnished software.
>
> (iv) manuals or instructional materials prepared or required to be delivered under government contract for installation, operation, maintenance or training purpose.

(a). Does the DoD actually need to acquire unlimited rights in all these categories of software?

(b). Is it appropriate for the DoD to claim unlimited rights in instructional materials or manuals for software that has been developed at private expense and acquired with restricted rights?

2. *Would a government purpose license in publicly developed software allow the DoD to satisfy its needs?*

It has been argued that the acquisition by the DoD of a government purpose license in publicly funded software would enable the DoD to meet its needs. In this context, a government purpose license is defined as:

> a license to the federal government that grants the government rights to use, duplicate, disclose, distribute, prepare derivative works, and publicly display software for government purposes, and to authorize others to exercise such rights when doing so will fulfill a legitimate federal governmental function.

(a). Would a government purpose license allow the DoD to meet its needs?

(b). Assuming a government purpose license for publicly developed software would meet DoD's needs in at least some instances, are there any revisions which should be made to the definition noted above?

(c). Would government purpose rights in software and its documentation satisfy industry's concerns?

(d). Are there any circumstances under which the DoD might need broader unlimited rights as opposed to government purpose rights in publicly developed software and its documentation? What are those circumstances?

3. *What are appropriate policy goals for the DoD in acquiring rights in software developed at public expense?*

Developing a policy for publicly developed software requires a reevaluation of DoD's priorities. The DoD currently claims unlimited rights in a broad spectrum of software and technical data which has been developed at public expense. The concept of giving the DoD the right to use, duplicate or disclose in any manner and for any purpose whatsoever stems from longstanding policy that when the government pays for research and development that produces new knowledge, products or processes, it has an obligation to foster progress through a wide dissemination of the new technology. Other rationales for claiming unlimited

rights in software developed at public expense include performance of maintenance and enhancement and competitive reprocurement. It has been argued that DoD's broad claim of unlimited rights deters high tech firms from licensing their most innovative technology to the DoD. In light of this, it may be appropriate to re-examine DoD's priorities to ascertain whether the unlimited rights concept is allowing the DoD to meet its needs.

What are the appropriate goals that would justify the DoD acquiring unlimited rights in software developed at public expense?

- Dissemination of new technology?
- Performance of maintenance and enhancement?
- Competitive reprocurement?
- Others?

4. *Should the contractor who develops software for the DoD at public expense retain any rights in the software and its documentation?*

In the course of our research, several questions were raised as to what rights, if any, contractors should retain in software that has been developed with public funds.

(a). Should the contractor retain the right to commercialize software developed at public expense?

(b). If the contractor were to prepare derivatives of the software delivered to the DoD, for his own internal use or for marketing, should the DoD have any rights to these derivatives? Why?

(c). Are there any other rights which it might be appropriate for a contractor to retain in software developed at public expense?

(d). Assuming it is appropriate for the contractor to retain some rights in software and documentation developed at public expense, should a software rights clause set forth those rights?

II. WHAT SET OF MINIMUM RIGHTS DOES DOD THE NEED IN SOFTWARE THAT HAS BEEN DEVELOPED AT PRIVATE EXPENSE?

1. *Is there a set of minimum rights that the DoD will always need to obtain?*

The current regulations provide that software which has been developed at private expense is acquired by the DoD with restricted rights, which include as a minimum the right to:

- (i) Use the software with the computer for which or with which
  it was acquired, including any government facility to which
  it may be transferred;

- (ii) Use the software with a backup computer if the computer for
  which or with which it was acquired is inoperative;

(iii) Copy programs for safekeeping; and

(iv) Modify computer software, or combine it with other software "subject to the provision that those portions of the derivative software incorporating restricted rights software are subject to the same restricted rights".

Additionally, restricted rights include any other rights which are not inconsistent with the above minimum rights which are listed in the software contract or in a license.

(a). Does the current set of restricted rights meet the DoD's needs?

(b). Should the DoD have the right to disclose or reproduce privately developed software for use by support contractors (contractors who maintain and enhance the software) subject to their "agreement to abide by the other restrictions that bind the DoD in its use of the software"?

(c). Should the DoD have the right to reverse engineer software that has been developed at private expense in order to make modifications?

(d). Should there continue to be a different set of minimum restricted rights for privately developed commercial software?

2. *Would it be in DoD's best interests to be able to acquire less than minimum rights in certain innovative technologies?*

Several studies have pointed out that the DoD may not be getting access to some of the most innovative software technology such as tools and CAD/CAM programs because of its current software and data rights policy. Because of the potential commercial value of such technology, its developers are reluctant to expose it to the risk that the DoD may disclose it to their competitors. It has been suggested that a means of accessing such technology might be through providing the DoD with a limited license which provides the DoD less than the minimum restricted rights, for example providing electronic access to a CAD/CAM program. Other alternatives include use of an escrow arrangement for software tools.

(a). Is it feasible to provide an option for the DoD to negotiate to take less than the minimum restricted rights in certain types of privately developed software technology? How might such an arrangement be structured?

(b). Is an escrow arrangement allowing the DoD access to software technology upon the meeting of certain specified conditions feasible?

(c). Is it feasible to provide for an arrangement whereby a tool developer would directly license his tool to a support contractor designated by the DoD to do DoD work?

