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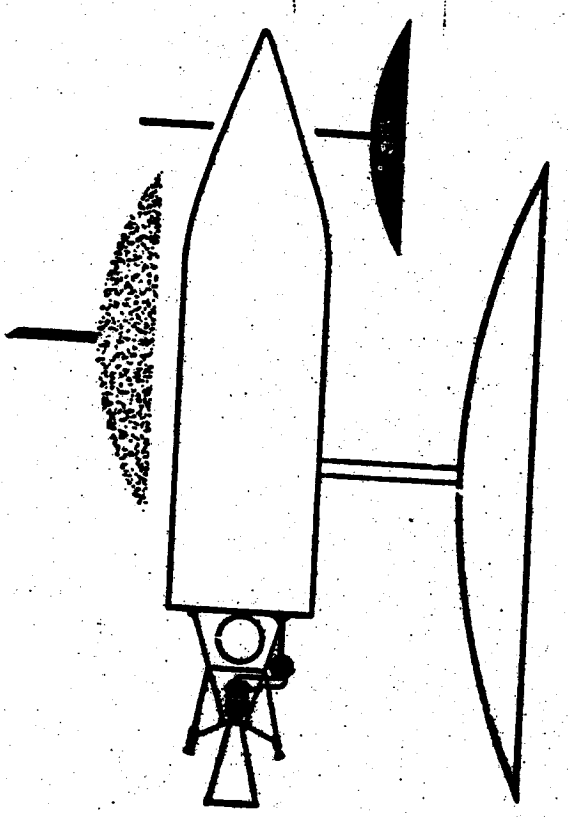

Pied Piper DEVELOPMENT PLAN

VOL II SUB-SYSTEM PLAN

K. Ground Data Processing

LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION
VAN NUYS, CALIFORNIA

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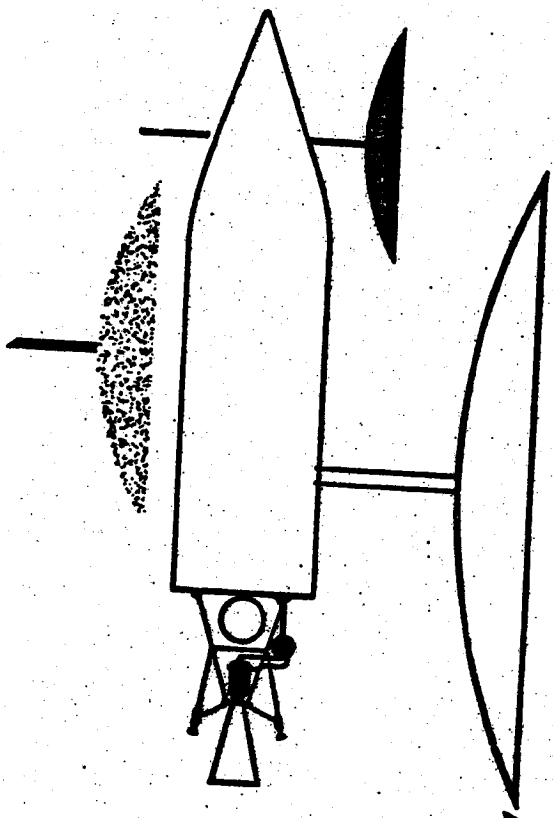

Pied Piper DEVELOPMENT PLAN

VOL. II SUB-SYSTEM PLAN

K. Ground Data Processing

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VAN NUYS, CALIFORNIA

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PIED PIPER DEVELOPMENT PLAN

VOLUME I. SYSTEM PLAN

VOLUME II. SUBSYSTEM PLAN

A. Airframe

B. Propulsion

C. Auxiliary Power

D. Guidance and Control

E. Visual Reconnaissance

F. Electronic Reconnaissance

G. Infrared Reconnaissance

H. Vehicle Electronics

I. Airborne Test Systems

J. Vehicle Intercept and Control Ground Station

K. Ground Data Processing

L. Vehicle Ground Support

CONTENTS

Subsystem K Ground Data Processing

1. PROJECT TITLE	2. SECURITY OF PROJECT	3. PROJECT NUMBER
GROUND DATA PROCESSING SUBSYSTEM FOR ADVANCED RECONNAISSANCE SYSTEM (UNCLASSIFIED) (PIED PIPER)	Secret	1115
	4.	5. REPORT DATE: 1 March 1956

21 c. Continued

the data, as acquired from the satellite, is received by radio-photo, wirephoto or physical delivery by air shipment from the intercept station.

