DEVELOPMENT OF TARGET MODEL FOR THE DORIAN SYSTEM

24 July 69

THE ATTACHED DATA REVISES CERTAIN CHARTS AND CONTAINS DATA DERIVED SINCE PUBLICATION OF THE STUDY

R.J Ruddle
MAT

FREQUENCY REQUIREMENTS SPECIFIED FOR AIMING POINTS IN SAMPLE

CATEGORY CODE & DESCRIPTION	NR. OF AIM. PTS.	FREQUENCY BW	W	M	Q	SA	A
1. Guided Missiles							
A. ICBM Deployment	168						
B. IRBM and MRBM	71						
C. Research & Development (inc. space)	46						
D. Production Facilities (inc. test)	26						
E. Suspect Missile	8						
G. Naval Launched Missiles	47						
H. Anti-Missile Missile	32						
I. SAM Sites	33						
J. Short Range SSM	10						
K. Missile Support/Storage Areas	18						
L. SAM Training Complexes	9						
Sub-Total	468						
2. Aircraft							
A. Long Range Bases	79						
B. Production Facilities (inc. R&D)	41						
C. Airfields	327						
Sub-Total	447						
3. Nuclear Energy							
A. Test Area	20						
B. Production	31						
C. Stockpiles	12						
D. Research Institutes	6						
E. Suspect Activity	3						
Sub-Total	72						
4. Naval Activity							
A. Operating Bases	27						
B. Production Yards	8						
C. Commercial Ports	13						
D. Locks & Canals	3						
Sub-Total	51						

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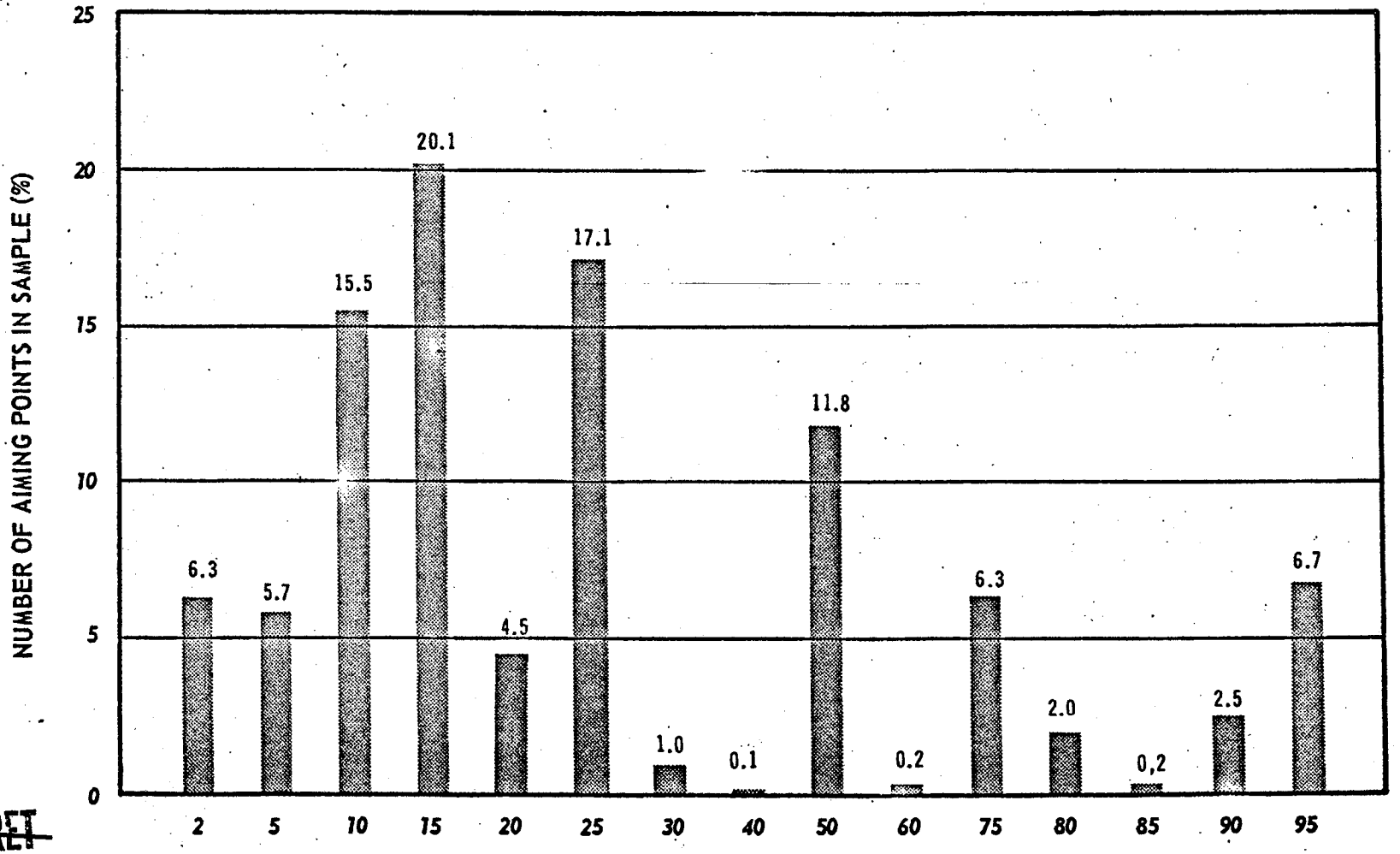
CATEGORY CODE & DESCRIPTION	NR. OF AIM. PTS.	FREQUENCY BW	W	M	Q	SA	A
5. Biological/Chemical Warfare							
A. BW/CW Test Areas	10						
B. Production	10						
C. Storage	14						
D. Research Institutes							
E. Suspect Activity	5						
Sub-Total	39						
6. Electronics							
A. Missile Tracking Facilities	19						
B. Electronics, General	39						
Sub-Total	58						
7. Military							
A. Military Installations	422						
B. Special Area	3						
C. (Unspecified)	2						
D. Landing Beaches	2						
G. Tactical SSM Support Facilities							
Sub-Total	429						
8. Urban/Industrial							
A. Complexes	16						
B. Industrial Plants	23						
Sub-Total	39						
9. Other							
A. Unidentified Installations	34						
TOTAL (NR.)	1637						
(%)							

PROBABILITY OF INTELLIGENCE ENHANCEMENT IF ACTIVITY OCCURS AT AIMING POINT



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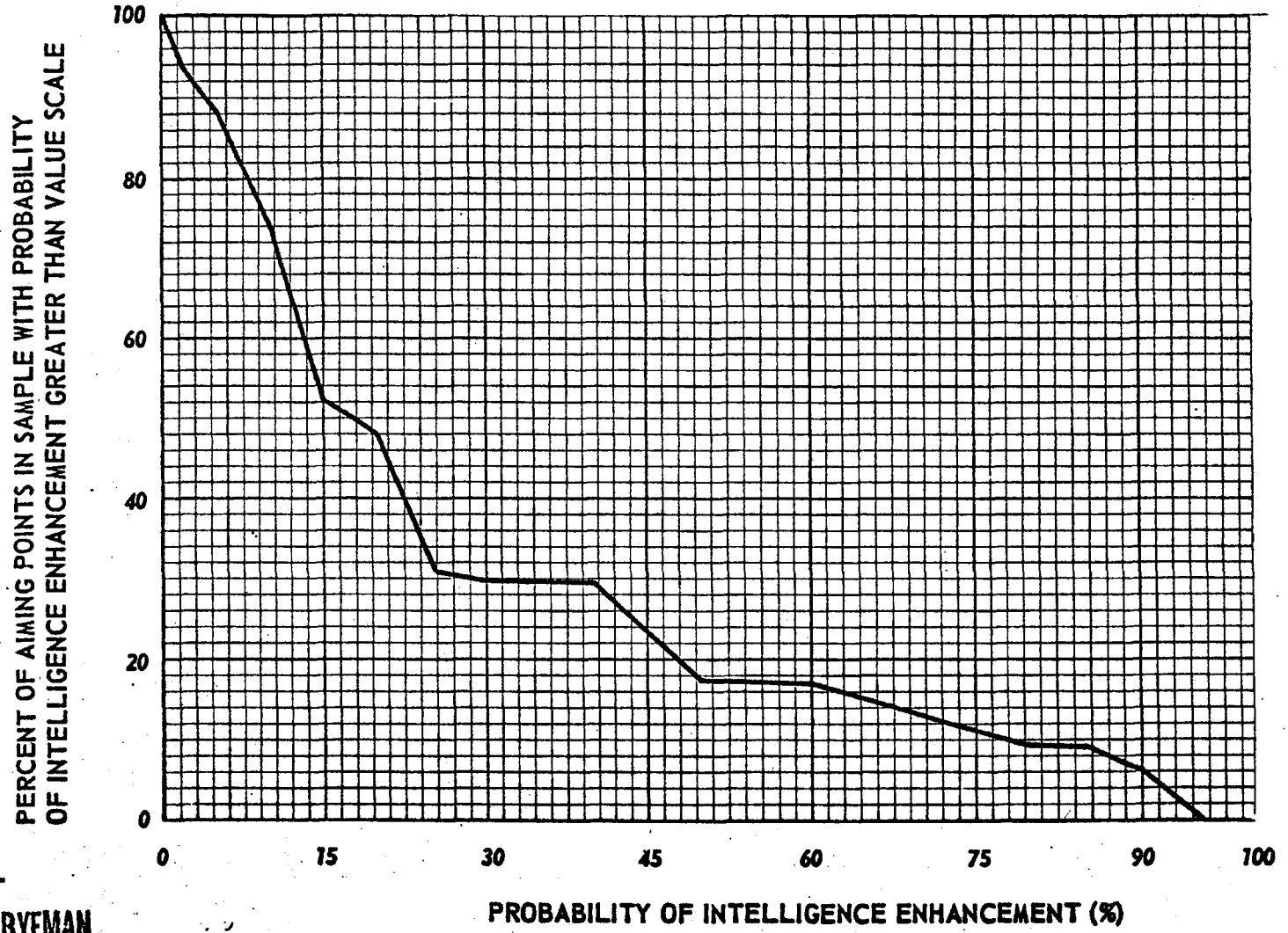
PROBABILITY OF INTELLIGENCE ENHANCEMENT IF ACTIVITY OCCURS AT AIMING POINTS



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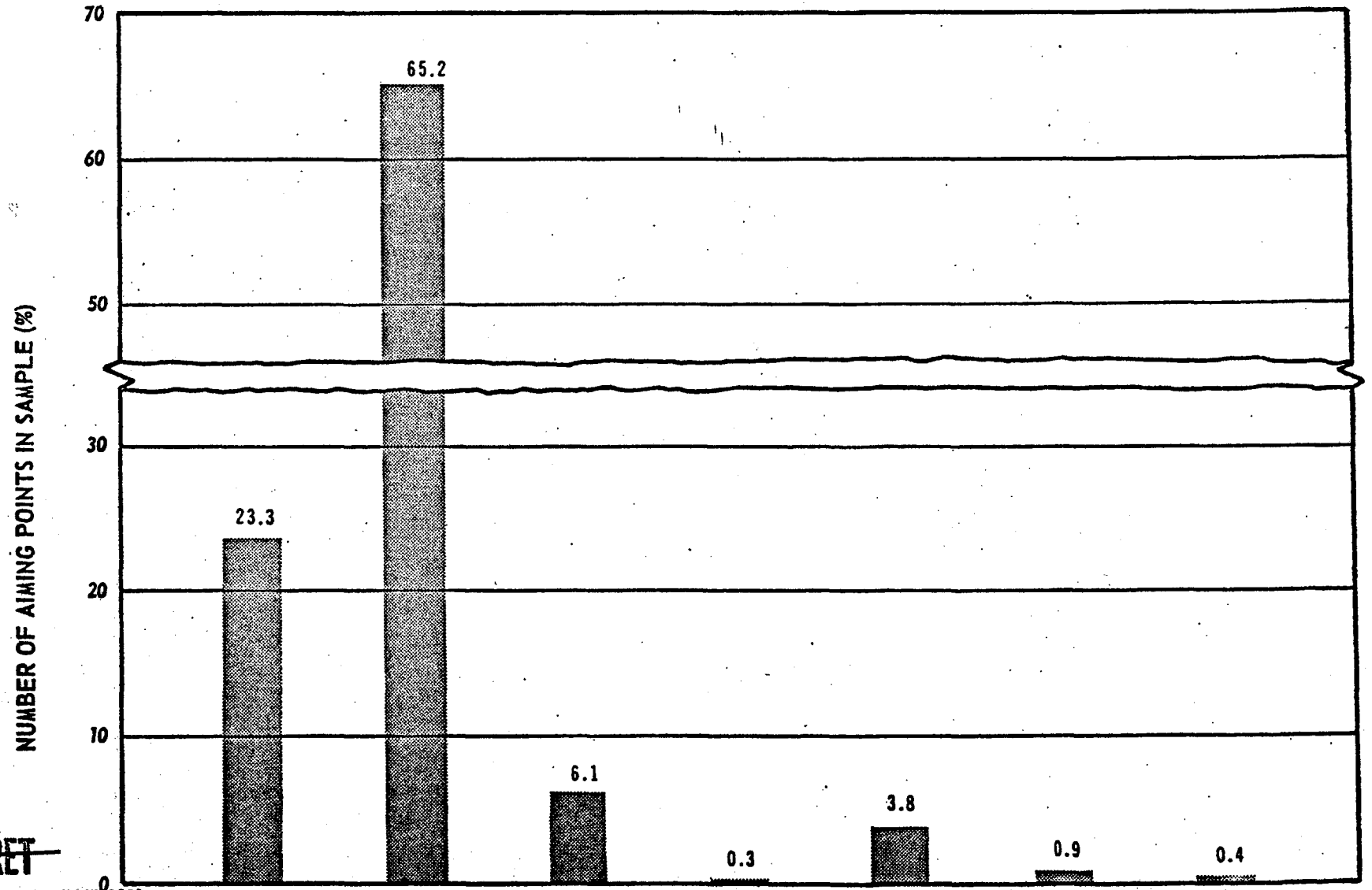
PROBABILITY OF ACTIVITY AT AIMING POINTS



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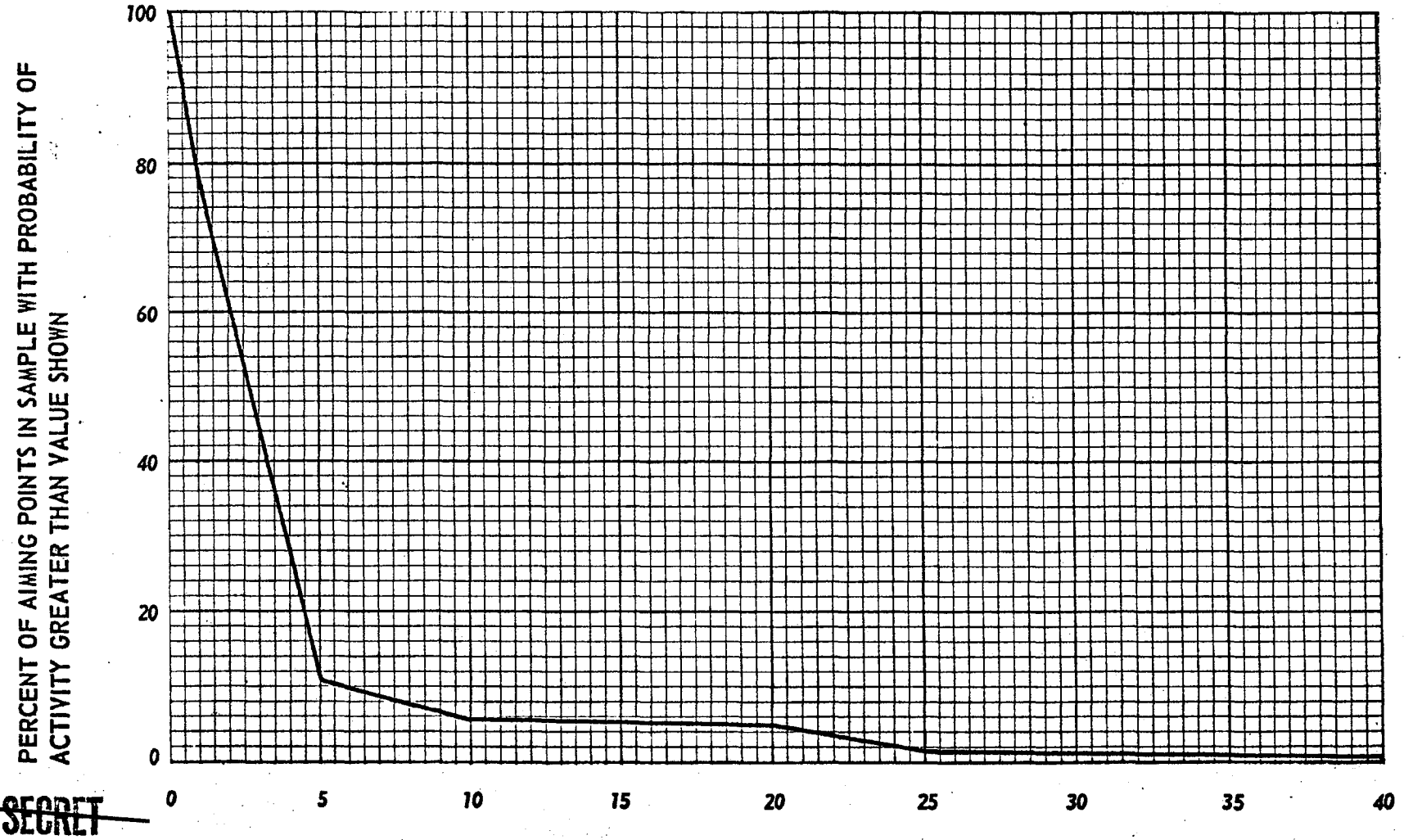
PROBABILITY OF ACTIVITY AT AIMING POINTS



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DISTRIBUTION OF INSTALLATIONS AND AIMING POINTS IN SAMPLE BY CATEGORIES

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	NR. OF AIM. PTS.	AIM. PTS. PER INSTALL.
1. Guided Missiles			
A. ICBM Deployment	75	168	2.2
B. IRBM and MRBM	27	71	2.6
C. Research & Development (inc. space)	19	46	2.4
D. Production Facilities (inc. test)	9	26	2.9
E. Suspect Missile	6	8	1.3
G. Naval Launched Missiles	13	47	3.6
H. Anti-Missile Missile	8	32	4.0
I. SAM Sites	26	33	1.3
J. Short Range SSM	7	10	1.4
K. Missile Support/Storage Areas	7	18	2.6
L. SAM Training Complexes	3	9	3.0
Sub-total	200	468	2.3
2. Aircraft			
A. Long Range Bases	12	79	6.6
B. Production Facilities (inc. R&D)	10	41	4.1
C. Airfields	70	327	4.7
Sub-Total	92	447	4.9
3. Nuclear Energy			
A. Test Area	9	20	2.2
B. Production	8	31	3.9
C. Stockpiles	3	12	4.0
D. Research Institutes	2	6	3.0
E. Suspect Activity	3	3	1.0
Sub-Total	25	72	2.9
4. Naval Activity			
A. Operating Bases	10	27	2.7
B. Production Yards	2	8	4.0
C. Commercial Ports	4	13	3.2
D. Locks & Canals	1	3	3.0
Sub-Total	17	51	3.0

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CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	NR. OF AIM. PTS.	AIM. PTS. PER INSTALL.
5. Biological/Chemical Warfare			
A. BW/CW Test Areas	3	10	3.3
B. Production	3	10	3.3
C. Storage	7	14	2.0
D. Research Institutes	0	0	-
E. Suspect Activity	3	5	1.7
Sub-Total	16	39	2.4
6. Electronics			
A. Missile Tracking Facilities	9	19	2.1
B. Electronics, General	31	39	1.3
Sub-Total	40	58	1.4
7. Military			
A. Military Installations	188	422	2.2
B. Special Area	3	3	1.0
C. (Unspecified)	2	2	1.0
D. Landing Beaches	1	2	2.0
G. Tactical SSM Support Facilities	0	0	-
Sub-Total	194	429	2.2
8. Urban/Industrial			
A. Complexes	9	16	1.8
B. Industrial Plants	10	23	2.3
Sub-Total	19	39	2.0
9. Other			
A. Unidentified Installations	5	34	6.7
Total	608	1637	2.7

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DISTRIBUTION OF INSTALLATIONS IN BASIC DECK BY COUNTRY CODES AND PRIORITIES

COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
AG	[redacted]									
AL										
BU										
CH										
CU										
CZ										
EG										
FR										
GE										
HU										
ID										
IN										
IQ										
[redacted]										
KN										
MG										
MZ										
PK										

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COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
PO	[redacted]									
RU										
RZ										
SA										
SY										
TI										
UR										
VN										
YE										

TOTAL 04654

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DISTRIBUTION OF INSTALLATIONS IN SAMPLE BY COUNTRY CODES AND PRIORITIES

COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
AG	[redacted]									
AL										
BU										
CH										
CU										
CZ										
EG										
FR										
GE										
HU										
ID										
IN										
IQ										
[redacted]										
KN										
MZ										
PO										
RU										
SY										

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COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
TI	[redacted]									
UR										
VN										
YE										
TOTAL 00608										

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DISTRIBUTION OF AIMING POINTS IN SAMPLE BY COUNTRY CODES AND PRIORITIES

COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
AG	[redacted]									
AL										
BU										
CH										
CU										
CZ										
EG										
FR										
GE										
HU										
ID										
IN										
IQ										
[redacted]										
KN										
MZ										
PO										
RU										

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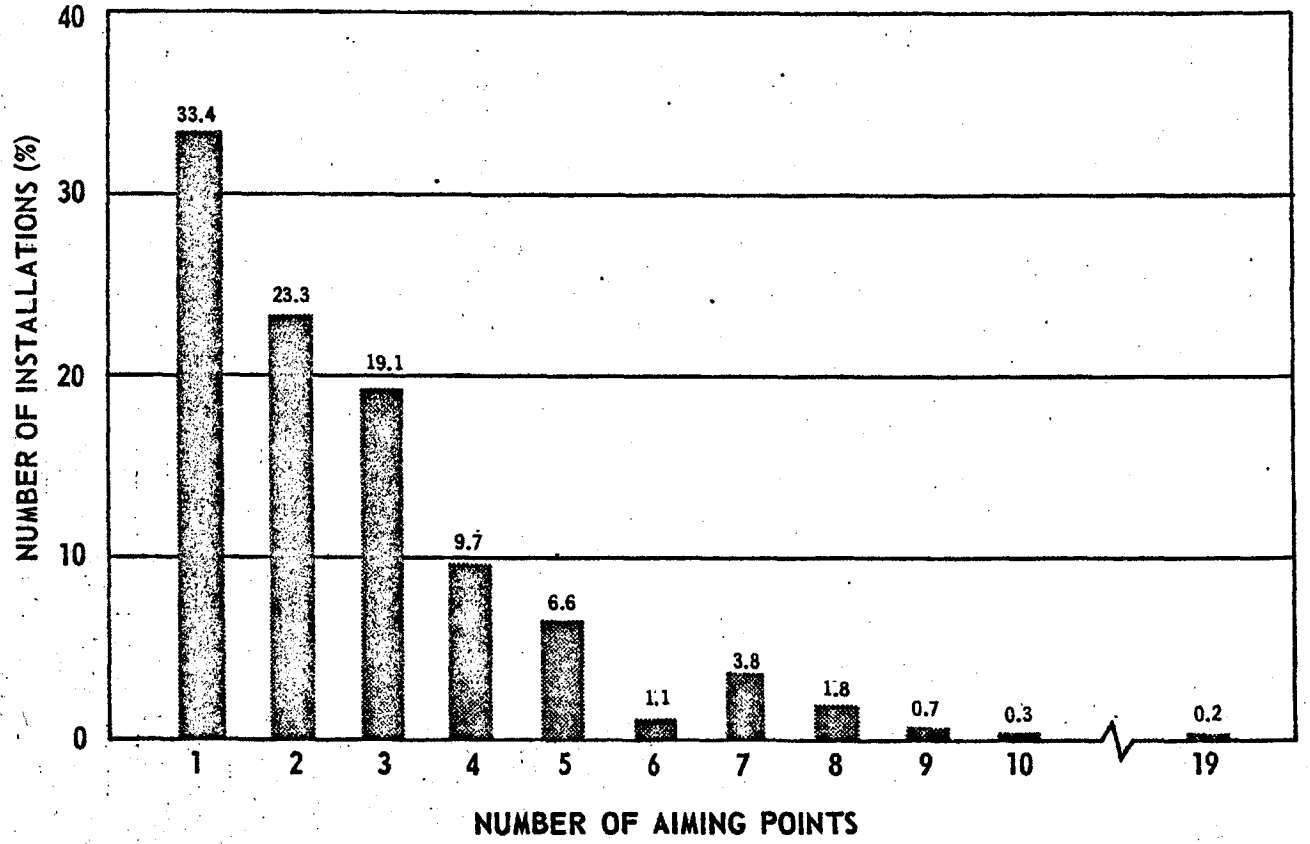
COUNTRY CODE	PRI 0	PRI 1	PRI 2	PRI 3	PRI 4	PRI 5	PRI 6	PRI 7	PRI 8	PRI 9
SY	[redacted]									
TI										
UR										
VN										
YE										
TOTAL 01637										

