



Management Services Office

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SATURN HISTORY DOCUMENT
University of Alabama Research Institute
History of Science & Technology Group
Date: _____ Doc # _____


DOCUMENTATION REPOSITORY

OCTOBER 1965




HUNTSVILLE, ALABAMA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



This sample is a typical microfiche diazo duplicate. The microfiche process is most valuable in the handling and distribution of reports and other book type documents. Microfiche is used by the MSFC Library, and is being considered for use along with associated reader-printers for report type documents handled by the Documentation Repository.

Microfilm duplicards are currently the most used method of storing and distributing documentation items. The application of microfilm is limited to engineering drawings, specifications, and related documents.



POINTS OF CONTACT

Activity	Name	Location	Telephone
Ch., Document Repository Br.	H. S. Garrett, Jr.	Bldg. 4746	876-1673 876-4724
Production Control		Bldg. 4494	876-6963
Work Order Desk (Dwgs. & Assoc'd. Documents)		Bldg. 4494	876-1371 876-7532 876-6498 876-3917
Work Order Desk (Specs & Reports)		HIC Bldg. #3-1	842-2147 842-2426
Satellite File (Boeing)		HIC Bldg. #3-1	842-2935 842-2936 842-2937
Satellite File (Test Laboratory)		Bldg. 4666 Room 224	876-6180 876-6168 876-6238
Satellite File (P&VE Laboratory)		Bldg. 4481 Room 10	876-0826 876-1576
Satellite File (Astrionics)		Trailer #T-12	876-7732

FOREWORD

A centralized Documentation Repository is provided at the George C. Marshall Space Flight Center to receive, catalog, store, reproduce and distribute drawings, specifications and associated documents pertaining to space vehicles which are originated by this Center and its prime contractors. The Repository does not originate any of the documents it handles, and except for national publications, such as Federal, Military, National Aerospace specifications, standards, bulletins, handbooks, etc., it is not responsible for acquisition of documents. Input of documentation to the Repository is the responsibility of the R&D Laboratories and participating contractors through the Program and Project Managers.

This brochure describes, for the benefit of documentation users, the services and materials that are available from the Documentation Repository. The present operations of the Repository are illustrated to provide a comprehensive picture of work flow, time scheduling and product output.

The planning which has been undertaken to improve future service in the automatic storage and retrieval of documents at this Center is also described.



V. C. Sorensen
Chief, Management Services Office

THE MISSION

Practically everything pertaining to the space effort requires some kind of documentation. Research efforts must be translated into industrial production by means of engineering drawings and parts lists. Specifications are needed to define an item and to describe its functional capability and purpose. Indeed, tremendous numbers of documents are required to design, produce and utilize space vehicles.

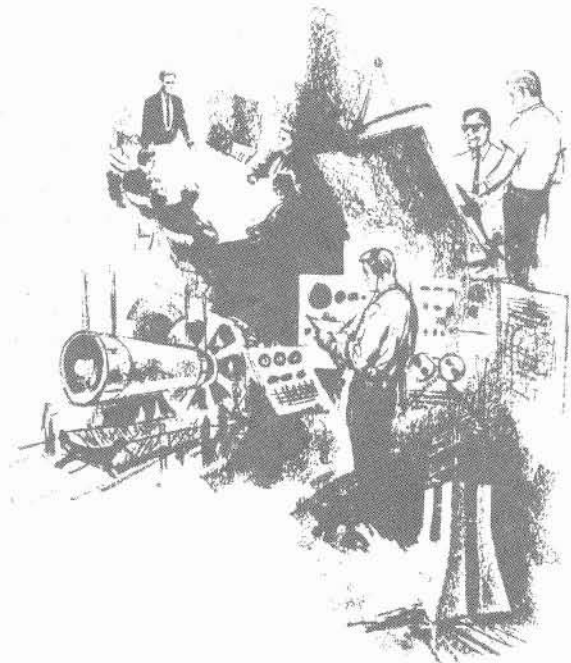
MSFC has established a central repository, to provide for control, coordination, integration, reproduction and distribution of the continuous flow of engineering drawings and allied documents needed by the government and industrial concerns engaged in Marshall Space Flight Center programs.

