

REPORT NO. 5181

V-1 JEEP HELICOPTER

MCDONNELL *Aircraft Corporation*



V-1 JEEP

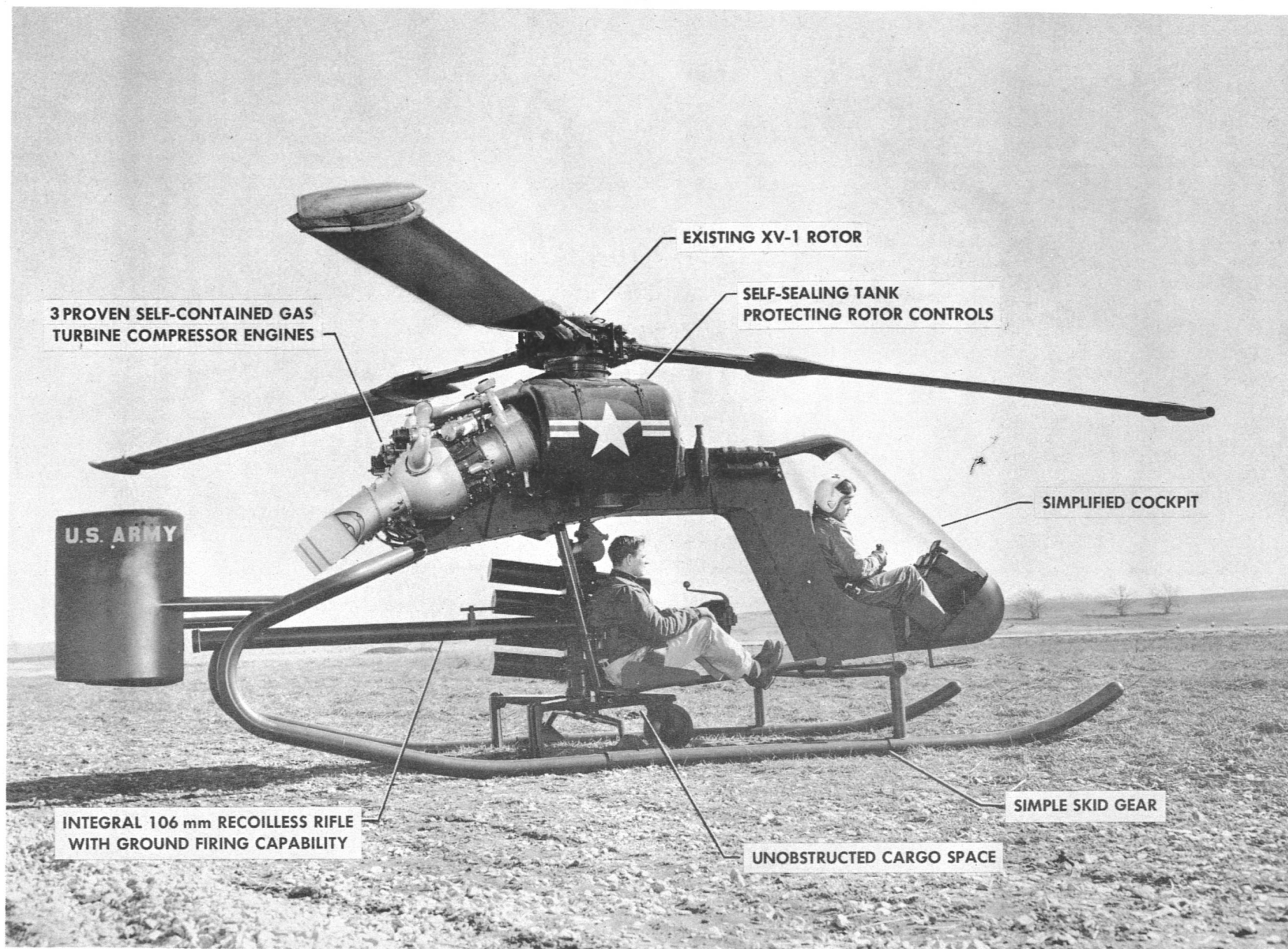
McDONNELL MODEL 120

UTILITY HELICOPTER

- ARTILLERY CARRIER
- FLYING CRANE
- TROOP CARRIER
- UNIVERSAL UTILITY

NOTE

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V-1 JEEP MOCK-UP

**VULNERABILITY**

- SMALL SILHOUETTE
- MULTIPLE INDEPENDENT ENGINES
- SAFE DEAD-STICK LANDINGS
- SELF-SEALING TANKS PROTECTING ROTOR CONTROLS

UTILITY

- SMALL SIZE
- BIG PAYLOAD
- UNOBSTRUCTED CARGO SPACE
- UNIVERSAL FRAME FOR DIVERSIFIED USE
- INHERENT DEICING

MAINTENANCE

- UNIQUE SIMPLICITY
- ENGINE CHANGE WITHOUT TOOLS
- ENCLOSED, AUTOMATICALLY LUBRICATED HUB
- NO BLADE RETENTION BEARINGS
- NO BLADE TRACKING
- NO REDUCTION GEARS
- NO SHAFTING
- NO TAIL ROTORS
- INFINITE LIFE BLADES





INTRODUCTION

The McDonnell Model 120 V-1 Jeep helicopter represents a radical departure from most of those features of the helicopter that have caused maintenance difficulties, operational problems, and low availability. A revolutionary rotor and drive system is combined with a utility type airframe of unprecedented simplicity and versatility.