DISTRIBUTION OF AIMING POINTS PER INSTALLATION IN SAMPLE



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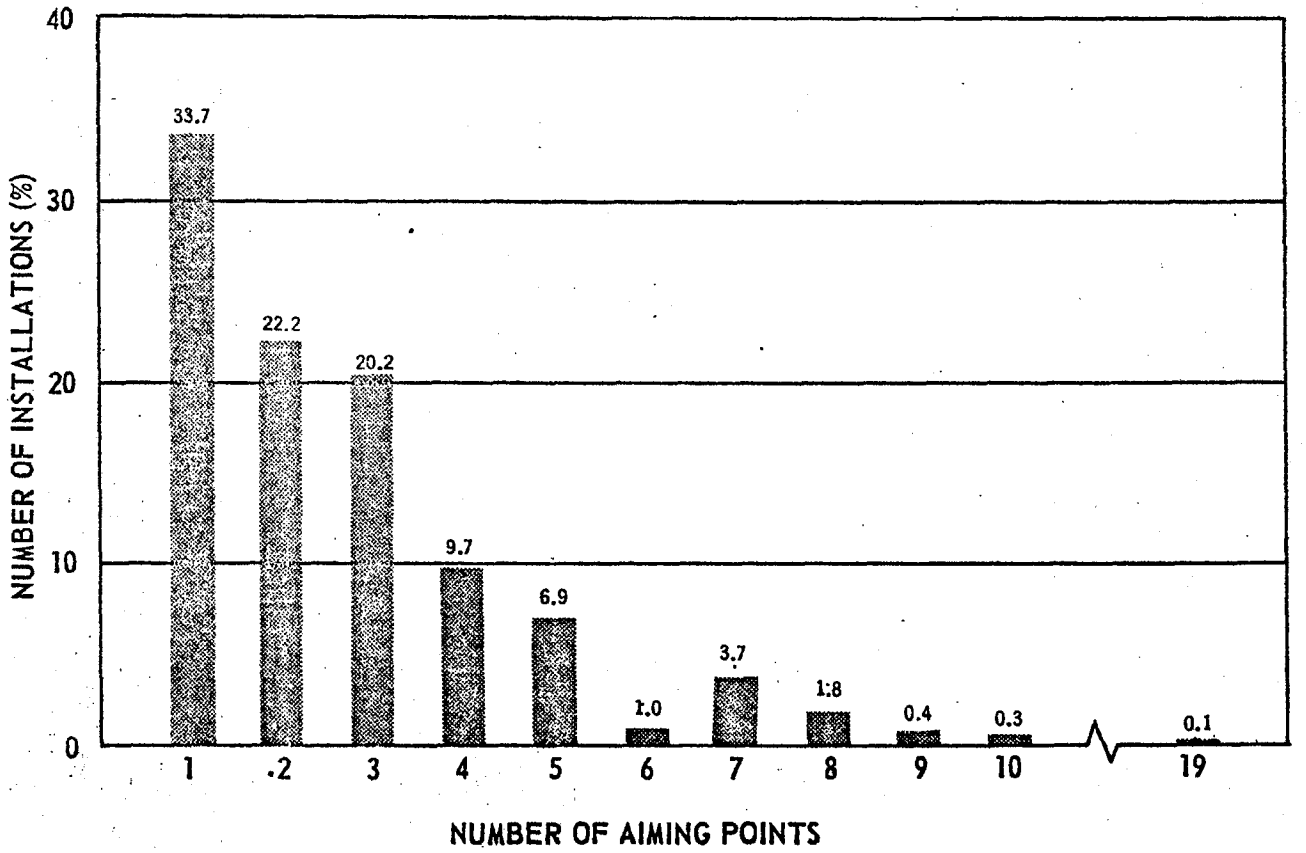
DISTRIBUTION OF AIMING POINTS PER INSTALLATION IN TOTAL DECK



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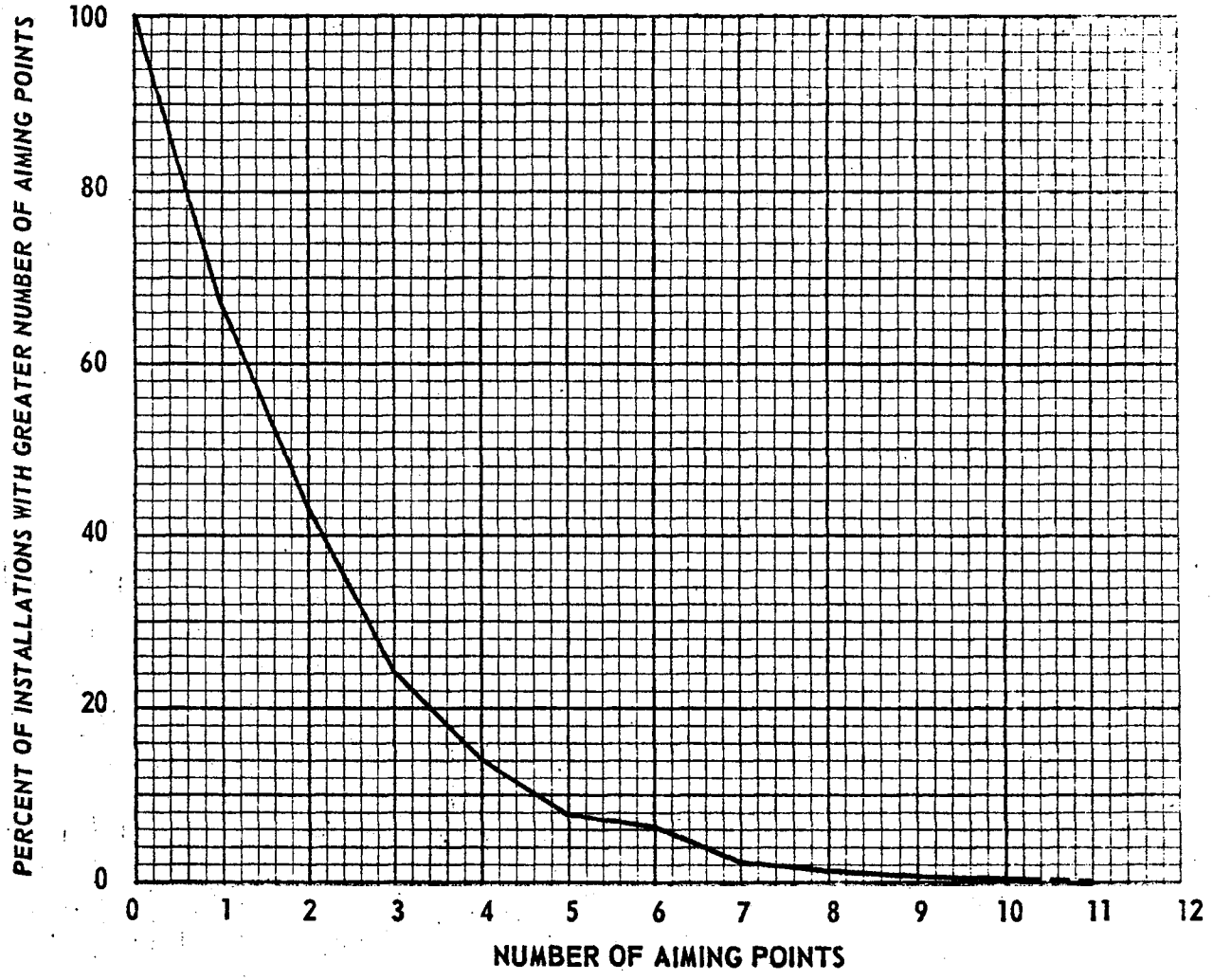
DISTRIBUTION OF AIMING POINTS PER INSTALLATION



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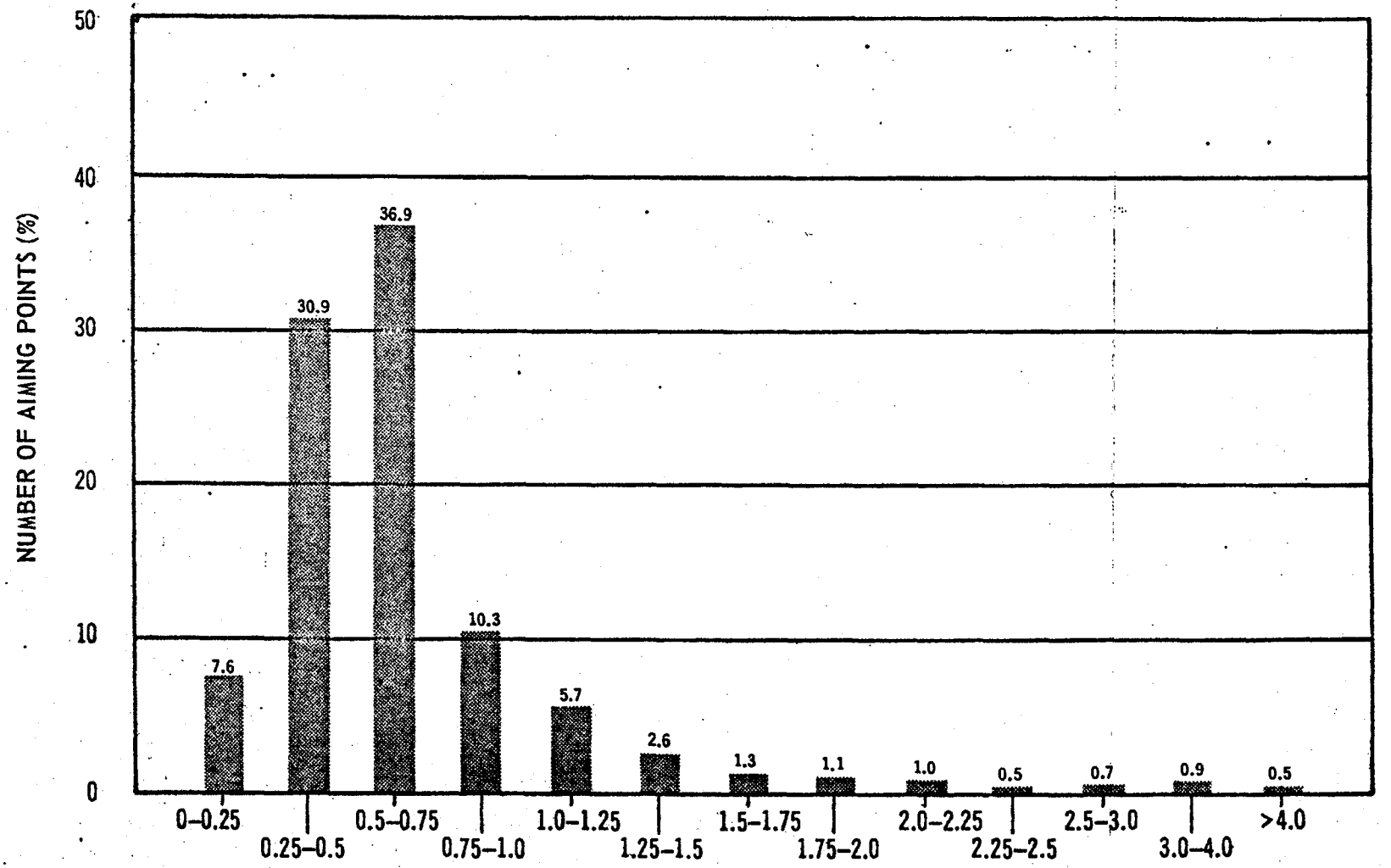
DISTANCE OF AIMING POINTS IN SAMPLE FROM CENTER OF INSTALLATION



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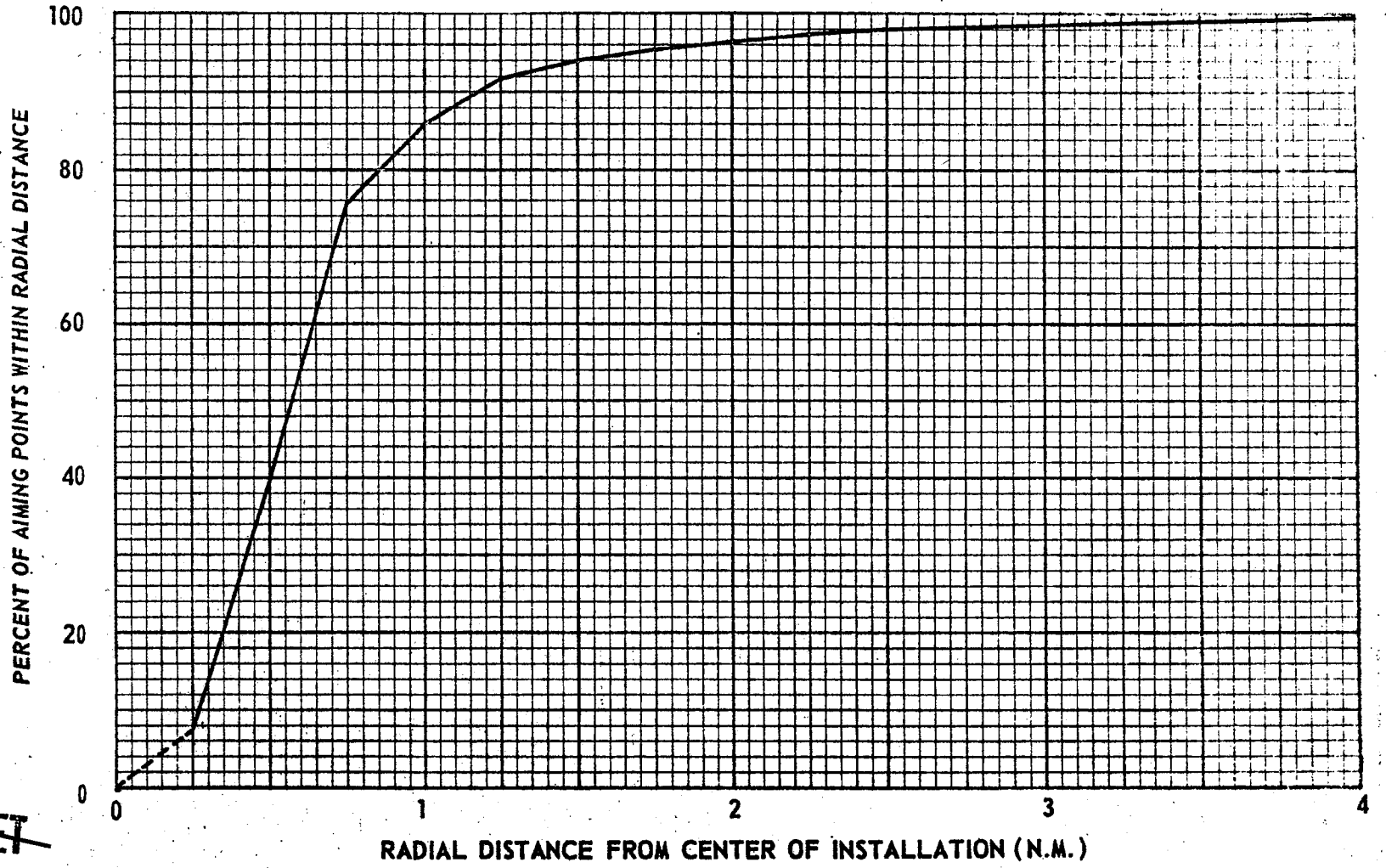
DISTANCE OF AIMING POINTS IN SAMPLE FROM CENTER OF INSTALLATION



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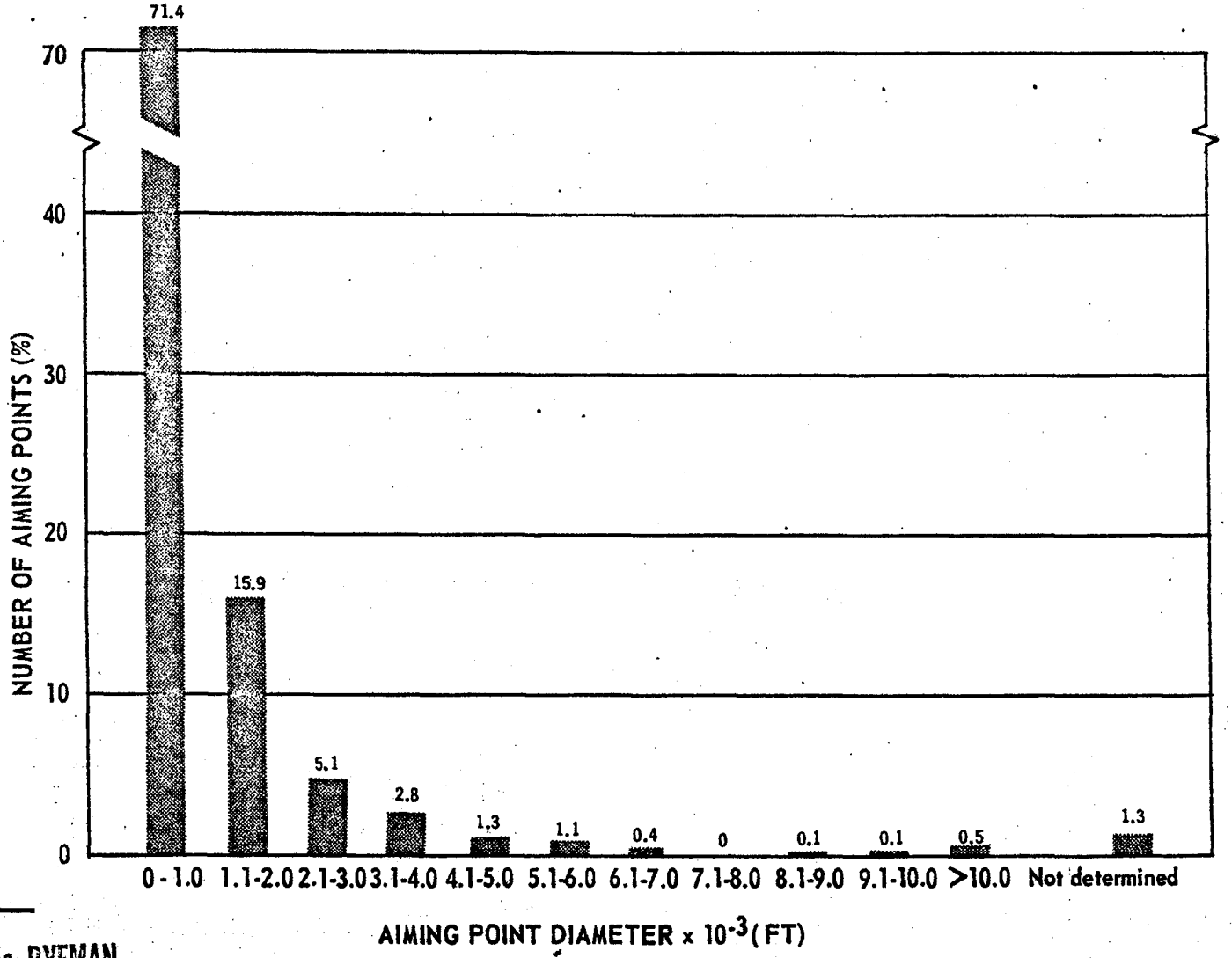
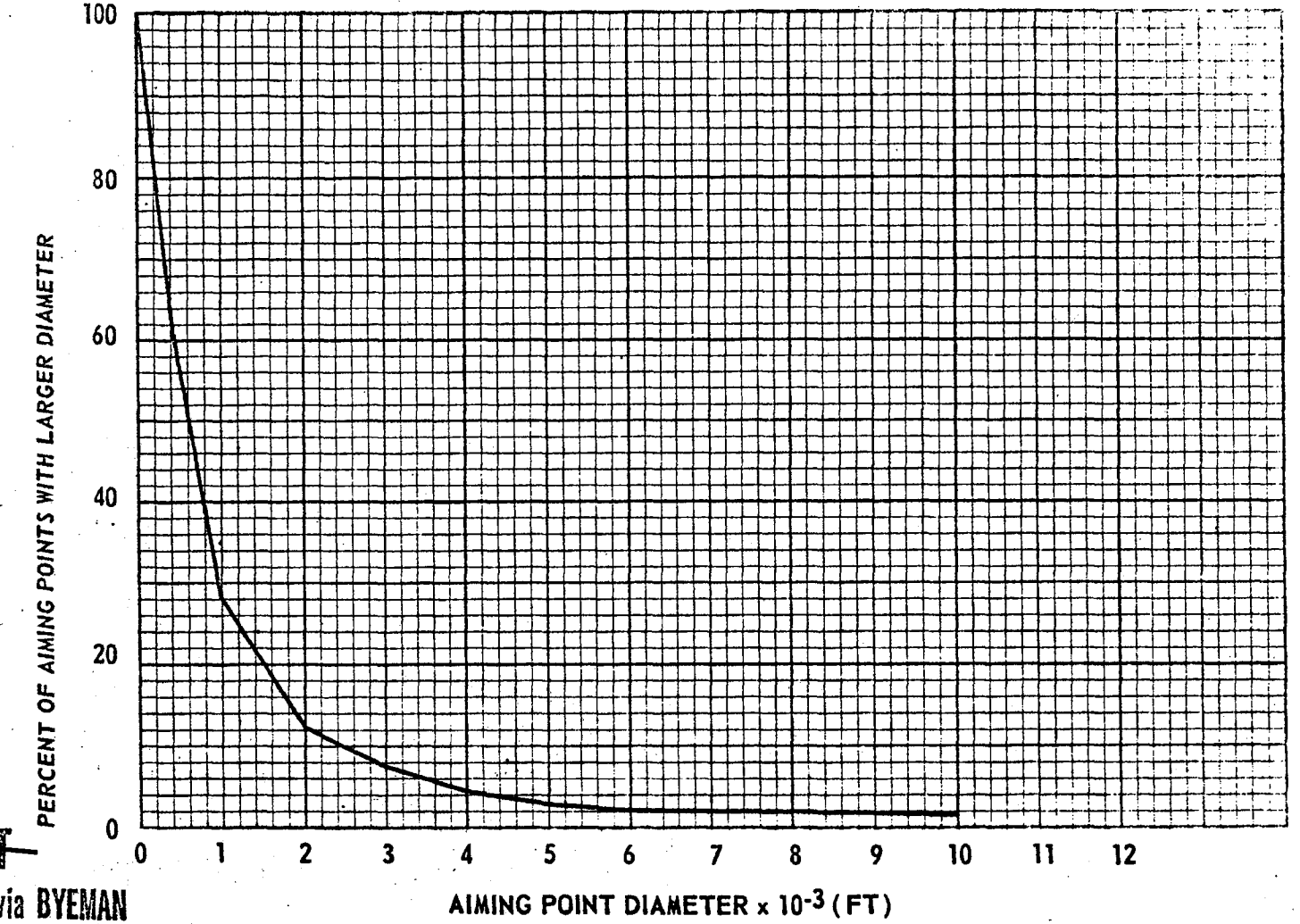
DISTRIBUTION OF AIMING POINT DIAMETER IN SAMPLE



