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DECLASS REVIEW by NIMA/DOD

TCS-14233/66
16 September 1966

Copy No. 7

MEMORANDUM FOR: Deputy Director for Intelligence

ATTENTION: Planning Officer

SUBJECT: Proposed NPIC Integrated Information System

REFERENCE: Deputy Director for Computer Services
Memorandum, 1 September 1966, Same
Subject (TCS-8048-66)

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1. In accordance with your telephone request, we have reviewed [redacted] comments on the proposed NPIC Integrated Information System (IIS). [redacted] has performed a thorough and incisive review of the [redacted] work to date and the proposed conceptual design. Unfortunately, [redacted] was not fully aware of the background of the project, which gives rise to some of his "serious doubts." In other cases he has taken the [redacted] statements out of the proper context.

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2. The requirement laid upon [redacted] was based on the major premise that NPIC's automated information processing systems were redundant and inefficient. This premise has been well documented by other survey groups, for example, the Land Panel and the Inspector General's survey. There has never been any question within NPIC's mind that a very major improvement in NPIC's internal data processing systems could and should be made. Consequently, [redacted] was charged with analyzing the requirements for digitized information handling within NPIC and with developing concepts for more efficient and effective handling. The report presents a system design concept and not a detailed system design; the detailed design will be developed during Phase II. Functions and methods are defined in this report as opposed to component specifications. [redacted] was not asked to take the time to document the steps of their reasoning process. NPIC/IPD representatives, however, participated in many of their discussions and can vouch for the depth of their considerations. The depth of their analysis becomes very apparent when one questions various aspects of their conceptual design. In the proposed target brief format, for example, they have included only that information required by the PI in the performance

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of his interpretation, and have excluded nothing which he normally requires.

3. The fact that the current system is not meeting needs as expressed by customers is well established. As a result, [REDACTED] did not feel it necessary to document "how well the current system is meeting needs as expressed by customers," although in their survey of the Center they discussed at great length various customers' desires and needs. The approach of the study, and in fact the charge given [REDACTED] in the Phase I contract, was to analyze the information processing procedures within NPIC; determine the actual requirements, not of the customers, but rather of the process itself; and develop a system to fulfill these requirements. The point is that a customer is not necessarily the best judge of his own data processing needs.

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4. Similarly, the solution of internal procedural and technical problems, in and of themselves, would not necessarily provide the degree of improvement in the overall system that we are striving for. We know, for example, that much of the information contained in several files is redundant. Simple elimination of this redundancy would not necessarily provide maximum improvement to the system. For these reasons the [REDACTED] approach, with our concurrence, was to design a system from scratch, using past NPIC experience as one of many factors influencing their design.

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5. Under the above approach, the [REDACTED] assumptions, especially those concerning workloads during the FY 70-74 time frame, were used to hypothesize peak load capabilities that will be needed. The objectives to be attained were defined by the design and evaluation criteria developed in conjunction with all NPIC management. Most of the capabilities conceived are not now available. Those which are available will require considerable improvement.

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6. While we are striving for a considerable improvement in current information processing procedures within NPIC, we have consistently insisted that any design effort developed by [REDACTED] be capable of implementation within the current state of the art. We do not desire, on a broad scale at least, to become a testing ground for questionable or unproven theories. We will incorporate new techniques into the system as they become available and we become convinced of their feasibility.

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7. The [redacted] work has resulted in a conceptual design. The specific details of the final design will be subject to considerable refinement through the iterative design process. As stated above, the concepts are being reviewed by all NPIC components at the present time, specifically to determine their acceptability. As we proceed into the detailed design phase, the first step will be "to develop alternative methods for performing the functions of the system defined by the conceptual design and evaluate these methods through analysis and, where necessary, simulation."

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8. [redacted] has apparently missed the entire purpose of the requirements section (paragraph 4 of SCR 273). This section specifies what data elements are required in each of the NPIC production processes. It does explicitly show the inter-relationship of these data elements in the form of a matrix.

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9. One of the major objectives in the [redacted] design concept is to be able to anticipate processing requirements in advance of receipt of the film. In projecting the response time necessary for such a system, [redacted] has considered the impact of the proposed in-flight process laboratory and real-time data link read-out. One of the objectives of the system is to avoid the regurgitation of volumes of unnecessary information, as currently must be done because the information requirements cannot be anticipated with sufficient precision.

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10. Concerning the question of compatibility of the IIS computer with other computers, the point is simply that any computer which can output a bit stream into a communications network can exchange data with any other such computer. This fact is being demonstrated by the development of the COINS network.

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11. [redacted] states that the [redacted] design assumes a completely independent facility. This is incorrect. The design assumes a fail-softly stand-alone computer system which will interface with outside reference services.

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a. [redacted] specifically mentions connection with the COINS network which, if it proves out as conceived, would be a logical interface with Project [redacted] pictures this as

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being done primarily through the COINS network simply because planning for this network represents the only tangible planning for computer-to-computer interface known to us. The design clearly provides for the query of remote data bases, for the development of on-line dissemination which can be used to update remote data bases, and for the remote query of NPIC data bases.

