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MILITARY STANDARD

HUMAN FACTORS ENGINEERING
DESIGN CRITERIA FOR HELICOPTER
COCKPIT ELECTRO-OPTICAL DISPLAY SYMBOLOGY

NO DELIVERABLE DATA REQUIRED BY THIS DOCUMENT

HFAC

DEPARTMENT OF DEFENSE
Washington, DC 20301

Human Factors Engineering Criteria for Helicopter Cockpit Electro-Optical Symbology

MIL-STD-1295A(AV)

1. This Military Standard is approved for use by the US Army Aviation Systems Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Aviation Systems Command, ATTN: DRSAV-ELS, 4300 Goodfellow Boulevard, St. Louis, MO 63120, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FORWARD

The intent of this document is to standardize the symbology used in rotary-wing aircraft. In its present form, the standard only applies to vertical situation displays and electronic attitude director indicators, though it is planned to expand the applicability to include horizontal situation displays, head-up displays and helmet mounted displays. Also, the current document is limited in the number of mission phases/segments for which symbology are provided. Again, these phases/segments will be expanded as additional information is available.

One will notice that the symbology provided herein is patterned after that provided for the AH-64. However, while the AH-64 symbology provided an initial data base, it does not mean the symbology, as presented in this document, is "locked in concrete." As new symbology is developed or new data becomes available to suggest alterations to current symbology, the appropriate changes will be made to this standard, thereby always reflecting the most up-to-date symbol sets.

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1. SCOPE

1.1 Purpose. The purpose of this standard is to establish human factors design criteria for symbolic and alphanumeric information used on electronically and optically generated airborne displays. Electronically and optically generated displays are those in which an image is presented to the observer directly on the image-generating surface or indirectly through an optical projection system. The symbolic presentation provides flight, combat, and cargo-handling information with or without video imagery for rotary-wing aircraft. Weapon status and fault detection/location status messages may also be presented. This standard is restricted to those display devices used in aircraft for the purpose of flight or mission control. Separate radar or electronic warfare displays are not included.

1.2 Scope. This standard establishes general information, symbology, and display format requirements for hover, position, transition, cruise and weapon delivery modes of rotary-wing aircraft missions.

1.3 Application. This standard shall be applied to vertical situation displays and electronic attitude director indicators that present flight and combat information.

2. REFERENCED DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or requests for proposal form a part of this standard to the extent specified herein:

Military Standards

MIL-STD-411	Aircrew Station Signals
MIL-STD-783	Legends for Use in Aircrew Stations and on Airborne Equipment
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment and Facilities

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. None.

3. DEFINITIONS

3.1 Display Definitions

3.1.1 Helmet-mounted display (HMD). The HMD is a display which projects video imagery, symbolic and/or alphanumeric information on a display medium (e.g., combining glass or visor) into one or both eyes of the aircrewmember. In most applications the display medium is attached to a flight helmet which is part of a head tracking system. The line of sight of the helmet is determined by the head tracking system and a designated sensor is slewed in a one-to-one angular correspondence with this line of sight. The display medium then displays the image from the designated sensor: television (TV), forward looking infrared (FLIR), or scan coverted radar. Specific symbols and formats can be selectable for a given mode of operation.

3.1.2 Head-up display (HUD). The HUD is a display which projects collimated symbolic information into the aircrewmember's forward field-of-view. The technique results in the combination of flight control and weapon delivery information with external visual cues from the scene normally viewed through the windscreen. Specific symbols and formats can be selectble for a given mode of operation. Take-off, landing, navigation, hover, bob-up, terrain-following/avoidance, sling load transportation, air-to-air, and weapon delivery modes may be provided. Video formats may also be displayed, such as TV, FLIR, or scan-coverted radar, along with symbology.

3.1.3 Electronic attitude director indicator (EADI). The EADI is a replacement for the standard ADI, but with no moving parts other than controls and switches. The EADI presents the symbols on a display using either a CRT or direct view flat plate technology. Basic symbology consists of an aircraft symbol; vertical and horizontal director indices (when applicable); heading information; and line, sky-ground color or shading separation for horizon reference. If desired, other symbols can be generated and displayed by mode selection, such as instrument landing system (ILS) window, collective, cyclic and yaw command, airspeed deviation, altitude, flight path, predicted flight path, range, et cetera. Specific symbols and formats can be selectable for a given mode of operation. Modes may consist of take-off, landing, hover, cruise, weapon delivery, and off.

3.1.4 Vertical situation display (VSD). The VSD has all of the features of an EADI, with the increased capability of displaying sensor data. Additional modes may consist of TV, infrared (IR), attack radar, weapon TV, or terrain-following radar. Specific symbols and formats can be selectable for a given mode of operation. When any mode other than one of the primary EADI modes is selected, the VSD may present basic symbolic information for flight control superimposed on the sensor data.

3.1.5 Horizontal situation display (HSD). An HSD is a display which aids the crew members in navigation. Basically, it consists of heading, distance-to-go, bearing-to-distination or some other navigation facility or reference, track, map, course, aircraft position, and steering error. Modes may consist of manual, north-up, track-up, data, test, and off. Selection of map scale factors may also be provided. Navigation update can be accomplished with the proper computer techniques. The HSD also has the capability of combining symbols with the map information. Symbols may be used for annotation of the projected map, such as check points, various legs of the mission, high-risk areas, track deviation, and radar homing and warning. Specific modes and formats can be selectable for a given mode of operation.

3.1.6 Multifunction display (MFD). The MFD is a general-purpose display which may be used in many places in the cockpit. In addition to the modes listed for the VSD and HSD, other possible modes are energy management, engine management, aircraft subsystem information, and integrated test and maintenance. Specific modes and formats can be selectable for a given mode of operation.

3.2 Information definitions

3.2.1 Coding characteristics. Coding characteristics are readily identifiable attributes commonly associated with a symbol by means of which such symbols are differentiated; e.g., size, shape, color.

3.2.2 Command information. Command information is displayed qualitative information directing a control action.

3.2.3 Mode. A mode is the functional state of the display and/or control system(s). A mode can be manually or automatically selected.

3.2.4 Predictive information. Predictive information is information predicting future status, condition, or position of the aircraft, a system, or a subsystem.

3.2.5 Qualitative information. Qualitative information is information presented by a display in a manner which permits the display user to assess the information without requiring attention to an exact numerical quantity.

3.2.6 Quantitative information. Quantitative information is information presented by a display in a manner which permits the display user to observe or extract a numerical value associated with the information. Quantitative information may be displayed in either digital or analog alphanumerics.

3.2.7 Status information. Status information (quantitative or qualitative type) is current condition information about the aircraft and its surroundings.

3.2.8 Symbol. A symbol is a geometric form or alphanumeric information used to represent the state of a parameter on a display.

4. GENERAL REQUIREMENTS

4.1 Information presentation elements. The symbols, as portrayed in the figures, are not intended to indicate relative size. The intent is to portray only the shape of the symbol and the relative location of the symbol within the display area.

4.1.1 Limits box. The limits box represents the angular elevation and azimuth-traversing limits of a weapon or sensor (see Fig. 1).

4.1.2 Sensor line of sight reference. The sensor line of sight reference symbol is fixed at the center of the display providing a reference for aircraft position symbols, weapons steering, hover symbols, and attitude information (see Fig. 2).

4.1.3 Helicopter reference symbol. The helicopter reference symbol represents an extension of the aircraft center line (see Fig. 3).

4.1.4 Performance management. Performance management information may be presented in either a digital or analog format. In an analog presentation, the display shall be a moving index against a fixed scale (see Fig. 4).

4.1.4.1 Lift margin. The lift margin symbol shall continuously indicate the amount of lift capacity remaining.

4.1.4.2 Power margin. Power margin shall continuously indicate the difference between power being demanded and power available.

4.1.4.3 Torque. The torque symbol shall provide the necessary indication of approach to and passage through red line torque values.

4.1.5 Heading. Heading (degrees) information should be displayed as analog information and shall be located on the display as shown in Fig. 5. The display shall have a moving tape compass reference scale with a fixed aircraft heading index mark. The display should have 10° increments with alphanumerics presented every 30°. The heading scale shall have a minimum of 90°. Cardinal heading shall be letters. The heading index shall be a vertical line.

4.1.6 Velocity vector. The velocity vector is a solid line symbol which represents the speed and direction of helicopter movement in a horizontal plane. The point of origin for the velocity vector is the center of the applicable display. The length of the vector as measured from its point of origin represents speed of movement, and the angular deflection of the vector as measured from the X and Y axes represents direction of movement (see Fig. 6).

4.1.7 Acceleration cursor. The acceleration cursor is a symbol which represents helicopter acceleration in a horizontal plane. The point of origin for the acceleration cursor is the extended tip of velocity vector. The spacing between this tip and the acceleration cursor represents the magnitude of acceleration and the direction of displacement from this tip represents the direction of acceleration (see Fig. 7).

4.1.8 Position reference. The position reference symbol is a dynamic symbol used as a precise ground reference point. The point of origin for the position reference symbol is the center of the applicable display. This symbol moves from its point of origin at a rate equivalent, and in a direction opposite, to the velocity of the helicopter (see Fig. 8).

4.1.9 Rate of climb. The rate of climb symbol indicates the rate of ascent or decent of the helicopter with the null point centered at the vertical center of the display. This symbol shall be a moving index against a fixed scale (see Fig. 9).

4.1.10 Horizon reference. This symbol indicates the pitch and roll attitude of the helicopter relative to the horizon. This symbol shall be trimmable in both pitch and roll (see Fig. 10).

4.1.11 Speed. Speed information may be displayed as analog or digital information and may be displayed as indicated airspeed, true airspeed or ground speed as required. The predominantly displayed speed should not require identification. Speeds that appear infrequently should be encoded using the following codes:

a. IAS = Indicated Airspeed

b. TAS = True Airspeed

c. GS = Ground speed

If ground speed is displayed, the unit of measurement shall also be displayed (see Fig. 11).

4.1.12 Altitude. Altitude information may be presented as absolute and/or barometric altitude, and may be displayed in digital and/or analog format.

4.1.12.1 Digital altitude. A digital altitude presentation shall consist of the number of digits required to precisely display the desired altitude information. A single digital presentation shall be located on the vertical center line of the display (see Fig. 12A); a dual digital presentation shall be symmetrically located above and below the vertical centerline of the display (see Fig. 12B).

4.1.12.2 Analog altitude. An analog altitude presentation shall consist of nine stationary horizontal scaling lines arranged vertically above one another without lateral boundary lines, and a moving thermometer-type indicator. The horizontal scaling lines, shall be grouped as depicted in Figure 12C with the third line from the top located on the vertical center line of the display. The thermometer-type indicator shall be less wide than the scaling lines so that the lines shall be visible to the side(s) of the indicator.

4.1.12.3 Absolute/barometric altitude. If both absolute and barometric altitude information are to be displayed simultaneously, barometric altitude shall be positioned above absolute altitude in a dual digital format, farther from the center of the display in a dual analog format, and as an analog scale, farther from the center of the display in a digital/analog format (see Fig. 12E). If both absolute and barometric altitude information are to be displayed non-simultaneously, the less commonly displayed altitude shall be encoded with the following code.

Altitude Type To Be Encoded	Digital	Analog
Absolute	Boxed	"A"
Barometric	Boxed	"B"

4.1.13 Side slip (trim indication). This display is a symbolic representation of a standard side slip indicator and should duplicate its function (see Fig. 13).

4.1.14 Warning information. Warning information such as the type established in MIL-STD-411, or threat warning, may be displayed either symbolically or by legend (see Fig. 14).

