ESD-TR-67-103

MTP-48-A

CLOSE COLLABORATION IN CONTRACT DEFINITION

N. Waks

JUNE 1967

Prepared for

PROCUREMENT AND PRODUCTION OFFICE
ELECTRONIC SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
L. G. Hanscom Field, Bedford, Massachusetts

Project 1820

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THE MITRE CORPORATION
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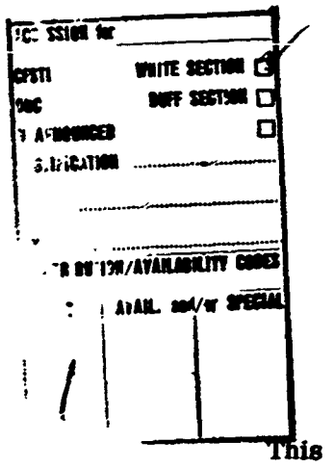

FOREWORD

This report was prepared by The MITRE Corporation, Bedford, Massachusetts, under Contract AF19(628)-5165, and reviewed by the Procurement and Production Office, Electronics Systems Division, Air Force Systems Command, L. G. Hanscom Field, Bedford, Massachusetts.

REVIEW AND APPROVAL

Publication of this technical report does not constitute Air Force approval of the report's findings or conclusions. It is published only for the exchange and stimulation of ideas.

BRYCE S. MOORE
Colonel, USAF
Chief, Procurement and Production

ABSTRACT

One of the important aspects of the Contract Definition (CD) procedure is the "close collaboration" called for between the Government and its contractors in its accomplishment. A detailed review of such collaboration effort, however, raises a serious question of whether it can be accomplished as intended by policy except by highly skilled men who have been intensively trained for the job. At the very least, it must be considered an art which requires unusual care and judgment to practice properly.

This paper is the beginning of an attempt to develop dynamic guidance for in-house (Government and Government-supporting) people who are called upon to participate in such a close collaboration effort, in order to enhance their contribution to the proceedings and to help them assure that their conduct cannot be criticized. It provides such guidance by highlighting certain substantive issues which seem to arise during a close collaboration effort and suggesting an approach to such issues. In doing so, it also suggests certain administrative arrangements which can be made to help ease the difficulty of meeting the seemingly conflicting close collaboration requirements of providing adequate guidance to contractors at the same time as assuring a "fully competitive environment."

While written from the point of view of in-house people (particularly Air Force people at the level of a system acquisition agency), it is hopefully helpful to industrial people as well in that it (a) reflects directly a number of problems which they have raised in discussions, and (b) attempts to establish what guidance they may and may not attempt to obtain or expect. Above all, it attempts to push towards satisfying the one consistent desire found in industry concerning close collaboration: to have a consistent, pre-determined procedure which contract close collaborators can count on and plan around.

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SECTION I

INTRODUCTION*

DoD Directive 3200.9,[1] as implemented in the Air Force by regulation 80-20,[2] calls for Contract Definition (CD) to "generally be conducted as a DoD-financed effort by two or more contractors working in close collaboration with the DoD Component having development responsibility" (underlining added). In furtherance of this requirement, the DoD study report on the topic (hereinafter referred to as the PML Report[3] notes specifically that part of the Government's responsibility during Phase B of a CD effort (the contractor CD report and development proposal preparation period)** is to provide "guidance" to the competing contractors (p 32). And it details the nature of this guidance responsibility in a section of the PML Report entitled "Government/Contractor Relationship (Close Collaboration)" (pp 54-56).

This detailed description of what is meant by "close collaboration" guidance is listed in the part of the Report entitled "Critical Areas," because one of the "more significant lessons learned from (its) Contract Definition experience" by the Office of the Secretary of Defense (OSD) to date has been that "The government must provide adequate direction to the contractors during Contract Definition."[4] That is, "Close collaboration between the government and contractors is necessary to strengthen the final output."[4]

The reasons for close collaboration being a necessity are as follows. "Close collaboration" during Phase B helps to assure (a) that, as required by DoD Directive 3200.9,[1] an active competition is maintained "until negotiations for a satisfactory contract for Engineering Development have progressed . . . to the point at which competition is no longer required;" (b) that final source selection is made on the basis of more than simply paper inputs; and (c) that the increased first-line operational life of systems hoped to be gained by the improved system planning of a CD effort is offset as little as possible by the lead-time taken to do this planning. That is, in this last regard, it is hoped that the intimacy established between Government and contractor people during a close collaboration and the

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* See Appendix A for the list of references used throughout this paper.

** See Appendix B for the three phases of Contract Definition (A, B, & C) and the decision environment in which they take place.

elimination of the false starts in various areas which such careful pre-scrutiny of contractor plans and approaches can provide will more than make up in the total system cycle for the extra time CD as a whole takes in the early stages of this cycle.

However, while the necessity for engaging in "close collaboration" may be clear, accomplishing it properly is another matter. This is particularly the case when it must be accomplished in a government/industry environment which has stressed for many years the doctrine of non-involvement of Government personnel with individual suppliers after Requests for Proposals (RFP's) have been issued or competitive contracts have been let, in order to gain the traditional benefits of competition.* In fact, close collaboration demands that in-house people** be involved over a period of 3-6 months in an activity requiring unusually good judgment and propriety of conduct. This is because "close collaboration" calls for in-house personnel to enter into a relationship with CD contractors which, at times, demands that they act just the opposite of the way they have acted historically. It asks, that is, for them to take an active, daily hand in guiding competing contractors. Indeed, overall, it calls for these in-house personnel to regularly "walk a tightrope" between providing sufficient guidance to contractors to further the ends of CD and, at the same time, in no way jeopardizing the "fully competitive environment" called for in the DoD CD Directive[1/] -- no mean task!

This "tightrope" is quite hard for Government system management and operating people to walk, in spite of their best intentions,*** because they can be assured, at least in the near future, that whenever a firm losing a CD competition decides to raise a fuss about this loss, it is going to blame to the maximum extent possible a new concept like "close collaboration" which is so fraught with opportunities

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* Except for answering questions at bidders' briefing, of course. But all prospective contractors attend such briefings simultaneously; and all of their questions are answered at the same time for all to hear. So, such briefings do not really represent a departure from the environment indicated.

** Hereinafter the term "in-house" will be used to refer collectively to the project office or SPO, using agencies, and those supporting organizations, like government laboratories and SE/TD (systems engineering and technical direction) firms, which may be involved in a particular program.

*** See reference 5/ for a good case example of the difficulties in which they can get involved.

for error. And for supporting technical organizations like MITRE, it is even more difficult to accomplish properly, because the pressures (subtle technical questions from the contractors and personal pride in one's own technical judgment) and the opportunities (the rapid give and take of a technical review) are so great for slipping in a typical technical interchange with a CD contractor. Hence this paper.

The paper is being written, specifically, to begin to try to help alleviate the possible negative results of these opportunities and pressures in "close collaboration" (hereinafter designated "CC") by providing a suggested way for in-house people to proceed on those more substantive aspects of the accomplishment of "close collaboration" which are being found from MITRE experience to be either controversial, misunderstood, or based on questionable assumptions. Hopefully, official guidance will eventually be provided on each of these latter, all of which are labeled "issues" for simplicity's sake in this paper.* The paper also suggests certain administrative and procedural arrangements for the accomplishment of CC which will hopefully help ease the situation. These suggestions either are interspersed among related substantive "issues" or are listed in convenient summary form at the end of the paper (Appendix D).**

It should be stressed at the beginning that it is assumed that interested people will have thoroughly acquainted themselves with Contract Definition (CD) policy and concepts -- at least to the extent detailed in references one through three of Appendix A -- before considering the material in this paper or planning a close collaboration. For CC is considered herein only in the context of CD: a technique for helping to further the goals of CD, not a technique which is being considered on its own.

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* See reference 6/ for certain pertinent USAF recommendations on CD as a whole.

** MITRE people can see MTR 347 of 19 December 1966 on the same subject as this MTP for more detail on these administrative suggestions.

SECTION II

ISSUES IN CLOSE COLLABORATION

Introduction What follows is a discussion of a list of specific "issues" in close collaboration which appear as yet to be insufficiently resolved. They are presented roughly in the order in which they might suggest themselves to close collaborators as they proceeded with their efforts.

2.1 The Basic Focus of Close Collaborators As noted, one of the reasons that a close collaboration effort is necessary to satisfy the objectives of CD is that CC helps ensure that an active contractor competition is maintained until negotiations for a satisfactory Engineering Development contract have progressed to the point at which competition is no longer required.* Now, this "active competition" purpose seems straightforward enough. However, in attempting to satisfy it, a rather significant and substantive question seems to arise in the in-house close collaboration group as to the basic focus of their efforts:

(a) Is their focus that of minimum Government interference; i.e., is their job to promote active competition by ensuring that: the competing CD contractors fully understand the Government's requirements, are given identical guidance regarding changes in these requirements and Government preferences, and, finally, are steered back onto the path if their basic approaches are incorrect, but in all other respects to provide an atmosphere of maximum competitive freedom?

(b) Or is this focus to try to see that the competing contractors, especially if there are only two, are fully responsive in all major respects at source selection time** and by that time are up to an acceptable level in all areas of needed functional capability (such as project planning/control and quality assurance)?

(c) Or, finally, are they to focus on attempting to improve each CD contractor's eventual proposal in every possible way; i.e., are they to encourage a "merger" of Government and contractor capabilities aimed at achieving the needed Government end (within the bounds of competitive propriety, of course)?

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* See Section I

** The job of ensuring full "responsiveness" includes the tasks of seeing that contractors meet all of the RFP requirements and making the determination that the contractors are not taking an approach to their proposed designs that exceeds the threshold of risk that the Government is willing to take on the program.

The Government's CD film on the MK 48 Torpedo[3/] seems to lean to this last or "maximum" relationship focus as being the correct answer when the project leader says in the film: "We realized at this time that close collaboration is essential to the optimization of each of the contractor's proposals."

On the other hand, the PML Report on CD[3/] seems to lean to the first or "minimum" relationship focus as being the correct answer, judging by its stress on "negative guidance"* to the exclusion of what might be called by contrast "positive guidance."**

It is recommended, however, that the (b) focus be considered the proper one by in-house people. Here their basic focus as close collaborators would be to provide the Government with a real choice between or among competing approaches and capabilities at source selection time.

The reason for this recommendation is that, given the fact that the CD contractors were all found during Phase A to be basically qualified by capability and to know what they were doing as regards the particular program for which they are now actively competing in Phase B, the "maximum" focus leads to the dangerous possibility of contractor approaches and functional capabilities becoming so similar by source selection time that a choice must be made at that time on somewhat arbitrary or narrow grounds, not on the basis of real differences. By the same token, the "minimum" focus presents the equally real danger that the Government may be prevented thereby from selecting even a highly desirable design approach because the contractor proposing it has either not been sufficiently responsive in one or two significant respects or is lacking minimum acceptable functional capability in important areas. And if there had been only two CD contractors in this case, the Government would have had no choice at source selection time. With the (b) focus, this contractor may well have been able to rectify his shortcomings given notice thereof through the probing of the in-house group during close collaboration.***

The focus recommended here for close collaborators should, of course, be aimed only at an attempt to provide a real choice at source selection time, not on assuring it. For such assurance might require the basic tenet of close collaboration which deals with competition (it must not jeopardize the fully competitive environment) to be abrogated in a given case. And this would defeat the very purpose of CD.****

* See p 32 and pp 54-56.

** See Section 2.4 "Proper Guidance to Contractors."

*** See Section 2.5 "In-House Questions and Depth Exploration."

**** See also Section 2.12 "Contractor Deficiencies."

2.2 Formal vs Informal Collaboration Closely related to the issue of which basic focus should be adopted by close collaborators* is a disagreement over the degree of formality of the relationship they should have with contractors. It is evidently felt by some that if there is to be direct contact with CD contractors during the Phase B proposal preparation period, in the name of close collaboration, this contact should be strictly formal. That is, it should consist essentially only of: (a) Government-initiated written guidance issued simultaneously to all contractors, (b) written responses by the Government to the proper questions of individual contractors, and (c) visits to contractor plants for progress briefings and guided demonstration tours which are provided at one time to all interested in-house parties. Further, they feel that contractor questions of substance should not be answered officially in open session.

In contrast, there are others who argue that the interests of CD are best served by as much interface as possible with contractor people during the close collaboration period. And further, they feel, the only way to really accomplish this maximum interface in the detail needed to assure that progress reviews and official guidance are adequate and specific enough is for small groups of specialists from both sides to get together informally as often as possible for discussion and demonstration, rather than confining the close collaboration to large formal meetings or tours. In addition, some people holding this view would: (a) encourage as many visits by a CD contractor to the pertinent military user's headquarters or field operational sites as such contractor deemed necessary, and (b) have teams of in-house specialists located at or near competing CD contractor plants during the entire close collaboration.

A satisfactory close collaboration would seem to embrace both the formality and the informality arguments. Certainly, that is, the provision of largely formal guidance at the system or overall program level will help prevent the loss of the proven strengths of a competitive environment like creativity, originality, and the efficiency of use of available resources which is derivable from proceeding in one particular, largely contractor-chosen direction. Indeed, confining the CC to formal guidance may prevent the extreme opposite situation in which competing contractors, trying to be as responsive and adaptive to the perceived informal guidance they are getting from many different members of the in-house group in many different meetings within a fixed time period, end up with nothing but confused or incomplete approaches.

Equally clear, on the other hand, is that one of the prime functions of close collaboration is to provide for the kind of intimacy or "living together" of the in-house and contractor staffs which will

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* See Section 4.1 "The Basic Focus of Close Collaborators."

give the former sufficient confidence that what is promised by the latter in a subsequent proposal can, in fact, be provided, and provided by the time needed, for a mutually acceptable price. Indeed, looking at it from the point of view of the highest level of DoD, the basic purpose of CD is to allow the Secretary of Defense to "ratify" his pre-CD "conditional" approval for system development by having CD provide him with an acceptable level of confidence regarding the program's estimated cost, performance, and lead-time parameters.*

Too, even if such high approval levels were not involved in a program, a major system/project effort is such a complex undertaking and is accomplished in so dynamic an environment that a good deal of the interchange between in-house and contractor personnel has to take place at informal, face-to-face working-level meetings if success is to be achieved on the program. Otherwise, the contracting parties cannot hope to accomplish the overall job in anything like a timely way under their "partner-like" relationship.** And in today's fixed-price type development contract environment, CD's close collaboration period is the only time that there is really an opportunity for this needed working level interchange to occur.

Finally, observation shows that formal meetings among all the participants to the CC can be both an inefficient means of communicating between the specialists in the two contracting parties and quite wasteful of the time of many of the people involved. When 50 people or more from both groups must (a) periodically spend several days sitting in the same room listening to numerous briefings, rather than to the one or two briefings they may wish to hear and to which they might contribute; and (b) can communicate with each other at the more critical times only through selected spokesmen or through written material to which all potentially interested parties on either side must first concur, there is a real danger that the boredom and frustration which sets in will assure that little does in fact get communicated among these people. Meanwhile, the wasted man-hours on both sides pile up.***

* See Appendix B for the timing of the conditional approval and the ratifying decision.

