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- Physical Characteristics
- System Function
- Engineering Manhour-Estimate
- System Activating Alternatives
- Material Requirements
- Cost Data

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This conceptual configuration evaluation study for the externally mounted, automatically inflated, multiplace life raft for helicopters includes component price information, physical characteristics of the system, system function, and system activating alternatives.

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ORIGINAL RELEASE DATE ____________. FOR THE RELEASE DATE OF SUBSEQUENT REVISIONS, SEE THE REVISION SHEET. FOR LIMITATIONS IMPOSED ON THE DISTRIBUTION AND USE OF INFORMATION CONTAINED IN THIS DOCUMENT, SEE THE LIMITATIONS SHEET.

MODEL H-46 CONTRACT N62269-76-C-0341

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ABSTRACT

This conceptual configuration evaluation study for the externally mounted, automatically inflated, multi-place life raft for helicopters includes component price information, physical characteristics of the system, system function, and system activating alternatives.

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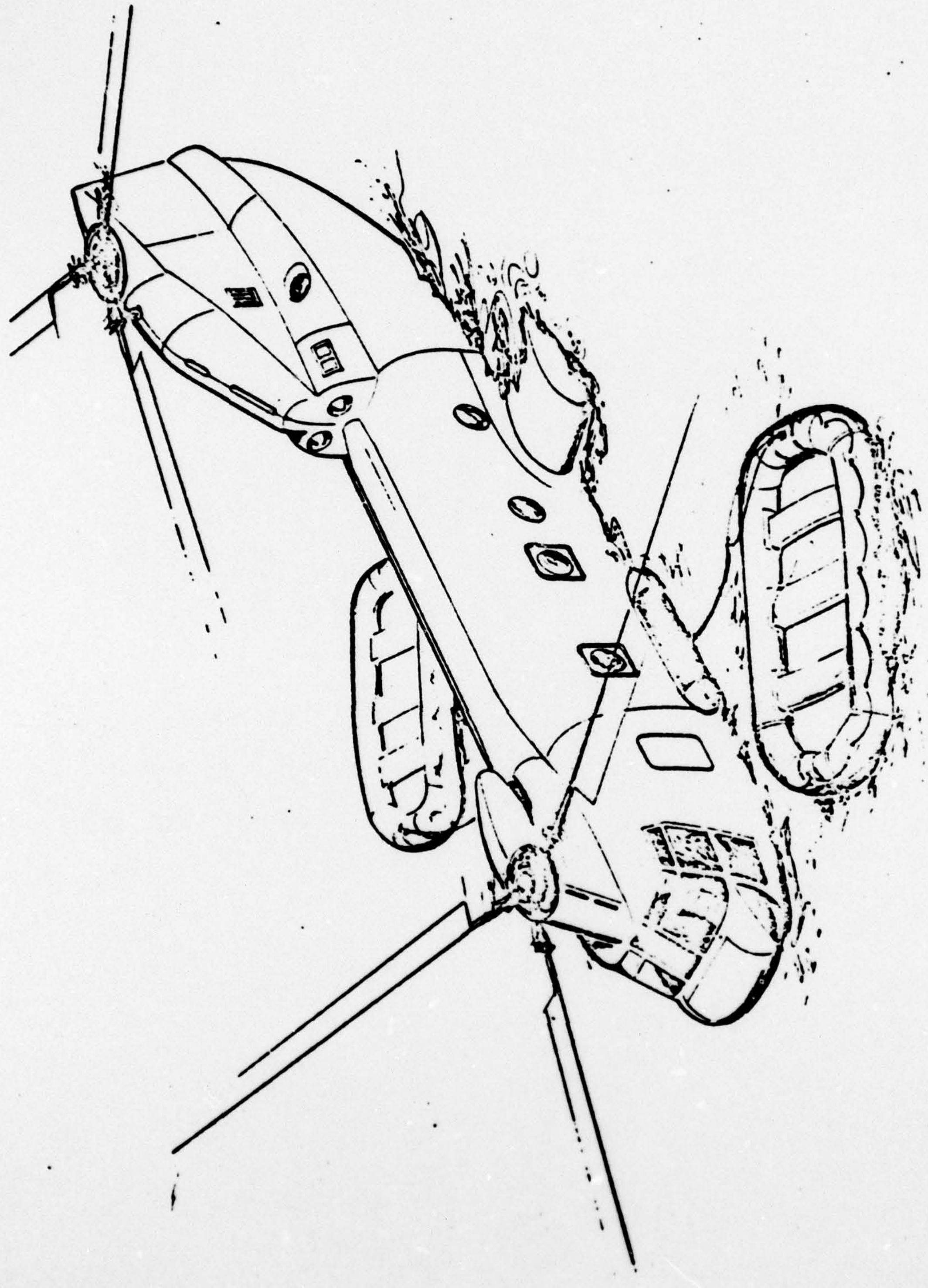