4.1.15 Range. Range is the distance (either slant or horizontal, as applicable) from the aircraft to a predetermined point (see Fig. 15).

4.1.16 Targeting information.

4.1.16.1 Target bearing. This information should indicate the relative bearing of the target from the helicopter (see Fig. 16).

4.1.16.2 Aiming reticle. The aiming reticle shall designate the predicated impact point of projectiles and shall operate in a dynamic or fixed mode as appropriate (see Fig. 17).

4.1.16.3 Target designation. The target designation symbol shall overlay the target on the video image when the target data is stored in the aircraft computer. This will provide a cue for the aircrew in target acquisition when the target is not clearly visible on the display. The symbol should blink or provide other feedback cues to indicate designation (see Fig 18).

4.1.16.4 Weapons/ordance status. This information should indicate the status of the weapons and on-board ordnance (see Fig. 19).

4.2 Information displayed. The displays shall provide information covering primary mission segments and the information which requires visual assessment during that mission segment. The mission segments covered by this standard are hover, position, transition, cruise and weapon delivery. Command, status, and weapon delivery information are appropriate for all modes of flight selected. They shall appear as required by the mission segment of concern.

4.2.1 Mode annunication. If more than one mode other than Off or Standby is selectable, each mode selected shall be indicated on the display or on an adjacent control panel.

4.2.2 Mission segments. Symbology modes are intended to enhance the data provided by sensor electro-optical imagery while minimizing display clutter. Symbology modes are particulary applicable to night and/or limited visibility operations.

4.2.2.1 Hover mode. The hover mode is intended for a flight environment involving hover operations characterized by no, or very low, speed. As a minimum, the hover mode shall incorporate:

a. Helicopter line of sight reference.
b. Sensor line of sight reference.
c. Heading information.
d. Speed information.
e. Altitude information.
f. Vertical velocity information.
g. Side slip information.
h. Performance management information.
i. Velocity vector.
j. Acceleration cursor.

See Fig. 20 for an example of hover mode symbology.

4.2.2.2 Position mode. The position mode is intended for a flight environment requiring a precision hover capability. The position mode provides reference symbology for hovering operations in relation to a selected point on the ground. As a minimum, the position mode shall incorporate:

a. Helicopter line of sight reference.
b. Sensor line of sight reference.
c. Heading information.
d. Speed information.
e. Altitude information.
f. Vertical velocity information.
g. Side slip information.
h. Performance management information.
i. Velocity vector.
j. Acceleration cursor.
k. Position reference.

See Fig. 21 for an example of position mode symbology.

4.2.2.3 Transition mode. The transition mode is intended for a flight environment involving takeoffs, landings and other operations characterized by variable low speeds and altitudes. As a minimum, the transition mode shall incorporate:

a. Helicopter line of sight reference.
b. Sensor line of sight reference.
c. Heading information.
d. Speed information.
e. Altitude information.
f. Vertical velocity information.
g. Side slip information.
h. Performance management information.
i. Velocity vector.
j. Acceleration cursor.
k. Horizon reference.

See Fig. 22 for an example of transition mode symblogy.

4.2.2.4 Cruise mode. The cruise mode is intended for a flight environment characterized by relatively constant airspeeds, altitudes, and courses. Generally, airspeeds will be faster, altitudes will be higher, and course lines will be more definite than in other modes of flight. As a minmum, the cruise mode shall incorporate:

a. Helicopter line of sight reference.
b. Sensor line of sight reference.
c. Heading information.
d. Speed information.
e. Altitude information.
f. Vertical velocity information.
g. Side slip information.
h. Performance management information.
i. Horizon reference.

See Fig. 23 for an example of cruise mode symbology.

4.2.2.5 Weapon delivery mode. The weapon delivery mode supplies symbolic information for surveillance, designation, or ordnance delivery. This mode may be used in conjunction with any of the flight modes. See Fig. 24 for an example of weapon delivery mode symbology.

4.3 Information presentation characteristics.

4.3.1 Information form.

4.3.1.1 Information. Information presented by the displays shall be in symbolic, pictorial, or alphanumeric forms as specified by the procuring activity.

4.3.1.2 Symbol. The meaning and motion of symbols shall be consistent throughout all modes of the display. Scaling and gain changes are permitted between modes.

4.3.1.3 Coding. Each symbol shall be unique by virtue of at least two coding characteristics. The use of either a raster, caligraphic or x-y matrix display shall not adversely affect these coding characteristics.

4.3.1.4 Motion. The sense of aircraft control symbol motion should be compatible with the motions of the corresponding controller.

4.3.1.5 Color-coding. Color-coding may be used, and flashing of symbols shall be used sparingly.

4.3.1.6 Numbers. At least three distinct sets of numbers shall appear at all times on analog displays using moving scales such as heading, speed and altitude.

4.3.1.7 Legends. All legends shall be in accordance with MIL-STD-783 or be approved for use by the procuring activity.

4.3.2 Information location. Location of the symbols on displays shall be in accordance with Figures 20-24, as applicable.

4.3.3 Information control.

4.3.3.1 Symbol brightness shall be continously adjustable to provide symbol legibility under all ambient light conditions. Contrast ratio may be automatically maintained at the selected level. During all modes of flight, all alphanumeric information may be eliminated by adjustment of the luminance level.

4.3.3.2 A declutter control shall be provided which eliminates certain preselected symbolic information.

4.4 Human engineering. Human engineering shall conform to MIL-STD-1472. The scaling/sizing of symbols shall be such that the symbol shall subtend not less than twenty minutes of visual angle. Image quality shall be consistent with the operator's needs.

5. DETAIL REQUIREMENTS

5.1 Head-up/helmet-mounted displays.

5.1.1 Information. The HUD/HMD shall present all essential flight and mission information. All information reflected from the display shall be collimated and of sufficient brightness to be seen in a real-world background of 10,000 foot-candles illumination. The information displayed is determined by the requirements of the modes of operation.

5.1.2 HUD/HMD mission mode information matrix. Information related to various mission modes is shown on Table I.

Custodian:

Army - AV

Review activities:

Preparing activity:

Army - AV

Project HFAC-A012

Table I. HUD/HMD/VSD MISSION MODE-INFORMATION MATRIX

INFORMATION	MODE				
	HOVER	POSITION	TRANSITION	CRUISE	WEAPON
Helicopter LOS	X	X	X	X	
Sensor LOS	X	X	X	X	
Heading	X	X	X	X	
Speed	X	X	X	X	
Altitude	X	X	X	X	
Vertical Velocity	X	X	X	X	
Side Slip	X	X	X	X	
Horizon Reference			X	X	
An Acceleration Cursor	X	X	X		
A Velocity Vector	X	X	X		
Position Reference		X			
Performance Management	X	X	X	X	
Sensor Gimbal Limits	*	*	*	*	
Sensor FOV Limits	*	*	*	*	
Range to Target	*#	*#	*#	*#	X
Solved Reticle	*#	*#	*#	*#	X
Unsolved Reticle	*#	*#	*#	*#	X
Pre-firing Maneuver Constraints	*#	*#	*#	*#	X
Post-Firing Maneuver Constraints	*#	*#	*#	*#	X
Weapons/Ordnance Status	*#	*#	*#	*#	X
Warning	*	*	*	*	X

X = Required
* = Optional
\# = Selectable to minize display clutter

NOTE: Weapon delivery mode may be used in conjunction with other modes.

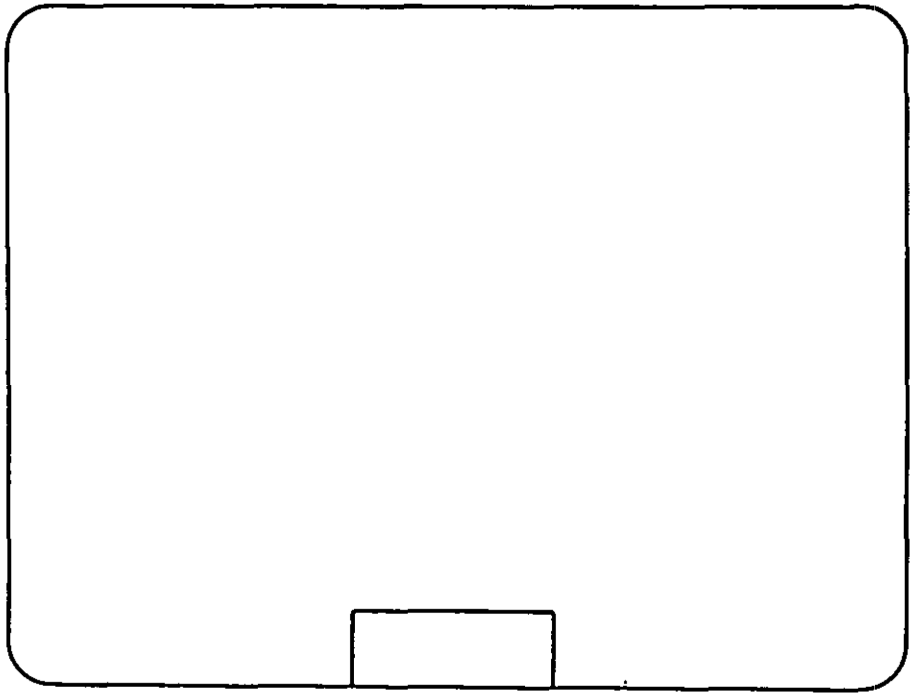

FIG. 1. SENSOR GIMBAL LIMITS BOX

NOTE: SENSOR FIELD-OF-VIEW AND COARSE TARGET LOCATION MAY BE INCLUDED IN THE GIMBAL LIMITS BOX.

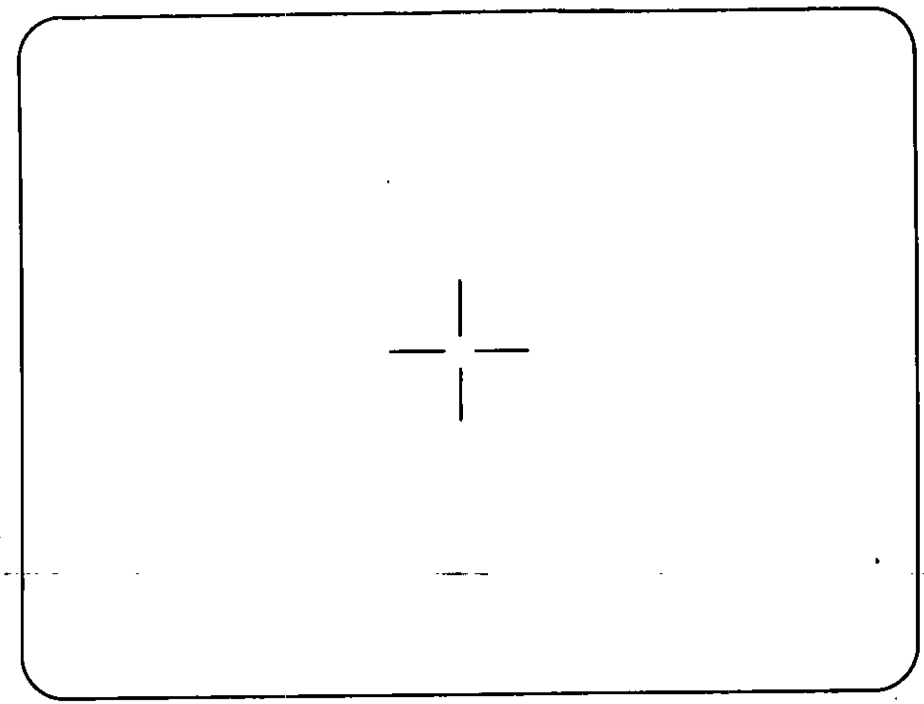

FIG. 2. SENSOR LINE-OF-SIGHT REFERENCE

NOTE: THE SENSOR LINE-OF-SIGHT REFERENCE SYMBOL IS FIXED AT THE CENTER OF THE DISPLAY PROVIDING A REFERENCE FOR AIRCRAFT POSITION SYMBOLS, WEAPON STEERING, HOVER SYMBOLS, AND ATTITUDE INFORMATION.

