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DEPARTMENT OF THE AIR FORCE
DIRECTORATE OF SPECIAL PROJECTS (OSAF)
AF UNIT POST OFFICE, LOS ANGELES, CALIFORNIA 90045



M.L.
Post 8-1
Claw

19 April 1969

REPLY TO
ATTN OF: SP-1



SUBJECT: Incentive Contracting

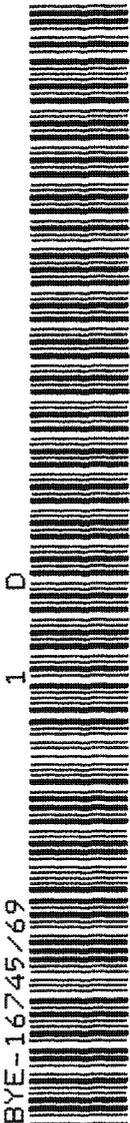
DNRO (Dr. McLucas)

1. This letter is in response to your request of 11 March, as forwarded by Mr. Davis, for a paper on my incentive contracting philosophy. I have completed the revision of the basic unclassified paper on this subject and am forwarding a copy with this letter. This third and final revision of my original April 1966 paper represents my current views as a result of these several years of work in applying this approach to SAFSP programs. At the present time some, if not all, of the major aspects of most SAFSP programs are included in a version of this incentive structure.

2. The paper first describes the application to a satellite vehicle (such as the Program 110 vehicle), and then describes the variations with which this basic structure is applied to other system elements such as payloads, command systems, etc. The paper then describes the application of this incentive approach to other types of satellite projects such as those with relatively long individual lifetimes (Program 770 [redacted])

[redacted] The incentive structure for the Program 467 mission software is included and illustrates the adaptation of this basic incentive philosophy to a non-flying end item. The essential contingency arrangements are also described. These are important elements of a practical incentive structure. It must be possible for the government to have full and complete flexibility in the use of the resulting satellite system without the contractor's fee possibilities becoming an entangling or limiting consideration of such use. At the same time, each vehicle represents a significant portion of the contractor's chance to earn, so the contingency must be handled in a way which is fair and reasonable, while providing the essential flexibility of operation in a manner which maintains the integrity of the incentive structure.

3. The first five major paragraphs of the paper describe this incentive approach as applied to a satellite vehicle, but the remaining paragraphs are necessary to show how the approach is adapted to other satellite system tasks. I realize that this paper is much longer than the eight



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to ten pages suggested by Mr. Davis, but I cannot fully explain the essential features of this rationale in a paper of that length. If one is contemplating the possible adaptation of this outlook to other types of programs, as Mr. Davis indicated, it is particularly important that the way this incentive structure is adapted within these satellite programs be understood in all its major variations.

4. With respect to the question of the degree of success achieved on the contracts which employ this approach, I must point out that none of this experience is suitable for any unclassified or even non-Byeman classified reference. Although a number of "white" contracts are involved in the group of about thirty eight currently active SAFSP contracts which employ this general incentive structure, there is some associated involvement with "black" contracts in every instance, and in no instance can the full effect be seen from consideration of the "white" contract data alone. Any specific reference to any of these contracts therefore must be carried out on a full Byeman clearance basis appropriate to the individual program involved, and cannot be used at all in unclassified or DOD classified discussions or material.

5. The major effect of this structure has been a definite and sustained improvement in the orbital performance of the end items. This improvement has been realized in some cases with improved financial control, that is, with generally lower overruns than those experienced by the same contractor in similar type of work. This is not an easy area to compare in many instances, however, since in some cases of new work we have no good reference of similar work with similar technical difficulty (as, for example which is difficult to compare fairly with any of our other project experience). On balance, our results show that performance is improved, in regard to both quality and reliability, that financial management is every bit as good and in some cases better than our previous experience even when we used cost incentives for underruns. (Prior to my introduction of this present incentive structure, SAFSP had used some CPIF structure with \pm cost incentives. However, I concluded that the typical effect of the cost incentive on underruns was only to reduce the fee available for positive incentive on performance, since no contractor ever had underruns on major satellite vehicles and payloads anyway.)

6. The nearest example of reasonably comparable effort is the satellite vehicle experience in Program 206 (GE), and Program 110 (LMSC) which replaced 206. In both programs the initial development buy was six

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vehicles. The 206 vehicles had cost incentive but no performance incentive, while the 110 vehicles had the full incentive structure described in my paper. Of the six 206 vehicles, only one lasted three days in orbit; four were two-day missions, three of which involved failures, and the other one failed in the first day on orbit. In contrast, all five of the 110 vehicles that reached orbit were 100% successful (the Titan booster second stage failed on one flight so the satellite vehicle did not have an opportunity to perform). The 110 vehicle is much more complex than was the 206 vehicle, but the initial orbital life of these first vehicles was significantly longer, in addition to being trouble free: 5 days primary plus 2 for the first one, 7 days primary plus 2 solo for the second, 8 days primary plus 2 solo for the third and fourth, and 10 days primary for the last. If the later aspects of these programs are compared, the performance difference is even more drastic. In the fall of 1965, I injected this basic incentive approach into the GE effort on 206. Although the contract was already in a major overrun condition, the effect of the new incentive was obvious in the results achieved during the last year of Program 206, (i. e., one major failure (due to use of the wrong squib in the camera hatch opening mechanism) in the last fifteen flights).