Data processing begins by preparation of the data for delivery to interpretation groups through the combined use of mechanical, photographic, optical, electronic and audio-visual aids as well as a sophisticated storage and recall system.

Limits of performance capabilities can be described only in terms of meeting the demands in rapid delivery of photos, charts, tabulations, or whatever forms in which data becomes useful.

2. a. Visual Reconnaissance Processing

b. Contractors: Lockheed Aircraft Corp., Missile Systems Division
Eastman Kodak Company

c. Early data processing in this area is primarily an extension of the present concept of photo interpretation. The many aids to human interpretation of variform data will include coder-decoders, special purpose computers, sorters, tabulators, and audio-visual aids.

Range and limits of performance capabilities will be measured only in terms of manpower initially, and eventually in the achievement of an optimum ratio of automation to manpower.

3. a. Electronic Reconnaissance Processing

b. Contractor: Lockheed Aircraft Corp., Missile Systems Division

c. Data processing in the area of electronic reconnaissance, which primarily concerns ferret data, offers the inherent advantage of lending itself more directly to automation than photo data. By way of example, "logical" computers are conceived as a means for eliminating the greater part of the redundant information expected.

Training and operational aids will be provided in a pattern parallel to that in the visual program above.

Performance limits will be those which are characteristic of computers and electronic display systems.

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LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION

TABS

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Subsystem K - GROUND DATA PROCESSING

Tab 1 - General Design Specifications

I. GENERAL

A. Statement of the Problem

The basic objective may be stated as a solution to the problem of data handling on such a large scale that machine and manpower demands may rapidly exceed realistic values. It is essential that means be found for minimizing redundancy, for speeding up interpretation of reconnaissance information, and for acquisition of trained intelligence personnel.

B. Approach

The subsystem objective will be approached by providing for three primary functions within the structure of the ARS Intelligence Center (ARSIC). These will be the operation of a Visual Reconnaissance Processing Center, an Electronic Reconnaissance Processing Center, and an Infrared Reconnaissance Center. While these need not have maximum effort capabilities in the early programs, they must arrive at a reasonable degree of sophistication by the time a useful satellite is operational.

The Intelligence Center will be augmented by data pre-screening and relay to the center from Vehicle Intercept Stations and manned from intelligence operations training program. A preliminary concept of units of the ARSIC, and the manning organization, is shown in Figures 1 through 10.

Fig. 1 Photo Interpretation Slow-Scan Pickup Center.