DISTRIBUTION OF AIMING POINT DIAMETER IN SAMPLE



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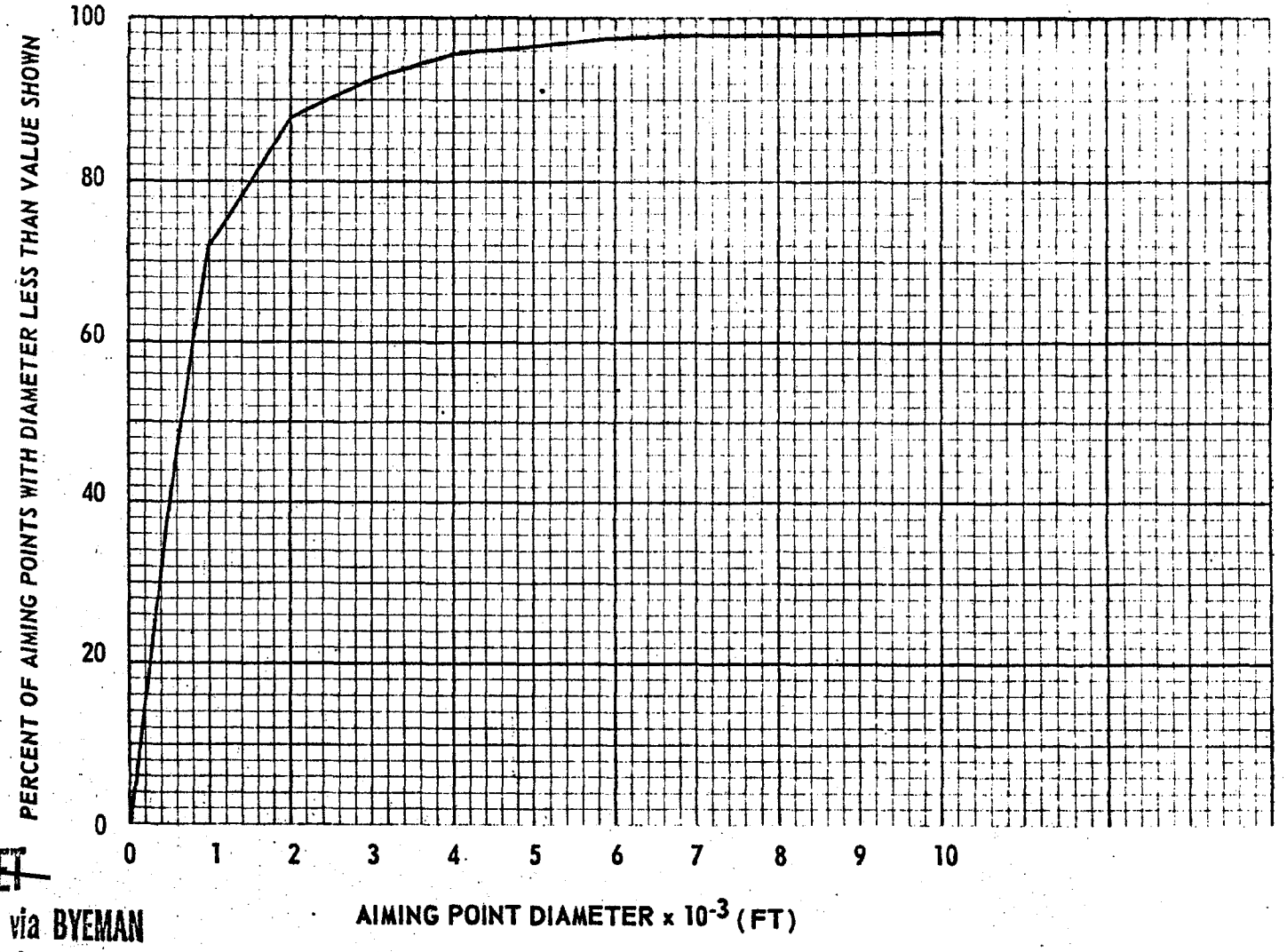
DISTRIBUTION OF AIMING POINT DIAMETERS IN SAMPLE



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DEVELOPMENT OF
A TARGET MODEL
FOR THE DORIAN SYSTEM

30 September 1968

CONTENTS

PREFACE

This report presents a history of the efforts undertaken to develop a target model for the DORIAN system and describes some of the data resulting from these efforts. It has been prepared by the Satellite Operations Center, National Reconnaissance Office, to provide information which may be needed to use the model or properly interpret the data. The development of the target model represents a high degree of initial agreement on goals, continued planning and working relationships among the National Reconnaissance Office and the U.S. Air Force agencies. Lieutenant Colonel Daniel Lycan, USA, initiated and sponsored the management actions leading to the development of the DORIAN target model.

Edwin F. Sweeney

EDWIN F. SWEENEY
Colonel, USAF
Deputy Director for
Satellite Operations

LIST OF TABS

DEVELOPMENT OF A TARGET MODEL FOR THE DORIAN SYSTEM

I. INTRODUCTION.

The purpose of the development of a target model for the DORIAN system was to obtain a realistic, comprehensive model of the MOL reconnaissance missions. The unique system capabilities, including those contributions which can be made by man, required information that was not available in current target lists. This report describes the requirement for a target model, the overall approach used, the sampling technique, the procedure followed in researching and recording data, and discusses the results of preliminary statistical analyses made to date. More detailed analyses will be completed in the near future, and the results will be covered in a subsequent report.

The following organizations have participated in this development effort:

MOL Program Office, Office, Secretary of the Air Force

MOL System Office, Office, Secretary of the Air Force

Office of the Assistant Chief of Staff, Intelligence,

Headquarters, USAF

544th Aerospace Reconnaissance Technical Wing,

Headquarters, SAC

Foreign Technology Division, Air Force Systems

Command

During the development, continuing progress reports have been made to various groups of the Committee on Imagery Requirements and Exploitation (COMIREX) (formerly Committee on Overhead Reconnaissance (COMOR), United States Intelligence Board, for review and comments.

II. TARGET MODEL REQUIREMENTS.

The MOL/DORIAN system is being developed to provide many new and unique capabilities for the collection of intelligence data by a photographic reconnaissance satellite. Some of these capabilities will result from equipment designs and others will result from the utilization of man in the space reconnaissance mission. The system is being designed to provide photographic resolutions of [redacted] a circular photograph covering a ground scene 9100 feet in diameter at

nadir. The tracking mirror has a continuous pitching capability which can provide line of sight coverage between the hardware limitations of + 30 degrees and — 40 degrees. The on-board astronauts increase system capabilities and reliability by providing backup or refinement of the automatic focus control and automatic alignment necessary for the high resolution photography. An important addition to the collection capability of the system is provided by the ability of the astronauts to view targets through a telescope to determine if programmed targets are obscured by weather or if alternate targets have more intelligence value and should be photographed instead of the programmed targets. The astronauts can also provide visual intelligence reports if photography is not needed to satisfy the intelligence requirements. The system will include a secondary camera platen which can be loaded with special types of film such as color, IR or high-speed black and white, or with black and white film which can be developed and evaluated on-orbit by the astronauts.

These capabilities of the MOL/DORIAN system can only be employed efficiently if requirements are defined in greater detail than requirements are defined for current operations. For example,

the small field-of-view of the MOL/DORIAN system will require a more specific definition of targets and greater accuracy in geodetic location; the continuous pitch capability and variety of photographic sequences will require a detailed description of the photographic mode for each target. The manned operations will require that new and unique collection requirements be specified for each target so that the astronauts can take appropriate actions and make proper decisions.

A realistic definition of these anticipated collection requirements was requested by the MOL Systems Office in October 1966. Early development of a target model was needed for use during the engineering development of the system and to provide guidance for defining system simulation and crew training requirements. The model would provide information which could be applied to detailed system design and trade-off studies; analysis of on-board computation and data management concepts; evaluation of compatibility and integration requirements for space-ground communications and control; and system tests and checkout including software validation. System simulation activities which required target model data included the development, validation and refinement of operating procedures and techniques; definition of

procedures, interfaces and data requirement for flight planning; and definition of types of training material and on-orbit cue requirements for crew members.

Another important aspect of the target model development was the identification of problem areas which might be encountered in obtaining operational targeting information. The main concern was whether the format and content of targeting requirements anticipated for the DORIAN operational time period would provide the data necessary to effectively and efficiently use all the system capabilities.

III. MODEL DEVELOPMENT CONCEPT AND SAMPLE DERIVATION.

Discussions between the Satellite Operations Center, MOL Program Office and the COMOR Photo Working Group (now Imagery Collection Requirement Subcommittee (ICRS)) indicated that data were not available to meet the system development requirements stated above. Further, resources were inadequate to make a complete study of anticipated intelligence requirements for DORIAN operations. It was decided therefore to use an existing GAMBIT CUBED target deck as the best available indication of high resolution objectives and to select a representative sample of targets from this deck

for detailed examination of very high resolution requirements. The use of a sample would reduce the amount of detailed analysis required, and would provide a basis for using the entire GAMBIT CUBED target deck to obtain an estimate of a total DORIAN target list.

The Satellite Operations Center used the GAMBIT CUBED intelligence target requirements provided by the PWG for Mission 4303, 14-22 December 1966 as the target model base. This target list included a collection priority and a category code for each target. A description of these codes and the number of targets in each category are contained in TAB A. Some targets were also identified with a Current COMOR Collection Requirements (CCCR) category code. A total of 4654 targets were in the list; 3422 were identified with CCCR categories.

The total target deck was sorted to obtain matrices of CCCR targets vs priorities and non-CCCR targets vs priorities. These matrices are at TAB B. Considering variations in geographic location, ten percent, but never less than one, of the targets in each matrix element were selected for the sample. Thus, the sample was representative of the total deck in terms of CCCR categories, non-CCCR categories, priorities and geographic distribution. This selection process resulted in a sample of 585 targets. As will be

discussed later, during the development effort 23 additional targets were added to the sample, resulting in a final sample size of 608 targets. The matrices for the final sample are at TAB C. TAB D is a summary by categories of the targets in the sample.

Each target in the sample was then examined to determine appropriate targets for the DORIAN system and to define the intelligence and photographic requirements for each of these selected targets. This effort is described in detail in the following section. During the model development effort and throughout the remainder of this report, the targets in the GAMBIT CUBED deck are described as "installations" and selected DORIAN targets are described as "aiming points."

Once the detailed analysis was accomplished for the sample, a total DORIAN target deck was developed by expanding the sample. All installations within a matrix element of the basic GAMBIT CUBED deck (TAB B) were assumed to be identical to the installation from that element which was selected for the sample. Only the geographic coordinates of the real installations were retained. For each installation in the sample, the locations of the aiming points from the center of the installation were determined. This geometric relationship was used to position the aiming points at all other

installations of the matrix. All intelligence and photographic data developed for the aiming points in the sample were used for these synthetic aiming points. When there were more than ten installations in the matrix element, more than one installation was included in the sample. Each installation in the sample was then related, on a geographic basis, to a proportionate number of installations in the matrix element.

IV. DEVELOPMENT OF DATA FOR THE MODEL.

With the support of the Assistant Chief of Staff, Intelligence, Hqs USAF, and the Director of Intelligence, Hqs SAC, selected personnel and the resources of the 544th Aerospace Reconnaissance Technical Wing were made available to perform the initial detailed analysis of each installation in the sample. The list of installations in the sample was provided to the 544th ARTW during the last week of January 1967, and project personnel were briefed on the model requirements. The system characteristics could not be discussed with these personnel since they did not have a DORIAN clearance. The model requirements were stated in terms of defining appropriate intelligence targets for an advanced satellite system which would have [redacted] resolution capability and a 9000 foot ground field of

view. Each installation was to be divided into suitable aiming points and the intelligence requirements (EEI's) and photographic requirements were to be supplied for each aiming points.

Installations in the sample were identified with a COMOR number. Targeting and intelligence data at the 544th ARTW is maintained in the basic encyclopedia (BE) identification system. The first task therefore was to use the DIA priority reconnaissance objectives list (PROL) and automated intelligence file (AIF) to convert each installation designation from the COMOR number to a BE number. The BE number was a more meaningful identifer to the photographic interpreters who subsequently worked on the model and it also provided a means for automatically transferring information in the AIF directly into the target model data base.

Photography was selected for each installation and given to photographic interpreters who determined appropriate aiming points and defined photographic requirements. Mensurated and geodetic coordinates were then derived for each aiming point. Photography was not available on some of the 585 installations in the sample and 23 installations in the basic deck on which photographic coverage was available were added to the sample, resulting in a final sample

of 608 installations. Although real aiming points could not be determined for those installations without photography, a single aiming point at the center of the installation was arbitrarily established in order to maintain the expansion logic previously described.

Priorities were determined by first grouping the aiming points into related areas: offensive, defensive, research and development, production, support, and miscellaneous. Aiming Points within each group were then arranged by TDI categories in relation to SAC intelligence interests. This procedure resulted in 502 separate priorities.

Upon completion of the aiming point definition phase, 1771 aiming points had been defined. The data derived for each of the aimings, either through manual efforts or by collation with the AIF, were assembled into a target model data base using the Formatted File System at SAC. This system provided flexibility and many unique capabilities which were needed in handling the large amount of textual and numerical data.

Outputs from the file were provided in two formats. One was a card listing for each aiming point using the same format as the current GAMBIT CUBED target card with a few data elements added.

A description of the format and a sample listing are at TAB E. The other output was identified as the Sortie Planning List. It contained references used in selecting aiming points such as photography and map sources, various identification numbers and categories, and textual descriptions of intelligence requirements, photographic requirements and coverage frequency. TAB F is an example of the Sortie Planning List.

When the initial aiming point definition had been completed by the 544th ARTW, the Foreign Technology Division (FTD) of the Air Force Systems Command was requested to review the target model in terms of technical intelligence requirements. This review indicated that the SAC priority system should be revised to accommodate specific technical intelligence needs. For example, the ICBM launch pad at [redacted] should have a higher priority for technical intelligence coverage than it had in the SAC priority structure since there is a large gap in technical intelligence concerning Chinese ICBM capabilities and the first Chinese ICBM would probably be fired from this site. The FTD review also indicated that photographic requirements should be specified on an individual target basis rather than on a target

category basis if maximum utilization was to be made of the DORIAN systems unique capabilities. Specific viewing angles and azimuths should be specified in order to obtain the best possible photography of those elements of the target which require very high resolution for technical intelligence analyses. The time of exposure is also a critical requirement. For example, the distance from exhaust nozzles to flame deflector impingement point and the location and sizes of deflector coolant openings are critical factors in assessment of the maximum thrust capability of a vertical rocket engine test stand. Flame deflectors are often in the shadow of the floor of the test stand and specific time of day for best photographic exposure should be identified.

In October 1967 it was decided that additional definition of requirements should be made if the target model was to be as realistic as possible of potential DORIAN requirements. Based on SAC's recommendations resulting from their difficulties caused by lack of DORIAN cleared personnel, authority was obtained to clear a group of people at FTD. A team of photo interpreters and engineering analysts, each specialists in a specific field, was organized by FTD. This team was cleared and given a detailed briefing on the system design and

capabilities, and the purpose of the target model development effort. Also by this time, the MOL Systems Office had defined the concepts for mission planning and evaluation computer programs. An information booklet describing the target data requirements was prepared and a format for recording target specific requirements was given to the team (see TAB G).

The work at FTD began in December 1967. A copy of the Sortie Planning List containing the 1771 aiming points identified by SAC was the basic reference document. Initially a target priority system was developed by FTD. A four digit number was used with the first two digits indicating the installation priority and the last two indicating the relative priority of aiming points within the installation. For example, an aiming point at a control area of an ICBM complex under construction has a priority of 0503 which indicates that ICBM complexes under construction have the fifth highest priority for technical intelligence exploitation and control areas are of third importance within such complexes (launch sites are first and tracking and guidance sites are second). A listing of the FTD priority for each aiming point was furnished to SAC for inclusion in the data base.

Folders were prepared for each of the 608 installations in the sample. Photography and other intelligence data such as reports on previous coverage were placed in each folder. Data sheets as described in TAB G were then prepared for each aiming point. The target folders were circulated among the photo interpreters until each specialist had completed the initial write-up on the aiming point data sheets in each folder which pertained to his specialty. The engineering analysts then reviewed the data sheets and made a final integration of all the requirements for each aiming point. This information was then prepared on punched cards and sent to SAC.

Concurrently with the effort at FTD, SAC was restructuring the data base in order to accommodate the large amount of new data. Revised formats were devised for the target card listing and Sortie Planning List. Computer programs were being written and validated for the expansion of the sample into a total target deck.

The development effort at FTD was completed by early May 1968 and approximately 34,000 punched cards had been prepared and sent to SAC. The sample now contained 1637 aiming points, or a reduction of 134 from the 1771 initially identified by SAC. This reduction resulted from the deletion of some invalid aiming points such

as large urban/industrial or complex type targets and the combination of overlapping aiming points. If two or more aiming points with the same EEI 's were located within 2000 feet of each other, only one aiming point was retained since photographic coverage of one aiming point would include the other with very little loss in resolution.

With the additional information entered into the data base, SAC prepared listings using the revised target card and Sortie Planning List format. Examples of these listings are contained in TABS H and I, respectively. The new target card contains all the elements of the current GAMBIT CUBED card so that the deck can be run with existing software programs if desired and also includes machine coded additional information developed for the target model. The format for this target card is described in Appendices A1 and A2 of TAB G.

The listings of the target model sample were reviewed by the SOC and a few corrections and/or additions were made. New listings were prepared for the sample and the sample was expanded to obtain a total target deck of 4654 installations with 12,462 aiming points. These lists have been furnished to the MOL Systems Office for use in the various studies and analyses discussed previously. FTD has

also sent the Systems Office the folders used in the development effort which contain annotated photography identifying all the aiming points. These folders should provide valuable information in defining crew training and on-orbit cue concepts.

V. STATISTICAL ANALYSES.

Statistical analyses have been made of some of the data included in the target model. These are at TAB J through TAB O and are discussed briefly in this section. Most of the data is presented in both histogram and cummulative percentage graphical form. Since the data provided by FTD has only recently been available, these analyses are based on the initial target model information defined by SAC. Changes resulting from analyses of the new data and the results of additional analyses will be published at a later date.

TAB J shows the distribution of the installation diameters for the 608 installations in the target model sample. Both the diameters as specified by COMIREX and as defined by SAC are shown. The differences in diameters occurred when SAC changed the targets from the COMIREX identification system to the BE system, and illustrates the problem of precise identification.

When SAC established a diameter larger than specified by COMIREX, then a greater area was available for selection of aiming points, and the converse is true if the SAC diameter was smaller. The distribution of diameters throughout the sample is about the same with both data, and the model should be valid for density-type studies even though there may be considerable differences on an individual target basis. Based on the SAC data 75% of the installations had a diameter of 1.5 n.m. or less; 93% had a diameter of 4.0 n.m. or less. The complex and urban/industrial targets account for most of the installations with diameters greater than 4 n.m.

TAB K indicates the number of aiming points identified for each installation in the sample and projected for the total deck. For the 608 installations in the sample, 1771 aiming points were selected, or an average of 2.9 aiming points per installation. However, 30% of the installations had only one aiming point, while 19 aiming points were selected at one installation. If this sample information had been expanded based on the original deck of 4654 installations, 13,534 aiming points would have been obtained. (After the FTD review, the sample contains 1637 aiming points; the total deck, 12,462 aiming points.)

TAB L shows the distance of the aiming points from the center of the installation. 39% of the aiming points are within 0.5 n.m.;

83% within 1.0 n.m.; and 91% are within 1.5 n.m. This illustrates that several aiming points may be covered by a single photograph. This single photograph might satisfy the intelligence requirements for all aiming points unless maximum possible resolution was required, which would necessitate having each aiming point near the center of separate photographs.

TAB M is a distribution of the diameter of the area of interest associated with each aiming point. 72% of the aiming points had a diameter of 1000 feet or less; 93% had a diameter of 3000 feet or less. The area coverage required and the distances shown in TAB L can be used for target coverage optimization.

The target model development has used the GAMBIT CUBED target deck of December 1966 as a base. Since that time the target deck has increased as shown in TAB N. Current mission decks contain slightly over 6800 intelligence targets. Most of this change has been caused by the addition of new targets, although some of the targets in the December 1966 list are no longer current or have been divided into several separate targets. TAB O shows the distribution of the current deck by target categories, which if compared with the distribution of the target model base deck (TAB A) shows little change in the types of targets requiring high resolution

coverage. Using an average of 2.7 (1637/608) aiming points per installation, the current GAMBIT CUBED deck would result in about 18,000 aiming points. The CCCR categories are no longer used, thus no comparison between the basic deck and current target lists can be made on this basis.

VI. PROBLEM AREAS IDENTIFIED.

The objective of the model development, in addition to providing a data base for use in studies and analyses, included the identification of potential problem areas in obtaining operational requirements for DORIAN missions. Many of the difficulties encountered were due to the developmental nature of the model effort which caused a number of false starts; however, certain problems were of such significance that they must be considered in preparing operational requirements. Actions are now being taken to develop procedures and/or operational concepts which will assist in resolving or minimizing some of these problems; others will require further investigation and study to determine appropriate solutions.

Initial definition of requirements by SAC was limited due to the lack of DORIAN cleared personnel. None of the information needed to support man's contributions, such as activity indicators,

visual reporting requirements, etc., nor any of the detailed system characteristics could be discussed within TALENT KEYHOLE classification. Some of these problems were overcome when the FTD team was cleared. Clearances for all members of the intelligence community who will have to participate in the definition of requirements will require long lead times and extensive planning.

In addition to the time required for clearance of personnel, a considerable amount of time and effort was needed to fully inform the analysts and photo interpreters of the new and unique system capabilities which will be available. Proper definition of collection requirements can only be made if the requesters fully understand the potential capabilities which can be exploited. An initial effort toward solving this problem was the preparation of a booklet (TAB G) to provide information and guidance to the FTD team. This booklet is being revised and expanded, and will be available for guidance in defining operational requirements. * 1

The amount of resources and time required to complete any phase of the model was usually underestimated. Some of the additional time was due to the developmental effort itself which required redoing tasks as more information and experience were obtained. The handling of the large amount of new data needed to efficiently plan and conduct DORIAN missions was also time consuming. Standard formats must

be established and completely understood by the requesters; computer programs will have to be prepared for processing and maintaining this data; and the adequacy of data links will have to be evaluated. Quality control of the data may be a serious problem when considering the textual data requirements.