(d) Would it be feasible to provide the DoD with an option to acquire certain tools or other technology? How would such an option be structured?

III. HOW BROAD SHOULD THE SOFTWARE RIGHTS POLICY BE?

1. *What should be included within the scope of the software rights policy?*

Different views have been expressed as to what should be included within the scope of a software rights policy, especially with respect to software documentation. Some types of software documentation are more critical than the others in making effective use of a software product for the purpose for which it was acquired. Other issues arise due to the unique nature and capabilities of software.

(a). Should some types of software documentation be treated as software? Please specify.

(b). How can flexibility be built into the regulation to reflect the variances in DoD's need for documentation while at the same time protecting the private sector's interests?

(c). Should there be a specific policy with respect to acquisition of rights in local area networks (LANS)?

(d). Should semiconductor chips be included within the software rights policy?

(e). Should there be a specific policy with respect to "worms" or "time bombs"?

(f). How should software data bases be treated?

Working Group B: Draft Recommendations

Issue I: What are appropriate policy goals for the DoD in acquiring rights in publicly funded software?

Recommendation: Appropriate policy goals include (1) performance of maintenance and enhancement, (2) competitive reprocurement, and (3) reuse.

Rationale: Although there are some instances where dissemination of new software technology may be an appropriate policy goal for purposes of promoting commercial development or otherwise, the DoD does not need the right to disseminate software technology in all cases. With respect to commercialization, the original developer is generally in the best position to commercialize software technology because of its base knowledge and experience in developing the product.

Issue II: Does the DoD always need unlimited rights in publicly funded software, or would a government purpose license in such software allow the DoD to satisfy its goals?

Recommendation: DoD's objectives as stated above can be achieved by the DoD acquiring less than unlimited rights in software developed at public expense. (Unlimited rights are themselves not equivalent to ownership.) It therefore does not appear that the DoD necessarily needs broad unlimited rights in every category of software.

Normally, software which has been funded even with 100% government funds under government contract should be procured under a license restricting the government to the rights to copy, disclose, enhance, maintain, modify, prepare derivative works, or otherwise use the software for government purposes. "Government purposes" will ordinarily exclude any action, including unrestricted public dissemination, that will detract from the commercial value of the software to the developer. In implementing this recommendation for restricted government purpose licenses in publicly funded software, consideration might be given to mechanisms for contract price reductions, royalties, and/or time limitations for restrictions on dissemination.

Rationale: As noted above, the developer is often in the best position to commercialize the software, but acquisition of unlimited rights by the DoD, which includes a substantial risk of unrestricted disclosure to competitors, may reduce the incentive of the software developer to pursue such commercial development. A government purpose license would ordinarily allow the DoD to meet its own needs, provided that the developer agrees to permit use for maintenance, enhancement, or competitive procurement by third parties who have in turn agreed not to use the software commercially without prior written authorization of the developer. Thus, it was not the intent of this recommendation to preclude disclosure to third parties for government purposes so long as such third parties have accepted an obligation not to use the software for commercial purposes. That obligation might best be enforced by use of associate restricted use and non-disclosure licenses between the developer and support contractors, subsequent bidders, etc. In some instances, copyright infringement actions for breach of a copyright license may be sufficient.

Issue III: What set of minimum rights does the DoD need in software that has been developed at private expense?

Recommendations:

a. The existing set of minimum restricted rights generally meets DoD's needs. The DoD, however, should also have the right to use software with an upwardly compatible replacement computer in cases where the software is licensed alone instead of as part of a system.

b. The group was split over whether the DoD should have the right to disclose software for use by support contractors without a required condition that support contractors sign a non-disclosure and non-use agreement with the original developer or be bound by an organizational conflict of interest clause in the support contractor's contract with the government.

c. The DoD does not need to have the right to reverse engineer software included in the set of minimum rights.

d. There should not be a set of restricted rights applicable to privately developed commercial software that is different from the set of minimum rights applicable to privately developed non-commercial software.

Rationales:

a. The existing minimum rights generally permit use of software by the DoD that is sufficient for DoD's purposes. The only exception is DoD's need to be able to transfer old software to replacement hardware that will accept it without rehosting.

b. Industry wants either a right to protect its privately developed software itself or have assurance that any support contractor be limited to a support role only for its use of such privately developed software. Some government representatives present did not disagree with industry's objectives but they were not in agreement with imposing such requirements in the body of a software policy or regulation. They felt such a regulatory requirement could pose an administrative burden. They also did not believe that requiring insertion of an organizational conflict of interest clause was properly part of the software acquisition process.

c. - d. These recommendations are self-explanatory.

Issue IV: Would it be in DoD's best interests to be able to acquire less than minimum rights in certain innovative technologies?

Recommendation: There should be some flexibility built into the regulation to allow the DoD to negotiate to take less than the four minimum restricted rights in privately developed software where appropriate.

Rationale: All recognized that some innovative technologies beneficial to the government can likely only be acquired with less than the existing minimum restricted rights. The group differed over an appropriate method of injecting flexibility into the regulation. Some felt that

the current practice of requiring a DAR deviation was not unduly restrictive and should be retained, on the theory that minimum government rights should not be too easily waived by contracting officers. Others felt that, because the DAR deviation process was too cumbersome and time consuming, an intra-agency approval process would be more appropriate.

Issue V: How broad should the software rights policy be?