** Cf. Section 2.2.3 of "Procurement and the Systems Engineer," MITRE MTP-1, N. Waks (prepared for the DoD Logistics Research Conference of 26-28 May 1965) for further elaboration of this point.

*** An additional heavy contributor to the boredom of the Government people is the phenomena observed in large formal meetings of: (a) the contractor's people attempting to say to the Government what they think it wants to hear; (b) the level of generality or nonsystem-specific nature of some of the material presented (particularly in the various functional areas); and (c) the tendency of the contractor's people to orient their briefings more towards explaining prior actions to or impressing their supervisors than to imparting useful information to the Government.

Therefore, to the extent that the Government controls the conduct of a close collaboration effort, some combination of both formal and informal guidance should be provided for. That is, both formal general guidance meetings and the more informal "splinter group" meetings should be held, with the larger meetings increasingly limited in the number and type of attendees.*

For example, in a close collaboration effort long enough to permit, say, three progress visits to contractors' plants, individual meetings might be arranged for as follows:

First Visit A general guidance meeting should first be held and be attended by as many participants on both sides as possible. This is necessary to allow all to help derive and understand a mutually approved overview of the program. "Splinter groups" should then break off and meet in parallel in any areas identified in the larger meeting as being either critical or of a nature which would hold up progress on the program if not resolved as early as possible. Finally, it should be arranged that those "splinter groups" which cannot resolve difficulties in their particular area during the first visit should continue to meet informally after the visit.

Second Visit A second general guidance meeting should be held, but be confined primarily to a steering group of people from both sides who are responsible for either the general management of the program or for system engineering/system integration. Aside from acting as "expert witnesses" for the steering group, only those specialists should attend whose area either has an unresolved problem affecting the overall system design or in which there is a program management issue. At that, attendance should be limited largely to specialty team leaders, who join the proceedings at scheduled time. At the same time, "splinter group" meetings should be taking place as much as possible in parallel with each other or in some efficient sequence in all subsystem and functional areas. In this way, each area is examined in sufficient detail to assure that it does not have problems requiring the attention of the steering group.

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* A particular contractor's management may be reluctant to have its people participate in working level meetings in various areas. If so, it may be an indication of their lack of faith in the capability of their people. In other words, it may be an indication that they think that these people are too weak to work directly with their in-house counterparts. If such reluctance is manifested, and the contractor does not have a satisfactory explanation for it, this fact should be made a matter of record for use during the subsequent Phase C evaluation.

Third Visit If timed correctly, the second of a three-visit sequence should be the last one in which alternative approaches are considered. From then on contractors must proceed along a single design path, if they are to meet the established proposal submission date. Thus, the third visit should be composed largely of parallel "splinter group" meetings whose participants are working at a relatively detailed level within the chosen approach. Besides handling last minute overall aspects, the project managers and generalists, or system designers, from the steering group should spend their time going from specialty meeting to specialty meeting during the visit. In this way, they can ensure both adequate intra-system design interfaces and adequate understanding by the various "splinter groups" of the latest proposed overall system configuration and program management plan.*

As to contractor visits to user facilities as a source of informal guidance, to the extent that such visits to operating environments serve to edify contractors in certain areas better than guidance provided by user members of the in-house close collaboration group during progress visits to contractor plants, they should be encouraged. However, the number and justification for each such visit should rest with the in-house group, not with the individual contractor. And this direct exposure to the operating environment should be provided equally, preferably simultaneously, to all competing contractors.

Finally, the use of in-house teams of specialists located at or near contractor plants should be considered an acceptable medium of informal close collaboration if geography dictates. However, such teams should not be used as a substitute for "splinter group" meetings which can be arranged for either at the program's project office or at a contractor's plant. And they should not necessarily remain continuously in being throughout the close collaboration once formed, nor be staffed throughout by the same people.

2.3 The Relationship of Contract Definition and Source Selection The selection of a source for the development (and possibly production) contract for a system program is, of course, technically a part of the CD effort.[1/] However, one of the philosophies about the relationship

* This concludes the three-visit example. However, it might be mentioned here that, if it does not interfere with contractor proposal package preparation, a fourth visit may be desirable at a later date. The purpose of such late visit would be both to provide for final understandings on details left open after the third visit and for giving those in-house participants (particularly new ones) who have an evaluator role to play during Phase C a comprehensive view of the proposed approaches.

of CD and Source Selection that exists is that this final Source Selection activity, or Phase C of CD (see Appendix B for the three phases of CD), should be an activity completely independent of the remainder of CD (Phases A and B), accomplished by an essentially different set of in-house people and commencing only after the decision has effectively (if not officially) been made to go ahead with Engineering Development on the program. Under this philosophy, officially identifying CD Phases A and B in a system's life cycle should not be viewed as adding any activity to that cycle. Rather, proponents of this view argue, it should simply be considered to provide a means for directly funding the former indirectly-funded contractor proposal-preparation period and extending the length of this period, thus hopefully making for better proposals. Under this philosophy, too, decisions by the Government about who will conduct the Source Selection or how it will be carried out need not and should not be made (with one exception) until the decision to hold this Source Selection has been made.* This is because the decision to proceed with Source Selection is only one of four possible alternative courses of action that can be chosen as a result of a CD Phase B activity.** Thus, it is considered a waste of time and effort to get into the details of the Source Selection before this time.

An extreme opposite philosophy or point of view which is held about the relationship of Phases A and B of CD and the Phase C Source Selection activity is that these Phases A and B are the Source Selection in the main. And the formal Phase C proposal evaluation effort should thus be considered simply the last iteration of a continuous relative evaluation of potential sources. This is because, proponents of this view argue, it is really during Phases A and B that

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* The exception is the selection of a Source Selection Authority (SSA) for the very large contracts. In these cases, per DoD Directive 4105.62 of 4/6/65 "Proposal Evaluation and Source Selection," an SSA (who may be the Secretary of Defense himself or one of the Service Secretaries) is to be chosen at the time the system/project is initially approved for CD and remains the same person throughout the CD.

** Reference 1/, Section VI-G-1. The other three alternatives are: (a) to continue further CD effort; (b) to defer or abandon the Engineering Development effort; or (c) to undertake further Exploratory or Advanced Development. Note that while an official decision on these alternatives is ostensibly not made until after Phase C, not after Phase B, effectively such decision must be made at the earlier point in order to give alternative (a) -- continuing the CD -- any substance.

you make the basic decisions on the acceptability of certain sources and the unacceptability of others. By the time you start the Phase C evaluation, they add, you have effectively determined that all the remaining contenders are acceptable and are evaluating them in a fine-grained way simply to determine a preference in an equitable manner (and to help assure a good Engineering Development contract). Consequently, under this philosophy, it is felt that all major decisions about the who and how of even the Phase C Source Selection (as well as the Phase A selection of CD contractors) must be made prior to Phase A, so that the in-house group may be chosen and guided by them during their Phase A and B activities.

A recommended middle position between these two extremes is that Phase B, at least, be considered part of the development Source Selection. This is because its close collaboration activity has so much potential for improving this Source Selection by assuring that the final contractor choice is based on something more than mere paper inputs. That is, in satisfying the "trial marriage" concept of close collaboration (getting an opportunity to "evaluate the merits of each contractors system/project team"[3] p 54), in-house participants can't help also getting a better knowledge of relative contractor functional capabilities and a better idea of the validity of their program plans. Further, as a practical matter, basic contractor design approaches must be frozen well before Phase B is complete, in order to allow time for adequate detailing and for the preparation of complete and responsive CD proposal packages. These design approaches can, thus, be evaluated to at least some degree on the basis of physical demonstrations and exploratory dialogues before the official Source Selection proceeding of Phase C reduces the evaluation activity o a relatively formal paper review. Indeed, the recommendation that the basic focus of in-house close collaborators should be to try to assure fully responsive proposals by Source Selection time (made in Section 2.1) is dependent on this overt evaluation effort beginning as early as possible.

If this so-called "middle position" is accepted, decisions about the who and how of the development Source Selection need to be made as early as possible in Phase B, in order to obtain the maximum source selection benefit from the close collaboration effort. The argument that making such decisions is a waste of time, because holding such a Source Selection is only one of four possible alternative courses of action resulting from a CD activity is negated by the fact that it is current official policy that when the go-ahead for CD is given by OSD, a go-ahead for development is also being given unless CD develops a reason to the contrary. (See Appendix B.) Thus, while there are four alternative actions possible after Phase B, the Source Selection alternative is far more likely to be adopted than the others.

Specifically, the following decisions relating to the Source Selection should be made as early as possible in Phase B, for the reasons indicated:

2.3.1 The major administrative units (boards, councils, and panels) responsible for accomplishing the Source Selection should have at least their key staffing completed. And these lead people should determine the source selection criteria and their relative importance early enough for such information to be of direct use to the in-house close collaboration group in their organizing for the job (choosing CC participants in various areas in numbers and talents which reflect the chosen criteria and their relative importance) and in their determination of the direction their efforts should take (determining what questions to ask, which areas to probe the most deeply, which aspects to select for trade-off studies, how to assess trade-off results, etc.). With in-house groups and contractors always too short in staff to pursue all the useful close collaboration activities that could be delineated, early guidance on evaluation criteria is a necessity if the human resources of both are to be allocated and utilized in anything approaching an effective manner.

Concerning this last point, attention is called to the fact that, by DoD Directive,[17] the RFP's for the contractor portion of CD must contain "criteria against which proposals will be evaluated, and their relative importance in general terms." But this is not enough for in-house use. For the informed PML Report[3] staff notes by way of defining what is meant by "criteria" and "relative importance in general terms" here:

> "Criteria may include such items (in order of importance*) as technical performance . . . , production unit cost, reliability, vulnerability, and development cost."**

And what is being stressed here is the early establishment of criteria for the in-house close collaboration group's use which are at least one level of specificity below those furnished to the contractors in

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* According to the authors of the Report, this "in order of importance" means that the relative importance of criteria may be given in the form of raw ranking, but not in terms of absolute or even relative weights.

** To this list undoubtedly could be added such equally general criteria as management and technical capability and capacity in various areas, system availability, system operational utility, and past contractor performance. The list is taken from page 37 of an earlier (April 1966) version of the Report. For the final Report simply speaks of "preliminary criteria . . . , exclusive of weighting factors" (p 26) by way of description here.

the RFP's. Further, the provision of maximum guidance on the relative importance of these more detailed criteria (within the constraint of closely guarding the absolute weights, of course) is being emphasized.

For example, the in-house group should have a criterion like "system operational utility" at least broken down into such items as "simplicity of system operation," "system adaptability to various likely mission contexts," and "system interchangeability." And the group should be apprised not only that the last item, for instance, is worth in the order of twice as much as the first item in evaluating against this general criterion, but that, say, the "system operational utility" criterion as a whole is "considerably" more important in this case than the "development cost" criterion. Otherwise, the in-house group cannot take advantage of the potential that close collaboration offers it to further the Government's objectives for the program in the hundreds of individual guidance decisions they make throughout CC.

2.3.2 Once the major administrative units have been staffed with key people, they should also delineate the incentive aspects of the program (if there are to be such). Not only is there an official requirement to designate in the RFP for Phase B "incentive features desired in the Engineering Development proposal, including (the) relative importance of incentives and specific schedule and performance items that will be subject to incentives," [1] but, again, an early determination of the areas in which the Government wishes to provide extra incentive (or penalties) to contractors can aid significantly in guiding the in-house group in the choice and conduct of their close collaboration activities. In addition, it enables them to review during close collaboration whether the parameters being chosen for incentive application are likely to be sufficiently measurable at test time to, in fact, be used for this purpose. Finally, it allows them to guide the preparation of the contractors' incentive proposals in a proper way. These proposals cannot be expected to be in the best interest of the Government without some such guidance.

2.3.3 Finally, and perhaps most importantly, as many members of the staffs of the working evaluation panels for the Phase C Source Selection as possible should be selected to participate in the close collaboration effort. Otherwise, a considerable amount of the value to be gained during a close collaboration from early decisions about the ensuing Source Selection will be lost. This loss comes about through the elimination of the responsibility the individual performing close collaboration has for keeping in mind throughout his CC efforts that he will eventually be called upon to provide a very specific and detailed evaluation of the things he is reviewing. The

loss also derives from the inevitable communication failures such specialists will have in trying to relate to replacements what they have learned about the program during a lengthy and intimate period of working closely with their contractor counterparts.

An important example of the type of advance planning that can be done by close collaboration people who know that they will be asked later to make critical evaluation judgments on current matters of concern is the job of identifying for contractors a certain class of desired analyses as the close collaboration effort proceeds. These analyses are those that contractors must provide in their proposals (if not provided at an earlier time) (a) to prove the realizability of what they propose in a critical or in a questionable area, or (b) to help establish the relative significance of various weaknesses in competing designs.* At Source Selection time, it is too late to ask for this class of effort.

2.4 Proper Guidance to Contractors In its discussion of the proper guidance to be given contractors during a close collaboration effort, the PML Report on CD[3] gives considerable emphasis to the provision largely of what it calls "negative" guidance (pp 32 and 54-56). And it would appear that this "negative" guidance concept is already a major guiding principle of Department of Defense CC participants. Therefore, the concept is worth examining critically.

The Report describes the "negative" guidance concept only by saying that:

> "In this practice, contractors are informed that a proposed approach has proven infeasible in the past or is questionable, or that some areas of their effort will need additional substantiation. The contractors are not informed, however, of what approaches the sponsoring Component feels would be acceptable or of the approaches being pursued by any of the competing contractors. In this manner, negative guidance does not discourage originality or the consideration of alternatives; nor does it give any contractor a competitive advantage. The practice of providing negative guidance, therefore, has proved to be an important contributor to successful close collaboration." (p 55)

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* For example, the competing designs for an important portion of the system may each be weak in a different respect. Thus, contractor analyses need to be available at Source Selection time for adequate determination by evaluators of the consequences, and hence relative significance, of these differing weaknesses.

Unfortunately, these examples of "negative" guidance are the simple ones. And what field observation shows is badly needed by in-house people during a close collaboration effort are the kind of specifics about proper guidance which can be directly applied in the more difficult situations. As a Navy film on CD says in this regard:

> "For example, it would be entirely proper to tell a contractor if his approach is technically incorrect or needs amplification. It would be completely improper to tell a contractor what technical approach must be used or which of several alternatives is the best. These are clear. The problem becomes greater when the technical men know that the approach might not work; or the approach will work, but it is difficult and expensive; or a better way is obvious and known."5/

In other words, what in-house people need is for the Government's policy on proper contractor guidance to be spelled out for them in much greater detail than it apparently has been to date, before they enter into a CC proceeding.