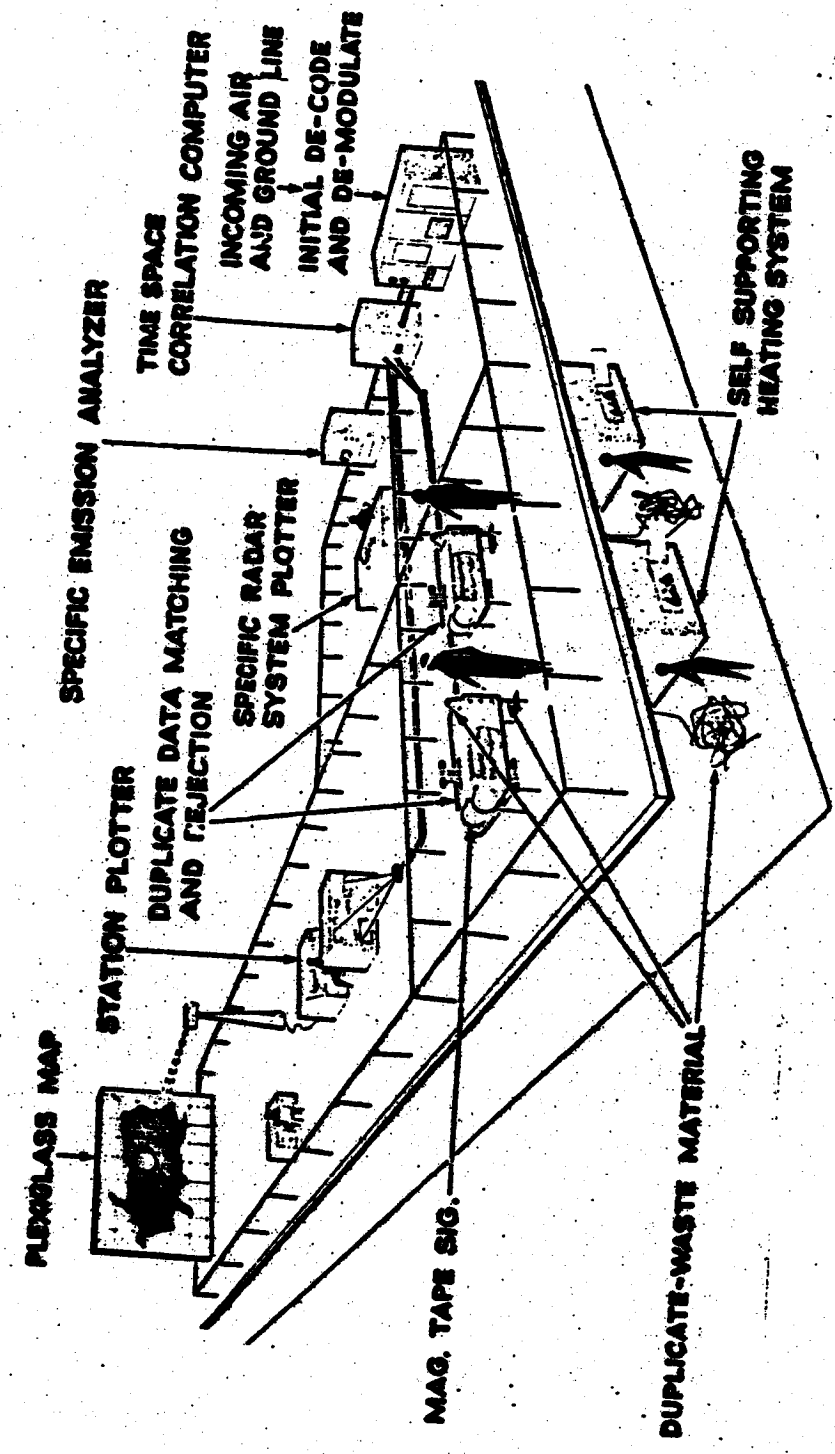

Fig. 3 Electronic Reconnaissance Process Unit

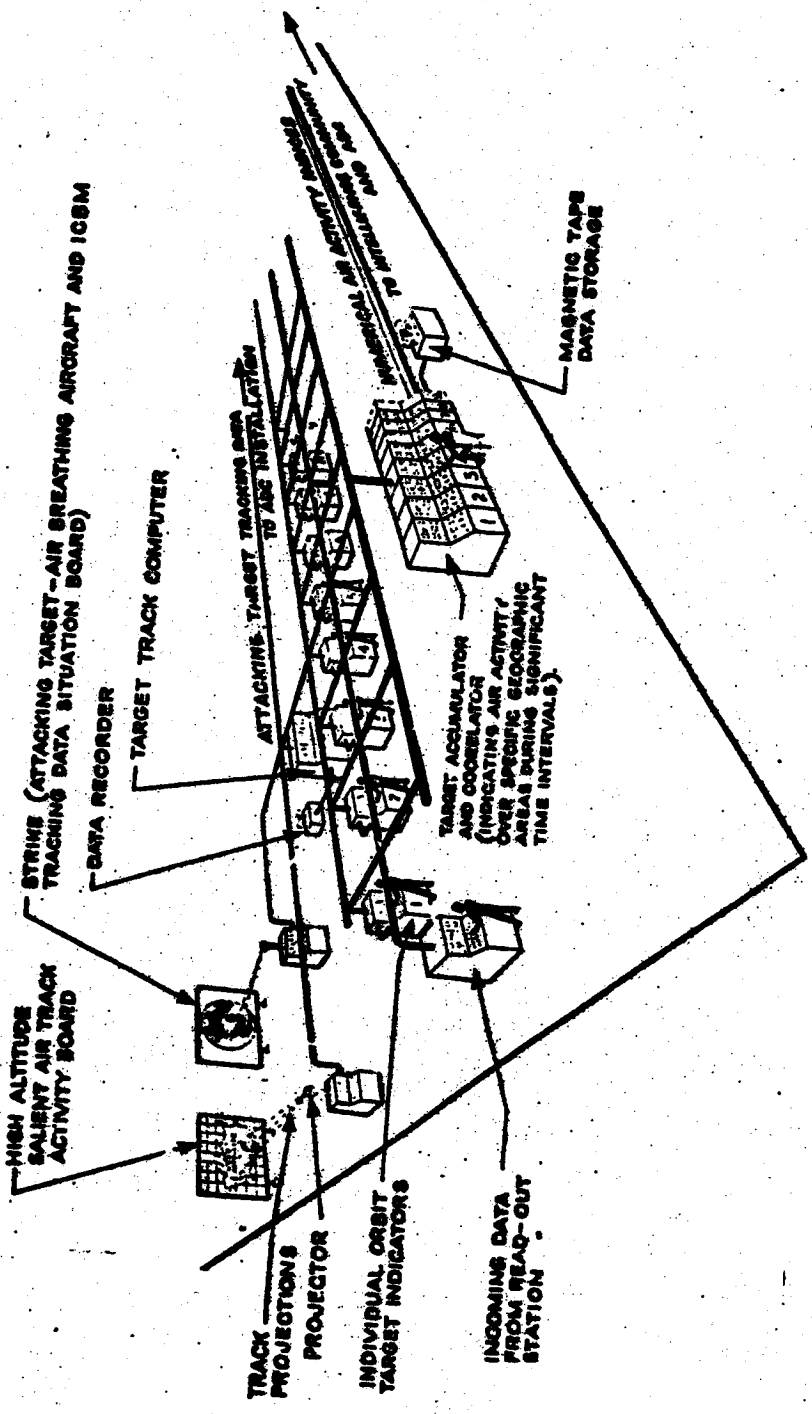

Fig. 4 Infrared Analysis Unit

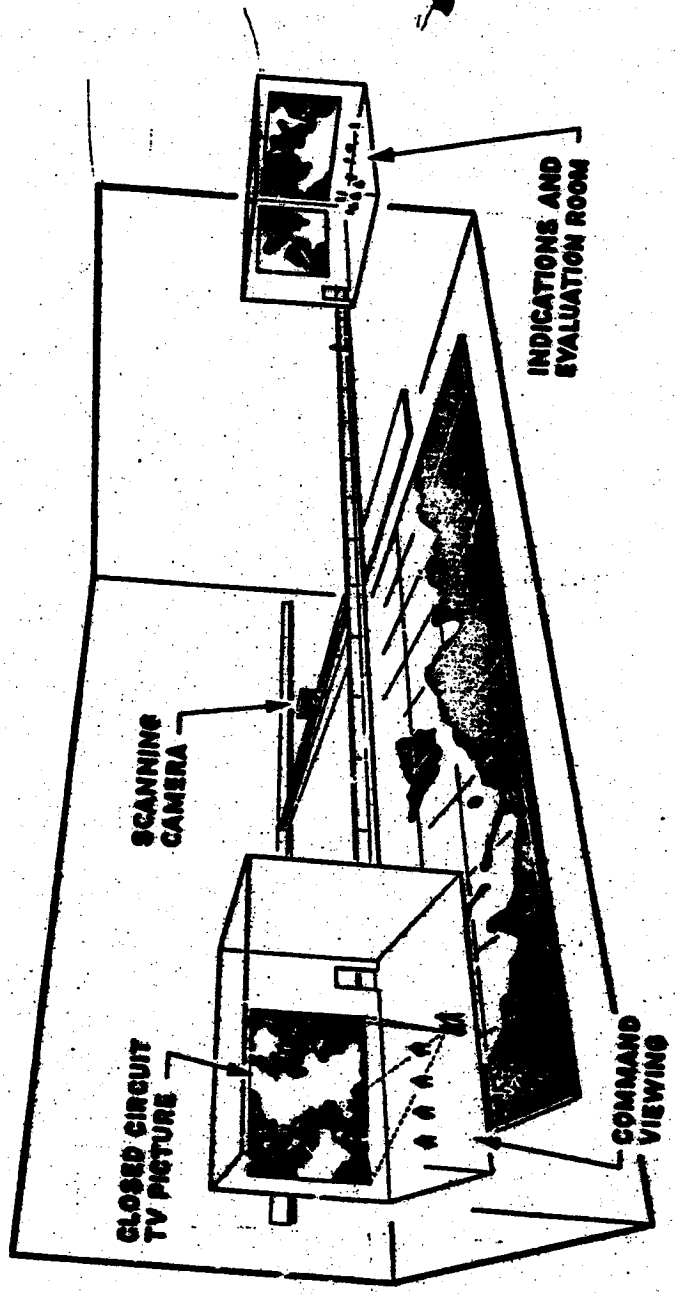

Fig. 5 Master Mosaic Map Builder

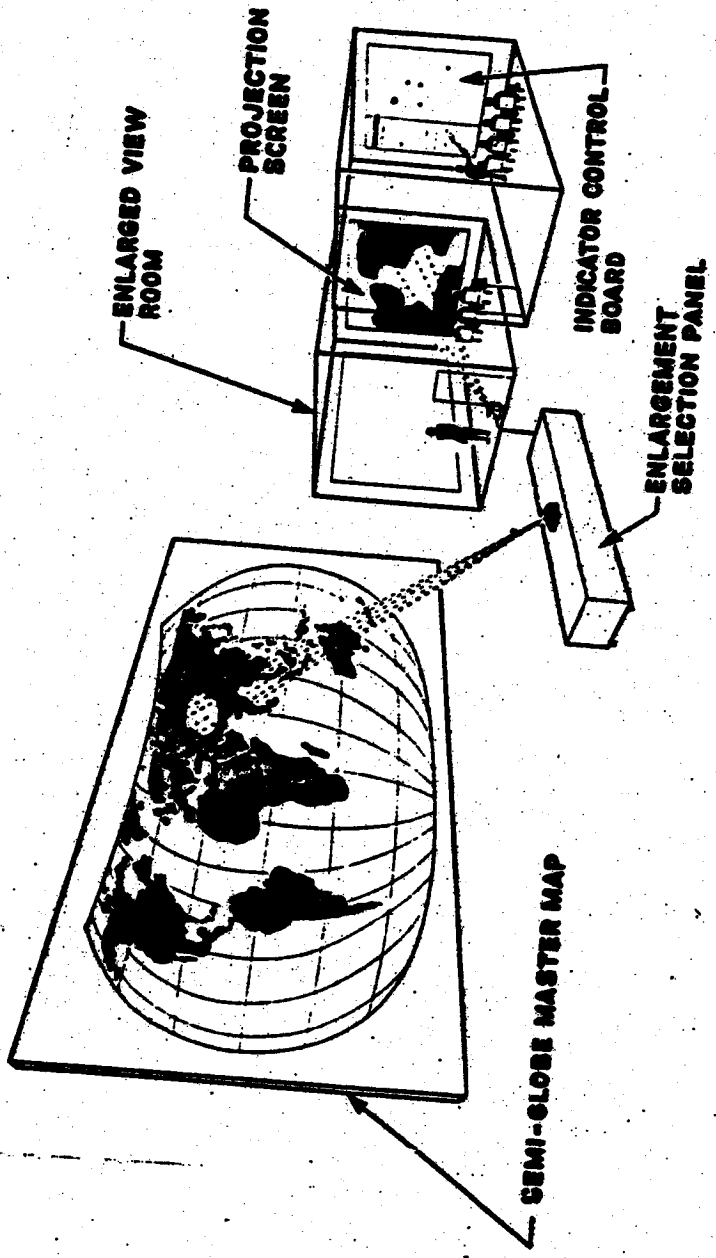

Fig. 6 Command Control and Indication Center