Initially, the Repository supported only the in-house Center requirements. It now also supports out-of-house development and production effort involving vast industrial contracts for research, development, and production of Saturn space vehicles. In addition, it serves as the repository for Saturn/Apollo interface documentation for Marshall, Kennedy, and Manned Spacecraft Centers.

Documentation handled and filed by the Repository includes engineering drawings and associated documents, specifications, procedures, standards, program schedules, hardware oriented reports, etc. Such documentation is apart from scientific and technical books, reports, and papers dealing with advances in the state-of-the-art. These latter documents are available through the Marshall Space Flight Center library on the ground floor of Building 4200 and through the main library of the Redstone Scientific Information Center in Building 4484.

In summary, the mission of the Documentation Repository is to:

- a. Maintain a centralized repository for drawings, specifications and related technical documents generated by this Center's in-house laboratories, its contractors and other government agencies.
- b. Operate a library for the receipt, storage, retrieval and distribution of engineering reports, specifications, handbooks, procedures and other related documents.
- c. Microfilm documents, mount, file and reproduce microfilmed documents by automatic and electronic data processing methods.
- d. Reproduce and distribute drawings and other engineering documents.



REPOSITORY FACILITIES

Activity	Building	Square Feet
Office, Repository Branch Chief	4746	1,700
Work Order Desk		
Drawing Files		
Microfilm Working File	4494	10,400
Darkroom		
Reproduction Unit		
Microfilm Camera Unit		
Automatic Data Processing Unit		
Reports and Specifications Unit	HIC*	12,270
Microfilm Master File		
Microfilm Satellite File (Boeing)		
Microfilm Satellite File (Test Lab)	4666	1,000
Microfilm Satellite File (P&VE Lab)	4481	400
Microfilm Satellite File (Astrionics)	T-12 (Trailer)	500
Classified Storage (Igloo)	8498	2,000
Supply Warehouse & Inactive Files	7207	6,180
Total		34,450

*Huntsville Industrial Center, Building 3, First Floor



The Documentation Repository is a government-owned, contractor-operated facility located at the George C. Marshall Space Flight Center. Repository Operations are directed by the Documentation Repository Branch of Management Services Office. At present, the following activities are being performed at the locations shown:



The Microfilm Master File or Deck now contains about 2.5 million aperture cards. Current effort requires an average reproduction of 10 duplicards from each master card which are distributed to field decks at 36 locations supporting large volume users. This places the number of duplicards in the system to about 25 million. A progressive growth is expected during the ground testing and product improvement of Saturn IB and Saturn V hardware and in anticipation of additional new systems.

Over 184 machines are used for storage, retrieval and reproduction of information by the Documentation Repository. New equipment and methods are continuously evaluated to ensure rapid and efficient response to the needs of all Repository users.

The capabilities of the Documentation Repository have also been advanced in both volume and variety to meet the Center's growth. Since 1961 the number of prints produced per month has jumped from 160 thousand to nearly 3 million; reports and specifications have increased ten-fold; and microfilm cards have increased by a factor of 40.

The growth of the George C. Marshall Space Flight Center and its nation-wide contractor operations has concurrently increased the requirement for floor space to house adequately a repository office and plant facility needed to receive and process the many documents. To consolidate the widespread facilities, a new building for the Repository is proposed in the fiscal year 1967 construction program. The new facility will house the personnel and the equipment required to perform the complete Center Documentation Repository function in a two-story structure of about 40,000 square feet.



Model 26 printing card punch machines are used to key punch microfilm system cards and master file cards.

