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DEPARTMENT OF THE AIR FORCE  
WASHINGTON 20330



OFFICE OF THE SECRETARY

May 7, 1969

MEMORANDUM FOR THE RECORD

SUBJECT: ICRS Briefing on DORIAN Targeting Data Requirements  
6 May 1969

At the request of Mr. John Schadegg, Acting Chairman, Imagery Collection Requirements Subcommittee (ICRS), COMIREX, a briefing on DORIAN targeting data requirements was given at the ICRS meeting on 6 May. In addition to the regular ICRS members a large number of SOC and DIA people attended.

The briefing was given by three persons. Lt Colonel Lycan reviewed previous discussions with ICRS on DORIAN targeting problems, outlined the briefing and presented a summary flow chart at the end; Major Macleay gave a 20-minute presentation on flight crew participation in on-orbit reconnaissance operations; CPT Gooch discussed target selection logic and the impact of new parameters. Copies of the vu-graphs used in the briefings were furnished for the minutes of the meeting. A copy of the current targeting data requirements document was also provided for inclusion in the minutes (Attachment 1).

The only questions asked were concerned with clarification of the parameters for specifying desired photographic azimuth and elevation on an individual target basis. Following the briefing I suggested ICRS consider two problem areas. First, procedures for accurate target description and precise location. If Master Photo Chips (MPC's) are to be used for this purpose, which I strongly recommended, the distribution of MPC's needs to be defined at an early date so ACIC can plan the production effort. Second, procedures and formats for specifying DORIAN targeting parameters need to be defined at an early date.

Mr. Schadegg stated that he had discussed DORIAN targeting problems with Mr. Tidwell, Chairman COMIREX, on 5 May. Mr. Tidwell does not want ICRS to consider any DORIAN targeting until COMIREX has reviewed the current launch schedule. He anticipates asking General Stewart to provide a MOL program update briefing in the near future. Mr. Schadegg also indicated that he felt the MPC could be of use for ICRS collection management and he would prepare a memorandum on the subject within a few weeks.

**DORIAN**

*Daniel L. Lycan*  
DANIEL L. LYCAN  
Lt Colonel, USA

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DORIAN TARGETING DATA  
REQUIREMENTS DOCUMENT

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### Introduction

This document contains the description and format for targeting data to be used in the mission planning process for the Dorian Photographic Reconnaissance System. The data sets requested herein represent those target card data needed for direct input to the mission planning software and those ancillary data required for use by the collection agency in support of the Dorian mission.

Because of the characteristics of the Dorian system, a concept of using "aiming points" as the basis for targeting operations has evolved. In this context, an "aiming point" is defined as a particular cultural feature on the earth's surface at which it is required to aim the Dorian Reconnaissance System for the purpose of obtaining the photography necessary to satisfy an intelligence need. More specifically, an aiming point is an identifiable intelligence objective of less than 9100 ft diameter for which Dorian photography is required.

Although most of the data requested on the target card is aiming point specific, it is recognized that some of the items will not be available or desirable on that basis by the start of Dorian operations. In the absence of aiming point specific data items, "canned" or "nominal" data will be used for target selection purposes.

### Targeting Data

The Targeting Data will consist of five 80-column computer cards which contain data for each aiming point. The information content of the data cards may be classified into the categories as described below. It is anticipated that the data in Categories I, II and III will be provided by the requesting intelligence agencies and the other data would be provided by collection and support agencies.

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I. Identification/Physical Data:

- a. Aiming Point Identification Number - This will be a standard identification number for each aiming point such as the current COMIREX or B. E. number. A correlation between this number and Dorian ID and MPC ID numbers will be established by the collection agency for use internal to the mission planning and commanding software.
- b. Latitude - The geodetic latitude of the aiming point expressed in degrees, minutes, and seconds (North or South) referenced to WGS-66.
- c. Longitude - The longitude of the aiming point expressed in degrees, minutes, and seconds, as measured east of Greenwich.
- d. Location Error - The probable error in knowledge of the aiming point location as expressed by an aiming point location validity code.
- e. Altitude - The altitude of the aiming point above mean sea level measured in hundreds of feet.
- f. Diameter - The diameter of the aiming point measured in hundreds of feet.
- g. Contrast - The intrinsic target-to-background contrast ratio at the aiming point. This data should reflect the time of the year the photography will be taken, as well as any known or suspected camouflage.

II. Aiming Point Intelligence Requirements:

- a. Priority - A number expressing the relative intelligence value of this aiming point in the absence of enhancement indicators as compared to other aiming points photographed under the same conditions.