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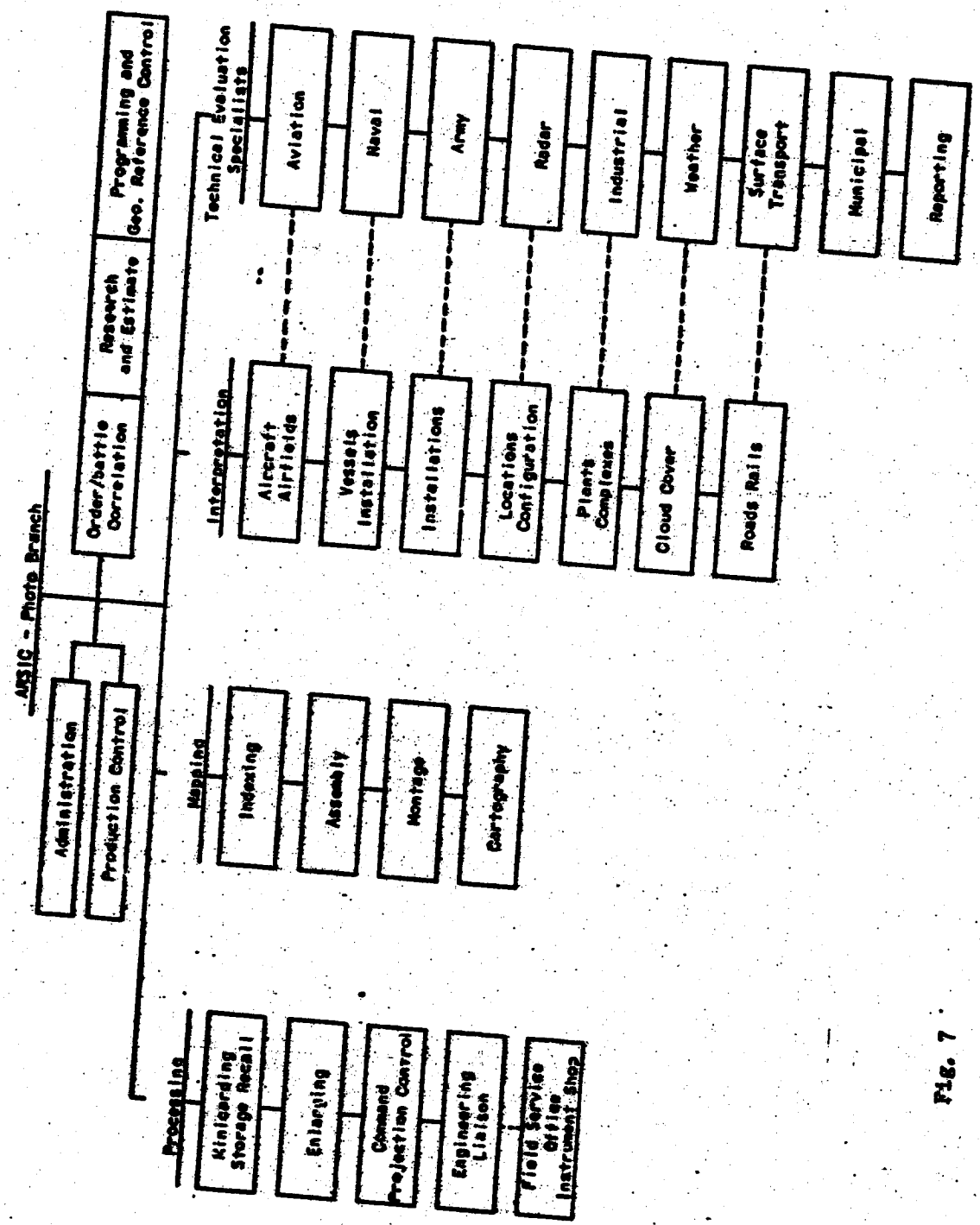
ARSIC - Photo Branch
Programming and Geo. Reference Control
Research and Estimate
Order/battle Correlation
Administration
Production Control
Technical Evaluation Specialists
Aviation
Naval
Army
Radar
Industrial
Weather
Surface Transport
Municipal
Reporting
Interpretation
Aircraft Airfields
Vessels Installation