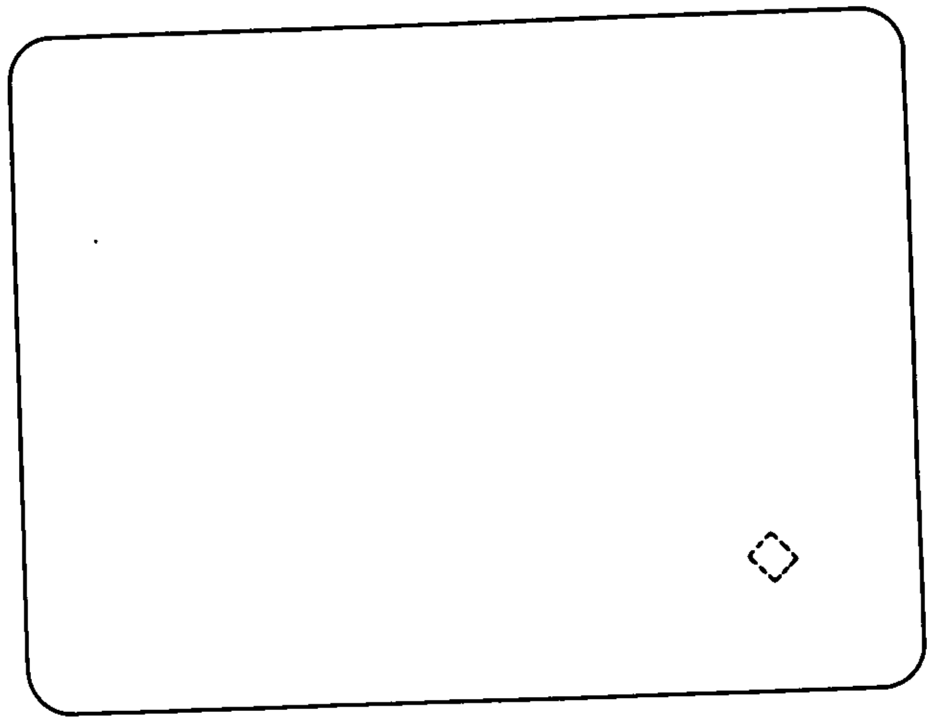

FIG. 3. HELICOPTER CENTERLINE REFERENCE

NOTE: THE HELICOPTER CENTERLINE REFERENCE INDICATES THE DIFFERENCE BETWEEN THE AIRCRAFT'S LONGITUDINAL AXIS AND THE SENSOR LINE-OF-SIGHT.

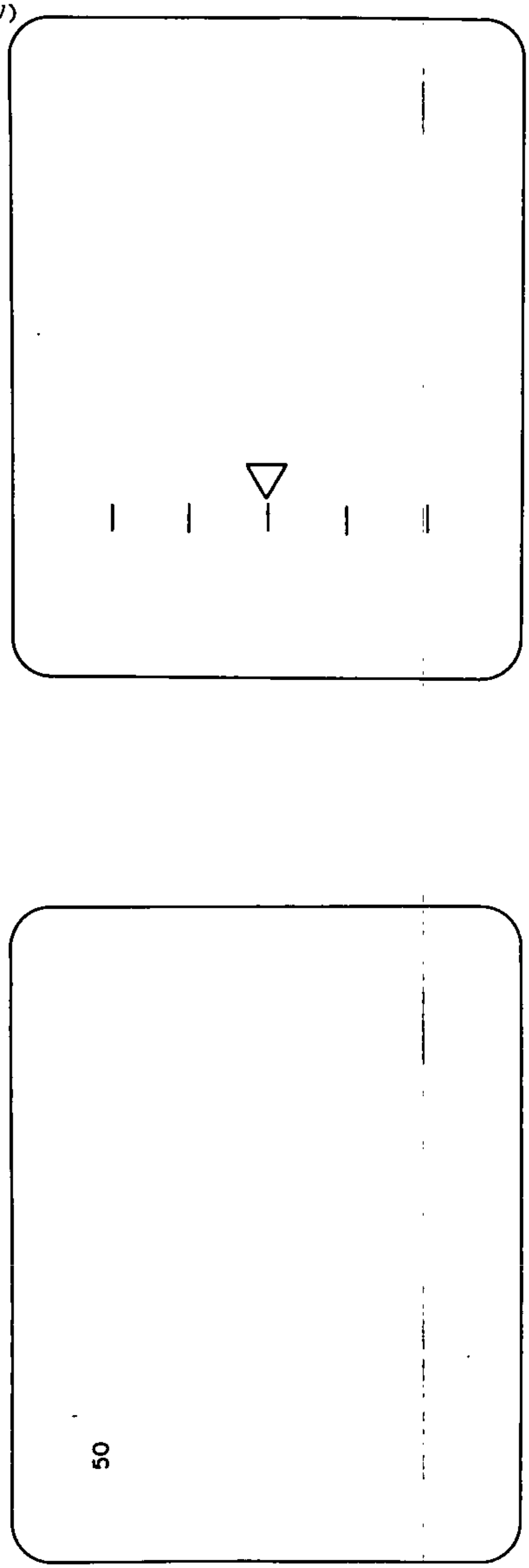

FIG. 4 PERFORMANCE MANAGEMENT

NOTE: PERFORMANCE MANAGEMENT MAY BE EITHER DIGITAL OR ANALOG.