THE PRESSURE JET ROTOR developed for the Army's XV-1 convertiplane is used on the V-1 Jeep. It eliminates all bearings under centrifugal load, eliminates all ground resonance, eliminates all need for blade tracking, permits automatic lubrication of all bearings, provides inherent deicing of the entire rotor system, minimizes vibration (see Navy evaluation, Flight Test Report PTR AC-4028.1), and provides positive stability (see Air Force "Preliminary Report Phase II Evaluation of XV-1 Convertiplane," No. 56RDZ-20510). The blades have infinite fatigue life. The rotor can be started in winds up to 100 knots. It will autorotate at all normal settings of collective pitch.

THE POWER PLANT consists of three completely self-contained gas turbine compressors of which two types are currently in quantity production (Continental TC-104-1 and AiResearch GTC 85-15). These highly qualified engines (500 and 800 hours between overhaul respectively) are used without modification. Individual engines can be changed in less than five minutes without use of tools in a manner similar to outboard motors. At normal gross weight, the aircraft can hover after failure of one engine. No reduction gears, transmission

shafts, or tail rotors of any kind are used. The attainment of these significant advantages requires the acceptance of an increase in fuel consumption and noise level above that of current operational helicopters.

THE V-1 JEEP is designed to serve as:

A FIRING PLATFORM FOR RECOILLESS RIFLES, providing for firing from the aircraft immediately upon landing and for instantaneous separation of rifle and aircraft to permit use of the aircraft alone for spotting and other utility purposes.

A SMALL FLYING CRANE, having a payload of 3000 pounds and a growth potential of up to 4000 in the near future with a rotor diameter of only 31 feet. A multiple cargo hook is provided to permit individual release of up to ten separate cargo nets for rapid distribution of cargo to dispersed points.

A PERSONNEL CARRIER with motorcycle type seating for twelve troops permitting instantaneous egress from the aircraft for assault operations.

A GENERAL UTILITY HELICOPTER with provisions for a large, totally unobstructed cargo space allowing installation of an unlimited number of packages such as electronics gear, rocket launchers, wire laying, fire fighting, litter carrying, and many miscellaneous units.



GENERAL ARRANGEMENT

POWER PLANT

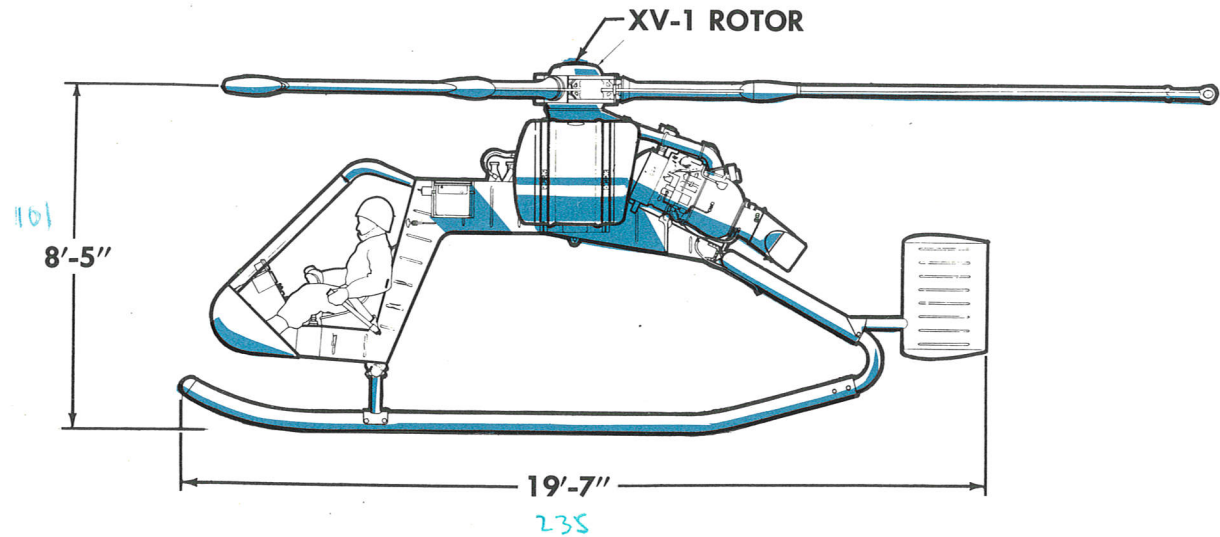
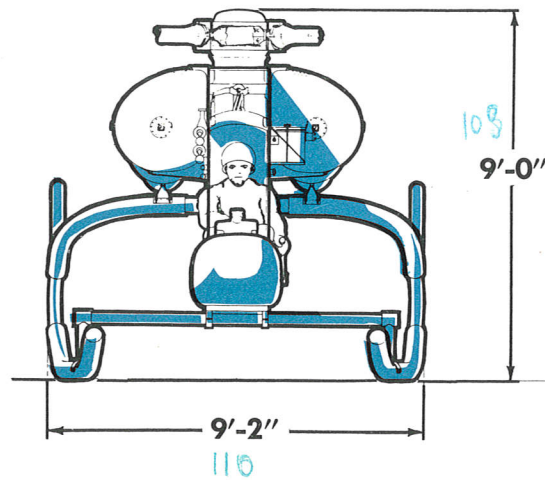
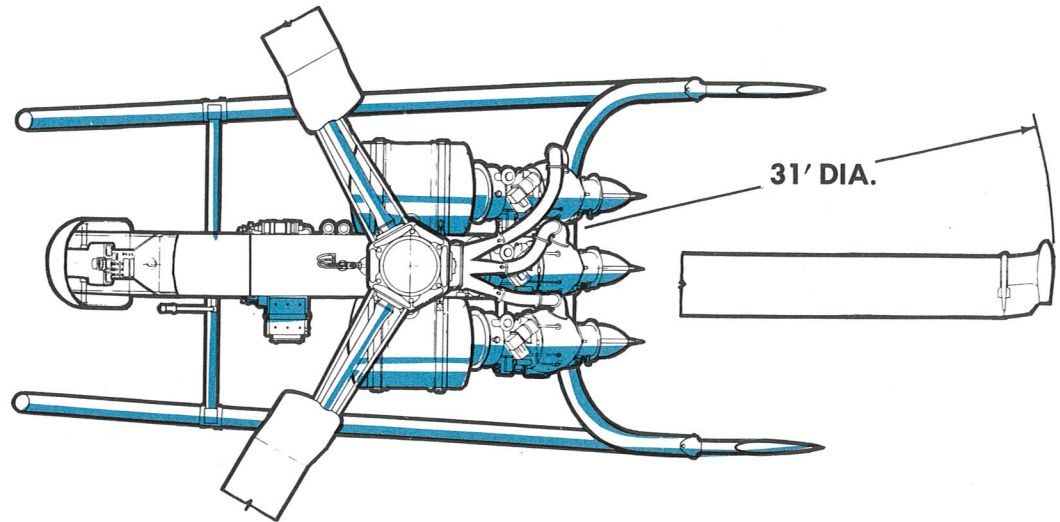
ENGINES—THREE CONTINENTAL TC-104-1
ALTERNATE: THREE AIRESEARCH GTC-85-15
TIP JETS—THREE McDONNELL PRESSURE JETS