Installations
Locations Configuration
Plants Complexes
Cloud Cover
Roads Rails
Mapping
Indexing
Assembly
Montage
Cartography
Processing
Klnlgarding Storage Recall
Enlarging
Command Projection Control
Engineering Liaison
Field Service Office Instrument Shop

Fig. 7

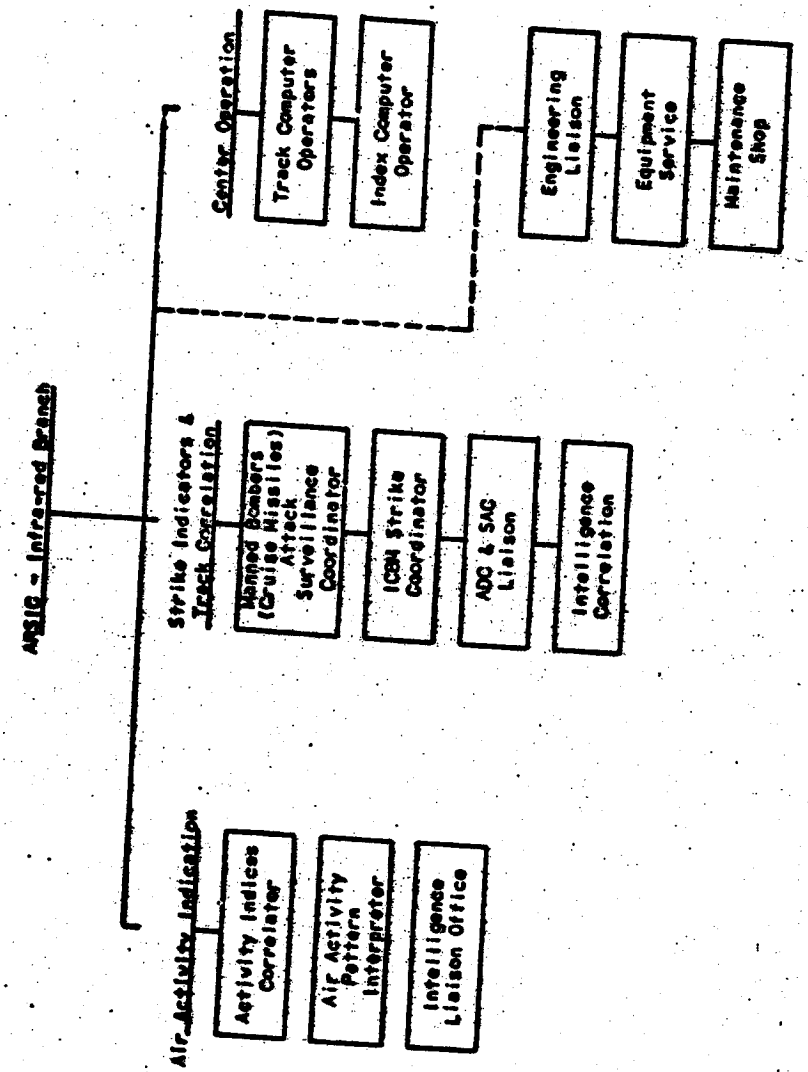
AFSIC - Infrared Branch
Center Operation
Track Computer Operators
Index Computer Operator
Engineering Liaison
Equipment Service
Maintenance Shop
Strike Indicators & Track Correlation
Manned Bombers (Cruise Missiles) Attack Surveillance Coordinator
ICBM Strike Coordinator
ADC & SAC Liaison
Intelligence Correlation
Air Activity Indication
Activity Indices Correlator
Air Activity Pattern Interpreter
Intelligence Liaison Office

