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PROJECT MANAGEMENT
OF THE
DAVY CROCKETT WEAPONS SYSTEM
1958 - 1962 (U)



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REGRADED (Appropriate Classification) (DATE) 11/1/80

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U. S. ARMY WEAPONS COMMAND
ROCK ISLAND ARSENAL
ROCK ISLAND, ILLINOIS



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PROJECT MANAGEMENT OF THE DAVY CROCKETT
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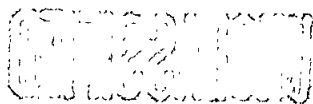
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— *Chlorophyll a* (mg/g dry weight) = 12.72 (OD₆₈₀) + 0.0001 (OD₆₈₀)² - 0.0001 (OD₆₈₀)³ - 0.0001 (OD₆₈₀)⁴ - 0.0001 (OD₆₈₀)⁵ - 0.0001 (OD₆₈₀)⁶ - 0.0001 (OD₆₈₀)⁷ - 0.0001 (OD₆₈₀)⁸ - 0.0001 (OD₆₈₀)⁹ - 0.0001 (OD₆₈₀)¹⁰ - 0.0001 (OD₆₈₀)¹¹ - 0.0001 (OD₆₈₀)¹² - 0.0001 (OD₆₈₀)¹³ - 0.0001 (OD₆₈₀)¹⁴ - 0.0001 (OD₆₈₀)¹⁵ - 0.0001 (OD₆₈₀)¹⁶ - 0.0001 (OD₆₈₀)¹⁷ - 0.0001 (OD₆₈₀)¹⁸ - 0.0001 (OD₆₈₀)¹⁹ - 0.0001 (OD₆₈₀)²⁰ - 0.0001 (OD₆₈₀)²¹ - 0.0001 (OD₆₈₀)²² - 0.0001 (OD₆₈₀)²³ - 0.0001 (OD₆₈₀)²⁴ - 0.0001 (OD₆₈₀)²⁵ - 0.0001 (OD₆₈₀)²⁶ - 0.0001 (OD₆₈₀)²⁷ - 0.0001 (OD₆₈₀)²⁸ - 0.0001 (OD₆₈₀)²⁹ - 0.0001 (OD₆₈₀)³⁰ - 0.0001 (OD₆₈₀)³¹ - 0.0001 (OD₆₈₀)³² - 0.0001 (OD₆₈₀)³³ - 0.0001 (OD₆₈₀)³⁴ - 0.0001 (OD₆₈₀)³⁵ - 0.0001 (OD₆₈₀)³⁶ - 0.0001 (OD₆₈₀)³⁷ - 0.0001 (OD₆₈₀)³⁸ - 0.0001 (OD₆₈₀)³⁹ - 0.0001 (OD₆₈₀)⁴⁰ - 0.0001 (OD₆₈₀)⁴¹ - 0.0001 (OD₆₈₀)⁴² - 0.0001 (OD₆₈₀)⁴³ - 0.0001 (OD₆₈₀)⁴⁴ - 0.0001 (OD₆₈₀)⁴⁵ - 0.0001 (OD₆₈₀)⁴⁶ - 0.0001 (OD₆₈₀)⁴⁷ - 0.0001 (OD₆₈₀)⁴⁸ - 0.0001 (OD₆₈₀)⁴⁹ - 0.0001 (OD₆₈₀)⁵⁰ - 0.0001 (OD₆₈₀)⁵¹ - 0.0001 (OD₆₈₀)⁵² - 0.0001 (OD₆₈₀)⁵³ - 0.0001 (OD₆₈₀)⁵⁴ - 0.0001 (OD₆₈₀)⁵⁵ - 0.0001 (OD₆₈₀)⁵⁶ - 0.0001 (OD₆₈₀)⁵⁷ - 0.0001 (OD₆₈₀)⁵⁸ - 0.0001 (OD₆₈₀)⁵⁹ - 0.0001 (OD₆₈₀)⁶⁰ - 0.0001 (OD₆₈₀)⁶¹ - 0.0001 (OD₆₈₀)⁶² - 0.0001 (OD₆₈₀)⁶³ - 0.0001 (OD₆₈₀)⁶⁴ - 0.0001 (OD₆₈₀)⁶⁵ - 0.0001 (OD₆₈₀)⁶⁶ - 0.0001 (OD₆₈₀)⁶⁷ - 0.0001 (OD₆₈₀)⁶⁸ - 0.0001 (OD₆₈₀)⁶⁹ - 0.0001 (OD₆₈₀)⁷⁰ - 0.0001 (OD₆₈₀)⁷¹ - 0.0001 (OD₆₈₀)⁷² - 0.0001 (OD₆₈₀)⁷³ - 0.0001 (OD₆₈₀)⁷⁴ - 0.0001 (OD₆₈₀)⁷⁵ - 0.0001 (OD₆₈₀)⁷⁶ - 0.0001 (OD₆₈₀)⁷⁷ - 0.0001 (OD₆₈₀)⁷⁸ - 0.0001 (OD₆₈₀)⁷⁹ - 0.0001 (OD₆₈₀)⁸⁰ - 0.0001 (OD₆₈₀)⁸¹ - 0.0001 (OD₆₈₀)⁸² - 0.0001 (OD₆₈₀)⁸³ - 0.0001 (OD₆₈₀)⁸⁴ - 0.0001 (OD₆₈₀)⁸⁵ - 0.0001 (OD₆₈₀)⁸⁶ - 0.0001 (OD₆₈₀)⁸⁷ - 0.0001 (OD₆₈₀)⁸⁸ - 0.0001 (OD₆₈₀)⁸⁹ - 0.0001 (OD₆₈₀)⁹⁰ - 0.0001 (OD₆₈₀)⁹¹ - 0.0001 (OD₆₈₀)⁹² - 0.0001 (OD₆₈₀)⁹³ - 0.0001 (OD₆₈₀)⁹⁴ - 0.0001 (OD₆₈₀)⁹⁵ - 0.0001 (OD₆₈₀)⁹⁶ - 0.0001 (OD₆₈₀)⁹⁷ - 0.0001 (OD₆₈₀)⁹⁸ - 0.0001 (OD₆₈₀)⁹⁹ - 0.0001 (OD₆₈₀)¹⁰⁰ - 0.0001 (OD₆₈₀)¹⁰¹ - 0.0001 (OD₆₈₀)¹⁰² - 0.0001 (OD₆₈₀)¹⁰³ - 0.0001 (OD₆₈₀)¹⁰⁴ - 0.0001 (OD₆₈₀)¹⁰⁵ - 0.0001 (OD₆₈₀)¹⁰⁶ - 0.0001 (OD₆₈₀)¹⁰⁷ - 0.0001 (OD₆₈₀)¹⁰⁸ - 0.0001 (OD₆₈₀)¹⁰⁹ - 0.0001 (OD₆₈₀)¹¹⁰ - 0.0001 (OD₆₈₀)¹¹¹ - 0.0001 (OD₆₈₀)¹¹² - 0.0001 (OD₆₈₀)¹¹³ - 0.0001 (OD₆₈₀)¹¹⁴ - 0.0001 (OD₆₈₀)¹¹⁵ - 0.0001 (OD₆₈₀)¹¹⁶ - 0.0001 (OD₆₈₀)¹¹⁷ - 0.0001 (OD₆₈₀)¹¹⁸ - 0.0001 (OD₆₈₀)¹¹⁹ - 0.0001 (OD₆₈₀)¹²⁰ - 0.0001 (OD₆₈₀)¹²¹ - 0.0001 (OD₆₈₀)¹²² - 0.0001 (OD₆₈₀)¹²³ - 0.0001 (OD₆₈₀)¹²⁴ - 0.0001 (OD₆₈₀)¹²⁵ - 0.0001 (OD₆₈₀)¹²⁶ - 0.0001 (OD₆₈₀)¹²⁷ - 0.0001 (OD₆₈₀)¹²⁸ - 0.0001 (OD₆₈₀)¹²⁹ - 0.0001 (OD₆₈₀)¹³⁰ - 0.0001 (OD₆₈₀)¹³¹ - 0.0001 (OD₆₈₀)¹³² - 0.0001 (OD₆₈₀)¹³³ - 0.0001 (OD₆₈₀)¹³⁴ - 0.0001 (OD₆₈₀)¹³⁵ - 0.0001 (OD₆₈₀)¹³⁶ - 0.0001 (OD₆₈₀)¹³⁷ - 0.0001 (OD₆₈₀)¹³⁸ - 0.0001 (OD₆₈₀)¹³⁹ - 0.0001 (OD₆₈₀)¹⁴⁰ - 0.0001 (OD₆₈₀)¹⁴¹ - 0.0001 (OD₆₈₀)¹⁴² - 0.0001 (OD₆₈₀)¹⁴³ - 0.0001 (OD₆₈₀)¹⁴⁴ - 0.0001 (OD₆₈₀)¹⁴⁵ - 0.0001 (OD₆₈₀)¹⁴⁶ - 0.0001 (OD₆₈₀)¹⁴⁷ - 0.0001 (OD₆₈₀)¹⁴⁸ - 0.0001 (OD₆₈₀)¹⁴⁹ - 0.0001 (OD₆₈₀)<

(U) FOREWORD (U)

Several centuries ago, Edmund Spencer recorded that he was impressed by "...the ever whirling wheel of change." We can but speculate what his reaction would be today, for we have seen the pace of acceleration increase a thousand times more than it has during the entire previous span of recorded history. This is especially true in the continuing military technology affecting weapons, equipment, strategy, tactics, and even the fundamental concepts concerning the role of military power.

Today, we must telescope tremendous technological concepts, whose more simple tactical and strategical counterparts of a few years ago could be worked out at a relatively, leisurely pace. The story of the Davy Crockett project is the recounting of such a telescoped project.

It behooves each key, military and civilian member of the Department of the Army to follow such developments so that all may profit by both the accomplishments and mistakes of the past while there is still time, for today we must face the reality that our plans for the "Continuity of Operations" are as realistic as "Mobilization Planning." The dire threat that we may some day have to rely on our knowledge following the sudden and all-out attack of a vicious aggressor is more prophetic than Marshal Foch could have possibly realized when he said "...no study is possible on the battlefield; one does there simply what one can in order to apply what one knows."



ROLAND B. ANDERSON
Brigadier General, USA
Commanding

(U) PREFACE (U)

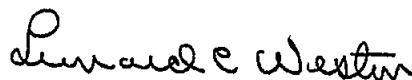
The task of writing the history of the development of the unique Davy Crockett weapons systems was received in June 1963. The Davy Crockett system was singularly appropriate for coverage in a historical monograph. This equipment was the first project managed item at this Headquarters; it was also the highest priority project ever assigned. The man-transportable atomic characteristic, together with other innovations and special requirements made it unique among projects for this organization. The task of writing this monograph was undertaken in March 1964. Due to unforeseen circumstances the project was re-directed, in June 1964, and restricted to only the techniques and activities of the project management organization; rather than a comprehensive history of the complete weapon.

It is extremely difficult to draw any conclusions about the management of the Davy Crockett weapons systems' development, except to say, it was successful. This cursory opinion results from the fact that only a tattered remanent of documents concerning this vital activity exist. The Davy Crockett project office, upon its dissolution in September 1961, disposed of all of its correspondence, the greater part of its reports, and maintained only a representative sampling of technical reports. This narrative has been based completely upon these last documents.

The special circumstances of writing this material, with a dearth of sources, was made easier by the aid and interest of the former deputy to the Special Assistant, Mr. George A. Hesse, Headquarters, U. S. Army Weapons Command. With the aid and advice of Mr. Hesse, and former members of the project staff, we have made every effort to make this report complete and accurate.

In co-ordination with this narrative, the research and procurement activities of the U. S. Army Watervliet Arsenal and the U. S. Army Springfield Armory have been prepared, by these subordinate installations, and are submitted together with this management account.

26 October 1964



LEONARD C. WESTON
Assistant Historian
Rock Island Arsenal

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(U) PROJECT MANAGEMENT OF THE DAVY CROCKETT WEAPONS SYSTEM (U)

(U) The age of atomic warfare began in August 1945, when the United States detonated two nuclear devices over Japan. These weapons were instruments of strategic national policy - that is, by using these means it was intended to end World War II expeditiously. Following the peace treaties concluding the War, the United States Army launched a long-range program for the research and development of atomic weapons for use by the field army. This effort centered upon the creation of warheads small enough for artillery and missile-delivery systems. Early emphasis, in efforts to develop an acceptable means of delivery, was placed in the area of rocket development. By 1953, the tactical means of delivering an atomic warhead was available in the Honest John missile, and shortly thereafter in the 280-mm. cannon.¹

¹ The 762-mm. Honest John missile batteries were activated in the early months of 1954. The Honest John missile had a range of 25,000 yards. Immediately before this, the first atomic shell was fired from the T131, 280-mm. cannon on 25 May 1953, at the Nevada Proving Ground. The 280-mm. "atomic cannon" could fire a conventional high-explosive or an atomic projectile 31,000 yards. For further information see: Mary T. Cagle, "History of the Basic (M31) Honest John Rocket System, 1959 - 1964," Redstone Arsenal, 1964, USAMC Monograph, AMC - 7M, Part I, and, Niel M. Johnson, "Artillery Development and Procurement, 1946 - 1955," Rock Island Arsenal, 1959, Part II, Ordnance Corps Historical Monograph, USAWECOM Historian's files.