When the concept is not clearly understood at the detailed level by the people who must employ it, two types of undesirable results occur. The first is that improper guidance is given, and the very thing feared happens: one contractor's position is improved at the expense of another's. The other undesirable result which occurs is that, for fear of giving such improper guidance, the in-house participants hold back -- that is, they "play it safe" -- at times when they should be actively providing guidance.

In what follows in this Section, a case illustrating the first undesirable result is presented as an example of what can happen when in-house people, with the best of intentions, are given inadequate instruction in so sensitive an area as proper guidance to contractors. Then, examples of the level and type of guidance detail needed to help prevent the second type of undesirable result are provided, in the form of a proposed general schematic for the whole contractor guidance area.

First, the illustrative case (disguised). Two CD contractors were competing for a mobile weapon system development contract in which the weapon system was to be completely enclosed in an inpenetrable defensive cocoon each time it was deployed in the field. This defensive feature of the system was considered to be a highly important element of its value to its intended users. As a result, going

into the first general guidance meeting with each of the two contractors, the in-house people were particularly concerned about this cocoon. While they knew that it could be developed, in theory, from a number of known and available materials, these materials had never been used in this specific fashion.

Thus, they were quite relieved when the first contractor, after proposing a relatively unique design concept for the cocoon which specialists in the field had just begun to talk about, indicated that its studies had determined that the concept was technically feasible to implement and that it would satisfy certain critical performance and design parameters the Government had specified for the cocoon (such as timely erectability under adverse field conditions and the ability to withstand the heavy stresses of the proposed physical and electrical environment under which the weapon was to operate). And they began immediately to review the proposed concept in depth to assure its validity.

The second contractor, in contrast, proposed a more straightforward design approach to the cocoon. However, on first review the Government had a number of doubts about its capability for satisfying various specified performance and design parameters. At this point, one member of the in-house group asked the second contractor: "Have you ever considered the use of 'X' material in your design?"

Even though posed as a seemingly innocuous question in the midst of a series of questions about the second contractor's proposed approach, this question was decidedly improper, because the "X" material was the very one proposed to be used by the first contractor. Indeed, it was an improper question whether or not the first contractor proposed to use the "X" material, because asking it was the equivalent of helping to design the system for the second contractor -- in a critical area at that.

Now, the person who posed the question undoubtedly did so only in the spirit of providing helpful guidance. Possibly he was also trying to meet the goal of in-house close collaborators of trying to assure fully responsive proposals out of CD.* However, his lack of knowledge of what constitutes proper guidance raised the possibility of the competitive position of the two CD contractors being significantly altered by a simple question.

As it turned out, the second contractor regarded his question as a routine one, because the contractor responded to it simply by saying that he had considered and rejected the "X" material for technical reasons which he briefly elaborated.

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* See Section 2.1.

To illustrate how seriously even the apparently most innocent in-house question or comment is taken by contractors in the highly competitive atmosphere of a CD, however, it may be useful to continue with this case example. For this ultra-sensitivity of CD contractors to every potential scrap of guidance is a key factor in establishing how serious the need is for thorough instruction of the in-house group in what constitutes "proper" guidance before they enter into a close collaboration.

What happened was that, subsequent to the first set of general guidance meetings, and based at least in part on the lead furnished him by the improper question noted above, the second contractor learned or at least suspected that the first contractor was proposing to use the "X" material. As a result, he presented a major briefing at the second general guidance meeting which contrasted his and the approach using the "X" material. This briefing effectively cast considerable doubt on the use of the "X" material, both in terms of the risks it involved and its ability to do the job. The contractor claimed, in summarizing the briefing, that another reason for his having originally rejected the "X" material, besides the technical reasons offered at the first guidance meeting and detailed at the second, was that he had acted on the presumption that the Government would be unwilling to take such risks in a program in which delivery was considered critical.

To end this case, it should be noted that no competitive harm was done to the contractor proposing to use the "X" material by the negative briefing of his competitor. If anything, the result was to the contrary. For the Government used the negative briefing material furnished by the second contractor to probe the first contractor's approach. And this probing showed that the first contractor had considered the potential weaknesses brought out by his competitor and had already determined how to overcome them. Thus, the Government's confidence in his approach was increased, not decreased, by the incident. However, the results of just the one improper question in such a competitive environment as CD could have been a source of considerable embarrassment to the Government. Indeed, it could have effectively nullified the competition.

Turning now to the problem of the detail needed to help prevent in-house people from holding back at times when guidance should be provided -- the second undesirable result of the lack of in-house knowledge of what constitutes proper contractor guidance -- it should be noted first that the basic DoD Directive on CD[1] does not use the expression "negative guidance." Indeed, it does not deal directly with contractor guidance at all. As indicated in the Introduction to this paper, it simply states that:

> "Contract Definition will generally be conducted as a DoD-financed effort by two or more contractors working in close collaboration with the DoD Component having development responsibility" (underlining added).

As its only reference to a source of possible information on the topic, it later adds that:

> "The Director of Defense Research and Engineering will provide more detailed guidance in the form of a DoD Guide for Contract Definition."

Unfortunately, the only direct information on the subject of contractor guidance furnished in the ODDR&E-sponsored, three-part PML Report on CD,[3] in either the part which expands on the policy intent of the DoD Directive (Part One on "Policy") or the part which describes "Definition Activities" (Part Two), are the simple statements that "During this (Phase B) period, the Government provides guidance to the contractors, usually in the form of 'negative guidance,'. . . . A free and equitable flow of communication between the parties should be established and maintained during Phase B to ensure that Government desires are met and contractors' resources are channeled into proper areas." (p 32) And the bulk of the pertinent material on the subject in the remaining part (Part Three) of the Report (that on "Critical Areas") is included in the one paragraph from p 55 quoted at the beginning of this Section 2.4.

Thus, detailed information on what constitutes even proper negative guidance is not really available. And the need and even responsibility of the in-house group for providing positive guidance in various areas during a close collaboration effort is apparently being almost completely overlooked. Finally, in spite of the fact that all of the Government's major CD experience up to mid-1965 showed that there is a "need for the Government to assume a stronger role during CD[4]" (p 8), the tendency of in-house people seems to be in the direction of providing less, not more, guidance to contractors -- whether positive or negative.

The situation just described seems to derive from the facts that in-house people: (1) are fastening onto "negative" guidance as the only safe way for them to proceed; (2) are equating "negative" guidance with "little" guidance, (3) are translating the current stress on "negative" guidance as preventing them from giving "positive" guidance, even where appropriate; and finally (4) are mixing up the concepts of "negative" and "positive" guidance with the question of whether the contractors or the Government are to take the initiative in the guidance area under various circumstances.

As a result, it is recommended that Government project offices (SPO's) issue detailed material on the topic of proper contractor guidance during close collaboration. A form something like that

of the schematic attached hereto as Appendix C could be used for this purpose. For illustration sake, this schematic is filled in at a level of detail which hopefully would be directly usable by people in the field trying to determine on the spot what contractor guidance is not only permissible but desirable. However, the project office should provide a tailored and longer chart of this type to cover its own specific case. And it should provide this chart to CD contractors as well as to in-house personnel, as part of its statement on how it intends to accomplish close collaboration during Phase B. Finally, before guidance meetings begin, it should provide detailed instruction on the topic to all in-house participants.*

2.5 In-House Questions and Depth Explorations The issue arises for the in-house group of whether the guidance sessions at CD contractors' plants are the contractors' sessions, i.e., are to be conducted largely as they see fit and with the in-house role being essentially only to react to the status and other material presented, or whether the in-house group should take a more active role in the determination of both the topics to be covered in such sessions and the use of their time while at the contractors' plants. With contractors submitting up to hundreds of written questions between such sessions, it is very tempting, from a practical workload point of view, for example, for in-house people not to prepare questions of their own for these sessions. And they know that if they try to explore more than a few areas in any significant depth it can add much time to already lengthy visits.

However, one of the major advantages of close collaboration is supposed to be the "trial marriage" it affords.** And it would seem that this advantage can be gained only if the in-house group spends in the order of at least half its time and effort during visits to contractor plants in asking prepared -- not simply ad hoc --

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* Such training should include material on the implications of a competitive environment on contractor behavior; for, from observation, one of the aspects of the relationship between in-house personnel and contractors least appreciated by the former is how responsive contractors will be, under such intensive competitive conditions, to their slightest comment. And such comments may be intended only as statements of personal preference or be made simply to "show-off" technical skills. Indeed, in the extreme, as a result of this highly responsive contractor attitude during a CC, off-hand comments by in-house people can even end up becoming unintended new requirements!

** See Section 2.3 "The Relationships of Contract Definition and Source Selection."

questions of the CD contractors and in exploring in depth various areas of contractor activity with the specific people responsible for these areas. If careful questioning and exploring is not accomplished, that is, the subsequent Source Selection will have to be based entirely on written inputs from contractors and on a review of contractor-selected briefing topics and material.

At best, such a purely reactive approach as this last does not allow for the needed development of confidence in the people and in the validity of the organizational relationships through which the system/project development is to be carried out. And it could even lead to the presentation of material in briefings which is largely the very "brochure" type material which close collaboration was created to help avoid -- material which has not necessarily even been prepared by the people who are responsible for doing the work it covers.

As a result of this last possibility, in fact, the in-depth exploration should probably begin by having in-house people validate the written material that formed the basis on which the particular CD contractors were originally selected during Phase A. For example, the contractors' Phase A "management" proposals should now be begun to be explored in detail as regards both the appropriateness of the skills assigned to various functional management areas (such as management planning and control) and the understanding of the proposal and its implications by the people assigned to the functional areas. (Such investigation might even establish that the Phase A management proposals were simply well-written, but "canned," general material used by a particular contractor in all its proposals!) Then, of course, as Phase B progresses, the exploration should continue by probing these various areas in depth for their adequacy. For example, the management planning and control system should be looked at in detail, to assure its comprehensiveness (coverage of all items and aspects of the program) and its responsiveness (the system's relative ability to absorb change, especially sudden change).

Assuming a lack of in-house staff as a constant fact, choices of the areas in which questions will be prepared in advance and/or depth explorations provided must be carefully made. To guide the making of such choices, the possible areas of interest are categorized into the following three groups. They are presented in order of recommended precedence of attention:

(1) Those areas which relate essentially to subsequent (to Phase B) in-house responsibilities (in-house Phase C evaluation and in-house Acquisition Phase activities) and about which, consequently, CD contractors are not likely to initiate

discussion of their own volition (or, if required to by a Government-prepared agerda for the session, on which they might provide only a minimum briefing). To be kept in mind with regard to the current importance of this first category is the fact that the subsequent (to CD) fixed-price type acquisition environment, unlike a cost-type environment, does not permit the Government to adjust readily for things it forgot to provide for during or prior to CD. Under a fixed price contract, these things now cost the contractor time and money. As much as possible about post-CD relationships must, therefore, be anticipated during CD.

Examples of this first category would be:

(a) the degree to which an integrated management reporting system needs to be provided in the particular case to give the Government the "visibility" it requires to be assured of program progress under a fixed-price type contract; and

(b) the adequacy of the test concept, plan, and specification being prepared for use in system testing under a fixed-price type contract.*

(2) Those areas in which contractors may well initiate some discussion, but which are so critical to the validity of the system's design or to the technical management of the program that they warrant the fullest possible exploration (to determine both the facts of the situation and the consequent actions being taken).

Examples of this second category would be:

(a) components or sub-systems on which some technical uncertainty existed when CD began; and

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* See Procurement and the Systems Engineer, op cit, Section 2.5 "The Relationship of Testing to Procurement," for material on what is adequate in this circumstance.

(b) potentially high-risk system concepts, of an operational, cost or lead-time nature.

(3) Those areas which are being covered in briefings by the contractors and on which they can be expected to continue to expend effort, but which seem to be being handled too lightly or in a questionable way.

Examples of this third category would be:

(a) the degree to which appropriate trade-offs are being accomplished and their consequences explored; and

(b) the degree to which such operational aspects as operator convenience or operational simplicity are realistically being considered in the system's design.

In closing this Section, it may be worth noting that there is every reason to believe that not only are contractors willing and prepared to have the in-house group take some initiative with regard to the conduct of its visits, but that they are quite desirous of having such initiative be taken. They want to give the customer what he wants. And the Government's basic design goals can be adequately communicated to (embedded in) the minds of the contractors' people only by the in-house group starting early and actively participating in the shaping of the direction of the meetings.

2.6 Safeguarding Contractor Ideas The Government has established general rules for the safeguarding of data considered "proprietary" by contractors which ha e been complied with for some time.* And the need for observing this safeguard during a CD has been explicitly recognized in the portion of the CD policy statement[1/] which relates to what has come to be called the "technical transference" activity of CD (the incorporation of desirable features of losing CD proposals into the winning one). This recognition lies in the ruling that "technical transference" is permitted only "to the extent that the Government has unlimited rights in the technical data describing such (desirable) features" (par VI-F-8-a).

However, there seems to be insufficient awareness of the facts that (a) a contractor's ideas are just as valuable to him during such an active competition as a CD Phase B as that written

* See Armed Services Procurement Regulation, Section 9, Part 2 "Data and Copyrights" for a definition of "proprietary data" and the rules for safeguarding such data.

data which he can specifically label "proprietary," and (b) that close collaboration, by its very nature, offers great opportunity for improper handling of these ideas. Worse, although the Report[3] shows that the Government is well aware that contractors have been expressing concern for the potential for inadvertent transmission of their good ideas to their competitors by in-house personnel during a close collaboration (p 55),* it has chosen to label this concern as "unfounded, especially when the sponsoring DoD Component follows a practice termed 'negative guidance'" (p 55).

Taking the word "especially" in this last statement at its face value -- i.e., assuming that the statement is held to be true whether or not "negative guidance" is used -- the evidence the Report presents for the "unfounded" label is simply "the knowledge gained from past Contract Definitions" (p 55). Yet, the Government's "Lesson Learned" pamphlet,[4] prepared by the same people who prepared the Report, shows no such knowledge to have been explicitly gained. The only reference to the topic that could be found in the Pamphlet, in fact, was the implication in a comment by one government manager that when the "negative guidance" concept is practiced, contractors need not be concerned (Section C, p 9). This comment, of course, is not, by itself, explicit evidence of "knowledge gained." (And it does depend on the word "especially" above.)