Fig. 9

A.R.S. Intelligence Center (ARSIC)
Tech. Liaison USAF Staff, MSD CBS, BMC
Dissemination USAF Command Liaison
Administration
Accounting
Personnel
Offices
Security
I.R. Branch
See chart
Elastr. Branch
See chart
Photo Branch
See chart
Maintenance
Plant Engineering
Installations
Material
Purchasing

Fig. 10

C. Solution or Recommendation

1. Equipment Requirements

While the coordinated effort of the various tasks in this subsystem represent an extension of the principle applied at interpretation centers, much of the equipment must materialize through development programs.

a. In the Data Prescreening and Relay task of this subsystem the ground vehicle-intercept will perform its main function of duplicating and relaying the data acquired from the satellite. Injected into this operation will be the secondary action of index printing under the command of a Geo-Reference Index Computer to facilitate establishing identity of a given photo with its geographical coordinates. It thus becomes feasible to fill requests for monitoring particular areas and commanding immediate viewing of them at the center via the Slow Scan Transmission Channel discussed in the Appendix. This facility will not be called upon to make decisions beyond those required to recognize proper functioning and correct fulfillment of requests.

b. Visual Reconnaissance Processing will employ equipment such as Video Signal Receivers, Kine-recorders, Geo-Reference Index Computers, Slow Scan viewers, photo duplicators, command projection equipment, as well as a Minicard storage and recall system. The operational function will be the conversion of incoming data into variform presentations for assimilation by the interpretation groups.

Early Training Schedules may employ breadboard types of newly developed equipment and easily simulated raw data acquisition.

c. Electronic Reconnaissance Processing will employ more of the computer type of equipment to accomplish sorting out, redundancy rejection and other functions on a semi-automatic basis at least until development work brings it to higher degrees of sophistication.

Data processing by such means will result in displays of the radar-plot type, tabulations and other aids to correlative interpretation.

The extent of electronic components employed will result in greater needs for trouble-shooting technicians than for operating trainees in these areas.

d. Infrared Reconnaissance Processing will be a more complete example of applied automation. Its general character will be somewhat similar to that of Electronic Reconnaissance Processing with an even higher ratio of electronic trouble shooters to operating personnel. Interpretation of infrared data is basically much simpler than handling data derived from other media.

Training programs in this area should be correspondingly less difficult and will be On-Job-Trained and include OJT personnel.

2. State of the Art

Nearly all aspects of this subsystem may be considered within the state of the art, in spite of the development programs required to produce the specialized types of computers envisioned. Much of the equipment employed both as interpretation aids and training aids will be acquired as modifications of generally available items.

The unusual aspects of the subsystem hinge entirely on the number of people involved and the magnitude of the training problem.

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Subsystem K - GROUND DATA PROCESSING

Tab 2 Summary - Subsystem Milestones

	CY 56				CY 57				CY 58				CY 59			
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1 Visual Data Acquisition for Processing from PTV																								
1 First Electronic Data Acquisition for Processing from PTV																								
1 Preliminary Visual Data Acquisition for Processing from STV																								
11 First Useful Visual Data for Processing from OPV																								
11 Electronic Data Acquisition for Processing from PTV																								
11 Utilization of ARSIC																								
11 ARSIC Operational Activation																								
11 Processing Develop. Begins-Photo Electronic																								
11 Processing Develop. Begins-I-R																								
11 Establish Training Syllabus																								
11 Begin Operator Training																								
11 First Graduates(re-assigned within program) Photo																								
11 Electronic																								
11 Automatic Rejection (Redundant Data) Electronic																								
11 Photo																								
11 Storage & Recall Capability for all Data Types																								