Recommendations:

    a. Software documentation generally should be treated in the same manner as the related software. However, user manuals which do not include source code, algorithms, processes, formulae, or flow charts should be acquired by the DoD with a broad government purpose license, even where the related software is acquired under more restrictive rights.

    b. A software rights policy should provide some broad guidance similar to that contained in the FAR to procurement personnel to consider possible LAN use when negotiating acquisition of privately developed software.

    c. Software embedded in semiconductor chips or other devices should be included within the scope of the software rights policy.

    d. The government should be informed of the existence of triggers, worms and time bombs designed into software delivered to the government.

    e. Technical data should be governed by the technical data rights policy regardless of the medium in which the data is delivered or stored.

Rationales:

    a. User manuals, which need not include source code, algorithms, processes, formulae, or flow charts to meet their intended purposes, need to be broadly and easily disseminated for instructional use. Moreover, because of the way user manuals are utilized, the government would have difficulty policing a more restrictive license regarding such manuals.

    b. Existing computer-restricted rights may not adequately provide for LAN use.

    c. Software is software regardless of the medium in which embedded.

    d. This recommendation is self-explanatory.

    e. Data, acquired under the technical data rights policy, should be distinguished from the data base management system which actually manipulates the data. The data base management system is software and should be acquired under the software rights policy. There are, however, instances where it is difficult to separate the data, as such from the software and where the data might be an intimate part of the software. AI systems, neural networks, and other emerging technologies pose such problems. The SEI should further explore this issue.

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Appendix C: Working Group C, Mixed Funding Alternatives

Issues

OVERVIEW

The focus of Working Group C will be to examine alternatives for allocating rights in software in situations in which both public and private funds are used in the development effort. This group will also address the related issue of defining the term "developed" for purposes of determining whether software has been "developed at private expense." Our research has indicated that, because of the unique nature of software, the definition of such terms may differ from that which would be appropriate to technical data.

In addressing this complex area, the working group may wish to focus on the following issues:

- What definition should be adopted for the term "developed" for purposes of determining whether a software product has been "developed at private expense"?
- How should a software rights policy define those situations in which a mixed funding alternative would be triggered?
- What allocation of rights between the DoD and the developer would be appropriate in mixed funding situations?
- What would be an appropriate allocation of rights in privately developed software that has been slightly modified at government expense?
- Should greater flexibility be afforded to contracting personnel in negotiating with respect to mixed funding software?

The product of this working group should be a series of recommendations reflecting the group's consensus as to the regulatory treatment of each of the five primary issues. If possible, a rationale for each recommendation should be included. If consensus cannot be reached on a particular topic, a description of the problems as to why the group could not agree should be provided. Members should feel free to submit minority position statements.

In analyzing these issues, the group may find it useful to attempt to address the subissues set forth below. Please note that these subissues are suggested only as a starting point and that members of the group should feel free to formulate their own approaches to addressing these issues.

I.   WHAT DEFINITION SHOULD BE ADOPTED FOR THE TERM "DEVELOPED" FOR PURPOSES OF DETERMINING WHETHER A SOFTWARE PRODUCT HAS BEEN DEVELOPED AT PRIVATE EXPENSE?

1. *When is software developed?*

There are many people who would argue that a software product is sufficiently different from technical data as to warrant a different definition for the term "developed", as used in determining the point at which the product has been developed.

(a). Should there be a different definition for the term "developed" when applied to software as opposed to technical data?

(b). What would be the rationale for a different definition for the term "developed" when applied to software as opposed to technical data? That is, in what respect is software different from technical data for purposes of determining the point at which it will be considered developed?

(c). What aspects of the development process should be considered in determining whether a software product has been brought to the point at which it has been developed? Should it be an operational definition? Should it include testing? Should it be based on whether the product has been fixed in a "tangible medium of expression"?

(d). In what ways will the economics of the software development process influence the definition of the term "developed"?

II.   HOW SHOULD A SOFTWARE RIGHTS POLICY DEFINE THOSE SITUATIONS IN WHICH A MIXED FUNDING ALTERNATIVE WOULD BE TRIGGERED?

1. *How can an appropriate mixed funding approach be defined?*

Congress has mandated that the DoD adopt a mixed funding alternative, but did not provide guidance as to its structure. There has been some criticism of the approach of basing a mixed funding alternative on a formula geared to the percentage of public and private funding which goes into a development.

(a). How might a more workable mixed funding alternative be structured?

(b). What would be considered as contributions to the development effort, and how would they be valued? Would a contractor's preexisting knowledge base be considered? Would use of privately developed design and development tools be considered?

(c). What would be included in determining the government's contribution?

(d). Would the approach suggested in the proposed FAR technical data regulations be workable?

2. *How should resource contributions be treated?*

A mixed funding situation might arise in the form of both public and private contributions to an ongoing development (concurrent development), or as an improvement, at private expense, to a software product which had been developed at public expense (sequential development).

Should a mixed funding alternative apply to sequential development as well as concurrent sharing of resources?

III. WHAT ALLOCATION OF RIGHTS WOULD BE APPROPRIATE IN MIXED FUNDING SITUATIONS?

1. *How should rights be allocated between the DoD and the private sector?*

Once it is determined that mixed funding treatment is appropriate in certain situations, the allocation of rights between the DoD and the developer must be examined. Such rights might supplement or replace the present categories of unlimited rights and restricted or limited rights.

