ALUMINUM IN GSE:

NEW APPROACH TO WEAPONS SUPPORT

BORG-WARNER BUILDS LARC 5-TON AMPHIBIAN

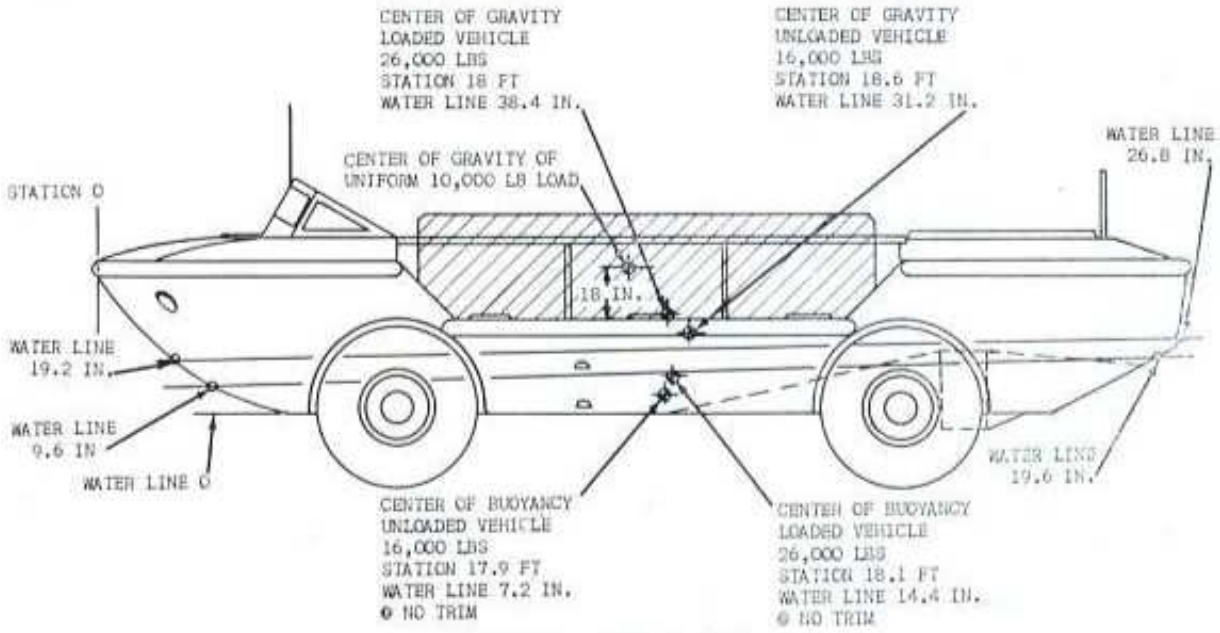
By Peer Fossen

KALAMAZOO, Mich.—The "LARC-5" (Lighter, Amphibious, Re-supply, Cargo), a five-ton all-aluminum amphibian, was recently demonstrated before a group of Defense Department officials at Ft. Custer, Michigan. The LARC, because of the use of aluminum throughout, is a "first" in a new line of light-weight, highly mobile amphibious craft engineered with the needs of modern warfare in mind.

