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CONTROL NO. _TCS 7775-64_

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Holding cy. 2

(OVER) Minicard

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CSD 23 Mar 65
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Handle Via Indicated Controls

TALENT -KEYHOLE-COMINT

....   * Excellent Report.
                              Believe the DD/I
....   AD's Staff Mtg
                              could profit. Following
....   which understanding
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I like 6. a.   DD/I our aim and
if it can be done +   selective intent as far
also - some part of this   as implementing the
appears most appropriate   recommendations is
for a future "Carroll"   concerned. Will you
briefing (PN)   coordinate our views,
                              plans, and
WARNING   follow thru
                              want on
This document contains information affecting the national security of the United States within the meaning of   this one?
the espionage laws U./S. Code Title 18, Sections 793, 794 and 798. The law prohibits its transmission or the
revelation of its contents in any manner to an unauthorized person, as well as its use in any manner prejudicial   CiCL
to the safety or interest of the United States or for the benefit of any foreign government to the detriment of
the United States. It is to be seen only by personnel especially indoctrinated and authorized to receive in-
formation in the designated control channels. Its security must be maintained in accordance with regulations
pertaining to the TALENT-KEYHOLE and Communications Intelligence Controls. No action is to be taken on
any communications intelligence which may be contained herein, regardless of the advantage to be gained, if
such action might have the effect of revealing the existence and nature of the source, unless such action is
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TCS 7775-64
28 October 1964

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MEMORANDUM FOR: Executive Director, NPIC

SUBJECT   :   Trends in the Use of the Minicard System by NPIC, DIA
                     and SAC

1. In response to your request, this paper summarizes the develop-
ment of the NPIC data base under Minicard control, the growth of requests,
SAC and DIA Minicard plans, and the expected future of the Minicard system
for information retrieval at NPIC. This paper has been prepared jointly
by CSD and IPD. CSD contributed Sections 1 through 3 concerning the data
base, request patterns and DIA/SAC Minicard plans. IPD contributed Sections
4 and 5 on operation of Minicard hardware, future plans for handling the
increasing volume, and analysis of the applicability for NPIC of the SAC/
DIA equipment modifications. The recommendations of Section 6 (on page 6)
are jointly proposed.

2. A substantial increase in DIA/SAC reliance on the Minicard system
and on NPIC holdings has occurred. We find that their equipment expansion
plans are designed to increase their throughput speed and system flexi-
bility and to eliminate their dependence on non-Minicard computers for
support. Some of the procedures to be instituted are already in use in
the Center. We do not recommend a joint machine development effort.

3. Although estimates of future volume are difficult to project, a
second shift for equipment operation will be required very shortly. This
will necessitate assigning 4 additional slots to the Document Storage and
Retrieval Section, Operations, IPD, and other changes. (See Recommendation
#4.)

4. A skeletal statement of a follow-on information retrieval system
to supplement and perhaps to eventually replace the Minicard system, is
given and the early steps required to prove its feasibility and proceed
with its design are included in the recommendations.
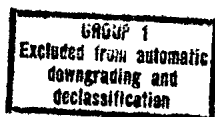
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SUBJECT: Trends in the Use of the Minicard System by NPIC, DIA and SAC

5. In the firm belief that the knowledge of the input specialists is needed to obtain the best response from the Minicard system, we recommend that NPIC do the searching and prepare the replies to DIA requestors. We are, however, reproducing sections of the file in accordance with SAC's priorities and sending it to them for their own searching.

50X1

DINO A. BRUGIONI
Chief, Collateral Support Division,
NPIC

50X1

Chief, Information Processing Division,
NPIC

Attachment: (1)
   Memo, Appendix A, & Chart

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TRENDS IN THE USE OF THE
MINICARD SYSTEM BY NPIC, DIA AND SAC

1. Development of NPIC Minicard Data Base

    a. Since 1956 when CIA/PIC became operational in the Steuart Building,
the Center's data base and the concept for handling this material have passed
through three phases.