(a). What package(s) of rights should be available in mixed funding situations?

(b). Would government purpose rights be appropriate? In what instances?

(c). Should there be a sliding scale of rights based on contributions made?

(d). Should some new allocation of rights be structured?

V. WHAT WOULD BE AN APPROPRIATE ALLOCATION OF RIGHTS BETWEEN THE DOD AND THE DEVELOPER IN PRIVATELY DEVELOPED SOFTWARE THAT HAS BEEN SLIGHTLY MODIFIED AT GOVERNMENT EXPENSE?

1. *What rights should the DoD acquire in slightly modified software?*

The DoD will sometimes request that a vendor make a slight modification to a privately developed software product so as to make the product applicable to some the DoD use. Because the product has been modified at government expense, the DoD can claim unlimited rights in the product. This reportedly has deterred software developers from modifying innovative proprietary software for the DoD use.

(a). What rights should the DoD acquire in privately developed software which has been slightly modified at public expense?

(b). Should it differ from other situations in which both public and private funds have been used to develop the software?

(c). How can the proprietary interests of the contractor be protected in situations where software has been slightly modified at government expense?

V. SHOULD GREATER FLEXIBILITY BE AFFORDED TO CONTRACTING PERSONNEL IN NEGOTIATING WITH RESPECT TO MIXED FUNDING SOFTWARE?

1. *Can the regulations regarding mixed funding provide some flexibility for contracting personnel?*

There are many people who feel that the present the DoD technical data regulations are too rigid, and that they do not allow for enough flexibility in the acquisition negotiation process. Others are concerned that government contracting personnel require extensive structure to ensure that the interests of the government are adequately represented during negotiations.

(a). How much negotiating flexibility should the regulations allow to government contracting personnel in mixed funding situations?

(b). How could greater flexibility be obtained while still ensuring that the interests of the government are adequately represented during the negotiating process?

Working Group C on Mixed Funding Alternatives: Draft Recommendations

I. Defining the term "developed" for purposes of determining whether software has been developed at private expense.

A. Proposed Definition of "Developed" (Government View)

The following definition for the term "developed" was put forth by the government participants in Working Group C and is intended to provide for the government's maintenance and enhancement needs.

Competition Enhancement Position

"Developed", as used in this subpart, means that the computer software exists and works as intended. For the purpose of this definition, "To exist" the computer software must be in the form of a computer program. Computer software "works as intended" when that software has been analyzed and tested sufficiently to demonstrate to reasonable persons skilled in the applicable art that there is a high probability that it will successfully operate for its intended purpose. How much and what type of testing is required, in addition to analysis, depends on the nature of the computer software and the state of the art.

B. Proposed Definition of "Developed" (Industry View)

The following definition for the term developed was put forth by private sector participants in Working Group C and was intended to provide an equitable resolution to the issue of when software has been developed at private expense.

"Developed" as used in this subpart shall mean with respect to computer software that sufficient documentation exists, in the form of detailed program design specifications, to demonstrate to a reasonable person skilled in the applicable art that there is a high probability that such computer software will operate as intended. A working model of such computer software or components thereof will normally be required only when such a high probability is not found. To be considered "developed" the computer software need not be at the stage where it could be offered for sale or sold on the commercial market. [As used herein, "computer software" includes related documentation].

C. Compromise Proviso for Definition of "Developed"

The following proviso was derived from materials included in the Packard Commission report. The private sector participants were willing to accept the Proposed Definition of "Developed" (Government View) presented in subsection A, above, on the condition that this proviso be attached.

This will be a proviso applicable to a definition of developed that requires testing.

If the computer software exists, then testing of such computer software under the contract will be used to establish whether or not such software was developed "at private expense". If no significant modifications are performed under the contract in order to satisfy the applicable tests, then the software will be considered to have been developed "at private expense". If significant modifications to such computer software are performed under the contract to satisfy the applicable tests, then this fact establishes that the computer software was not developed "at private expense".

D. Model to Guide Discussion of Definition of "Developed"

A model used to guide discussions related to defining the term "developed" appears below.

Figure 1: Model Used in Defining "Developed"

II. *Trigger mechanism for mixed funding alternative*

When is funding mixed?

Substantial monetary contribution by both parties.

Should "substantial" be defined to mean a particular percentage?

May need a percentage to avoid disputes over the meaning of terms such as material or substantial.

There was some agreement as to 10% as a percentage for determining if the contribution had been substantial, but there was not a consensus as to this.

III. *Minimum rights in mixed funding software*

A. Consensus:
Negotiation of data rights is appropriate and desirable in mixed funding situations.

B. Consensus:
Government should have certain clearly defined minimum rights in all mixed funding situations.

C. Government View as to Government Minimum Rights
Minimum rights in mixed funding situations should be close to unlimited rights.

Government purpose license rights may be an appropriate minimum standard, but the obligations of the government to protect the data (software) should be clearly articulated.

Competitive reprocurement and competitive maintenance are the heart of the problem.

Government perspective: Government purpose rights require the government to police or administer; unlimited rights are preferable because the government has no responsibility with respect to the software once it has been released into private hands for the purpose of competitive reprocurement or maintenance.