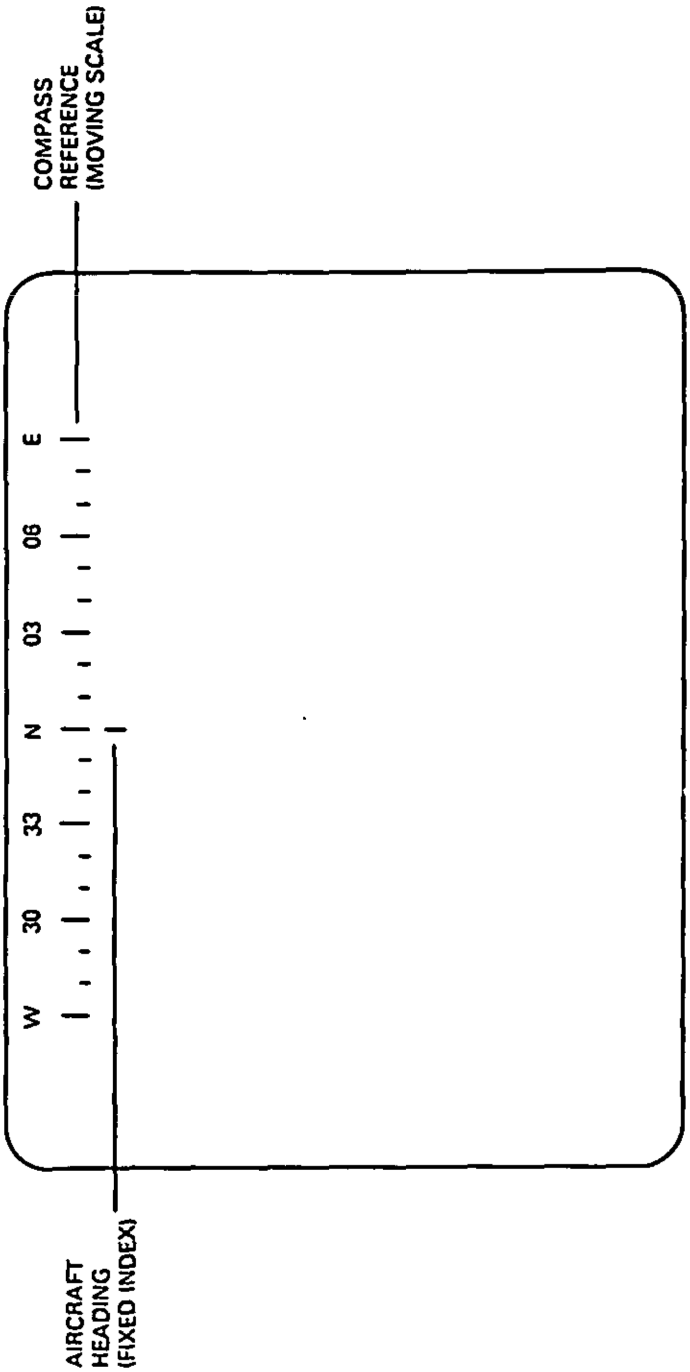

FIG. 5 HEADING

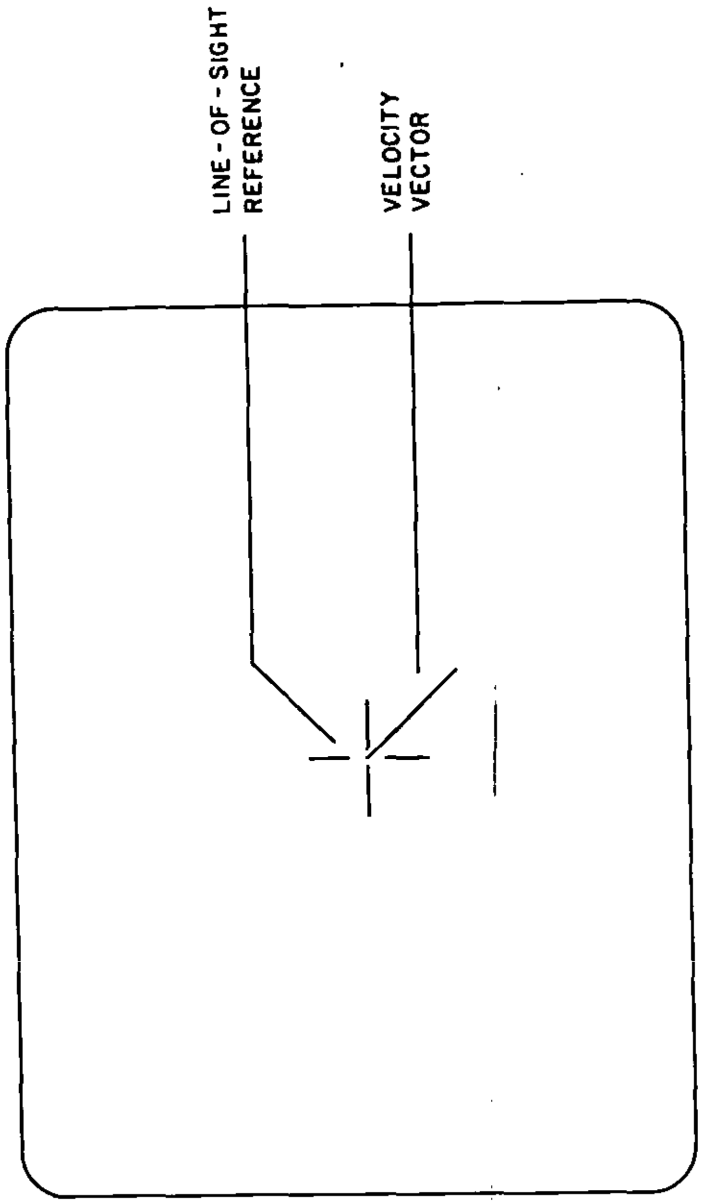

FIG. 6. VELOCITY VECTOR

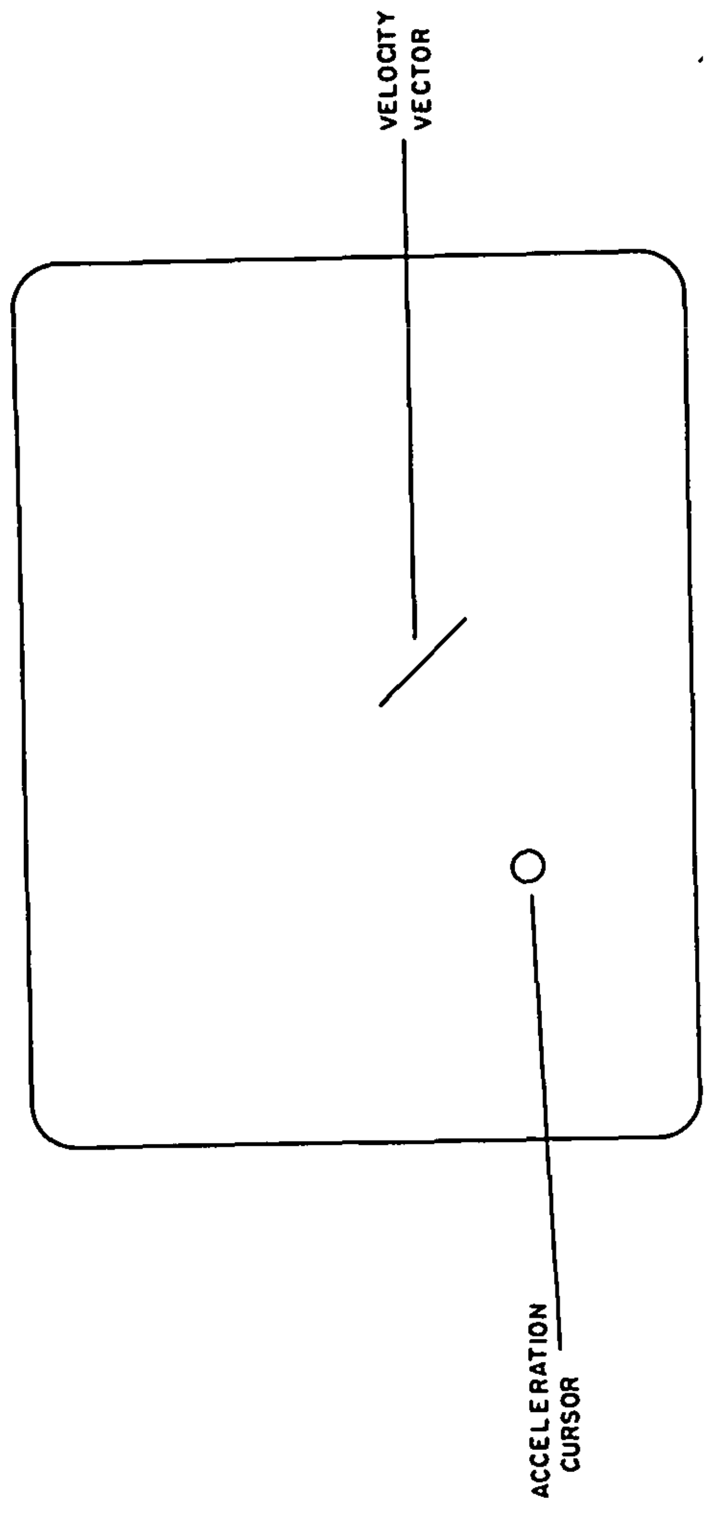

FIG. 7. ACCELERATION CURSOR

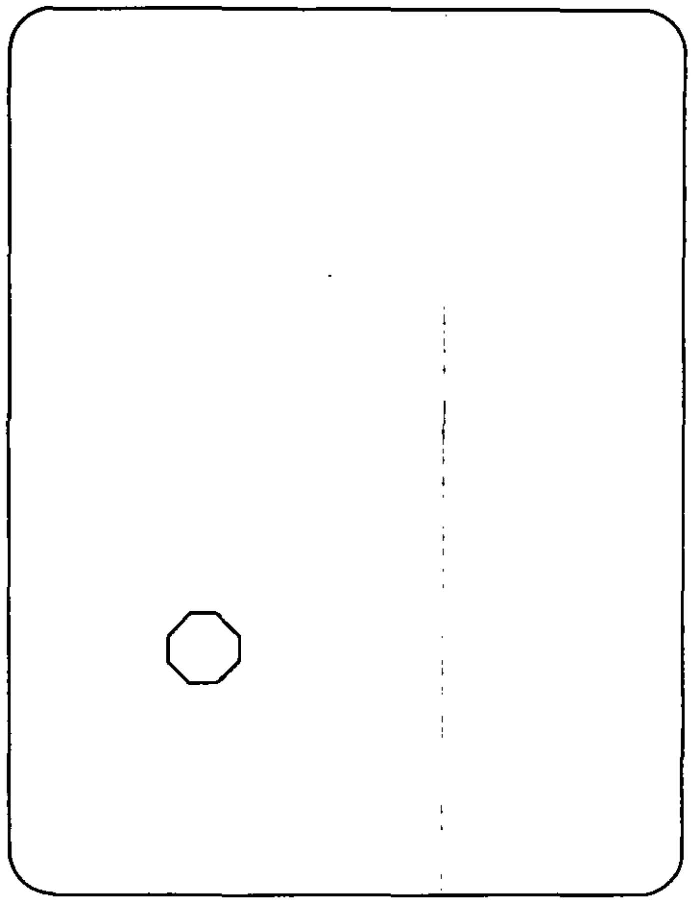

FIG. 8. POSITION REFERENCE

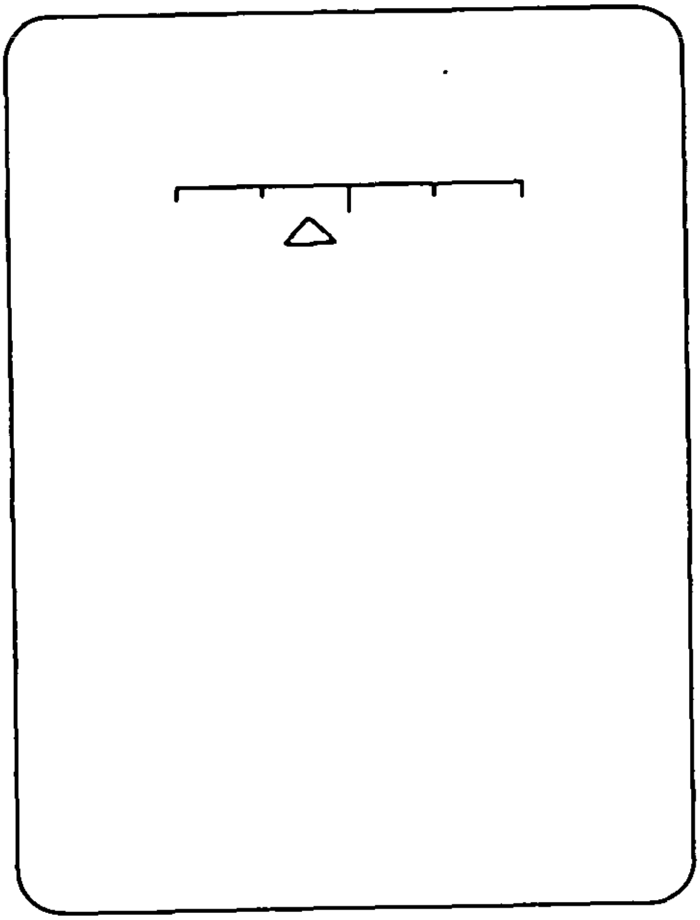

FIG. 9. RATE OF CLIMB

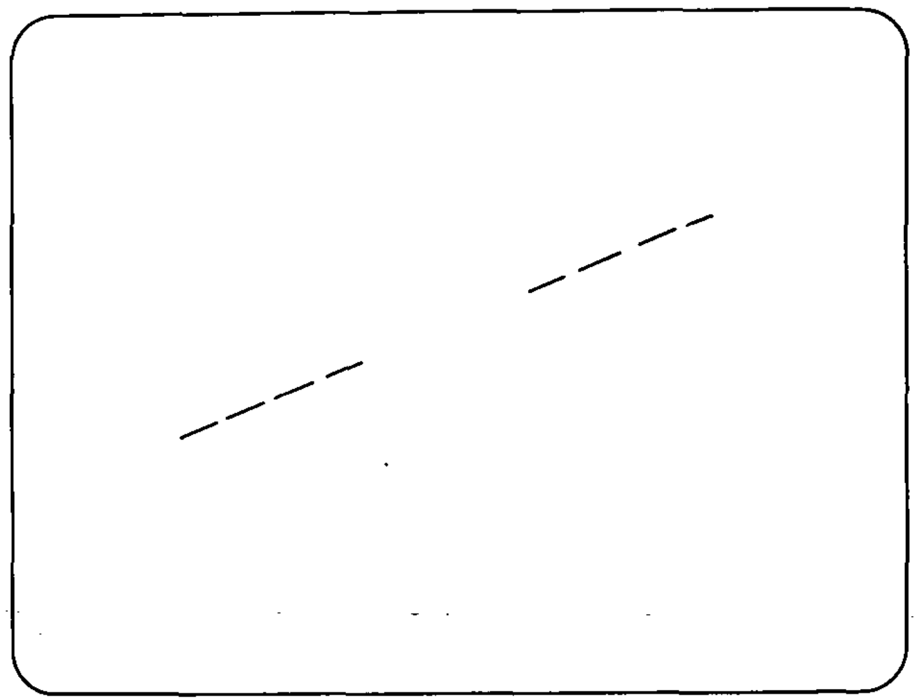

FIG. 10. HORIZON REFERENCE

NOTE: IN APPLICATIONS WHERE A VISUAL SCENE IS NOT PRESENTED, THIS SYMBOL SHOULD BE USED IN CONJUNCTION WITH THE LINE-OF-SIGHT REFERENCE SYMBOL IN ORDER TO PROVIDE A REFERENCE POINT