        (1) From 1956 to 1960 the data base was designed to contain
only code-word material to be used in support of systems-cleared
photo interpreters. It was essentially an "Internal Use Only"
data base. Processing of material for Minicard was limited to
TALENT, TALENT/COMINT, or SENSINT reports. The "All Source" con-
cept of information handling began to develop during this period.

        (2) From 1 May 1960 to January 1963, the development of the
concept continued. The downgrading of U-2 photography and the
advent of the KH system greatly stimulated this trend because of
the production of PI reports ranging through all levels of security
classifications.

        (3) Since April 1963 when the Center's Minicard equipment
became operational in Building 213, many new types of photo
intelligence documents have been incorporated into the data
base. As a result of this multi-faceted input, along with the
wide spread publicity received by the Center during these years,
the pattern has evolved into an accepted NPIC philosophy. This
embodies the "all-source" photographic interpretation support of
intelligence requirements, both National and Departmental.

    b. Fundamental to this philosophy is the Center's reference collection
of photographic and related materials. The file consists of the finest, most
complete collection of PI reports produced since 1953. Additional documents,
although not technically PI reports, are based on photography and are held
in the collection. Special files, such as the photo-mosaic, VISS (Strategic
Hamlets), and PI reports from friendly foreign governments, are also under
IBM and Minicard control. Briefing boards and notes are now being input.
Informal memoranda both national and departmental have been processed since
October 1963.

    c. The file presently consists of 45,000 items including formal and
informal publications, photo-mosaics, special files, and 23,000 SAC Minicards.

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About 35,000 of these items including the SAC Minicards, have been added
since January 1963. While this file is small in comparison to other
intelligence collections (SAC's contains 300,000 items), it is the best
source of target and technical information on the Sino-Soviet Bloc.

    d. The growth rate of the Center's data base is difficult to predict.
This, in part, will be dependent on the growth in rate and scope of the
requirements levied upon the Center and upon increased film inputs. In the
past two years NPIC has been catapulted into supporting worldwide surveill-
ance activities. Continued improvements on current and future collection
systems will increase the magnitude and scope of the data base. Further,
additional requirements to produce various types of order of battle reports
based on photography are anticipated. Requests to produce detailed reports
comparing the Center's data base with Comint and other types of collateral
are increasing.

2. <u>NPIC Minicard Request Pattern</u>

    a. In the early months of 1963, requests levied against Minicard were
limited to searches for NPIC components. Reproductions were prepared for
external organizations who had received the cumulative "NPIC Reports List-
ing". These organizations used the listings as a recall mechanism for
reports not readily available in their files. This listing was NPIC's only
vehicle of bibliographic communication with other intelligence producing
elements since the Center's formally published listings were restricted to
TALENT and TALENT/KEYHOLE reports.

    b. Interest in NPIC holdings has been greatly stimulated as a result
of the many tours conducted since January 1963, and the advent of the "Index
To All-Source Photographic Intelligence Reports" first published in September
1963. (This Index included reports of all classifications for the first
time.) This interest was manifested by the marked increase of requests for
Minicard support. At present, requests for information against the Minicard
data base fall in one or all of three forms:

        (1) Requests for entire file or portions thereof either
in Minicard <u>chip</u> or <u>roll</u> form: The Strategic Air Command,
Defense Intelligence Agency and National Security Agency are
or will be receiving material in this form.

        (2) Requests for Minicard <u>hard copy</u> reproductions of the
entire file or portions thereof: Special Register/OCR is receiving
two copies of selected photographic interpretation reports from
the data base to fill gaps in their file. The Atomic Energy
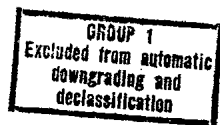
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Commission and the National Security Agency have requested
Minicard copies of selected portions of the file that fall
within the scope of their activities.

