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AD861436
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DEPARTMENT OF THE ARMY
ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96384

AVIB-GCD

25 Nov 68

SUBJECT: Final Letter Report - AN/TVS-3 30-Inch Xenon Searchlight

Commanding General
United States Army, Vietnam
ATTN: AVHGC-DST
APO 96375

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1. REFERENCE

DF, AVHGC-DST, G3 USARV, 21 December 1968, subject: Evaluation
of the 30-Inch Xenon Searchlight AN/TVS-3.

2. PURPOSE

The purpose of this project was to evaluate the AN/TVS-3 30-inch
xenon searchlight in the operational environment of the Republic of
Vietnam (RVN).

3. OBJECTIVES

a. Objective 1

To describe and evaluate the tactical employment of the 30-
inch xenon searchlight.

b. Objective 2

To determine maintenance requirements for the searchlight
system.

4. BACKGROUND

In 1966 the Commanding General, United States Army, Vietnam
submitted an ENSURE request for a 30-inch xenon searchlight to
replace the 30-inch carbon-arc searchlight. Since that time the

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23-inch xenon searchlight replaced the older carbon-arc light in the searchlight batteries in RVN. Commanding General, I Field Force, Vietnam (I FFV) requested six 30-inch xenon searchlights. In March 1969, nine 30-inch xenon searchlights were received in RVN for a 60-day operational evaluation. Six searchlights were assigned to I FFV, one searchlight was assigned to the 1st Cavalry Division (Airmobile), and two systems were retained as maintenance floats.

5. DESCRIPTION OF EQUIPMENT

The 30-inch xenon searchlight is mounted on a two-wheel trailer. The combined unit weighs 1500 pounds and is 6.5 feet high. The searchlight has two types of visible light beams: a horizontal spread beam of 1.75° , and an adjustable beam which may be varied from 1.75° in the focused mode to 9° in the defocused mode. Presently the 30-inch xenon searchlight has no infrared capability. The searchlight is both liquid- and air-cooled. The external power source is a 400-cycle, 3-phase, 120/208 volt, 15 KW or larger generator. With maximum output of the generator, the searchlight will produce 1.2 billion peak beam candlepower.

6. EMPLOYMENT TECHNIQUES

During the evaluation three techniques of employment were used: direct illumination, indirect illumination, and illumination to enhance the use of night observation devices (NOD).

a. Direct Illumination

This was the most widely used employment of the searchlight during the evaluation. It consisted of orienting direct light upon the suspected target. Illumination of the target to a range of 16,000 meters was equivalent to daylight conditions.

b. Indirect Illumination

Environmental factors limited employment of the searchlight for indirect illumination. Cloud formations were not conducive to extensive indirect illumination missions. During the monsoon season, clouds usually enveloped the searchlight position. This restricted, and in some cases prevented, searchlight operation.

c. Night Observation Devices

The intensity of light from the 30-inch xenon searchlight to a range of 25,000 meters was sufficient and the use of NODs was

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not necessary. The searchlight was effective in providing light to enhance the use of NODs from 25,000 to 50,000 meters. However, units operating between the extended target area and the light source complained of having their areas compromised by the light.

7. EMPLACEMENTS

a. The searchlights assigned to I FFV were positioned at the following locations:

- (1) Hon Cong Mountain
- (2) Phan Thiet
- (3) Phan Rang
- (4) LZ Uplift
- (5) Dragon Mountain
- (6) Artillery Hill.

The searchlight assigned to the 1st Cavalry Division (Air Mobile) was positioned on Nui Ba Den, a mountain of 3300 feet elevation located approximately 13 kilometers northeast of Tay Ninh.

b. At each location the searchlight was positioned on the highest terrain within that immediate area. All searchlight positions were occupied by US Army forces, such as integrated communication systems units and observer personnel. The searchlights were placed on wooden towers. These towers ranged in height from 6 to 30 feet, depending upon the height required to overcome the terrain features or communication equipment obstructing the line of sight of the searchlight.