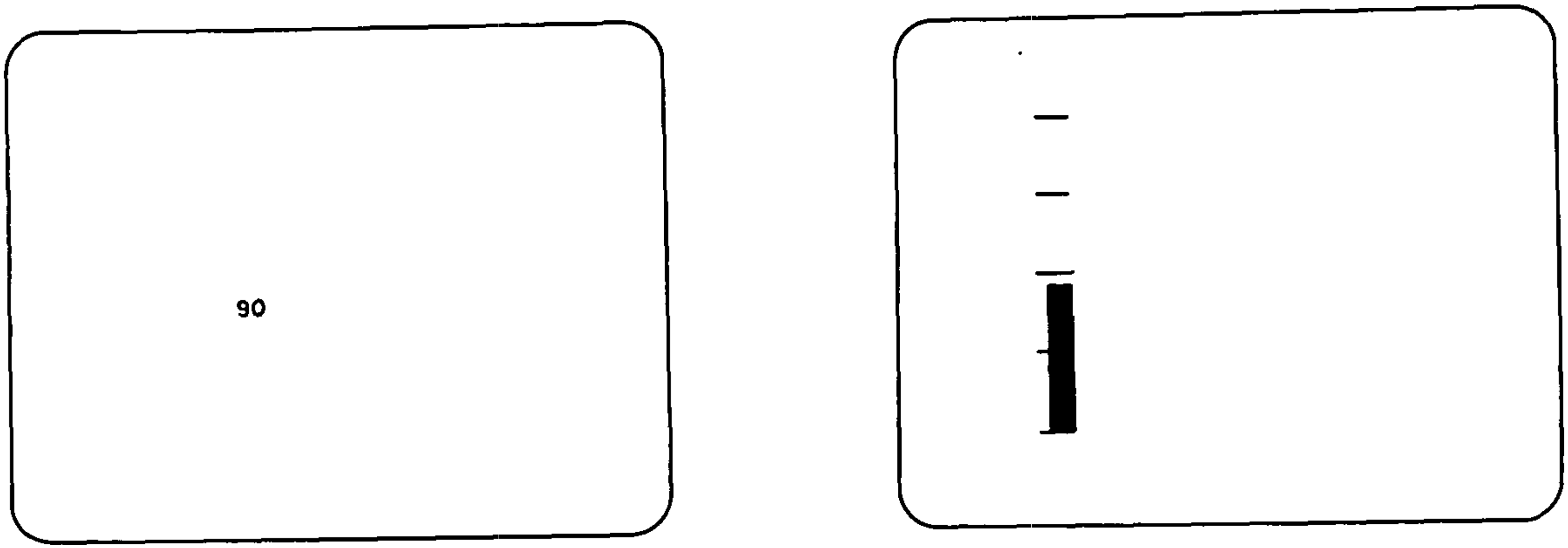

FIG. 11. SPEED

NOTE: SPEED MAY BE EITHER DIGITAL OR ANALOG. IN SOME APPLICATIONS, IT MAY BE MORE APPROPRIATE TO DISPLAY GROUNDSPEED. IF THIS IS THE CASE, AN INDICATION OF THIS SHALL BE PRESENTED TO THE CREW.

