AD 665 032

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES

Joseph T. Fucigna

Dunlap and Associates, Inc.
Darien, Connecticut

February 1968

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES

FINAL SUMMARY REPORT

Contract No. Nonr-4418(00)
NR 196-037

Prepared for:

Engineering Psychology Branch (Code 455)
Psychological Sciences Division
Office of Naval Research
Washington, D. C.

BSD Report No. 68-448/463

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES

FINAL SUMMARY REPORT

Contract No. Nonr-4418(00)
NR 196037

February 1968

Prepared for:

Engineering Psychology Branch (Code 455)
Psychological Sciences Division
Office of Naval Research
Washington, D. C.

Prepared by:

Dunlap and Associates, Inc.
One Parkland Drive
Darien, Connecticut

SUMMARY

The work reported herein was performed under Contract No. Nonr-4418(00) during the period 1 January 1964 through 31 December 1967 and involved: 1) the conduct of five (5) Navy Human Factors Institutes; 2) preparation of a Human Factors Supplement to the Chief of Naval Material R&D Implementing Plan; 3) development of a detailed description of human factors functions to be performed in support of CNM; 4) development of a human factors engineering specification guide; 5) development of training requirements for the Bureau of Naval Personnel; 6) development of a draft version of a programmed text in the area of human engineering; 7) consulting with the Navy Mine Defense Laboratory regarding a special human factors institute; 8) assistance in the development of the personnel and training section of WR-30; 9) preparation of personnel and training material for a revised Logistic Support Manual; and 10) conduct of initial research pertaining to the effects of cold on diver performance.

The preceding efforts were accomplished under the cognizance of Dr. James W. Miller, Dr. Marshall J. Farr, and Mr. Gerald S. Malecki of the Engineering Psychology Branch of the Office of Naval Research. Grateful appreciation is expressed for their guidance and cooperation.

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES

Introduction

The work performed under this contract represents a continuation or follow-on to Contract Nonr-3876(00) which was performed for the Deputy Chief of Naval Operations (Development) during 1962-1963 and involved a detailed and comprehensive study of human factors research and development activities in the Navy's RDT&E program. Human factors R&D requirements were identified, the degree to which requirements were being satisfied was assessed and recommendations for broadening and strengthening the Navy's human factors effort were made.

One of the findings of the study indicated the need to indoctrinate RDT&E personnel regarding the objectives, scope, application and techniques of human factors. In response to this need, the Navy Human Factors Institute was established. The basic concept was to provide, on an annual or semi-annual basis, a five-day program devoted to human factors in Navy RDT&E. The audience to which the Institute was and is directed includes RDT&E management personnel (organization, program and project), project engineers and inexperienced human factors personnel. The objective was not to train but rather indoctrinate personnel in the field of human factors as applied to the Navy RDT&E program.

The program for each of the five days was developed around the following general topics:

- Overview of human factors in Navy RDT&E and its role in the development of operational requirements.
- Role and techniques of human factors in planning and analysis of systems.
- Human factors engineering.
- Personnel and training research and development.
- Test and evaluation and human performance assessment.

Under the original contract, in addition to the basic study, four Institutes were conducted in 1963--three in Washington, D. C. and one in San Diego,

California. These Institutes consisted of five three-hour lectures and five two-hour problem-solving sessions in the areas outlined above. All speakers were from Dunlap and Associates, Inc. Approximately 50 persons attended each Institute. Analysis of the evaluation forms completed by the attendees indicated that the Institutes should be continued.

Accordingly, a contract, Nonr-4418(00), was established in January 1964 between the Office of Naval Research and Dunlap and Associates, Inc., the objectives of which were twofold: 1) to conduct a series of Human Factors Institutes, and 2) to assist various Navy organizations in implementing recommendations made to broaden and strengthen the Navy's human factors effort in RDT&E. The work performed under this contract between January 1964 and December 1967 is summarized herein.

Navy Human Factors Institutes

Under this contract, five (5) Institutes were conducted as follows:

- Washington, D. C. - 18-22 May 1964
- Washington, D. C. - 7-11 December 1964
- Washington, D. C. - 28 November - 2 December 1966
- Washington, D. C. - 12-16 June 1967
- Monterey, California - 13-17 November 1967

The daily program for each of the five-day Institutes was developed around the topics outlined previously; however, two major changes were introduced during the course of the five Institutes. Problem-solving/demonstration sessions, except that associated with the Planning and Analysis session, were eliminated and more presentations were substituted. Secondly, the number of Navy civilian and military speakers was increased to the point where the last Institute utilized 18 Navy speakers and only three Dunlap speakers. These changes were introduced to increase the number of topics covered, to take advantage of and provide exposure for Navy in-house human factors specialists and to reduce costs. Representative of this approach is the Institute conducted at the Navy Post Graduate School in November 1967, the program for which is summarized in the Appendix.