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J (U) The continuing program to reduce the size and weight of atomic warheads, to make them adaptable to tactical uses, was accompanied by a significant reduction in the cost of producing the item. This scientific accomplishment was perfectly timed to provide the U. S. Army with an advanced atomic capability.²

(U) With the 280-mm. cannon and the Honest John missile delivery systems available, military planners speculated on the feasibility of further developing a low-cost, low-weight, simple warhead and delivery system for use by front-line combat troops. The first and most important characteristic for this proposed system, compared to the larger cannon and missile systems, was its immediate operational availability to the small-unit commander. The range and nuclear yield of the larger cannon and missile systems prevented their use in close front-line combat situations. The planners considered the ideal characteristics for this proposed system to be a small, easily-transported, dependable weapon equipped with a safe, but simple nuclear warhead, with a sub-kiloton

5 4 3 2 1 m
2 (SRD) FS; Ord Corps Study of Close Spt Sp Wpn Sys (U), Ph I, p. 3, 24 Feb 58, Memo Rept ORDBB-TK-191, Picatinny Arsenal, cy 51, Vol I, DACRO files, RD Directorate, HQ, USAWECOM.

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yield and having a range of from 500 to 4000 yards.³

(U) In late 1957,⁴ the United States Atomic Energy Commission announced that they had successfully developed a light, sub-kiloton yield warhead. The weapon met the initial characteristics proposed for the front-line tactical weapons system. The Commission turned the responsibility for the warhead's development, into a tactical weapons system, over to the Chief of Ordnance, General J. H. Hinrichs. General Hinrichs further assigned the study of the development of this unique weapons system to the Picatinny Arsenal, Dover, New Jersey.⁵

(S) In addition to the study assignment, the Chief of Ordnance requested the Picatinny Arsenal to organize and supervise an Ordnance Corps-wide AD HOC Committee to prepare a comprehensive study of the adaption of this warhead to tactical military usage. This AD HOC Committee was titled, during its brief existence, as the "9 - 10 Study Group." In further instructions to the Picatinny

³ (SRD) (1) Ibid., p. 3. (2) Rept, Cbt Development Obj Guide, para 1137 (A) and (B), sub-para 1 and 2, OCO, DA, 31 Jul 58, Concept Gp, RE Div, RIA.

⁴ (S) (1) Rept, Proj Mgt Master Plan, Davy Crockett Wpn Sys, M-28, M-29 (U), 27 Mar 63, RCS AMCPM-101, cy 10, p. 6, DACRO Stf. (SRD) (2) Rept, Davy Crockett Final Eval (U), Nov 62; RCS SMUPA-TK-778, Picatinny Arsenal, cy 3, DACRO files, RD Directorate, HQ, USAWECOM.

⁵ (SRD) (1) FS, Ord Corps Study of Close Spt Sp Wpn Sys (U), Ph I, Picatinny Arsenal, op. cit., p. 7. (U) (2) TT, DA934131, COFORD to CO, Picatinny Arsenal, 17 Dec 57, subj: AD HOC Committee, DACRO files, RD Directorate, HQ, USAWECOM.

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Arsenal and the AD HOC Committee, the Chief of Ordnance- in his letter, stated that the group in its efforts should explore all conceivable types of delivery systems capable of propelling a 35-pound warhead, approximately 12 inches in diameter, with a yield of between 0.1 and .01 kilotons, to a target at a distance of from 2,000 to 11,000 yards. The results of the AD HOC Committee's study were to be approved by the Department of the Army Staff and the Headquarters, United States Continental Army Command, before development was to be undertaken.⁶

(U) The first meeting of the AD HOC Committee took place at the Picatinny Arsenal on 9 - 10 January 1958. This meeting was largely devoted to setting up procedures, group policies, establishing a detailed scope of the work to be accomplished, and the methods to be used to achieve the study goals. The major concern of the participants in the AD HOC study group was the defining of the limits of the proposed conceptual effort. To begin with, the

⁶ (SRD) (1) FS, Ord Corps Study of Close Spt Wpn Sys (U), Ph I, Picatinny Arsenal, op. cit., pp. 3-4. (U) (2) Membership in the AD HOC Committee included representatives from the Office, Chief of Ordnance; Headquarters, United States Continental Army Command; Ballistic Research Laboratories, Aberdeen Proving Ground; Redstone Arsenal, Frankford Arsenal, Picatinny Arsenal, Watervliet Arsenal, Rock Island Arsenal, Watertown Arsenal, and Headquarters, Ordnance Weapons Command. (3) A security classification of Secret - Restricted Data was assigned to the Committee's assignments and to its proposals.

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Committee recognized that the weapon was specifically designed for use by the front-line combat soldier. This requirement imposed a number of important characteristics upon the Committee. These included the effects of the front-line environment, limitations of individual soldiers, and the tactical requirements and effects of terrain upon the equipment and the soldier. In addition, members of the committee accepted the following characteristics as being appropriate to a front-line atomic-delivery system:⁷

1. immediately responsive to fleeting targets of opportunity
2. relatively light in weight
3. economically feasible
4. deliverable with acceptable error
5. maneuverable: specifically, adaptable to man transport over most terrain
6. a sub-kiloton yield from the warhead

20 (U) Once the limitations of the proposals were outlined, the Committee's responsibilities shifted to determining if such a weapons system was feasible under the
15 existing state-of-the-art in artillery equipment design. The AD HOC group also had to recommend, once the weapons
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⁷ (S) (1) Rept, An Eval of the XM28 and XM29 Wpn Sys Against an Expected Soviet Target Complex (U), Dec 60, Ballistic Research Lab, Aberdeen Proving Ground, p. 5.
5 (S) (2) Rept, Study and Anal of Requirements for and Implications of the Davy Crockett Wpn Sys (U), 31 Mar 58, HQ, USCONARC, cy 206, pp. 4-9, DACRO files, RD Directorate, HQ, USAWECOM.
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system was conceived, as a practical possibility, what organizations were capable of developing the equipment.⁸ All of the known advantages and disadvantages of the proposed system were to be included in the recommendations. Approximately 20 proposed delivery systems were selected for consideration by the group. The installation and agency representatives, on the committee, then volunteered to study, in greater depth and detail, selected systems. All systems were assured of consideration by at least one agency. In some cases, more than one organization studied a variation of a single concept.

(U) The study committee further recommended that the following distances be considered as maximum ranges: 2,000, 4,000, 6,000, and 11,000 yards.⁹

20 (U) The AD HOC Committee's Activities (U)

15 (U) The second meeting of the AD HOC Committee was held at the Picatinny Arsenal on 6 - 7 February 1958. The

10 ⁸ (S) (1) Rept, First Qtr Prog Rept on the Davy Crockett Sys (U), 15 Jul 58, pp. 4-8, Memo rept ORDBB-TK-223, Picatinny Arsenal, cy 4. (S) (2) Rept, Tech Development Plan (Davy Crockett) (U), 1 Feb 62; OCO, pp. 1-2, RCS CSRD-21, cy 43, Concept Gp, RE Div, RIA.

5 4 3 2 1 m ⁹ (SRD) Rept, Ord Corps Study of Close Spt SP Wpn Sys (U), Ph I, pp. 7-10, 24 Feb 58, Memo Rept ORDBB-TK-191, Picatinny Arsenal, cy 51, Vol I, DACRO files, RD Directorate, HQ, USAWECOM.

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participants used only a short time, 10 January to
6 February, to prepare weapons concepts. Each participant contributed its assigned design studies to a full committee report. This extremely short period of time prevented the concepts from representing more than preliminary-design estimates. Yet, all possible effort had been made to gain accurate and essential data. The participating installations recommended, from their own list of projects, the concept they considered most feasible. These prime concepts were so designated and ordered in the report that was submitted to higher headquarters. By this means the Committee narrowed down the possible choices, provided a good basis for selection, and provided aids to higher headquarters in their selections. Each of the participants provided the Picatinny Arsenal research-and-development supervisors with a copy of the many proposals. These numerous proposals were then bound and sent to higher headquarters. They comprised Phase II of a joint study upon the development of the Battle Group Atomic delivery system.

10 (SRD) Ibid., pp. 1-5.

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1 (U) The AD HOC Committee also prepared a detailed list of the desired characteristics and performance information on each of the proposed systems. By using this compilation as a guide, it was possible to provide a common ground for the comparison of the resulting conceptual systems. These detailed analyses are contained in an appendix to the second volume of the committee's report.¹¹

(U) The preliminary feasibility studies, complete with theoretical information about their yield, range, and dependability, were provided by the Ballistic Research Laboratory, Aberdeen Proving, and were assembled and presented as the two volume study, "Ordnance Study of Close Support Special Weapon Systems (U)," Picatinny Arsenal report ORDBB-TK-191. These reports were delivered to the Office, Chief of Ordnance, by the Research and Development supervisors at the Picatinny Arsenal.¹²

11 (SRD) Ibid., pp. 7-11.

12 (SRD) Ibid., pp: 5-6. (SRD) (2) Rept, Davy Crockett Final Eval (U); SMUPA-TK-778, Picatinny Arsenal, Nov 62, pp. 20-22, cy 3, DACRO files, RD Directorate, HQ, USAWECOM.

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(U) The original feasibility studies included weapons concepts of every conceivable sort. The proposals covered the gamut from sophisticated fully guided missiles to re-designed standard artillery and mortar equipment. No overall evaluation of the most feasible system was made. The accompanying information that Picatinny Arsenal provided simply stated that these weapons systems were all within the realm of development. With this Ordnance Corps-wide study available, a decision was made to emphasize the investigation of three possible delivery means: a full caliber (11-12 inch), portable, recoilless rifle with a maximum range of 2,000 meters; a 155-mm. (6.1-inch), spigot-type, portable, recoilless rifle with a maximum range of 2,000 meters; and a full-caliber, recoilless rifle with a maximum range of 4,000 meters.¹³

(U) The submission of the AD HOC Committee's report initiated efforts by the Office, Chief of Ordnance, to assign responsibility for development of the equipment. This weapons-system assignment was essentially different from many others that this office had made previously, for the Battle Group Atomic Delivery system represented a significant growth in weapons technology, and a gain

¹³ (SRD) Rept, Davy Crockett Final Eval (U), op.cit., p. 20.

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in the adopting and development of new material. To develop this equipment, important contributions would be required from many of the existing technical-service organizations and installations. This diversity of action suggested that an increase in developmental lead time would occur and perhaps delay the manufacture, dispersal to the field, and support of this weapon. Therefore, time being one of the prime factors, the very first challenge was to form an organization, across existing resource lines, that would provide for the most effective utilization of technical skills and talents available. To accomplish the task of organizing, directing, controlling, and coordinating these diverse organizations and talents, the Office, Chief of Ordnance, assigned weapons system responsibility to the Commanding General, Ordnance Weapons Command, Rock Island Arsenal, Rock Island, Illinois. Furthermore, in the initial directive, Ordnance Corps Order 15-55, the "overall research-and-development management and complete-system 'integration' was assigned to the Picatinny Arsenal, Dover, New Jersey." Within the assignment of responsibilities, an Ordnance Corps readiness date of 31 March 1962 was assigned.

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(U) As weapons system manager, Brigadier General W. K. Ghormley, Commanding General of the Ordnance Weapons Command recognized new and heavy responsibilities, namely, provide the creation of an effective system of project management, and the establishment of effective lines of command and communication.¹⁴ Immediately following receipt of this new assignment, General Ghormley further delegated the responsibility for equipment management to a Special Assistant, Colonel Richard J. Rastetter.¹⁵

(U) As commodity managers, the Ordnance Weapons Command had several important wide-spread responsibilities. These included planning, directing, controlling and appraising the Battle Group Atomic delivery system; the determining of the system's technical requirements; directing coordinating and integrating the participation of all Ordnance installations and activities assigned responsibility for a phase (s) of the system; resolving technical and

¹⁴ (U) (1) Ord Wpn Comd Org Manual, 180.00, 4 Mar 1959, p. 1, iss as ch 78 Mr. George Hesse, Deputy Proj Off, DACRO files. (U) (2) Order, Ord Corps O 15-55, 15 Jul 1955, rescinded by AMC Circular 10-12, 17 Feb 1963. No apparent record of the 15-55 order remains.

¹⁵ (U) Reg, Internal Responsibilities and Procedures of HQ, OWC, Davy Crockett Weapon System (U), OWCR 1-24, 23 Dec 1958, pp.1-2, HQ, USAWECOM.

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Discursive footnote:

1 (U) The title Battle Group Atomic Delivery system has been arbitrarily used to designate the selected designs for this weapons system. Although the title "Davy Crockett" was used as early as 19 February 1958,¹⁶ its general use was not common until developmental work was undertaken in August. Therefore, to maintain a consistent policy, the "Davy Crockett" designation is not used in this work, until the 1 August date. The first prototype tube for the lightweight system was delivered to Picatinny Arsenal in November 1958.¹⁷

(U) General Maxwell D. Taylor, Chief of Staff, United States Army, considered the development and deployment of the Davy Crockett system significant enough to state, in a letter to project participants, on 24 February 1958, that any problems or delay that could not be resolved speedily at any other level of management be brought to his attention for expeditious solution. The priority of development for the Davy Crockett system was prime among all projects undergoing Ordnance Corps development.¹⁸

20 ¹⁶ (U) Ltr, Ofc, Asst Secy of Def, to Chmn, AEC, 19 Feb 58, n.s., re: Davy Crockett, as quoted in Ord Tech Committee Min (OTCM) 37188, subj: Gun, Recoilless, 120-mm., XM63, Clas as LP Type (U), Ord Corps, 1 Sep 59, p. 92, Mat Mgt Div, Comp and Plans Div, USAWECOM.

15 ¹⁷ (U) (1) Ibid., p. 90. (U) (SRD) (2) FS, Ord Study of a Close Sup Sp Wpn Sys (U), Ph I, Picatinny Arsenal, op. cit., pp. 1-9. DACRO files, RD Directorate, HQ, USAWECOM.