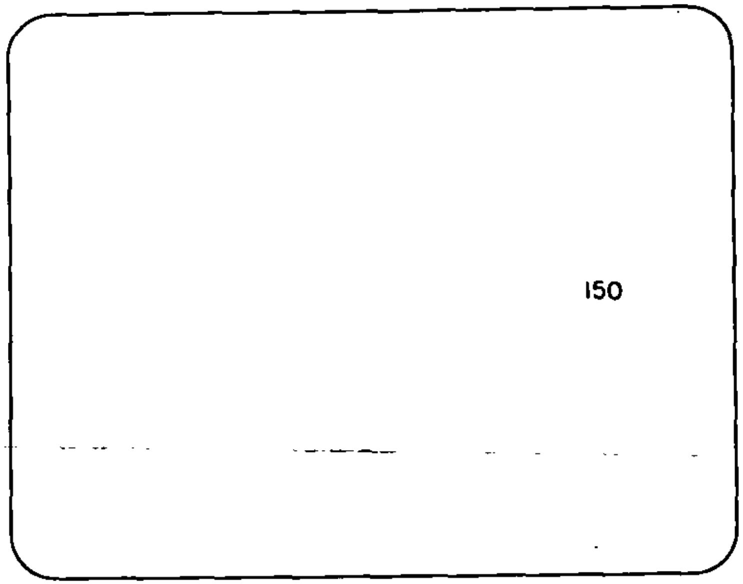

FIG. 12A. SINGLE DIGITAL ALTITUDE DISPLAY

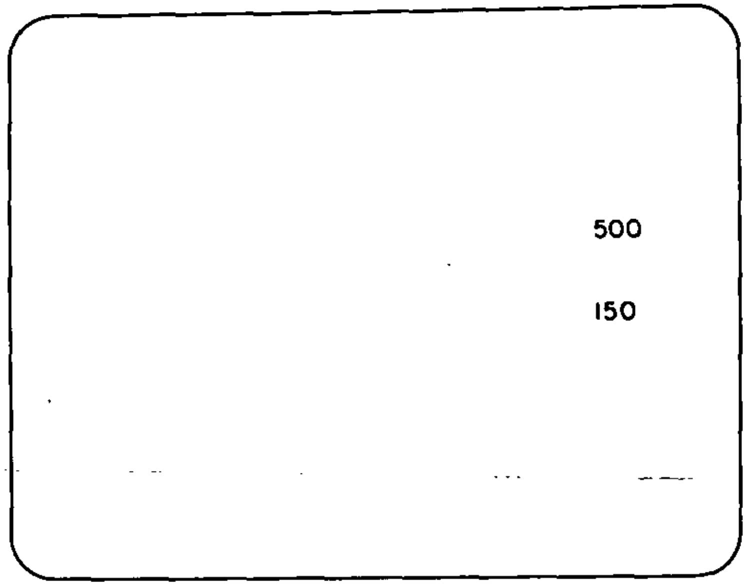

FIG. 12B. DUAL DIGITAL ALTITUDE DISPLAY

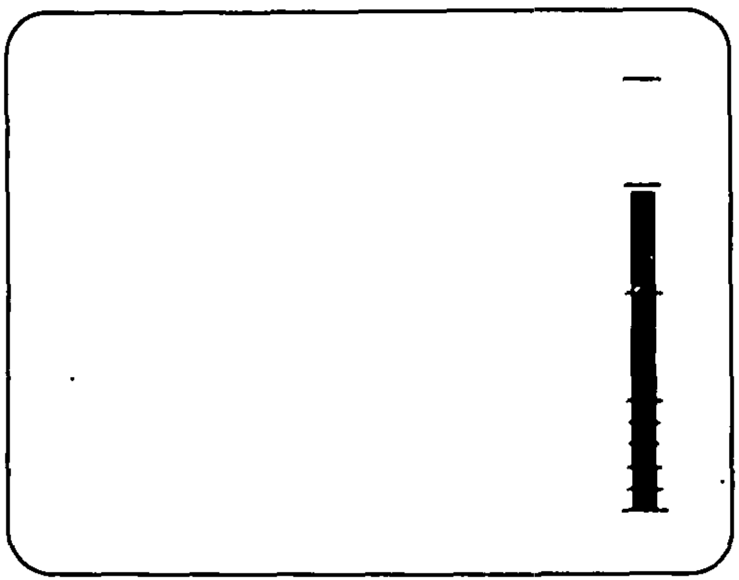

FIG. 12C. SINGLE ANALOG ALTITUDE DISPLAY

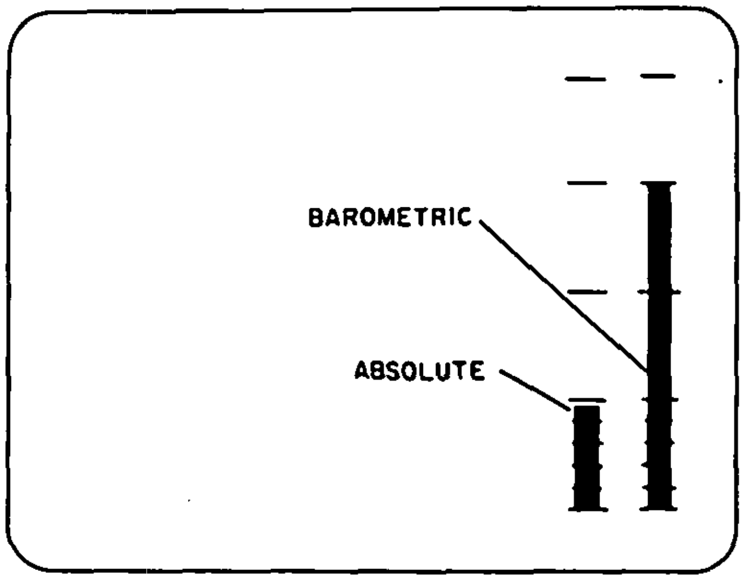

FIG. 12D. DUAL ANALOG ALTITUDE DISPLAY

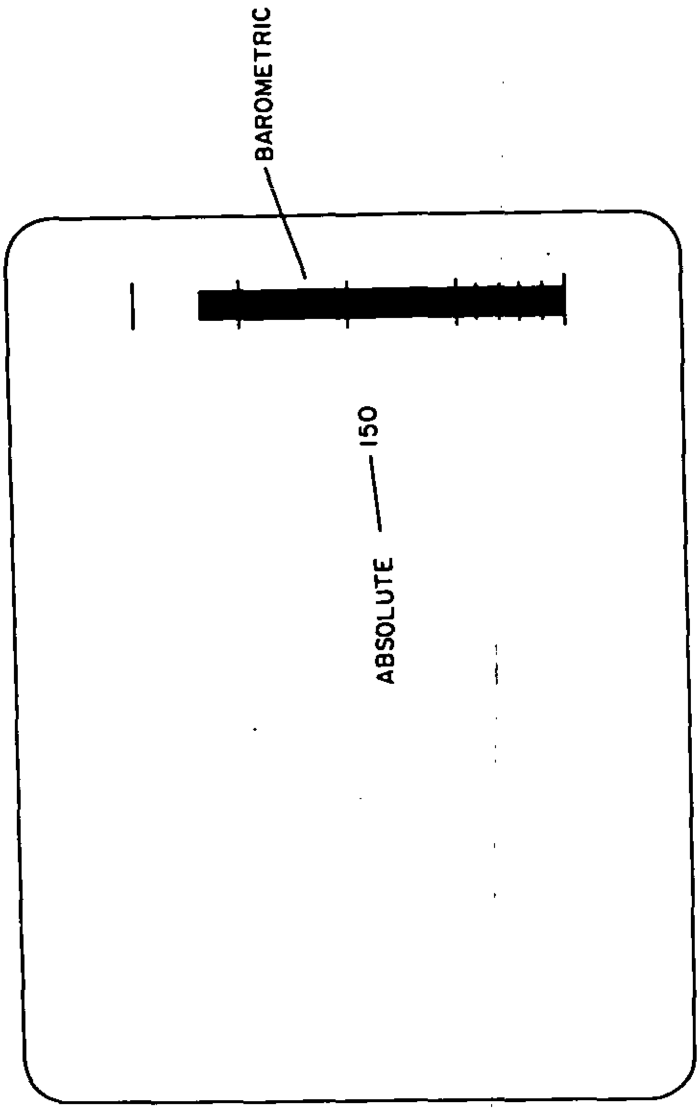

FIG. 12E. SIMULTANEOUS DIGITAL/ANALOG DISPLAY

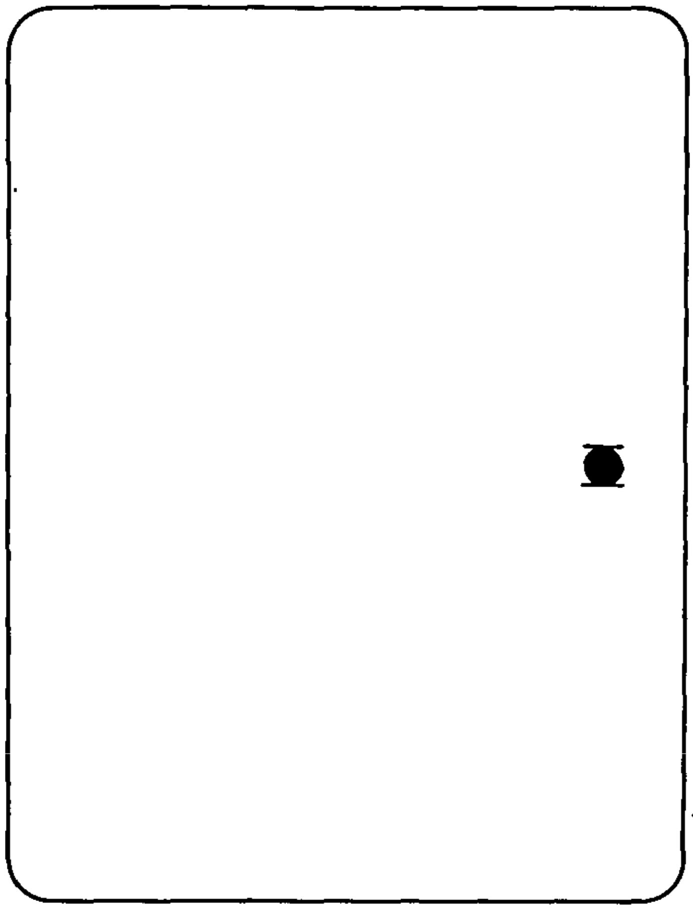

FIG. 13. SIDE SLIP

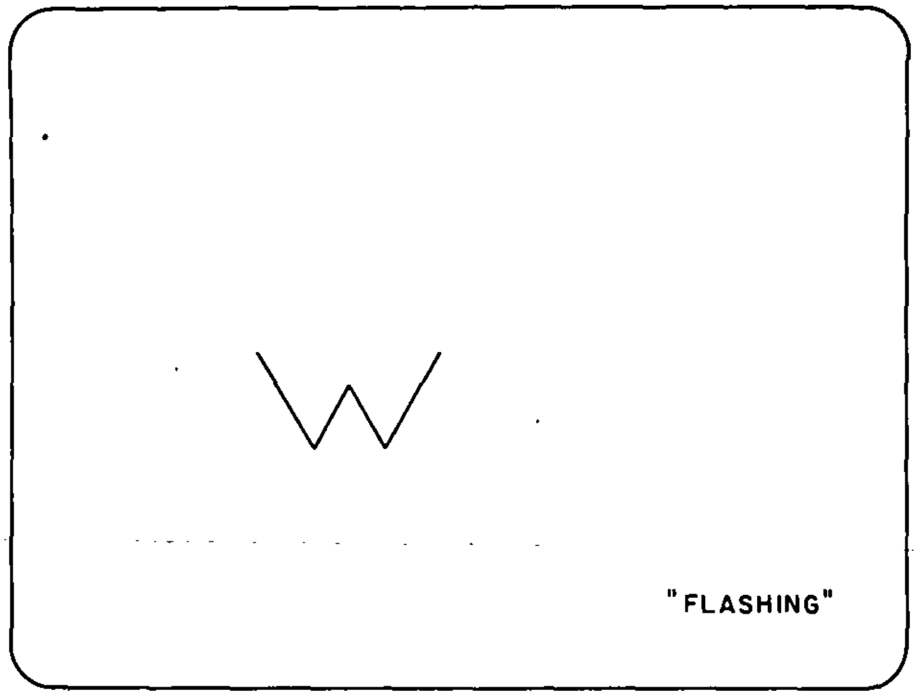

FIG. 14. WARNING SYMBOL (W OR WARN)

NOTE: IF THIS SYMBOL IS USED FOR THREAT WARNING, THE POSITION OF THE SYMBOL MAY INDICATE THE RELATIVE DIRECTION OF THE THREAT.

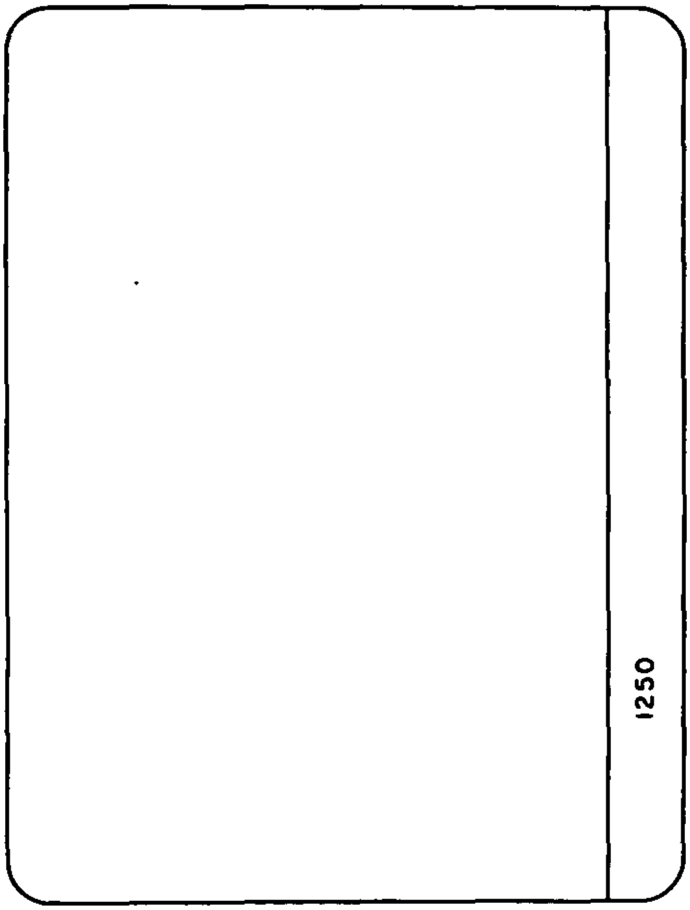

FIG. 15. RANGE

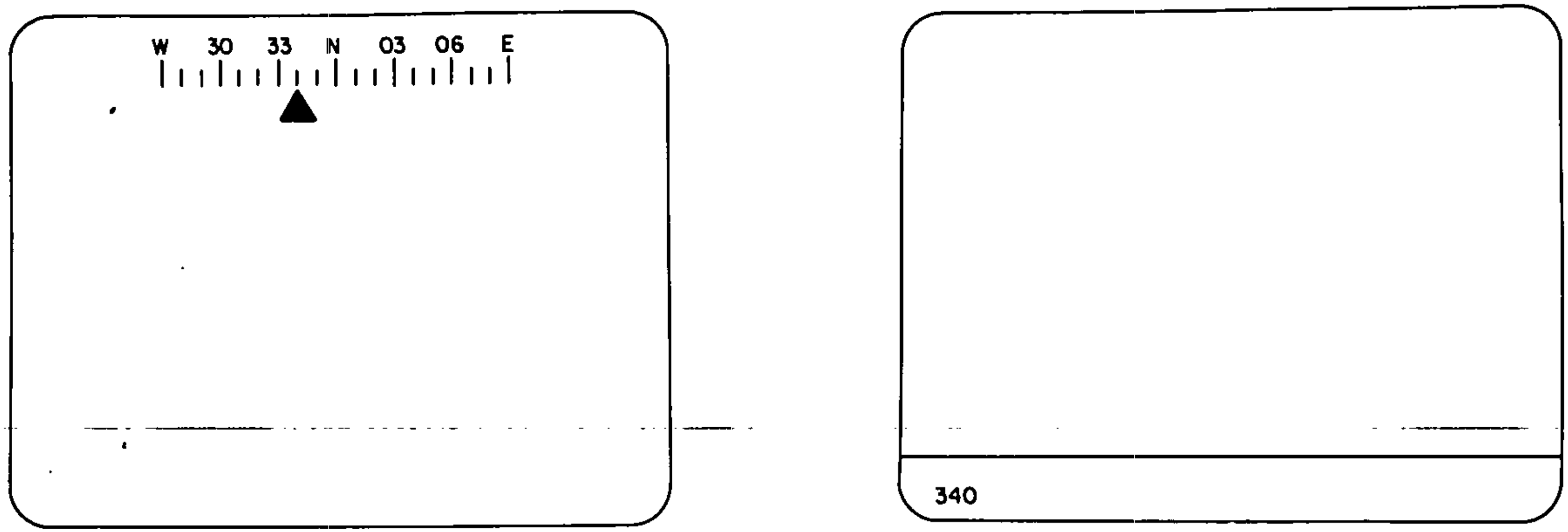

FIG. 16. TARGET BEARING

NOTE: TARGET BEARING MAY BE DISPLAYED BY ONE OF THE ABOVE METHODS.

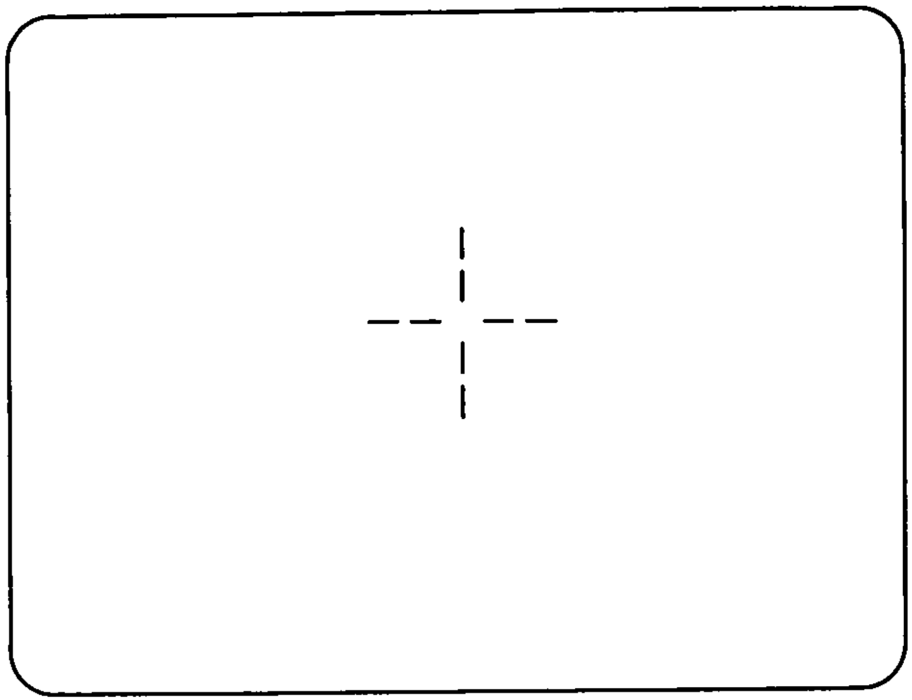

FIG. 17. AIMING RETICLE

NOTE: THE AIMING RETICLE IS THE PREDICTED IMPACT POINT FOR WEAPONS/ORDNANCE DELIVERY.