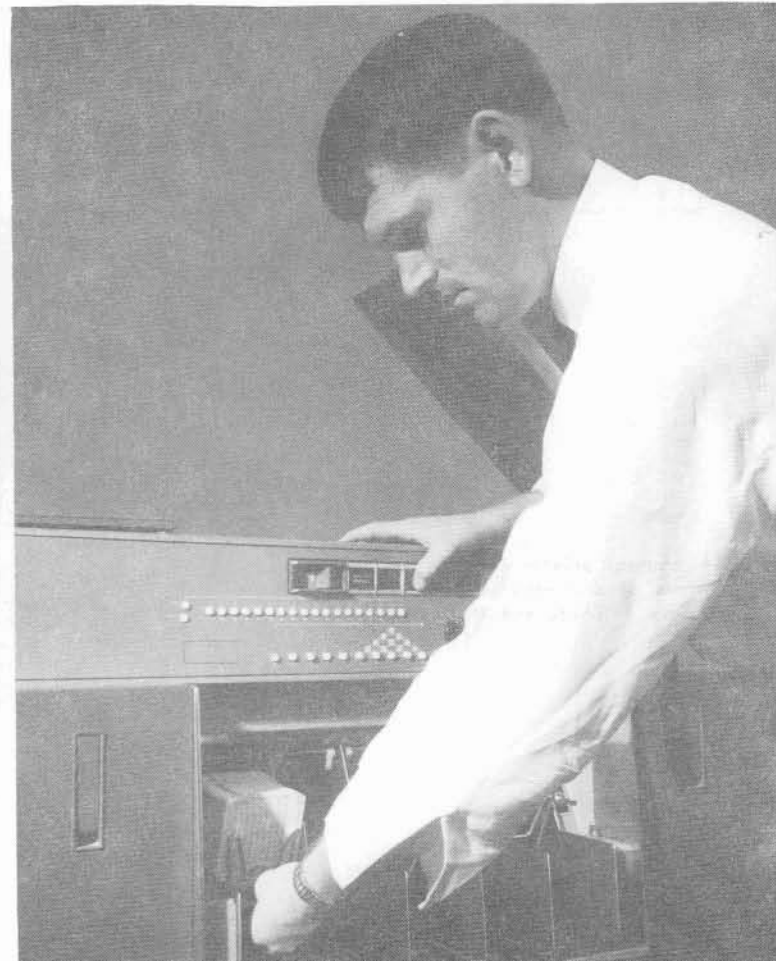


The Model 041 card to card printer reproduces master card images on diazo duplicate cards at the rate of 2000 cards per hour.



Reader-printers are provided for viewing and making prints of individual microfilm aperture cards.

DUPLICARD PRODUCTION



This Model 188 collator is designed to match card for card, sequence-check, or sequence-and-merge cards at the rate of 650 cards per minute in one file.



This semi-automatic mounter is used to mount up to 3000 silver microfilm images into aperture cards daily.



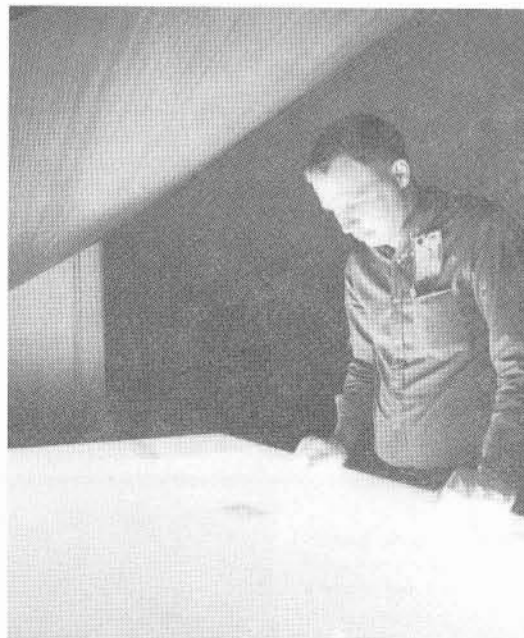
Model 557 card interpreters are used to interpret the punches in the microfilm aperture cards at the rate of 6000 cards per hour.

DUPLICARD PRODUCTION

This electrostatic copying machine accepts microfilm, hard copy, reproducible, or offset masters. The output of the machine can be hard copy, reproducible, or offset masters. Images can be reduced or enlarged to meet individual requirements.