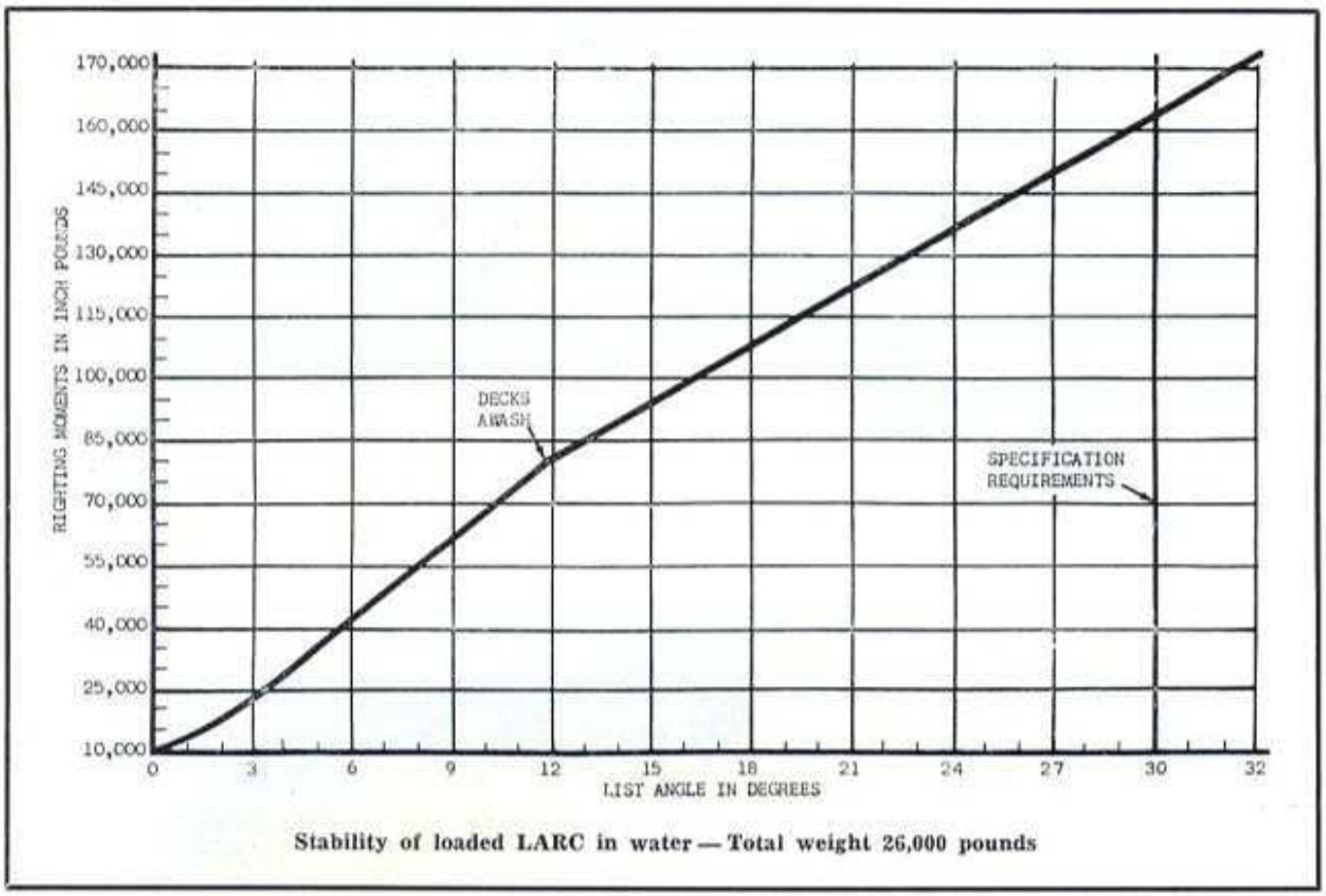
The craft, developed by the Ingersoll Kalamazoo Division of Borg-Warner, in conjunction with US Army Transportation Corps and its Transportation Research and Engineering Command (TRECOM), is termed the greatest advance in amphibians in the last 20 years. Although LARC's mission officially is limited to "over-the-beach supply," its potential as a vital part of a missile weapon system has been discussed unofficially. It is significant that the Ft. Custer demonstrations were attended by representatives from the Office of he Director of Defense, Redstone Arsenal, Rock Island Arsnal, and Aberdeen Proving Ground, all directly connected with missile armament.

LARC is powered by a Ford 535 cu. in. "N" industrial V-8 engine which provides land propulsion through four rubber-tired wheels and sea propulsion through a single propeller. In addition to the engine, the power-train includes converter and reverse transmission, torque converter, hydraulic retarder, forward and reverse gearing, transfer transmission, and differential transmission. The housings of the latter two are aluminum castings.

Basically a watercraft, the LARC can handle off-road terrain (including deep sand) and highways with equal ease. Water speed is about 10 miles per hour; highway speed between 30 and 35 miles per hour. Although the suspension system lacks springs, "gallop" is minimized by low-pressure tires.