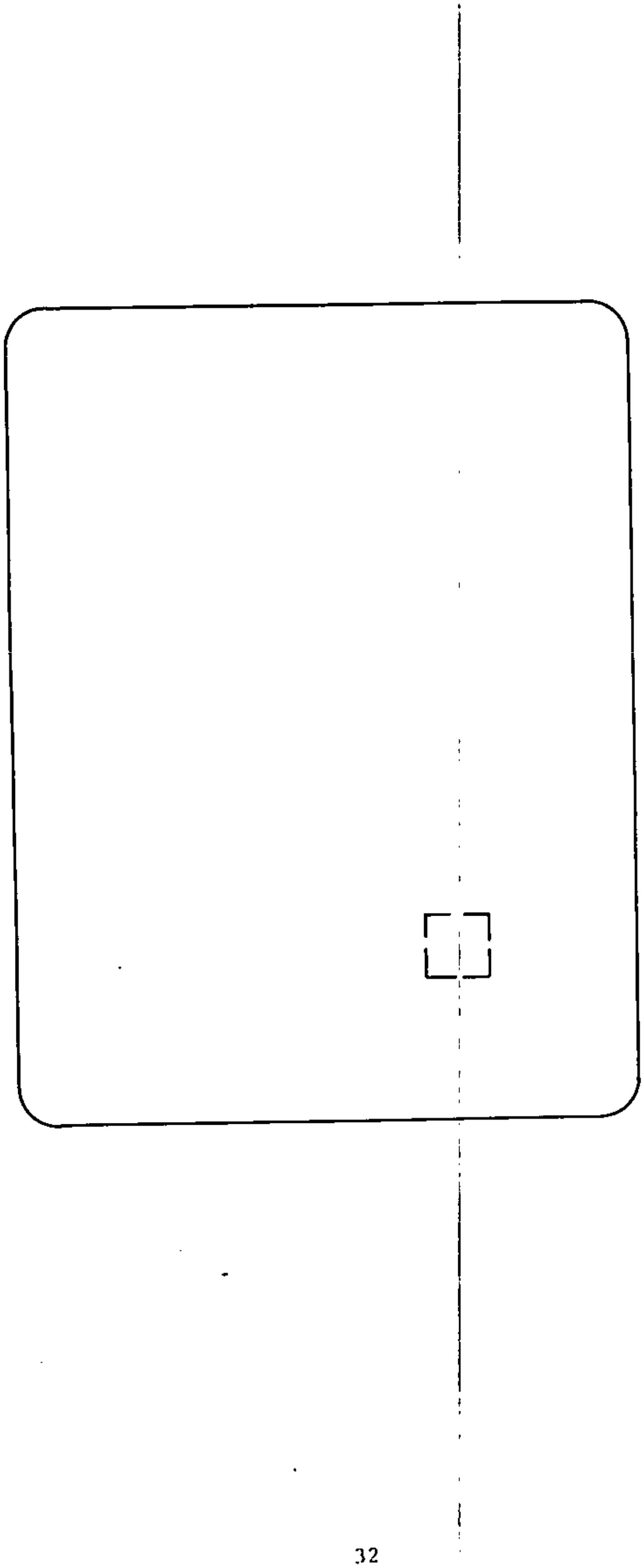

FIG. 18. TARGET DESIGNATION

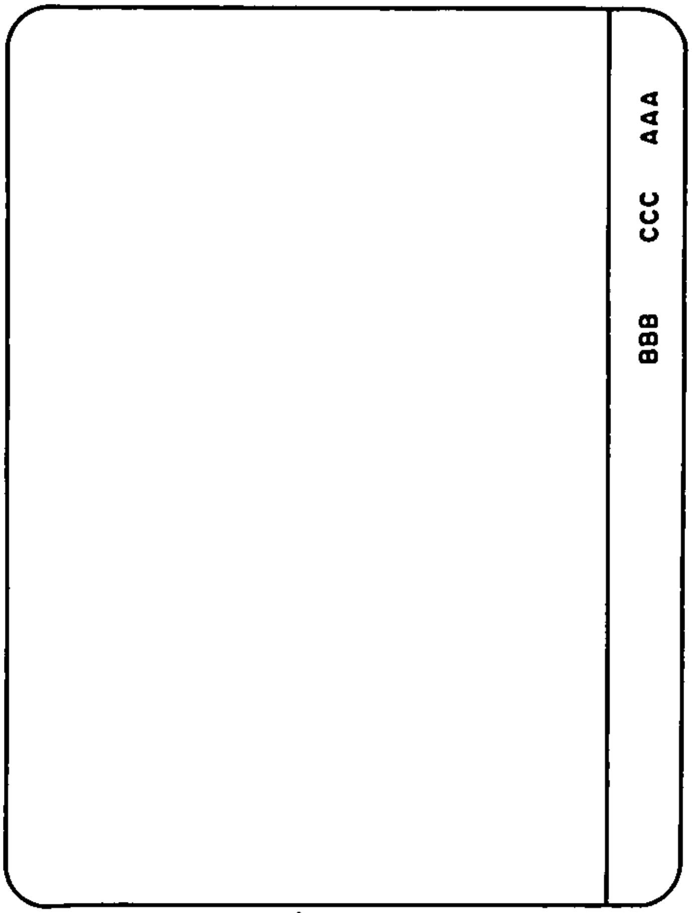

FIG. 19. WEAPONS/ORDNANCE STATUS

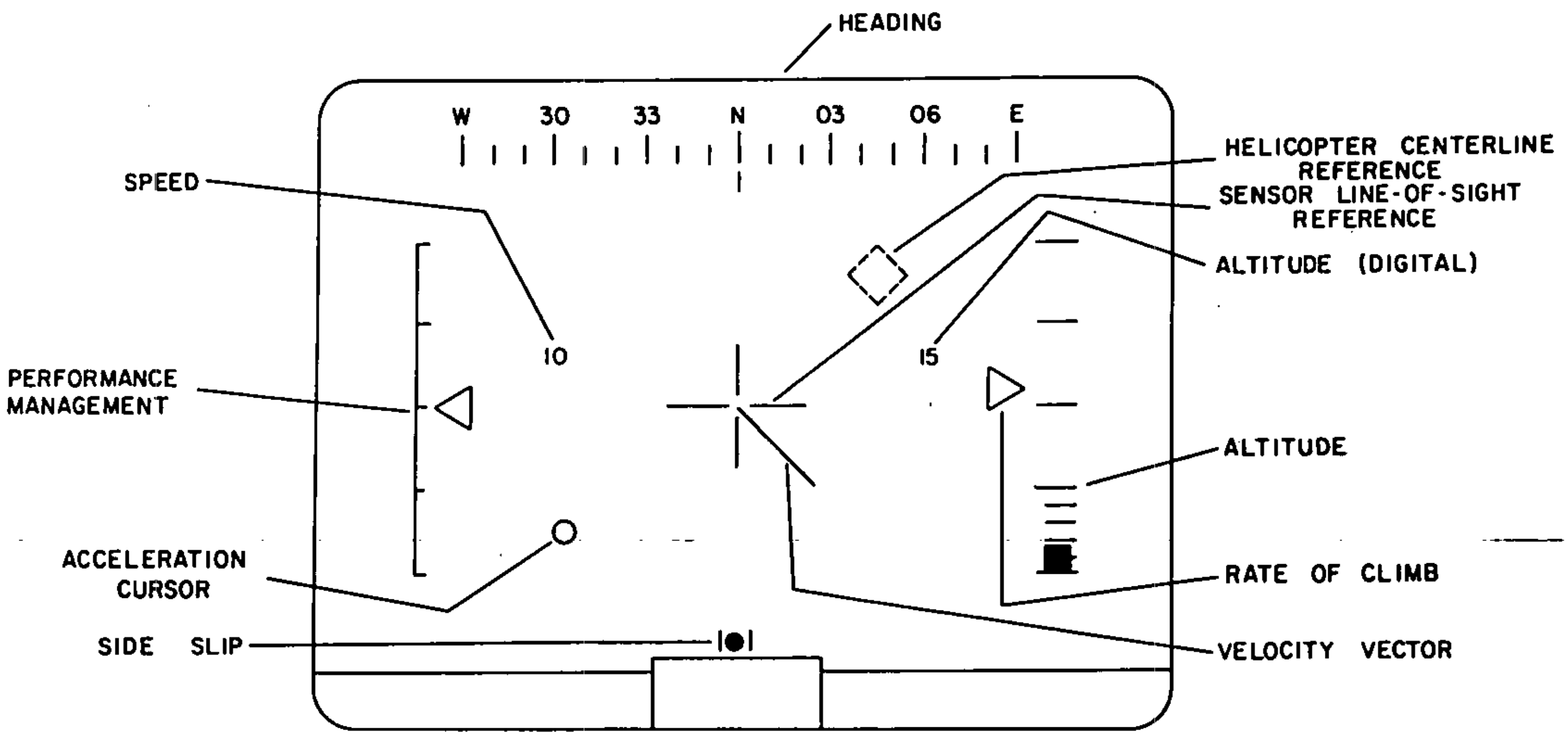

FIGURE 20. GENERAL ARRANGEMENT; HOVER MODE EXAMPLE.

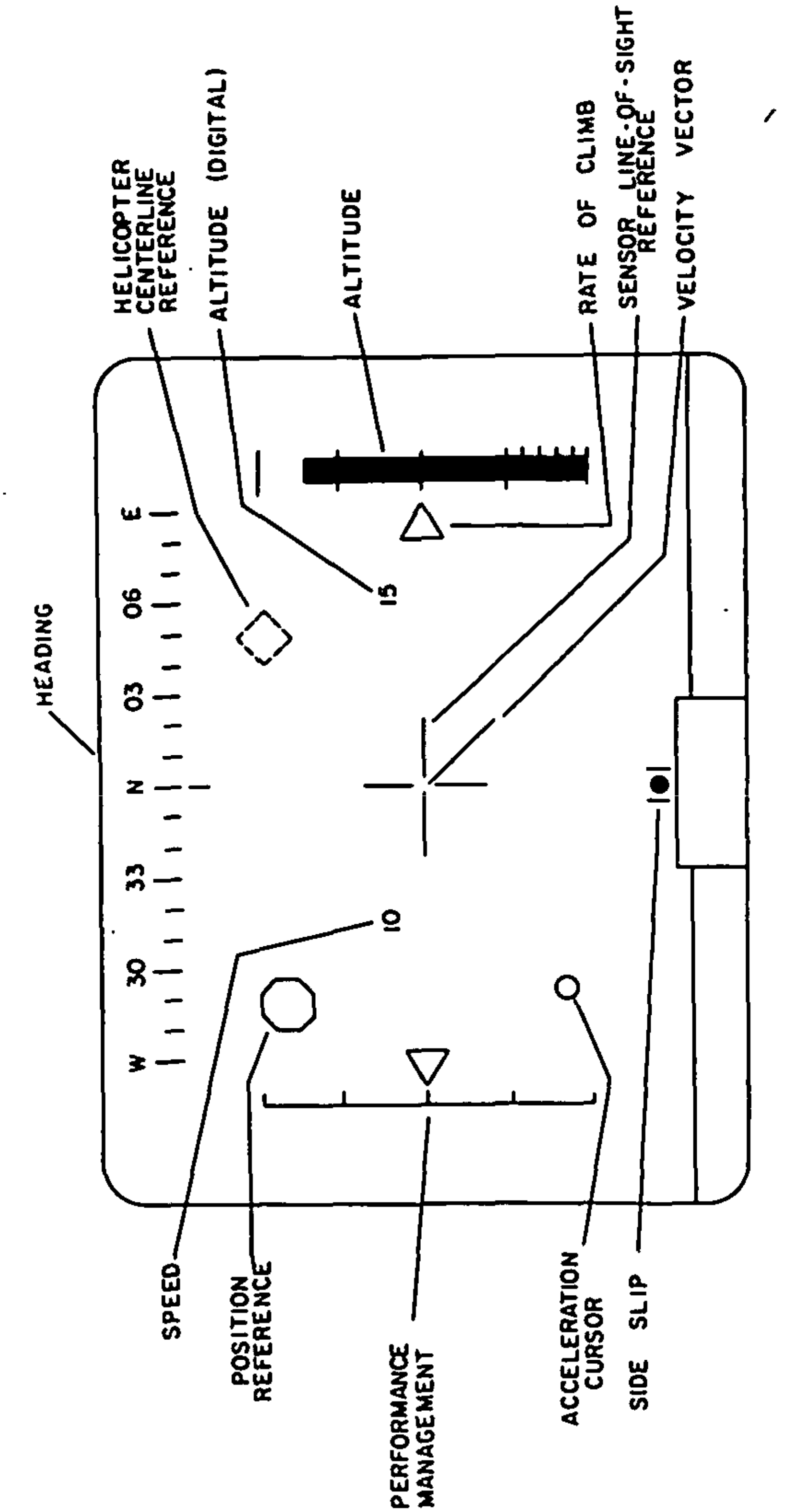

FIGURE 21. GENERAL ARRANGEMENT; POSITION MODE EXAMPLE.

