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Prepared for
Naval Medical Research and Development Command
Bethesda, MD 20014

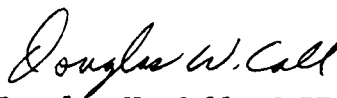
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REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b RESTRICTIVE MARKINGS	
2a SECURITY CLASSIFICATION AUTHORITY		3 DISTRIBUTION / AVAILABILITY OF REPORT Unlimited	
2b DECLASSIFICATION / DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NBDL-89R004		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a NAME OF PERFORMING ORGANIZATION NAVAL BIODYNAMICS LABORATORY	6b. OFFICE SYMBOL (if applicable)	7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) PO BOX 29407 NEW ORLEANS, LA 70189-0407		7b. ADDRESS (City, State, and ZIP Code)	
8a NAME OF FUNDING / SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (if applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO. 63216N	PROJECT NO. M0097
		TASK NO. 001	WORK UNIT ACCESSION NO.
11 TITLE (Include Security Classification) PHOTO REFERENCE TARGET ARRAY SCHEME			
12. PERSONAL AUTHOR(S)			
13a. TYPE OF REPORT Tech Note	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) MAY 1989	15. PAGE COUNT 8
16. SUPPLEMENTARY NOTATION			
17 COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		Reference Target, Photo Target Scheme, Target Designation Scheme, Target Pattern Designation, < < <	
19 ABSTRACT (Continue on reverse if necessary and identify by block number)			
<p>A standardized reference target nomenclature has been defined for a high speed photogrammetric system. High speed cameras record three-dimensional displacement of living human and non-human primate subjects undergoing impact acceleration. This motion is measured from the reference target. A standardized nomenclature of the location and orientation of each target face eliminates confusion when surveying multiple camera sites or on subsequent test setups.</p>			
20 DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION	
22a NAME OF RESPONSIBLE INDIVIDUAL James F. Palmer, CDR, MSC, USN		22b TELEPHONE (Include Area Code) (504) 257-3922	22c. OFFICE SYMBOL

PHOTO REFERENCE TARGET ARRAY SCHEME

INTRODUCTION

This technical note documents NAVBIODYNLAB's numbering and pattern conventions for reference target arrays. The reference target location and orientation identifies displacement within a coordinate system. Targets used within the coordinate system may be from one to five sided depending upon the application and location. (See Figure 1)

Target orientation predictions are necessary when the target (X-1) center is not visible from a specific theodolite position. Target supports are machined to close tolerances with parallel sides and the target face center accurately marked. Theodolites are used to locate the position of each corner, allowing calculation of each target's center even when the target is not visible.

TARGET PATTERN DESIGNATION

Solid black and white patterns in alternate quadrants are joined to patterns on adjacent sides so that the patterns alternate on each side. (See Figure 1)

DESIGNATION OF TARGET SIDES

Due to the various mounting orientations, permanent designations are not given to the photo reference target sides. These designations are determined as follows: S1 designates the side which most nearly faces down (90° depression), S2 the side most nearly facing up (90° elevation), S3 the side most nearly facing 0 degrees of azimuth within the coordinate system; and the other sides are designated clockwise in sequence S4, S5 and S6 around the axis through S1-S2. The side used to mount the target follows normal designation protocol but is eliminated from the designations recorded.

DESIGNATION OF TARGET CENTERS

The center of a target side is designated by using "X1" with the designation of that side. For example, "S1X1" designates the target center of target S1.

DESIGNATION OF TARGET CORNERS

Target corners of a cube target are identified for calculating target orientation. Corners are numbered starting with S2. On S2 the corners are designated in a clockwise direction with C1 being at 45 degrees, C2 at 135 degrees, C3 at 225 degrees, and C4 at 315 degrees. The S1 side corners opposite the corners of S2 are designated as C5 at 45 degrees, C6 at 135 degrees, C7 at 225 degrees, and C8 at 315 degrees.

Single faced targets use the same numbering convention, dependent on the target orientation in the coordinate system. If a single faced target is at 90 degrees azimuth in the coordinate system, the target would be designated as S4 with corners designated C1, C5, C6, and C2 in a clockwise direction (See Figure 1, Oblique View). Beginning with the first target corner, with the target facing 180 degrees azimuth in the coordinate system, the target would be designated as S5 with corners designated in sequence C2, C6, C7 and C3.