D. Industry View as to Government's Minimum Rights

(note: not monolithic)

Minimum rights should <u>not</u> include the rights to disclose for competitive reprocurement or competitive maintenance. Government rights should increase as government funding increases and as time passes.

Appropriate minimum rights in mixed funding situations may be the four "restricted rights" the government gets in software developed wholly at private expense. The four minimum rights were generally acceptable to the private sector participants, although there was some feeling that the right to modify might not be appropriate in all situations.

E.   Some Thoughts Put Forward by Mr. Len Rawicz on Development of Computer Software and Mixed Funding

A. *At Private Expense*

  I. Government License Rights

    a. Four minimum positive rights

    b. No negative covenants

    c. Can add additional limitations

    d. Software documentation either unlimited (manuals) or limited rights or copyright

  II. Level of Software Deliverables

    a. Not specified by DFARS

    b. Contracting officer must consider level of software deliverables based on need

      1. Object code

      2. Source code

      3. Documentation

      4. Software Tools

  III. Competitive/Maintenance/Enhancement

    a. Not specified in DFARS 27.4 except "right to modify"

    b. Contracting officer must consider - acquire downstream rights and information if competitive reprocurement or competitive maintenance is needed

B. *At Government Expense*

  I. A. Government Rights

    a. Unlimited Rights, or

    b. Government purpose copyright license of all exclusive rights under copyright laws, and/or

    c. Contract limitations on right to use internally, release for competitive purposes or for maintenance or enhancement.

I. B.   _Contractor Rights_

    a. Unlimited Rights, or

    b. Copyright ownership (for commercial purposes), or

    c. Trade secret if sufficient contract rights are obtained (?)

II. _Level of Software Deliverables_

    a. Not specified by DFARS

    b. Contracting officer must specify (assume it will be source code and documentation)

III. _Competitive/Maintenance/Enhancement_

    a. Informational requests not specified in DFARS 27.4

    b. Sufficient rights are available

Figure 2:   Proposed Mixed Funding Approach

F. Some Thoughts Put Forward by a Private Sector Participant on Allocation of Rights In Software

These proposals for allocation of rights in software were provided by a private sector participant. Unfortunately, time did not allow discussion.

The government shall have government purpose rights in computer software pertaining to items, components or processes for which the contractor has funded, or will fund any of the development cost of the item, component or process.

The government shall have "restricted rights" in computer software pertaining to items, components, and processes developed exclusively at private expense.

The government shall have "unlimited rights" in computer software pertaining to items, components and processes developed exclusively at government expense.

The government may agree to waive these "unlimited rights" provided that the United States receives, as a minimum, a royalty-free license to use, release, or disclose the computer software for purposes of the United States, including purposes of competitive procurement.

Such terms as "adaptation" and "modify" shall mean and be used to signify revisions made to computer program items, components, or processes in machine readable form, which had previously been "developed".

IV. *Slight modification under government contract of software developed at private expense.*

1. Does it meet the standard for "developed" prior to government funding?

2. Was it modified with government funds?

If the answers to questions 1 and 2 are yes, the critical question then becomes:

3. Is the modification severable from the original privately developed software?

If no, then go to a mixed funding analysis.

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Appendix D: Summary of Software Rights in Data Survey

I. Introduction

The purpose of the Software Rights in Data Survey was to determine the needs and concerns of the DoD and industry with respect to key issues affecting the new rights in software policy. The survey's aim was to supplement and refine the information obtained from our project interviews and workshop. Although the interviews had helped us to identify the key issues, they were not optimal for collecting detailed, objective information. The workshop enabled us to determine whether consensus was possible on some of the issues, but introduced the effects of small group dynamics through which a vocal or persuasive member can narrow or distort the range of opinions that emerge. The survey allowed us to capture the entire distribution of opinion with enough detail to support the conclusions of the workshop while being independent of it.

II. Method

A. Survey Population and Sample

We planned to use the survey to extend the breadth of our coverage of the two populations from which we interviewed: industry managers and lawyers who are knowledgeable in data rights, and the DoD technical personnel and program managers. In selecting our sample, we found it efficient to use the contacts that we had made over the more than two-year life of our project. Since we did not attempt to sample scientifically from all industry lawyers or the DoD software personnel, but rather those we knew to be experienced in this area, our results undoubtedly represent more informed positions than those held by the populations at large.

The government sample size was 141, with representation from all three services. Additionally, a sprinkling of other government and DoD agencies, including the Defense Logistics Agency and NASA, were represented in the sample.

The industry sample size was 288, which included both large and small companies. Approximately 20% of the firms responding were small businesses.

B. Response Rates

The overall response rate to the survey was 34%, but the response rate was markedly greater for the DoD sample (50%) than for the industry sample (26%). However, in many cases more than one survey was sent to a single company, and often only a single survey was returned, which mitigates the lower response rate for industry. A total of 51 different companies responded to the survey.

In addition, it is likely that many people in the sample did not return the questionnaire because they did not consider themselves knowledgeable enough about data rights issues.

We asked respondents to evaluate their expertise in this area, and very few of those we received indicate less than moderate expertise.

C. Question Design

Although the survey questionnaires were different for the DoD and industry, we tried, where possible, to use identical questions which would enable precise comparisons between the two groups on certain issues. In other cases, we were able to ask complementary questions of both groups that provide cross-checks on the reasonableness and precision of the responses.