The number of attendees at each Institute ranged between 40 and 50 and included civilian project engineers, military personnel assigned to RDT&E positions, and experienced and inexperienced Navy human factors specialists. Contrary to the objectives, the latter category represented the majority of

attendees at each Institute which, combined with the positive comments provided by the attendees, suggests that the Institute is serving a real need within the Navy human factors community but providing indoctrination to only a limited number of RDT&E management and engineering personnel--the primary audience toward which the Institute was directed. The general reaction of attendees not specializing in human factors was favorable which suggests that the reason for low attendance by RDT&E management and engineering personnel could be lack of knowledge regarding the Institute's existence or knowing of its existence, reluctance to spend five days away from the primary job. A poll of a sample of such personnel is recommended to establish the reasons for low attendance in order that future Institutes can be tailored to better suit their needs.

Attendees were requested to complete evaluation for after each Institute. As implied above, the general reaction was most favorable from the standpoint of organization, content, speakers, facilities and logistics. While there was a wide range of opinion regarding specific speakers or topics at each Institute, there was not a large difference in the rankings of general topics covered each day which suggests that the Institute provided something of interest for everybody each day--a desirable achievement when confronted with a heterogeneous audience.

Foremost among the criticisms were that too much time was devoted to Navy organization and administration and that too little time was devoted to the contributions and examples of application of human factors. Other major criticisms related to speakers reading their presentations, visual aids and the need for more interaction among attendees. In some cases, the elementary or general nature of the Institute was criticized but this came primarily from experienced human factors specialists. The Institute was not intended to satisfy their needs.

Probably the best indication of the extent to which the Institute is satisfying an existing need is the large number of requests for attendance which must be refused and the fact that the West Coast Institute was conducted at the request of representatives of West Coast Commands who had attended the East Coast Institutes.

Based on general knowledge of human factors in Navy RDT&E plus experience participating in nine Navy Human Factors Institutes, it would appear that there are three general needs to be satisfied using the Institute/Symposium media:

- RDT&E management and engineering personnel require indoctrination regarding the objectives, scope and application of human factors in RDT&E. Perhaps two to three days rather than five days is all that is necessary, practical or possible. As suggested, this type of audience should be polled to determine requirements and constraints.

- Civilian or military personnel assigned to perform in the general area of human factors but who have little or no experience in the field and/or its application in Navy RDT&E require indoctrination but in more breadth and depth than that provided to RDT&E management and engineering personnel. The current Institute program comes closest to satisfying this type of need.

- There appears to be a need for a mechanism for experienced human factors specialists in the Navy to meet periodically to interact regarding current efforts underway, current problems, new techniques, available capability, etc. To some extent, the present Institutes serve such a purpose but are not structured to do so, i.e., they are too elementary and general. A two to three day symposium such as that conducted by the NMC Systems Effectiveness Branch might better serve this particular need providing it is structured to provide for a limited amount of lecturing and a maximum amount of audience participation; for example, through seminars, panels, group discussions, social events, etc.

Note that it is not suggested that Institutes, such as those discussed herein, should serve as a medium for training. It is believed that three to five days is probably too short a time to provide anything beyond indoctrination and information exchange.

In summary, it is believed that the Institutes have served a real need insofar as providing a means for indoctrination and communication within the human factors community and, to the extent that RDT&E management and engineering personnel (civilian and military) attended, achieved the objectives originally established for the Institute. Future Institutes/Symposia should be tailored to satisfy the needs of particular groups and not attempt to serve a multiple purpose unless the requirements and constraints of the groups are determined to be similar.

Assistance in Implementation of Human Factors Recommendations

Throughout the course of this contract, several Navy organizations requested assistance in implementing recommendations aimed at broadening and strengthening human factors in Navy RDT&E. The consulting services provided were as follows:

1. For the Deputy Chief of Naval Operations (Development), a guide was prepared containing a detailed and comprehensive human factors engineering specification for use in requests for proposals and contractor work statements. It also contained guidance regarding the use of the specification on a particular system.

2. For the Chief of Naval Material, the Human Factors Supplement to the CNM Research and Development Implementing Plan was prepared. It contained the definition and purpose of human factors, background regarding human factors in the Naval Material Command and proposed human factors functions to be performed in support of various Divisions in Headquarters, Naval Material Command.

3. For the Chief of Naval Material Command, a more detailed description of the human factors functions to be performed in support of Headquarters, NMC Divisions was prepared in terms of outputs of each function; factors, criteria and information which should be considered in developing the outputs; and specific tasks, decisions, actions and procedures involved in performing the functions.