8. MISSIONS

The 30-inch xenon searchlight performed several different missions.

a. Base Defense

The searchlight was used to scan the perimeter of the base camp at unscheduled times. When performing this mission, the tactical operations center (TOC) of the base camp would instruct the searchlight crew to prepare for a scan mission. The TOC would then notify the base

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defense sector headquarters which, in turn, notified its perimeter guard personnel to be alert on the scanning light. The searchlight operator would then scan the entire perimeter with direct light from the searchlight.

b. Adjacent Bases

Military installations within 20 kilometers of a searchlight position frequently called for illumination during a suspected or actual probe of their perimeters. On two missions the searchlight at Artillery Hill provided illumination for the defense of Kontum located 41 kilometers from Pleiku. Base defense personnel at Kontum judged the illumination to be equivalent to a full moon, if not more. A total of 20 enemy KIAs was amassed in these two engagements.

c. Night Airmobile Operations

Several techniques were used in conjunction with night airmobile operations during the evaluation. Helicopter pilots flying missions near the Cambodian border frequently called the searchlight at Artillery Hill or Dragon Mountain to turn on their light for position verification. The pilots would also request the searchlight be beamed on a given azimuth for pilot orientation during flight. Pilots could fly within this beam without any disorientation effects. When flying parallel to the beam, pilots could identify the beam up to 25,000 meters from the light source.

d. Artillery Illumination

The 30-inch xenon searchlight was used to provide illumination for forward observers adjusting artillery fire. Most observers stated they preferred the searchlight illumination over conventional artillery flare illumination because it provided greater illumination and did not produce wavering shadows encountered with artillery flare illumination.

e. Medical Evacuation (MEDEVAC)

The 30-inch xenon searchlight supported MEDEVAC operations in two ways. Within ranges of 25,000 meters, the searchlight provided illumination for ground troops to perform pre-MEDEVAC first aid. When flying to a location of a MEDEVAC, the pilot would request the searchlight to direct the light beam on an azimuth to that location. The pilot flew in, or parallel to, the beam en route to the MEDEVAC site. The light also assisted MEDEVAC personnel in performing their work

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after the helicopter was on the ground, enabling speedier pickups of wounded personnel.

9. COORDINATION

a. The factor which had the most impact on searchlight operations was the coordination required between the requesting unit and illuminated units located between the requesting unit and the light source.

b. At the start of the evaluation, only those units which had been supported by the 23-inch searchlights requested illumination support from the 30-inch xenon searchlights. I FFV published the frequencies of the searchlight battery in its signal operating instructions and the availability of these lights was announced at commanders' meetings. A TOC was usually located near a searchlight position. The responsible commander announced the capability of the 30-inch xenon searchlight and encouraged its use. The requests for searchlight missions were channeled through the TOC on the command frequency. Subsequently, increased use of the searchlight was experienced.

c. Considerable problems were experienced by units located between the target location and the light source as these units' positions were often compromised by the illumination. Coordination between US units was considerably easier than with Army of the Republic of Vietnam (ARVN) troops. When ARVN units were affected, it was found that additional coordination was required by the TOC and the US Military Assistance Command, Vietnam advisor who was normally located in either the district or province headquarters. Because of coordination requirements and the excessive delay involved in mission clearance, many potential searchlight missions were not requested nor supported.

10. TARGETS

Two types of targets, preplanned and targets of opportunity, were used during the evaluation. Most of the preplanned targets were located on the perimeter of the base where the searchlight was located, or within 1000 meters of the perimeter. An exception to this was the support of preplotted targets of outlying fire support bases and previous illumination target concentrations. Targets of opportunity were anywhere within range of the searchlight.

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a. Preplanned Targets

To establish preplanned targets, the TOC would notify the searchlight crew to prepare for plotting missions. The TOC would then direct the searchlight beam to a general area of the perimeter. An observer in the base defense sector headquarters would adjust the light on the specific site desired to be illuminated. When this was accomplished, the TOC would record the location, assign it a control number, and record the azimuth and elevation settings provided by the searchlight crew. When illumination on a preplanned target or general area was required, the mission was sent to the searchlight section and within moments illumination was provided. If required, adjustments were made by the base defense sector observer.

b. Targets of Opportunity

Targets of opportunity were requested for illumination of any location within range of the searchlight. The request would be sent, via radio, to the searchlight section on the searchlight unit's frequency. The TOC in that area would monitor the request. Adjustment of the illumination would be directed by the observer of the requesting unit. The target would then be plotted and recorded as a concentration to support other missions in that location, or as a reference point for adjustment of an on-call mission.