ROTOR

DIAMETER 31 FT.
DISC AREA 750 SQ. FT.
SOLIDITY .09

TAIL

VERTICAL AREA 12 SQ. FT.





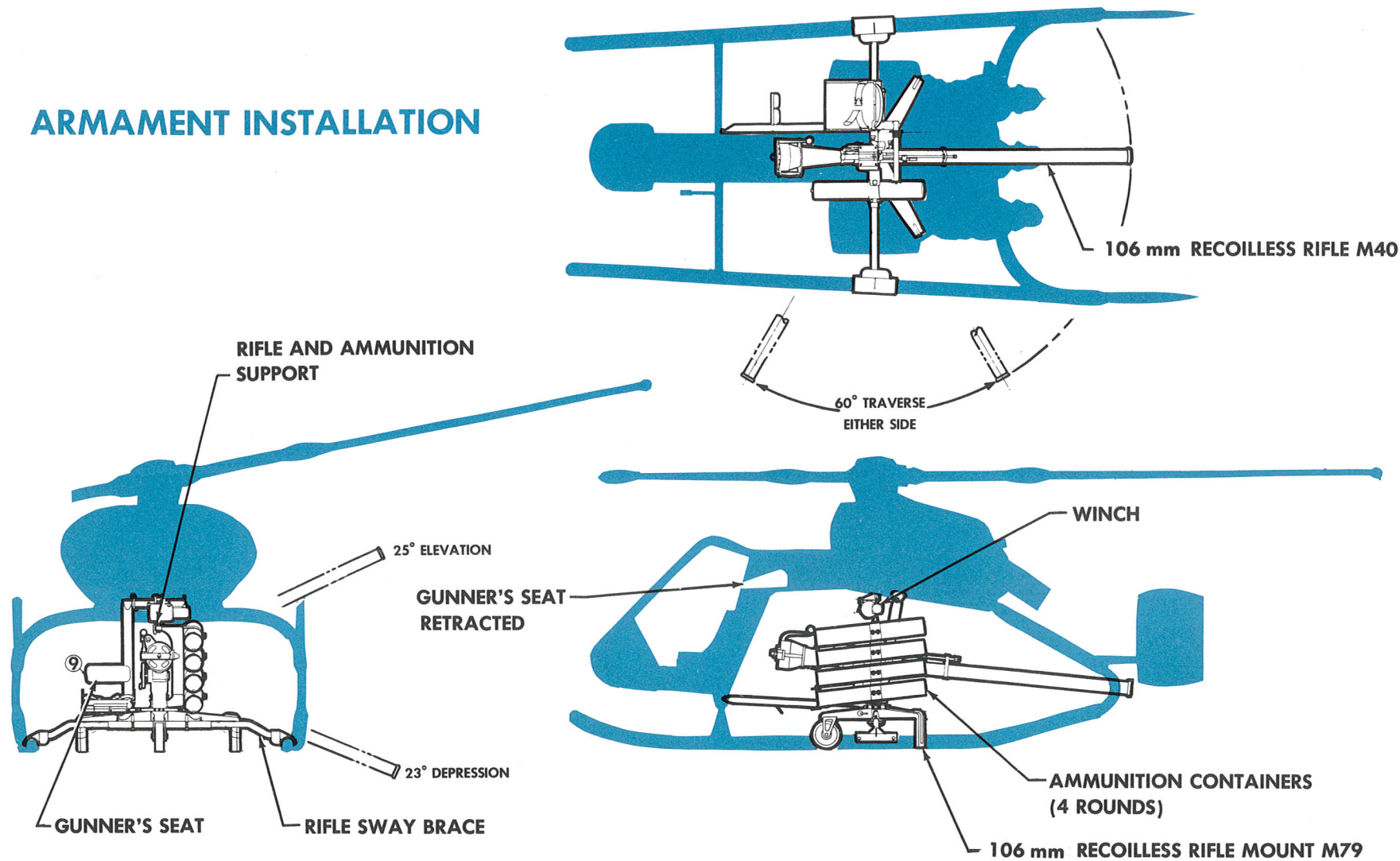
PERFORMANCE SUMMARY

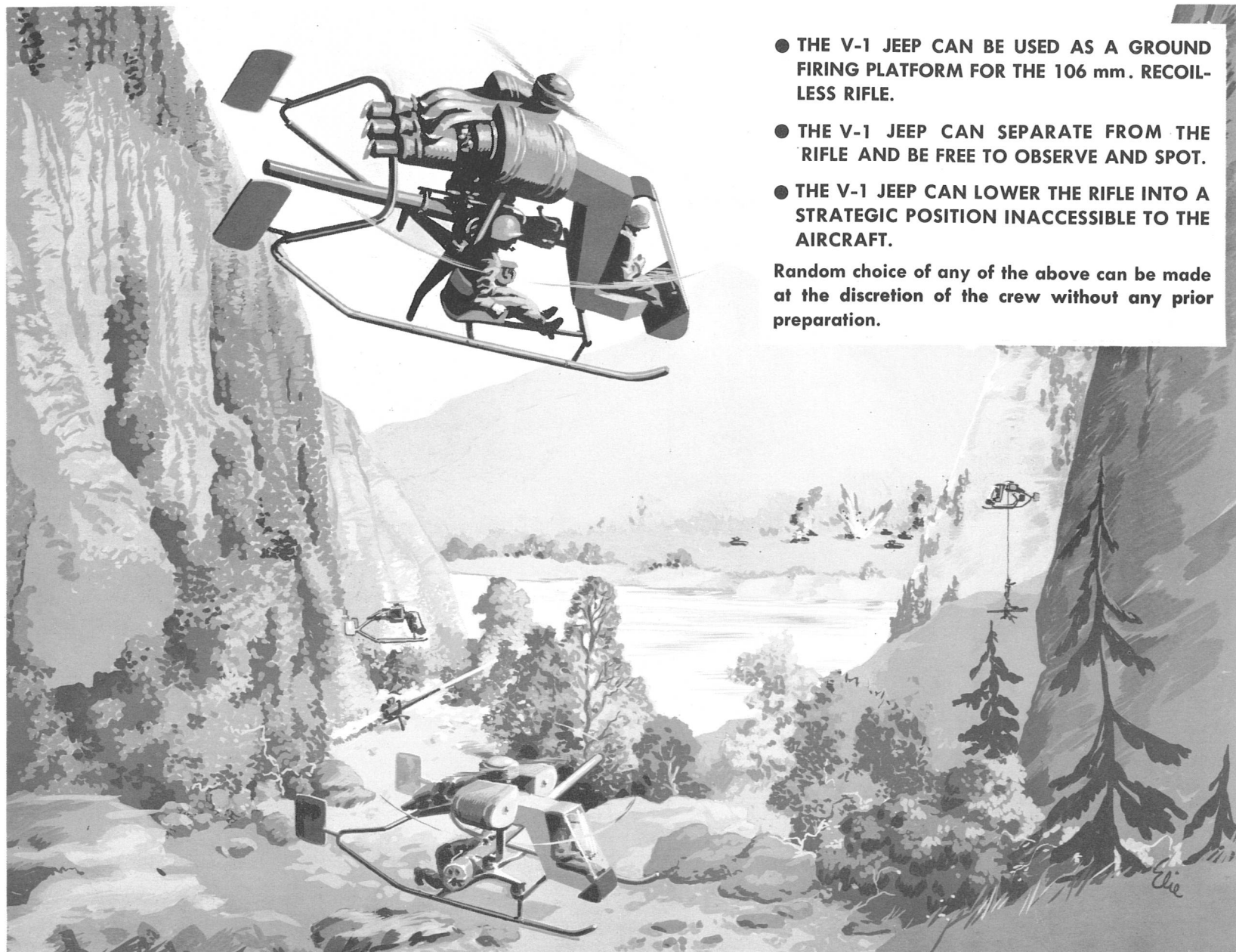
		JEEP	CRANE
WEIGHT EMPTY	lbs.	2300	2300
USEFUL LOAD	lbs.	2000	3700
GROSS WEIGHT	lbs.	4300	6000*
MAXIMUM SPEED	kts.	120	95
CRUISING SPEED	kts.	80	80
MAXIMUM RATE OF CLIMB	ft./min.	3200	1600
VERTICAL RATE OF CLIMB	ft./min.	2000	300
HOVERING CEILING OUT OF GROUND EFFECT			
NACA STANDARD CONDITIONS	ft.	12000	1700
95°F AT ALTITUDE	ft.	7000*	S. L.*
RANGE**	na. mi.	72	63
ENDURANCE			
MAXIMUM (55 KTS.)	min.	55	41
CRUISE (80 KTS.)	min.	46	36
HOVER	min.	38	25

*It is expected that refinements in the power system will soon permit the attainment of 7000 pounds gross weight or a substantial increase in the hot day hovering ceiling.