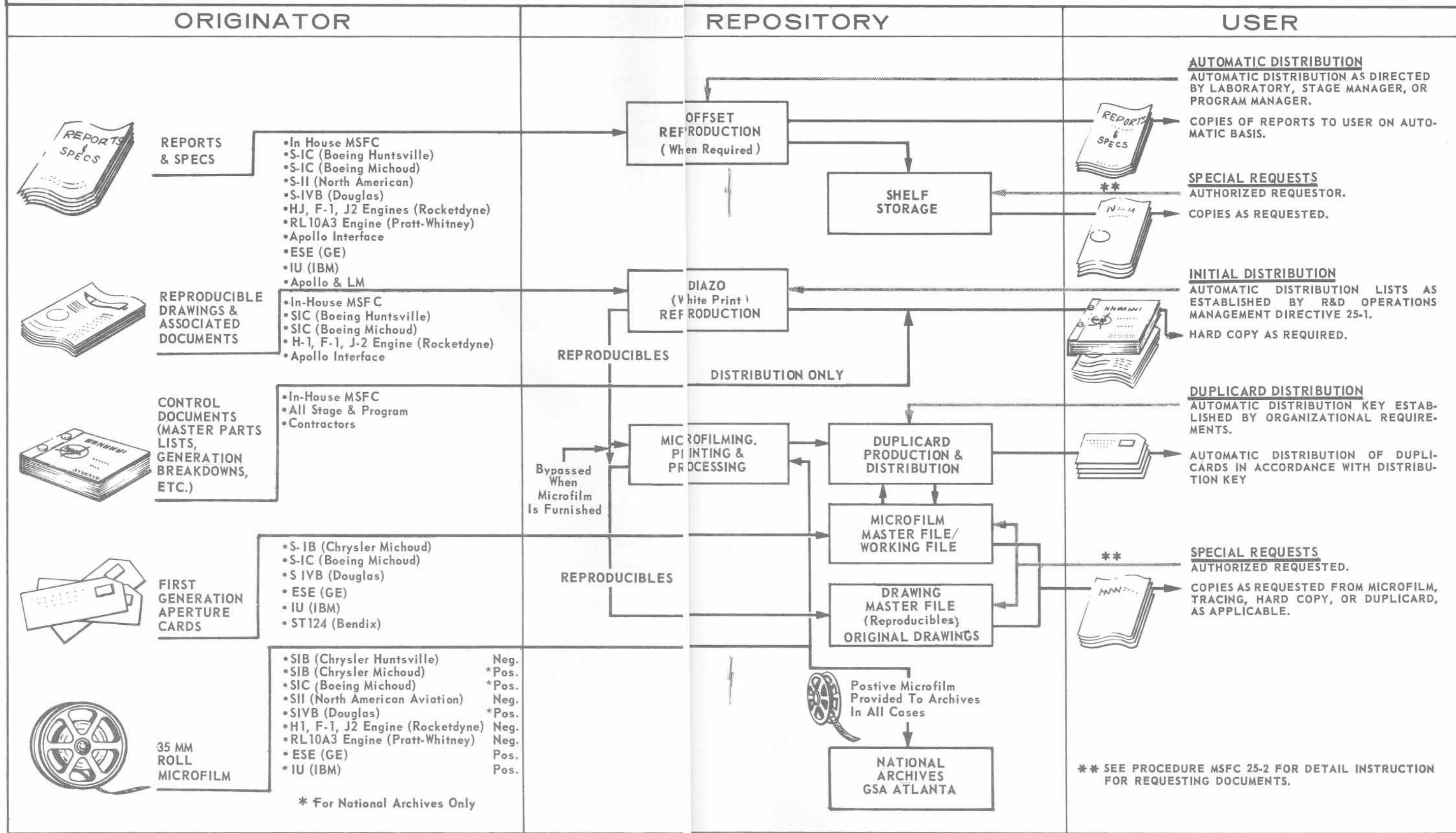


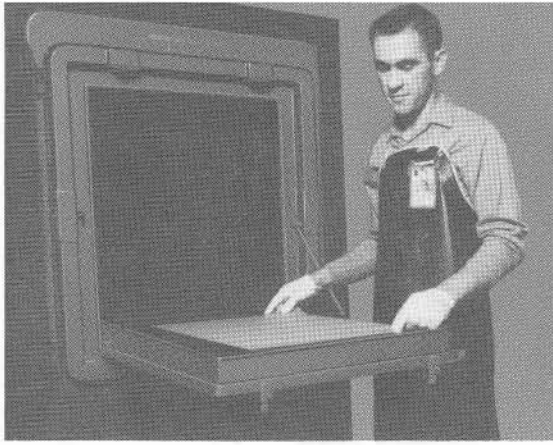
A contact printer is used to make prints of drawings up to 40 by 60 inches on photo sensitive materials.