This careful review of the Report's words is not made to be clever. Undoubtedly those who prepared the Report did arrive at the "unfounded" conclusion noted above in a systematic, albeit implicit, way. Rather, the reason for the review is to provide a background for the question of whether there is not now a need for a quite detailed, overt gathering of evidence on the topic. For recent discussions with contractors and their silence during joint guidance meetings shows how zealously they intend to try to guard against the inadvertent transfer of their ideas -- "negative guidance" or no "negative guidance." And the case example presented previously** shows just how great the potential is for such transfer. That is, in the area of safeguarding contractor ideas, the risk of error would seem to be quite high and the consequence of that error quite serious. And the simple rule of thumb that the practice of the "negative guidance" concept will automatically prevent the transfer is suspect on two counts: (a) to be effective, close collaboration involves much positive, as well as negative, guidance; and (b) in-house people cannot hope to know how to provide even "negative" guidance so well in the rapidly moving give and take of a close collaboration meeting that individual judgment alone can be depended on to assure prevention of "informal

* This inadvertent transmission has been given the name "informal technical transfusion" by some.

** See Section 2.4 "Proper Guidance to Contractors."

technical transfusion." Putting this last in other terms (because it is so important), observation indicates that the potential for error in impromptu determination of what constitutes proper "negative" guidance is well beyond the reasonable error level expectation of even the professional type of in-house people who are responsible for conducting close collaboration. As in the security area, their individual judgments and habits must be aided by specific safeguards, if an inadvertent transfer of ideas is to be prevented.

The intensive training of in-house close collaboration participants in what constitutes proper guidance has been suggested.* Hopefully, such training will act to safeguard contractor ideas. Three examples of other actions that might also be taken to serve this purpose are listed below. However, many more than these three and much experience with close collaboration will be needed, it is suspected, before contractors are relieved of what is believed from discussion with them to be the valid and continuing concern on their part expressed by one of them in the following: "We are continually worried that the Government may inadvertently give our competitors one of our important concepts...."**

(1) The first example is one which seems to be working well in the Source Selection area. And that is to label and safeguard all papers, briefing charts, etc. that relate to a close collaboration effort as "sensitive information." Coupled with a requirement that each in-house close collaboration participant sign a "non-disclosure" statement, the combination should help keep even careful participants continually conscious of their personal responsibility for safeguarding what they see and hear (and the less careful participants conscious also of the penalties for carelessness).

(2) A second possible safeguard involves the manner of handling contractor questions. In reference 4/, it is noted in the context of another issue that "In some cases, the answers to questions asked by one contractor were given to all competitors" (p 8). Since a surprising amount of valuable competitive information can be imparted by this administrative convenience, the Government should always provide that answers to questions by one contractor (whether written or oral) which are deemed desirable guidance to all are reviewed with the originating contractor before dissemination. In this way, an acceptable wording of the question, as well as its answer, can be provided. Indeed, since the mere fact that a contractor has even raised a particular question, regardless of how carefully it is worded, can itself be of competitive significance in

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* See Section 2.4 "Proper Guidance to Contractors."

** A direct quote from a contractor in Reference 4/, p 8.

certain cases, contractors should be allowed to withhold certain of their questions from dissemination at all. In this circumstanc. when disseminated, the answer given to the originating contract should be worded so as not to imply that there even was a quest and it should be disseminated only as part of the guidance beir furnished by the Government to all competitors.

(3) Finally, a source of carelessness on the part of in-house people about "informal technical transfusion" derives from the very existence of the Government's policy on what might be designated here by way of contrast as "formal technical transfusion" (the Government's right, during negotiations, to incorporate the desirable features of losing CD proposals into the winning one, to the extent it has unlimited data rights).* This source of carelessness might be eliminated by the provision of specific contrasting policy and procedural statements which distinguish between the two types of technical transfusion -- one proper and the other improper -- whenever either is alluded to. That is, in the interest of preventing carelessness, any statement regarding the "formal" (and proper) type of technical transfusion like: "DoD funds prime contractors during Phase B . . . to permit unlimited rights in data to improve the project" (p 41[3/]) could always be followed by a statement to the effect that: "However, in no way is the Government's right to transfer such data from one contractor to another during the contract negotiation of Phase C intended to imply that any such data or contractor ideas may be transferred during the active competition of Phase B. Indeed, great caution should be exercised during this close collaboration period to assure that such transfer does not take place inadvertently.

2.7 Contractor Validation Efforts Mr. J. W. Roach, The Defense Department's Director of Engineering Management, indicated in a speech to an industrial group on March 3, 1966 that "... our objective in Contract Definition is the precise validation of the Concept Formulation results...." This validation or verification goal for CD is also stated in Reference 1/: "Contract Definition ... is that phase during which preliminary design and engineering are verified or accomplished ...." (underlining added).** Since CD is to be performed by contractors in the normal case, this validation chore, in some significant measure at least, must thus fall to them to perform.

That a heavy contractor responsibility for validation is intended is specifically delineated in the Report[3/] in at least three places.*** Indeed, these discussions show that the Government definitely intends to have CD contractors not only immediately but continuously examine and provide "feedback" on its requirements

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* See above and pp 47-49 of the Report.[3/]

** See also reference 6/, p 8 for an Air Force statement of this validation objective of CD.

*** pp 28, 31, and 32.

and specifications as part of their total CD effort.* Further, this validation "feedback" is intended to cover not only the feasibility of these requirements/specifications, but also preferability or desirability considerations. This last is illustrated by the requirement that certain cost-effectiveness and other less formal tradeoff studies be performed throughout CD.

In spite of this clear statement of the Government's desire for a continuous validation effort by CD contractors, there exists a serious question of whether, without some strong reassurance by the Government on the subject, any contractor in such a highly competitive situation would, in fact, ever be willing to say, in effect, that the Government's specifications could or should not be met in some particular respect -- i.e., is either infeasible or not worthwhile -- if a "mandatory" requirement is involved. There is even a serious question of whether any contractor would be willing to say that a part of a specification labeled simply as a "design objective" is undesirable or should be changed, without some further inducement by the Government for them to do so beyond merely requiring it by contract and by designating specific studies to be performed. For such statements appear to threaten a contractor's competitive status. The other fellow may well claim to be able to meet what appears to be an infeasible specification or be willing to try to satisfy one which is of dubious value in certain respects. In fact, as time passes during Phase B, all CD contractors will be increasingly reluctant to do otherwise, because their resources have become so committed to a certain approach and their internal management planning has become so detailed as a result of a specific due date for CD proposal packages.

Initiative by the Government during close collaboration can do much to eliminate this competitive threat, and thereby hopefully free contractors to initiate the necessary studies and to provide the comments by which Government requirements/specifications can be improved. That is, the Government can encourage both honest responses to its direct questions to contractors on the validity of those aspects of the requirements/specifications about which it has a known concern** and voluntary study and comments, by providing positive affirmation of the fact that it will be considered a plus factor, not a minus factor, for a contractor to establish valid

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* While this Section 2.7 emphasizes requirements and specifications, contractor validation is by no means intended to be confined to these. Rather, it is intended to apply to nearly any Government inputs to contractors during CD. For example, another area needing such critical contractor review is the stated Government assumptions in RFP's and CD contracts.

** See Section 2.5 "In-House Questions and Depth Explorations."

requirement/specification weaknesses as early as possible.* It can strongly affirm, in fact, that a contractor's showing early that a specification cannot be met in some regard, or showing, for example, that certain design objectives in the specification do not represent a preferred balance from the Government's point of view, will be considered quite favorably in the subsequent Source Selection. And the Contracting Officer should back up this affirmation by personally assuring that all contractor actions of this type are documented and that the Source Selection Evaluation Board (SSEB) does, in fact, take such actions into account.

Indeed, the close collaboration procedure can be used to help maximize contractor validation efforts. This can be done by having in-house participants consciously trying to establish an atmosphere in which not only is the competitive threat eliminated for contractors, but the provision by contractors of better "solutions" to the basic military need involved in the program than that provided by the Government system specification is shown to be highly regarded by the Government.

Take the following case as an illustration of what is meant here in this Section. A CD contractor came forward during the very first guidance meeting and showed by analysis that if a particular mandatory aspect of the specification had to be met, several other mandatory aspects could not. Furthermore, he showed that retaining this mandatory aspect had certain undesirable effects on a number of non-mandatory aspects of the specification.

In terms of the reasoning just outlined (how Government initiative during close collaboration can be used to encourage contractor validation efforts), the Government's reaction to these voluntary comments by the contractor should have portrayed its awareness that the contractor had done something quite favorable in its behalf, instead of leading him to believe -- as it did in part directly and in part by its silence -- that his input was regarded as a sort of request for specification waiver.

In addition, if the contractor had gone further and shown for a series of values of the mandatory parameter in question (in this case "weight") what the effect would be on the other parameters -- i.e., if the contractor had done a design sensitivity analysis of a type which would have allowed the Government to choose a preferred set of new parameter values -- the validation "feedback" would have been maximized for the Government. And the Government should have let the contractor know immediately that a detailed record of this valuable contribution would be made and subsequently submitted to the Source Selection Evaluation Board.

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* By "valid" is meant here either that competing contractors are also not able to meet the specification in the identified area or that the Government agrees that the suggested change in its requirements/objectives is an improvement.

2.8 In-House Validation Efforts The need for validation activity during CD is described in Section 2.7, "Contractor Validation Efforts." However, there seems to be a widespread impression that this need is confined entirely to contractor validation. No mention is made of any needed in-house validation effort. For example, the three references to validation in the Report[3] deal exclusively with contractor validation.*

Unfortunately, this impression that in-house design work has ended with the creation of the system specification and its acceptance as the basis for a statement of work in CD Phase B contract leads to an observed weakness during close collaboration. As CD progresses and more becomes known about possible design configurations, the in-house group is increasingly unprepared to accomplish adequately for contractors such tasks as (a) identifying the more desirable or even necessary tradeoff studies, and (b) designating the relative importance of parameter values and combinations. Yet, with limited CD funding and other resources, contractors cannot be expected to perform all the desirable tradeoff studies that arise. Similarly, with regard to parameter values, contractors cannot be expected to decide for the Government, for example, that a 10% reduction in weight is worth a 10% increase in volume. Most important of all, CD contractors cannot be expected to determine for the Government the relative desirability of various possible comprehensive Government "back-off" positions as aspects of the Government's system specification or other requirements are found to be infeasible or undesirable. Only a continuous in-house validation effort throughout CD can prepare the Government to make such decisions.**

Specifically, while the inevitable lack of funds and staff to perform such in-house validation work leads to a natural reluctance to undertake it, a continuous in-house validation effort throughout all of CD is necessary -- especially during the high information interchange period of close collaboration -- for at least the following reasons:

1. To compensate for the natural reluctance of contractors to disclose validation results which they consider damaging to their competitive position in the CD.***

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* pp 28, 31, and 32.

** Contractors should, of course, be encouraged to make recommendations in these areas. See Section 2.7, "Contractor Validation Efforts" and the Supplement to Appendix D.

*** See Section 2.7.

2. To compensate for the natural reluctance of contractors to reveal design or validation results which are contrary to other interests. For example, a given contractor might be quite adverse to suggesting a system configuration or a change in specification which he considered damaging to his case for having the system use a certain piece of equipment (such as a particular computer) which he wishes to produce.

3. To give the Government an increasingly detailed "baseline" (a) against which to measure the significance of contractor design and validation inputs, and (b) to use as a standard in providing adequate responses to these inputs. For example, as contractors' design detailing efforts proceed during a CD, they become increasingly interested and raise potential validation issues about specification or requirements detail (such as "rate of turn" and other aircraft performance data in an air weapon tracking and control system) with which their designs could be in conflict in the absence of such detail. As the work of the various CD contractors proceeds, the details they need must, in fact, be anticipated by the in-house group.

4. To develop an in-house basis for determining both (a) the relative realizability of what contractors claim to be able to do or to provide, and (b) the validity of their validation claims (in a sense, validation of their validation).

5. To save program lead-time by allowing the Government to identify specification conflicts even before the contractors. In a more general sense, to save program lead-time by allowing the Government to make specification improvements of any type which ideally would have been accomplished before the CD.

6. To help prepare the in-house group for its Phase C "technical transference" job (transferring desirable portions of losing contractor proposals to the winning proposal)* by assuring in-house knowledge of the critical aspects of the proposed system's design in depth. Even the determination of a desirable area in which to make a "technical transference" requires great technical judgment. It means, in effect, cutting out a portion of an overall system design which a winning contractor has determined over a number of months of effort as having balance and integrity (in the system cost-effectiveness sense) with the remainder of his system. And merely determining desirable areas for such transference is not all that is required of the in-house group. Both of the contractors involved in a particular transfer -- the winner as well as the loser -- will undoubtedly fight

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* See pp 47-49 of the Report[3/] for a discussion of "Technical Transfusion."

the transfer. Thus, the onus is on the in-house people to prove that a particular transfer has major advantages in terms of cost, system effectiveness, or schedule. It is no coincidence that the Report[3] notes that: "Despite the Government's right to 'transfuse' many items in past Contract Definition efforts, only a few items actually have been transfused" (p 48).

2.9 Close Collaboration with Subcontractors While the DoD Directive on CD[1] does not explicitly require that prime CD contractors conduct CD efforts with subcontractors, OSD's intent in the matter can be gleaned from the Report on CD.[3] This document states unequivocally that during Phase B "DoD wants (CD) funds and requirements to flow down to the key subcontractors from the prime contractors" (p 42). Indeed, the Report notes specifically that "He (the subcontractor), in essence, acts as an extension of the prime contractor in Contract Definition analysis and planning" (p 41).

OSD's attitude about subcontractors performing CD as well as prime contractors is presumably based on the logic presented in the Report's discussion of the Prime Contractor/Subcontractor Relationship (p 41) which emphasizes that it is funding CD both to get unlimited rights in data and to assure that planning for development is based upon comprehensive and objective analyses -- goals which, of course, involve subcontractors as well as prime contractors. It may also be based on the experience of certain prime contractors with regard to subcontractor responsiveness: "Several winning CD prime contractors stated that providing adequate funds to their key subcontractors made their subcontractors more responsive to their requirements and that, without adequate funding, the subcontractors would probably not have responded with sufficient speed and detailed analyses to enable the prime to be successful" (p 41).

In spite of the foregoing, the Report admits that in the CD competitions held to date: "... few subcontractors have received Phase B funding from the prime contractors." But it provides little data on why this last is so (other than in the understandable case of the subcontractors who "play the field" of the prime contractors) and its consequences for close collaboration with subcontractors.

Because of this last, the matter was investigated with two competitive CD prime system contractors during an actual close collaboration effort.* This review established that neither contractor was providing CD funds to any subcontractors, for a reason which is significant to an assessment of the likelihood of others conducting a close collaboration with subcontractors. And that is, both prime contractors felt that to pick a particular subcontractor to fund or to

* See also Reference 4/, pp 15-16, for data on this point.

work with exclusively in any given area at the beginning of a CD would adversely affect their own competitive positions. This was due, they felt, to the fact that it would lose them their flexibility to work with many competing subcontractors as their own creative design effort proceeded through CD and to be able to pick the best among them. They also felt that their bargaining position on subcontractor prices for the ensuing acquisition effort would be lost by such an early choice of subcontractors. And, they noted, a "make-buy subcontracting procurement plan" is presumably required in their CD Proposal Packages by DoD Directive[1] for the very purpose (among other reasons) of determining how well they did these two jobs of picking the best subcontractors and getting the most favorable prices possible from them. That is, they both believed that their handling of subcontracting would be a direct competitive factor in the ensuing Source Selection. Consequently, they felt that they could not make subcontractor selections early and hence be in a position to provide CD funding to subcontractors.