**Includes conservative fuel consumption margins and allowances for hovering for picking up and depositing loads.

ARMAMENT INSTALLATION





● THE V-1 JEEP CAN BE USED AS A GROUND FIRING PLATFORM FOR THE 106 mm. RECOIL-LESS RIFLE.

● THE V-1 JEEP CAN SEPARATE FROM THE RIFLE AND BE FREE TO OBSERVE AND SPOT.

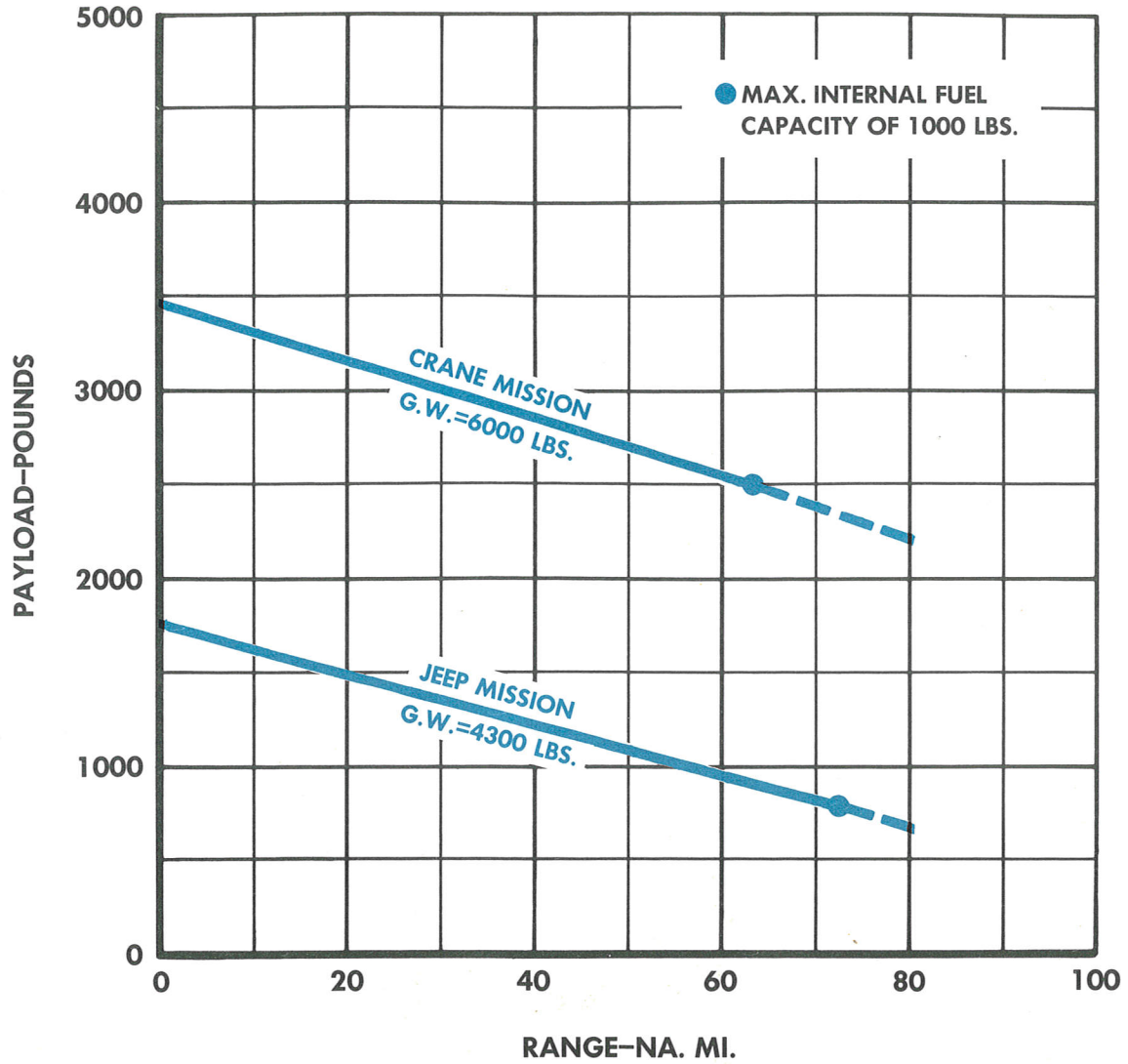
● THE V-1 JEEP CAN LOWER THE RIFLE INTO A STRATEGIC POSITION INACCESSIBLE TO THE AIRCRAFT.