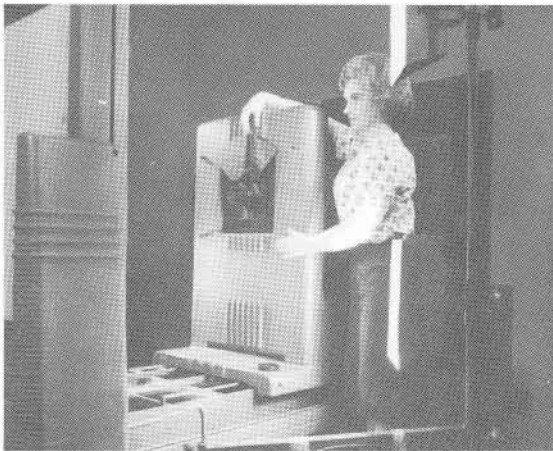
REPRODUCTION

DOCUMENTATION FLOW





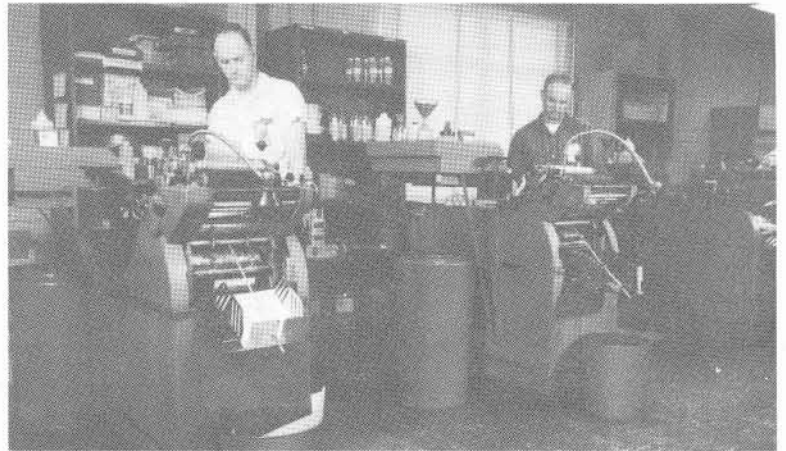
This is the back of the flat bed copy camera. An electrostatic attachment makes possible direct copy onto offset masters for press reproduction.



A flat bed copy camera is used to resize drawings from 25 percent to 200 percent of their original size.



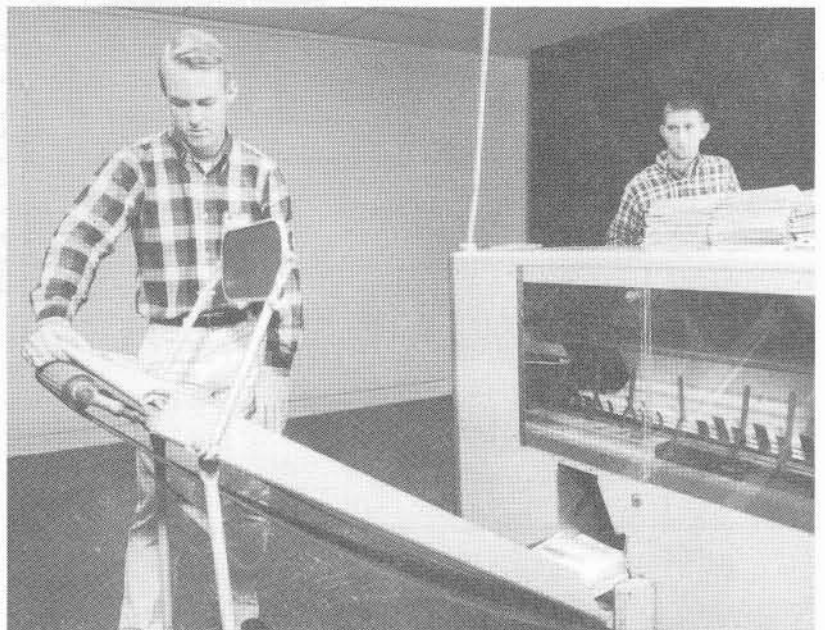
The Model II is used to make offset masters from hard copy. Up to 180 masters can be produced per hour.