10 ¹⁸ (SRD) Ltr, App A, CofS, to Participants, 24 Feb 58, p. 155, contained in rept, First Qtr Tech Prog on the Davy Crockett Sys (U), ORDBB-TK-223, 15 Jul 58, Picatinny Arsenal, DACRO files, RD Directorate, HQ, USAWECOM.

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the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion. The number of people aged 65 and over is expected to increase from 200 million to 400 million. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion. The number of people aged 15 and over is expected to increase from 3.5 billion to 4.5 billion.

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the first time, the authors found that the mean age at onset was significantly lower than that reported in previous studies. The authors suggested that this may be due to the fact that the study included a larger number of children with early-onset schizophrenia.

The authors also found that the mean duration of illness was significantly longer than that reported in previous studies. This may be due to the fact that the study included a larger number of children with long-term illness.

In conclusion, the authors suggest that the findings of this study have important implications for the diagnosis and treatment of childhood-onset psychosis. Further research is needed to confirm these findings and to explore the underlying mechanisms of the disorder.

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non-technical problems as they arose, and the supervising
of the developmental effort by constant over-all and
specific supervision to insure that decisions were made
that would accomplish the assigned project within the
readiness date.

(U) The Special Assistant, Colonel R. J. Rastetter,
was instructed to perform his assigned function separately
and distinctly aside from other missions of the Head-
quarters, Ordnance Weapons Command. Furthermore, the
Special Assistant, within the scope of the Battle Group
Atomic delivery system program, was to deal with all
Ordnance Weapons Command subordinate installations in
the same manner as he would with other Ordnance Corps
installation outside of the Ordnance Weapons Command
group.¹⁹

(U) The one most important requirement for all par-
ticipants in this group effort, one that cut across all
existing relationships of installations and activities,
was the necessary efforts to successfully accomplish
the assigned goal of meeting the Ordnance readiness date
with an acceptable piece of equipment. To complete this

¹⁹ (U) (1) OTCM 37185, Mil Char of the Bat Gp
Atomic Delivery Sys (U), DA, OCO, 8 May 1959, p. 47.
(U) (2) OTCM 36895, Atomic Ammo -155-mm. and Smaller
Cal, re-written as, Bat Gp Wpn Sys and Small Cal Atomic
Proj (U), DA, OCO, 9 Oct 1958, p. 7. Tech Info Br, RIA:

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

2. Next, gather relevant information and data. This may involve research, consultation with experts, or collecting data from various sources.

3. Once the information is gathered, analyze it to identify patterns, trends, and key factors that influence the outcome.

4. Based on the analysis, develop a plan or strategy to address the problem. This plan should outline the steps to be taken and the resources required.

5. Implement the plan, monitoring progress and making adjustments as needed. This is the execution phase where the solution is put into practice.

6. Finally, evaluate the results and compare them against the original goals. This step helps in understanding the effectiveness of the solution and identifying areas for improvement.

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All-important requirement, the Special Assistant was provided a number of extraordinary rights and privileges. Except in a small number of specific areas, he was authorized to act in the name of the Commanding General. The Special Assistant's areas of responsibility included exercising staff supervision over activities of Headquarters' organizations doing work on the weapons system, establishing and maintaining Ordnance-wide contacts necessary to accomplish the assignment, representing the Commanding General to higher authority and agencies, as necessary to fulfill his assignment; presenting assignments to and obtaining services of designated elements within the Ordnance Weapons Command; and communicating directly with the Office, Chief of Ordnance, and other Ordnance Corps installations and activities.²⁰

(U) The Battle Group Atomic delivery system development group, in its initial stages of existence, was made up of representatives from the following participating organizations: the Picatinny, Lake City, Frankford, Watervliet, Watertown, Rock Island, and

²⁰ (SRD) Rept, Joint RD Industrial Meetings Davy Crockett (U), Picatinny Arsenal, 3-14 Aug 1959, pp. 1-5. DACRO files, RD Directorate, HQ, USAWECOM.

The first of these is the fact that the

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(U) In this narrative we have omitted the use of the authorized abbreviation, DACRO, to represent the Davy Crockett Project Officer. In place of this term we have consistently used the title, Special Assistant, or the name of the officer who occupied the position, Colonel Richard J. Rastetter, Ordnance Corps. Our purpose in doing this is to prevent as much as possible confusion between the Special Assistant's functions early in the program with the Davy Crockett Project Office (AMCPM-DC), which was established later. The mission and functions of these two offices are not comparable and interchangeable, therefore, distinctions in use of titles must be made clear.

(U) The development of the Battle Group Atomic delivery system (Davy Crockett) satisfied the requirements of the Combat Development Objectives Guide, as indicated in paragraph 1137(A) and (B), sub-paragraphs 1 and 2. The Ordnance Corps planners had projected this requirement early in the 1950's. As has been pointed out, previously, the creation of this equipment and its successful integration into the Army's combat equipment inventory would materially increase the military defense capability of the United States Army. 21

21 (S) (1) Rept, Cmbt Development Obj Guide, para 1137 (A) and (B), (U) sub-para 1 and 2, 31 Jul 58. (S) (2) Rept, Tech Development Plan (Davy Crockett) (U), 1 Feb 62, OCO, p.1, RCS SCRD-21, cy 43, Concept Gp, RE Div, RIA.

THE HISTORY OF

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Redstone Arsenal; the Ballistic Research Laboratory; and the Headquarters, Ordnance Ammunition Command. The functional head of this diverse group was the Special Assistant, Colonel Rastetter. The most pressing problems following the assignment of participants to the project were the establishing of a mission, discussing overall design parameters, working out agreements upon relationships, and assigning responsibilities. Once these preliminary activities were complete, the very important work of publishing planning directives and funding documents could be undertaken.

(U) The actual development of the Battle Group Atomic delivery system was initiated by action of the Office, Chief of Ordnance, on 1 March 1958. The priority of the project was classified as 1A.²²

(U) A brief view of the organizational alignment of the Battle Group Atomic weapons development group is in order. The alignment of the participating installations during April and May 1958 was as follows: the Ordnance Weapons Command was made up of the Rock Island and

22 (S) (1) Ord Tech Comm Minute 37185, Mil Char of the Bat Gp Atomic Delivery Sys (U), op.cit., p. 47. (S) (2) Ord Tech Comm Minute 36895, Atomic Ammo - 155-mm. and Smaller Cal, op.cit., p. 7. Tech Info Br, RIA.

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Watertown Arsenals, the Springfield Armory and the Headquarters, at the Rock Island Arsenal; Picatinny Arsenal and the Ordnance Ammunition Command were constituent members of the Ordnance Specials Weapons Ammunition Command, headquartered at the Picatinny Arsenal; Frankford and Watervliet Arsenals were independent Class II Ordnance installations reporting directly to the Office, Chief of Ordnance; the Lake City and Detroit Arsenals were similar Class II installations. The Diamond Ordnance Fuze Laboratory, in Washington, D. C., performed research and development activities for all Ordnance organizations and was directly subordinate to the Chief of Ordnance. The primary testing organization was the Development and Proof Services Division of the Aberdeen Proving Ground. Additional testing facilities for this program were provided at the Erie Ordnance Depot; Forts Wainwright and Greely, both in Alaska; and the Yuma Test Station, Arizona. This wide-spread network of government facilities was coordinated, in each phase of development and testing, by the technical supervision of the Picatinny Arsenal and the Special Assistant's project office. A total of 14 government installations, spread from coast to coast, provided direct support to this project.

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1. 1940年12月，国民党政府颁布《战时新闻纸杂志图书检查办法》，规定所有新闻纸、杂志、图书在出版前必须经过检查，否则不得发行。这一规定旨在加强对舆论的控制，防止敌对势力利用媒体进行破坏活动。

2. 1941年6月，国民党政府颁布《战时新闻纸杂志图书检查实施条例》，进一步细化了检查程序，规定检查机关有权对出版物进行审查，并对违反规定的行为进行处罚。

3. 1942年10月，国民党政府颁布《战时新闻纸杂志图书检查实施细则》，明确了检查机关的组织架构和职责分工，确保检查工作的有效实施。

4. 1943年12月，国民党政府颁布《战时新闻纸杂志图书检查奖惩办法》，规定了对检查工作中表现优秀的人员给予奖励，对失职人员进行处罚，以提高检查效率。

5. 1944年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

6. 1945年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

7. 1946年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

8. 1947年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

9. 1948年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

10. 1949年10月，国民党政府颁布《战时新闻纸杂志图书检查实施办法》，对检查工作进行了全面部署，要求各级检查机关严格执行相关规定，确保战时舆论的稳定。

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J (U) The research-and-engineering responsibility
for the Battle Group Atomic delivery system rested heavily
upon the services of Picatinny Arsenal personnel. Tech-
nical co-ordination and technical advice and directions
were forthcoming from this same source. Once component
development was undertaken, the Picatinny personnel
gained additional responsibility to oversee that systems
components were compatible. The mission organizations,
Watervliet and Frankford especially, had a great deal of
technical liaison and direct contact with Picatinny as
the program of development progressed.

20 (U) Once the decision had been made, by higher
authority, to restrict development to three conceptual
possibilities, the responsibilities for the weapon's
development were returned to the Special Assistant.
15 The Battle Group Atomic weapons organization was required
to prepare acceptable coordinated developmental schedules,
with schedules and time frames for development of the
10 weapon, the fire control, and the ammunition. Following
creation of these documents, they were forwarded to the
Office, Chief of Ordnance, for review. Furthermore, once
5 initial concepts were developed, the Ordnance Corps required
4 the fabrication of models and a review of these models by
3 higher authority.
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(U) The developmental effort put particular emphasis upon the creation of a spigot-type system of propulsion. As was pointed out earlier, no work of consequence had been done on this type of weapons system for the Army. As a result, a new system had to be created.

(C) The developmental organization, which represented the mission arsenals, the research-and-development director, and the Special Assistant, created the following development plan (these were estimated completion dates subject to change): Feasibility Study (FS) - March 1959, Engineering Design (ED) - January 1961, Engineering Test (ET) - April 1962, Service Test (ST) - May 1962, and Type Classification (TC) - June 1962. Reiterating special assignments, the Ordnance Weapons Command had weapons system management, and the research-and-development responsibility was assigned to Picatinny Arsenal. In conjunction with the developmental plan, a Mission Assignment and Mission Responsibility directive was established and charts were made representing these assignments.²³

²³ (S) (1) Rept, Tech Development Plan, DA, OCO, RCS CSCRD--21, 1 Feb 1962, cy 43; pp. 6-7. (U) (SRD) (2) Rept, Davy Crockett Final Eval (U); Ph I, Picatinny Arsenal, op.cit., p. 21. DACRO files, RD Directorate, HQ, USAWECOM.

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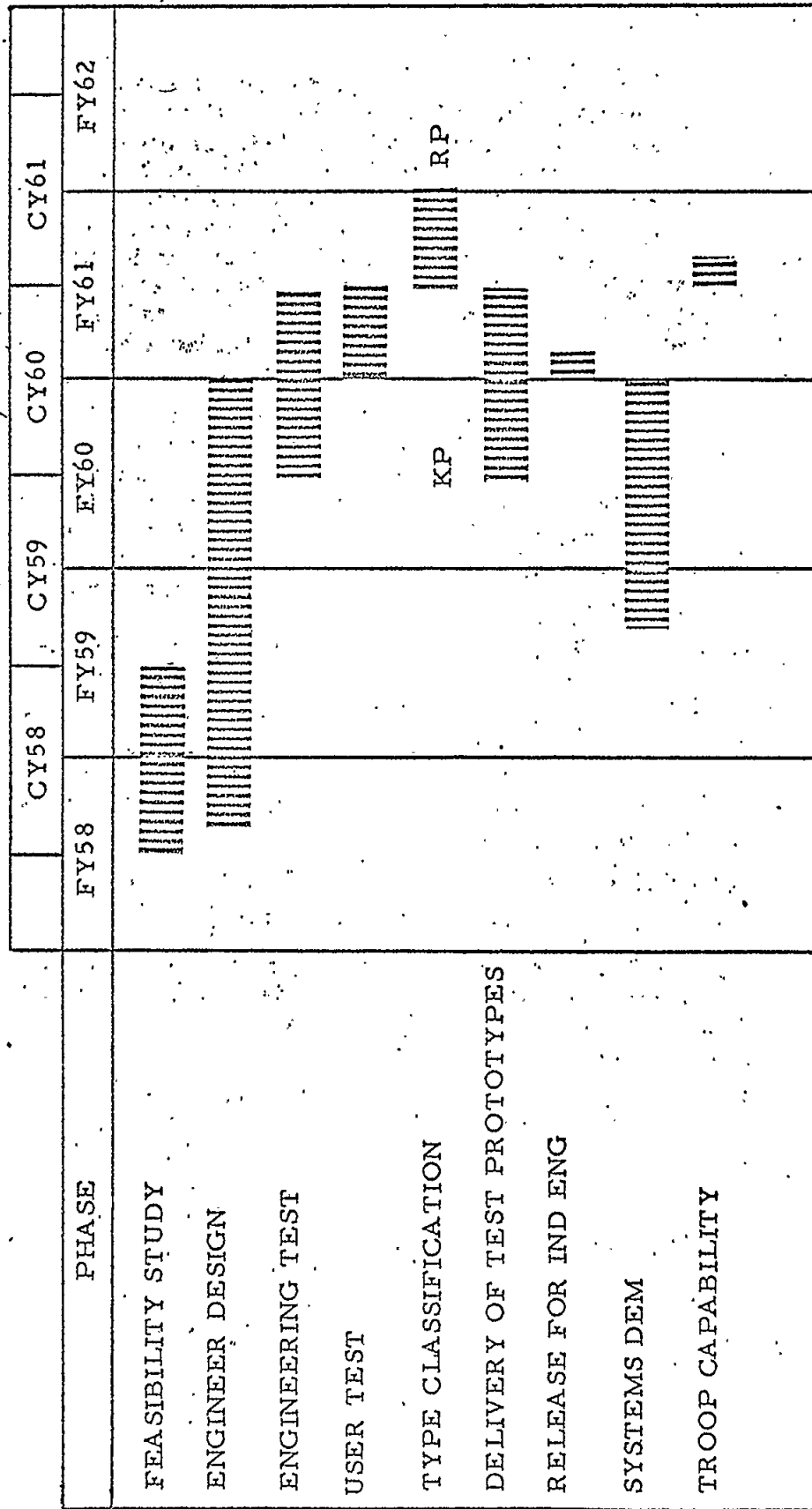
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(U) A decision on the design of the Battle Group Atomic delivery system was originally set for 1 August 1958. A meeting, on 24 July 1958, extended the final date until 15 August 1958.²⁴

(U) The developmental breakdown of this program was nearly complete by August 1958. Once a well-defined division of effort was established and the system of coordination and communications was created, the next problem was that of adequate and timely funding. Each of the participating installations was required to establish their own funding requirements. The consolidation and review of these submissions, before forwarding them on to the Chief of Ordnance, was the responsibility of the Special Assistant and his staff. Nowhere, in this entire program, is the complexity of management more obvious

24 (SRD) Rept, title classified, Memo rept ORDBB-TK-241, Picatinny Arsenal, p. 1, DACRO files, RD Directorate, HQ, USAWECOM.