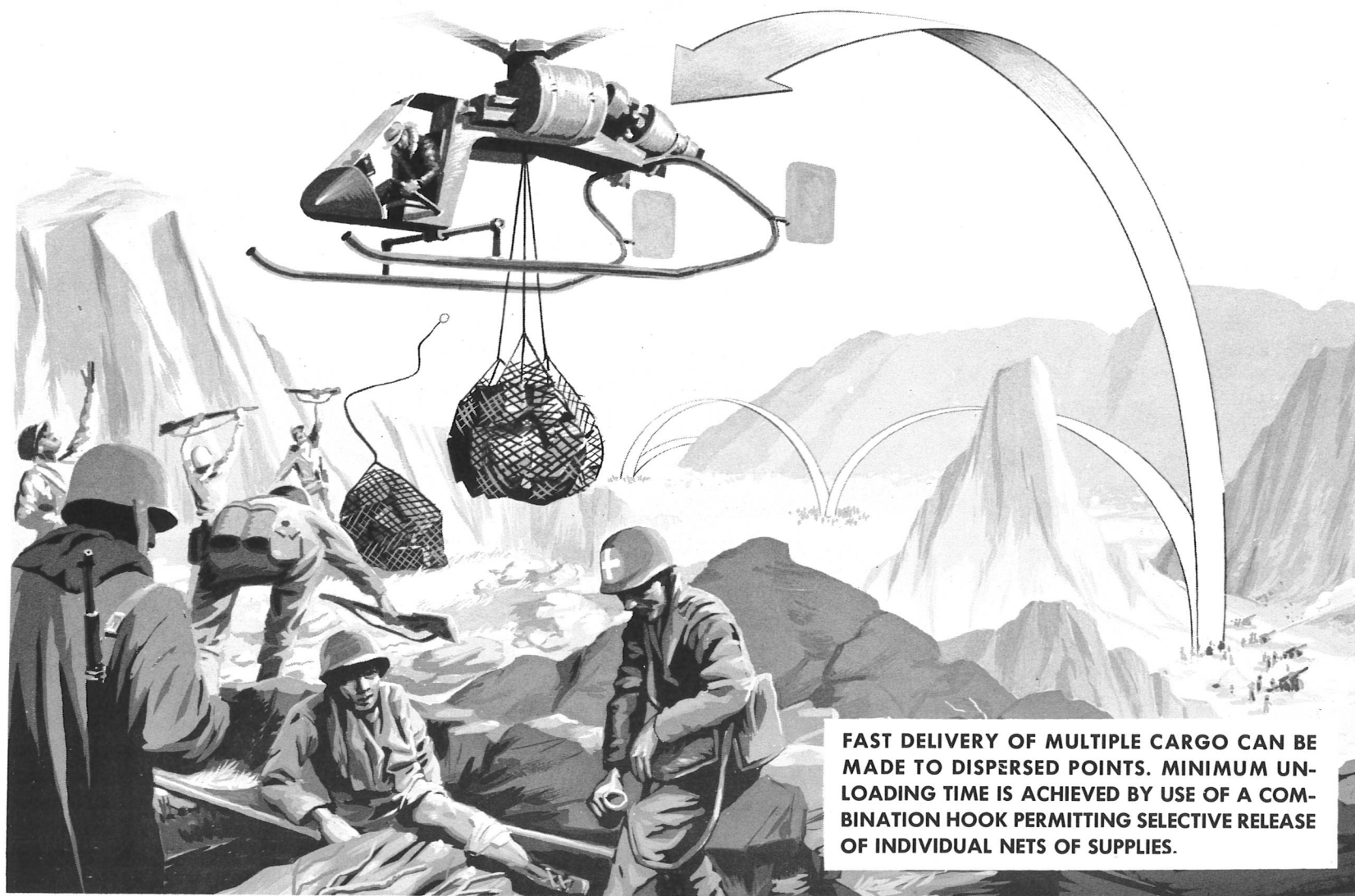
Random choice of any of the above can be made at the discretion of the crew without any prior preparation.

V-1 JEEP IN COMBAT WITH 106 mm RECOILLESS RIFLE



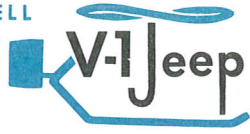
PAYLOAD vs RANGE



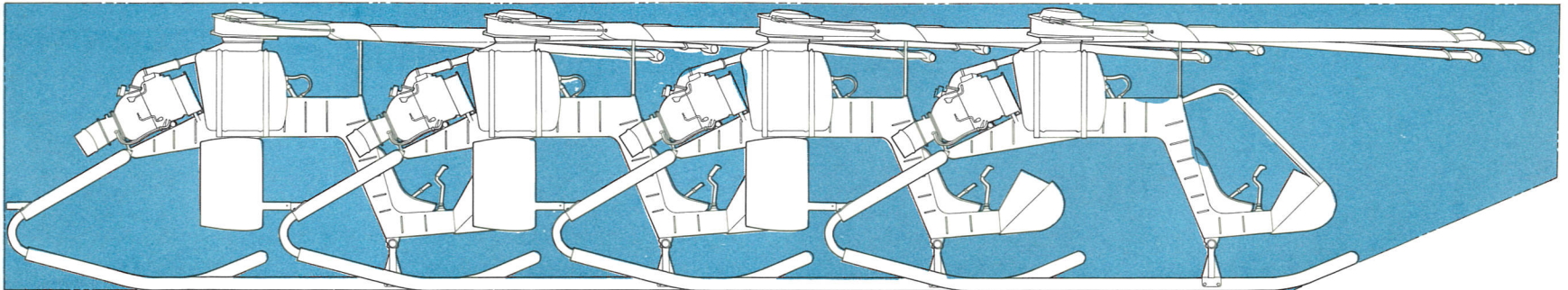
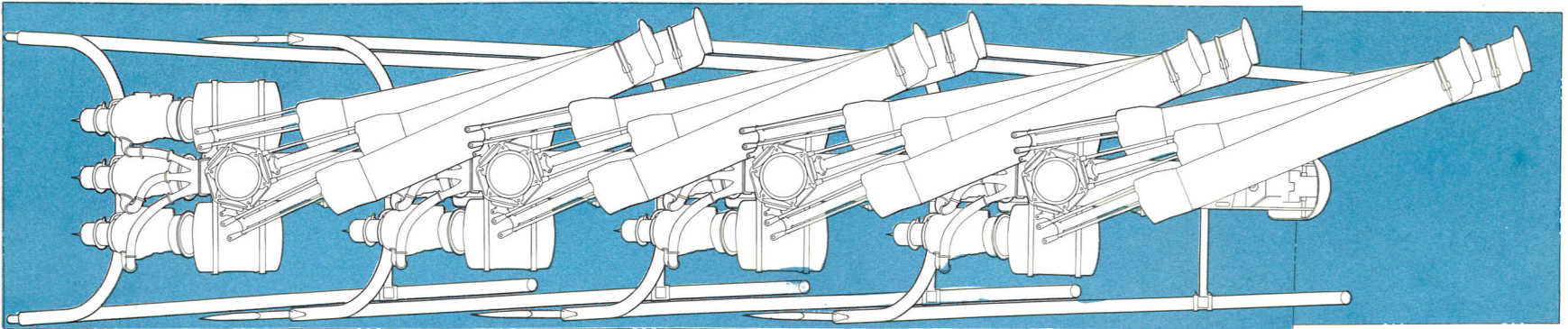