It could be argued that prime contractors could prevent both of the losses just described and still fund the CD efforts of subcontractors by funding all of the promising subcontractors in important areas. However, this argument tends to be unrealistic in the face of the strong evidence that CD contractors are already spending considerably more for CD than is being provided by the Government.

A more realistic argument might be that prime contractors could hold their own "Phase A" selections among subcontractors and fund only the two or three best subcontractors in each significant area, just as the Government does with the primes during a CD. However, even this argument could be rebutted by pointing out that the lead-time allowed by the Government for CD is ordinarily far too short to permit such a procedure.*

Since it may be important in a given program to provide for close collaboration in certain critical sub-system or component areas, however, and prime contractors evidently cannot be counted on to fund subcontractors for CD or to work closely enough with them to validate their proposals (even those of so-called "team" members), the best way for the Government to assure such close and direct review would seem to be by providing for associate contracting rather than subcontracting in critical cases. Then close collaboration can be accomplished directly and simultaneously by the Government in its normal fashion. Such simultaneous close collaboration with associates was provided, for example, in the cases of the Air Force's

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* But it has been done, even at the second tier. See Reference 4/, p 13, for an interesting example of this.

C-5A aircraft[7] and the Navy's Mark 48 Torpedo[5] programs. Failing this -- that is, if interface or other considerations dictate that subcontracts rather than associate prime contracts are necessary in particular cases -- then the prime system contracts for CD should provide for the Government to have the selective opportunity for direct close collaboration (in cooperation with the prime contractor) with at least those subcontractors named or being considered for "team" membership who are not being funded by the prime and with whom the prime is not conducting its own close collaboration. *

2.10 The Role of the User in Close Collaboration There is disagreement concerning the degree to which the competing contractors should be allowed to be influenced directly by the User during a CD. This issue seems to become particularly overt during close collaboration.

On the one hand, the feeling is expressed by the User (or is implied by his actions) that the system being acquired is, after all, intended for him; and, therefore, in the final analysis it should reflect primarily his wants. Thus, he feels, his preferences should be the paramount factor in any close collaboration deliberations with contractors. Indeed, he contends, regardless of the numerous formal criteria used as a basis for the Phase C evaluation, if he prefers one contractor's system to the other(s) and its estimated cost does not exceed the approved funding level for the program, this preference should be the deciding factor in the source selection.

Further, he feels that he has the right to change requirements as often as he likes during CD. And while marked changes to the approved "program requirements baseline" brings on a risk of program cancellation, he believes that this risk is his to evaluate and to take if he chooses.

In his view, in sum, the system project office and its support technical agencies are simply instruments for helping him to get what he feels he needs to accomplish his mission. Therefore, while these other members of the in-house group can and should provide him with advice in the various areas of their specialized competence -- such as on contracting or technical matters -- they should realize that it is only advice that is being given. And, as with any consultant, this advice may be taken or not, just as the User chooses.

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* Note, however, the conclusion of the Air Force in Reference 6/, p 34, that "A government policy of (directly) funding subcontractors in a CDP is not needed at this time" (underlining added).

The opposite viewpoint is that the User represents only one -- the operational -- source of influence on the project office during CD. That is, the project office, not the User, is the decision-making agency in the acquisition of the new system, representing a higher Service headquarters which has determined how best to allocate its resources among competing Users and other claimants of these resources. In contrast to the User's attitude on the subject, advocates of this position claim that only the project office can speak officially for the Government during a close collaboration. And, in speaking, it needs to take into account design features desired by the User, User preferences, and User-suggested changes in requirements beyond the approved "baseline" only to the extent that these features, preferences, and changes: (a) do not raise a risk of cancella ion of the program it has been assigned to implement; and (b) can be justified on the same cost-effective, tradeoff, and other bases on which the original program was approved.

Now, in its basic form, this issue between Users and project offices is not new with CD. It has, in fact, been a matter of dispute for some time. Why it merits special attention in a discussion of close collaboration is the relative fluidity, and hence influenceability, of the proposed system's design during CD as compared with the ensuing Acquisition Phase. Also, the close collaboration procedure affords a relatively unique opportunity for the User to exert its direct influence on contractors over a relatively extended period of time. In contrast to his situation before there was such an approach as close collaboration, this opportunity to really make himself felt during a period of design fluidity is what makes it worthwhile for him to raise the issue in a given instance, even in such an outside-the-family forum as a guidance meeting with a contractor.

It is highly recommended that a firm position on this issue be taken by the Government as it relates to CD. Such a position is now urgently needed because:

(1) CD contractors get confused as to how to proceed when two sets of in-house people give them directions, with a consequent negative effect on design and lead-time.

(2) The financial drain on CD contractors is increased by the extra design effort which has to be expended during CD to satisfy in-house parties with unreconciled interests.

And (3) CD contractors have a right to assume that they are competing in good faith on the basis of both the criteria designated in the RFP and a consistent set of known and accepted procedures. Failure to observe this last, in fact, was the single biggest complaint voiced by contractors in interviews with them.

It could be argued that the Government already has an official position on this issue in its DoD Directive 5010.14 of May 4, 1965 "System Project Management" and in related Service regulations on systems management like the Air Force's AFR 375 series of regulations. This is the position of project office dominance. However, this official position is not as adequate for the highly fluid and competitive CD Phase of a system's life cycle as it is for the more straightforward and non-competitive Acquisition Phase. For these policy documents are based largely on the simplifying assumption that a system's life cycle proceeds in a straight line of increasing certainty and increasing detail within designated boundaries, once approval for CD has been given. Such approval ostensibly is not given, in fact, if there is any reason to believe that such cannot be done.

What actually seems to take place during a close collaboration, however, is a highly dynamic and iterative series of inter-personal actions and reactions. Through these, all of the parties to the collaboration -- the User, the contractors, the project office, etc. -- constantly learn things from each other which markedly affect system uncertainties and design boundaries. During this period, in fact, numerous combinations of the possible and the desirable are reviewed in detail by the various interested parties, including a mutual assessment of the operational and cost consequences of these combinations. The inevitable compromises are then reached.

Therefore, while it is convenient for program decision-making purposes to act as if the program boundaries are known or fixed to some level of certainty and specificity before CD starts, no party to such a proceeding can realistically have a fixed position in advance regarding either the firmness of the system specification or the use of the system in its intended operational environment. To be particularly noted here, in this latter regard, is that it is only as specific alternative configurations are proposed that Users can really specify what they need or the degree to which the conditionally approved program is operationally suitable. It is their reactions to

specific proposals during close collaboration which (a) cause changes or the refinement of proposed configurations, (b) provide focus to the tradeoffs of operational needs with resource and technical considerations, and (c) even bring about basic changes in program requirements. And once they have reacted, the results are factored into the design effort; the iterative cycle then proceeds to their next set of reactions, and so forth.

In summary, if the mission system being acquired is complex enough to require a CD effort in the first place (whether a formal CD is involved or not, incidentally) then official regulatory material on CD must provide that it will be conducted in a fashion which matches the human/management realities of the acquisition process through which mission systems are obtained. And while this undoubtedly means that the project office, as the appointed spokesman for the higher headquarters or Service-wide point of view, must have the final responsibility in a close collaboration proceeding, it also means that an adequate mechanism must be provided for assuring continual User inputs of a type which gives confidence that the final system product will do a needed military job. Otherwise, the whole system acquisition effort may be in vain.

2.11 The Funding of Contractors The DoD Directive on CD[1] indicates that "It is the intention of DoD that each contractor will be fully compensated under the terms of his contract for his proposed work during Contract Definition" (underlining added). However, all evidence indicates that CD contractors are expending considerably more funds on this work than are provided by the Government, for a variety of reasons listed in the Report[3] (pp 43-44). And it is clear that many people in the various DoD Components openly condone this extra funds expenditure by contractors during CD, as an understandable "fact of life." Yet (a) it is a basic policy of DoD to ask its contractors to absorb a share of their R&D expenses under government contract "only when there is a high probability that the contractor will receive substantial present or future commercial benefits" from the R&D.* And (b) DoD has pointedly outlawed contractor willingness to share such costs being used as a competitive factor in a source selection.** In any case, Service people feel they can do little about such expenditures beyond (a) assuring that CD contractors know about the DoD full-funding policy, and (b) processing

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* ASPR 4-208a, "Cost-Sharing Policy," 11/1/64.

** ASPR 4-208b.

requests to OSD for additional funds when a winning Phase A contractor's CD cost estimate turns out to be greater than budgeted.*

The Report[3/] fully recognizes that the deviation in practice from DoD's full-funding policy is a serious problem by including it for discussion among its list of ten "Critical Areas" (pp 43-45). However, it does not discuss why the deviation is a critical problem. Instead, it deals largely with identifying why the deviation occurs. Therefore, it needs to be stressed here that the problem is critical because clever contractors can almost literally "buy" their way into "the winner's circle," if they spend enough funds during CD!

As a result, as a minimum, in-house close collaborators should not encourage or act as if they condone such expenditures by any overt word or action. And, to make the full-funding policy believable, they undoubtedly have to express disapproval when proposed expenditures of the type described below are brought to their attention by contractors.

The argument that is inevitably put up at this point by those who wink at the known deviation from DoD policy on full-funding of CD is that the Government has always faced the situation of widely divergent spending on development proposal preparation by its suppliers. The direct funding of the CD competition for this development work in a significant amount has, if anything, offset in some degree the possible negative consequences of this situation by reducing the likely degree of this divergence. That is, it is argued, in spite of various devices to which the Government has resorted to hold down proposal costs (like imposing page limits on bids), contractors could always pretty much spend as much as they wanted to in proposal preparation. So why fuss about it simply because CD is introduced into the picture, especially when CD funding helps to "raise the ante" to a pretty high (and hence time and resource consuming) level, colloquially speaking, before the divergence in spending can begin?

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* Reference 8/ illustrates that such a request for additional CD funds for a particular contractor will actually be processed. However, there is undoubtedly some practical limit on the supplemental amount that can be provided in a given case, particularly if the total amount awarded to one CD contractor thereby becomes substantially greater than that provided its competitor(s). (As it is, there is a body of opinion which holds that all CD contractors should be funded essentially equally, cf Reference 6/, p 34.)

** A distinction is being drawn, in making this last comment, between extra expenditures made to meet the requirements of the CD contract and those which are made for competitive purposes.

And the answer which is pertinent to this paper is that CD's extension of the effective proposal preparation period and its close collaboration's provision of a unique opportunity -- indeed encouragement -- to influence in-house personnel personally with the results of the expenditure of extra funds are new and critical elements in the picture. When a source selection is based almost entirely on reviews of pieces of paper, bidders do not have anywhere near the opportunity to make the extensive personal impression on in-house people that they have during a close collaboration. Thus, what is intended to be close collaboration's strength -- the time and opportunity it provides for intimately determining what really can and will be provided during the ensuing development period by the respective contractors -- can also be its weakness, if some financial restraint on competing contractors is not imposed. For close collaboration allows, putting it in the extreme, for "brainwashing."

What will be presented now are two case examples of how the winning position can be effectively "purchased" by the expenditure of sufficient funds in a CD competition.* Each of these examples takes place after two qualified Phase B contractors have been selected through Phase A competitions for a competitive CD effort.

The first example concerns an unexpected and critical conceptual design problem which arose during a six-month Phase B effort. Both of the competing contractors recognized the problem, but neither, of course, had anticipated it in their CD contract cost estimates.

Trying to stay as much within the CD funding provided as possible, Contractor A set out to resolve the design problem by putting a few of his best people on it on an extended overtime basis. In contrast, Contractor B without regard to the costs involved, called in every firm in the Country with specialized knowledge in the problem area and bought their "know-how."

As a consequence, when the Government was briefed on the results some six weeks after the problem was detected, Contractor A was able to present an acceptable solution. As might have been expected, however, Contractor B presented a much better one. And it was apparent that the in-house people were more impressed by it, upon detailed examination, than by the fact that Contractor A had demonstrated his relatively superior technical ability in the problem area by successfully taking an internal approach to the problem.

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* The examples presented are based on true incidents, but, for obvious reasons, none of the facts stated are necessarily true.

Since the confidence engendered by even demonstrated technical ability is a rather difficult factor to evaluate in a source selection as compared to results achieved, what this case illustrates is that a difference between competing contractor attitudes about spending extra funds during a CD can become a decisive factor in source selection. Carried to its extreme, given the lengthier Phase B period as compared to the normal pre-CD source selection proposal preparation period, and given the dramatic, face-to-face opportunity close collaboration affords to contractors to spend a whole day (or more) demonstrating in detail to in-house people the superiority of various aspects of a particular proposed overall design, this case example raises the possibility that some clever contractor will come to realize that every aspect of his proposed design can represent a synthesis of the ideas of the Country's best talent in the area. All it will take on his part is a willingness to spend money!

Now, this extreme is not likely to occur, for there is a natural limit on spending related to the gain to be derived from winning the source selection. However, it does illustrate the unusual opportunity to buy into even a major program that deviation from Government policy on the full-funding of a CD effort permits. Such deviations potentially could turn CD competitions into competitions in spending, rather than competitions in value offered.

The second case example concerns a program in which delivery, rather than a design problem, was critical, because the operational utility of the system undergoing the Phase B competition was so dependent on it. (It was a so-called "interim" system.) In this case, Contractor C, working within the CD funds provided him, did everything he could to design and staff a program planning and control system for the Acquisition Phase of the system cycle which would assure his meeting the tight delivery schedule established by the Government. In contrast, Contractor D went ahead and actually ordered a prototype model of an important element of the system midway through the CD. He did this in spite of the fact that the very purpose of the CD competition presumably was to see who would get the job of doing the development of which such prototype would be a part. The prototype could not be delivered in time to help validate Contractor D's proposed overall design at source selection time. However, as a consequence of his anticipatory action, Contractor D was able to offer the Government a much higher assurance of meeting, and a significant possibility of beating, the needed delivery date for the system, based both on the prototype's progress and on those tests which could be made on it.

This tactic can be considered clever management on the part of Contractor D. Nevertheless, it illustrates that the willingness by a contractor to spend (or more correctly risk, in this case*) large sums during a CD above those provided for the CD can be used to gain for him a marked source selection advantage: it permits him to bid an early delivery date. Indeed, looking at the extreme again, on a delivery-critical program such a tactic might be carried to the point of ordering as much of the program's hardware in advance of the source selection for that program as a contractor can possibly release.** This approach could gain for the contractor a much higher assurance that he will win. If the delivery situation is tight enough, in fact, the approach might even "lock-in" the Government to this contractor, even though he had a somewhat less desirable design.