Perhaps the two most significant problems faced in the development effort were target identification and location. As stated in Section IV, the installations selected for the sample were furnished to SAC in terms of a COMOR (now COMIREX) identification number. This is the identification system currently used in specifying collection requirements between ICRS and SOC; however, all information at SAC (and FTD) is maintained according to the BE (Basic Encyclopedia) identification system. There is no direct correlation between these two systems. A particular COMIREX target may include many BE-numbered targets. Conversely, although not usually, a BE target may refer to an area much larger than that included in the COMIREX number. Since there is no standard definition for targets, it is difficult to communicate between various organizations, and sometimes even between several groups in the same organization. This problem exists today for those targets in the current target lists.

The problem of unique identification of new targets, which will be required for DORIAN operations, must be solved.

Associated with unique target identification is the problem of obtaining accurate geodetic coordinates required for satellite operations. After selecting appropriate aiming points, SAC derived mensurated and geodetic coordinates. Coordinates determined at FTD for supposedly the same aiming point differed considerably from the SAC values in a large number of cases. This difference was many thousands of feet in some cases and apparently was caused mainly by the use of different editions of series 200 charts to determine coordinates. Since the data in the model will only be used for analytical purposes, no attempt was made to resolve these differences and the SAC derived coordinates have been used.

These problems are of significant importance to DORIAN operations. The small field-of-view requires precise target identification and accurate geodetic positions. Training of the crew-members and proper evaluation of the target on-orbit requires a system which insures that the person requesting coverage and the crewman observing the scene are both considering the same target. With the large number of new targets which will have to be designated for

collection by the DORIAN system, a procedure must be established for rapidly, and if possible automatically, determining accurate geodetic coordinates. A system using a gridded, photographic chip is now under consideration which will provide common identification and the automatic determination of accurate coordinates. This chip would also be used to provide pre-mission training material and on-orbit cueing.

VII. SUMMARY.

The development of a target model for the DORIAN system has been completed. Starting with an actual GAMBIT CUBED target list, a sample of 608 targets (about 13%) was selected and 1637 aiming points were defined in detail. This sample was then expanded into a synthetic total deck of 12,462 aiming points. This model contains information which can be used as guidance for performing system evaluations, conducting mission studies, evaluating computer programs, estimating crew training requirements, and developing operational concepts.

Several difficulties were encountered in the development effort which must be considered if operational requirements are to be obtained in a timely manner. Personnel designating requirements must be

familiar with the many unique capabilities of the DORIAN system in order to state their requirements in a manner which will effectively exploit these capabilities. The identification of targets and determination of accurate locations are problems which must be solved at an early date.

DISTRIBUTION OF INSTALLATIONS IN BASIC DECK BY CATEGORIES

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
1. Guided Missiles		
A. ICBM Deployment	717	15.4
B. IRBM and MRBM	279	6.0
C. Research & Development (inc. space)	57	1.2
D. Production Facilities (inc. test)	60	1.3
E. Suspect Missile	33	0.7
G. Naval Launched Missiles	50	1.1
H. Anti-Missile Missile	32	0.7
I. SAM Sites	217	4.7
J. Short Range SSM	16	0.3
K. Missile Support/Storage Areas	23	0.5
L. SAM Training Complexes	4	0.1
Sub-Total	1488	31.9
2. Aircraft		
A. Long Range Bases	91	2.0
B. Production Facilities (incl. R&D)	32	0.7
C. Airfields	630	13.5
Sub-Total	753	16.2
3. Nuclear Energy		
A. Test Area	19	0.4
B. Production	46	1.0
C. Stockpiles	23	0.5
D. Research Institutes	18	0.4
E. Suspect Activity	5	0.1
Sub-Total	111	2.4
4. Naval Activity		
A. Operating Bases	41	0.9
B. Production Yards	14	0.3
C. Commercial Ports	27	0.6
D. Locks & Canals	1	<0.1
Sub-Total	83	1.8
5. Biological/Chemical Warfare		
A. BW/CW Test Areas	9	0.2
B. Production	19	0.4
C. Storage	37	0.8
D. Research Ins titutes	5	0.1
E. Suspect Activity	12	0.3
Sub-Total	82	1.8

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
6. Electronics		
A. Missile Tracking Facilities	34	0.7
B. Electronics, General	190	4.1
Sub-Total	224	4.8
7. Military		
A. Military Installations	1738	37.3
B. Special Area	3	0.1
C. (Unspecified)	13	0.3
D. Landing Beaches	1	<0.1
G. Tactical SSM Support Facilities	0	0
Sub-Total	1755	37.7
8. Urban/Industrial		
A. Complexes	73	1.6
B. Industrial Plants	61	1.3
Sub-Total	134	3.9
9. Other		
A. Unidentified Installations	23	0.5
Total	4654	

CCCR INSTALLATIONS IN BASIC DECK

CCCR NR.	PRIORITY								TOTAL
	2	3	4	5	6	7	8	9	
114	[redacted]								
121									
123									
131									
132									
134									
135									
136									
141									
142									
143									
144									
151									
161									
171									
211									
213									
214									
221									
231									
241									
251									
261									
311									
331									
341									
351									
411									
421									
441									
461									
511									
521									
531									
611									
622									
623									
624									
625									

CCCR INSTALLATIONS IN BASIC DECK (CON'T)

CCCR NR.	PRIORITY 2	3	4	5	6	7	8	9	TOTAL
631	[redacted]								
632									
641									
711									
721									
741									
751									
191									
TOTAL									

NON-CCCR INSTALLATIONS IN BASIC DECK

CATEGORY CODE	PRIORITY 2	3	4	5	6	7	8	9	TOTAL
1A	[redacted]								
1C									
1D									
1E									
1G									
1H									
1I									
1J									
1K									
1L									
2A									
2B									
2C									
3A									
3B									
3C									
3D									
3E									
4A									
4C									
4D									
5A									
5B									
5C									
5E									
6A									
6B									
7A									
7B									
7C									
7D									
8A									
8B									
9A									
TOTAL									
GRAND TOTAL									

CCCR INSTALLATIONS IN SAMPLE

CCCR NR.	PRIORITY 2	3	4	5	6	7	8	9	TOTAL
114	[redacted]								
121									
123									
131									
132									
134									
135									
136									
141									
142									
143									
144									
151									
161									
171									
211									
213									
214									
221									
231									
241									
251									
261									
311									
331									
341									
351									
411									
421									
441									
461									
511									
521									
531									
611									
622									
623									
624									
625									

CCCR INSTALLATIONS IN SAMPLE (CON'T)

CCCR NR.	PRIORITY 2	3	4	5	6	7	8	9	TOTAL
631	[redacted]								
632									
641									
711									
721									
741									
751									
191									
TOTAL									

NON-CCCR INSTALLATIONS IN SAMPLE

CATEGORY CODE	PRIORITY 2	3	4	5	6	7	8	9	TOTAL
1A	[redacted]								
1C									
1D									
1E									
1G									
1H									
1I									
1J									
1K									
1L									
2A									
2B									
2C									
3A									
3B									
3C									
3D									
3E									
4A									
4C									
4D									
5A									
5B									
5C									
5E									
6A									
6B									
7A									
7B									
7C									
7D									
8A									
8B									
9A									
TOTAL									
GRAND TOTAL									

DISTRIBUTION OF INSTALLATIONS IN SAMPLE BY CATEGORIES

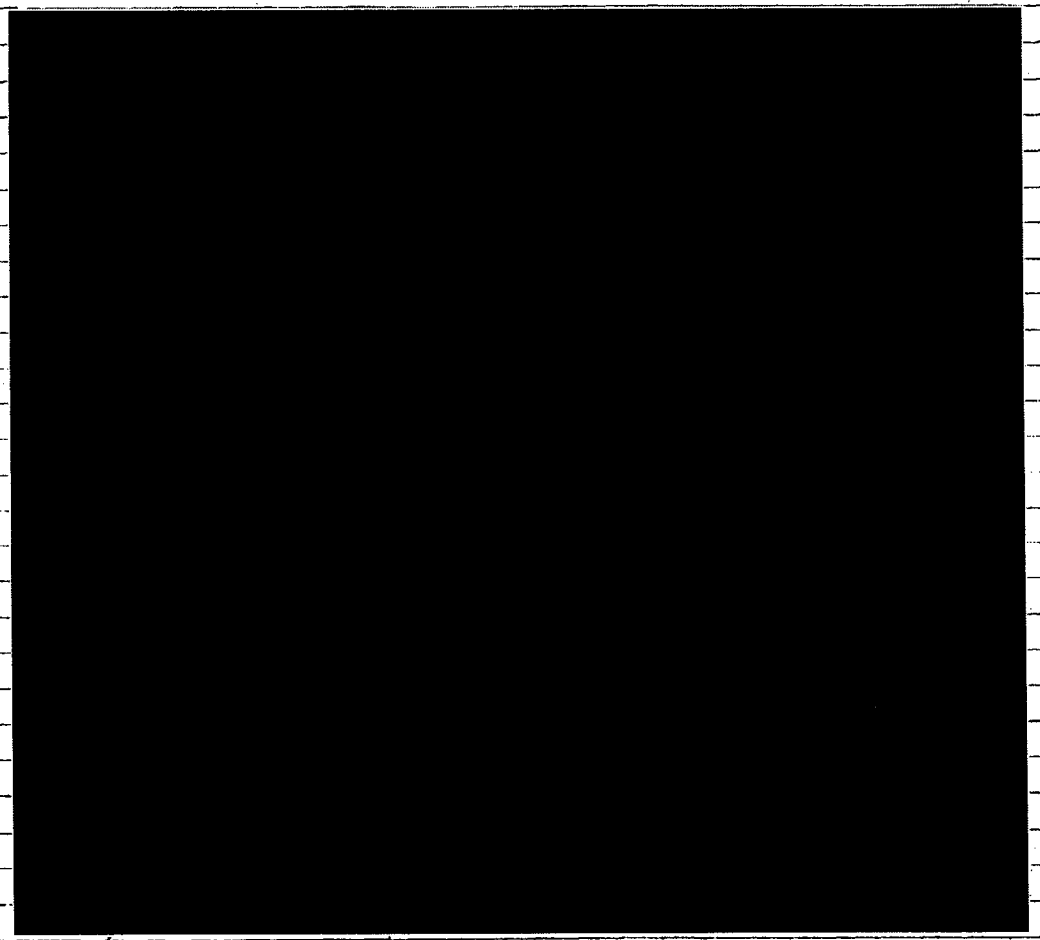
CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
1. Guided Missiles		
A. ICBM Deployment	75	12.3
B. IRBM and MRBM	27	4.4
C. Research & Development (inc. space)	19	3.1
D. Production Facilities (inc. test)	9	1.5
E. Suspect Missile	6	1.0
G. Naval Launched Missiles	13	2.1
H. Anti-Missile Missile	8	1.3
I. SAM Sites	26	4.3
J. Short Range SSM	7	1.2
K. Missile Support/Storage Areas	7	1.2
L. SAM Training Complexes	3	0.5
Sub-Total	200	32.9
2. Aircraft		
A. Long Range Bases	12	2.0
B. Production Facilities (inc. R&D)	10	1.6
C. Airfields	70	11.5
Sub-Total	92	15.1
3. Nuclear Energy		
A. Test Area	9	1.5
B. Production	8	1.3
C. Stockpiles	3	0.5
D. Research Institutes	2	0.3
E. Suspect Activity	3	0.5
Sub-Total	25	4.1
4. Naval Activity		
A. Operating Bases	10	1.6
B. Production Yards	2	0.3
C. Commercial Ports	4	0.7
D. Locks & Canals	1	0.2
Sub-Total	17	2.8
5. Biological/Chemical Warfare		
A. BW/CW Test Areas	3	0.5
B. Production	3	0.5
C. Storage	7	1.2
D. Research Institutes	0	0
E. Suspect Activity	3	0.5
Sub-Total	16	2.6

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
6. Electronics		
A. Missile Tracking Facilities	9	1.4
B. Electronics, General	31	5.1
Sub-Total	40	6.6
7. Military		
A. Military Installations	188	30.9
B. Special Area	3	0.5
C. (Unspecified)	2	0.5
D. Landing Beaches	1	0.2
G. Tactical SSM Support Facilities	0	0
Sub-Total	194	32.1
8. Urban/Industrial		
A. Complexes	9	1.4
B. Industrial Plants	10	1.6
Sub-Total	19	3.1
9. Other		
A. Unidentified Installations	5	0.8
Total	608	

THE FOLLOWING DESCRIBES THE FORMAT OF THE 80 CHARACTER RECORDS WHICH GIVE INFORMATION ABOUT INSTALLATIONS AND THEIR RESPECTIVE AIMING POINTS. THE NOTATION #-C-# INDICATES THAT THE INFORMATION WAS ORIGINALLY SUPPLIED ON THE COMOR TARGET CARD.

COLUMNS	DESCRIPTION
1	LINE IDENTIFIER. #X# FOR COMOR TARGET RECORD, OR #X-RECORD,# AND BLANK FOR RECORDS CONTAINING AIMING POINT INFORMATION, OR #AP RECORD.#
2	COMOR PRIORITY -C-
3	NUMBER OF LOOKS -C-
4-5	INSTALLATION DIAMETER ON X-RECORDS -C-, AIMING POINT DIAMETER ON AP RECORDS. NOTE- DIAMETERS GREATER THAN 9900 FEET WILL BE EXPRESSED TO THE NEAREST TEN-THOUSAND AS A NUMBER FOLLOWED BY AN ASTERISK
6	NOT USED
7-9	INSTALLATION ELEVATION IN HUNDREDS OF FEET -C-
10-12	NEW PRIORITY, 0001-0519, ASSOCIATED WITH THE SORTIE PLANNING LIST
13	MODE -C-
14	A, C, OR D, INDICATOR -C-
15-18	INSTALLATION DIAMETER ON X-RECORDS ONLY
19-20	COUNTRY CODE -C-
21	SLIT MODIFIER -C-
22-25	BURST TIME IN TENTHS OF SECONDS -C-
26-35	INSTALLATION BE NUMBER
36-37	MAXIMUM OBLIQUITY -C-
38-46	COMOR IDENTIFICATION -C-
47	AIMING POINT IDENTIFIER ON AP RECORDS ONLY
48	NOT USED
49-51	INSTALLATION ELEVATIOS ON X-RECORDS, AP ELEVATION ON AP RECORDS.
52-55	NOT USED
56-58	SPECIAL CATEGORY CODE -C-
59	NOT USED
60-66	INSTALLATION LATITUDE ON X-RECORDS -C-, AIMING POINT GEODETIC LATITUDE, I.E. WGS COORDINATES, ON AP RECORDS.
67-74	INSTALLATION LONGITUDE ON X-RECORDS -C-, AIMING POINT GEODETIC LONGITUDE, I.E. WGS COORDINATES, ON AP RECORDS
75-76	NOT USED
77	TECHNICAL FREQUENCY ON AP RECORDS ONLY.
78	OPERATIONAL FREQUENCY ON AP RECORDS ONLY
79-80	TECHNICAL RESOLUTION ON AP RECORDS ONLY

NOTE- SOME AIMING POINTS ARE WITHOUT COORDINATES DUE TO THE FACT THAT PHOTO COVERAGE WAS NOT OF SUFFICIENT QUALITY TO SECURE EITHER METRIC OR GEODETIC COORDINATES.
ALL AIMING POINT COORDINATES ARE GEODETIC.

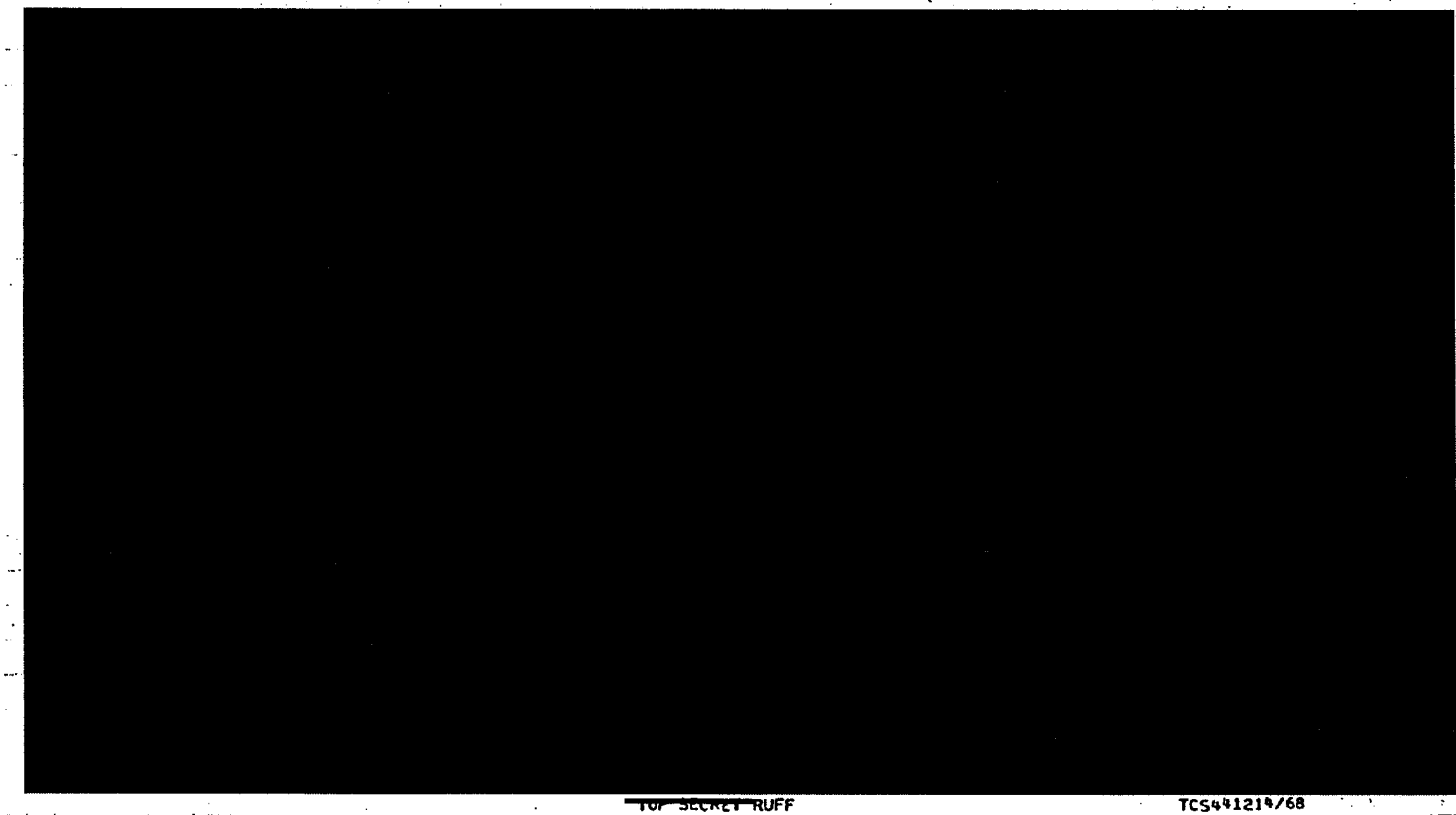


*** TARGET MODEL - SORTIE PLANNING ***

[redacted]

HANDLE VIA TALENT/KEYHOLE CHANNELS

*** TARGET MODEL - SORTIE PLANNING ***



~~SECRET~~
Handle via BYEMAN
Control System

DEVELOPMENT INFORMATION

FOR THE

MODEL 608 ANALYSIS DECK

~~SECRET~~
Handle via BYEMAN
Control System

THE MODEL 608 ANALYSIS DECK AND ITS APPLICATION

INTRODUCTION

The Model 608 Analysis Deck will be used as the target data base for study and analysis during development of a High Resolution Photographic System. The deck will reflect the data associated with approximately 13,500 aiming points. The data for each aiming point will be specified in an 80 column format which will, when required, be used with analysis software. Appendix A shows the proposed Model 608 Analysis Deck format.

It will be noticed that the "608 Deck" is made up of much target-specific information. A great majority of this type of information has previously been specified, but on a data base-specific basis, i.e., "canned" parameter, rather than a target-specific basis. In order to efficiently employ the flexible capabilities of the proposed system, it is now necessary to specify this requirements data on a target specific basis.

Many of the data on the target card are used to access other data for use in the analysis computer programs. In these instances, the table or function which is called by the target card data entry is stored in the analysis program data base. For certain target card entries the absence of data will automatically imply that "canned" parameters are to be used. Finally, for certain target card entries, nominal data at a minimum must be input for there is no "canned" data to be used. The succeeding sections of this report describe the target data card for the "608 Deck" and the data base parameters associated with target selection.

SYSTEM CAPABILITIES

Max Resolution Capability: [redacted]

Field of View: 9100' diameter circle @ 80 NM

Variable Pitch Mirror: + 30° to —40° nominal 22 ± 15 to -25°

Vehicle Roll Capability: ± 40° from Nadir ± 37°

Manned/Automatic Systems Capability

Real Time Decision Making On-Board via Visual Inspection Telescopes and On-Board Computer

Secondary Camera System allows two different types of photographic film to be used on a target on any one pass

ANALYSIS DECK FORMAT

The following describes, in general terms, the format and information content of the target data card which will be used in the Model 608 Analysis Deck. Instructions for preparing detail data required in the Analysis Deck are contained in Appendix C. This detail data will be entered into a data base using the format described in Appendix A.

I. Priority (Inactive) - Card Columns 1-2

A number from 0-00 which expresses the relative intelligence value of obtaining a clear photograph of this target in the absence of activity as compared to other targets photographed under the same conditions. This input will be used in conjunction with a data base priority/value table for the pruposes of target selection.

II. Number of Looks - Card Column 3

III. Diameter - Card Columns 4-5

The diameter of the target as measured in hundreds of feet. These data are utilized by the ground software for target selection purposes and by the flight crew for cue information. Large targets may be selected as scan targets. The range of allowable values for this input is from 0 feet to 9,900 feet.

IV. Altitude - Card Column 6-9

The altitude of the target above or below mean sea level at its associated geodetic coordinates as measured in hundreds of feet. The range of allowable values for this input is from -99,900 feet to +99,900 feet.

V. Shade Factor - Card Columns 10-12

This factor will allow the shading of the effects of Priority (Inactive). This shading takes the form of assigning an interpolated value to the weight for the target derived from the data base priority/value table. There are 1000 interpolated weight values between priority levels available.

VI. Photo Mode Weighting Table - Card Column 13

This indicator allows selection of the proper photographic mode table of sequence value relationships. The available data base tables are used in target selection. The range of values available is from Table 0 to Table 9.

VII. Target Alter Card Flag - Card Column 14

This indicator signifies that the target is to be added to, deleted from, or changed in the target selection data base. This column may contain an "A" for additions, "D" for deletions, "C" for changes, or a blank where no alter operation is desired.

VIII. Acquisition Rev Number - Card Columns 15-17

This number is used to specify any special revolution in which the Target Alter Card Flag is to apply. A blank in this column is interpreted by the mission planning software as a request to use the alter information on all applicable revs.

IX. Direction of Pass - Card Column 18

This alphabetic symbol is used to specify whether the Target Alter Card Flag is to apply on the Ascending (A) passes only, the Descending (D) passes only, or on both (blank).

X. Country Code - Card Columns 19-20

Approved alphabetic characters representing the specific country in which the target is located.

XI. Exposure Setting Sequence - Card Column 21

An indicator which specifies the desired photographic exposure sequence for photography on the target.