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b. "Activity" Enhancement Factor - A number indicating the relative increase in value of photograph of the aiming point if "activity" is present. This factor will correspond to the order of magnitude of this increase. (See Dorian System Description Handbook for discussion of "Activity".)

c. Probability of Enhancement - The probability expressed in percent, that "activity" enhancement indicators will be present when the aiming point is viewed. (See "Activity" discussion in above reference.)

d. Technical Resolution - The photographic resolution required to satisfy the majority of the technical intelligence requirements.

e. Special Category Code - The category of this aiming point within the COMIREX special category code structure.

f. Special Target Type Flags -

(1) Mandatory Aiming Point - This flag indicates that the aiming point is of exceedingly high intelligence value and will cause this aiming point to be selected for photography.

(2) Active Indicator Only Flag - This flag indicates that the aiming point may be scheduled for both ATS viewing and photography, but photography should only be performed if there is evidence of "activity."

(3) Scan Mode Flag - This flag indicates that the aiming point has such dimensions or is of such a nature that a scanning procedure should be used with the Acquisition and Tracking Subsystem (ATS).

### III. Photography Requirements Data:

a. Preferred Azimuth - The desired mean azimuth for stereo photography, and the allowable minimum and maximum azimuth for stereo photography, all in degrees, comprise this information category. Azimuth

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is defined as the angle between the line-of-sight vector from the target to the mirror as projected on a plane tangent to the earth's surface at the target, and a vector in that tangent plane from the target to true north. Azimuth is measured from true north in a clockwise sense.

b. Preferred Elevation - The desired mean elevation for stereo photography and the allowable minimum and maximum elevation for stereo photography, all in degrees, comprise this information category. Elevation is defined as the angle between the line-of-sight vector from the target to the mirror, and a plane tangent to the earth's surface at the target.

c. Preferred Sun Angle - The minimum sun angle conditions, in degrees, under which photography is desired. Sun Angle is defined as the angle between the line-of-sight vector from the sun to the target and a line tangent to the earth at the target in the plane of the sun vector.

d. Photographic Sequence (Primary) - This denotes the desired photographic sequence to be accomplished on the aiming point. Standard sequences will be defined by the collection agency prior to aiming point nomination and special sequences will be allowed on high priority or otherwise special targets. (See nominal parameters section.)

e. Photographic Sequence (Alternate) - This denotes the minimal sequence acceptable for scheduling this aiming point as an alternate.

f. Secondary Platen Film Type - This indicator will designate the type of film requested for use on the secondary platen for this aiming point.

IV. Weighting Function Data - (These data are required for operation of the software and will be determined/published based on mission trade-off studies prior to flight.)

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a. Azimuth Function - A function identifier used to select the proper weighting function or table of values to be used with Azimuth (III-a) in order to select the mean azimuth for stereo photography. These data and the data for IV-b will be jointly considered.

b. Elevation Function - A function identifier used to select the proper weighting function or table of values to be used with Elevation (III-b) in order to select the mean elevation for stereo photography. These data and the data for IV-a will be jointly considered.

c. Sequence Function - Table look up identifiers to select the proper photographic sequence value relationships. To be used with Photographic Sequence (III-d) in order to select the photographic sequence for stereoscopic and/or monoscopic photography.

d. Relative Resolution Function - A resolution weighting function can be used for determining the relative value of scheduling photography on this aiming point.

e. Weather Weighting Function - A weather dewatering function can be used for determining the relative value of scheduling photography on this aiming point.

V. Operational/Data Processing Information:

a. Alter Classification - This data signifies that the target is to be added to, deleted from, or modified in the target selection data base unless directed otherwise in V-b or V-c.

b. Rev Number - These data identify the specific revolution in which the added target is to be considered, from which the deleted target is not to be considered, or in which the existing target data is to be modified.

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c. Direction of Pass - This data identifies the specific direction that the above required addition or deletion should be effective.

d. Requirement Status - The cumulative probability of having accomplished the stated photographic requirements for the aiming point necessary to allow countdown.

e. Countdown Procedure Code - A flag to indicate which countdown procedure is to be used. The options will include reduction of priority as elimination from the aiming point acquisitions list.

f. Special Target Type Flags -

(1) Benchmark Flag - This flag indicates an aiming point has identifiable features and a location uncertainty such that it can be used as a benchmark for ephemeris update.

(2) SFR Flag - This flag indicates that the aiming point is to be used to fulfill special flight requirements such as focus, bore-sighting or R&D photography.

g. Card Type - Type of card (1, 2, 3, 4, or 5) of this card within the data card set.