FAST DELIVERY OF MULTIPLE CARGO CAN BE MADE TO DISPERSED POINTS. MINIMUM UNLOADING TIME IS ACHIEVED BY USE OF A COMBINATION HOOK PERMITTING SELECTIVE RELEASE OF INDIVIDUAL NETS OF SUPPLIES.

V-1 JEEP MULTIPLE CARGO SUPPLY OF DISPERSED POINTS



LONG DISTANCE DELIVERY

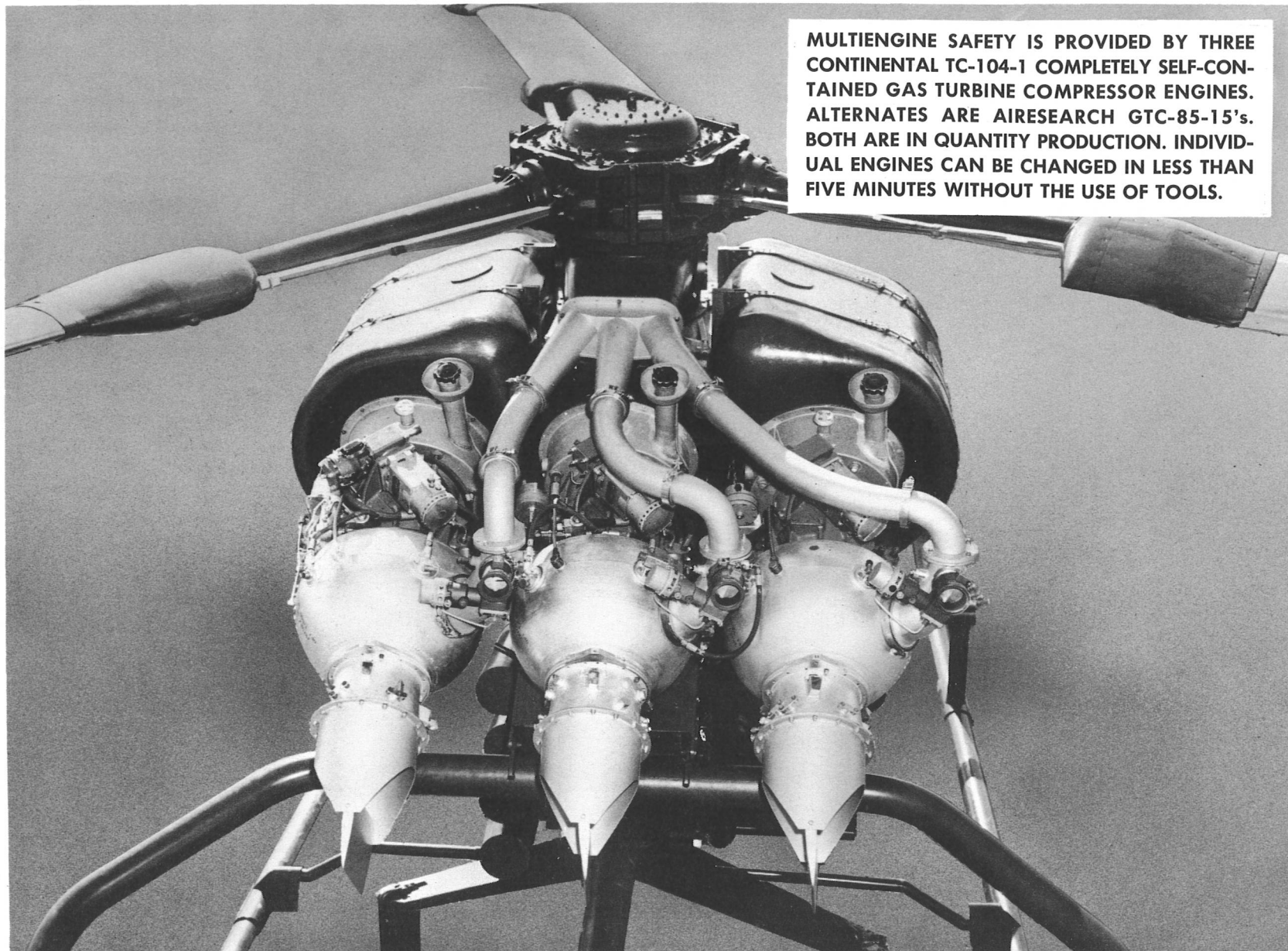


**FOUR V-1 JEEP'S CAN BE CARRIED IN THE CARGO COMPARTMENT OF A C-130.
UPON REMOVAL, THE AERIAL JEEP CAN BE READIED FOR FLIGHT IN 15 MINUTES.**