In conclusion, the basic question these cases hopefully help to raise is whether the Government wants, by the introduction of CD and close collaboration, to encourage its competitions to become competitions in spending. If it does not, it will have to take deliberate steps to change its unofficial attitude about this spending.

2.12 Contractor Deficiencies It was recommended in Section 2.1 ("The Basic Focus of Close Collaborators") that the close collaboration effort of Phase B be aimed at giving the Government a real choice at Phase C source selection time, i.e., close collaborators should try to assure that selection will be made from at least two proposals which are fully responsive in all major respects. This focus, unfortunately, provides a number of problems for close collaborators relating to contractor deficiencies which should not be overlooked.

(1) The first problem it causes is that it leads to the automatic assumption by some that a CC effort will always succeed in providing the fully responsive proposals sought. In other words, an observed phenomenon of Phase C is that many in-house people seem to think that there will be no important deficiencies in the proposal packages provided by contractors at the end of Phase B,

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* "Risk" is stressed here in contrast to spending because some types of extra spending, such as anticipatory spending, turn out to be recoverable if the spender is the successful bidder (unless reflected in a lowered bid price, of course).

** Aiding in such tactic is the fact that at some point in the CD, well before the end, the overall configuration of a proposed system must get frozen and sub-systems detailed, in order that the required CD "Proposal Package" can be prepared in time.

simply as a result of the fact that there has been a close collaboration effort on the program. And this simply is not so. CC is a gross, not a detailed, review activity, whose results are very much dependent on: (a) what contractors choose to discuss and to present; (b) which areas the Government can and does probe to what depth; and (c) above all, differences of opinion among in-house close collaborators regarding the degree of realizability of what a particular contractor proposes to provide. (This last is why the Government wants contractors to furnish data in Phase C proposal packages relating not only to what they plan to provide, but also to how they intend to achieve what they are offering.) The dependency of CC on factors such as these is the very reason, in fact, why the review and preliminary evaluation of Phase B must be supplemented by the detailed review of Phase C -- not only for contracting purposes, but for source selection purposes as well.

First of all, therefore, CC must be recognized and accepted for what it is: a gross activity which may well not uncover even significant deficiencies.

(2) A second problem for close collaborators in the area of contractor deficiencies caused by the focus of CC is the practical difficulty they thereby have after their efforts to find any proposal "unacceptable" in the subsequent source selection. Many of the same key in-house people staff the source selection boards and panels as were involved in the CC. Such a finding might, therefore, somehow be considered an admission that they had been derelict in carrying out their CC responsibilities. Thus, in a source selection which has been preceded by a CC, a unique situation exists. Contrary to the usual source selection situation in which the burden of proof of responsiveness is on the contractor, the onus of proving to higher level authority that a particular contractor should be eliminated outright from a post-CC competition as being too deficient tends to shift markedly to the particular acquisition agency involved.

A second conclusion to be reached about CC as regards contractor deficiencies, therefore, is somewhat the opposite extreme of the first. While CC is by no means a guarantee against significant deficiencies in proposal packages, it does offer a practical guarantee that, except in extreme cases, these deficiencies will not be considered so great or so numerous as to cause a given contractor to be eliminated from the competition (especially if there are only two). Deficient contractors simply get rated lower in the proposal evaluation effort.

(3) The third problem for close collaborators concerning contractor deficiencies may have legal implications. Certainly it has implications for good Government-industry relationships. This is the

problem of whether, when a contractor in good faith does detail his approach in a questionable area during a CC -- particularly one being probed by the Government -- and no negative reaction is evoked from the Government, this failure to demur may legally not be taken as prima facie evidence of the acceptability of the approach in the area.

For example, an important portion of the system was required by contract to be "off-the-shelf" in one program. During the CC, both voluntarily and in response to Government questioning, the competing contractors provided much detail in this area. A question thus arose at this point of whether the close collaborators were or were not responsible for declaring themselves on the issue of the "off-the-shelfness" of what was being offered by each contractor. Even if not considered a legal question, it would have evoked pretty hard feelings if they had remained silent and then afterwards tried to label a particular contractor as "deficient" in this area.*

(4) A fourth problem is that of distinguishing a bona fide "deficiency" (a failure to meet the CD contract specifications in some respect) from other lacks in the proposals submitted and determining how it should be treated in comparison to these other lacks. In one meeting, for example, the following terms were all found to be used somewhat interchangeably, and there was some real confusion as to how to treat those types of lacks that were distinguished from each other: deficiencies, insufficiencies (of proposal data), insufficiencies (of contractor capability in given functional areas), ambiguities, unresponsiveness, needed amplifications, needed clarifications, inaccuracies, inconsistencies, invalidness, non-correctables, and not wanted/needed. The Source Selection Plan for a program should both distinguish among the various possible types of "deficiencies" and be specific as to how these "deficiencies" are to be handled in the particular program for source selection, as contrasted with contracting, purposes.

2.13 Close Collaboration During Source Selection In theory, Phase B of CD (the contractor work period) is an "attained level" type of activity. That is, it is an activity in which a certain level of program certainty and specificity must be achieved before it is considered complete and OSD can, as a result, "ratify" its earlier

* See the chart attached to Section 2.4 (Appendix C) for the impropriety of contractors using Government silence as a sign of assent in the general case, however. What is being stressed here, in contrast, is silence or failure to react negatively when a specific potential contract deficiency is being overtly examined for just such reason.

conditional decision to proceed with Engineering Development on the program. Indeed, CD policy specifically provides for the option of a recommendation "to continue further Contract Definition effort" if the estimated schedule, cost, and technical factors upon which conditional program approval was given have not been confirmed as a result of this Phase B effort.*

However, an opposite view of Phase B as an activity arises from the practical exigencies of carrying out the procedure. In this more practical view, Phase B is a fixed time-period type of activity, rather than an attained level one. That is, it is an activity which is devoted to trying to achieve the goals of CD for whatever predesignated period of time is allowed for it. This view has arisen as a result of the fact that, in addition to stating the philosophy noted above, the CD Directive (Reference 1/) also fixes the length of Phase B at a norm of 3-4 months and a maximum of six months. As a consequence of this, while CD may officially be recommended to be continued if the desired level of attainment is not reached during Phase B, nobody counts on this continuation possibility in their planning. Rather, all activity by the implementing DoD Element during this period tends to become geared to seeing that all the necessary steps in the process are accomplished within the established schedule. It does not focus on assuring in detail that adequate time is provided for accomplishing fully each of the specific tasks to be done in Phase B.

This situation is admittedly due partly to the difficulty of realistically determining how long Phase B tasks should take. And partly it is due to the way Phase B funding is determined.** Present, too, is the feared risk of program elimination by higher levels which is involved in admitting the need for a prolonged CD. Whatever the reason, however, it seems clear from observation that people behave during Phase B of CD pretty much as if it were a fixed time period effort -- not an attained level effort.

This view of Phase B in practice leads to a close collaboration issue. The practical considerations exist that: (a) while certain work on a program should have been accomplished prior to Phase B, often it has not been; (b) while a certain level of specificity and certainty is to have been achieved by the end of Phase B, often

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* Reference 1/, Section VI-G "Actions Resulting from Contract Definition."

** Ostensibly, funding is based on contractor estimates of what it will take to do the Phase B job. But since greater funding is inevitably required, contractors tend simply in their bidding to try to get the maximum Government "contribution" they can without becoming noncompetitive. The DoD Component adopts a similar philosophy in its budgeting. Neither, thus, really measures the funds required to achieve a given level of quality.

it cannot be; and (c) while a recommendation for a continuation of Phase B is theoretically an acceptable option to higher levels, for political reasons it is not likely to be availed of, especially to clean up what may amount to only one to two months more of needed contractor effort. We thus have a situation in which important Phase B work needs to, and unquestionably is, being asked to be done unofficially during Phase C. And CD contractors cannot object to the request, because they are provided with Phase C "holding period" funds to cover the fact that their people "may be engaged in assigned tasks, such as refinement of specifications."* The CC issue then arises under these circumstances: should CC, ostensibly designed as an activity to be accomplished only during Phase B, be openly and actively continued during Phase C?

Those who argue that there should not be any such CC during Phase C say that Phase C is essentially a source selection period. And, they feel, once the contractors have been given all the proper guidance possible during Phase B, there has to be a fixed point at which the contestants withdraw from this intimate type of Government contact, draw up their reports and proposals, and compete purely on the basis of these. If subsequent ambiguities or omissions of data are found in these reports or proposals, these should be taken care of by the Contracting Officer through normal procurement channels -- not by CC. And for source selection purposes at least, such Contracting Officer communications should deal, at most, with minor correctable deficiencies. In contrast, if close collaboration, in the name of specification validation for example, is allowed to, it can become the equivalent of a major design upgrading effort, rather than a mere assurance that the specifications reflect what is in the CD proposals for contracting purposes. This all leads, it is strongly felt, to the Government doing the contractors' job and consequently to the aborting of the hoped-for gains of the competitive atmosphere. The practical consequence of this discussed earlier,** which is intolerable to a Source Selection Authority, is his having to choose among contractors whose proposals and plans have been guided to such a point that the Government has made them essentially equal -- thus giving him little real choice among them.

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* Reference 1/, Section VI-F-3. Contractors can request reimbursement for certain of this extra work, of course (that which is beyond the scope of their CD contracts). But as one contractor pointed out, there really was no way of his getting reimbursed for or refusing to re-write in the order of 70% of his specifications four times during Phase C. Once contractors have "thrown their hats into the ring," so to speak, they are committed to doing practically anything asked for, right up to the signing of a contract in Phase C.

** See Section 2.1 "The Basic Focus of Close Collaborators."

Those who argue for continuation of CC during Phase C say that major program definition as well as source selection is still taking place during Phase C. And it is likely that you won't get a really acceptable proposal and set of specifications from anybody, much less from at least two contractors, until you have seen and had a chance to react to what is offered as often and as intimately as is necessary during Phase C. Indeed, it is only when you get down to the details of contract negotiations, they argue, that the true test of what contractors are willing to provide for a given price really comes out.

There is clearly merit to both sides of this argument. On the one hand, as one high ranking Government procurement officer indicated on the basis of years of experience: "I have yet to see a contractor proposal which was completely responsive to the RFP, either because of omissions, redundancies, or exceptions to terms and conditions stated in the RFP or in specifications submitted in response to the RFP." Some significant, rather than simply minor, "clean-up" work is ordinarily needed during Phase C, that is.

On the other hand, interviews with various officials show, the Department of Defense has also learned through years of experience the necessity for adhering as closely as possible to the policy stated in its CD Directive: "Source selection for Engineering Development shall be based upon proposals as initially submitted in order to stimulate the best possible proposals."* Otherwise, competitions in tactics rather than competitions based on value offered the Government arise.

To resolve this issue, it is recommended that close collaboration be permitted in Phase C, but only on those programs in which it is determined by the program's project office, after preliminary review of contractors' proposals and reports, that, for legitimate reasons, the full job of Phase B was unable to be carried out by at least two contractors. Only one Phase C close collaboration period should be provided, in a maximum duration of, say, a month to six weeks. And no reference to higher authority should be required to engage in it. Rather, it should be considered a normal Phase C "holding period" activity. Finally, this supplementary procedure should be kept as much as possible within the intent of the DoD "initial proposal" policy stated above by the formal notification to all competing contractors that only one additional submission of data will be allowed. And this one must be confined to the specific points of concern raised by the Government in their respective cases.

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* Reference 1/, Section F.8. See also Air Force Systems Command Manual AFSCM 375-4 of 31 May 1966, System Program Management Procedures, pp 63 and 64.

2.14 Sole Source Contract Definition Sole-sourcing for CD, though not expected to be the normal situation, is, of course, permitted by regulation.* However, this exception to what is considered to be normal gives only "major modification" as the circumstance permitting it:

> "In the case of major modifications to (1) an existing Engineering Development project or (2) an item already in the inventory, Contract Definition may be conducted on a sole-source basis by the contractor responsible for the predecessor item, provided that competition is not feasible or desirable."**

There is one other circumstance where an argument has been advanced for permitting it which merits examination here, because the manner in which the close collaboration effort is conducted on the program in question is a determinant in assessing whether this circumstance should be considered permissible or not.

The argument made is that there is ample justification for a sole-source CD award to a given industrial organization when it alone has risked a considerable amount of its own funds and the efforts of its key people prior to the CD phase of the program in carrying the system, or certain of its critical parts, to the point of establishing confidence that the program is worth going forward with. Indeed, the argument goes on, the Department of Defense is pointedly engaged in encouraging such self-initiative, as a matter of policy. It does so by directly helping firms who display it to increase the probability that their efforts go in a direction which will in fact be profitable, i.e., is likely to result in a "solution" to a real military "problem." This is being accomplished by DoD through a marked step-up in the dissemination of its classified technological plans and programs to properly qualified industrial sources.*** Thus, it is pointed out, when the Government provides for a competitive CD under circumstances in which one company is way ahead of all others as a result of its own initiative, and allows lagging organizations to catch up sufficiently to take part either by means of multiple pre-CD "study" contracts or, more directly pertinent here, through a close collaboration effort aimed at providing the Government with a real choice at source selection time,**** it is taking away the very

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* Reference 1/.

** Section VI-F-1-b.

*** See, for example, DoD Instruction 5230.14, "Advanced Planning Briefings for Industry," July 24, 1964.

**** See Section 2.1, "The Basic Focus of Close Collaborators."

"pay-off" which leads to the kind of self-directed initiative which is ostensibly one of its basic policy goals. And this goal is not trivial, for its aim is admittedly to help assure that the millions of hours being spent annually by some of the most talented man-power the Country possesses -- that being devoted to independent research and development -- is being applied in areas where the Government has or can foresee serious technical or military operational difficulties in the years ahead. This sole-source CD argument is thus a powerful one.*

A possible major weakness in the argument, however, is that which was offered directly by an Air Force authority on procurement.** And that is, if one company is really ahead in a particular field, another company cannot catch up in the 3-6 months of a Contract Definition effort -- even (presumably) if this CD includes a close collaboration effort.

The point of concern here is that this rebuttal depends very much on how the CC is carried out. If the in-house people conduct themselves so as to keep the competitive consequences of their actions well in mind, then it is hard to dispute General Keeling's point. If, on the other hand, the desire on the part of the Source Selection Authority for a real choice is interpreted in practice as requiring assurance that not only are at least two proposals fully acceptable, but quite competitive -- as is claimed to be too frequently the case -- then the argument advanced above for sole-sourcing CD takes on added impetus. It all depends on the CC.