Many of the questions asked about the frequency of past events or the perceived likelihood of future events. These are difficult questions to ask precisely in surveys, and the approach usually taken in surveys has significant limitations. What is typically done is to have respondents check one of a set of words that designate frequency categories, such as "never," "occasionally," "seldom," "often," "usually," and "always." But these words mark neither precise nor unambiguous points on the frequency continuum, so using them makes it difficult to calculate any summary measure of "average frequency."

Accordingly, we devised a graphical estimation technique that turned out to be both novel and natural for respondents to use, while providing more reliable and precise estimates of the frequency of past events or the likelihood of future events. We presented a question with a line whose endpoints were labeled **never** and **always**, and asked the respondents to mark a point on the scale.

NEVER...ALWAYS

This is a form of "magnitude estimation," a measurement technique first studied by Stevens. *Stevens, The direct estimation of sensory magnitude — loudness. American Journal of Psychology, 1956, 69, 1-25.* For an introductory treatment, see P. H. Lindsay and D. A. Norman, An introduction to psychology, 2nd ed. Academic Press, 1977, Appendix A.

Hundreds of experimental studies have since shown, almost counter to intuition, that asking subjects to make direct estimates of subjective magnitude give more reliable judgments than more complex measurement instructions. Elaborate numerical and categorical scales almost always make things worse, because people can let what they know about numbers and language get in the way of their subjective responses.

D. Analysis

The unconventional graphical response technique which we used enabled us to calculate meaningful summary statistics but posed some interesting analysis issues. The respondent's mark on the 100mm scale between **never** and **always** was easily transformed to a number between 1 and 100. Respondents generally made small and careful marks on the response scale, which gives us confidence that their estimates can be meaningfully averaged. However, at the ends of the scale responses were much less precise, and we

sense that many responses that were meant to be **never** were recorded as "5" and many that were meant to be **always** were recorded as "95." We point this out because it implies that our statistical claims are conservative if extreme observations are effectively weighted less heavily than data points closer to the central tendency.

E. Presentation of Results

The following sections summarize the results of the two surveys. In order to ensure that the results are understood by the reader, we must first explain some of the conventions we use in describing our findings. When we say that something happens "54% of the time" this means that the average graphical response on the **never...always** scale was 54% of the distance from **never** to **always**. Sometimes, the average isn't a fair characterization of the responses, because the responses weren't normally distributed (following the common bell-shaped curve). In those situations, where a large number of **never** or **always** responses are part of the average, we generally emphasize the proportion of extreme positions. When the mean isn't a good characterization of distribution, because it isn't normal (bell-shaped) and contains many extreme positions, we will point out the percentage of **never** or **always** responses.

III. Summary

A. Scope of the Software Policy

The current DoD data rights regulations define software to include data bases and programs in machine readable form. The issue posed to survey participants was that if this definition were to be changed in a software rights policy, which items should be included within the definition of software. A majority of the respondents from both surveys felt that source code, design documents, user manuals and requirements documents should be included in a revised definition of software. A majority of industry respondents also favored the inclusion of maintenance and installation manuals in the revised definition.

Additionally, industry and DoD participants identified other items, such as micro code, firmware, specifications and listings which should be included within the definition of software. Table 1 depicts the relative percentages of the DoD and industry survey participants who indicated that certain items were to be part of the definition of software within the policy.

This survey data reflects the clear preference of both the DoD and industry that the new software policy cover more than just object code but also key documentation, firmware and micro code.

B. DoD and Industry Needs

1. Software Support vs. Industry's Need to Protect In order to elicit information about DoD needs, respondents were asked how frequently they needed to modify and correct software. DoD personnel indicated they needed to modify software 67% of the time and to correct software acquired from contractors 70% of the time. Moreover, 42% of industry respon-

dents indicated that the DoD should always have the right to modify software developed for it at public expense.

Survey participants were asked to identify the types of documentation needed to use, modify and correct the software. The items that were identified as necessary for software use include source code, user manuals, installation manuals, maintenance manuals, design documents, testing information and data, software tools used in developing the software, and requirements documentation. In order to to correct and modify software, the following items were identified as being needed: source code, user manuals, maintenance manuals, design documents, testing information and data, software tools used in developing the software and requirements documentation. Additionally, installation manuals were identified as necessary for software modification. Table 2 reflects how frequently the items were identified as necessary to correct, modify and use software.

DoD respondents reported problems (56% of the time) in obtaining access to needed documentation for software that had been developed by contractors. The types of software technology that contractors are most likely to withhold from the DoD are source code, design documents, designer notes, and software tools. Industry respondents confirmed that they have withheld privately developed software technology from the DoD because of the data rights policy.

The next set of questions sought to ascertain how often the DoD used third parties rather than the original developer to modify and correct software. Of those responding, 34% had never used a third party to correct or modify software. This is consistent with the industry survey results reflecting a trend toward developer support. Software firms indicated they had entered into agreements with the DoD to support software developed by them 61% of the time.

In those cases where the DoD respondents would have used third party contractors to support software, they identified the following items as necessary for third party contractor support: machine readable code, source code, user manuals, installation manuals, maintenance manuals, design documents, testing information and data, software tools used in developing the software, and requirements documentation.