LARC trim Characteristics

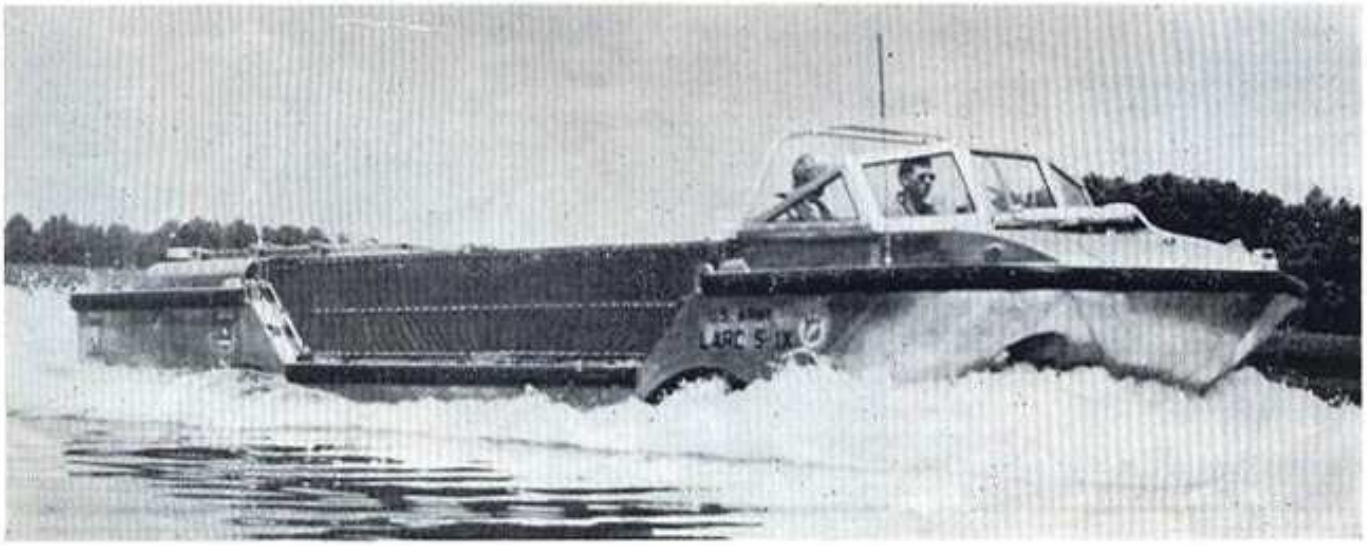


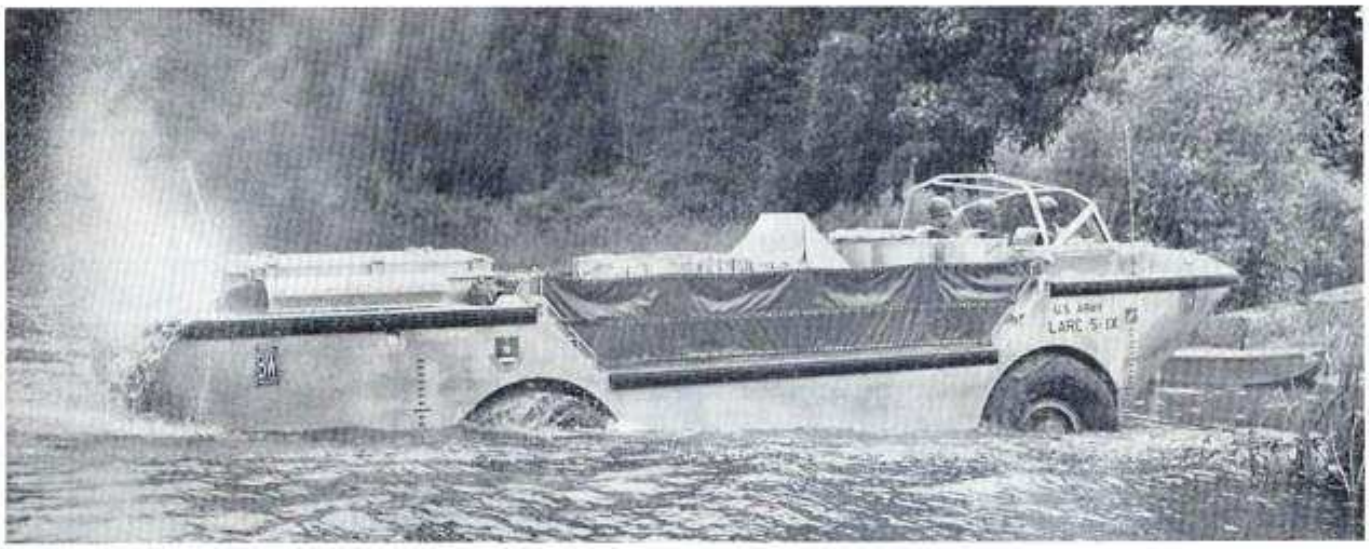
Stability of loaded LARC in water — Total weight 26,000 pounds

The LARC points to one rather important development in Armed Forces procurement thinking, the shift to light-weight, low-maintenance equipment made of aluminum. Used either in the form of sheet, plate, forgings, or extrusions, aluminum has found broad application in every kind of military equipment imaginable, "from tent pegs to missiles to combat vehicles."