XII. Priority (Active) - Card Columns 22-23

A number from 0-99 which expresses the relative intelligence value of obtaining a clear photograph in the presence of activity as compared to other targets photographed in the absence of activity. This input will be used in conjunction with a data base priority/ value table for the purposes of target selection.

XIII. Desired Pitch - Card Columns 24-26

The desired initial pitch angle for stereoscopic photography on this target. This value with allowable range from + 99 degrees to — 99 degrees is used in conjunction with the specified Pitch Weighting Function for target selection purposes.

XIV. Scan Target Flag - Card Column 27

This flag indicates that the target has such dimensions or is of such a nature that a scanning procedure is to be exercised by the flight crew utilizing an Acquisition Telescope (ATS). This flag is not used in target selection.

XV. Benchmark Flag - Card Column 28

This flag allows identification of those targets whose geographic location is well enough known to be considered as landmarks for on-board ephemeris update. This flag is not used in target selection.

XVI. Mandatory ATS View Flag - Card Column 29

This flag indicates that the target is of exceedingly high intelligence value when active. The existence of this flag will cause the target to be selected for ATS viewing, i.e., it will necessarily be selected as either a primary or an alternate target.

XVII. Mandatory Primary Flag - Card Column 30

This flag indicates that the target is of exceedingly high intelligence value even in the absence of activity. This target will be necessarily scheduled for the primary optics path.

XVIII. Probability of Activity - Card Column 31-32

The probability, expressed in percent, that the target will be active when photographed. These data are used in target selection.

XIX. Specified ATS View Time - Card Columns 33-34

The specified time in seconds and tenths of seconds for flight crew viewing of a target prior to a determination of active indicators and/or degrading weather conditions are, or are not, present. These data are used in target selection.

XX. Pitch Weighting Function - Card Column 35

This value specifies that pitch weighting function to be used in conjunction with Desired Pitch for target selection. The weighting functions themselves are contained in data base.

XXI. Obliquity Limit - Card Columns 36-37

This value defines, in degrees, the absolute value of maximum allowable obliquity angle for photography of this target. The allowable range of the limit is from 0-99 degrees.

XXII. Target I.D. - Card Columns 38-47

This is an administrative sequence number assigned by COMIREX to top priority targets in the National Priority Reconnaissance Objectives List (PROL).

XXIII. Weather Factor - Card Columns 52-53

This is a factor to be used in deweighting the value assigned to target photography as a function of predicted and/or verified weather.

XXIV. Resolution Requirement - Card Columns 54-55

[redacted] This value expresses the technical resolution requirement for photography of this target. This value is not used in target selection.

XXV. Special Category Code - Card Columns 56-58

This number represents that functional classification of the target as obtained from a Functional Classification Handbook. These data are not used in target selection.

XXVI. Target Location Validity - Card Column 59

This number specifies the validity of the geographical coordinates utilized to define the position of the target for selection purposes. These data are not used in target selection.

XXVII. Latitude - Card Columns 60-66

The geodetic latitude of the target as expressed in degrees, minutes, and seconds. These data must also have indicators for north or south.

XXVIII. Longitude - Card Columns 67-74

The longitude of the target as expressed in degrees, minutes, and seconds. These data must also have indicators for east or west.

XXIX. Card Type Flag - Card Column 75

XXX. Visual Intelligence Flag - Card Column 76

This flag indicates that the target need not be scheduled for possible photography but that it may be scheduled for ATS viewing alone.

XXXI. Card Count - Card Columns 77-80

APPENDIX A: FORMAT FOR TARGET MODEL DATA BASE

Two types of data cards will be prepared for entering target model information into the data base - an installation record and an aiming point record. Each installation record will be followed by a record for each aiming point for that installation. Formats for the installation records and the aiming point records are described in Appendix A1 and A2, respectively.

FORMAT FOR TARGET MODEL INSTALLATION CARDS

COLUMNS	DESCRIPTION & UNITS	SOURCE
1	Line Identifier (X)	X indicates installation card
2	Priority (0-9)	COMIREX Priority
4 - 5	Diameter (N.M.) (0-99)	COMIREX diameter
7 - 9	Elevation (ft x 10^{-2}) (0-99)	COMIREX elevation
11 - 14	Diameter (N.M.) (00.0-99.9)	SAC measured diameter for installations in sample (Model 608). ***indicates diameter could not be measured. Blank for installations not in sample. Decimal point in Co. 13.
16 - 18	Elevation (ft x 10^{-2}) (0-99)	SAC measured elevation for installations in sample (Model 608). *** indicates elevation could not be measured. Blank for installations not in sample.
19 - 20	Country Code (Alphabetic)	COMIREX designation
26 - 35	Installation BE Number (Alphanumeric)	WAC-BE identifier determined by SAC.
39 - 47	Target Designation (Alphanumeric)	COMIREX identifier
56 - 58	Special Category Code (0-999)	COMIREX code (CCCR)
60 - 66	Latitude (deg, min, sec, E/W)	Metric values determined by SAC for center of installation. If SAC did not measure coordinates COMIREX coordinates will be used.
67 - 74	Longitude (deg, min, sec, N/S)	

FORMAT FOR TARGET MODEL AIMING POINT CARDS

COLUMNS	DESCRIPTION & UNITS	SOURCE
1	Not used	Blank
2	COMIREX Priority (0-9)	Same as COMIREX priority for parent installation
3	Number of Looks (0-9)	Blank
4 - 5	Diameter (ft x 10^{-2}) (0-99)	Measured by SAC for each A.P. in sample; same for all related A.P.'s in total deck. Diameters greater than 9900 ft will be expressed to nearest 10,000 ft in Col 4 and * in Col 5. ** indicates diameter could not be measured.
6	Not used	Blank
7 - 9	Elevation (ft x 10^{-2}) (0-999)	Same as COMIREX elevation for parent installation
10 - 12	SAC Priority (0-999)	Priority designated by SAC for each A.P. in sample; same for all related A.P.'s in total deck.
13	Photo Mode Weight Table (0-9)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
14	Target Alter Flag (A, C, D)	Blank
15 - 17	Acquisition Rev Number (0-999)	Blank
18	Direction of Pass	Blank
19 - 20	Country Code (Alphabetic)	Same as COMIREX designation for parent installation.
21	Exposure Setting Sequence (0-9)	Blank
22	Not used	Blank

COLUMNS	DESCRIPTION & UNITS	SOURCE
23	Enhancement Factor (0-9)	Log of the enhancement factor K designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
24 - 26	Desired Pitch (deg.) ($\pm$ 0-99)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
27	Scan Target Flag (0, 1)	Blank
28	Benchmark Flag (0, 1)	Blank
29	Mandatory ATS View Flag (0, 1)	Blank
30	Mandatory Primary Flag (0, 1)	Blank
31 - 32	Probability of Activity (%) (0-99)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
33 - 34	Specified ATS View Time (sec x 10^1) (0-99)	Blank
35	Pitch Weighting Function (0-9)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
36 - 37	Obliquity Limit (deg.) (0-99)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
38	Not Used	Blank
39 - 47	Target Designation (Alphanumeric)	COMIREX installation number plus A.P. alphabetic designated by SAC for each A.P. in sample; same A.P. alphabetics used for A.P.'s of related installations in total deck.

COLUMNS	DESCRIPTION & UNITS	SOURCE
48 - 51	FTD Priority (0-9999)	Priority designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
52 - 53	Probability of Intelligence Enchancement (0-99)	% designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
54 - 55	Resolution Required [redacted] (0-99)	Resolution required to meet 75% of intelligence requirements designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck.
56 - 58	Special Category Code (0-999)	Same as COMIREX designation for parent installation.
59	Target Location Validity (0-9)	Appropriate code to indicate position error (ft x 10^{-2}) defined by SAC for each A.P. in sample; same for all related A.P.'s in total deck.

CODE	PE RANGE (ft x 10^{-2})
*	Not determined
1	0-5
2	6-10
3	11-15
4	16-20
5	21-30
6	31-40
7	41-50
8	51-100
9	Over 100

COLUMNS	DESCRIPTION & UNITS	SOURCE
60 - 66	Latitude (deg, min, sec, E/W)	Metric values determined by SAC for each A.P. in sample; same relative location of A.P. to center of parent installation retained for related A.P.'s in total deck.
67 - 74	Longitude (deg, min, sec, N/S)	
75	Card Type Flag	Blank
76	Visual Intelligence Flag (0,1)	Designated by FTD for each A.P. in sample; same for all related A.P.'s in total deck (0 = No, 1 = Yes).
77 - 80	Card Count (Alphanumeric)	Blank

APPENDIX B: ACTIVITY AND ACTIVITY INDICATORS

1. Advanced Aspects of the DORIAN System - The DORIAN system program is unique among reconnaissance system programs because it is manned and because it possesses advanced capabilities for utilization of man in the space reconnaissance role. The increased man/equipment capability of the DORIAN system will, therefore, require more sophistication in specifying collection requirements in order to fully exploit the system design potential and to assure that the use of man in making decisions relative to enhancing the photographic product does not lead to either loss of man's potential through overcaution or the degradation of the value of the collected data.

The resolution capability of the DORIAN photographic sensor payload will provide the potential for obtaining detailed information of a technical intelligence nature which would be inaccessible by other systems as a result of resolution limitation alone. In addition, the DORIAN system provides high quality automatic tracking telescopes to provide the capability for the flight crew members to closely inspect several designated reconnaissance targets and evaluate their technical intelligence value prior to the optimum time for committing the photographic payload to a photographic sequence opportunity. Therefore, collection requirements for the DORIAN system should consider not only the advanced potential of the photographic sensor payload but also the flight crew potential for enhancing, through real-time observation, the value of the photographic intelligence information collected.

2. Transitory Nature of High Value Technical Intelligence - In the past, the most valuable technical intelligence information contained on photography derived from overhead reconnaissance has usually occurred accidentally, i.e., preprogrammed photography of an area has revealed something that would not normally have been exposed. Therefore, it has been concluded that the exposure of objects of high technical intelligence value are likely to be of a transitory nature. The meaningful technical intelligence objects which make a complicated high resolution photographic sensor cost effective are usually of a size and nature which permits their concealment from exposure to overhead photographic reconnaissance.

They can be kept under shelters and protective covers; they can be covered over after construction; they can be lowered into silos and sealed off from overhead view, etc. For example, ICBM's may be transported to a launch area and placed in silos or storage buildings where they might not be exposed to overhead reconnaissance for months, and, even then, they might only be exposed for a few hours for the conduct of training, replacement, maintenance, etc. Similar situations also exist relative to aircraft, naval vessels, nuclear weapons, etc.

The DORIAN system, with its advanced photographic sensor payload and its employment of man to provide real-time decisions offer a means of increasing the frequency of securing photography of these transitory occurrences. This can be accomplished by equipment which permits the crew members to observe the targets and make real-time decisions on whether a target is "active" (designated transitory occurrence is present) or "inactive" (designated transitory occurrence is not present) based upon community designated "activity" and "activity indicators."

3. Activity - For DORIAN operations the transitory exposure to overhead photographic reconnaissance of objects designated as being of high technical intelligence value has been identified as "activity." "Activity" means that the designated high value object (subject, item, condition, etc., which represents an identified high priority need) is present and vulnerable to overhead photographing. A photograph of a DORIAN target (aiming point) should, therefore, be of much greater value to the community if it contains activity than if it does not contain activity. Activity, then, is the actual presence of a specific object designated by the community as representing high technical intelligence value. The same object could apply to more than one target, and the relative value of the objects could vary. Also, designated objects and their values are subject to change as community needs change--due to changes in emphasis and the success of overall collection activities.

4. Activity Indicators - It would be ideal if it were possible for the crew members to always be able to positively confirm the presence or absence of the object(s) designated as constituting activity. However, size of the objects and other limitations make this impossible. Nevertheless, there are conditions which are known to exist in conjunction with the presence of certain high value technical intelligence objects. There may be a variety of these conditions and they may have widely varying degrees of credibility, i.e., they may represent various abstraction levels which possess varying degrees of probability that the object will be present if the condition is present. These conditions are called "activity indicators" or their presence indicates some probability that an associated activity might be present. By using "activity indicators" the probability of the presence of activity can be used as the basis for assigning enhancement value for an "active" target prior to the pass on which it will be vulnerable to photography. The crew members can then make their decisions relative to whether targets are "active" or "inactive" upon whether or not they can confirm the presence or absence of the specified activity indicators. Like activity, these indicators and their values must be designated by the community. Because they would also be subject to change based upon community decision, there must be some way to show the appropriate community-designated activity indicators to the crew members in conjunction with programming their equipment to view the targets. The designation of the indicators in this manner relieves the flight crew from the responsibility for making probability computations relative to a variety of potential indicators, and it relieves them from having to remember a number of indicators and the changes that could occur during the course of a mission. Probabilities should have been determined by the community in designating indicators for the targets, and the updating should occur as a function of target programming.

Much effort is still required to develop valid activity indicators. A representation of the current effort by the SPO to determine possible activity indicators for certain categories of targets is shown in Atch 1.

POSSIBLE ACTIVITY INDICATORS OF TRANSITORY INTELLIGENCE POTENTIAL

COMOR CATEGORY	TYPE		ESTIMATED REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
1A and 1B	Missiles, Deployment (U/C or Mod), ICBM Sites and Missiles, Deployment, Operational, IR/MRBM	Missiles Exposed	10 Ft. Ground Res.	
		Missile Erection/Loading Equipment Exposed	10	
		AGE Exposed	10	
		Vehicular Activity	10	
		Silo Door Open	5	
		Special Road/Rail Vehicles	3	
		Snow Removal	10	
		Particular Construction Phase	3	
1C	Missiles, Test Range	Same as 1A and 1B Plus Firing Evidence - Smoke/Steam	15	
		Flame/Water Discoloration	5	
1D	Missiles, Production, R&D	Missile/Components Exposed	10	
		Vehicular Activity	10	
		Special Road/Rail Vehicles	3	
		Snow Removal	10	
		Firing Indicators -- Smoke	15	
		Steam	15	
		Scars in Snow	10	
		Scars on Ground	3	

COMOR CATEGORY	TYPE	POSSIBLE INDICATOR	ESTIMATED REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
1F	Missiles, Deployment, Suspect or U/I	Launch Complex Pattern Layout	5	
1G	Naval Logistic Support Bases	Missile Carrying Subs and Ships (Combat)	5 Ft. Ground Res.	
		Road/Rail Traffic into Base	10	
		Armaments Exposed	3	
1H	Missiles, Deployment (U/C, Mod), AMM SAM	Missiles on Launchers	5	
		Missiles Stored at Site	5	
		AGE Present	5	
		Radars Present	5	
1I	Missiles, Deployment-SAM Sites	Missiles/Launchers Present	5	Non-conflict targe only on specifical designated sites.
		Radars Present	5	
		AGE in Open	5	
1J	Missiles, Launch Sites, Cruise Missiles	Road/Rail Activity	10	
		Missiles/Launchers Present	5	
		AGE in Open	5	
1K	Missiles, Storage	Missiles in Open	5	
		Road/Rail Activity	10	
		Special Vehicles	3	
		Snow Clearance	10	
1L	Missile Deployment, Operational SAM Training Sites	Same as 1I		

COMOR CATEGORY	TYPE	POSSIBLE INDICATOR	ESTIMATED REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
2A	Airfields -- Long Range Bases	New Aircraft	15	
	Primary -- Long Range Bases	Unusually Configured Aircraft	5	
	Naval	Aircraft in Odd Locations	15	
	Long Range Bases - Staging	Disassembled Aircraft	5	
		Aircraft/Ground Equipment in Weapons Loading Areas	10	
		Aircraft Subsystems Exposed	3	
		Aircraft in Maintenance Docks	10	
		Vehicle/Truck Activity Around Aircraft	5	
2B	Aviation Production and Facilities	Same as 2A +		
		Aircraft Components and Parts Exposed	3-10	
		Large Crates/Road and Rail Activity in Receiving/Shipping Areas	5	
		Engines Exposed or in Test Cells	3	
		Vehicles/Equipment in Test or Storage Areas	3-5	

COMOR CATEGORY	TYPE	POSSIBLE INDICATOR	ES IAT REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
2C	Airfields - Tactical Strike Bases, Fighter Bases, Control, Transportation Bases	Same as 2A + Troop and Army Equipment Loading Exercises	10	
3A	Nuclear Test Sites	Construction Activity	10 Ft. Ground Res.	
		Vehicles/Support Equipment in Storage Areas or Test Areas	5	
		Craters/Earth Slides and Localized Snow Melting	15-20	
3B	Nuclear Production	Road/Rail Activity in Shipping/Receiving Areas	10	
		Unusual Road/Rail Vehicles	3	
		Activity in HE Test Area	3	
3C	Nuclear Storage	Vehicular Activity Near Bunkers/Buildings	10	
		Unusual Vehicles/Material/Crates in Open	3	
3D	Nuclear Institutes	Unusual Vehicles/Material/Crates in Open	3	Unlikely Target f Quick Look
3E	Nuclear Energy			Unlikely Targets

COMOR CATEGORY	TYPE	POSSIBLE INDICATOR	ESTIMATED REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
4A	Naval - Surface Ship Bases	Vessels Present	15	
		Vessel Types	10	
		Vessel Classes	3	
		Road/Rail Traffic	10	
		Vessel Loading	5	
4B	Naval, Shipyard (Missiles	Ships in Dry Docks, Marine Railways, Etc.	5 Ft. Ground Res.	Most intelligence is of non-transitor nature
		Ship Classes	10	
		Missile - Nuclear Features	3	
		Partial Hulls, Etc.	3-5	
4C	Naval Activity/Ports Ships	Presence of Vessels	10	
		Type of Vessels	5	
		Vessel Classes	3	
		Loading Operations	5	
5A	BW/CW Major Proving Grounds	Look for Test Grids at Suspected Locations		
		Smoke, Aerosols	5-10	
		Vehicle Activity	5	
		Special Vehicles	3	
		Troop Activity	3	
		Instrumentation	3	
5B	BW/CW, Major Production and Storage	Special Vehicles	3	
		Road/Rail - Heavy Traffic	5	
5C, 5D, 5E	BW/CW Other	See 5A, 5B		
6A	Electronics/Communications Major	Particular Construction Phase	5	

COMOR CATEGORY	TYPE	POSSIBLE INDICATOR	ESTIMATED REQUIRED RESOLUTION FOR QUICK LOOK	REMARKS
6B	Electronics/Communications, Other	Mobile Equipment Present Radome/Covers Removed	5 5	Most intelligence is of non-transitory nature except on special tgts
7A	Ground Forces, Major Installations, Motor Pool	Vehicles Present Vehicle Types Maintenance Activity	5 3 5	
7B, 7D	Military Activity	Vehicle Activity Troops in Area, Tents, Etc.	5 5	
8A	Complexes	Unusual Activity in Rail Yards Road/Rail Traffic	5	Unlikely targets
8B	Ground Forces, Armament Production, Ground/Naval	Armaments Firing in Progress Special Vehicles Present	3 3	
8C	Geodetic Control Pts.			Not applicable
9A	Miscellaneous	Vehicle Traffic Vehicle Concentration Troop Concentration	10 10 10	Unlikely targets
11A	World Cities			Not applicable

APPENDIX C: EXPLANATION OF AIMING POINT DATA SHEET

This appendix provides guidance in the specification of additional data for the Model 608 Analysis Deck. A separate sheet will be prepared for each of the 1776 Aiming Points. Appendix C1 is an example of a completed data sheet.

Item 1, 2 & 3: Aiming point number and geodetic coordinates as specified in the Sortie Planning List.

Item 4a: Verbal description of the intelligence requirements and specific types of data required by the intelligence analyst such as type of measurement, equipment identification, etc.

Item 4b: A verbal description of the type of photographs required. It should include desired photographic sequences, viewing angles, direction of photograph, desired resolution, and special film type requirements (i.e., IR, color, or high speed).

Item 4c: A verbal description of coverage requirements in terms of frequency.

Item 4d: The Analyst's verbal description of activity indicators which would be visible with 6' to 10' resolution through the ATS and whose presence is highly correlated with the activity on this target which would enhance the value of collected photography. This activity need not be recognizable through the ATS at the time of photography. See Appendix B for further discussion of activity and activity indicators.

Item 5: Enter a number 1 through 5 to indicate desired photographic sequence. The five sequences which are available are described in Table 1. The desired sequence should be the one which will provide photographs that best match the requirements stated in Item 4b. The desired sequence and the desired initial pitch angle selected in Item 9 define the optimum photographic coverage.

Item 6: Enter a number 0 through 9 to indicate the weighting table that relates the value of desired photographic sequence selected in Item 5 to other available photographic sequences. The relative values used in each table are shown in Figure 1. For example, if Item 5 showed a desire for sequence 1, the selection of Table 1 indicates that photographs obtained from using sequences 2 and 3 are worth 70%, sequence 4 is worth 10%, and sequence 5 is worth 90% of those obtained from the desired sequence 1.

Item 7: Enter a value for K of 1, 10, 100, 1000, or 10,000 to reflect the relative value of a target in an active state compared to its value in an inactive state. A complete discussion of activity and active indicators is given in Appendix B. Such activity, when present, would enhance the target's intelligence value. Active value = K (inactive value).

Item 8: Enter a number 0 through 99 to indicate the percentage of the time that the analyst, based on past experience and coverage, would expect activity to occur.

Item 9: Enter a number + 30 through - 40 to indicate the desired pitch angle for start of photographic sequence (see Item 5). Pitch angle is the angle in the orbit plane between the line of sight from the vehicle to the target and the local vertical. Hardware limitations restrict the pitch angle to a value between + 30° and -40°.

Item 10: Enter a number 1 through 6 to indicate the type of pitch weighting function shown in Figures 2 through 7 which reflects the relative value of starting the photo sequence at a pitch angle other than the one selected in Item 9.

Item 11: Enter a number 0 through 90 to indicate the maximum allowable obliquity angle. Obliquity angle is the angle in a plane perpendicular to the orbit plane between the line of sight from the vehicle to the target and the local vertical. Hardware limits are plus or minus 40°.

Item 12: Enter a value for photographic resolution [redacted] which would satisfy the indicated percentages of the intelligence requirements.

Item 13: Mark YES or NO to indicate if a visual intelligence report only would be sufficient to satisfy most of the intelligence requirements on this target.

TABLE 1: PHOTOGRAPHIC SEQUENCES

Sequence No. 1. Type: Symmetric Stereo

Seven Frame Sequence: First three primary frames at 3 degrees pitch increments; a 16 degrees tracking angle with a secondary frame inserted midway; and a final series of three primary frames of 3 degrees pitch increments.

An example of this sequence in which the starting angle was specified at +14 degrees pitch is:

14^{o}	11^{o}	8^{o}	0	-8^{o}	-11^{o}	-14^{o}
Pri	Pri	Pri	Sec	Pri	Pri	Pri

Sequence No. 2. Type: Forward Asymmetric Stereo

Five Frame Sequence: First three primary frames at 3 degrees pitch increments; a 12 degrees tracking angle with a secondary frame inserted midway; and a final primary frame.

An example of this sequence in which the desired starting angle was 11 degrees is:

11^{o}	8^{o}	5^{o}	-1^{o}	-7^{o}
Pri	Pri	Pri	Sec	Pri

Sequence No. 3. Type: Aft Asymmetric Stereo

Five Frame Sequence: A single primary frame; a 12 degrees tracking angle with a secondary frame inserted midway; and three primary frames at 3 degrees pitch increments.

An example of such a sequence for a desired start angle of 8 degrees is:

8^{o}	2^{o}	-4^{o}	-7^{o}	-10^{o}
Pri	Sec	Pri	Pri	Pri

Sequence No. 4. Type: Basic Mono Sequence

Three Frame Sequence: Two primary frames at 6 degrees separation and a secondary frame midway between the primary frames.