7. Another case in which the performance has been improved after introducing this incentive structure is Program 770. The orbital lifetime achieved in the last few flights substantially exceeds the original design lifetime. If the remaining STRAWMAN vehicles continue to operate as well as the earlier flights, the total operational time on orbit for the five flights of this series could exceed by 18 months to two years the original expectation when procurement of these flights was approved by the DNRO.

8. Turning now to the question of satisfaction with this incentive approach, I will say first that I am well satisfied with it. I am convinced that it not only works but that it is a significant factor in getting and keeping responsible managerial attention throughout all phases of the contractor's effort. As to the contractor's satisfaction, I have had many expressions of such satisfaction and no instance of dissatisfaction with this structure from anyone who has worked under it. After the success of the developmental 110 vehicles, which I have described above in paragraph 6, Dr. Flax asked the Lockheed management for their view of the major factors which contributed to this early success. The contractor's response cited three major factors, one of which was this incentive structure. The following is a verbatim quote of this response:

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listed factor:

"A carefully devised incentive contract biased toward technical performance which resulted in a powerful management tool for motivation of all employees associated with the program to promote early and continued success. "

discussion:

"The incentive contract which featured vehicle performance had the desired result. It was of particular importance that all performance was to be measured as a negative from optimum. In other words, any performance less than perfection represented a loss to the company rather than a more classic approach which provided a potential gain. The contract will experience a cost overrun of 5% or less. This did not result from irresponsible fiscal management, but rather many program decisions which were believed to contribute to better reliability. These actions were broadly within the scope of the contract but not foreseen. They did not represent difficult trade-off decisions, since it was believed that vehicle performance would offset the penalty to the company. "

9. With respect to other attitudes toward this incentive structure, I must say that not everyone in the procurement field has instantly accepted it, although it has been completely validated as both legal and within the intent of DOD incentive contracting policy. I had many long sessions with some of my own people in the beginning before getting them oriented in the same direction. I think that some of the people in the procurement field, such as some in plant representative work, question paying the contractor more for, in effect, supervising his own efforts better, and possibly see in this approach a tendency toward reduction of their own role. I think that some of the Aerospace personnel see the continued use of this approach as a potential inroad on their traditional GSE/TD role, as the contractor is much less inclined to lightly take all sorts of direction after his work is put under this type

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of incentive. I should note also that there is a fundamental difference in the attitude which leads to this incentive structure and that which seems to underlie many more conventional incentive structures. Even though, in a legalistic sense, the various applicable documents contain words and phrases here and there which purport to keep things in proper perspective, in actual practice it has seemed to me that much of the conventional incentive attitude reflects a desire to get something for nothing -- to get more than the contract requires at a cost less than the agreed contract price. The real problem is just the opposite -- to get as much as was contracted for without having to pay much more than the original contracted price.

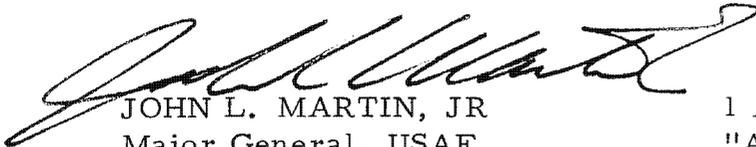
10. One of the major factors which has motivated me to develop this approach is the problem of keeping the satellite reconnaissance program at a sustained level of operational effectiveness under very difficult circumstances which normally and constantly threaten to erode it. This capability rests on an industrial base of contractor facilities and personnel, many separate contracts, with people constantly changing and affecting the knowledge, experience, and competency on which this capability depends for its very existence. Such changes must be watched closely by responsible management and controlled through selection and training of replacements in order to prevent serious reduction of the existing capability. The other aspect of the problem is that the continued production of on-going systems requires continued top quality engineering support, yet top quality engineers normally want to move on into the initial design of newer work rather than continuing to watch and guide on-going production. Their employers also tend toward this same end in order to take advantage of their knowledge and experience to get new business. Yet the continued production of the most stabilized satellite projects involves constant changes for various reasons. A myriad of components which are initially selected because they are available in production either go out of production or undergo changes for other work, forcing changes in all systems which use them. The choice is often to either change to accommodate the new production version of this component, change to accommodate a different component, or else to continue as a sole user of very small production lots of the old component, which course, if available at all, is usually more expensive and involves greater degradation in reliability than accepting the forced change.

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The only solution to these problems is constant, meticulous attention of competent management at every echelon of the contractor's efforts. This incentive contract structure is certainly not a panacea, but it is the best way I have been able to find to cope with this task.



JOHN L. MARTIN, JR
Major General, USAF
Director

1 Atch (Unclassified)
"A Specialized Incentive Contract
Structure for Satellite Projects,"
Ref No: SP142866
Revised 4/18/69

cc: Gen Berg (SAFSS)
Harry Davis

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