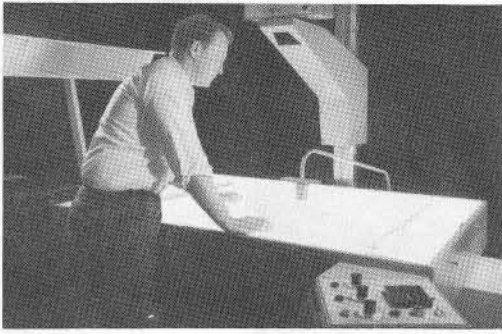


These offset presses are used to print hard copy or translucent reproductions, from prepared offset masters.

White prints, transparencies, and translucent intermediate copies are made by the diazo process. Drawings up to 42 inches wide and of any length can be handled.

The automatic folder is used to fold drawings up to 16 feet long and 42 inches wide. The drawing is accordion-folded into an 11 inch package and cross-folded to a final size of 8 1/2 by 11 inches for distribution.





This microfilm camera is used to make microfilm images of drawings up to 45 by 63 inches. The reduction ratio of this precision planetary-type camera is variable from 12x to 36x.

MICROFILMING

Quality control of microfilm is maintained with the densitometer and the microscope. The densitometer is used to measure background density; the microscope, to check resolution in compliance with MSFC-SPEC-108A.



Satellite microfilm files are maintained in five locations close to users. Each of the card files in this photograph has a capacity of 1/4 million cards.



These flat files are used by the Records Unit to store drawings. The file cabinets shown in this photograph have a capacity of approximately 9200 documents.

FILES

Most document requests are filled from stock or are ordered from the appropriate agency. Incompleted portions of requests are placed on "back order," and action taken to secure them for the requestor.



The Reports and Specifications Unit stores, reproduces, and distributes various kinds of documents in support of engineering data input from MSFC contractors. Distribution varies from 4 to 96 copies, depending on the documents. Individual documents will vary from as few as 15 pages to over 900 pages. Distribution is controlled by the applicable program office.

CATEGORIES OF DOCUMENTS

Approximately 85 different types or categories of documents are handled by the Repository. These include the full range of technical classifications for documents expected from such an extensive government-industry venture as the United States space program. The principal identifier for documentation is its source. For this reason, two classes of documents are recognized:

Class I - Documents originated by the government following standardized formats and bearing numbers controlled by the government.

Class II - Documents originated by participating contractors and having numbering systems managed by the contractor.

FILING AND INDEXING

The Repository files its drawings, microfilm aperture cards and associated documents in numerical sequence by stage within major program categories, such as S-IC, S-IB, S-II, S-IVB, etc. Specifications, standards, reports, etc., are filed in numerical sequence under the heading of the originating source, such as MSFC, other government agency, contractor, etc.

Although indexing of documents is of great importance to its operation, the Repository does not apply additional index numbers to the documents it receives, stores, reproduces and distributes. In filing and indexing, the Repository relies entirely upon the numbering system applied to the documents by their originators.

