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31 MAR 1970

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MEMORANDUM FOR: Director, National Photographic Interpretation Center

SUBJECT : Request for Approval to Expend [Redacted] from FY-1970 Funds for a Ground Order-of-Battle Resolution Study Contract with [Redacted]

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1. This memorandum requests approval for the commitment of funds for a contract. The specific request is contained in paragraph 7.

2. Image quality requirements for satellite reconnaissance systems exert a major influence on the costs of such systems. The more stringent the specifications, the higher the development and production costs. Photographic ground resolution is a primary image quality variable affecting intelligence extraction from reconnaissance exploitation. Empirical determination of information yield as a function of improving image resolution can provide a critical input to objective acquisition system design. Through the use of controlled imagery, simulating potential optical system capabilities, resolution break points may be established for specific targets. These cutoffs, beyond which no further useful intelligence information can be extracted from photography, act as guidelines to collection planners who are thus able to compare intelligence requirements on one hand with attendant system parameters and costs on the other. Conversely, once the parameters of a new reconnaissance system have been designated, those requirements that the system can be expected to fulfill may be compiled objectively by empirical investigations of PI output as a function of anticipated image quality. Results of such studies must be target specific, since interpretation of targets consisting of large components usually can be accomplished with poorer ground resolution than that required for targets containing small components. Furthermore, usable results must be specific to particular PI functions. Mere target identification as the interpreter's goal can generally be achieved with poorer image quality than that needed for detailed technical analysis of the same target.

Declass Review by NIMA/DOD

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[Redacted]

GROUP 1 Excluded from automatic downgrading and declassification

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with [redacted]

3. The proposed study to be conducted by [redacted]  
[redacted] will treat ground order-of-battle (GOB) targets. This  
object category is of high priority in the Intelligence Community in terms  
of both current denied area assessment via satellite reconnaissance and  
future SALT environment inspection capabilities. Previous investigations  
of intelligence extraction as a function of photographic ground resolution  
have been conducted for such targets as aircraft, ICBM sites, and mobile  
radars. The results of these studies have proven to be of great interest  
and assistance to Community planners. Each study has produced results  
unique to the specific target under consideration. The radar investigation  
resulted in an indication of the most stringent ground resolution require-  
ment [redacted] because of the many small electronic components included in  
the targets. Photo interpretation requirements in the GOB category are  
becoming increasingly more detailed. It may very well be that future  
analysis requirements can be met only by ground resolutions even finer  
than those presently indicated for the electronics targets.

4. Developing data on intelligence extraction in the particular  
area of ground order-of-battle equipment--as a function of photographic  
ground resolution--will enable NPIC to respond with greater precision to  
the needs of collection system designers and resource planners. Such  
responses, giving proven technical data about the degree and quality of  
intelligence which could be obtained relevant to various design resolutions,  
enable better judgments to be made concerning value versus costs of alter-  
native designs and objectives.

[redacted]

The imagery utilized will simulate as closely as practicable the modulation  
transfer function and scale as well as the resolution of present and  
proposed acquisition systems. The study will employ NPIC photo inter-  
preters and/or external PI's performing similar GOB analysis functions.

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Final results of the investigation should be available to the Community  
[redacted] thus  
enabling Center management to make a practical prediction of GOB readout  
functional assignments and capabilities [redacted]  
The study's results will also depict those GOB requirements, if any, which  
can be satisfied only with a ground resolution better than that expected  
[redacted] The proposed project will consist of two major  
phases, data collection and data analysis. A final technical report will  
be prepared upon completion of the study. [redacted] is currently under a  
separate contract to prepare for the study by executing an experimental  
design, by coordinating the acquisition and processing of domestic GOB  
imagery and ground truth data, and formatting the required experimental  
materials.

6. [redacted] has been chosen to perform the proposed project because of  
the contractor's experience gained and competence demonstrated on similar  
previous efforts for NPIC. It is deemed inadvisable at this time to re-  
quest open bids on such a project due to the absence of any other cleared  
contractor well-versed in the extremely specialized nature of the research  
involved. Estimated price of the work to be done under this contract is  
[redacted] under a separate Time and Materials contract  
to NPIC, is assisting [redacted] with several tasks in the current contract. It  
is anticipated that [redacted] will continue its support role to the effort  
proposed herein, under both FY-70 & FY-71 funds. [redacted] is perform-  
ing the image processing portion of this program for approximately [redacted]  
under PAR 255 of Contract [redacted]  
of GOB targets is being flown by an OSA/DDS&T aircraft covered by approxi-  
mately [redacted] of miscellaneous services funds transferred from NPIC.

7. Successful completion of this contract could lead to further image  
quality requirements studies to contribute to NPIC's imagery exploitation  
planning. However, additional investigations of photographic ground reso-  
lution as a critical variable probably will not be required. Similar studies  
employing the simulated products of unconventional sensor systems, such as  
line-scan, side-looking radar, or infra-red, are likely future requirements.

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8. The sterility code, [ ] is appropriate for this work; the  
Project Officer will assign security classifications to the reports.

9. It is requested that the negotiation with [ ]  
[ ] for a contract to conduct the program described at a cost  
not to exceed [ ] be approved.

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[ ]  
Chief, Technical Services & Support Group,  
NPIC

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Attachments:

1. Proposal
2. Form 242



22 APR 1970

APPROVED: \_\_\_\_\_

ARTHUR C. LUNDAHL  
Director

\_\_\_\_\_  
Date

National Photographic Interpretation Center

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