11. OPERATIONAL LIMITATIONS

a. Backscatter

At the start of the evaluation, backscatter was considered as a possible problem in the employment of the light in the base defense role. It was thought that the light flux around and behind the searchlight would reveal the identity of the searchlight and the base complex. However, no problems with backscatter were experienced.

b. Enemy Fire

The searchlights drew enemy fire on two occasions. Both incidents occurred at the Nui Ba Den site. On one occasion rounds were received immediately after the light was first turned on, but no damage was experienced. On the other occasion, an enemy sapper attack was launched on the searchlight position. It is not known whether the attack was prompted by the presence of the searchlight or because the searchlight was collocated with communication equipment and a

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surveillance radar. Other attacks had been initiated against the communication position before the searchlight was installed. During the attack a satchel charge was detonated under the searchlight generator causing a combat loss to this item of equipment.

c. Environmental Condition

No difficulties were experienced with the system operation in inclement weather. However, ground haze and fog reduced and at times completely prohibited the use of the searchlight. During the monsoon season, clouds descending upon the mountain tops often enveloped the searchlight position and prevented operation. This problem was not unique with the 30-inch xenon searchlight.

12. MAINTAINABILITY

a. The 30-inch xenon searchlight proved to be a reliable item of equipment. On two occasions an igniter malfunctioned and on one occasion a rectifier became inoperable. Only five days of down time was experienced because of these malfunctions. Repair by the organizational personnel was effected using expedient means due to the lack of direct support parts. There were five failures of the 400-cycle generator. Three were attributable to faulty circuit boards and two to the circuit breaker.

b. A direct support maintenance capability was not available during the evaluation. The searchlights were either shipped without the direct support maintenance packages or they were lost in country. Repeated actions to locate the direct support maintenance packages proved fruitless. A message was sent to Night Vision Laboratory, Fort Belvoir requesting additional 30-inch xenon searchlight direct support maintenance packages. No answer to this message was received and apparently no additional direct support maintenance packages were shipped.

13. CONCLUSIONS

a. The 30-inch xenon searchlight provided light capabilities not previously available in RVN.

b. The 30-inch xenon searchlight proved to be a reliable system.

c. The absence of the direct support maintenance packages precluded a comprehensive evaluation of the searchlight maintenance support.

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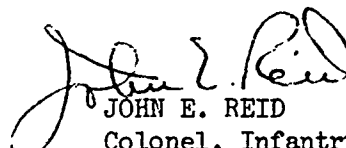
14. RECOMMENDATIONS

It is recommended that:

a. The 30-inch xenon searchlight be deployed to RVN on a mission-justified basis.

b. Action be taken to provide complete maintenance support for the 30-inch xenon searchlight deployed in RVN.

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Security Classification

DOCUMENT CONTROL DATA - R & D		
<i>(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)</i>		
1. ORIGINATING ACTIVITY (Corporate author) Army Concept Team in Vietnam APO San Francisco 96384		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED
		2b. GROUP
3. REPORT TITLE 30 Inch Xenon Searchlight AN/TVS-3		
4. DESCRIPTIVE NOTES (Type of report and Inclusive dates) Final Letter Report		
5. AUTHOR(S) (First name, middle initial, last name) George E. Hjorth, LTC, OrdC		
6. REPORT DATE September 1969	7a. TOTAL NO. OF PAGES 8	7b. NO. OF REFS 1
8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S) ACTIV Project No' ACG-12/69I	
b. PROJECT NO.		
c. None	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.	None	
10. DISTRIBUTION STATEMENT Distribution of this document is unlimited.		
11. SUPPLEMENTARY NOTES None	12. SPONSORING MILITARY ACTIVITY US Army, Vietnam APO San Francisco 96375	
13. ABSTRACT The AN/TVS-3 30-Inch Xenon Searchlight was studied in Vietnam to describe and evaluate the tactical employment of the searchlight and to determine its maintenance requirements. The 30-inch xenon searchlight is mounted on a two-wheel trailer; It is both liquid- and air-cooled. The searchlight has two visible light beams: a horizontal spread beam and an adjustable beam. The searchlight uses an external power source of 400-cycle, 3-phase, 120/208 volt 15KW or larger generator. The searchlight will produce 1.2 billion peak beam candlepower. It has no infrared capability. The searchlight provided light capabilities not previously available in RVN. It proved to be a reliable system. The absence of the direct support maintenance packages precluded a comprehensive evaluation of the maintenance support. It was recommended that the searchlight be deployed to RVN on a mission-justified basis, and when deployed, that complete maintenance support be provided.		

DD FORM 1473
1 NOV 65

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
AN/TVS-3 30-Inch Xenon Searchlight Xenon Searchlight						

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Security Classification