Figure 1. H-46 Helicopter with Two 15-Man Life Rafts (Deployed from External Fuselage Containers)

1.0 PURPOSE

1.1 The purpose of this document is to evaluate the conceptual configuration of the "Externally mounted, Automatically expelled/activated Life Raft System".

2.0 SCOPE

2.1 The scope of this evaluation study will include component price information, physical characteristics of the system, system function, and system activating alternatives.

3.0 BACKGROUND

3.1 When a helicopter enters water due to an emergency or impacts water inadvertently, two major causes of casualties to the occupants arise. First, helicopters enter the water and sink, often rapidly, in less than one minute. Second, because helicopters are not built as boats, they are unstable in water. This instability frequently causes instant rollover, making egress difficult or impossible.

3.2 Numerous problems confront would-be survivors in their efforts to egress successfully from sinking, capsizing helicopters. They must contend with shifting displaced cargo and equipment inside the cabin. They must cope with disorientation, confusion, and panic as the helicopter impacts, fills with water, capsizes, and sinks. They must release restraining straps and locate, release, and deploy internally stowed life rafts. Through it all they must contend with inrushing water.

3.3 After getting out of the helicopter and reaching the surface, both major undertakings, helicopter borne personnel must contend with the ultimate challenge, survival on the surface.

3.4 U.S.Navy and Marine Corps helicopter crewmembers and passengers have faced these problems on many occasions and survivors have repeatedly stressed the need for some method of reducing the criticality of these challenges and improving the survivability odds.

3.5 The objective of the basic feasibility study was to determine the best method of modifying, or adding to, a helicopter airframe so that an externally mounted, automatically inflated, self-deployable, multi-place life raft could be used for human survival. This objective was accomplished by analyzing the physical and functional compatibility requirements of the airframe and selecting an appropriate life raft system.

4.0 PHYSICAL CHARACTERISTICS OF SELECTED SYSTEM

4.1 The conceptual design configuration of the Automated Life Raft System consists of two GFE, air aspirated 15 man life rafts located in externally mounted, containers attached to either side of the H-46 helicopter.

These containers house the two life rafts and are capable of being deployed and inflated in approximately 10-15 seconds.

4.2 The total weight of the life raft system, exclusive of the two life rafts is calculated to be less than 80 pounds. A weight summary is contained in the feasibility study D210-11002-1.

4.3 Attachment of the life raft containers on either side of the helicopter between stations 200 and 254 at established hard points, provide ideal anchor points on the helicopter fuselage at the most advantageous locations.

4.4 An electrical firing circuit enables the pilot or crewmembers to deploy the rafts or they can be deployed automatically. Once deployed, the rafts remain connected to the helicopter by umbilical lines. Should the helicopter sink, the lines pull free from the helicopter due to raft buoyancy and the rafts remain on the surface.

5.0 <u>SYSTEM ACTIVATION, RAFT DEPLOYMENT, AND INFLATION</u>

5.1 Three methods of deployment coupled with simplified preflight testing are required for maximum system effectiveness. The two primary methods of deployment are by a pilot or a cabin crewmember after the aircraft is in the water. The third method is automatic deployment of the life rafts after water impact and rotor stoppage.