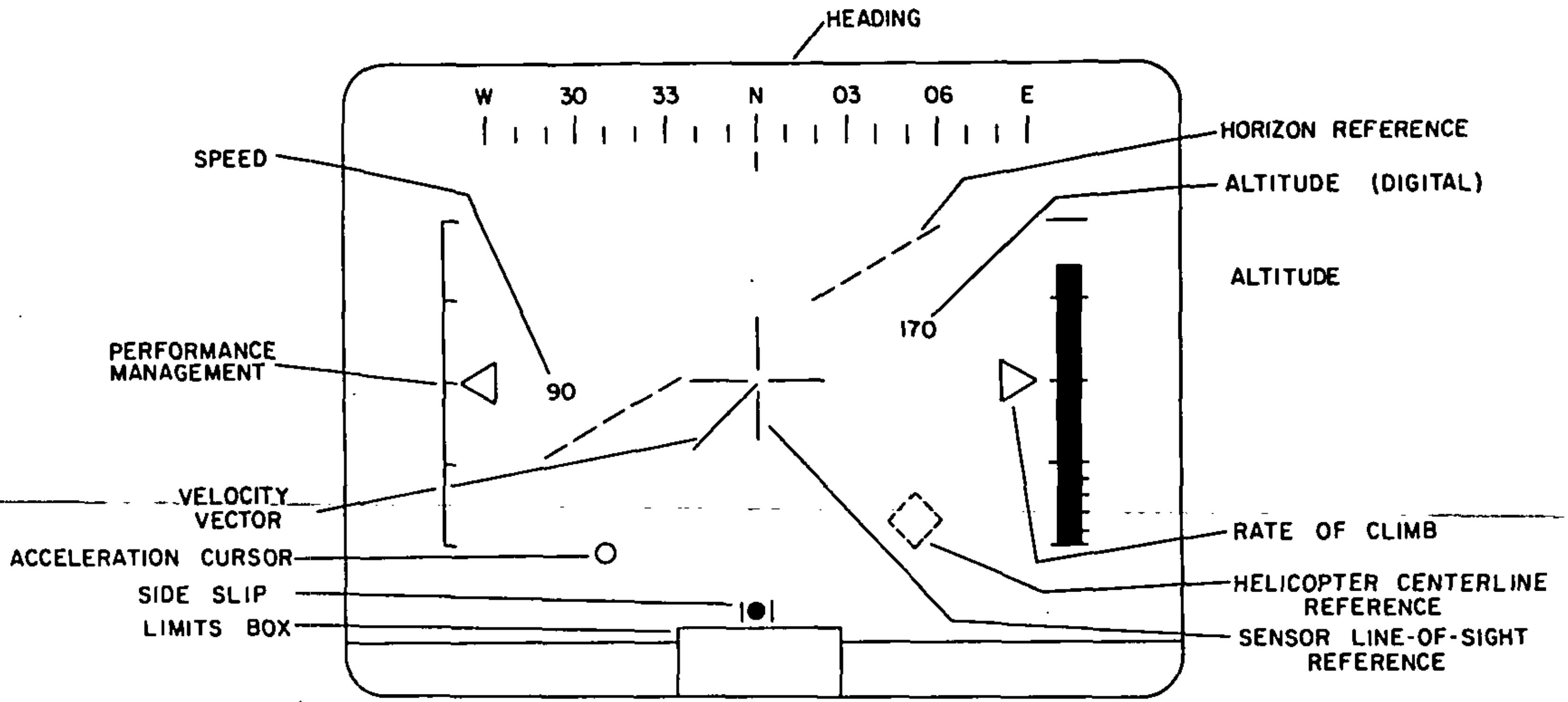

FIGURE 22. GENERAL ARRANGEMENT; TRANSITION MODE EXAMPLE.

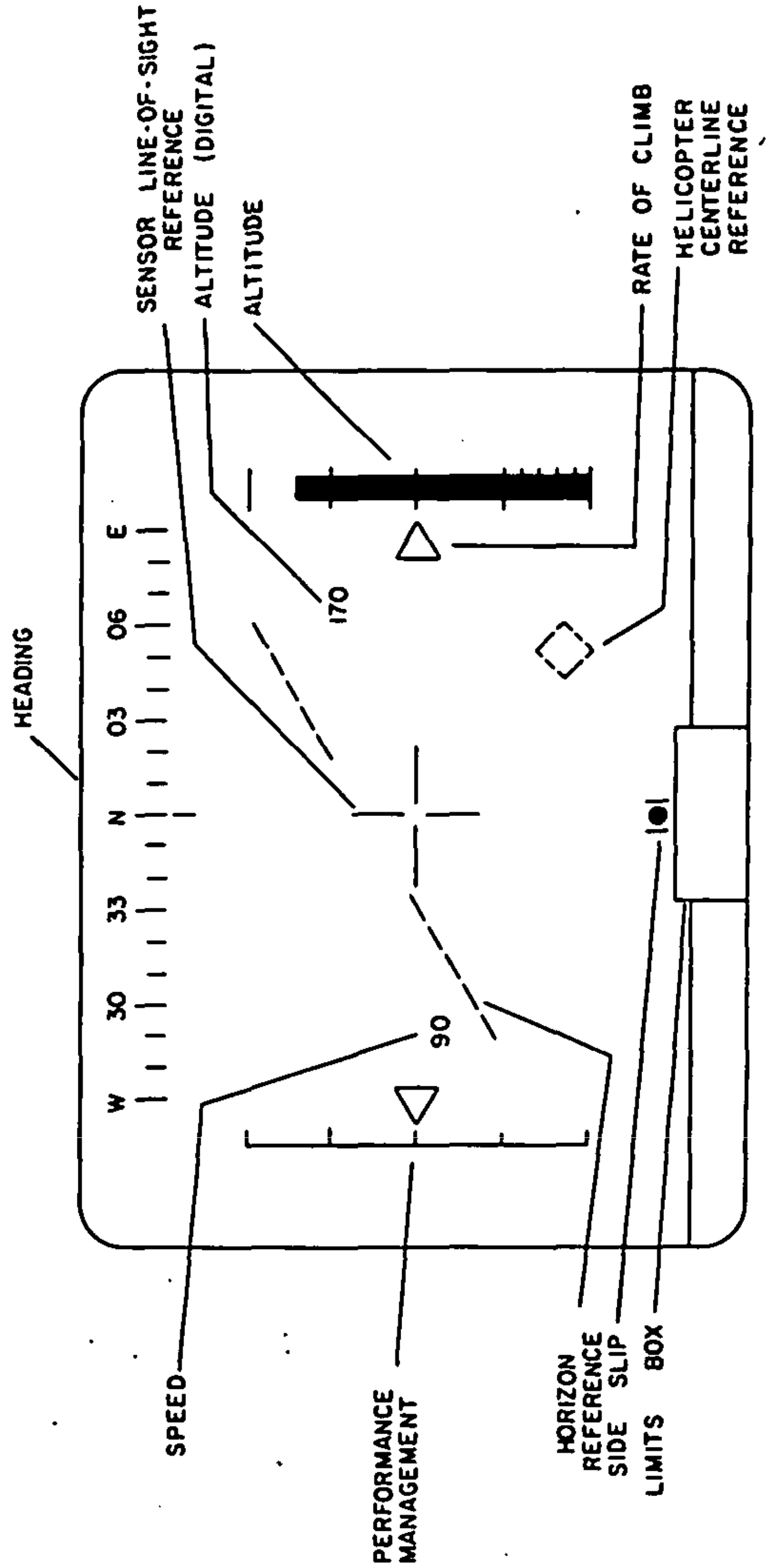

FIGURE 23. GENERAL ARRANAGEMENT; CRUISE MODE EXAMPLE.

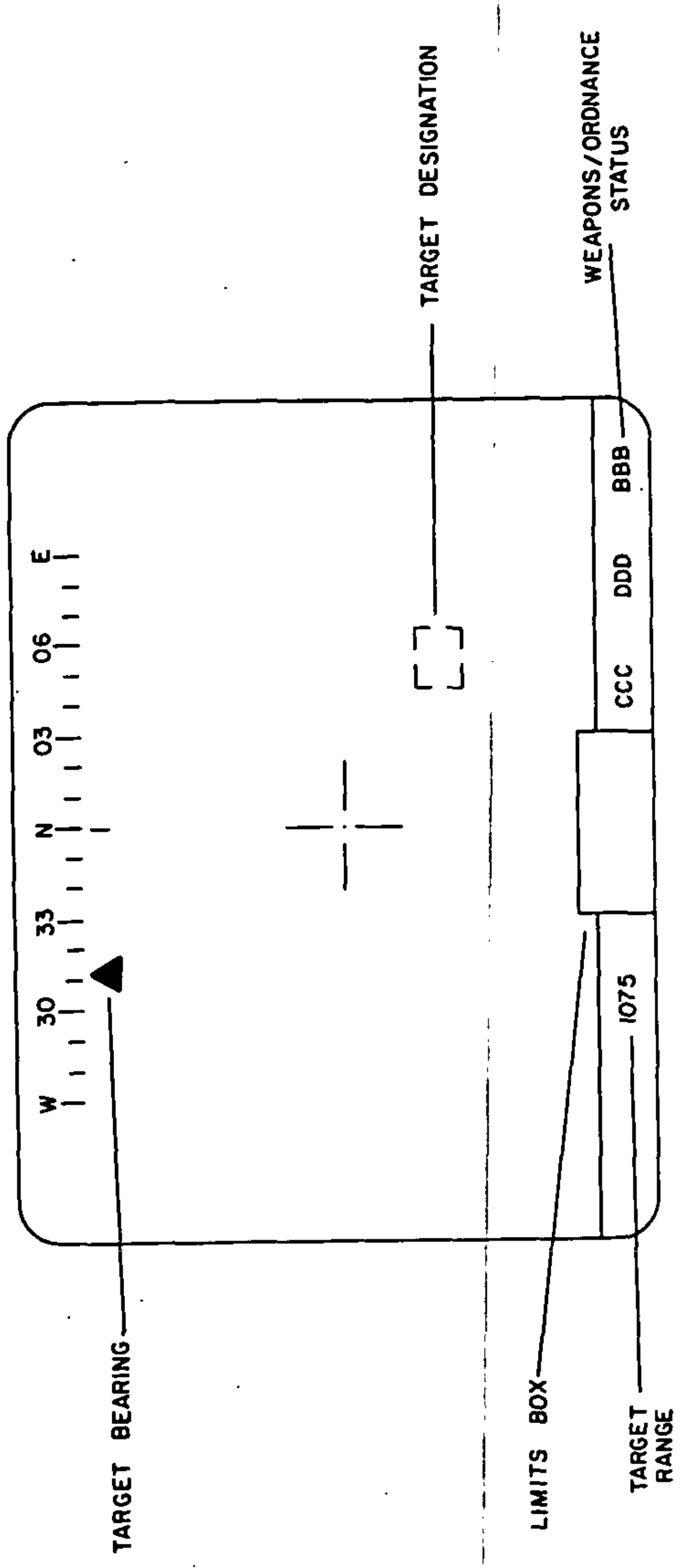

FIGURE 24. GENERAL ARRANGEMENT; WEAPON DELIVERY MODE EXAMPLE.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE	
MIL-STD-1295A(A)	HUMAN FACTORS ENGINEERING DESIGN CRITERIA FOR HELICOPTER COCKPIT ELECTRO-OPTICAL DISPLAY SYMBOLOGY	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION *(Mark one)*
b. ADDRESS *(Street, City, State, ZIP Code)*		☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: ______

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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