Thirty percent of the industry participants indicated that the DoD should never have the right to allow a third party contractor to modify privately developed software that had been sold or licensed to the DoD. The average response would allow the DoD this right only 41% of the time. However, they indicated that they had licensed documentation necessary to support privately developed software to a third party contractor only 21% of the time and development tools 19% of the time. Indeed, 51% of the respondents had never licensed privately developed documentation or tools to third party contractors.

Despite the fact that the majority had never licensed tools and documentation to third party support contractors, 68% were willing to enter into such arrangements if they were able to negotiate the terms of the license directly with the support contractor. Some reservations

were expressed that the support contractor not be a competitor of the developer. We noted that 21% of the industry respondents indicated that under no condition would they enter into licensing arrangements with a third party support contractor.

The survey also found that industry is willing to place privately developed documentation and tools into escrow with the understanding that the DoD could gain access upon the occurrence of certain conditions. Industry participants expressed a willingness to enter into such escrow arrangements the majority of the time. The most frequently cited conditions for release of escrowed tools and documentation were, the company goes out of business, the company discontinues the product line, and a national emergency.

Table 3 reflects the percentage of respondents who would agree to certain conditions. Even though three-fourths of industry respondents had never entered into escrow arrangements, a majority were willing to do so under certain conditions.

2. Innovative Technology

The difficulty that the DoD has in gaining access to innovative technology was highlighted by the finding that 71% of industry respondents indicated that at some time they had chosen not to sell or license privately developed software to the DoD because of DoD's data rights policy. Moreover, the data indicated that 29% of the time, the DoD is losing access to privately developed software. Technology which has been withheld include software tools, applications software, CAD/CAM programs and artificial intelligence programs. Industry reluctance to license their privately developed technology to the DoD was corroborated by DoD's survey results which indicated that DoD organizations had encountered contractors or subcontractors who would not license privately developed software technology to the DoD 35% of the time.

It should be noted, however, that 88% of industry respondents agreed that restrictions on licensing arrangements would make them more willing to license privately developed technology to the DoD. The types of restrictions preferred by the majority of participants, in order of preference, were limitations preventing the DoD from permitting parties outside the DoD to make use of or see the software or its documentation, and limitations restricting DoD's use to a particular site.

3. Commercialization of Publicly Developed Software

DoD and industry respondents differed sharply as to whether industry should have the right to commercialize software developed at public expense, or to prepare and market derivatives of software developed at public expense. Industry respondents overwhelmingly felt that industry should have the right to commercialize and prepare such derivatives, while among government respondents, a smaller majority felt that industry should have the right to prepare and market the derivatives and only about one third of the respondents felt that industry should have the right to commercialize the publicly developed software itself. (See Table 4.)

The primary reason for this contrast stems from DoD's need to release the software outside the DoD 51% of the time. The dominant reason for making software or documentation available to persons outside the DoD is for post-deployment software support (74% of the time). Other reasons include: release to third parties for reprocurement purposes (35% of the time), allowing outside persons to develop commercial applications for software (14% of the time). Additionally, independent verification and validation, making software available as GFE, foreign military sales, and reuse were indicated by respondents.

C. Copyright Policy

Under current DoD policy a contractor may claim a copyright in software developed at public expense, subject to granting the DoD a non-exclusive paid up license to reproduce the work, distribute copies of the work, display the work publicly, prepare derivative works and authorize others to do so for government purposes. DoD and industry groups hold somewhat different positions on copyright policy. The primary contrast was that 45% of the DoD respondents said that contractors should never be permitted to copyright software developed at public expense while 24% of the industry respondents said that contractors should always be allowed such copyrights.

Under current policy, when a contractor claims the copyright in software developed at public expense, he is required to affix to the software a copyright notice and notice of government rights in the work. Survey respondents were asked to indicate what other requirements should be imposed on a contractor copyrighting software developed at public expense. Table 5 reflects industry and government positions on each of these restrictions.

Interestingly enough, despite the fact that industry respondents indicated a contractor should be permitted to claim a copyright in publicly developed software 56% of the time, they only actually claim such a copyright 21% of the time. Moreover, 41% of respondents never have claimed such a copyright in publicly developed software.

Tables

Table I

The current definition of software in the DoD data rights regulations includes only computer programs and data bases in a machine readable form. Some people feel that this definition doesn't adequately characterize software.

If this definition were to be changed in a software rights policy, which of the following items should be included in the definition of the term "software"?

Item	DoD%	Industry%
Source Code	94	96
User Manuals	54	58
Installation Manuals	44	51
Maintenance Manuals	45	55
Design Documents	67	69
Designers' Notes	26	31
Testing Information and Data	48	47
Configuration Management Tools	32	23
Software Tools Used in Developing the Software	48	39
Requirements Documentation	52	58

Table II

DoD Questionnaire

	Use%	Correct%	Modify%
Source Code	74	97	99
User Manuals	96	70	75
Installation Manuals	80	49	54
Maintenance Manuals	64	61	64
Design Documents	61	82	87
Designers' Notes	25	34	39
Testing Information and Data	57	66	63
Configuration Management Tools	46	43	46
Software Tools Used in Developing the Software	61	73	81
Requirements Documentation	59	72	67

Table III

Industry Questionnaire

Conditions under which industry participants would be willing to allow the DoD to gain access to escrowed proprietary documentation and tools.