## VI. Crew Operations Data

a. Recommended View Time - The recommended time in seconds for flight crew viewing of an aiming point prior to a determination that enhancement indicators and/or degrading weather conditions are, or are not, present.

b. Recommended View Angle - The limiting angle for scheduling flight crew view through ATS to enhance recognition of "activity."

c. False Alarm Probability - The probability that the flight crew will report "activity" on an aiming point when it does not exist.

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d. Recognition Probability - The probability that the flight crew will recognize "activity" when it is present at an aiming point.

e. Cue Number - Alphanumeric characters indicating the number of the cue available for this aiming point.

**VII. Reference/Training Data:**

a. Aiming Point Name - The approved name of the DORIAN aiming point. Name also allows identification of complex and installation in which the aiming point is located.

b. Country Code - Approved alphanumeric characters representing the specific country in which the target is located as described in DOD Standard Geopolitical Code.

c. Master Photo Chip Number - The number of the master photo chip from which the aiming point was nominated.

d. TDI Category - Represents one of the functional classifications of the installation/aiming point as obtained from a Function Classification Handbook.

e. Project Identifier - Alphabetic characters representing the project code keyed to the project name under which photography producing the best exposure of the aiming point was last collected (See DIAM 65-10-2, 002).

f. Mission Number - The number assigned to the photo mission which produced the best exposure of the target. (See DIAM 65-10-2, 017.)

g. Status - An alphabetic designator identifying the status of the installation and aiming point at the time last photographic coverage was obtained. Current codes are given in the discussion of nominal parameters.

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CARD I

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COLUMN	SYMBOL	RANGE	UNITS	DESCRIPTION
1-11	APID	11 Characters	ND	Aiming Point Identification
12	Blank			
13-20	APLAT	0-90° N, S	Deg/Min/Sec	Latitude of AP (Geodetic)
21-29	APLONG	0-360° E	Deg/Min/Sec	Longitude of AP
30	V	(0-9)	ND	Target Location, Validity Code
31-34	ALT	(0-9999)	Ft x 10-2	Altitude of AP
35-26	DI	(0-99)	Ft x 10-2	AP Diameter
37-38	C	(0-9.9)		Nominal Target Contrast
39	Blank			
40-42	PRI	(0-999)	ND	Target Priority
43	E	(0-9)	ND	Activity Enhancement Factor
44	Blank			
45-47	PA	(0-99.9)	%	Probability of Enhancement
48-89	RS	(0-99)	%	Requirements Status
50	P	(0-9)	ND	Countdown Procedure Code
51-53	SCC	(0-999)	ND	Special Category Code
54	T	1 Character	ND	Special Target Type
55-57	AZI	(0-360)	Deg	Desired Azimuth
58-59	EV	(0-90)	Deg	Desired Elevation
60-61	SA	(0-90)	Deg	Desired Sun Angle
62	P/S	(0-9)	ND	Photo Sequence Weighting Function
63	Blank			
64	A/S	(0-9)	ND	Azimuth Weighting Function
65	F	1 Character	ND	Secondary Film Code
66	E/F	(0-9)	ND	Elevation Weighting Function
67	R/F	(0-9)	ND	Resolution Weighting Function
68	W/F	(0-9)	ND	Weather Weighting Function
69	Blank			
70	A	1 Character	ND	Target Alter Flag
71	D	1 Character	ND	Direction of Pass
72-74	Rev	(0-999)	ND	Revolution Number of Change
75	L	(0-9)	ND	Slit Width Modifier Code
76-77	VT	(0-9.9)	Sec	Recommended ATS View Time
78-79	VA	(0-90)	Deg	Recommended View Angle
80	N	(0-5)	ND	Card Type

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CARD 2

<u>COLUMN</u>	<u>SYMBOL</u>	<u>RANGE</u>	<u>UNITS</u>	<u>DESCRIPTION</u>
1-11	APID	11 Characters	ND	Aiming Point ID NR
12	Blank			
13-23	MPCNR	11 Characters	ND	Master Photo Chip referenced AP
24	Blank			
25-28	X	(0-99.9)	cm	X Coordinate of AP or MPC Grid
29	Blank			
30-33	Y	(0-99.9)	cm	Y Coordinate of AP or MPC Grid
34	Blank			
35-36	TR	(0-99)	inches	Technical Resolution Requirement
37	Blank			
38-40	AZI	(0-360)	deg	Desired mean azimuth of coverage
41	Blank			
42-44	AZL	(0-180)	deg	+ Limit on Acceptable Azimuth Deviat
45	Blank			
46-47	EV	(0-90)	deg	Desired Elevation of Coverage
48	Blank			
49-50	EL	(0-90)	deg	+ Limit on Acceptable Elevation Devi
51	Blank			
52	V	(0-9)	ND	Target Location Validity Code
53-56	Blank			
57-58	PS	(0-99)	ND	Primary Sequence NR Desired by Use
59	Blank			
60-61	AS	(0-99)	ND	Minimal Secondary Sequence NR
62	Blank			
63-64	F	2 Characters		Secondary Film Types Required by TC
65	Blank			
66-68	CUEM	3 Characters		Indicator of Cue Material Available
69	Blank			
70-75	Blank			
76-78	SCC	(0-999)	ND	COMIREX Special Category Code
79	Blank			
80	N	(2)	ND	Card Type