Any variations from this standardized convention should be fully documented for each test.

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TARGET NUMBERING AND PATTERN SCHEME

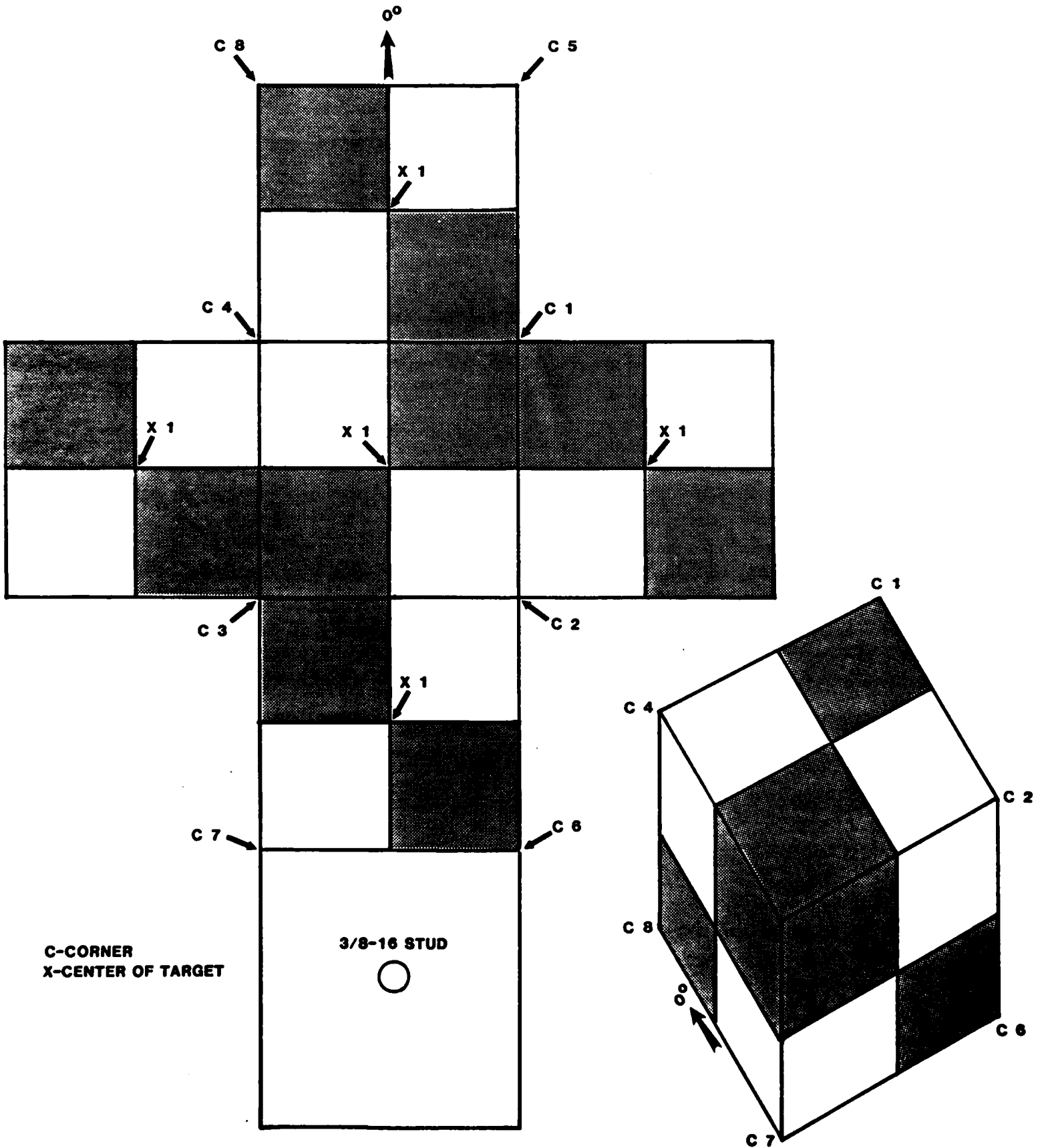


Figure 1