5.2 The sequences of the different modes of system operation are as follow:

5.2.1 <u>Water Landing - Primary Operation</u> - Pilot activates life raft system after aircraft is in water by arming the system and activating the inflation circuit.

5.2.2 <u>Water Landing - Alternate Operation</u> - A crewmember in the cabin may initiate system operation after the aircraft is in the water by arming the system and activating the inflation circuit.

5.2.3 <u>Water Landing - Automatic Operation</u> - Automatic deployment will occur when: (1)the aircraft is in the water, (2) both life raft container water sensing switches are wet, and (3) rotor rpm is less than one percent.

6.0 <u>SERVICES AND MATERIAL NECESSARY TO DEVELOP THE LIFE RAFT SYSTEM</u>

6.1 The Engineering manhour estimate, material requirement, and cost data information is contained in Appendix A.

6.2 The estimated travel requirements are as noted in Appendix B.

6.3 The Preliminary Program Schedule reflects accomplishment of the proposed program through demonstration and delivery of the prototype lift raft system within eight months after receipt of authorization to proceed (see Appendix C).

7.0 LIFE RAFT ACTIVATING ALTERNATIVES

The inflating gases to inflate the life rafts may be provided by separate means. One method to be demonstrated will utilize CO_2 in conjunction with air aspirators. An alternate method to be demonstrated, consistent with component cost, utilizes gases derived from Solid Propellent cool gas generators. This method also utilizes air aspirators to supplement the inflating gases.

APPENDIX A

AUTOMATED LIFE RAFT SYSTEM
ENGINEERING MANHOUR ESTIMATE,
MATERIAL REQUIREMENTS, AND COST DATA

APPENDIX A

AUTOMATED LIFE RAFT SYSTEM
ENGINEERING MANHOUR ESTIMATE, MATERIAL REQUIREMENTS, AND COST DATA

ENGINEERING MANHOUR ESTIMATE:

		HOURS
Task I	Study & Design Management	200
Task II	Fabricate and Assemble Prototype	300
Task III	Prototype Test Program	300
Task IV	Prototype Demonstration	160
Task V	Documentation	160
	TOTAL---------	1120

$39,745.00

MATERIAL REQUIREMENTS

Life Raft Containers Shell, Nuts and Bolts, Fittings, Bracketry, Fuselage Reinforcements, Fasteners, Etc.	$ 1,500.00
Electrical Circuitry Test Circuit Squibs Switches, Guarded Arming Lights, Wiring, Relays Etc.	500.00
Contingencies	$ 3,255.00

COST DATA:

Note: The costs of the above program calculated using representative cost data (generated using industry rate averages) excluding fee which would be approximately