4. For the Bureau of Naval Personnel, a training program for the staff of the New Developments Research Branch was prepared. The objective of the program was to ensure the capability of NDRB to undertake augmented responsibilities in the Navy's human factors program.

5. For the Office of Naval Research, a draft of a programmed text covering a portion of a chapter in the "Human Engineering Guide to Equipment Design" was prepared for evaluation as a possible instructional aid in Navy Human Factors Institutes.

6. For the Bureau of Naval Weapons, assistance was provided to Code FWTP-1 in the development and integration of material for the Personnel and Training section of WR-30 as well as the preparation of material for a revised Logistics Support Manual, including the role of the various Navy agencies in the identification of new series weapon system personnel and training elements.

7. For the Engineering Psychology Branch of the Office of Naval Research, research was initiated on the effects of cold on the performance of divers. The pilot effort produced: a) a review of the literature on the effects of exposure to cold on human performance as it is relevant to diving; b) the results of a preliminary experiment on the effects of immersion at various temperatures on tactile sensitivity of the hand and manual dexterity; and c) a plan for a more comprehensive experimental program designed to measure the effects of cold on a cross-section of psychological functions performed by divers.

8. For the Navy Mine Defense Laboratory, several days were devoted to discussions regarding the conduct of a special human factors Institute at NMDL and development of a suggested program.

APPENDIX

Sample of an Institute Program

SAMPLE

NINTH NAVY HUMAN FACTORS INSTITUTE

13 - 17 November 1967

Host:

U.S. Naval Postgraduate School
Monterey, California

Sponsored by:

Chief of Naval Operations
and
Office of Naval Research

Presented by:

Dunlap and Associates, Inc.
Darien, Connecticut

PROGRAM

Monday, 13 November 1967

OVERVIEW OF HUMAN FACTORS IN NAVY RDT&E

0830 - 0900	Registration	
0900 - 0910	Introduction	James W. Miller Office of Naval Research
0910 - 0920	Welcoming Remarks	Admiral R. W. McNitt Superintendent U. S. Naval Postgraduate School
0920 - 1015	Overview of Human Factors in Navy RDT&E	Joseph T. Fucigna Dunlap and Associates, Inc.
1015 - 1045	Coffee	
1045 - 1130	Invited Address: Naval Material Command's View of Human Factors in System Development	John W. Stone Headquarters Naval Material Command
1130 - 1300	Lunch	
1300 - 1345	Selected Research Programs in Human Factors	James W. Miller
1345 - 1430	Requirements and Planning for Human Factors in Navy Systems	CDR. John P. Charles MSC, USN Office of the Chief of Naval Operations
1430 - 1500	Coffee	
1500	Introduction of Attendees and Group Discussion	

Tuesday, 14 November 1967

PLANNING AND ANALYSIS

0900 - 1000	Navy's Planning for Future Manpower Requirements	Martin A. Tolcott Center of Naval Analyses
1000 - 1030	Coffee	
1030 - 1130	Analytical Techniques in Human Factors	Joseph G. Wohl Dunlap and Associates, Inc.
1130 - 1300	Lunch	
1300 - 1500	Problem Demonstration and Examples of Application of Analytical Techniques	Joseph G. Wohl
1400 - 1430	Coffee	
1500 - 1600	Discussion	

Wednesday, 15 November 1967

HUMAN FACTORS ENGINEERING

0900 - 1100	Human Engineering Principles	Jack Wm. Dunlap Dunlap and Associates, Inc.
1000 - 1030	Coffee	
1100 - 1145	Applications of Human Factors in the Naval Material Command	Heber G. Moore Headquarters Naval Material Command
1145 - 1315	Lunch	
1315 - 1400	Human Factors In Aircraft Cockpit Design	Capt. Roland A. Bosee MSC, USN Naval Air Systems Command
1400 - 1430	Coffee	
1430 - 1515	Human Factors Programs in the Naval Ship Systems Command	Charles H. Irwin Naval Ship Systems Command
1515 - 1600	Human Factors Engineering at the Naval Electronics Laboratory Center	Richard Coburn Naval Command Control Communications Laboratory Center

Thursday, 16 November 1967

PERSONNEL AND TRAINING

0900 - 1000	Personnel Requirements for New Navy Systems	Eugene M. Ramras Personnel Research Laboratory
1000 - 1030	Coffee	
1030 - 1130	A Method for Predicting Maintenance Personnel Requirements	Bernard H. Manheimer Center for Naval Analyses
1130 - 1300	Lunch	
1300 - 1400	Computer Assisted Instruction	Glenn L. Bryan Office of Naval Research
1400 - 1430	Coffee	
1430 - 1515	Findings and Applications of Training Research	Earl I. Jones Navy Training Research Laboratory
1515 - 1600	Selection and Training of Naval Aviators	LCDR. Thomas J. Gallagher, MSC, USN Bureau of Medicine and Surgery