DAVY CROCKETT



Initial Development Schedule

CHART 1

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than in the area of funding. Although, technically, all funds were allotted to the Special Assistant for distribution, direct-funding procedures were sometimes followed in dealing with Ordnance Corps subordinate installations. So, literally, an installation could receive funds for the Battle Group Atomic delivery system from an assortment of sources. The overall funding picture is illustrated in charts 2 & 3 .²⁵

(U) The Special Assistant and the Activity Manager of Research and Development were required to review, update, and maintain the phase schedules for the project. Specifically, six documents were included in this responsibility. These documents were the Activity Operating Schedules (AOS-3's); Weapon System Operating Schedules (WSOS-1's); Phase Scheduling Ordnance Research and Development Projects (RCS-ORDTX-113); Army Materiel Control Program, Annex II, Vol I, Program 4000; Schedule of Key Dates for Ordnance Weapons Systems Planning; and the Quarterly Revision of Annex A through H, required

²⁵ (U) (1) For further, more detailed funding data and procedures, see infra., p. 32. (U) (SRD) (2) Rept, Integrated Industrial Engineering Meeting (U), Ord Wpns Cmd, 7-8 July 1960, cy 1, charts 1-11, p. 32. DACRO files, RD Directorate, HQ, USAWECOM.

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DAVY CROCKETT XM 28-29 SYSTEM

PROGRAMING LEGEND

GUIDANCE
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 AUTHORIZATION
 WORK ORDER
 PROJECT ORDER
 REPORT

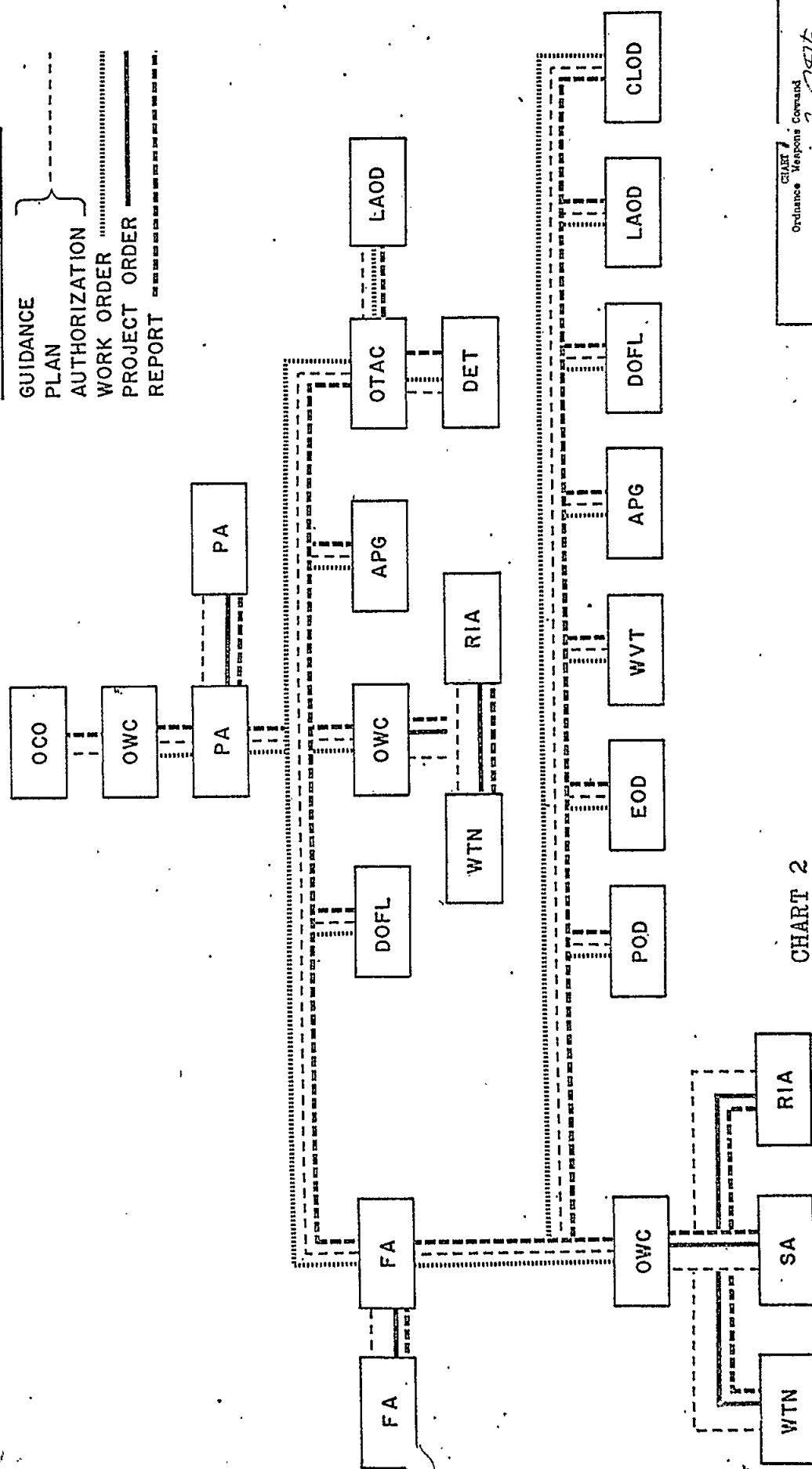


CHART 2

DAVY CROCKETT XM 28-29 SYSTEM

FUNDING LEGEND

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PROJECT ORDER

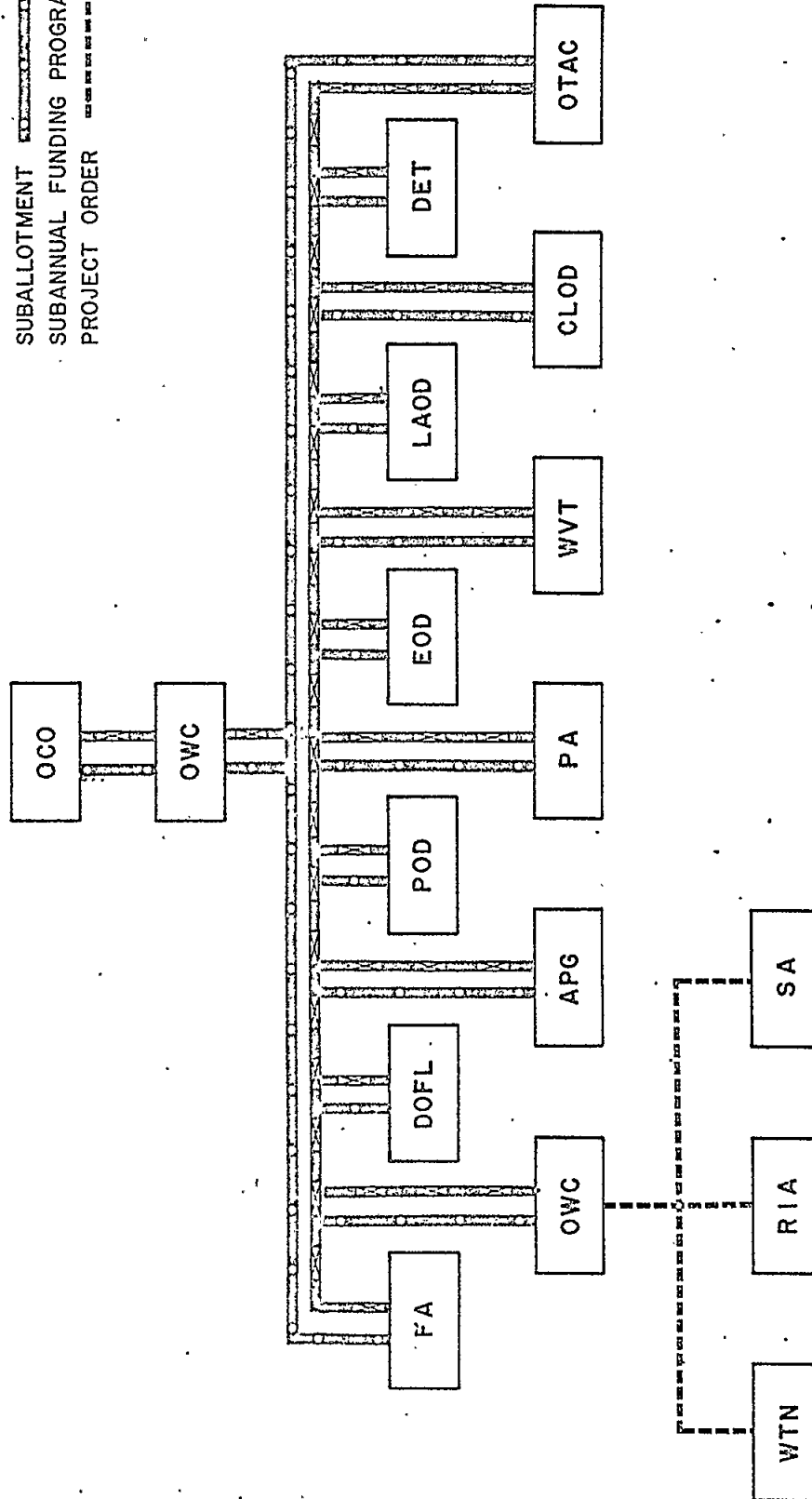


CHART 3

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quarterly by Headquarters, United States Continental
Army Command.

(U) The Special Assistant's office prepared and issued the three major kinds of program-guidance and control documents; system plans, weapon-systems schedules, and funding documents. By these means the full program was responsive to the directions of this one office. However, to keep the schedules and funding appropriate and timely, a great deal of personal contact and on-site visits were necessary. The Special Assistant's job required that he be as knowledgeable of the activities and capabilities of each of the participating installations as he was of the staff of his own organization. Actually, the success or failure of this new system of weapons management depended upon how well the participants could adapt to controls and directions from outside of their own previous command set-ups. The success of this job was in direct proportion to the willingness of Ordnance Corps installations to receive advice and criticism and schedules and controls from this new source.

(U) An important problem, concomitant with the development of the potent Battle Group system, was the impact of this novel system upon existing Army organizational

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patterns, tactics, training, logistics, and other weapons in the Army's inventory, for this weapon put all of the destructive power of atomic energy's development into the hands and under the control of a very low-echelon of command. The Army Staff and the Department of Defense were concerned over systems of command, of support, and of control of this important new weapon. Definitive answers to the following questions were sought: "How is the Army going to use the weapon?", "Who is going to control its fires?", "What special requirements will be created in order to support the weapon?", and finally, "What training, new and unique, will be required?". A great number of additional queries were also unanswered by existing regulations, staff relationships, and previous experience.

(U) The concept of the delivery system was going to have enormous impact upon the military thinking and the military organization of America's Armed Forces.

(U) In an effort to evaluate the salient characteristics of this new weapon the Department of the Army assigned the Headquarters, U. S. Continental Army Command (USCONARC) the responsibility of appraising it. This

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(S) Ltr, J. B. Sweeney, Act C, Plans and Prog, HQ, OWC, to C of Ord, subj: RD Ph Scd (U), 12 June 1961.

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study assignment was made on 13 February 1958.²⁷

(U) Upon receipt of this requirement, Headquarters, USCONARC, undertook the study by making a number of initial assumptions concerning the system as it would emerge from its developmental process. These assumptions were recognized as keys to the validity of the subsequent recommendations. The assumptions were as follows: The Battle Group Atomic delivery system was considered a direct fire weapons system with a first round accuracy not to exceed circular error probable of 50 yards. The delivery device would have two delivery systems, each with different range capabilities and each adaptable to both offensive and defensive operations. The warhead, it was assumed, would have no significant problem of radioactive fallout. Inherent destructive power and scarcity of the atomic munitions prohibited the use of the main round as means of adjusting fire. The developmental progress of the system, in early 1958, did not seem to guarantee that these characteristics would be met. However, Headquarters, USCONARC, deemed these qualities as feasible following intensive development, and based their studies upon them. The study did contain a declaration that any significant deviation

²⁷ (SRD) Study and Anal of Requirements for and Implications of the Davy Crockett Wpns Sys (U), HQ, USCONARC, 31 March 1958, pp. i - ii. DACRO files, RD Directorate, HQ, USAWECOM.

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from these sophisticated qualities would effect the studies' recommendations. These weapons characteristics were modified, but did not require changes in the above assumptions, during the development process.