$ 45,000.00

APPENDIX B

AUTOMATED LIFE RAFT SYSTEM
ESTIMATED TRAVEL REQUIREMENTS

APPENDIX B

AUTOMATED LIFE RAFT SYSTEM
ESTIMATED TRAVEL REQUIREMENTS

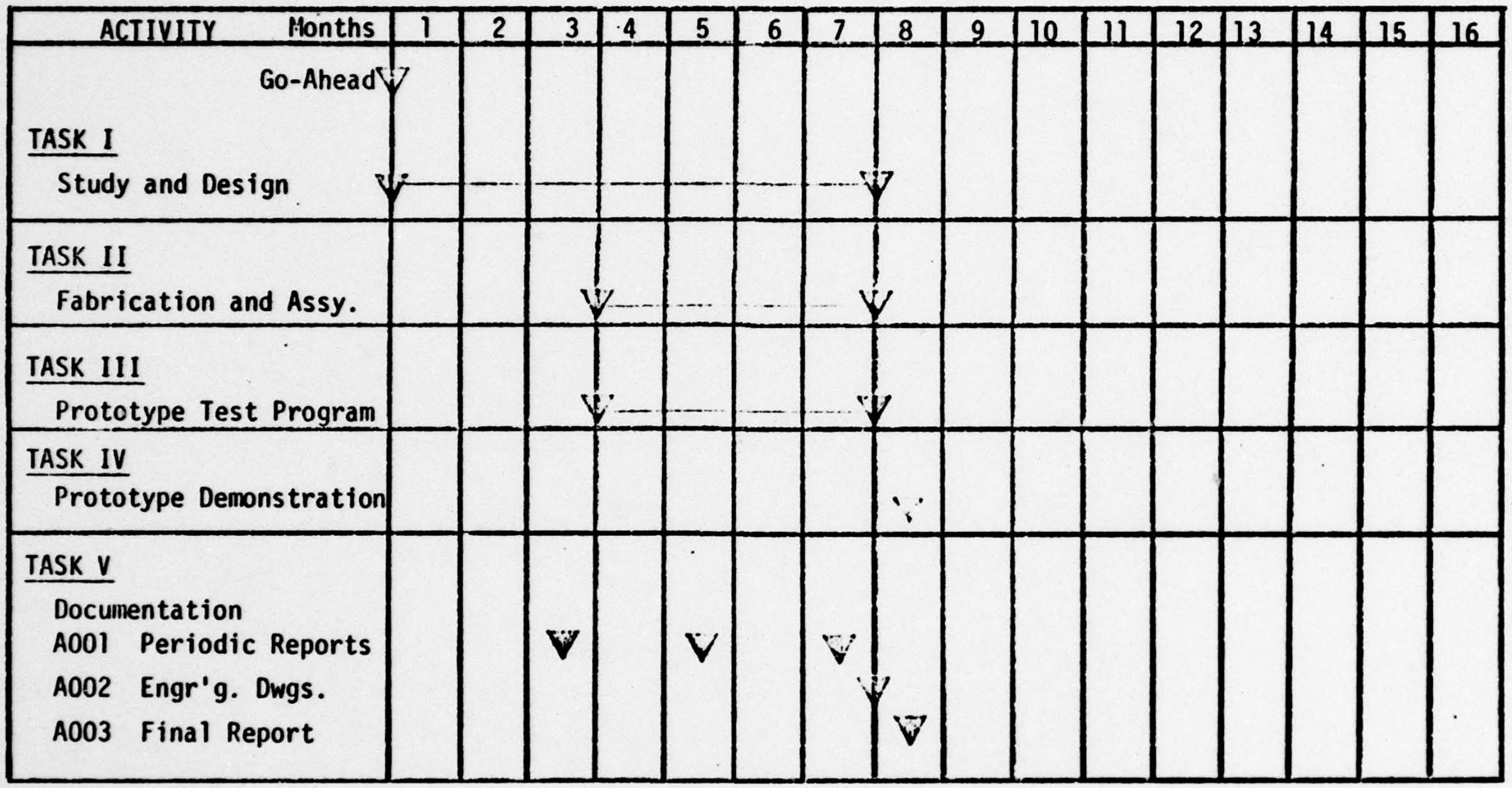
TASK	NUMBER OF MEN	YEAR	NUMBER OF TRIPS	DURATION		DESTINATION	PURPOSE OR JUSTIFICATION
				Days	Nights		
II	1	1977	5	1	0	NADC Warminster, Pa.	Prototype Coordination
II	1	1977	3	1	0	Trenton, N.J.(POV)	Inspect material before shipment to Navy
III	1	1977	1	1 - Week		NADC Warminster, Pa.	Technical Consultation
IV	2	1977	1	2 - Weeks		NADC Warminster, Pa.	Prototype Demonstration

APPENDIX C

AUTOMATED LIFE RAFT SYSTEM
PRELIMINARY PROGRAM SCHEDULE

APPENDIX C

AUTOMATED LIFE RAFT SYSTEM PRELIMINARY PROGRAM SCHEDULE



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