Revised Form 103

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Subsystem K - GROUND DATA PROCESSING

Tab 2 Summary - Subsystem Milestones (Continued)

CY 60 | FY | CY | FY | CY | FY | CY

1. Automatic Rejection (Redundant Data)
   - Electronic
   - Photo

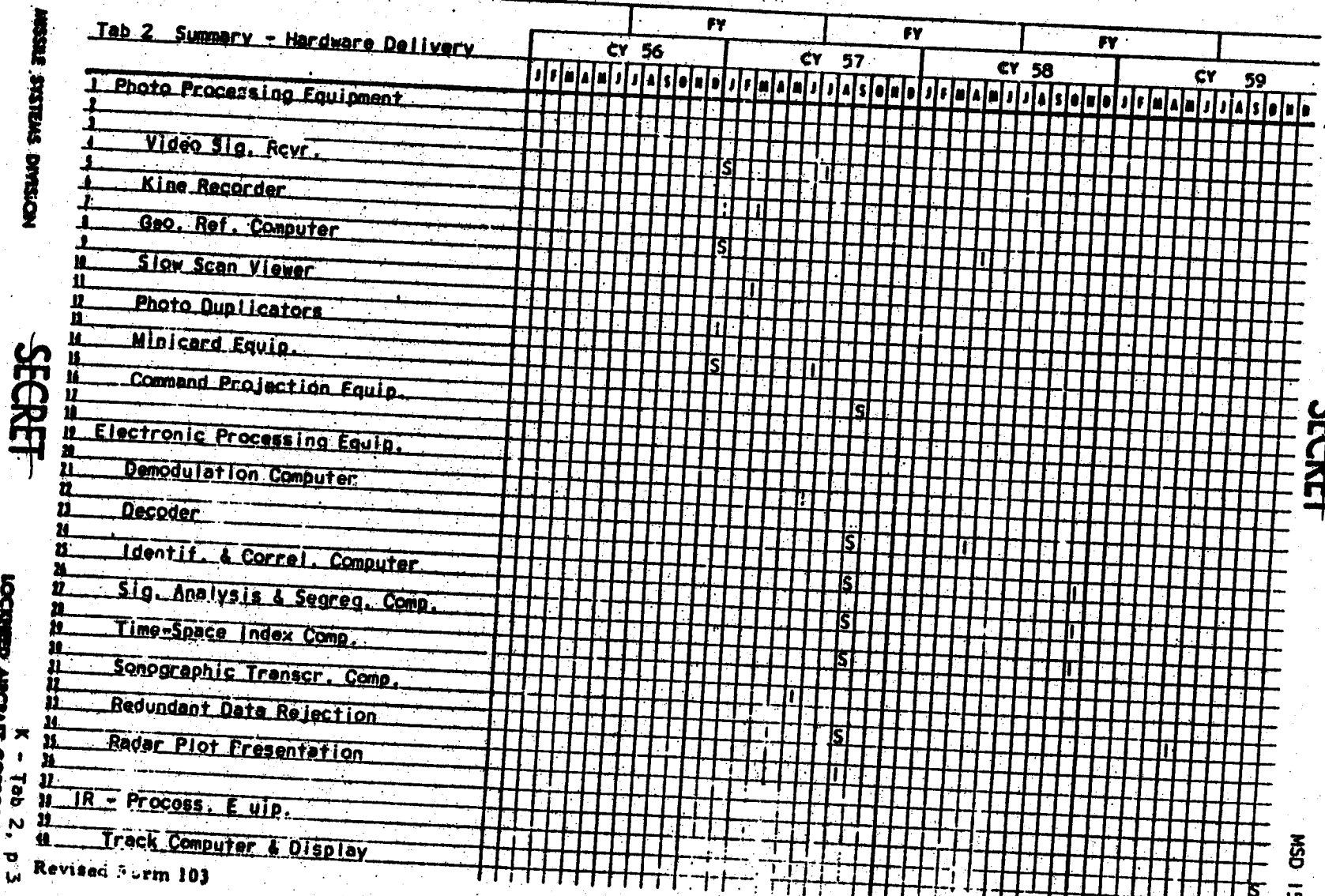
MISSILE SYSTEMS DIVISION

LOCKHEED AIRCRAFT CORPORATION

Revised Form 103

Subsystem K - GROUND DATA PROCESSING

Tab 2 Summary - Hardware Delivery



S = Simulators, developed and del'd as training aids.

ARSIC Operational

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