(U) The Headquarters, USCONARC's conclusions upon the impact of introducing the Battle Group Atomic delivery system into the Army inventory are contained in the Study and Analysis of Requirements and Implications of the Davy Crockett Weapons System (U), 31 March 1958.²⁸

20 (U) The most difficult problem that the Special Assistant, his staff, and all participants, in the Battle Group Atomic delivery program faced was program management and timely control. When the project was first being developed, skepticism was expressed over whether or not so new an organization, with a new concept of command and control, could accomplish its goal. The complete
15 system was also assigned the very short developmental lead time of 42 months. The whole program was immediately
10 recognized as a challenge to the participants and to the concept of Ordnance Corps development-and-research

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²⁸ (SRD) Ibid. (U) passim.

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capabilities. If this development program failed to meet deadlines, more was to be lost than the pride and sense of accomplishment of an assortment of government installations. In fact, the whole field of government in-house development and pilot-line manufacture would receive adverse criticism and publicity.²⁹

(U) The management system for the delivery system included a statement of policy, or the philosophy of the Special Assistant, Colonel Richard J. Rastetter, who pointed out the mission and responsible assignments, what was expected in the way of co-operation, the relationships that would develop, and how these were to be regulated. This policy statement was in addition to the more formal programming, funding, scheduling, and reviewing requirements.³⁰

²⁹ (S) (1) Rept, Proj Mgt Master Plan, Davy Crockett Wpn Sys, M-28, M-29 (U), 27 March 1963, RCS AMCPM-101, cy 10, pp. 1-5. (2) These were the expressed views of the former members of the DACRO Office.

³⁰ From this point the title Davy Crockett will be used to denote the program to develop an Atomic Battle Group delivery system. The identification of the staff of the Davy Crockett program is given in Appendix I

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(U) As the Davy Crockett weapons system organization developed Ordnance Corps-wide, specific individuals, at all participating installations, were assigned responsibilities as Associate Project Officers. These assignments provided a means whereby the Special Assistant had one point of contact at each participating organization. Each of the dispersed organizations had one man with whom all questions, answers, and problems could be cleared. By using these subordinates, the program maintained continuity and a smoother operation, as opposed to everyone contacting the Special Assistant for advice, directions, and decisions.

20 (U) The Davy Crockett Associate Project Officers were instrumental in making changes in the funding program. Inherent in the Davy Crockett's developmental scheme were possible re-programming needs and requests for more funds. These requests, in part, came from the unique character of the equipment and its high priority, which often required immediate and costly resolution of conflicts over design and changes in equipment. The Associate Project Officers received and reviewed all planning guidance and funding documents so that they were immediately responsive to requests for changes. The

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participating installations received all Activity Operating Schedules (AOS's) and Summary Sheets (SS's) that were marked up by the Special Assistant's staff, through the Associate Project Officers.

(U) An important step in management, and one of the greatest responsibilities the Special Assistant had, was that of accumulating all of the approved funding documents, consolidation of these requests into one program, and presenting it to the Chief of Ordnance for final approval. The Special Assistant's function was then to defend and explain the fine points of these requests. The conferences upon the Davy Crockett's requests were some of the key functions of the Special Assistant and his staff. A great deal of the information required to back-up the funding requests was obtained through the Associate Project Officers. Approval of the funding program at the Department of the Army level made it necessary for the Comptroller, Headquarters, Ordnance Weapons Command, to prepare approved Annual Funding Sub-Programs and Sub-Allotments to accompany the complete Activity Operating Schedules and Summary Sheets. The release of these documents to participants made possible their preparation of authorized funding

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documents, including Project Orders. This was a final¹ step before the program could get underway. Constant monitoring of the program was accomplished by the Special Assistant and the Associate Project Officers. These are functionaries were required to maintain a complete file of documents illustrating all actions taken by their respective offices.³¹

(U) The Davy Crockett Associate Project Officers were responsible to the Special Assistant for comprehensive plans covering their installation's portion of the total program. In many respects, these individuals performed the functions and duties, at the installation level, of the Special Assistant. The Associate Project Officer created component plans, which included mission assignments and component assignments to particular installations. Within these component plans were detailed phase and time schedules of effort, total quantities, critical areas in the program, and reporting procedures. The key document made up and monitored by the assigned Associate Project Officers was the Weapon System Component

³¹ (U) Reg, OWC Reg 1-24, Internal Responsibilities and Pro of HQ, OWC Davy Crockett Wpn Sys (U), 23 Dec 1958, para 2, 3, 5, pp. 1 - 2, HQ, OWC. Mr. George Hesse, Deputy Proj Off, DACRO files.

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Control Schedules. The individual installation's Weapon System Component Control Schedules were reviewed and consolidated into the Master System Plan by the Davy Crockett Special Assistant and Staff. This prime management device was then submitted to the Commanding General, Ordnance Weapons Command, for his concurrence and information. The important responsibilities of the Weapons System Manager were noted on this key command document. All slippage, all key dates and sub-schedule completion periods were indicated, and any deviations from the Master System Plan were made known by the Special Assistant. This one schedule performed a key role in the management of the Davy Crockett Weapons System.³²

20 (U) Once the major scheduling documents were made up and approved, the responsibilities of the Associate Project Officers and the Special Assistant did not
15 noticeably decrease, for approval of the System Plans made the more detailed and demanding requirements of
10 funding next for managerial consideration on this project. Each of the Associate Project Officers were required to prepare an Activity Operating Schedule - mark 3 (AOS-3),

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32 (U) Ibid. (U)

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Plan Phase and send it along to the Special Assistant. Again, by this means, working through the installations project officers, the complexities and time required to achieve a well-balanced organization were diminished. In a procedure similar to the acceptance of the Master Schedule, the Special Assistant had to review, approve, and consolidate the submissions of the subordinate organizations. These documents were essential in controlling the program and making information available through presentations to superior headquarters. Approval of these documents, by the Davy Crockett Special Assistant, made it possible for each subordinate installation to mark up their Activity Operating Schedules and prepare Summary Sheets (SS-1's). These documents included information from support agencies as necessary. Upon completion of the AOS's mark-up and creation of the necessary Summary Sheets, the complete financial program was returned by the installations to the Davy Crockett Special Assistant.³³

³³ (U) Ibid. (U)

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(U) This portion of the Davy Crockett monograph will not include specific and lengthy details on the technical aspects of the equipment. The manager of the research and development phase will present these facts in a similar study. However, the weapons system manager and the special assistant's staff were vitally concerned with solutions to design problems and the ultimate results of design activities. To represent that concern, the following brief coverage of design activities and technical development is given.

(U) By 15 August 1958, enough design data and firing information had been accumulated to make possible an evaluation of proposed weapons concepts. Concepts for a spigot-equipped, recoilless rifle were selected as the most feasible.³⁴

(U) The spigot concept won approval as the best propulsion system for both the large and the small caliber weapon. Formerly, it was considered likely that a full-caliber system would be necessary for the proposed 4,000 meter weapon. Utilizing the spigot principle in both

³⁴ (U) (1) Supra., pp. 8, 16. (S) (2) Rept, First Tech Prog Rept on the Davy Crockett Sys (U), 1 July 1958, Picatinny Arsenal, RCS ORDBB-TK-223, p. 4. DACRO files, RD Directorate, HQ, USAWECOM.

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Weapons made it possible to standardize certain components of the large and small caliber weapons.

Specifically, uniformity in the round's configuration was sought. Using the spigot principle also made it possible to achieve the significant reduction in weight that the designers and the users sought for the equipment.

(C) The need for a spigot-assisted propulsion system stems from the fact that the rounds minimum diameter was 11 1/2-inches. The only recognized alternative was to construct a full-caliber artillery piece with its inherent gain in weight.

(U) Collectively the concepts for the Davy Crockett delivery system emphasized the recoilless rifle, completely portable, 2 - 4,000-meter aspect of the earlier proposals. The concepts also included, for the first time in Army equipment, the utilization of a spigot-tube launching device. The spigot characteristic was recognized as one of the most difficult aspects of this weapon's development. Although the spigot design was new, none of the characteristics of the equipment for the Davy Crockett delivery system were founded upon technological break-throughs or unusual scientific advances.³⁵

35 (C) The ranges for these concepts were changed from yards to meters in March 1958. Rept, Tech Info Rept 1-6-1A1, DA, OCO, Dec 1959, p. 4. (U)

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The system, however, was designed to take advantage of the latest scientific- and engineering-design accomplishments. This was especially true in the case of the projected use of titanium and the novel spigot design.³⁶

(C) Something more should be said concerning the use of the spigot concept in this weapons design. The idea of a spigot shell was new, although the U. S. Navy had used it in their "Y" guns with depth charges, the Army had not adopted it for use previous to this time. The need for this uncommon device, as has been pointed out, sprung from the size of the atomic projectile. A full-caliber weapon (11-12 inch) would in all likelihood, exceed all weight restrictions. Therefore, some means had to be found to reduce the size of the tube while still using the atomic round. The spigot design was thought to be the answer to this problem. The spigot cylinder was designed to be loaded into the muzzle of the weapon while the atomic round was held at the muzzle by stud attachments on the foremost end of the cylinder. The spigot served as a piston once the weapon was fired. The piston-like appendage was separated from the

³⁶ (S) (1) Rept, Tech Development Plan, DA, OCO, RCS CSCRD-21, 1 Feb 1962, p. 2. Concept Gp, RE Div, RIA.
(C) (2) Rept, Tech Info Rept 1-6-1A1, DA, OCO, Dec 1959, p. 2. Tech Info Br, RIA.

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fin-stabilized round ~~some~~ predetermined distance from the muzzle.³⁷

(U) The foremost military characteristic of this system, limited weight, could not be compromised, so that a crew-transportable weapon would be feasible. The safety of friendly troops and the system's reliability were considered as the next most important of its qualities. Accuracy and operational simplicity were additional characteristics adopted in the study. Perhaps the most special characteristic was its capability of delivering fire rapidly and accurately without elaborate preparation of any kind. In a tactical situation calling for an atomic weapon, this quality would make the Davy Crockett system an effective means of providing fire support.³⁸

(U) As first noted, the tactical use of this system is limited to atomic warfare, since a conventional capability was not considered. This brought into question the flexibility of the system, for in a non-atomic conflict, the Davy Crockett system would be an encumbrance - a weapon with no application. However, in the studies of

³⁷ (S) Rept, First Qtr Prog Rept on the Davy Crockett Sys (U), 15 Jul 58, pp. 1 - 9, 40, Memo Rept ORDBB-TK, 223, Picatinny Arsenal, cy 4. DACRO files, RD Directorate, HQ, USAWECOM.

³⁸ (S) Rept, Ord Tech Comm Minute 37185, Mil Char for Bat Gp Atomic Delivery Sys (U), DA, OCO, 8 May 1959, p. 51. DACRO files, RD Directorate, HQ, USAWECOM.

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this equipments application, no changes were made in the weapon's characteristics, since it was felt that it would be useful, in both atomic and non-atomic warfare, to possess a weapon that could use conventional high-explosives as well as atomic warheads if a dual role should be necessary. This type of flexibility would enhance the value of the Crockett system in a general infantry role.³⁹

(U) It has been implied that the Davy Crockett system was not to duplicate the atomic-fire capabilities of existing delivery systems (the Honest John, the 8-inch howitzer, the Corporal, etc.). The high-yield warheads of these systems prevented their use in close support, while the Davy Crockett system was established to fill the gap of from 600 to 1500 meters. Because of this, this weapons system was designed so that there would be no radiation to endanger friendly troops. It also provided an advantage in the ease of emplacement, displacement, accumulation of firing data, and simplified procedures.

³⁹ (U) (1) Supra., pp. 19-21. (SRD) (2) Rept, Anx E (Discussion of Dev of an Optimum Fragmentation Warhead for the Davy Crockett Wpn Sys), Study and Anal of Requirements for an Implications of the Davy Crockett Wpns Sys (U), HQ, USCONARD, 31 Mar 1958, p. 143. DACRO files, RD Directorate, HQ, USAWECOM.

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The major nuclear support systems were extremely limited in comparison to the quick response enjoyed by the Davy Crockett system. All of the necessary equipment to fire it could be carried by its crew, which would be organic to the lowest possible echelon of Army command.⁴⁰

(U) In the design stage, a nearly direct link existed between the activities of the nuclear-munitions group and the weapons-system staff. The original design parameters indicated a 35-pound weight for the round with a diameter of 11½ inches. The conclusions of the weapon's feasibility studies were based upon these values. Later, when the weight of the nuclear munitions was changed, the values and conclusions in the feasibility study were discounted. Complete and direct liaison between the Picatinny Arsenal's Nuclear Weapons Ammunitions Laboratory and the Davy Crockett's concept-development group was an early necessity. The design of components so affected the weapon that changes had to be integrated into the system.⁴¹

⁴⁰ (S) Rept, Proj Mgt Master Plan, Davy Crockett Wpn Sys, op. cit., pp. 1-3.

⁴¹ (S) (1) Rept, Davy Crockett Min of the One day Orientation - XM28 and XM29 Bat Gp Wpns Sys. (U) 1 Dec 1959, Picatinny Arsenal, cy 15, pp. 5, 6, 11-13, ORDBB-TK-470.
(S) (2) Rept, FY 1960 Davy Crockett Bud Presentation (U), Feb 1959, Picatinny Arsenal, cy 5, p. 5, ORDBB-TK-293.
(S) (3) Rept, Intrg Industrial Engr Meeting (U), 7-8 July 1959, cy 2, OWC, p. 19. DACRO files, RD Directorate, HQ, USAWECOM.