25X1A b. Experience has shown that the use of other computers as back-up for the NPIC facility is very impractical. Channel assignments, executive systems, and peripheral equipment are rarely identical, and necessitate considerable program modification. [REDACTED] has run programs at NPIC; in both cases program modification and dedication of the entire hardware system to the other agency's work has been necessary. The use of other remote computers as back-up to the proposed IIS would also be extremely difficult from a technological point of view, considering the extensive use of on-line rapid response remote stations in the system. Given the proposed loading of the equipment and the required data transfer rates, any attempt to use an outside facility would slow the entire NPIC productive effort drastically.

25X1A c. The [REDACTED] conceptual design includes a ground photography file and an all-source photo-interpretation report index, reflecting the fact that both are currently maintained at NPIC because adequate reference services are not now available elsewhere. Should adequate services become available, these sub-files could easily be discontinued and dropped from the system with little effect on the overall concept.

25X1A d. The concept estimates a need for two computer supported photo composing devices. While such facilities may be available in OCS and PSD, it would be rather inefficient to utilize them for material generated in, and to be printed in, [REDACTED]. Further, it would, we assume, be difficult

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to attain adequate access to such facilities, if the [REDACTED] assumption that the NPIC workload will require two such machines is valid, and if the facilities available in OCS and PSD are being utilized.

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12. There is, at present, much argument within the industry over the relative merits of dynamic allocation of functions and tasks between central processors vs the direct coupling of central processors in a master/slave relationship. Most hardware manufacturers are retreating from or delaying plans for the development of true multi-processing systems, apparently because they have been unable to cope satisfactorily with the extensive problems involved with the dynamic allocation of the various tasks within given programs. The new system will be fully duplexed and will be programmed in such a manner that the total configuration is not required for the performance of any function.

13. The conceptual design is for an integrated information system. The assumption must be made that the five basic computer program packages will be designed to be compatible with each other and will contain many sub-packages to perform specific functions. Problems of the inter-dependence of these packages, however, are properly left to the detailed design phase.

14. Paragraph 6.1.5.3 of the [REDACTED] Report, SCR 288, is confusing. [REDACTED] is actually talking about two separate devices which will be used for data entry. Also, the [REDACTED] statement that "computational programs seldom change" is not necessarily true. However, most of the changes are in the formats of the input and output data streams, not in the basic mathematics.

15. The personnel requirements specified in paragraphs 5.3 and 7.8 of SCR 288 would be extremely optimistic if they were meant to represent the personnel required to install the system. They are estimates of only those required to operate and maintain an operational IIS.

16. The computer rental costs estimated by [REDACTED] were based on the average monthly rental of four different configurations. The most expensive configuration consisted of IBM 360/67 and 360/50 central

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processors with disc files. The least expensive utilized augmented Sigma 7 and Sigma 2 computers with Bryant discs. Two middle systems were considered, one based on UNIVAC 490 and 418, the other on GE 645 and 625. It should be pointed out that the estimate of 11.7 billion bits of storage assumes a 300% increase above the total estimated storage requirements of 3 billion bits, and not a 30% increase for overhead and directories as stated by [REDACTED]. Actually, [REDACTED] has included requirements for anticipated directories in its 3 billion bit storage estimate.

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17. The costs indicated in SCR 288 for contractor programming assistance cover that programming which [REDACTED] feels will be required to implement group 2 and group 3 functions, and covers the time after the basic system has become operational. The figures quoted in SCR 289 are the contractor's estimates for contractual assistance necessary to design, program and install the initial system.

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18. [REDACTED] infers that the contractor is to be allowed to develop and implement the system with minimum control from IPD and NPIC. We wish to assure [REDACTED] that the contractor's efforts will be very closely monitored by IPD personnel and that there are major review points established throughout the program (there were three such review points in Phase I). As far as Phase II is concerned, each of the specifications for individual sub-systems will be carefully and completely reviewed not only by IPD, but also by the other NPIC components concerned, prior to proceeding with programming and check-out.

19. The concept conceives of three levels or groups of sophistication in the implementation of the integrated information system. Phase II systems design and the follow-on phases are primarily concerned with group 1 activity. Individual sub-systems will obviously be phased in as they become available. However, within the time frame proposed by [REDACTED] there can be little spread in phase-in dates. It should be noted that the contractor was directed from the start to provide a level of effort which would result in an operational IIS in a two-year time frame. We agree that the implementation schedule is optimistic; it will slip, and in fact already has.

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20. Evaluation of system performance is a part of Phase IV, Installation and Test, and will be carried out utilizing data from our management information system and simulation model.

21. In summary, it is our intention that the development of an integrated information system, in accordance with the general concepts outlined by [REDACTED] will have a significant impact on the efficiency of NPIC's activities. These improvements have long been recognized as necessary, not only by NPIC management, but also by top Agency management and the numerous outside review groups which have studied NPIC's operations. The impact of the development of the IIS upon NPIC's operations will permit NPIC to fulfill its photo interpretation responsibilities to the community in a more timely and accurate manner, and to keep pace with the intended growth in the collection of imagery data. The impact of the system on portions of the Agency and the intelligence community outside NPIC will be in the form of increased responsiveness to the specific requirements for imagery interpretation data. Once the integrated information system design has been completed, individual parts of the system may be implemented in accordance with the data processing workload, as well as the availability of manpower and dollar resources. We believe it is imperative, however, that the system be designed in its entirety to avoid redundant files and inefficient processing. The detailed design is a necessary and integral step toward the fulfillment of NPIC's long-range goals and objectives.

[REDACTED]

Chief, Information Processing Division, NPIC

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