An example of this sequence for a desired pitch of +15 degrees is:

15°	12°	9°
Pri	Sec	Pri

Sequence No. 5. Type: Continuous Coverage Mode

Twelve Frame Sequence: Four primary frames at 3 degrees pitch increments; a 9 degrees tracking angle with a secondary shot inserted; and a final sequence of seven primary frames at 3 degrees pitch increments.

An example of such a sequence for a desired starting angle of 12 degrees is:

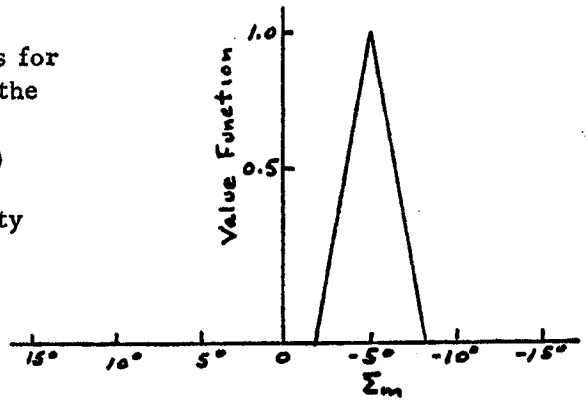
12°	9°	6°	3°	0°	-6°	-9°	-12°	-15°	-18°	-21°	-24°
				Sec							

FIGURE 1: PHOTO MODE WEIGHTING TABLES

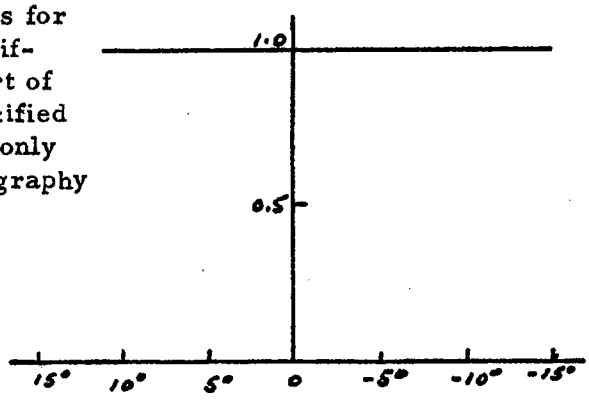
Table	1	2	3	4	5	6	7	8	9	0
Sequence 1	1.	.9	.9	.5	.8	1.	1.	.8	.8	.7
Sequence 2	.7	1.	.8	.5	.6	.5	.2	1.	.9	.5
Sequence 3	.7	.8	1.	.5	.6	.5	.2	.9	1.	.5
Sequence 4	.1	.2	.2	1.	.1	0	0	.3	.3	.1
Sequence 5	.9	.7	.7	.5	1.	.9	.8	.9	.9	1.

FIGURE 2: NOMINAL PITCH WEIGHTING FUNCTIONS

TYPE 1: This weighting function is for very pitch sensitive targets where the user is very particular about the specified initial pitch angle (Σ_m) at the start of the sequence. This particular example shows sensitivity about Σ_m of -5^o.



TYPE 2: This weighting function is for targets about which the user is indifferent to the pitch angle at the start of a sequence. In this case, the specified initial pitch angle will be obtained only if it does not interefere with photography on other targets.



TYPE 3: This weighting function is for targets about which the user is indifferent to pitch angle over a certain range and sensitive to pitch angle outside of this range. The nominal indifference range will be $\pm$ 5 degrees from the specified initial pitch angle, Σ_m. This example shows a desired Σ_m of 0 degrees.

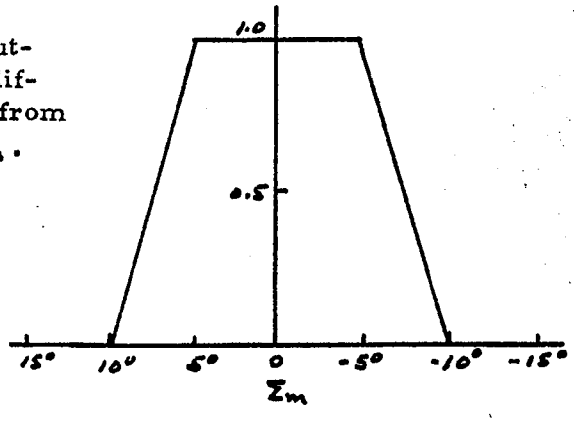
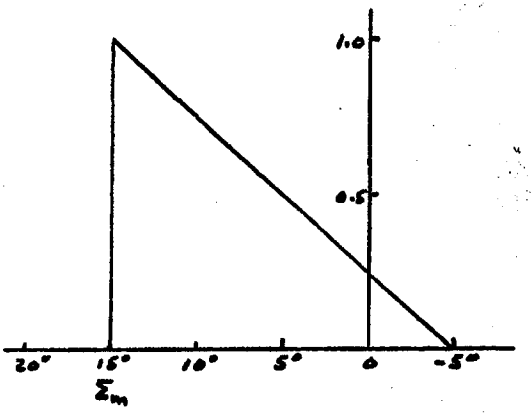
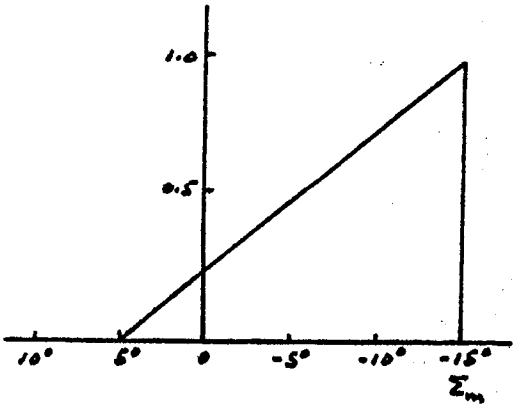


FIGURE 2: NOMINAL PITCH WEIGHTING FUNCTIONS (CON'T)

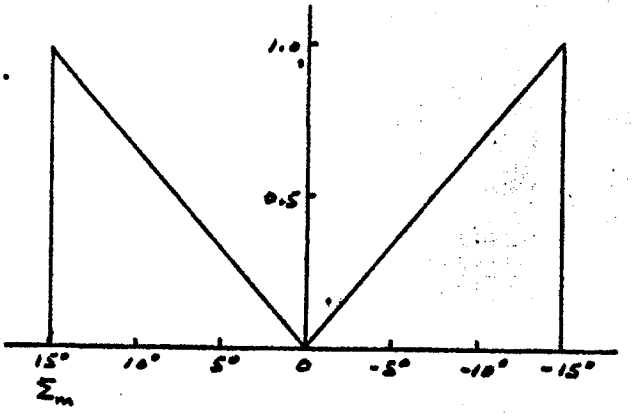
TYPE 4: This weighting function is for targets where the value of a photo sequence is of decreasing value as the starting pitch angle moves from fore to aft. The nominal full value to zero value range will be Σ_m to (Σ_m = -20 degrees). This particular example reflects a user desire for $\Sigma_m = +15$ degrees.



TYPE 5: This weighting function is for targets where the value of a photo sequence increases as the initial pitch angle moves from fore to aft. The nominal range from zero value to full value will be (Σ_m +20) to Σ_m. This particular example is for Σ_m = -15 degrees.



TYPE 6: This weighting function is for targets on which either a forward or aft high oblique sequence is desired. The nominal varies from full value at $\pm\ \Sigma_m$ to zero value at ($+|\Sigma_m|$-15 degrees) and ($-|\Sigma_m|$ +15 degrees). This example shows the function for Σ_m = 15 degrees.



APPENDIX C1: AIMING POINT DATA SHEET

1. Aiming Point No. 1A0019D A

2. Latitude: 46° 00' 58" N

3. Longitude: 64° 01' 07" E

4. Verbal Description:
   a. Intelligence Rqmt: Detailed dimensioning of missiles, transporters, loaders, fueling vehicles, cranes, auxiliary equipment. Check any retorfitting on site to determine extent & follow-on photo coverage rqmts.
   b. Photographic Rqmt: Symmetrical stereo, high oblique at 30° coverage fram all directions, color film to detect blast marks, medium contrast, max resol requirement = [redacted] 50% rqmts satisfied by [redacted]
   c. Frequence: Annually or when equipment is observed
   d. Visible Activity Indicators: Fueling trucks, instrument vans near launch pad, missile loaders.

5. Desired Photo Sequence: 1

6. Photo Mode Weighting Table: 1

7. Activity Enhancement Factor: K = 100

8. Probability of Activity: 60%

9. Desired Pitch of Sequence Start: +/- 30°

10. Pitch Weighting Function: 4

11. Obliquity Limit: 40°

12. Resolution Required to Fill Percent of Intelligence Rqmts

%	Resol [redacted]
95	[redacted]
75	
50	
0	

13. Visual Intelligence Acceptable: YES X NO ___

AIMING POINT DATA SHEET

1. Aiming Point No. _____

2. Latitude: _____ _____ _____ _____

3. Longitude: _____ _____ _____ _____

4. Verbal Description:
   a. Intelligence Rqmt:

   b. Photographic Rqmt:

   c. Frequency:

   d. Visible Activity Indicators:

5. Desired Photo Sequence: _____

6. Photo Mode Weighting Table: _____

7. Activity Enhancement Factor: K = _____

8. Probability of Activity: _____ %

9. Desired Pitch of Sequence Start: _____

10. Pitch Weighting Function: _____

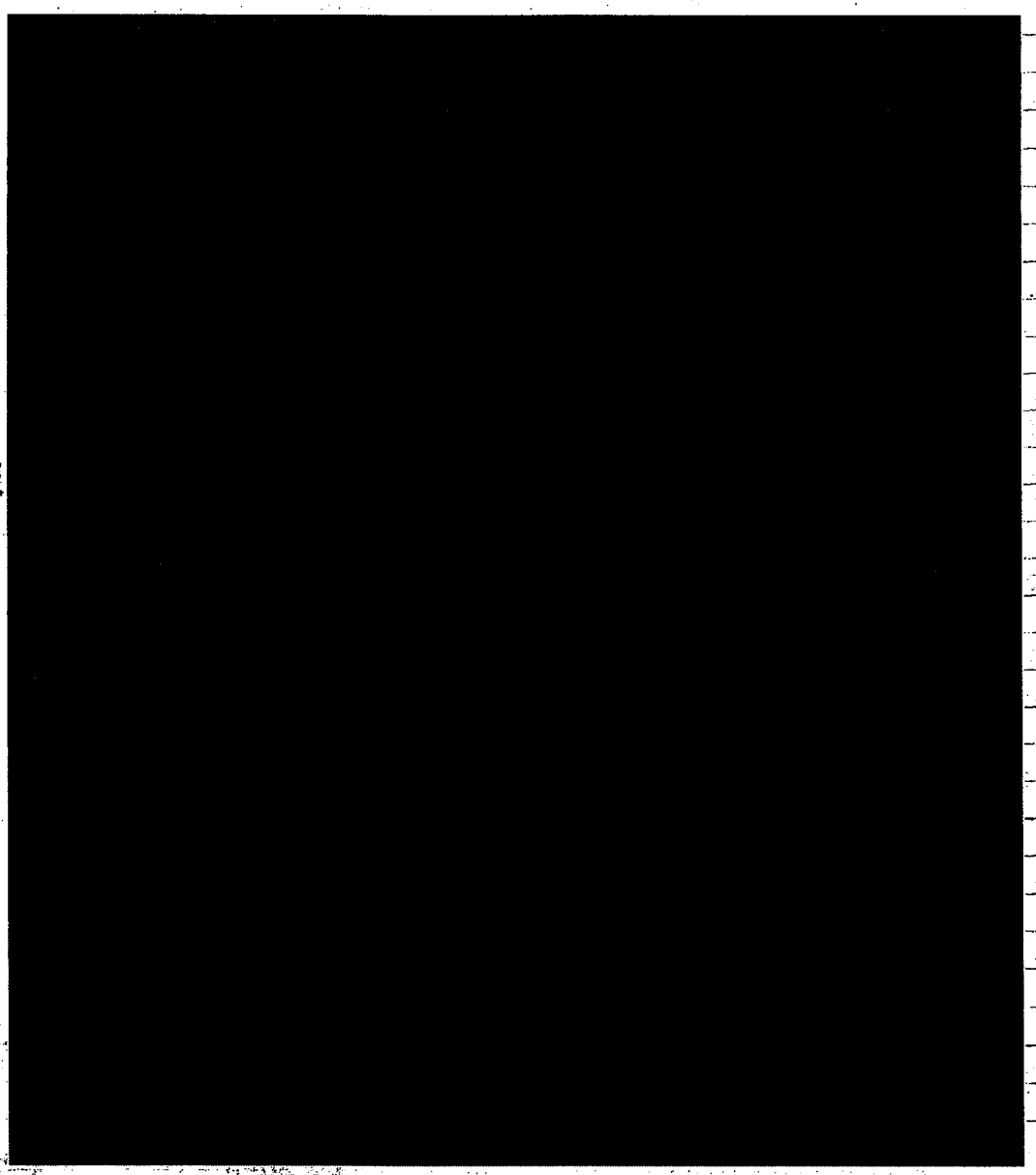
11. Obliquity Limit: _____

12. Resolution Required to Fill Percent of Intelligence Rqmts

%	Resol [redacted]
95	_____
75	_____
50	_____
0	_____

13. Visual Intelligence Acceptable: YES _____ NO _____

[redacted]



BEGOUI

1	COMIREX	INSTALLATION NAME			SAC	COORDINATES	D	DIAM	SH	E	YR	SPECIAL CHART		S	V
2	WAC/BE		CC	TDI CAT	WGS-60	COORDINATES	D		PR	DATE	MISN	CAM	FR	X	Y
3		AP AIMING POINT NAME			SAC	COORDINATES	D	PE DIAM	SEQ		PIT/OBLI	R95	R75	R50	
4			PRI	SAC FTD	WGS-60	COORDINATES	D	ELEV	TAB		WT-FN	REPT	FCTR	PACT	PIE
5		INTELLIGENCE REQUIREMENTS			PHOTO	REQUIREMENTS						FREQUENCY REQUIREMENTS			
6				ACTIVITY INDICATORS											

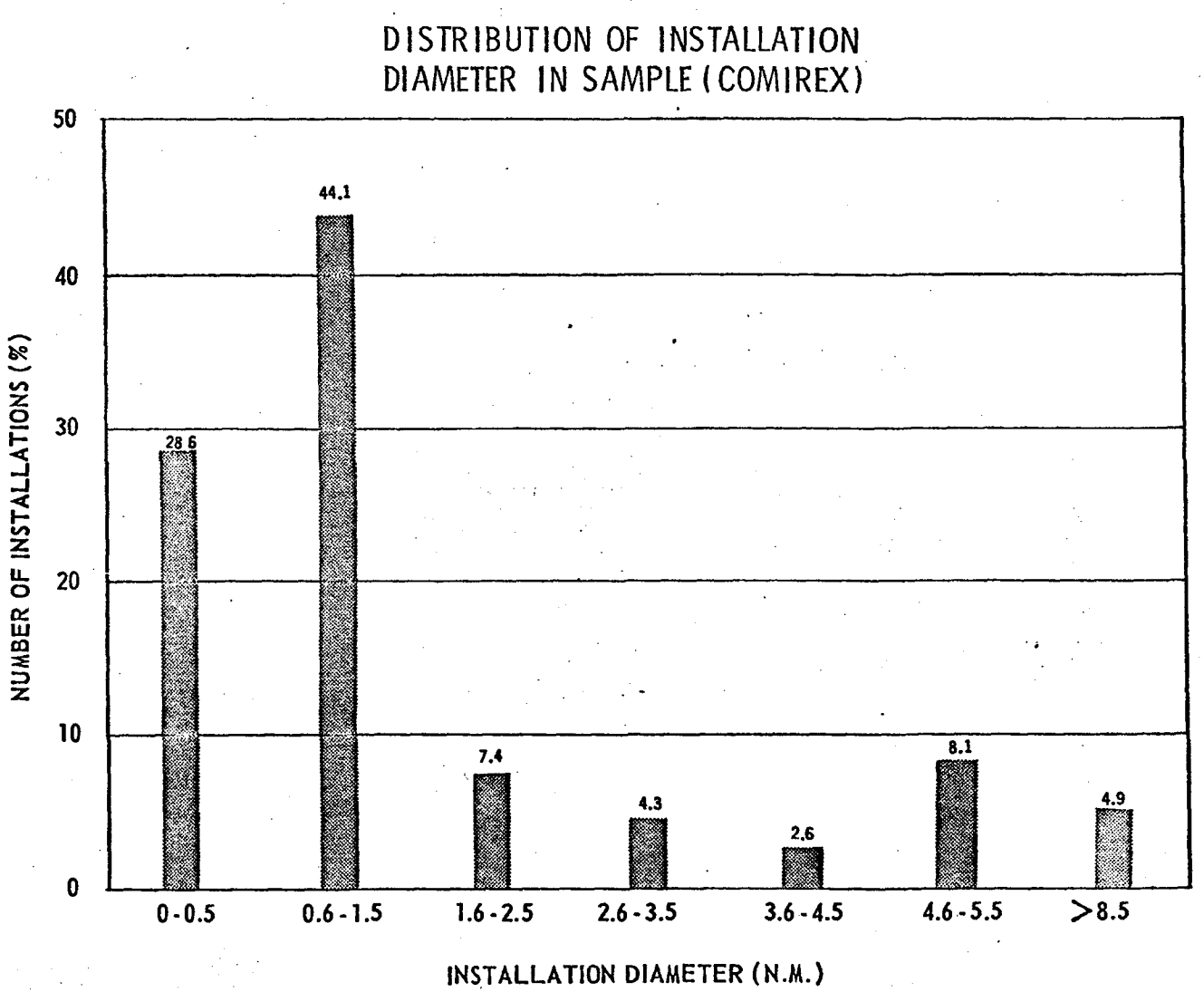
[redacted]

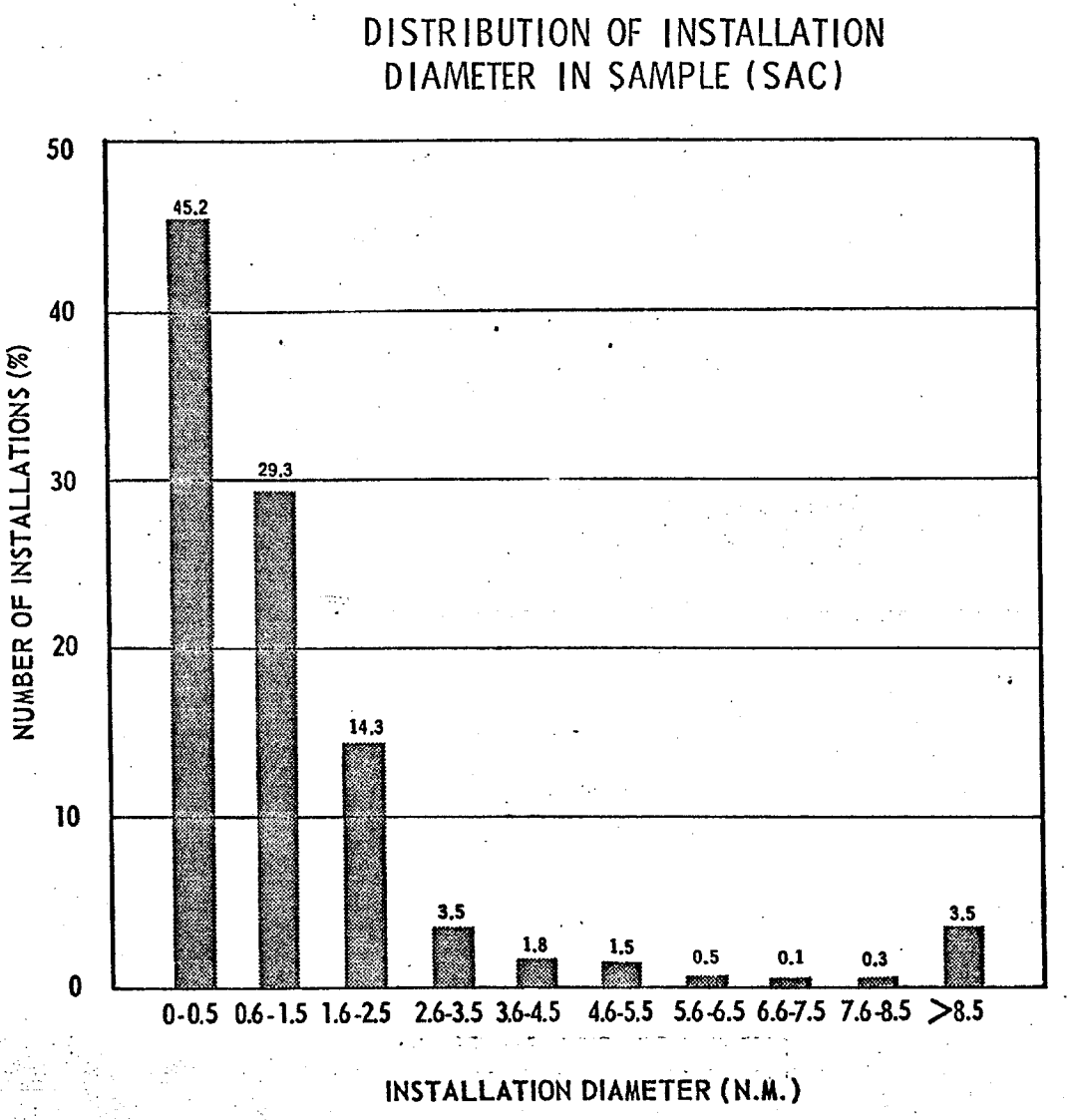
5	DETAILED DESCRIPTION OF LAUNCH CONTROL BUNKER ACTIVITY. DEFINE STRUCTURAL CHANGES/MODIFICATION TO EXISTING BUNKER. DESCRIBE AND DIMENSION COMMUNICATION, ELECTRONIC/GUIDANCE EQUIPMENT, GUIDANCE COMPONENTS, MASTS/ANTENNAS. DIMENSION AND DESCRIBE ANY NEW EQUIPMENT BEING INSTALLED.	SYMMETRICAL STEREO, VERTICAL, 25-40 DEGREE OBLIQUES. MAX RESOLUTION REQUIRED [redacted] 95 PERCENT OF REQUIREMENT WITH [redacted] 75 PERCENT WITH [redacted] AND 50 PERCENT WITH [redacted] COLOR FILM REQUIRED.	SEMIANNUALLY. IF THERE IS EVIDENCE OF CONTROL BUNKER BEING MODIFIED.
6	EARTH REMOVAL FROM BUNKER, PRESENCE OF CONSTRUCTION EQUIPMENT AND EXCAVATING AROUND STRUCTURE.		