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(U) Funding (U)

(U) Administrative actions and how to speed them up and reduce the time lag in decision making was an area given heavy emphasis by the Special Assistant. Within this area of action, programming authority and funding were the functions receiving greatest attention. The project-management staff realized that the maintenance of a sense of urgency and the maintenance of momentum could only be accomplished through direct, emphatic, and accelerated funding. By this acceleration, the staff intended to meet the readiness date and match effort with the high priority of the program.⁴²

(U) A concurrent problem for the weapons-management group was its determination to receive full value for all funds expended. A program of cost-consciousness was developed and applied to the project to add support to the program of timely funding. Reduction of costs was extremely hard to accomplish in a program undergoing accelerated development with very short lead time.

⁴² (U) (1) Ord Wpn Comd Org Manual, 180.00, 4 Mar 1959, p. 1, iss as ch 78, (U) Mr. George Hesse, Deputy Proj Off, DACRO files. (U) (2) Order, Ord Corps O 15-55, 15 Jul 1955, rescinded by AMC Circular 10-12, 17 Feb 63. DACRO files, RD Directorate, HQ, USAWECOM.

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(U) In the final analysis, the financial status of the Davy Crockett project was rather difficult to ascertain with certitude. The best information available was obtained through interviews with management personnel and through a review of the few reports, that remain, correspondence files, and procurement files. By these means, the financial figures used in this narrative were derived. Basically, these are considered to give the most exact information available, although not as definitive as desired. The determination of the financial status being discussed here is for 30 June 1963. Although this financial information post-dates the coverage of this study (the cut-off date for this study is 31 December 1962), this is necessary because no data as complete as the "Closeout of the Davy Crockett Weapons System," is available. Some fragmentary data for earlier periods has been used, and this is clearly identified. The need to use these sources results from the fact that the working papers used in creating the funding documents were not retained after use, and, therefore, are not available for inclusion in this narrative.⁴³

⁴³ (U) Rept, Internal Rev Rept 4-64, "Closeout of Davy Crockett Wpns Sys Proj," H. J. Reed, Internal Rev and Ext Audit, Compt Div, HQ, USAWECOM (U). (S) (2) Rept, Proj Mgt Master Plan, Davy Crockett Wpn Sys, M-28, M-29 (U), 27 March 1963, HQ, USAWECOM.

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(C) Almost immediately after the assignment of this project to the Ordnance Weapons Command, a review of funding to support the program was held. Principally, this was done to determine the adequacy of the developmental funds available to support the assigned schedule of equipment-completion dates. These sums include research-and-development funds and Procurement of Equipment and Missiles, Army funds in support of research and development. For Fiscal Year 1958, these funds were \$1.1 million, and subsequently, for FY 1959, \$4.65 million; FY 1960, \$5 million; FY 61, \$2.4 million; FY 62, \$1.5 million; and FY63, \$.25 million, for a total of \$14.90 million. This review of funds determined that a difference of \$5 million existed; \$4.5 million for FY 1959 and \$500,000 for FY 1960. These needs stemmed from certain unanticipated requirements, added requirements, and acceleration of the initial research-and-development program. Therefore, the total program envisioned by the research-and-development personnel equalled \$19.9 million.⁴⁴

⁴⁴ (S) Rept, FY 60 Davy Crockett Bud Presentation (U), Picatinny Arsenal, Feb 1959, pp. 4-5. DACRO files, RD Directorate, HQ, USAWECOM.

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Of the above sum, \$13.15 million was to cover the expense of providing the two proposed Davy Crockett systems. An additional \$1.75 million was set aside for a proposed equipment-improvement program that was scheduled for FY 1962 and FY 1963.⁴⁵

(S) The Procurement of Equipment and Missiles, Army (PEMA) funds in the FY 1961 (approved program) amounted to \$13,914,779, while obligations were \$12,704,115. The research-and-development funds obligated in FY 1961 were \$6,709,125. Unobligated funds in this category were \$118,875. Fiscal Year 1962 Procurement of Equipment and Missiles, Army (PEMA) funds did not equal the high rate of FY 1961 (the approved program was \$7,435,187 with an additional \$291,481 unobligated). The approved research-and-development program for FY 1962 was \$1,799,138, with \$112,779 unobligated. Total programming for the Davy Crockett program through FY 1962 totaled \$78.1 million - including ammunition, weapons, propellant, and ground mounts.⁴⁶ The aggregate PEMA program through FY 1962 was \$49.2 million. This figure constitutes a little better than one-half of the total program of \$78.1 million. The research-

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(S) Ibid. (U)

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(U) Approved PEMA Prog for FY 61 and FY 62 reflects amounts shown on Actv Op Scd - 5, prep by the Proj Mgr, 15 Oct 1962.

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and-development portion comprised \$26.8 million of prior year funds. The remainder, \$2.1 million of the \$78.1 million total funding, was comprised of O&M,A and miscellaneous funds.⁴⁷

(U) It can be stated that the financial management machinery of the Davy Crockett program was a nearly conventional system in concept.⁴⁸ However, in application, this program contained a number of unusual aspects. As an example, the funding channels as illustrated in charts 2 , 3 , and 4 , are somewhat unusual. The Office, Chief of Ordnance, was the ultimate source of all funding and guidance. By utilizing the newly developed principle of project management, the Office, Chief of Ordnance, was able to effectively delegate a great part of its authority to the Headquarters, OWC. Through use of this delegated authority, the Special Assistant was provided the means of controlling and directing the installations and agencies engaged in the project. The outward conventional appearance

⁴⁷
(U) Rept, Internal Rev Rept 4-64, "Closeout of Davy Crockett Wpns Sys Proj," H. J. Reed, Internal Rev and Ext Audit, Compt Div, HQ, USAWECOM (U). (S) (2) Rept, Proj Mgt Master Plan, Davy Crockett Wpn Sys, M-28, M-29 (U), 27 March 1963, pp. C-1, C-2, C-3, C-4, (S) (3) Rept, Integrated Industrial Engr Meeting, HQ, OWC, 7-8 July 1959, cyl, pp. 20-25. (S) (4) Rept, FY 1960 Davy Crockett Bud Presentation (U), Picatinny Arsenal, RCS-ORDBB-TK-293, pp. 4-7. DACRO files, RD Directorate, HQ, USAWECOM

⁴⁸
7 (U) Supra., p. 32. (U)

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DAVY CROCKETT

37-MM SUB. CAL. SPOTTING RIFLE

PROGRAMING AND FUNDING LEGEND

GUIDANCE }
 PLAN }
 AUTHORIZATION }
 WORK ORDER
 PROJECT ORDER
 REPORT
 SUBALLOTMENT
 SUBANNUAL FUNDING PROGRAM

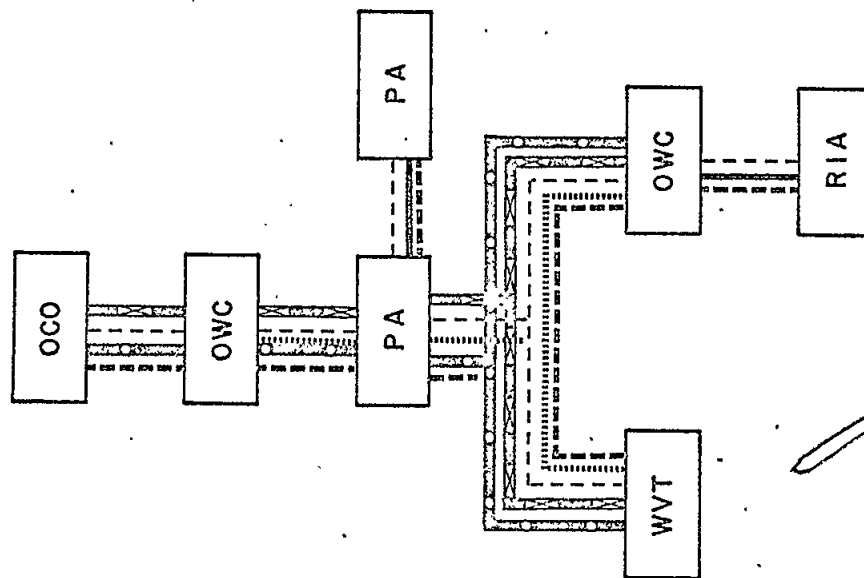


CHART 4

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of this management system was disturbed by Headquarters,
OWC's multiple roles. The receipt of funds at the Head-
quarters, and their subsequent distribution pointed out
the fact that Headquarters, OWC and subordinate installations
were buyers and sellers. Funds initially received from
OCO, denoted for use in research and development, were sent
to the Picatinny Arsenal. However, if the Picatinny
Arsenal had contracted for services from Watertown or
Rock Island Arsenals or Springfield Armory, the money was
returned to the Headquarters, OWC for re-distribution to
the correct organization. All work for the Ordnance
Weapons Command's installations was issued from the Head-
quarters. In this way, funds, originally from the Head-
quarters, could be sent to the Picatinny Arsenal or the
Frankford Arsenal, returned to the Headquarters, OWC for
ultimate disposition to Watertown, Rock Island or Spring-
field. This funding scheme was utilized because the
Picatinny Arsenal was the overseers of research-and-
development work, while the Headquarters, OWC did central
accounting for its subordinate installations. All funding
between installations was accomplished through work orders
except where an installation issued work to itself or in
the case of the Headquarters, OWC, to its subordinate
members. These procedures were in agreement with the

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Command-Management-System procedures as contained in
ORDM 1-6 and 1-5.⁴⁹

(U) The Headquarters, OWC divided all Research, Development Test and Engineering, Army (RDT&E,A) funds into research-and-development activities, and Davy Crockett activities. This division necessitated a flow of sub-allotments and sub-annual funding programs within the OWC complex. This accounts for the Headquarters, OWC issuing to itself sub-allotments and sub-annual funds in chart 3 . Funding from Headquarters, OWC to subordinate installations, in this funding area was accomplished through project orders.⁵⁰

(U) The responsibilities of the Weapons System Manager required definition and elaboration throughout the program. Actions taken by the Field Service Division of the Office, Chief of Ordnance, in direct funding actions to subordinate installations, were prime causes of concern. The Headquarters, OWC found that Activity Operating Schedules covering essential parts of the program were being sent directly from the Office, Chief of Ordnance, to performing installations. This technique of management

⁴⁹
(S) MFR, J. C. Hensley, Mgt Science Div, HQ, OWC, to Col R. J. Rastetter, Davy Crockett Sp Asst, subj: Additional Funds Required -- XM28 and XM29 (U), 2 Feb 1960. DACRO files, RD Directorate, HQ, USAWECOM.

⁵⁰
(S) Ibid. (U)

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effectively eliminated the System Manager from seeing reports of progress and allowed no supervision or authorization of required work. The Weapons Command management felt this system of funding thwarted the proper administration of the Davy Crockett program. It prevented the System Manager from obtaining valid reports on field requirements and accomplishments. Also, no reports from the System Manager were possible within the areas being funded outside of OWC control.⁵¹

(U) One of the distinctive problems in creating the Davy Crockett system resulted from the use of depleted uranium. This product was used in making the spotting rounds for the sub-caliber spotting system. Some concern was expressed over the potential contamination of the gun crew by the uranium, but theoretical studies indicated no exposure was possible while using this material. To determine the safety characteristics, the System Manager established a test proposal and assigned the job of determining the safety of this material to the Development and Proof Services Division, Aberdeen Proving Ground. The testing of these projectiles for possible side effects

⁵¹
(U) Ltr, Col Samuel Smellow, CO, AWC, to COFORD, DA, subj: Requirement for Clarification and Action on Wpns Sys Mgr Responsibility, HQ, OWC, 6 Feb 1961, pp. 1-2. Mat Mgt Div, Compt and Programs Directorate, HQ, USAWECOM.

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effects would be done concurrent with the regular engineering tests. This search for side effects would require no increase in expenditure over the cost of the projectiles for the regular program.⁵² An early test by personnel at Watertown Arsenal had concluded that no health hazard existed in normal handling and firing of this metal. Nonetheless, the Special Assistant supported the Development and Proof Services' proposal and asked the Office, Chief of Ordnance, for approval and financial support.⁵³

(U) The Office, Chief of Ordnance considered all information available, concerning the radiation problem, and declined support of the proposed tests. The program was not recommended due to the extensive report compiled by Watertown Arsenal's Health Physicist. Further concern over this problem awaited results of the equipment tests.⁵⁴

(U) The atomic munitions, however, did create the

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(U) Ltr, Benjamin S. Goodwin, Asst Dir, Dev and Proof Svc, Aberdeen Proving Ground, to CG, OWC, attn: Col R. J. Rastetter, subj: Test Proposal for Determining Exposure and Contamination in connection with 20-mm., XM101 Projectile, 6 Feb 1961.

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53
(U) 1st Ind, Col R. J. Rastetter, Sp Asst to CG, OWC, to Ofc, Ch of Ord, subj: Test Proposal for Determining Exposure and Contamination in Connection with 20-mm., XM101 Projectile (U), 9 Feb 1961.

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(U) 2nd Ind, Melvin C. Miller, Deputy Chief, Ballistic Sec, RD Div, to CG, APG, subj: Test Proposal for Determining Exposure and Contamination in Connection with 20-mm., XM101 Projectile (U), 26 May 1961.

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need for an exceptionally strong program of safety and accident prevention. Although a discussion of these requirements here is not pertinent, a brief mention of the Special Assistant's role is appropriate. An essential need was to see that Explosive Ordnance Disposal Units had published Render Safe Procedures available before the atomic warheads were moved. All materials necessary to support the Disposal Units were prepared and distributed before the movement of the war-reserve warheads.

20 (U) The Davy Crockett Office and the functions of the Special Assistant were terminated on 1 September 1961. All subsequent activities in this program were to be taken care of by most appropriate existing directorate in the Headquarters, Ordnance Weapons Command. Subsequently, many of the staff members from this office were placed within directorates and given continued responsibility
15 for the Davy Crockett weapon.⁵⁵

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(U) TT, G. A. Hesse, Act C, DACRO, HQ, OWC, to participating installations, subj: Davy Crockett, 22 Aug 1961.