2.15 "Price" Competition There seems to be a belief among certain industrial organizations who engage in Contract Definition efforts that the Phase C competition for an engineering development (and possibly production) contract is essentially a pure "price" competition. That is, based perhaps on the way such competitions are perceived to have been conducted in the past and on public speeches of procurement officials, they have come to feel that the extra value they might offer in a proposal entered in such a competition either can't be measured and traded-off against its extra cost

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* For a broader context of this argument, note the current ASPR Committee attempt to develop a general policy in the area of desirable protection of private innovators by DoD. See also the Report of the Defense Science Board Subcommittee on Defense Contractor Effort "Encouragement of Innovation," 17 September 1964.

** Major General G. F. Keeling, DCS/Procurement & Production of the Air Force Systems Command, to an industrial audience in Boston, Mass. on October 18. 1966.

by the Government or that the Government is unwilling to pay more for such extra value.* Whatever the reason for this belief, it leads to a competitive tactic which places a burden on CC to help counteract. And that is, it encourages CD contractors to offer the type of marginal technical proposals which allow their bid prices to be as low as possible.

It is true that the Government does have difficulty performing a so-called "cost-effectiveness" tradeoff during a source selection, especially one involving "life-cycle" costs. It is also true that there is some (unspecified) level at which exceeding its performance specifications will be classified by the Government as unnecessary "gold-plating." And contractors do take much less competitive risk or can "shave" things much closer in offering a marginal technical proposal in a CD Phase C source selection that would ordinarily be the case, because of the practical difficulty described in Section 2.12 ("Contractor 'Deficiencies'") of finding any CD proposal completely "unacceptable" after a close collaboration effort. Thus, the basis of the competitive tactic is not entirely without foundation.

However, CC can be effectively used to help dispel the notion of the validity of this tactic, at least in its extreme form. That is, it can go a long way towards helping to assure that the Government is not offered marginal benefits in Phase C proposals, but, rather, fully acceptable ones in terms of both operational effectiveness of products and risks of program performance. It can be done by openly discussing the tactic during CC (a) in the form of overt statements by the Government of its willingness to pay extra for benefits it considers of value, (b) in terms of the possible negative consequences of the tactic in relation to the risk threshold established by the Government for the particular program, and (c) in a fashion which provides assurance that contractor-prepared specifications will be fully validated during Phase C.** If, indeed, Government priorities on a particular program are such that costs do predominate over lead-time and effectiveness, and essentially a competition in prices is intended as a result, this fact can and should be openly admitted.

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* By "extra value" is meant here not only a benefit like increased product effectiveness, but also benefits like a good contractor performance record, greater contractor functional capability in key areas, and more readily realizable specifications -- all of which add up to a reduction of the risk of program performance by a given contractor.

** By "validated" is meant that the Government will contract only on the basis of specifications it has first determined to be achievable (and achievable for the price proposed) and acceptably specific for contracting and testing purposes.

SECTION III

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

3.1 Summary Conclusions While one may disagree with one or more of the "issues" just raised or their recommended way of being handled, the existence of so many of them (and more) makes it hard to quarrel with the following conclusions about close collaboration as far as in-house Government and Government-supporting participants are concerned:

(1) For effective accomplishment, it requires a detailed knowledge on the part of its participants not only of its goals but also of the proper manner of achieving these goals. Without such detailed knowledge, close collaboration may well serve to thwart, rather than advance, the purposes of Contract Definition.

(2) For effective accomplishment also, it requires participants who are skilled in the art of rapid verbal give-and-take with an arms-length respondent. Without such skills in close collaborators, again, close collaboration may well serve to hinder, rather than forward, the purposes of Contract Definition.

(3) A DoD-wide "Guide to Contract Definition," such as the one now being made available in the form of a consultant study report,* cannot hope to provide the "how to" type of guidance needed by close collaborators in sufficient detail to be used directly. Close collaboration is too complex an activity to be "programmed" in this way. At best, such a guide can only raise warning signals about broad areas of potential difficulty, and, like Congressional Hearing Reports related to new legislation, act as a source of amplification of the intent of those who are creating the new policy. And, at that, such guidance document will become increasingly less useful as time passes, if it is not provided in a fashion which permits of regular revision as experience is gained and as conflicts are discovered between it and related policy documents and legal rulings.

(4) Every decision and action on the part of a close collaborator is burdened with the conflict between trying to be helpful -- i.e., guide contractors adequately -- and the necessity for not aborting the active competition which is taking place. And walking such a "tightrope" over an extended time period may well be beyond the reasonable error level expectation of even highly trained people.

(5) Adding to this burden in each case is the fact that CD contractors are unusually sensitive to even the slightest comment of close collaborators, creating a "hair trigger" relationship with them. Thus the consequences of a close collaborator's error can be great.

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* Note that such a DoD guide is called for in Section VIII of Reference 1.

(6) Close collaboration practitioners are currently confused, do not take seriously enough, or are in disagreement over:

(a) what their basic focus should be;

(b) whether close collaboration should be a formal or an informal activity;

(c) what the relationship of their activity is to the official source selection activity which follows;

(d) what constitutes proper guidance to contractors;

(e) what degree of initiative they should take in a close collaboration proceeding as compared to the contractors;

(f) how high the potential is for their inadvertent transfer of ideas which contractors consider competitively valuable;

(g) the responsibility they bear for actively assuring that CD contractors validate Government-prepared material;

(h) the responsibility they also bear for conducting a continuous in-house validation effort of their own;

(i) the need for close collaboration on critical subsystems or components;

(j) the role the User should play in a close collaboration proceeding;

(k) what their attitude should be about the extra expenditure of funds by contractors during CD;

(l) how they should handle contractor "deficiencies" after the formal contractor work period of Phase B of CD has ended and proposal packages have been submitted;

(m) whether they should continue to collaborate closely during Phase C;

(n) the need for them to satisfy their basic goals in a fashion which does not create a degree of competition that does not otherwise exist; and, finally,

(o) the need for them to act in a fashion which minimizes the impression that a CD competition is considered by the Government to be essentially a price competition only.

3.2 Recommendations In the light of these summary conclusions, the following recommendations are made:

(1) A formal training program in close collaboration should be set up within each DoD Component. And this Component-wide program should be supplemented at each acquisition agency large enough to engage in Contract Definition with a local training group which provides -- just before a proceeding in a particular program begins -- intensive training of the intended close collaboration participants in the specific demands and planned approach to this program.

(2) Nominees for key participation in a particular close collaboration should be carefully pre-screened for abilities similar to those of contract negotiators. And these abilities in likely close collaboration candidates from all pertinent functional groups (including technical groups) should be developed on a regular basis by attendance at existing DoD procurement schools.

(3) Any written guidance on Contract Definition which is issued by OSD or a DoD Component should recognize that close collaboration is an art and not attempt to treat the "how to" aspect of it at all. Rather, the treatment of close collaboration in such guidance documents should be confined to "what" or policy amplification and broad caution type material. Further, serious consideration should be given to preserving the usefulness of any such material to practitioners by issuing it on a basis which allows for its regular revision as the various acquisition agencies gain experience and as conflicts with other policy direction or practices are uncovered.

(4) A considerable body of sample material on what constitutes proper guidance should be developed. And contractor as well as in-house people should be indoctrinated in its use. Only such intimate advance familiarity with numerous examples by both parties can hope to reduce the unusual sensitivity of contractors to in-house comments during a close collaboration and alleviate the personal burden of the continual conflict that arises for in-house practitioners in the making of the hundreds of individual guidance decisions called for in such a proceeding. Such familiarity, too, should reduce both the likelihood of in-house people giving improper guidance and their tendency to hold back for fear of doing so.

(5) The official focus of close collaborators should be to help provide the Government with a real choice between or among competing approaches and capabilities at source selection time by trying to see that at least two fully responsive proposals are available for consideration at that time. However, steps should be taken to assure that close collaboration is not used to create a degree of competition which does not otherwise exist.

(6) During close collaboration, a mixture of both formal and informal relationships with contractors should officially be encouraged, with the ground rules for its conduct in a particular case established in advance with the contractors. In the normal case, this mixture would be characterized as an overall relationship which is neither as completely at arms-length as that historically practiced during the contractor proposal-preparation period, on the one hand, nor, on the other, one which fails to observe at any time that an active competition is going on from which the Government eventually hopes to benefit.

(7) Phase B of Contract Definition (the contractor work period) should be characterized in official procedural material as a distinct part of the ensuing (Phase C) Source Selection, in order to take advantage of the potential close collaboration has for improving this Source Selection. If so characterized, it should be provided: (a) that the major administrative units (boards, councils, and panels) responsible for accomplishing the Source Selection have at least their key staffing completed early in Phase B; (b) that appropriate members of this key group determine the source selection criteria (including their relative importance) and the incentive aspects of the program early enough to be of direct use to the close collaboration group in organizing and determining a direction for their efforts; and (c) that as many members of the staffs of the source selection working panels be selected to participate in the close collaboration as possible.

(8) In order to take full advantage of the "trial marriage" potential of close collaboration, program managers should assure that in-house participants are not simply reactive to contractors at guidance meetings, but, rather, take full responsibility for preparing detailed questions in advance and for exploring in depth those areas which either relate to subsequent (to Phase B) in-house responsibilities, are critical to the validity of the system's design or the technical management of the program, or are being handled too lightly or in a questionable way by contractors.

(9) Close collaborators should be trained to protect against the inadvertent transfer of contractors' ideas; and specific safeguards should be designed to help prevent their doing so.

(10) Contractor responsibility for validation of Government material such as requirements and specifications should be made more than simply a matter of contract. Detailed close collaboration concepts should be developed which overcome the natural reluctance of contractors to accept such responsibility.

(11) Continuous in-house validation effort throughout all of a CD -- especially during the high information interchange period of its close collaboration effort -- should also be provided for, as a matter of regular practice. This needs be done to compensate for a variety of tendencies which are natural to competitive contractors and to better prepare Government personnel for doing those parts of the Phase B (contractor work period) and Phase C jobs which are their responsibility.

(12) It should be made a matter of policy that either associate prime CD contracts are written on all key subsystems/critical components or a clause is inserted in all prime CD system contracts reserving the right of the Government to directly conduct a close collaboration with those potential subcontractors with whom the system contractor is neither collaborating nor funding for CD.

(13) The Government should take a firm position on the role of the User in close collaboration proceedings. This position should take into account both the unique responsibility the system project office has to act as the appointed spokesman for the higher headquarters (or Service-wide) point of view and the singular responsibility the User bears for assuring that the final system product does the needed military job.

(14) The Government should recognize and take steps to counteract the fact that CD's extension of the effective proposal preparation period and close collaboration's provision of a unique opportunity to contractors to influence in-house people personally with the expenditure of extra funds invite competitions in spending rather than in value offered. In particular, it should take deliberate steps to change its unofficial attitude of winking at such extra expenditures (especially those not required for a contractor to be responsive).

(15) Close collaboration should be recognized and treated for what it is, a gross activity which may not uncover even significant deficiencies in contractor plans and proposals. A closely related converse of this, which should also be recognized, is that while close collaboration, as indicated, by no means assures against significant deficiencies being found in proposal packages, it does offer a practical guarantee in all but extreme cases that these deficiencies will

not be considered so great or so numerous as to cause a given contractor to be eliminated from the competition -- especially if there are only two. Taken together, this means that, following a close collaboration, in-house people inevitably will face a serious problem of determining how they should handle a variety of types and classes of contractor "deficiencies." More detailed guidance is needed on this topic.

(16) When circumstances warrant it, close collaboration should be permitted to some pre-determined, relatively short term extent in Phase C -- as well as being a normal part of Phase B. And the job of determining when circumstances warrant such short term extension should be the project office's, with no reference to higher levels required.

(17) It should be a normal activity to take specific steps during a close collaboration to dispel the notion that the competition taking place is essentially a "price" competition only, unless in fact such is intended in a given case. Otherwise, the Government may be encouraging the submission of marginal proposal packages from CD contractors.

APPENDIX A

REFERENCES

1. DoD Directive 3200.9 "Initiation of Engineering and Operational Systems Development," July 1, 1965.

2. Air Force Regulation 80-20 "Concept Formulation and Contract Definition of Development Projects," August 31, 1965.

3. "A Report on Contract Definition," prepared for the Office of the Director of Defense Research and Engineering (ODDRE) by Peat, Marwick, Livingston and Co., January 2, 1967. While the Report is not being issued as an official document, the way it was prepared allows it to be usefully considered a reflection of the current thinking in many pertinent quarters of the Department of Defense. (See its "Foreword".)

4. "Lessons Learned from Contract Definition," prepared for ODDRE by Peat, Marwick, Livingston and Co., August 16, 1965.

5. Department of the Navy film on Contract Definition (covering the MK 48 Torpedo program), March 1965.

6. Special Task Group Report, USAF, "C-5A Source Selection and Contract Definition Experience," Spring 1966.

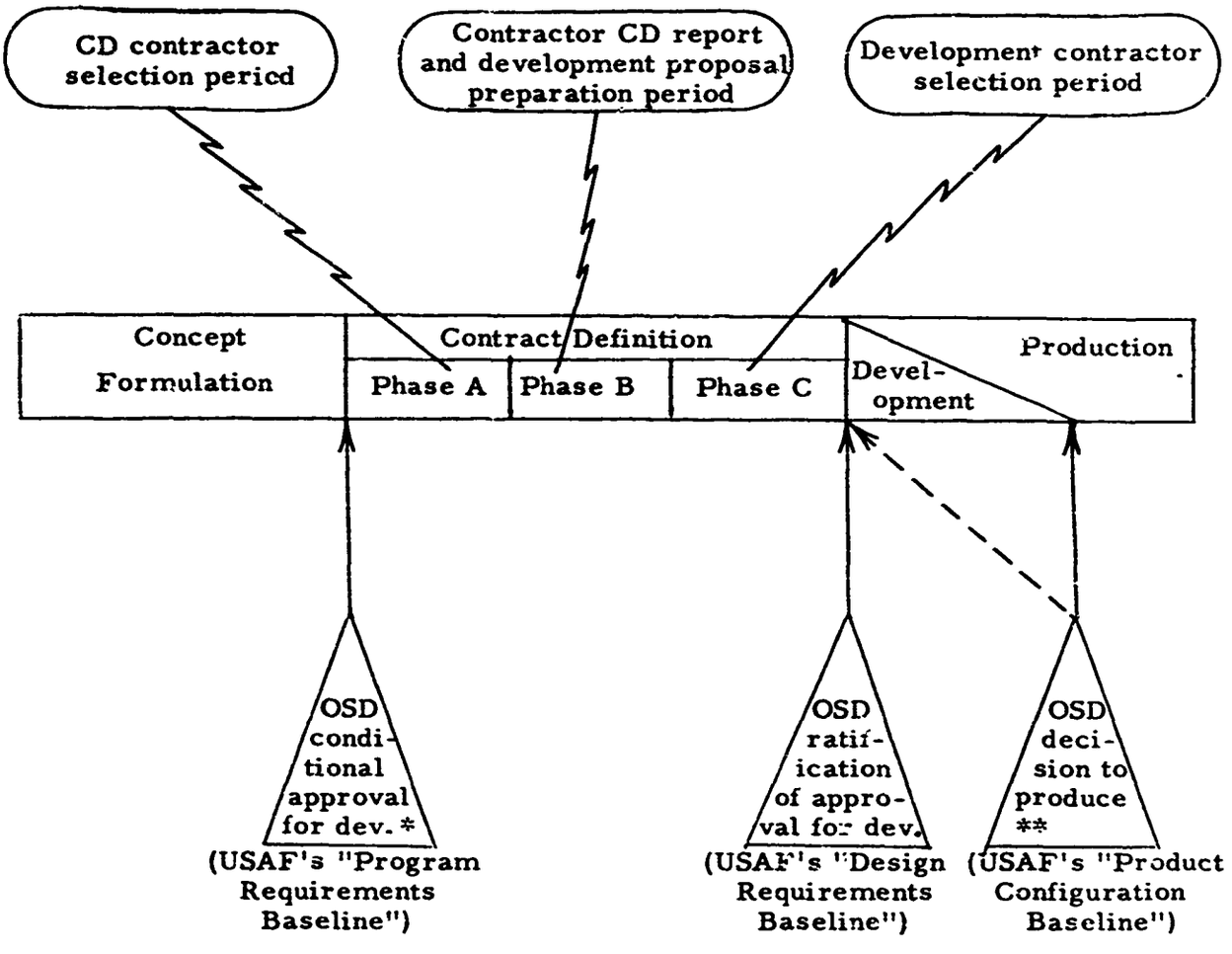
7. Department of the Air Force film on Contract Definition (covering the Heavy Logistics Transport or C-5A program), September 1965.