(3) Requests for information: Minicard searches for
subject information have been increasing steadily as more
organizations become cognizant of the retrieval capabil-
ities of the system and the content of the data base. The
results of these searches have been forwarded to the re-
quester as reports listings and subject dossiers. More
meaningful answers are also being supplied in the form of
memoranda containing information abstracted from reports
along with bibliographic attachments. These answers usu-
ally generate additional requests for Minicard reproduc-
tions of selected reports.

c. Since January 1963 the number of new external requesting organiza-
tions has grown on the average of 2.5 per month. As new centers are created
and more people receive the necessary clearances this list will continue to
grow (see Attachment #1).

3. DIA and SAC Minicard Activity

a. On 21-22 July 1964 and 29-30 September 1964, joint Minicard confer-
ences were held by personnel of DIA Production Center and SAC Automatic Data
Processing Center. NPIC representatives were invited to attend as observers.
These conferences, along with other periodic liaison between members of these
organizations, reveals a growing effort to establish and maintain firm ties
between the three Minicard-based intelligence information systems.

b. Historically, this liaison has been carried on since 1959. During
this time, division personnel periodically visited SAC and the then Air Force
Production Center. Such items as code books, procedures manuals, etc., were
the only items exchanged. Periodic visits and discussions pertaining to the
merits and disadvantages of the Minicard system were continued. No formal
arrangement was made for the exchange of intelligence materials until September
1963, when a request from Colonel Leonard Pratt, Chief, Data Systems Center,
SAC, was received and the exchange of Minicard chips and services between NPIC
and SAC was initiated.

c. In January 1964, DIA Production Center personnel visited NPIC and
indicated a desire to participate in an exchange program. Since that time
several informal discussions have been held, but no direct exchange of mate-
rials or services has occurred. Information service and Minicard reproduc-
tions, however, have been provided to various elements of the DIA through their
liaison officers attached to the Center.

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d. An analysis of the information derived from the conferences and from statements made by various SAC and DIA visitors to the Center indicates the following trends in the use of Minicard by SAC and DIA:

(1) Intensive research by the DOD into various types of information storage and retrieval systems utilizing a graphic storage medium indicates that there will be a minimum of 5 to 8 years before any equipment to replace Minicard will be designed and operational even if basic research and development is started immediately.

(2) The Defense establishment apparently finds no immediate replacement for the Minicard System and pending the development of new systems has approved the expansion and improvement of existing facilities with substantial funding for Minicard system development and equipment. We do not have exact figures of the funds obligated for new equipment and modifications to existing equipment, but believe the total being spent by DIA and SAC will exceed $280,000 and may go as high as $500,000 each.

(3) DIA seems to have regained the initiative from SAC in its Minicard program and is contemplating world-wide dissemination of intelligence materials via Minicard film chips. Both DIA and SAC are investigating the use of chips in conjunction with other types of equipment such as the FMA File Search. This involves the capability of converting 16mm film to 35mm and 70mm. Both SAC and DIA programs seem to be aimed at achieving independent, self contained information systems which can function without reliance on machine or computer operations outside of their administrative control. This is being accomplished by adding computer functions (tape drives, printers, etc.) to their Minicard equipment. Compatibility with other computer driven information systems is the goal along with the elimination of duplication of effort among the various service elements.

(4) The role of photographic intelligence is rapidly increasing in importance with more and more reliance placed on this source for answers to priority intelligence requirements. SAC personnel indicated that prior to the input of PI materials into their data base approximately 90-95% of their requests were answered by use of the non-code-word, non-PI information reports held in Minicard. Since 1961, when the input of PI materials into their base began, this figure has dropped to about 45%. It was stated that many analysts now request only those reports generated from photography.