[redacted]

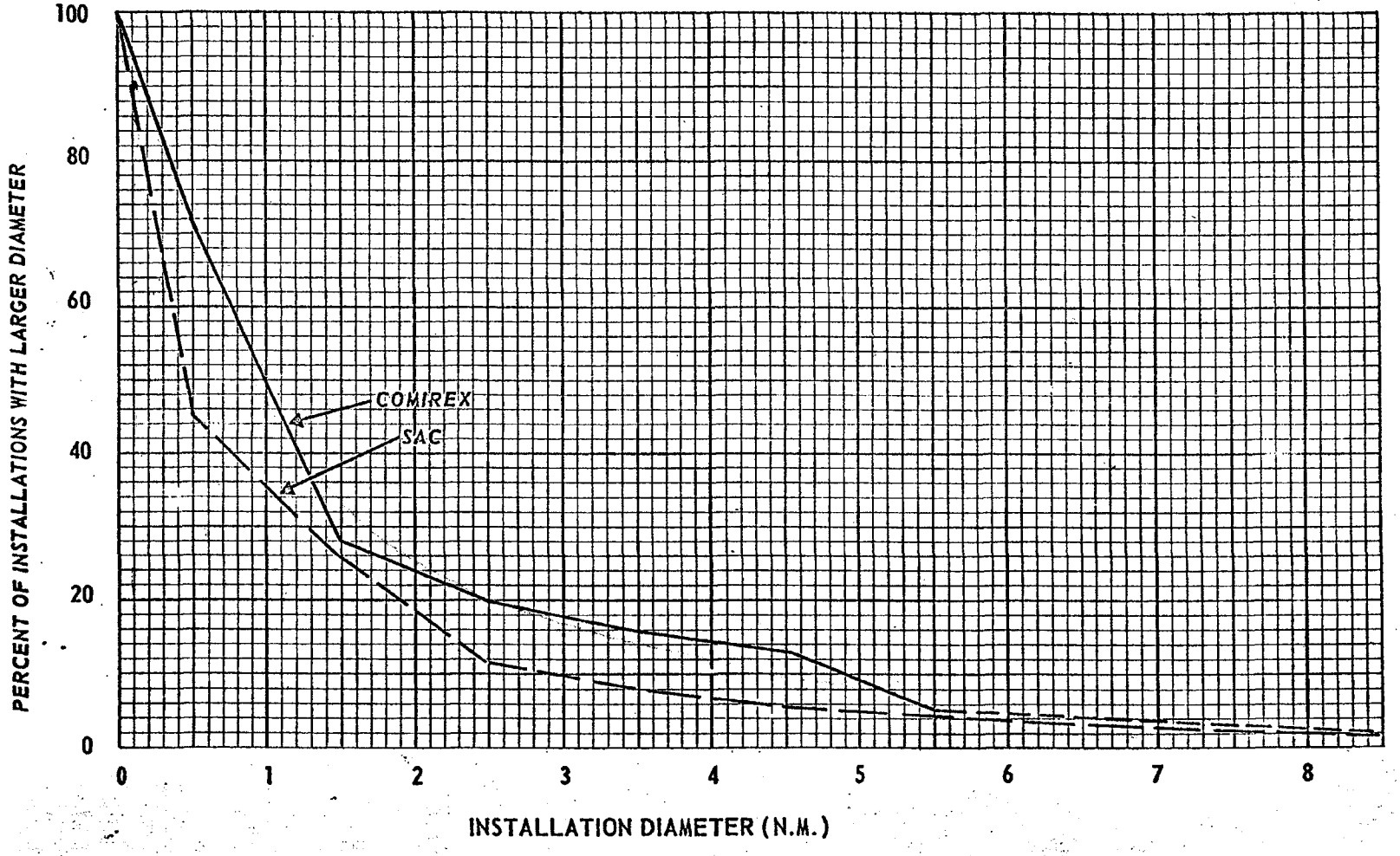
5	DETAILED SITE ACTIVITY DESCRIPTION. DETAILED DIMENSIONING OF MSLS. GROUND SUPPORT EQUIPMENT AND SERVICE TOWER. DESCRIBE COMMUNICATION AND ELECTRONICS/ GUIDANCE FACILITIES. DIMENSION GUIDANCE COMPONENTS. DEFINE ANY SITE RETROFIT. DESCRIBE AND DIMENSION COMPONENTS THAT WOULD INDICATE A CHANGE OF SITE FUNCTION TO A SPACE ROLE.	SYMMETRICAL STEREO, VERTICAL, 25-40 DEGREE OBLIQUES OF MSLS, FUELING AND SUPPORT VEHICLES, AND OBTAIN A 25-40 DEGREE OBLIQUE LOOKING IN A SSE DIRECTION. OBTAIN EXPOSURE IN THE PM LOCAL SUN TIME. OBTAIN FRONT SIDE AND REAR VIEW OF EQUIPMENTS. MAX AND 95 PERCENT OF REQUIREMENT FILLED WITH [redacted] 75 PERCENT WITH [redacted] AND 50 PERCENT WITH [redacted] COLOR PHOTOGRAPHY REQUIRED.	MONTHLY. IF MSLS OR TRANSPORTERS ARE EVIDENT. IF RETROFIT OF SITE IS EVIDENT.
6	PRESENCE OF MSLS, MSL TRANSPORTERS, GANTRY/SERVICE TOWERS IN POSITION. TANK CARS AND TRUCKS. EXCAVATING/CONSTRUCTION ACTIVITY.		

1	COMIREX	INSTALLATION NAME				SAC	COORDINATES	D	DIAM	SH E YR	SPECIAL CHART			S	V		
2	#AC/BE		CC	TDI	CAT	#GS-60	COORDINATES	D		PR DATE	MISN	CAM	FR	X	Y		
3		AP AIMING POINT NAME				SAC	COORDINATES	D	PE DIAM	SEQ	PIT/OBLI	R95	R75	R50			
4			PRI	SAC	FTD	#GS-60	COORDINATES	D	ELEV	TAB	WT-FN	REPT	FCTR	PACT	PIE		
5		INTELLIGENCE REQUIREMENTS				PHOTO REQUIREMENTS					FREQUENCY REQUIREMENTS						
6		ACTIVITY INDICATORS															
[redacted]																	
5	DETAILED DESCRIPTION OF LAUNCH READY BLDG ACTIVITY. CHECK READY BLDG FOR MODIFICATION. DIMENSION NEW TOWERS, LIGHTNING DIVERTERS, VENTS, STACKS, UTILITIES, RAIL SERVICE AND ELECTRONIC DEVICES. DESCRIBE AND DIMENSION ANY SPACE LAUNCH SUPPORT EQUIPMENT. DESCRIBE AND DIMENSION ANY NEW/MODIFIED MSLS, RAIL TRANSPORTERS AND MSL ASSOCIATED EQUIPMENT.					SYMMETRICAL STEREO, VERTICAL, 20-40 DEGREE OBLIQUES LOOKING NW AND SE. MAX RESOLUTION REQUIRED [redacted] 95 PERCENT OF REQUIREMENT WITH [redacted] 75 PERCENT WITH [redacted] AND 50 PERCENT WITH [redacted] COLOR FILM REQUIRED.					QUARTERLY. IF THERE IS EVIDENCE OF THE READY BLDG BEING MODIFIED. IF THERE ARE MSLS OR RAIL TRANSPORTERS ABOUT THE BLDG.						
6		MSLS, RAIL TRANSPORTERS, CONSTRUCTION OR EXCAVATING ABOUT BLDG.															
[redacted]																	
5	DETAILED DESCRIPTION OF LAUNCH TECHNICAL SUPPORT AREA ACTIVITY. DEFINE NEW EXCAVATING/CONSTRUCTION, STRUCTURAL CHANGES TO THE EXISTING SUPPORT FACILITIES AND DEFINE METHODS/PROCEDURES FOR THE SERVICING SUPPORT AND STORAGE OF MSL HANDLING EQUIPMENT. DEFINE THAT EQUIPMENT NECESSARY FOR THE SUPPORT OF SS-6 LAUNCH OPERATIONS USED IN THE TECH SUPPORT AREA.					SYMMETRICAL STEREO, 25-40 DEGREE OBLIQUES. MAX RESOLUTION REQUIRED [redacted] 95 PERCENT OF REQUIREMENT [redacted] 75 PERCENT WITH [redacted] AND 50 PERCENT WITH [redacted] COLOR FILM REQUIRED.					SEMIANNUALLY. IF THERE IS EVIDENCE OF SUPPORT FACILITIES BEING MODIFIED.						
6		CONCENTRATIONS OF EQUIPMENT, CONSTRUCTION/EXCAVATING ACTIVITY.															
[redacted]																	

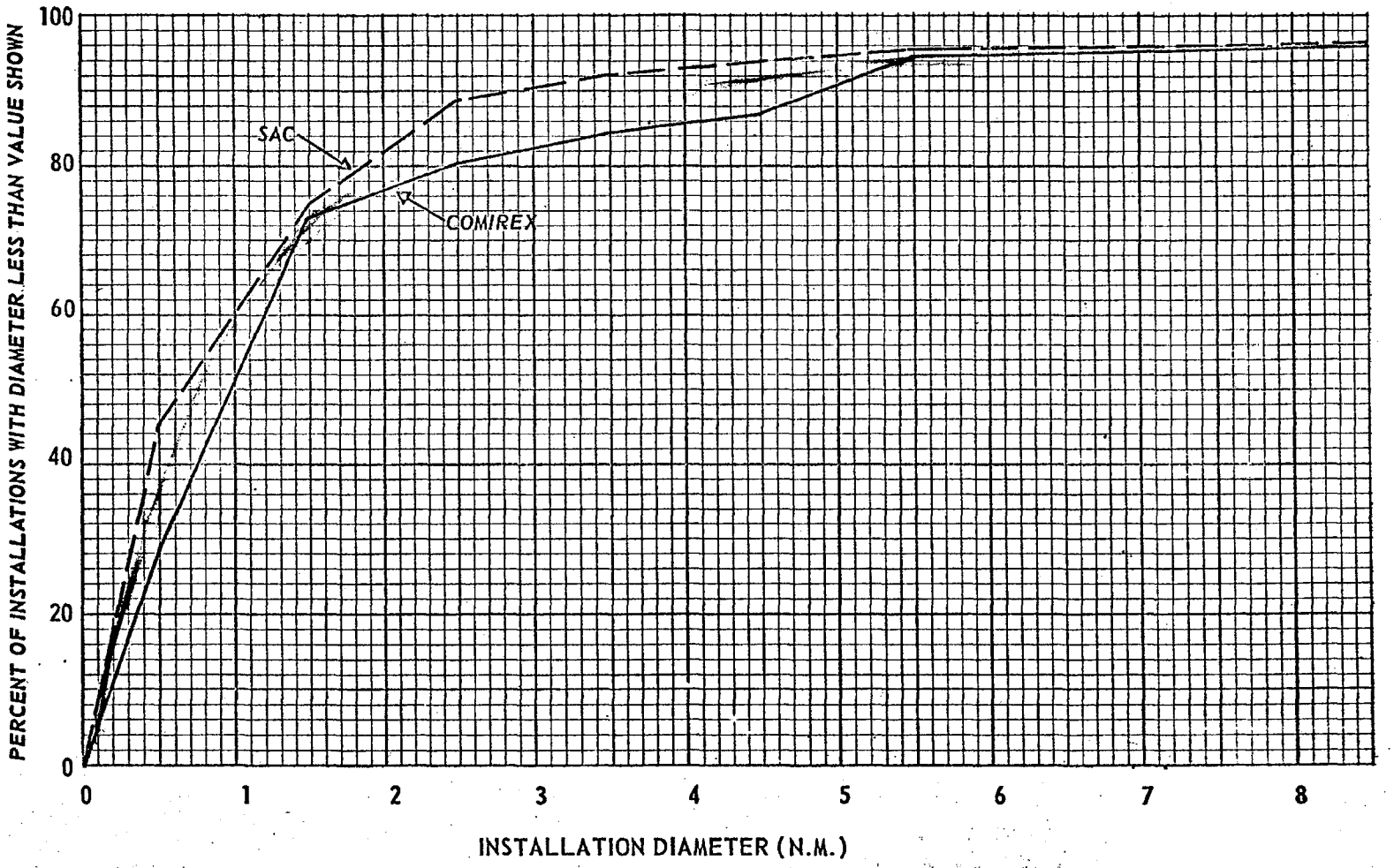




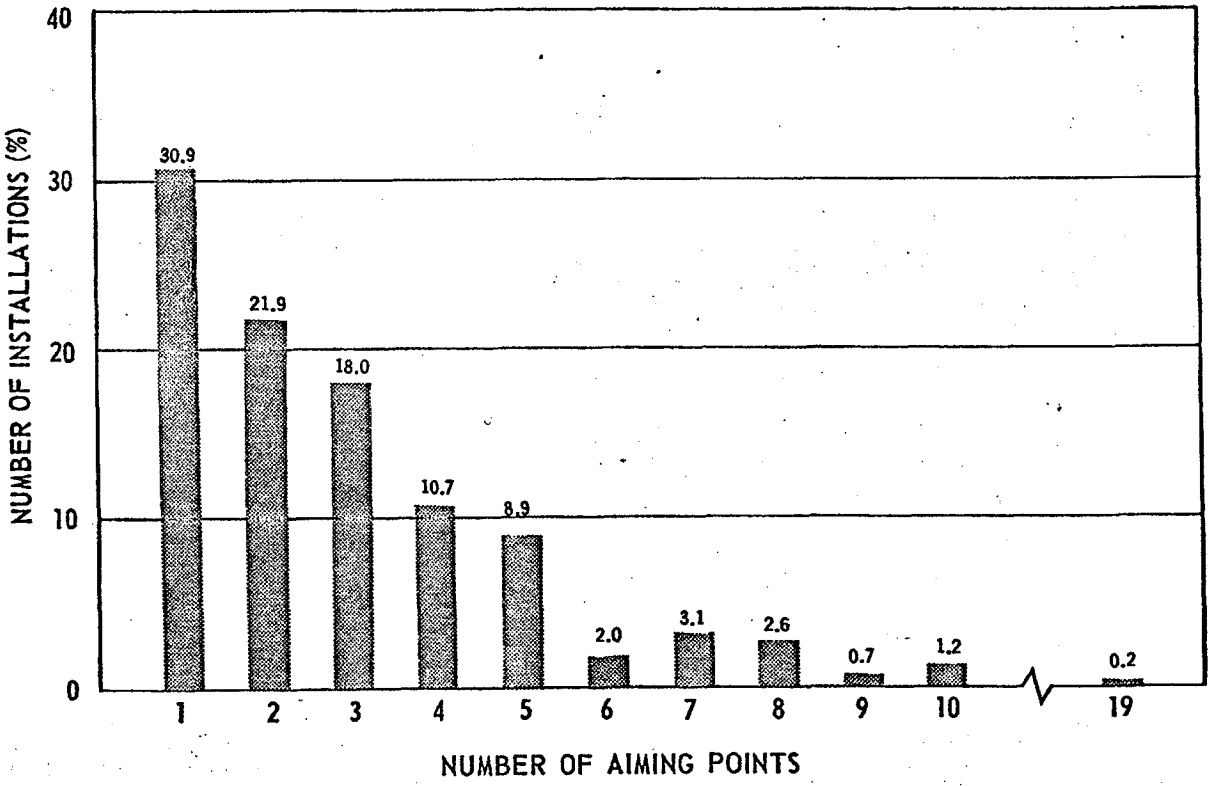
DISTRIBUTION OF INSTALLATION DIAMETER IN SAMPLE



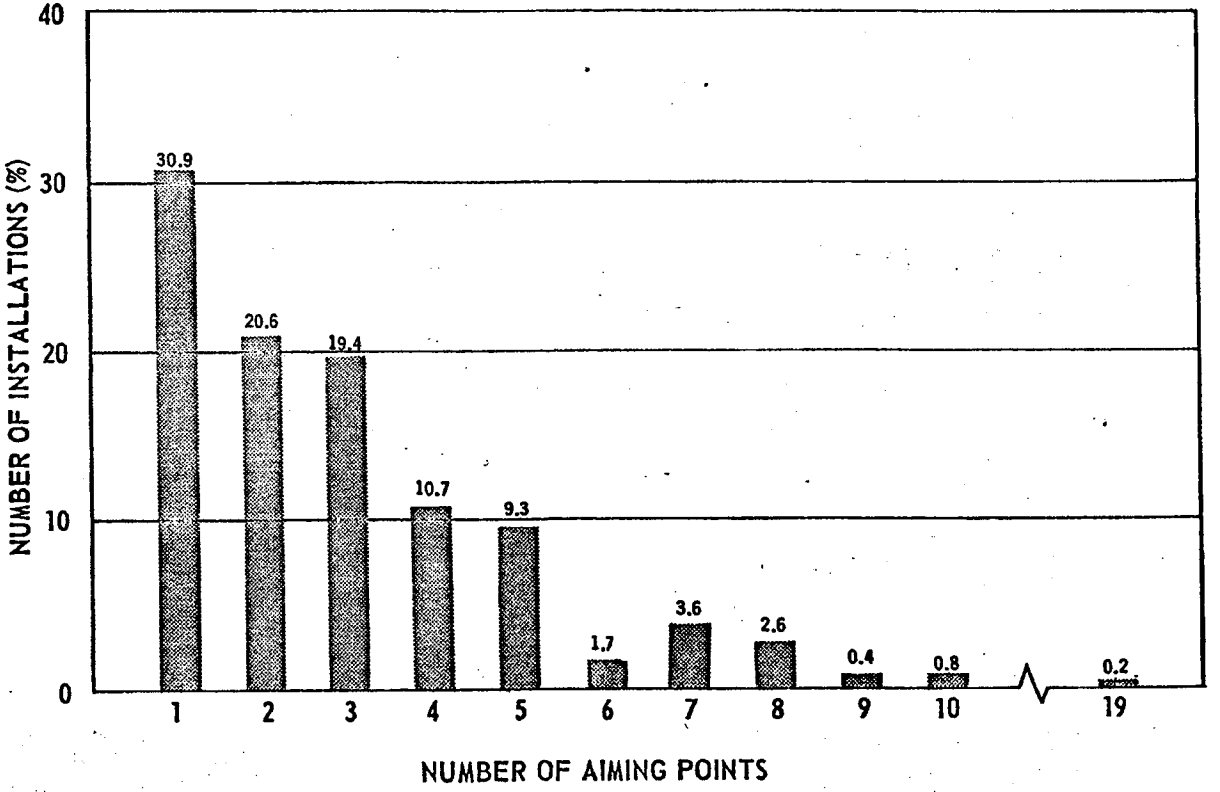
DISTRIBUTION OF INSTALLATION DIAMETER IN SAMPLE