IMPROVED METHODS AND EQUIPMENT

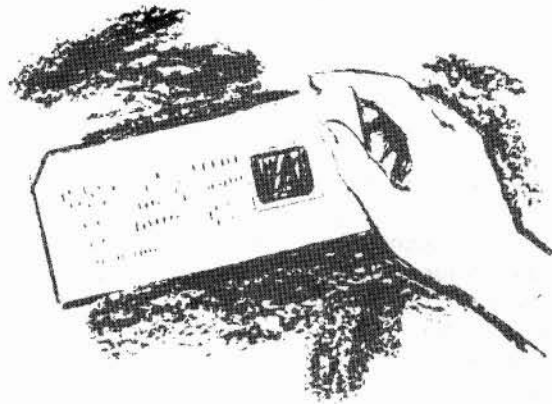
If the space program will be supported in the 1970's and beyond at the current level needed to achieve and maintain national pre-eminence in space, the Repository will be confronted with a continuously growing stream of documents. This flow of essential documented information between individuals in NASA and its contractor organizations must be fast, effective and efficient. As a part of a long range plan to anticipate and satisfy growing documentation requirements, two immediate improvements have been undertaken:

1. Master Index File

A reliable, up-to-date document index is essential to proper documentation management. A computer-oriented drawing index system, therefore, is being developed to list the existing microfilm aperture cards in the Repository's master microfilm deck. Thus, if participating contractors are required to furnish computer listings or indices of their own applicable documentation and its revision status for a particular end item, the completeness of such documentation at this Center may be verified. By comparing the two indices, the Repository may update its files and assure delivery of proper and complete documentation when requests are received.

2. Microfiche

Numerous automatic and semi-automatic systems for the storage and retrieval of information have been investigated. It appears that some advantages can be gained by utilizing the more compact microfilming system known as "Microfiche." Equipment has been procured for this purpose and will be installed early in 1966. In anticipation of center-wide acceptance of this system, a plan for its implementation is being prepared. With concurrence of the Center users, Microfiche should be in full operation by mid-1966. Use of this system for specifications and reports having 8½ x 11 inch printed pages appears more promising than for large size drawings.



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AUTOMATIC STORAGE AND RETRIEVAL

Advanced data systems proposed by industry are being studied for possible future application. It must be recognized, however, that the Repository is primarily a clearinghouse for documents. Its mission does not include providing information from the documents it handles, but rather providing the documents themselves. The documents, whether original tracings, microfilm aperture cards or reports and specifications, are manually filed in numerical sequence in cabinets, on shelves and in map cases. Search, retrieval, reproduction and distribution are also done manually.

Studies indicate that with the increased magnitude of documents expected as the George C. Marshall Space Flight Center space mission continues, automatic handling may be more practical than manual. If so, there would be a need for equipment specifically designed to store and retrieve documents automatically.

In considering automated systems, there may be a real danger in acquiring a sophisticated computerized system, which, due to non-uniformity between document sources and users, will require a parallel manual system. Such duplication should be avoided.

In the meantime, therefore, it appears that the most profitable application of computers or other automatic devices or systems will be for indexing documents that must continue to be handled manually.

DISTRIBUTION

Director (1)
Assistant Director for Scientific and Technical
Analysis (1)
Deputy Director, Technical (1)
Deputy Director, Administrative (1)
Executive Staff (4)
Purchasing Office (2)
Technical Services Office (2)
Management Services Office (6)
Mr. H. S. Garrett (50)
Personnel Office (1)
Facilities and Design Office (1)
Financial Management Office (2)
Research and Development Operations (1)
Future Projects Office (1)
Technical Systems Office (1)
Advanced Systems Office (1)
Operations Management Office (1)
Technical Staff (1)
Aero-Astrodynamics Laboratory (2)
Astrionics Laboratory (2)
Computation Laboratory (2)
Manufacturing Engineering Laboratory (2)
Research Projects Laboratory (2)
Propulsion and Vehicle Engineering Laboratory (2)
Quality and Reliability Assurance Laboratory (2)
Test Laboratory (2)
Launch Vehicle Operations (2)
Industrial Operations (1)
Contracts Office (1)
Facilities Projects Office (1)
Resources Management Office (2)
Saturn I/B Program Office (2)
Saturn V Program Office (2)
Engine Program Office (2)
Michoud Assembly Facility (2)
Mississippi Test Operations (2)
KSC Resident Manager's Office (1)
Mission Operations Office (1)
Project Logistics Office (1)