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(5)   Both SAC and DIA personnel are acutely aware of the weaknesses of their respective files. The DIA Production Center has no code-word PI reports under Minicard control; SAC has few under control - none prior to 1961. Neither collection is adequately file expanded. Since this material has become increasingly valuable, and since the most complete photo intelligence file is under Minicard control at NPIC, both elements are actively seeking to establish firm ties with the Center. SAC has requested the entire file of code-word and non-code-word reports, photomosaics, VISS, etc., in chip form. They have also requested any future input. DIA personnel have stated that to duplicate the NPIC coding effort to input their backlog of code-word PI material would impede the implementation of their proposed world-wide dissemination system. They feel that the close proximity of the two operations requires only an exchange of services. Specifically, they would like to levy requests for information directly against NPIC with limited Minicard exchange at a later date. It was implied that should a world-wide dissemination program become effective, NPIC could contribute significantly to the program with the contribution of future Minicard inputs to their system.

(6)   SAC and DIA representatives feel that NPIC should impart its experience in processing PI related materials, and its files to the community.

4.   Short-Range Outlook for NPIC Minicard
Equipment Activity (1-2 Years)

a.   We believe that present Minicard equipment will be sufficient for at least the next two years unless input and output volume grow at rates higher than now anticipated. It will be necessary to go to a two-shift operation, however, which will require an additional four machine operators (over and above the current T/O ceiling), the assignment of one additional Recordak maintenance engineer (by extension of our service contract), and an increase in our spare parts inventory. A third shift may be required toward the end of FY-66.

The most likely large-volume increase will be in service requests from PID, NSA, SAC, DIA, and other departmental activities. Any additional commitment from them will substantially increase our forecasting accuracy.

b.   As for the DIA/SAC equipment modifications mentioned in Section 3, we do not believe they will speed our throughput or increase our capacity significantly enough to justify the quarter to half-million dollar investment required. A detailed analysis is attached (Appendix A).

c.   Throughput speed to SAC and DIA will increase if facsimile communications are substituted for courier services. Such communication equipment is already being justified for other purposes; should Minicard transmission requirements warrant electronic communications, only the circuits would have to be installed and operating procedures developed.

NPIC is obtaining a secure Xerox facsimile transmission link with Langley and it is understood that SAC is obtaining the same equipment. NPIC will also have a high-speed data link with Langley, the Pentagon, SAC (or possibly Weather Central, located at SAC Headquarters), and possibly DIA at Arlington Hall. The cryptographic part of this link will handle facsimile transmissions as well as data transmissions.

5.   Long-Range Outlook for NPIC Minicard Equipment

a.   We believe that the future improvements to the Minicard system will come from a major revision of operating philosophy and a merger of the various data bases at NPIC to produce a new information retrieval system. The ultimate system would incorporate into its data base not only the existing Minicard data base and "All-Source Index", but also the target brief file supplemented by much of the pertinent intelligence contained in NPIC's detailed reports and special studies (e.g., MILOB and VISS). The teletype machines which are an integral part of the on-line mensuration system can serve as query stations for specific data, records, or bibliographies. Teletypes can be added at any location (Langley, Arlington Hall, Omaha). It is imperative that the human judgment capabilities of CSD analysts be woven into the query-response operation to avoid misinterpretation of both requests and responses.

b.   A first step toward the new system will be comparative analysis and testing of index searching on Minicard equipment and on a computer. The computer system would involve file searching on the Univac 490, utilizing the FH 880 magnetic drum. If it can be proven that the Minicard search capability can be done more economically and efficiently by a computer, the Minicard system could be reduced to a microfilm document storage medium. At this point, the feasibility and costs of conversion to less expensive microfilm equipment and acquiring the necessary drum capacity will be studied.

c.   Assistance will be obtained from Lockheed information retrieval specialists, Dr. Roger Summit and Mr. H.R. Jaschke, whom we expect to have with us approximately half time during the first half of 1965.

6.   Recommendations

a.   Take immediate steps to inform the community that NPIC will assume the primary responsibility for the control, storage and retrieval of all Photographic Intelligence Reports regardless of source or security classification.