	Documentation	Tools
Company Goes Out of Business	84%	83%
Company Discontinues Product Line	84%	71%
A National Emergency*	7%	8%

*Although not included as an answer on the survey, several respondents wrote in that a National Emergency would be acceptable grounds for releasing the documentation and tools from escrow.

Table IV

DoD and Industry Questionnaire

When a contractor develops software with government funds or a combination of government and private funds, under a DoD contract, and delivers it to the government, what should the contractor be permitted to with it?

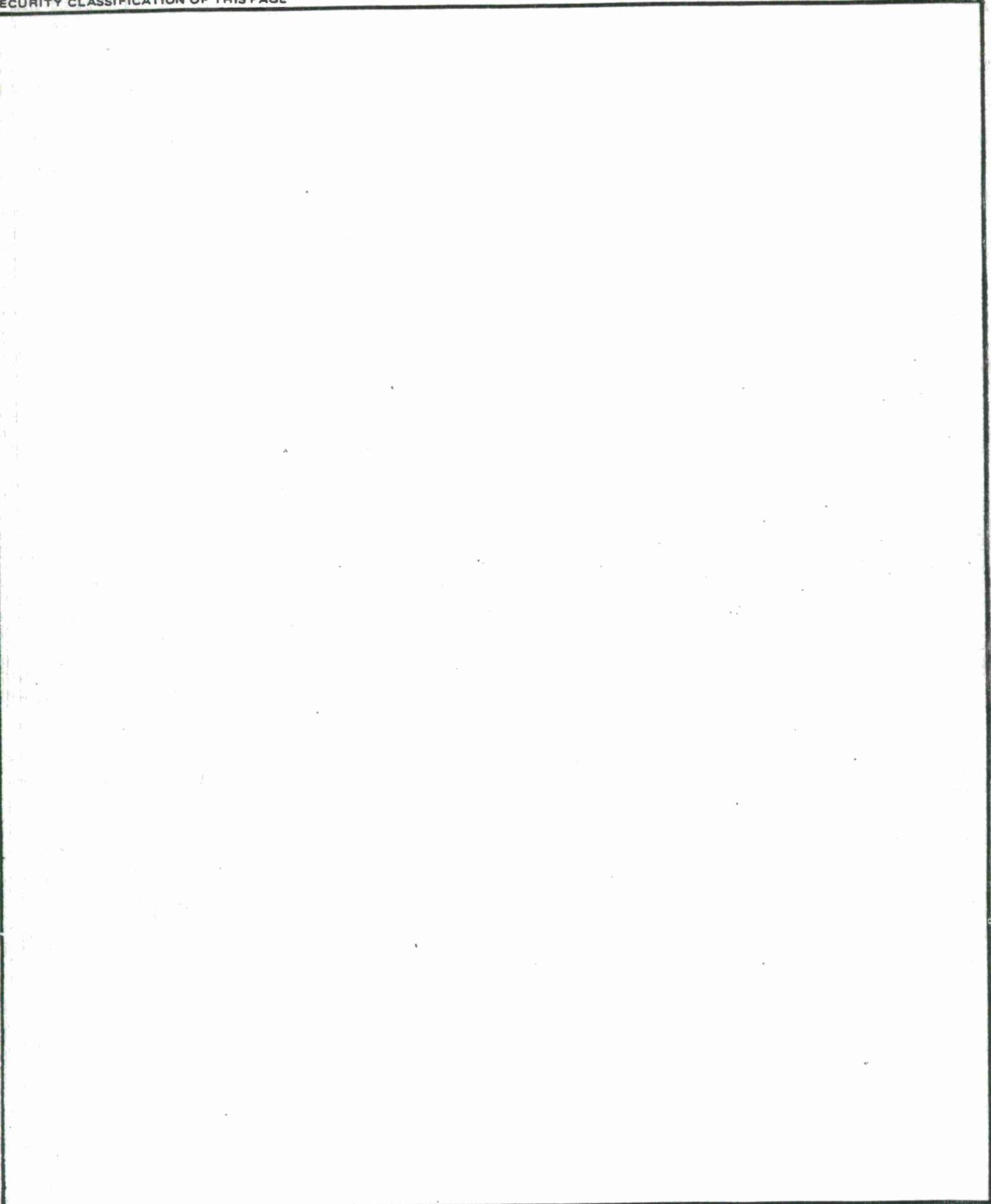|	DoD%	Industry%
Retain right to commercialize the software	35	81
Retain the right to prepare derivatives of the software product delivered to the government and to market them	58	90
Retain no rights to commercialize and market the software	26	7
Be required to deliver all derivatives made of the software to the DoD	26	3

Table V

DoD and Industry Questionnaire

Other requirements which should be imposed on a contractor copyrighting software developed at public expense:

	DoD%	Industry%
Seek permission from the government	67	31
Give notice to the government	48	64
Agree to assign the copyright to the government	59	31

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The policy under which DoD acquires rights in software and technical data has, in the past, been imbalanced in the direction of obtaining more rights than necessary to meet its needs. As noted by the Packard Commission, a more balanced policy is in the interests of both DoD and industry. DoD has recently adopted a new policy for acquiring rights in technical data, and is developing a separate policy for acquiring rights in software. This report offers several recommendations for achieving a balanced policy as to government funded software, privately funded software, and mixed funding software that will meet the mission needs of DoD while enabling contractors to protect their proprietary interests, and commercialize their software products.

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