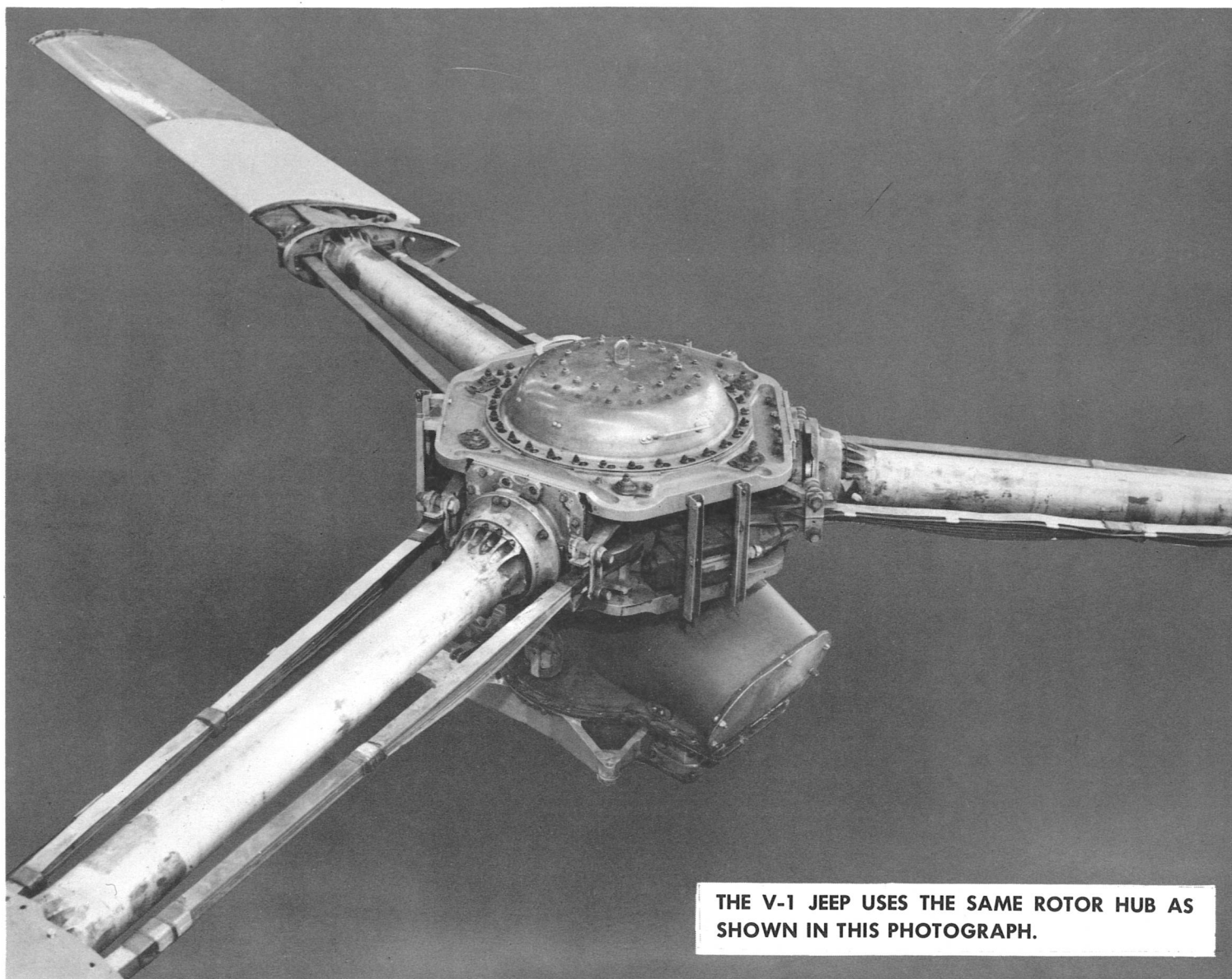
SEATING SPACE IS PROVIDED FOR 12 TROOPS
WITHOUT PACKS OR 8 TROOPS WITH PACKS.



V-1 JEEP CARRYING TROOPS



MULTIENGINE SAFETY IS PROVIDED BY THREE CONTINENTAL TC-104-1 COMPLETELY SELF-CONTAINED GAS TURBINE COMPRESSOR ENGINES. ALTERNATES ARE AIRESEARCH GTC-85-15's. BOTH ARE IN QUANTITY PRODUCTION. INDIVIDUAL ENGINES CAN BE CHANGED IN LESS THAN FIVE MINUTES WITHOUT THE USE OF TOOLS.



THE V-1 JEEP USES THE SAME ROTOR HUB AS
SHOWN IN THIS PHOTOGRAPH.

XV-1 HUB



THIS PHOTOGRAPH ILLUSTRATES THE RUGGEDNESS OF THE ROTOR BLADE ON THE XV-1 CONVERTIPLANE. THE IDENTICAL BLADE IS USED ON THE V-1 JEEP.

XV-1 BLADE



XV-1's-FORMATION FLIGHT