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    b. Take the initiative in establishing formal working relationships with SAC, DIA and any other intelligence organization wishing to request machine searches of the NPIC collection of Photographic Intelligence Reports and related materials.

    c. To this end, ensure NPIC's Minicard equipment is fully operational and is available for use on priority projects on a 24-hour basis with sufficient parts on hand to minimize machine down-time.

    d. Take the necessary steps to keep Minicard files and service current. As a first step, increase the T/O of the Document Retrieval Section, IPD by four electronic machine operators.

    e. Continue cooperative exploration with DIA and SAC of information exchange and systems compatability.

    f. Proceed with the analysis and testing described herein to develop a more responsive integrated information retrieval system for NPIC.

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APPENDIX A

The Importance to NPIC of SAC/DIA
Modifications of Minicard Equipment

1. Magnetic Tape Capability

    a. DIA and SAC are adding a magnetic tape capability to their Minicard
computer-duplicators, making it unnecessary to request 1401, 1410 or 7090
computer support from other components in their headquarters. We do not
recommend that NPIC join in this effort for two major reasons: our equipment
is older than theirs; we expect to achieve the results which are applicable
to NPIC upon completion of the studies now underway.

    b. DIA and SAC have second generation Minicard Computer-Duplicators.
Unlike NPIC's first generation duplicator, they are faster, more versatile,
and possess what is in effect general purpose computer logic. NPIC's dupli-
cator in conjunction with the 1401 and 490 will produce some of the results
of the computer-duplicator but at a significantly slower throughput speed
and with considerably more manual intervention. Since we do not have a com-
puter-duplicator, it would take both a separate design effort and the add-
ition of computer logic to add magnetic tapes to the NPIC equipment. It
would probably be more feasible to replace NPIC's existing duplicators and
order a new computer-duplicator to accomplish this. However, current volume
estimates do not justify this step, which would cost upwards of $250,000.

    c. Specifically, with the addition of magnetic tape, DIA/SAC plan to
modify their procedures as follows:

        (1) Index codes will be key punched on IBM cards instead
of paper tape. NPIC already does this.

        (2) The cards will be verified and converted to paper
tape for input to the Computer-Duplicator where a code validity
check will be made. NPIC performs this check with the 1401,
using cards directly.

        (3) File expansion will be "computed" to speed throughput.

        (4) DIA/SAC will also use magnetic tape as input to the
cameras to speed photographing documents. We do not believe that
magnetic tape will speed throughput; the speed of photographing
documents is governed by the speed with which an operator can
position pages under the camera, not by the time required to read
in the code from punched cards. In any case, the time required
to photograph documents is a small part of the input process; our
present and anticipated volume does not justify speeding up this
phase of the operation.

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(5) After original Minicard negatives are processed, DIA/SAC will use their computer-duplicator to machine verify the codes actually imaged against the magnetic tape input. Our finished chips are spot checked by hand to insure against camera malfunction. Verification has never found inaccuracy at this step to be a serious problem.

(6) SAC plans to write a monthly accessions list from the magnetic tapes. A similar list can be done by NPIC as soon as 1401/490 All-Source programs are completed.

2. Addition of a Line Printer

DIA/SAC are considering adding a 300-600 lines per minute printer in lieu of the Flexowriter which has only 1-3% of this printing speed. A recent IPD/CSD study shows that we have no need for a faster printout directly from the Minicards. Programs are nearing completion to generate bibliographies on the 490 using the accession numbers of retrieved Minicards and the previously recorded all-source index data. Upon completion of these programs (scheduled for September), requirements for Minicard typeouts will drop 90%.

3. Hard Copy Reproduction

DIA and SAC are also considering an Eastman bid to add a hard-copy reproduction capability to the second generation Minicard viewer for about $40,000. This development will be watched with interest. However, commercial viewers with fair reproduction capability are available in the $1,000 to $5,000 price range.

4. Human Readable Chip Identification

SAC is contracting with CBS Laboratories to add a line of human-readable identification to the chip (document number, page, set). This may be of value if chips and viewers are used extensively. The Recordak Viewer-prints are on order. Within the Minicard Section, operators quickly learn to interpret the coding directly.

REPORTS ANALYSIS SECTION

DOCUMENT PROCESSING

GROWTH OF EXTERNAL REQUESTERS