(U) SUMMARY (U)

The essence of project management is the successful completion of an assigned project, within a shortened developmental time, that meets the established military characteristics and requirements. The object of project management is to place selected, high-priority, high-dollar-value, complex, weapons-developmental programs under this exceptional control and derive benefits from the exclusive, personal attention of the special staff. Under this scheme, benefits are gained from the undivided attention and concern of the staff, the centralized low-level of decision making, and the improved time of response to answer queries and provide guidance and directions. The higher levels of defense management also receive benefits from this system through the decrease in volume of paper and reports, the improved time of reaction for plans and decisions, a more direct concern with the problem (rather than a shared concern for all problems at the higher level), and the de-centralized, next-to-the-problem and working-staff environment.

The Davy Crockett Atomic delivery system was first and the highest priority project ever assigned to the Headquarters, U. S. Army Weapons Command. This unique weapon was begun in 1958, following the development, by U. S. Atomic Energy Commission, of a miniature atomic war-head. This breakthrough in weapons' technology made possible the creation of a crew transportable atomic-delivery system. To make this concept a reality, the then Chief of Ordnance, General J. H. Hinrichs, created a special Ordnance Corps-wide grouping of technical personnel with the supervision reposed in a project manager, who was located at the Headquarters, U. S. Ordnance Weapons Command (later the Headquarters, U. S. Army Weapons Command). The urgency of this project, the technical innovations, and the new concept of its use, made the project difficult to accomplish. In addition, an extremely short lead time was assigned. Aside from all of these problems, this diverse group accomplished its task -- a unique weapons system to provide greater potential to the Army's Arsenal.

The management of the Davy Crockett weapons system was an exceptional assignment to the Headquarters of the

Weapons Command. This project involved new and heavy responsibilities in that this was, as noted, the first project-managed item at this organization. It, therefore, contained as well, not only a large number of technical innovations, but firsts in production as well. The Weapons Command's function as program supervisors was complemented by the technical supervision of the program by personnel at the U. S. Army Picatinny Arsenal, Dover, N. J. These two organizations were supervisors of some 14 military and civilian installations that contributed directly to the production of this equipment.

The Commanding General of the Weapons Command, as weapons system manager, was called upon to create a system of management while actively promoting the program. Subsequent to this special project, the Weapons Command has received a number of project-managed assignments, the many new techniques and procedures, originated in the DACRO assignment, have been appreciably improved and developed for use in the later programs.

As noted, the Davy Crockett management program contained a number of new techniques. These increased performance, but heightened the complexity of management and may have increased the outlay on this weapon. One of the techniques was accomplished through "telescoping" the research and industrial portions of the program. This combining of activities to run concurrently was devised to gain time - an indispensable part of the project management goal. The research-and-development personnel were feeding industrial engineers the drawings on components as soon as they were complete. Of course, subsequent changes in design required the industrial people to re-do their work also. This scheme of development gave certain benefits, notably time, but also made certain demands, especially in funding.

The second means of telescoping the Davy Crockett program was through combined engineer-user tests. By this means, all common testing objectives were sought under the purview of the Ordnance Corps with user participation and observers.

Just the fact that a urgently required, major, high-priority project was assigned to the Headquarters was a milestone. Once the assignment was made, the creating of

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the transparency and accountability of the organization. This section also outlines the various methods used to collect and analyze data, ensuring that the information is reliable and up-to-date.

2. The second part of the document focuses on the financial aspects of the organization. It provides a detailed overview of the budget, including the projected income and expenses for the upcoming year. This section also discusses the various financial risks and how they are being managed to ensure the organization's financial stability.

3. The third part of the document addresses the operational challenges faced by the organization. It identifies the key areas where improvements are needed and outlines the strategies being implemented to address these challenges. This section also discusses the role of the staff and how they are being trained to meet the organization's needs.

4. The fourth part of the document discusses the future of the organization. It outlines the long-term goals and the strategies being implemented to achieve them. This section also discusses the role of the board of directors and how they are being involved in the organization's future planning.

5. The fifth part of the document discusses the impact of the organization on the community. It highlights the various programs and services that the organization provides and how they are benefiting the community. This section also discusses the organization's commitment to social responsibility and how it is being implemented.

6. The sixth part of the document discusses the organization's relationship with its stakeholders. It identifies the key stakeholders and outlines the strategies being implemented to engage them. This section also discusses the organization's commitment to transparency and how it is being implemented.

7. The seventh part of the document discusses the organization's compliance with the law. It outlines the various laws and regulations that the organization is subject to and how it is ensuring compliance. This section also discusses the organization's commitment to ethical behavior and how it is being implemented.

8. The eighth part of the document discusses the organization's overall performance. It provides a summary of the key achievements and challenges over the past year. This section also discusses the organization's commitment to continuous improvement and how it is being implemented.

9. The ninth part of the document discusses the organization's future plans. It outlines the key areas where the organization is planning to invest and how it is ensuring that these investments are aligned with its long-term goals. This section also discusses the organization's commitment to innovation and how it is being implemented.

10. The tenth part of the document discusses the organization's conclusion. It summarizes the key findings of the document and outlines the next steps. This section also discusses the organization's commitment to transparency and how it is being implemented.

an appropriate organization and of establishing procedures were demanding requirements. The Headquarters, also had to develop a meaningful relationship with the Office, Chief of Ordnance. This office, previously responsible for equipment-developmental requirements, showed some reluctance to allow all functions to be performed from the Weapons Command. This problem required a series of liaison visits, including several high-level conferences. Once the full meaning of the program was defined and accepted, the Office, Chief of Ordnance, depended on the established procedures and the project manager's reports to obtain the desired information.

The Davy Crockett Weapon System provides all of the desired military characteristics envisioned in the weapon's proposals. Of 26 initial characteristics, all were either met originally, or were met following revisions to the military characteristics on 2 February 1962. The most comprehensive source of information on this phase of the program is the Davy Crockett Final Evaluation, Picatinny Arsenal, November 1962.

HQ, OWC RESPONSIBILITY

COMMANDING GENERAL
BRIG GEN W. K. GHORMLEY

PROJECT OFFICER
COL R. J. RASTETTER

R&D PROJECT OFFICER
MR F. GROSSMAN

P&O PROJECT OFFICER
MR GEO. HESSE

RESEARCH & DEVELOPMENT

- OPERATIONS & ACTING
- PLAN, DIRECT, COORDINATE
- MONITOR
- FOLLOW ALL ACTIVITIES
- COORDINATE BETWEEN PICATINNY R&D MANAGER & OCO & USING SERVICES
- FURNISH GUIDANCE
- DISSEMINATE ACTIVITY TO WITH
- THOSE OF IND & FS PROJECT OFFICERS
- REPORT TO CLERK/COGN
- PROGRESS & PROBLEMS
- RECOMMEND SOLUTIONS
- PREPARE & PRESENT BRIEFINGS
- REVIEWS AGO'S

INDUSTRIAL

MR F. WITTBBER

- EXERCISE STAFF CAPABILITIES & MANAGERIAL GUIDANCE
- ENGINEERING ASSISTANCE
- DEVELOP & PROVIDE RESOURCES FOR INDUSTRIAL ENGINEERING
- FACILITIES & MATERIALS
- ELABORATE ALL EFFORTS OF SUPPORTING AGENCIES FROM TECHNICAL IND DESIGN THROUGH FABRICATION & DELIVERY
- REDUCE REQUIREMENT OVERLAP FROM CONARC & DCSLOG THRU OCO
- DEVELOP
- PRODUCTION SCHEDULES
- ALL COST FACTORS
- 5 YEAR PLAN
- BUDGETARY PROGRAMMING
- PREPARE ASSETS FOR IND

FIELD SERVICE

MR F. ABEL

- STAFF & OPERATIONAL
- DESIGN FACTORING & ANALYSIS
- REVIEW MILITARY CHARACTERISTICS, DRAWINGS, PROTOTYPE AND PRE-PRODUCTION MODELS
- EXPLORE DESIGN CAPABILITY
- TALK WITH SERVICE OFFICIALS
- ALLOCATE MAINTENANCE OPERATIONS, REPAIR PARTS & TOOLS AND EQUIPMENT FOR SYSTEM
- ALL IN PERSONAL ITEM, STRUCTURE AND ITEM FOR REPAIR
- CORRECT, CONTROL FOR SYSTEM
- TECHNICAL DEVELOPMENT FOR INDUSTRY
- MAINTENANCE & SUPPLY MANUALS FOR SUPPORT OF WEAPONS IN FIELD
- REPAIR AGO'S TO CORRECT
- EVALUATE & REVISE FOR THE
- REPORT TO AGO'S & INDUSTRY

MANPOWER & TRAINING

MR J. LEVENHAGEN

- COORDINATE ALL TRAINING DEVELOPMENT ACTIVITIES
- MAKE RECOMMENDATION OF:
 - AREAS OF TRAINING NEEDS
 - WHO, WHERE, WHEN SHALL BE TRAINED
 - WHO SHALL DO THE TRAINING
 - EQUIPMENT REQUIREMENTS
 - TRAINING AIDS & DEVICES
 - SUPPORT RESPONSIBILITIES
 - FUNDING
 - SEE THAT PO'S ARE PROVIDED FOR OTHER AREAS
 - BUDGET TRAINING PROGRAM
 - INITIATE AGO'S FOR SUBJECT AGENCIES
 - EVALUATE TRAINING
 - FOLLOW-UP OF TRAINING

MGT ENG

MR M. SILKINER

- ADVISORY
- PARTICIPATES IN DEVELOPMENT FORMULATION IMPLEMENTATION
- OCO MANAGEMENT ENGINEERING
- DIRECT ADMINISTER
- PROVIDE STUDIES & ANALYSES OF ORGANIZATION, MISSION PROCEDURES, WORK METHODS, ETC
- PREPARE MANAGEMENT SYSTEMS DEVELOPMENT AND ANALYSES
- DEVELOP SERVICE MANAGEMENT
- TRAINING & TECHNOLOGY

FIN MGT

MR J. HENSLEY

- BUDGET
- COORDINATES PREPARATION & RELEASE OF WORKLOAD PLANS
- COORDINATES PREPARATION & CONSOLIDATES WORKLOAD PLANS FOR SUBMISSION TO OCO
- PREPARES SS-1'S OUTLINING ANNUAL FUNDING PROGRAM & ALLOTMENT NEEDS & FORWARDS TO OCO
- FUNDS
- RECEIVES APP'S & ALLOTMENTS FROM OCO
- ISSUES AF SUB-PROGRAMS & SUB-ALLOTMENTS TO ACTIVITIES
- RECORDS & RETENTS
- MAINTAIN RECORDS BY ACTIVITIES ON FUNDS & WORK REC'D & ISSUED
- MAINTAIN STATUS OF FUNDS & WORK BY WEAPONS MAJOR COMPONENTS

APPENDIX I (U) STAFFING OF THE DAVY CROCKETT PROGRAM, HEADQUARTERS, ORDNANCE WEAPONS COMMAND. DACRO FILES, RESEARCH AND DEVELOPMENT DIRECTORATE, HQ, USAWECOM. (U)

CONFERENCE
SESSION

DAVY CROCKETT

OCO

COMBAT
COL. O. E. HURLEUT

PROJECT OFFICER
COL. R. J. RASTETTER

P&O
G. HESSE

R&D
F. GROSSMAN

IND
F. WITTBER

FS
F. ABEL

MP & TNG
J. LEVENHAGEN

MGT ENG
M. SILKINER

FIN MGT
J. HENSLEY

PA

RESEARCH & DEVELOPMENT
• COMPLETE PROJECTILE
• COMPLETE LAUNCHER



INDUSTRIAL - IND ENG (OAC)
FIELD SERVICE - MAINT (OAC)
• PROJECTILE, LESS NUCLEAR COMP
• SPIGOT
• PROPELLANT CHARGE
& CARTRIDGE CASE

OTAC

IRP SUP & STK CONTROL
FS - MAINTENANCE
• VEHICLE MOD KIT
RESEARCH & DEVELOPMENT (PA)
INDUSTRIAL (WVT)
• VEHICLE MOD KIT



WVT

IRP SUP & STK CONTROL
IND - IND ENG
IND MOD
• COMPLETE LAUNCHER
• TUBE & MOUNT

OAC

INDUSTRIAL
MI STOCK CONTROL
FS - RP SUP & STK CONTROL
MAINTENANCE
• COMPLETE PROJECTILE
INCLUDES: W.R., H.E., PRACTICE,
& 20 MM TRAINING

DOFL

RESEARCH & DEVELOPMENT (PA)
IND - IND ENG, FS - MAINT (OAC)
• FUZES

SA

RESEARCH & DEVELOPMENT (FA)
INDUSTRIAL (WVT)
• SPOTTING RIFLE

HQ. OWC

IRP SUP & STK CONTROL
FS - MAINTENANCE
• COMPLETE LAUNCHER
• TUBE & MOUNT
• SPOTTING RIFLE

MISMA

FS - MI SUPPLY CONTROL
• COMPLETE PROJECTILE
• COMPLETE LAUNCHER
FS - MI STOCK CONTROL
• COMPLETE LAUNCHER

FA

IRP SUP & STK CONTROL
FS - MAINTENANCE
• FIRE CONTROL

FS - MAINT ENG SUPPORT (OAC)
• SAFING & ARMING MECH
• 20 MM SPOTTING PROJ

INDUSTRIAL (WVT)
• FIRE CONTROL

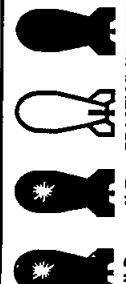
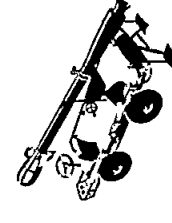
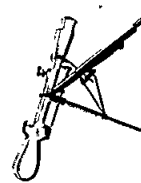
IND (OAC) - IND ENG
• SAFING & ARMING MECH