Friday, 17 November 1967

PERFORMANCE ASSESSMENT

0900 - 0945	A Perspective of DOD Management and Resources Related to Human Factors	John J. Collins Office of the Chief of Naval Operations
0945 - 1015	Coffee	
1015 - 1100	Application of Human Factors Methods to Test and Evaluation	LCDR. Robert J. Wherry MSC, USN U.S. Naval Missile Center
1100 - 1145	Man's Performance in the Sea	Gerald S. Malecki Office of Naval Research
1145 - 1315	Lunch	
1315 - 1400	Sleep Loss and Effects on Performance	Paul Y. Naitoh Naval Medical Neuro-psychiatric Research Unit
1400 - 1445	Human Performance in ASW Systems	James E. Wise Scientific Advisory Team ASWFORLANT
1445 - 1515	Coffee	
1515	Concluding Remarks Presentation of Certificates	

DISTRIBUTION LIST FOR NR 196-037

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES, Contract Nonr-4418(00)
Performing Organization: Dunlap and Associates, Inc., Darien, Connecticut

Addressee	Number of Copies
Chief of Naval Research Code 455 Department of the Navy Washington, D. C. 20360	5
Director Office of Naval Research Branch Office 495 Summer Street Boston, Massachusetts 02210	1
Commanding Officer ONR Branch Office, London Box 39 FPO New York 09150	1
Technical Information Division U.S. Naval Research Laboratory Department of the Navy Washington, D. C. 20390	6
Defense Documentation Center Cameron Station Alexandria, Virginia 22314	20
Dr. John J. Collins Office of the Chief of Naval Operations Op-07T 16 Department of the Navy Washington, D. C. 20350	1
CDR. John P. Charles Office of the Chief of Naval Operations Op-701H Department of the Navy Washington, D. C. 20350	1
Dr. Heber G. Moore Code 325 Headquarters, Naval Material Command Department of the Navy Washington, D. C. 20360	1

DUNLAP and ASSOCIATES, INC.

DARIEN, CONNECTICUT 06820
One Parkland Drive
Area Code 203 655-3971
In N.Y.C., WYandotte 3-2464
Executive Offices

WASHINGTON, D.C. 20007
1050 Thirty-First Street, N.W.
Area Code 202 333-0100

BOSTON, MASSACHUSETTS 02116
607 Boylston Street
Area Code 617 262-6270

SANTA MONICA, CALIFORNIA 90404
1454 Cloverfield Boulevard
Area Code 213 393-0166

MANHATTAN, KANSAS 66502
200 Research Drive
Area Code 913 539-3565

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Dunlap and Associates, Inc. One Parkland Drive Darien, Connecticut 06820	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP --

3. REPORT TITLE

HUMAN FACTORS RESEARCH, CONSULTING AND INDOCTRINATION SERVICES

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Final Summary Report - 1 January 1964 - 31 December 1967

5. AUTHOR(S) (First name, middle initial, last name)

Joseph T. Fucigna

6. REPORT DATE February 1968	7a. TOTAL NO. OF PAGES 13	7b. NO. OF REFS None
8a. CONTRACT OR GRANT NO. NONR-4418(00) b. PROJECT NO. c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) BSD Report No. 68-448/463 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) Contract Authority Number NR 196-037	

10. DISTRIBUTION STATEMENT

This document has been approved for public release and sale; its distribution is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Engineering Psychology Branch Office of Naval Research (Code 455) Department of the Navy, Washington, D. C.

13. ABSTRACT

The research, consulting and indoctrination services provided under this contract included: 1) the conduct of five (5) Navy Human Factors Institutes; 2) preparation of a Human Factors Supplement to the Chief of Naval Material R&D Implementing Plan; 3) development of a detailed description of human factors functions to be performed in support of CNM; 4) development of a human factors engineering specification guide; 5) development of training requirements for the Bureau of Naval Personnel; 6) development of a draft version of a programmed text in the area of human engineering; 7) consulting with the Navy Mine Defense Laboratory regarding a special human factors institute; 8) assistance in the development of the personnel and training section of WR-30; 9) preparation of personnel and training material for a revised Logistic Support Manual; and 10) conduct of initial research pertaining to the effects of cold on diver performance.

DD FORM 1 NOV 68 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

Unclassified

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Human Factors Institutes						
CNM Human Factors Functions						
Human Factors Specification						
WR-30 Personnel and Training						