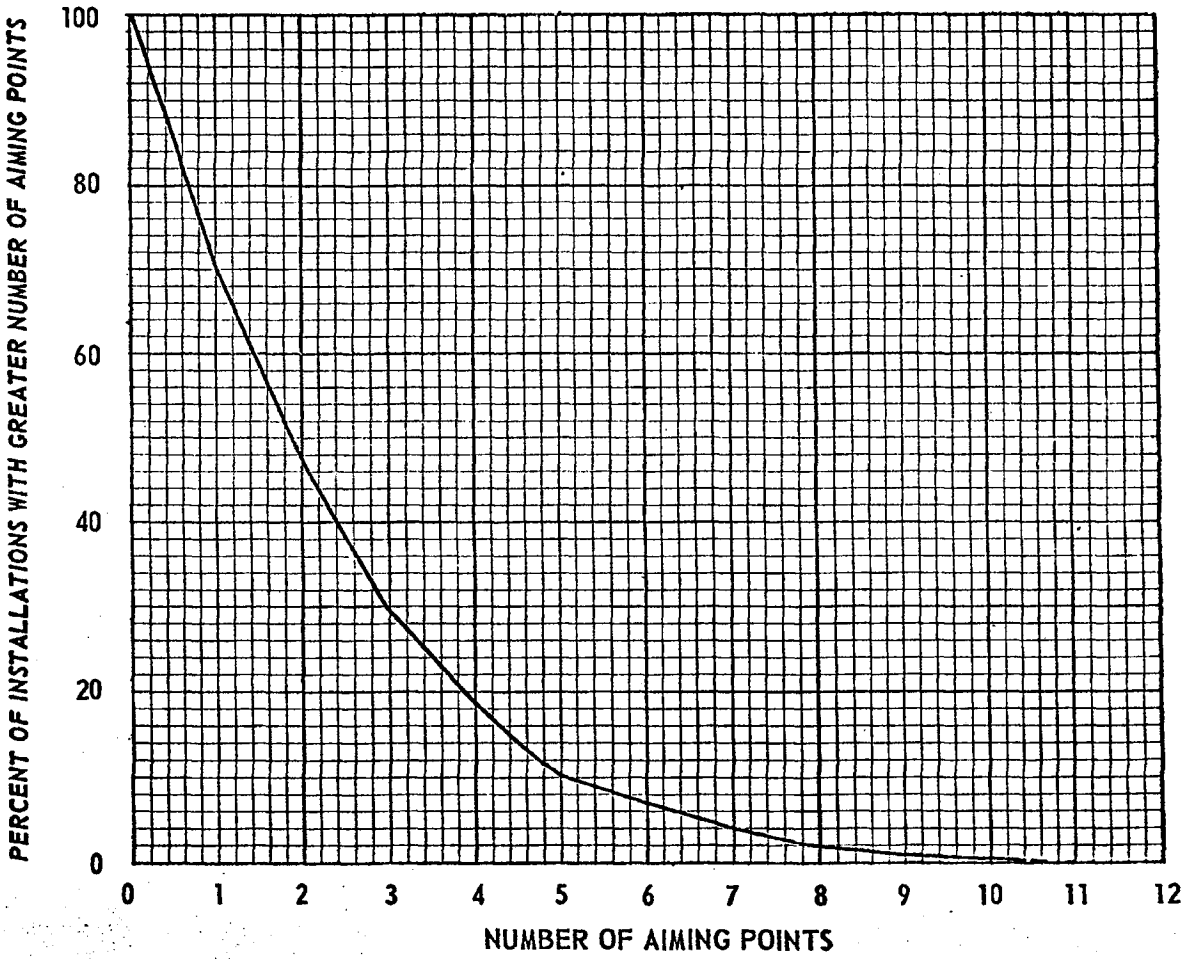
DISTRIBUTION OF AIMING POINTS PER INSTALLATION IN SAMPLE

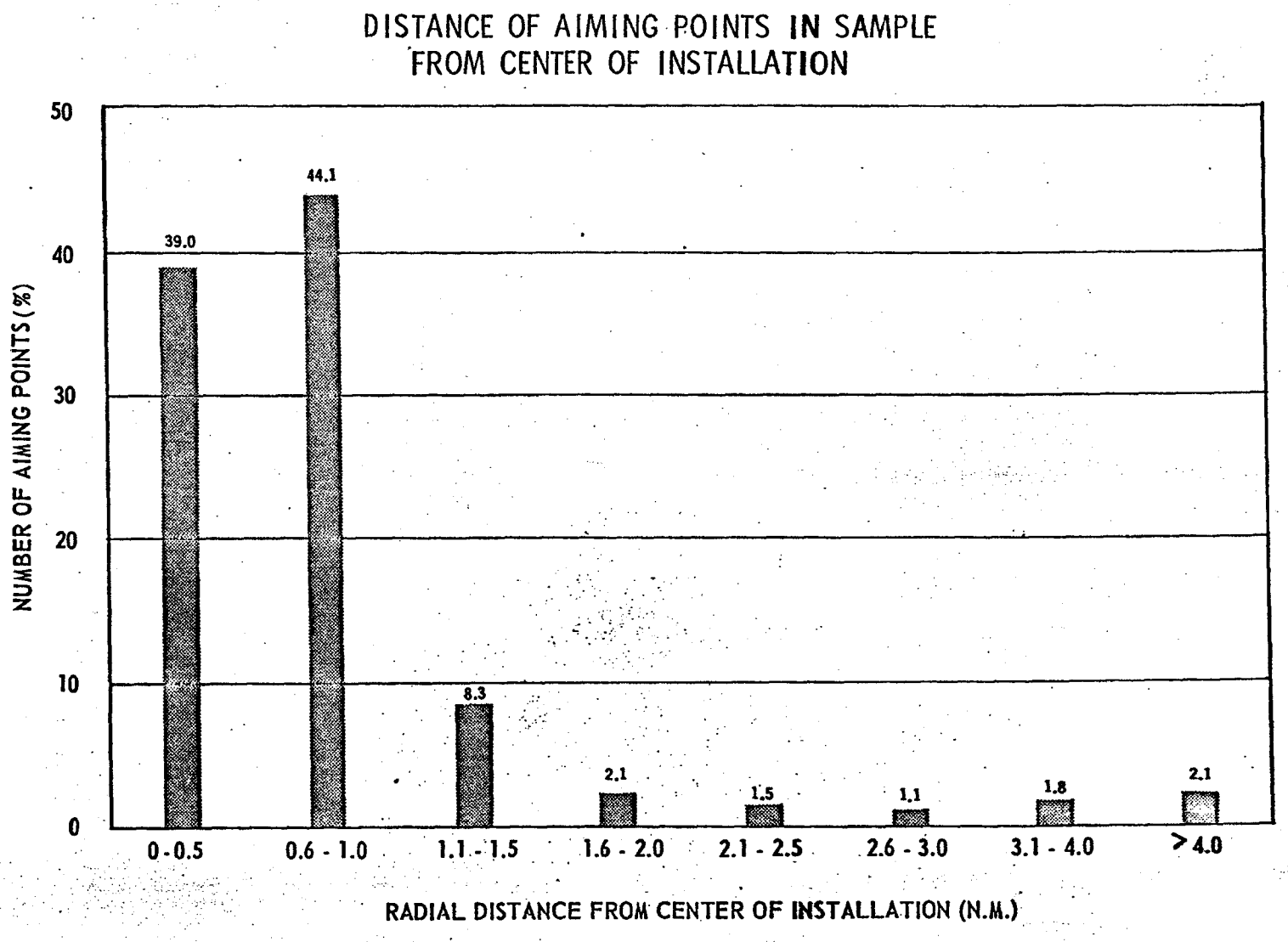


DISTRIBUTION OF AIMING POINTS PER INSTALLATION IN TOTAL DECK

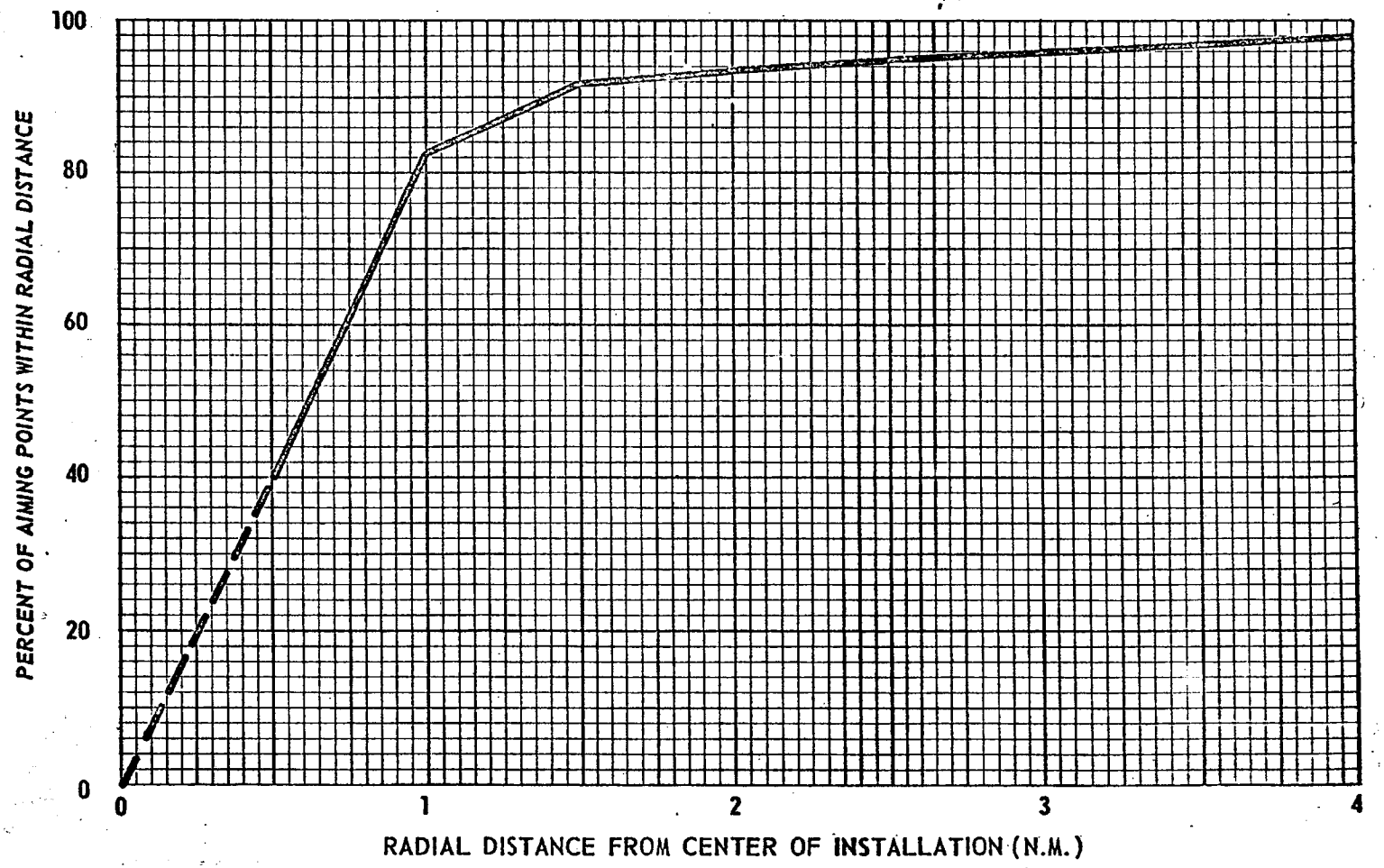


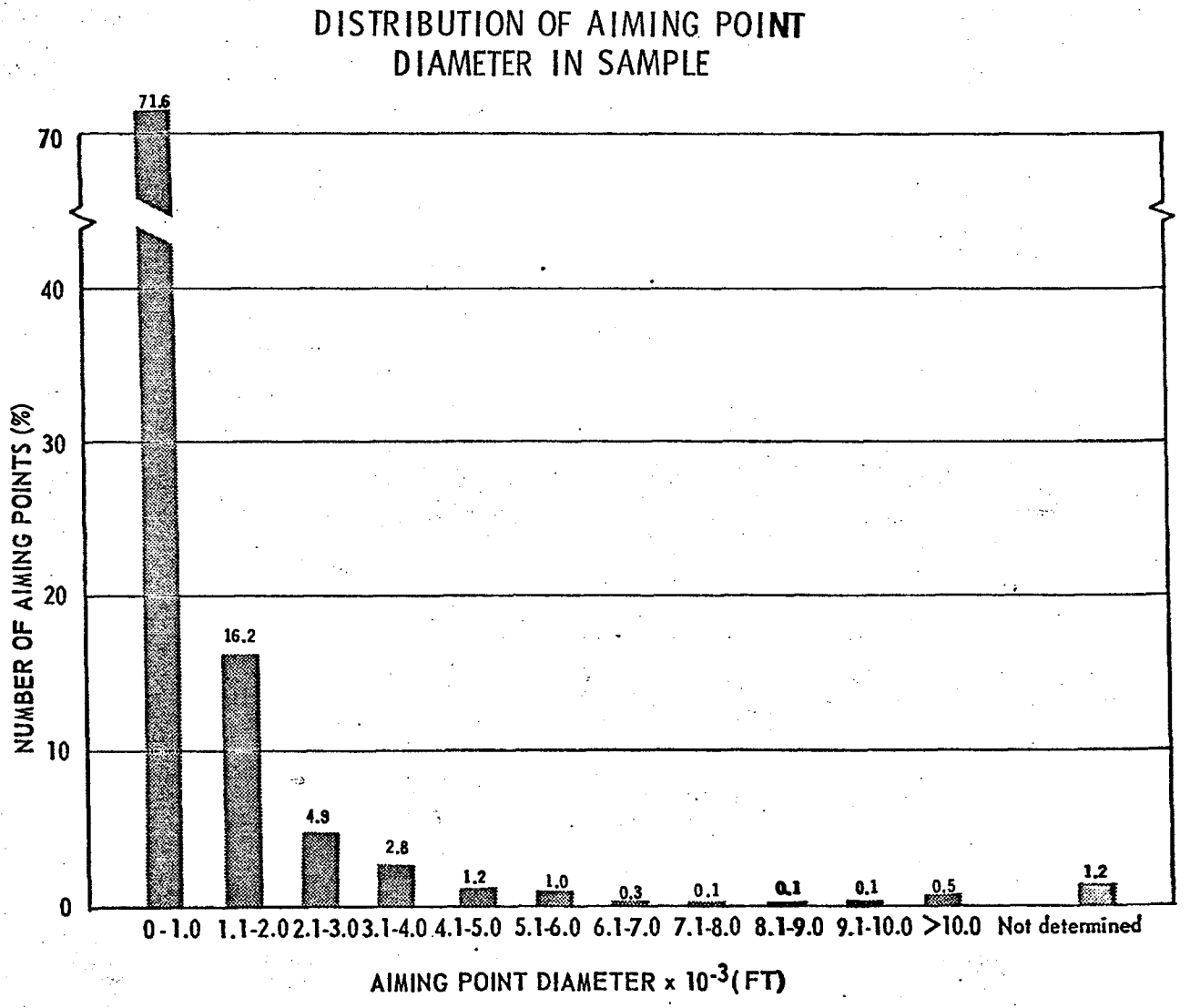
DISTRIBUTION OF AIMING POINTS PER INSTALLATION



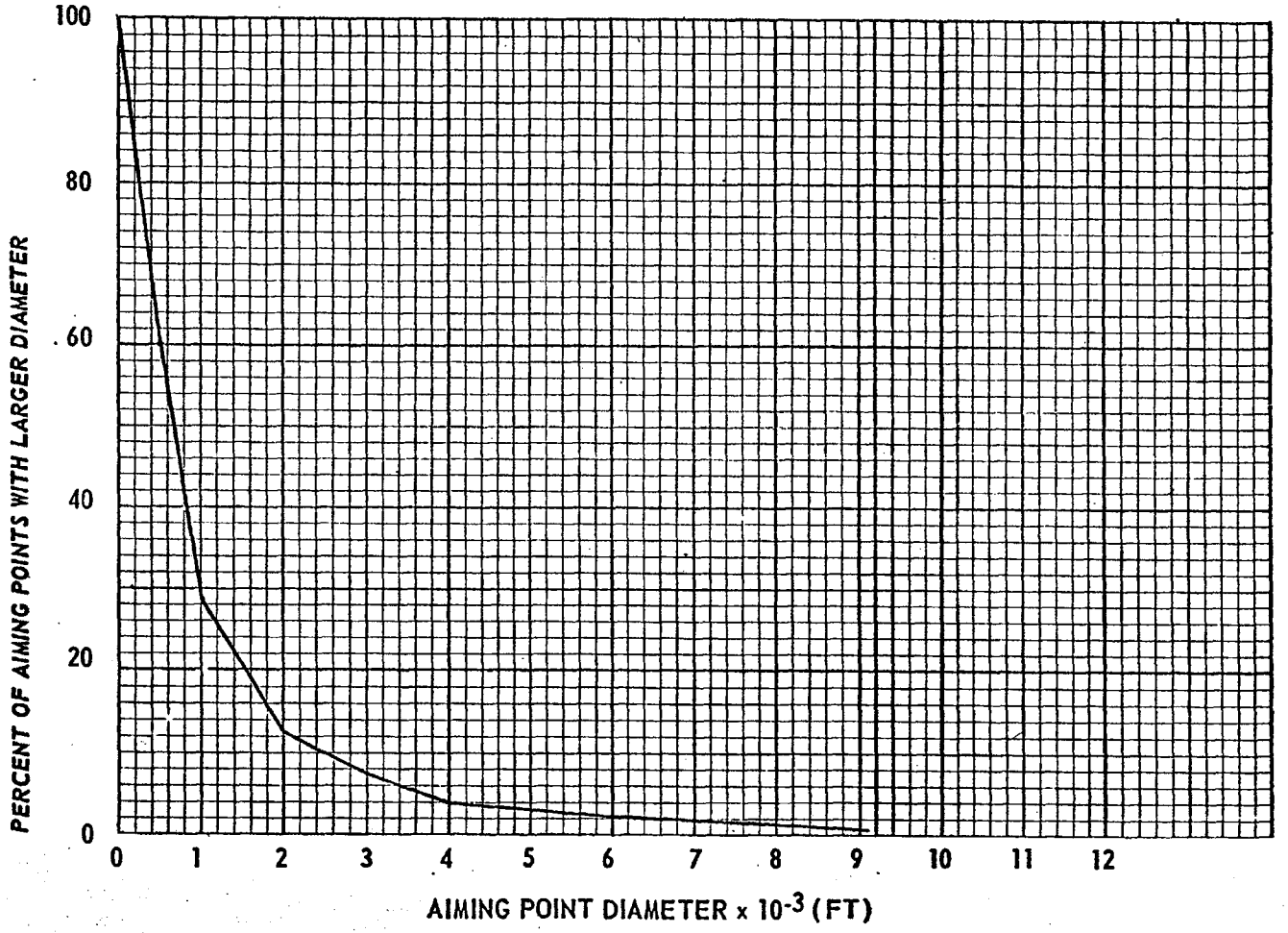


DISTANCE OF AIMING POINTS IN SAMPLE FROM CENTER OF INSTALLATION

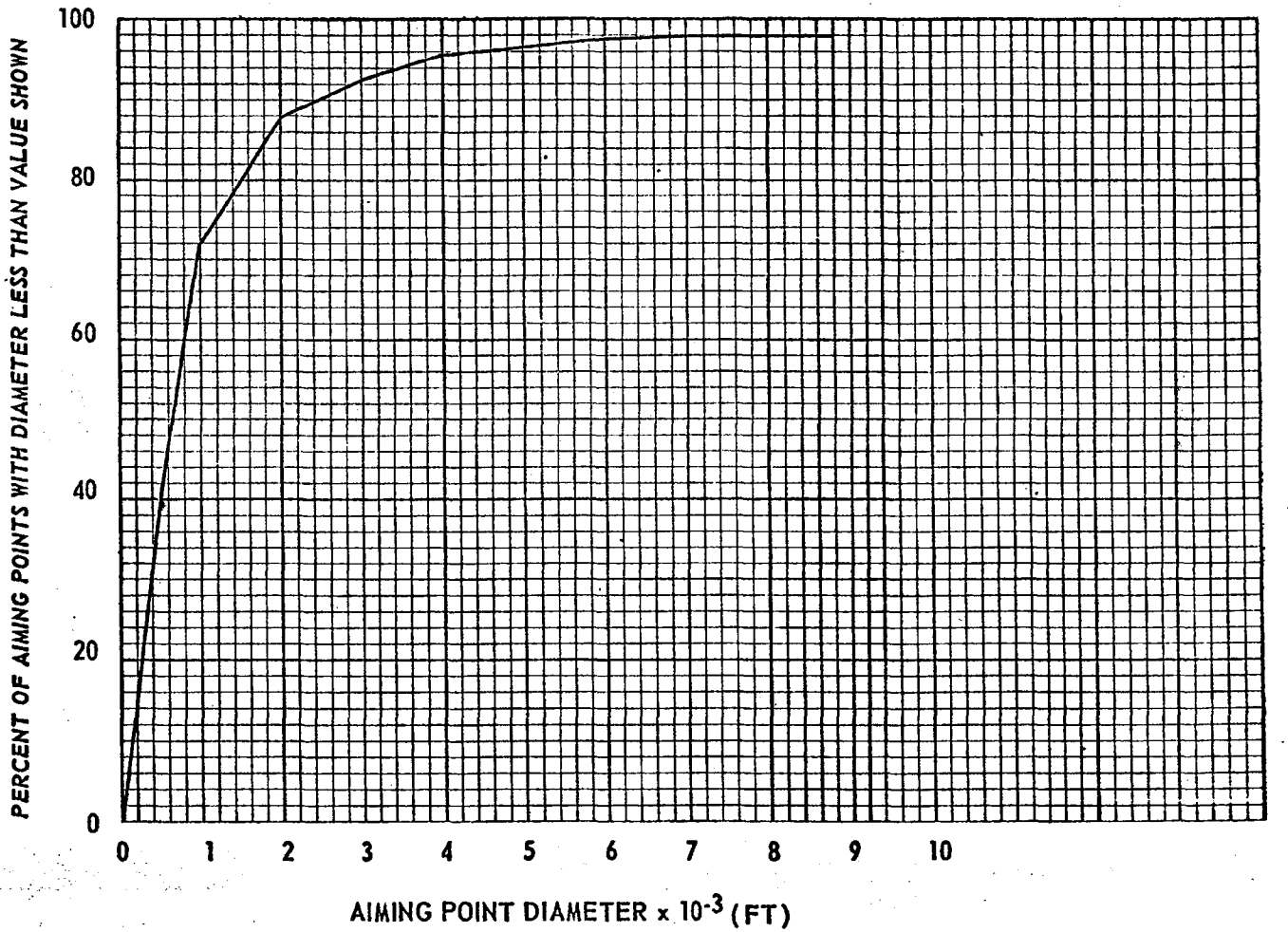




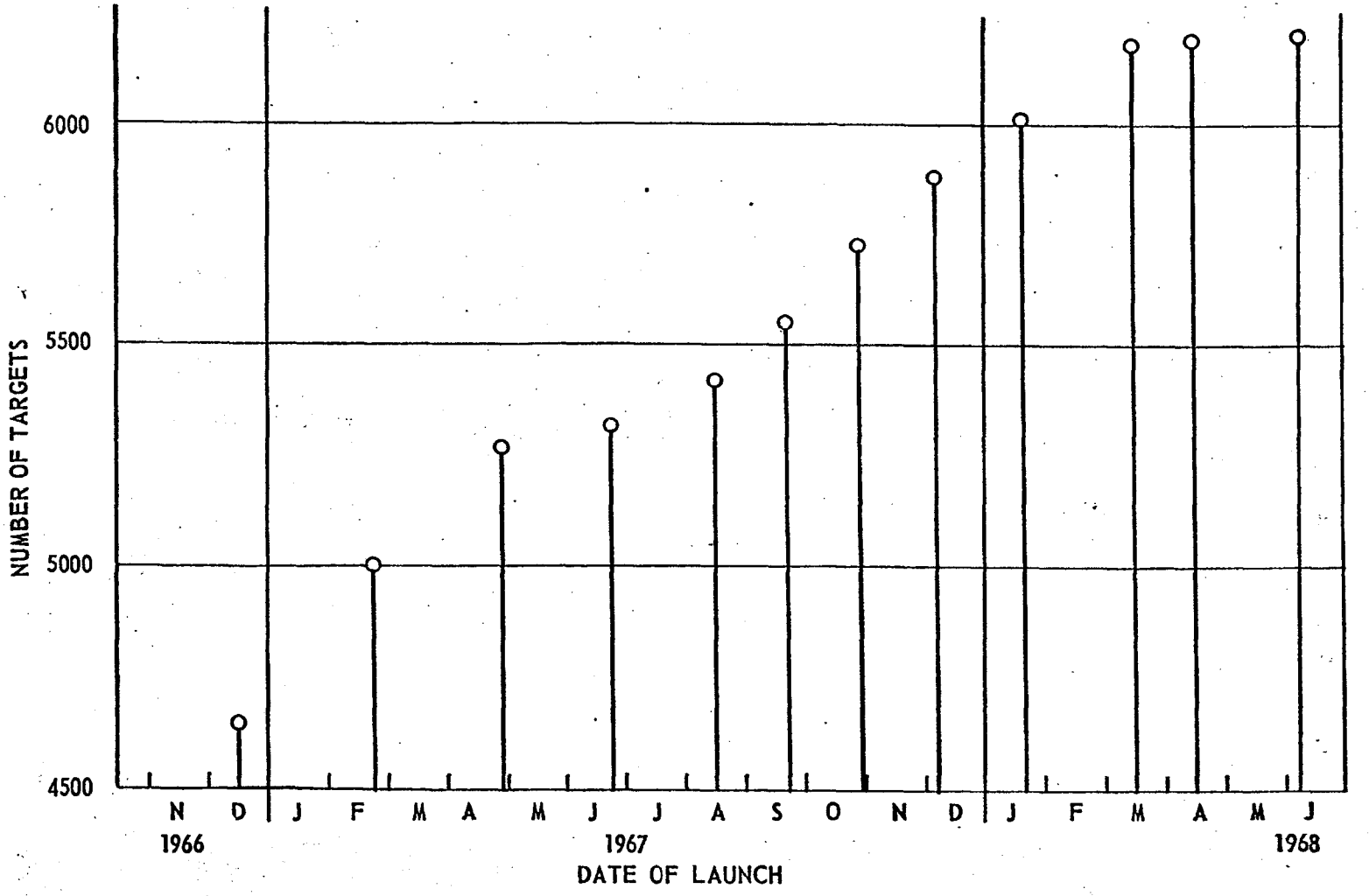
DISTRIBUTION OF AIMING POINT DIAMETER IN SAMPLE



DISTRIBUTION OF AIMING POINT DIAMETERS IN SAMPLE



GROWTH OF INTELLIGENCE TARGET REQUIREMENTS



DISTRIBUTION OF INSTALLATIONS IN CURRENT DECK BY CATEGORIES

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
1. Guided Missiles		
A. ICBM Deployment	1113	16.6
B. IRBM and MRBM	296	4.3
C. Research & Development (inc. space)	67	1.0
D. Production Facilities (inc. test)	79	1.1
E. Suspect Missile	13	0.2
G. Naval Launched Missiles	72	1.0
H. Anti-Missile Missile	62	0.8
I. SAM Sites	475	7.0
J. Short Range SSM	49	0.7
K. Missile Support/Storage Areas	46	0.6
L. SAM Training Complexes	16	0.2
Sub-Total	2288	33.5
2. Aircraft		
A. Long Range Bases	95	1.4
B. Production Facilities (inc. R&D)	46	0.7
C. Airfields	830	12.4
Sub-Total	971	14.6
3. Nuclear Energy		
A. Test Area	25	0.4
B. Production	58	0.9
C. Stockpiles	14	0.2
D. Research Institutes	22	0.3
E. Suspect Activity	19	0.3
Sub-Total	138	2.1
4. Naval Activity		
A. Operating Bases	78	1.2
B. Production Yards	35	0.5
C. Commercial Ports	81	1.2
D. Locks & Canals	0	0
Sub-Total	194	2.9
5. Biological/Chemical Warfare		
A. BW/CW Test Areas	10	0.1
B. Production	25	0.4
C. Storage	30	0.4
D. Research Institutes	5	0.1
E. Suspect Activity	11	0.2
Sub-Total	81	1.2

CATEGORY CODE AND DESCRIPTION	NR. OF INSTALL.	% OF TOTAL
6. Electronics		
A. Missile Tracking Facilities	58	0.9
B. Electronics, General	200	3.0
Sub-Total	258	3.9
7. Military		
A. Military Installations	2261	33.9
B. Special Area	7	0.1
C. (Unspecified)	16	0.2
D. Landing Beaches	1	0.1
G. Tactical SSM Support Facilities	80	1.2
Sub-Total	2365	35.4
8. Urban/Industrial		
A. Complexes	192	2.9
B. Industrial Plants	149	2.2
Sub-Total	341	5.1
9. Other		
A. Unidentified Installations	32	0.5
Total	6672	