RESEARCH & DEVELOPMENT (PA)
PROJECTILE COMPONENTS
• PROPELLANT CHARGE
& CARTRIDGE CASE
• SAFING & ARMING MECH
• 20 MM SPOTTING ROUND

LAUNCHER
• TUBE & MOUNT
• FIRE CONTROL
• SPOTTING RIFLE

APPENDIX II (U) ASSIGNMENT BREAKDOWN OF DAVY CROCKETT RESPONSIBILITY.
DACRO FILES, RESEARCH AND DEVELOPMENT DIRECTORATE,
HQ, USAWECOM. (U)

INSTALLATIONS INVOLVED

PA RESEARCH & DEVELOPMENT • COMPLETE PROJECTILE • COMPLETE LAUNCHER  INDUSTRIAL - IND ENG (OAC) FIELD SERVICE-MAINT (OAC) • PROJECTILE, LESS NUCLEAR COMP • SPIGOT • PROPELLANT CHARGE & CARTRIDGE CASE	OAC INDUSTRIAL MI STOCK CONTROL FS- RP SUP & STK CONTROL MAINTENANCE • COMPLETE PROJECTILE INCLUDES  W.R. PRACTICE (INERT) H.E. PRACTICE TRAINING 20MM SPOTTING	WVT PROC & PROD IND-IND ENG IND MOB • COMPLETE LAUNCHER • TUBE & MOUNT 	FA RP SUP & STK CONTROL FS- MAINTENANCE • FIRE CONTROL FS- MAINT ENG SUPPORT (OAC) • SAFING & ARMING MECH • 20 MM SPOTTING PROJ INDUSTRIAL (WVT) • FIRE CONTROL IND (OAC) - IND ENG • SAFING & ARMING MECH
DOFL RESEARCH & DEVELOPMENT (PA) IND-IND ENG, FS-MAINT (OAC) • FUZES	SA RESEARCH & DEVELOPMENT (FA) INDUSTRIAL (WVT) • SPOTTING RIFLE	HQ. OWC IRP SUP & STK CONTROL FS- MAINTENANCE • COMPLETE LAUNCHER • TUBE & MOUNT • SPOTTING RIFLE 	FA RESEARCH & DEVELOPMENT (PA) PROJECTILE COMPONENTS • PROPELLANT CHARGE & CARTRIDGE CASE • SAFING & ARMING MECH • 20 MM SPOTTING ROUND LAUNCHER • TUBE & MOUNT • FIRE CONTROL • SPOTTING RIFLE
OTAC IRP SUP & STK CONTROL FS- MAINTENANCE • VEHICLE MOD KIT RESEARCH & DEVELOPMENT (PA) INDUSTRIAL (WVT) • VEHICLE MOD KIT	MISMA FS-MI SUPPLY CONTROL • COMPLETE PROJECTILE • COMPLETE LAUNCHER FS-MI STOCK CONTROL • COMPLETE LAUNCHER		

RIA - MANUFACTURING SUPPORT OF R&D
WVT - MANUFACTURING SUPPORT OF R&D
WA - METALS RESEARCH & MANUFACTURING SUPPORT OF R&D
OTC - UNIT/MOS TRAINING
APG - TESTING PROGRAM
AEC - NUCLEAR COMPONENT INDUSTRY - R&D PARTICIPATION

APPENDIX III (U) ORDNANCE CORPS INSTALLATIONS INVOLVED IN DAVY CROCKETT PROGRAM. DACRO FILES, RESEARCH AND DEVELOPMENT DIRECTORATE, HQ, USAWECOM. (U)

APPENDIX IV

HEADQUARTERS
ORDNANCE WEAPONS COMMAND
Rock Island, Illinois

OWCR 1-24

OWC REGULATIONS

23 December 1958

NUMBER 1-24

ADMINISTRATION

Internal Responsibilities and Procedures of Hq OWC DAVY CROCKETT Weapon System

Paragraph

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Establishment of Weapon System Projects.....	2
Preparation and Authorization of DAVY CROCKETT Weapon System Plans, Schedules, and Funds.....	3
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1. Responsibilities. The Chief, DAVY CROCKETT Office (DACRO) is assigned the duties of Weapon System Project Officer. Except in matters reserved to the Commanding General and Deputy Commander,^{1/} he is authorized to act in the name of the Commanding General, OWC, in the following:

a. Direction, coordination and integration of the efforts of all activities of the Headquarters and Ordnance installations participating in the DAVY CROCKETT Weapon System program.

b. Representation to higher authority and other agencies in the fulfillment of his assignment.

c. Review and approval of plans, programs, schedules and reports submitted to the Commanding General, OWC, by participating installations and activities.

d. Preparation and submission of consolidated plans, programs, schedules and reports submitted by the Commanding General, OWC.

2. Establishment of Weapon System Projects. a. The Chief, DACRO will contact activity managers of the Headquarters, requesting them to designate an Associate Project Officer throughout the assignment of the Weapon System responsibility.

b. The Chief, DACRO will procure and research all available information on the Weapon System, such as CONARC studies, draft MC's, OCM's, concept studies, etc., to determine and establish the scope and general requirements of the system.

c. The Chief, DACRO will call a meeting of all organizations which are expected to participate in the Weapon System for the purpose of discussing tentative assignments of mission, overall parameters of the Weapon System, and agreement on working relationships to execute the Weapon System assignment

which will form the basis of a planning directive. This general meeting will usually be followed by on-site visits by the Weapon System Project Officer, accompanied by such Associate Project Officers as shall be concerned with the organization being visited to discuss more detailed aspects of each particular organization participating. This will usually also be followed by technical meetings confined to particular phases of effort.

3. Preparation and Authorization of DAVY CROCKETT Weapon System Plans, Schedules, and Funds. a. Chief, DACRO issues planning directives for preparation of component plans. The planning directives include:

- (1) A description of Weapon System assignment and the extent, scope, or parameters of the Weapon System and its physical requirements.
- (2) A statement of policies governing the Weapon System such as: mission and responsibilities assignments, programming, funding, reporting, relationships, etc.
- (3) Specific program requirements established by higher echelon.
- (4) Guidance for preparation of component plans including formats, checkpoints, parameters, timing, inter-relationships with other components, etc.

b. Associate Project Officers develop component plans covering their portion(s) of the system and submit to the Chief, DACRO. The component plans will include:

- (1) Assignment of mission responsibilities to particular installations.
- (2) Assignment of component responsibilities to particular installations.
- (3) Phases and time schedules of effort, quantities, critical points of program, etc.
- (4) Weapon System Component Control Schedules.

c. The Chief, DACRO ^{Project Manager} consolidates component plans into the Master System Plan and submits to Commanding General for approval and if required presents the plan to the Chief of Ordnance. The Master System Plan will include:

- (1) Weapon System Master Control Schedule.
- (2) Weapon System Component Control Schedules.
- (3) Critical points of development, action or decision.

d. Upon approval of System Plan, ⁴⁻⁴ DACRO Associate Project Officers will prepare AOS-1 (Plan Phase) and send to Chief, DACRO for approval and

forwarding to performing installations.

e. Installations mark up the AOS's, prepare SS-1, in accordance with OCTI 100-1-58, including information from support installations as necessary, and return to DACRO.

f. DACRO Associate Project Officers review mark up AOS-1's and SS-1's for system changes or deviations, and submit recommendations to Chief, DACRO.

g. After review DACRO will consolidate Operating Schedules accompanied by a series of SS-1's and forward to the Chief of Ordnance, ATTN: ORDPX, for approval.

h. Upon receipt of the approved AOS's, SS-1's, and funding documents from the Chief of Ordnance, the Chief, DACRO will:

(1) Request the Comptroller to prepare Annual Funding Sub-Program and Sub-Allotment to accompany authorized AOS's and SS-1's.

(2) Request Associate Project Officers to prepare authorized AOS's and SS-1's and Project Orders (as applicable) and submit for approval to Chief, DACRO.

(3) Release authorized AOS's, related SS-1's and funding documents to all participating installations and their support installations.

i. DACRO will maintain a centralized control file of all planning and authorization AOS's and SS-1's and all internal funding documents. Associate Project Officers will insure that sufficient copies are provided for the DACRO file and for their own offices. Associate Project Officers will also maintain copies of documents reflecting actions taken within their areas of responsibility.

4. Weapon System Reporting. a. Participating installations will submit the reports listed in Paragraph 4, OWCR 1-2 to the Chief, DACRO except as provided in sub-paragraph b of that paragraph.

b. The Chief, DACRO consolidates installation reports into a Weapon System report and submits to Commanding General and if required to Chief of Ordnance, ATTN: ORDPX. The submission of these reports may be in the form of or accompanied by a presentation. Presentations of the status of the Weapon System shall be made by the Chief, DACRO.

5. Weapon System Work and Resource Revisions. All requests for changes in programs, projects, and/or funds, will be submitted through program channels, to the Chief, DACRO.

FOR THE COMMANDER:

OFFICIAL:

M. D. Walling
M. D. WALLING
CWO-2 USA
Acting Adjutant

ELWOOD G. LEHNUS
Capt, OrdC
Adjutant

DISTRIBUTION: C

WEAPON SYSTEM PROJECT OFFICER (DAVY CROCKETT)

The Davy Crockett Weapon System Project Officer is a Special Assistant to the Commanding General and performs the following:

1. Plans, directs, controls and appraises the Davy Crockett Weapon System program (OCO 15-55). *OCO Circular 10-11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.*
2. Directs, coordinates and integrates the participation of all Ordnance installations and activities assigned responsibility for a phase(s) of the Weapon System.
3. Exercises staff supervision over activities of Headquarters organizational elements being performed for the Weapon System.
4. Relieves the Commanding General of detail pertaining to this program except those matters reserved to the Commanding General.
5. Establishes and maintains contacts necessary to the fulfillment of his assignment.
6. Represents the Commanding General to higher authority and agencies, as required, in the fulfillment of his assignment.
7. Performs his assigned function separate and distinct from the other missions of the Ordnance Weapons Command and deals with the other OWC activities and installations in the same manner as any other Ordnance installation or activity.
8. Presents requirements to and obtains services of such elements of OWC as he deems necessary to the successful prosecution of his assignment.
9. Exercises full and direct supervision over personnel detailed to him. (They shall perform such assignment as he shall prescribe and shall be required to provide competent and current advice regarding an area or specialization. All action taken or advice rendered by these personnel shall be considered as having full approval of their respective division or office chiefs.
10. Communicates directly with the Office, Chief of Ordnance, and with Ordnance installations and activities with respect to his assigned function; communicates with the Atomic Energy Commission through the Commanding Officer, Picatinny Arsenal, or his authorized representative.
11. Performs other duties which the Commanding General may specify from time to time.

GLOSSARY

A

AD HOC Comm - AD HOC Committee

AEC - Atomic Energy Commission

Ammo - ammunition

Anal - analysis

Arty - artillery

Asst - assistant

Asst Secy of Def - Assistant Secretary of
Defense

AWC - Army Weapons Command

B

Bat Gp Atomic Delivery Sys -
Battle Group Atomic Delivery System

Br - branch

C

C - confidential

Cbt - combat

Ch and C - chief

Cmt - comment

COFORD & CofOrd - Chief of Ordnance

C of S - Chief of Staff

Contr - contract

CONARC - Continental Army Command

GLOSSARY
(Cont)

D

DA - Department of the Army
DACRO - Davy Crockett weapon system
Dept - department
Dev - development
Dir - director
DOD - Department of Defense

E

F

FA - Frankford Arsenal
FOUO - For Official Use Only
FS - feasibility study

G

H

HE - high explosive
Hist - history
How - howitzer
HQ - Headquarters

GLOSSARY
(Cont)

I

Ibid. - in the same or the previous reference

In - inch

Ind. - indorsement

Info - information

Infra. - hereinafter, below

J

JCS - Joint Chiefs of Staff

L

Ltr - letter

M

Mat - material or materiel

Mat Mgt Div - Materiel Management Division

memo - memorandum

-mm. - millimeter

N

n.s. - no subject

GLOSSARY
(Cont)

O

Obj - objective

OCO - Office, Chief of Ordnance

Op. cit. - In the work (previously but not immediately above)
cited.

Org - organization

OTCM - Ordnance Technical Committee Meeting

OWC - Ordnance Weapons Command

P

PA - Picatinny Arsenal

Passim. - here and there in the reference cited.

pp. - pages

Prog - progress

Proj - project

Q

Qtr - quarter

R

RD - Directorate - Research and Development
Directorate

RE Div - Research and Engineering
Division

GLOSSARY
(Cont)

R
(Cont)

Reg - regulation
Rept - report
RIA - Rock Island Arsenal

S

S - secret
Scd - schedule
Secy - secretary
Sp Asst - special assistant
sp - special
spt - support
SRD - Secret Restricted Data
Stf - staff
Supra. - Above, previously (in this work)
Sys - system

T

Tech - technical
TIR - Technical Information Report
TT - teletype or teletypewriter

GLOSSARY
(Cont)

U

U - unclassified

USAWECOM - United States Army Weapons Command

USCONARC - United States Continental Army Command

W

wpn - weapon

X

X - experimental

XO - executive officer

Y

yd - yard

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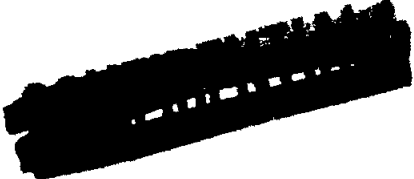
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