8. Department of the Army film on Contract Definition (covering the Advanced Aerial Fire Support System or AFSS program), June 1965.

9. Air Force Regulation 70-15, "Proposal Evaluation and Source Selection Procedures," 20 September 1965.

APPENDIX B

THE TERMS ASSOCIATED WITH CONTRACT DEFINITION (CD)
(per 7/1/65 version of DoD Directive 3200.9)



* Note that this conditional approval is for full-scale development (and even production, under the "Total Package Concept"), not merely for Contract Definition.

** The production decision, for at least initial production quantities and/or long lead-time items, may be made concurrently with the development decision; hence, the dotted line.

Guidance Which an Individual Contractor May Take the Initiative to Obtain and Should be Given	Guidance Which the Government Should Take the Initiative to Provide to an Individual Contractor	Guidance Which the Government Should Take the Initiative to Provide to All Contractors *
1. Specific statements as to the degree to which various pertinent background specifications, standards, manuals, studies, drawings, reports, etc. named or referred to in the contract statement of work (SOW) are to be used or taken into account in the particular program. 2. Clarification of the contract SOW (and amendments thereto) and a determination of whether any particular in-house comment made during a meeting thereafter is official guidance or not. 3. Elaboration of the mission context of the program and the resulting specific operating needs. 4. Comments on whether its proposed approach is responsive (in total or in various areas) in terms of such factors as comprehensiveness and yes/no (only) acceptability. 5. Comments on whether its proposed approach has known errors in it or is known to be infeasible in any regard. 6. Comments on the appropriateness of the contract end-items and related specifications it proposes to provide.	1. Comments on whether sufficient detail is being developed in various areas for adequate Phase C evaluation. 2. Comments on whether the more important tradeoffs from the Government's point of view have been accomplished in various areas. 3. Comments on which areas will require validation studies before Government acceptance of what is proposed. 4. Comments on whether the design proposed is being described in a fashion which is appropriate for fixed-price type contracting (i.e., is specific enough about what will be provided and when, for the price to be agreed upon). 5. Comments on those unspoken assumptions inherent in the contractor's approach which are questionable. 6. Comments on whether the degree of technical or operational risk inherent in the contractor's approach is acceptable.	1. A delineation of mandatory aspects of its specifications, and the priorities among these. 2. A delineation of those aspects of its specifications which are of a "try to achieve" nature, and the priorities among these. 3. A delineation of those aspects of its specifications or program which represent "customer preferences" (distinguishing the treatment to be given those which cost dollars or time from those which do not). 4. A statement of the value the Government places on exceeding delivery dates or the specifications in various areas (tied to its evaluation criteria and incentive plan, if any). 5. The results of any pertinent study or design verification activity accomplished after the CD contracts are let. 6. Details on other systems with which the proposed system is to integrate.

(continued)

Guidance Which an Individual Contractor Might Take the Initiative to Obtain Which It Should Not	Guidance Which the Government Might Take the Initiative to Provide to an Individual Contractor Which It Should Not	Guidance Which the Government Should Not Provide Even to All Contractors
1. Evaluative comments on its approach in various areas, above their yes/no acceptability (e.g., comments like "fair," "good," "excellent"). 2. A designation of a preferred alternative among several possible alternative approaches presented. 3. Problem-solving assistance. 4. Guidance based on Government silence. ("If you don't comment adversely on this particular presentation, then I will assume that you approve it.") 5. Guidance based on clever wording of questions asked or submitted. 6. Comments on a competitor's approach, work progress, or results -- even in a general way.	1. A suggestion to consider a specific alternative approach to the contractor's proposed design or a part thereof. 2. Suggestions concerning either desirable features or revisions that might improve the contractor's proposed design. 3. "Suggestions" which have the effect of taking over the contractor's design effort in a particular area. 4. Comments on proposed outside studies, planning factors, or consultant opinions the contractor intends to obtain or to take into account which are not known to be fallacious. 5. Comments on how the contractor might achieve an acceptable level of functional capability in areas which the Government plans to evaluate as part of the competition (e.g., quality assurance, logistics planning, and management planning and control). 6. Comments on the qualifications of the contractor's CD staff.	1. A delineation of a mandatory approach. 2. Comments on how the subsequent evaluation effort will be staffed and conducted (except for general criteria and their relative importance). 3. Comments on which subcontractors are preferred (unless mandatory). 4. Comments on what funding is available or obtainable for the subsequent development or production program. 5. Guidance which involves premature release of information on other programs. 6. Guidance which is better deferred for negotiation with only the winning CD contractor(s).

* Some of this guidance may be included in the CD contract, as well as being provided or elaborated during close collaboration. However, there is value in the Government deliberately delaying the provision of certain types of guidance -- such as that involving statements of what are simply its preferences, not its requirements -- because such delaying action allows it to see first what contractors suggest.

APPENDIX D

SUGGESTED ADMINISTRATIVE AND PROCEDURAL ARRANGEMENTS

1. The Management Plan Develop a detailed in-house management plan for the conduct of the close collaboration proceeding well before it begins. Tailor this plan to the needs of the particular program involved, and write it in a fashion which permits as much of it as possible to be issued directly to CD contractors.

2. The Sensitivity of CD Information Take steps to assure that information about contractors gained during a close collaboration effort, whether designated by them as "proprietary" or not, is treated as sensitively as that gained during a formal Proposal Evaluation and Source Selection proceeding.[9]

3. Agenda for Guidance Meetings Provide contractors in advance with a list of the specific areas the Government wishes to have covered in each guidance meeting. Encourage contractors to suggest additional items for this meeting agenda. Prepare in advance, also, a list of questions to use to explore verbally the various areas of concern the Government has delineated in the agenda.

4. In-House Unity Assure that all in-house participants to contractor guidance meetings are in full agreement before such meetings, both on the answers to contractors' written questions and on the actions they intend to take or questions they intend to ask at the meetings. Arrange for a single in-house spokesman to provide official guidance at meetings. And allow time for daily "caucuses" at the nearest in-house facility to resolve in-house differences which arise at meetings with contractors.

5. Joint Guidance Meetings Do not press for guidance meetings to be held jointly, except in those instances where reaction and interaction with contractors is not considered to be an important purpose of the meeting (such as at a Government operational demonstration).

6. Recording of Guidance Meetings Tape-record (but not necessarily type up) all guidance meetings. And supplement these recordings with in-house stenographic assistants who can manually record, on signal, necessary follow-up actions and significant items which need to be reviewed on-the-spot by contractor and Government representatives while still fresh in mind.

7. Ad Hoc Briefings by In-House Personnel Do not provide a requested briefing on work in process (either in-house or by contractors other than the instant ones), however pertinent, until it has first been

determined in a coordinated way that such briefing should be given. Even if it is so decided, consider whether the briefing should be a substantive or an administrative one (this-is-what-is-being-done and these-are-the-results-hoped-for-by-when). And confine the briefing to either selected materials at the detailed level in the area in question or to some sort of appropriate gross guidance in this area.

8. The Handling of Contractor Questions Screen and categorize written questions from contractors into at least three groups before acting on them: (a) those questions which should not be answered; (b) those questions which, if answered for one contractor, should be answered simultaneously for all; and (c) those questions which can be answered for the contractor alone who asked them. Advise contractors of those of their questions which fall into the (a) category, but do so without explanation for the classification made. As to oral questions from contractors, whether received by phone or at a guidance meeting, do not feel obligated to answer each of them as they are posed. Rather, automatically defer answering those which appear to require some review of their implications before an answer can be given.

9. Technical Direction vs Technical Monitoring Provide full technical direction to contractors during close collaboration, even though CD contracts are classified as being of the fixed-price type. Include positive and precise reaction to contractor presentations in this direction. And take the preparatory steps necessary to assure the adequate discharge of the Government's responsibilities when it switches later to more of a technical monitoring than a technical directing role on the program.

10. Comments on Subcontractors Do not comment on the subcontract arrangements of prime contractors during the close collaboration.

11. Non-Critical R&D During close collaboration, be alert to the possibility of eliminating proposed development work of a desirable, but not-necessary, nature, particularly when delivery is a critical program parameter. If otherwise justified, contrac for such development on a separate basis.

12. "Splinter" Groups Provide for separate, small-group meetings during or between regularly scheduled general guidance meetings with contractors as a means of exploring particular aspects of the program in depth without having to tie up all of the attendees at the general meetings. Carefully plan and administer such "splinter" group meetings with regard to: (a) the significance of the guidance provided in them, (b) who shall be on their attendance lists, and (c) how the decisions reached in them are to be included in the official record.

13. The Requirements Baseline Provide for a constant internal updating of the requirements "baseline" as the close collaboration proceeds and new information becomes available or current statements of need get interpreted. And regularly issue this "baseline" to contractors as well as to in-house people, in order to validate it and assure a common reference point for any given close collaboration activity.

14. Contractor Over-Responsiveness During close collaboration, pre-plan and implement a scheme for assuring the credibility of the Government's position (a) on the submission of unnecessary data in the ensuing source selection, and (b) of not wanting to have contractors waste resources during Phase B of CD doing work which need not be performed until the later detailed design and development period on the program.

15. Specification Waivers Do not handle a request for a specification waiver during a close collaboration as a simple contracting matter. Rather, make no decision on the request until something like the procedure outlined in the supplement to this Appendix D has been followed.

SUPPLEMENT TO APPENDIX D

PROCEDURE FOR HANDLING SPECIFICATION WAIVERS DURING A CLOSE COLLABORATION

(1) First of all, it should be ascertained whether the request involves a real "waiver" or whether the particular contractor's difficulty is being caused by a weakness or inconsistency in the specification.*

(2) If it has been determined that a real waiver is being requested, no response should be made until it is seen how competing contractors are reacting to the particular aspect of the specification in question. If at least one of the competing contractors demonstrates now (not simply claims) he will meet the specification on this aspect, the requested waiver should not be granted. Rather, work towards meeting the specification should be continued by all contractors during Phase B. And the inability of particular contractors to meet various aspects of the specifications by the end of Phase B should be treated as a competitive factor to be evaluated during Phase C.

A special caution should be raised here with regard to questioning competing contractors on the point at issue. If the questioning is too heavy or too pointed, it may alert them to the fact that a competitor is in difficulty in the area. It may even raise an issue for them which they were not as astute as a competitor in seeing. The matter, thus, needs to be handled quite delicately.

(3) If a real waiver is being requested, but investigation shows that none of the competing contractors believe they can meet the specification with respect to a particular requirement, a review of the entire specification should be made by the in-house group for the implications of this fact before a decision on the requested waiver is made. As part of this review, all of the contractors should be asked to assess the design, cost, and lead-time effect of the waiver on the specification as a whole, not simply on the one specification area at issue, because of the possibility of a chain-reaction across the specification of a waiver of any one substantive aspect of it.

Before the waiver is granted, in fact, the contractors might well be asked to investigate the effect of the requested waiver on a series of potential "back-off" positions on the part of the Government. In effect, these "back-off" positions would be a series of alternative ways of rewriting the overall specification with the waiver taken into account, given the Government's priority categorization of its specification (regarding mandatory, objective, and preference aspects).

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* See Section 2.7 "Contractor Validation Efforts."

As was illustrated in an actual case, the development of such overall alternatives and the tradeoff assessment of the performance, cost, and lead-time consequences of those alternatives which are deemed worthy of serious consideration (i.e., do not represent a waste of contractor resources or time to pursue) allows the in-house close collaboration group not only to make a better and more precise decision on the requested waiver, but also to determine promptly who else needs to be a party to any decision made.

For example, in this last regard, if the alternatives chosen for review involve only changes in specification preferences, the waiver decision may be handled right within the collaboration group. If they involve specification objectives, however, it may well require review by the user's headquarters to determine whether the Government should go ahead with a system which cannot meet some of its important objectives to the degree desired. Finally, if mandatory aspects of the specification are involved in the alternatives, OSD may have to settle the waiver issue, because the very basis on which the program was approved may now be in question.*

In sum, a number of considerations are involved before a specification can be waived, when a contract calls for the type of work involved in a CD contract and this CD is being accomplished competitively. And each such consideration must be very carefully weighed during the CC.

* As a practical consequence to the in-house group, this discussion also illustrates that there will undoubtedly exist a technical vs political (need for other parties to concur) tradeoff among the alternatives. In each case, that is, it may find that it can trade increased technical difficulty for decreased political difficulty in considering the "back-off" series of alternatives, and gain lead-time by so doing.

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13. ABSTRACT

One of the important aspects of the Contract Definition (CD) procedure is the "close collaboration" called for between the Government and its contractors in its accomplishment. A detailed review of such collaboration effort, however, raises a serious question of whether it can be accomplished as intended by policy except by highly skilled men who have been intensively trained for the job. At the very least, it must be considered an art which requires unusual care and judgment to practice properly.

This paper is the beginning of an attempt to develop dynamic guidance for in-house (Government and Government-supporting) people who are called upon to participate in such a close collaboration effort, in order to enhance their contribution to the proceedings and to help them assure that their conduct cannot be criticized. It provides such guidance by highlighting certain substantive issues which seem to arise during a close collaboration effort and suggesting an approach to such issues. In doing so, it also suggests certain administrative arrangements which can be made to help ease the difficulty of meeting the seemingly conflicting close collaboration requirements of providing adequate guidance to contractors at the same time as assuring a "fully competitive environment."

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