Use of the light-weight metal in the LARC is typical of the trend to use aluminum in ground support equipment. Both Kaiser Aluminum and Chemical Corporation and Reynolds Metals Company are supplying plates for the skin of the LARC vehicles.

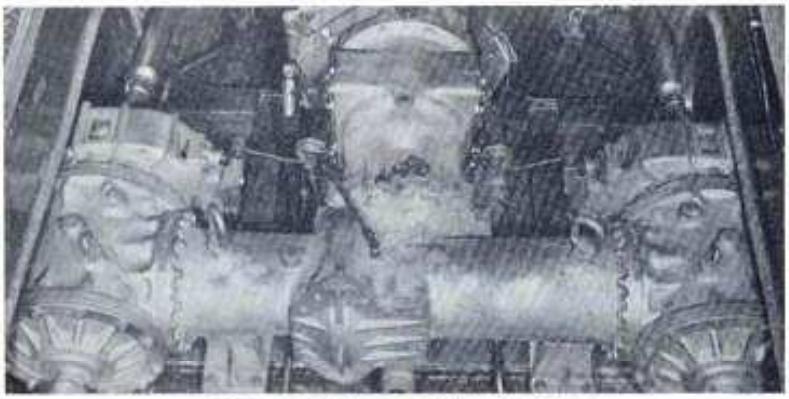
Other major subcontractors for the LARC are: Clark Equipment Co., Ford Motor Co., US Rubber Co., Aeroquip Corp., and several divisions of Borg-Warner Corp.





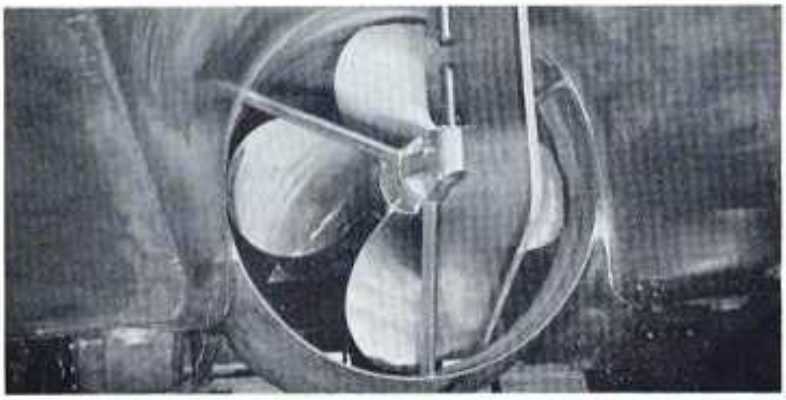
LARC 5 DESIGN CHARACTERISTICS

Weight:	
Net Vehicle Weight	16,000 lbs.
Cross-Country Payload	10,000 lbs.
Highway Payload	10,000 lbs.
Dimensions:	
Length	420 in.
Width	108 in.
Wheelbase	192 in.
Tread, Front and Rear	87.75 in.
Ground Clearance	23 in.
Angle of Approach	31 deg.
Angle of Departure	28 deg.
Pintle Height	47 in.
Fuel Capacity	145 gal.
Brakes	Hydraulic
Transfer Transmission:	
Forward	Hi - 0.905:1
	Lo - 1.778:1
Reverse	Hi - 0.905:1
	Lo - 1.778:1
Converter Ratio:	3.5:1
Differential Transmission Ratio:	1.6:1
Propeller Drive Ratio:	3.384:1
Axle Ratios:	
Wheel Angle Drive	3.529:1
Wheel Planetary	3.529:1
Suspension	Rigid
Steering:	
Land	4 wheel—full hydraulic, selective crab and oblique
Water	Rudder steer
Water Propulsion	Propeller
Hull Material	Welded aluminum
Gradeability	In excess of 70 percent slope
Stability	54 percent side slope
Ambient Temp. Range	115°F to —25°F
Engine Max. HP	270 @ 3200 rpm



Differential transmission details

Ball joint and wheel steer cylinder details



Rudder and propeller details