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CARD 3

COLUMN	SYMBOL	RANGE	UNITS	DESCRIPTION
1-11	APID	11 Characters	ND	Aiming Point ID Number
12	Blank			
13-23	APBE	11 Characters	ND	Aiming Point Basic Encyclopedia Num
24	Blank			
25-30	TDI	6 Characters	ND	Target Data Inventory Number
31	Blank			
32-33	CC	2 Characters	ND	Country Code
34	Blank			
35-54	APNM	20 Characters	ND	AP/Target Name (Free Field)
55	Blank			
56	ST	1 Character	ND	Target Status as Last Coverage
57	Blank			
58	Proj	1 Character	ND	Project Code of Last Coverage
59	Blank			
60-63	MSNR	(0-9999)	ND	Mission Number of Last Coverage
45	Blank			
65	Cam	1 Character	ND	Camera of Past Coverage
66	Blank			
67-71	FRM	(0-9999)		Frame of Exposure of Last Coverage
72	Blank			
73-75	Blank			
76-78	SCC	(0-999)	ND	COMIREX Special Category Code
79	Blank			
80	N	(3)	ND	Card Type

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CARD 4/5

<u>COLUMN</u>	<u>SYMBOL</u>	<u>RANGE</u>	<u>UNITS</u>	<u>DESCRIPTION</u>
1-11	ID	11 Characters	ND	Aiming Point ID
12	Blank			
13-78	Text			
79	Blank			
80	N	(4/5)		

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### Nominal Targeting Parameters

Prior to the nomination of aiming points for the Dorian mission, various trade-off studies will be performed considering factors including expected quantity and quality of photography, vehicle expendables, and payload constraints. The purpose of these studies will be to set values for nominal targeting parameters such as photo sequences and weighting tables that will optimize the fulfillment of mission requirements. This section presents an abbreviated sample of these nominal parameters which will be revised and expanded before the initial nomination of Aiming Points.

#### FILM TYPES

<u>CODE</u>	<u>EXPLANATION</u>
IR	Infra red solar film
HS	High Speed Black and White
BW	Black and White '3404 Type Film
CL	Color Film

#### SPECIAL TARGET FLAGS

<u>CODE</u>	<u>EXPLANATION</u>
1	Mandatory Target
2	Activity Target Only
3	Scan Target
4	Benchmark Target
5-9	(Unassigned)

#### TARGET STATUS CODE

<u>CODE</u>	<u>EXPLANATION</u>
C	Under Construction
F	Finished
E	Operational
L	Abandoned
R	Removed

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TARGET STATUS CODE (Continued)

<u>CODE</u>	<u>EXPLANATION</u>
D	Destroyed
U	Unknown
A	Active
I	Inactive

PHOTOGRAPHIC SEQUENCES

Photographic sequences will be implemented in the ground and airborne software systems in terms of frame exposure times referenced to the first frame of the sequence. The sequence will be scheduled so as to fulfill, as well as possible, the specified desires of mean azimuth and elevation angles of the coverage. Exposure bracketing will occur with those frames prior to nadir generally being biased to an exposure less than the calculated nominal. Approximately five of the most frequently desired sequences will be stored on-board the vehicle in the computer's core memory unit; however, the capability will exist to send other exposure sequences to the vehicle in the uplink message.

Example types of nominal sequences from which the user would specify his requirements are:

<u>Sequence #</u>	<u>Frame Times (Sec) &amp; Types (P, S)</u>	<u>Nominal Convergence Angle (First to Last Primary)</u>
1	0P, 1P, 2P	6°
2	0P, 1.3P, 2.6P, 4P, 5.3P	16°
3	0P, 2P, 4P, 6P, 9S	23°
4	0P, 3P, 5S, 8S, 10P, 12P	30°
5	0S, 2P, 3P, 5P, 6P, 8P, 10P, 12P, 15P	40°

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WEIGHTING FACTORS

Weighting factors will be supplied based on mission studies to "tune" the software to achieve commanding of the Dorian payload that best fulfills requirements and would be in subsequent versions of this document.

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