

The evolution of the Assault Amphibious Vehicle (USMC)

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- I. Lesson Plan Summary:
 - A. This lesson is designed to give the students a better understanding of the evolution of the Assault Amphibious vehicle from first use in 1937 to the current war in Iraq.
 - B. Objective: Students will be able to compare and contrast the different variations of the AAV over the last 72 years.
 - C. Materials: overhead projector, transparencies, Venn diagram,
 - D. Lesson time: at least 45 minutes (maybe a second class period)

- II. Lesson Procedure
 - A. Explain to the students the function of an AAV.
 - B. Tell students they will look at several transparencies of AAV at different stage in its life.
 - C. Look at LVT- 1941 and specification sheet. Discuss weapons, armor, speed set up, etc.)
 - D. Look at LVTP5A1 and specification sheet. Discuss weapons, armor, speed set up, etc.)
 - E. Look at AAVP7A1 and specification sheet. Discuss weapons, armor, speed set up, etc.)
 - F. Look at E.F.V. (Expeditionary Fighting Vehicle) and specification sheet. Discuss weapons, armor, speed set up, etc.)
 - G. As a class compare and contrast all four variations of the AAV.

- III. Activity: After you have finished discussing the different types of AAV's. Have the students answer the following question in 4 paragraphs (one paragraph for each vehicle). What would it be like to go into combat with each vehicle? Remind students to recall what each vehicle looked like and the specifications. **This can be done for homework**

- IV. Resources:
 1. <http://www.amtrac.org>: great website for information about AAV



LVT - 1941

General Information

Date of First Acceptance - 1941

Total Acceptances - 1225

Crew - 3 Man + 24 passengers

Commander

Driver

Assistant driver

24 Combat Equipped Marines

Armor:

Maximum

None

Minimum

None

Armament:

Type	Mount	Ammunition	Traverse	Elevation
Two .30cal M1919 Machine Guns	Skate mounts around cargo area	6000 rounds	n/a	n/a

Dimensions:

Combat Weight (land)	32,500lbs	Height	97.5"
Length	258"	Gun Overhang Forward	
Width	118"	Tread	
Ground Clearance, Sides		Ground Pressure, Zero Penetration	

Performance:

Max Level Road Speed	12 mph	Max Water speed	6.1 mph
Max. Trench		Min. Land Turning Diameter	
Max. Vertical Obstacle		Max. Grade	
Angle of Approach		Angle of Departure	
Cruising Range Roads	150 miles	Cruising Range Water	60 miles

Automotive:

Engine:	Hercules WXLC-3; 6 cylinder
Transmission:	Spicer
Steering:	Steering levers
Brakes:	

Suspension:

Type:	Road Wheels:	Track Return Rollers:
Unsprung	11/track	2/track
Drive Sprockets:	Idlers:	Shock Absorbers:
Front drive	Adjustable at rear of track	None

Track:

Width:	10.25"	Pitch		Shoes/Track:	
Ground Contact Length:					

Developed from a swamp rescue vehicle in use in Florida's Everglades, the main identification point for the LVT1 is that its cab is placed right at the bow of the vehicle. Early versions of the LVT1 had the 3 driver's cab windows spaced farther apart than later versions. The tracks of the LVTs had large grousers attached that propelled the vehicles through the water. Since the LVT1 was unarmored, it was most useful as a ship-to-shore cargo ferry, and it could haul 4500lbs (2000kg) at a time. LVT1 was unofficially known as Alligator.

References:

AFV Database: <http://afvdb.50megs.com/>



LVT5A1

General Information				
Date of First Acceptance - 1956		Total Acceptances - 1123		
Crew - 3 Man + 34 passengers				
Commander in hull right front		Driver in hull left front		
Assistant driver		34 Combat Equipped Marines		
Armor:				
Maximum	0.625"	Minimum	0.25"	
Armament:				
Type	Mount	Ammunition	Traverse	Elevation
.30cal M1919A4 Machine Gun	Cupola mount	250 rounds	360°	+60° to -15°
Dimensions:				
Combat Weight (land)	87,780lbs	Height Over Cupola	120.5"	
Length	356"	Gun Overhang Forward	0"	
Width	140.5"	Tread	116.7"	
Ground Clearance, Sides	11"	Ground Pressure, Zero Penetration	9.2 psi	
Performance:				
Max Level Road Speed	30 mph	Max Water Speed	6.8 mph	
Max. Trench	144"	Min. Land Turning Diameter	Pivot	
Max. Vertical Obstacle	36"	Max. Grade	70%	

Angle of Approach		Angle of Departure	
Cruising Range Roads	190 miles	Cruising Range Water	57 miles
Automotive:			
Engine:	Continental LV-1790-1; 12 cylinder, 4 cycle, 90° vee gasoline		
Transmission:	Allison CD-850-4A or -4B, 2 ranges forward, 1 reverse		
Steering:	Mechanical, wobble stick		
Brakes:	Multiple plate, oil cooled		
Suspension:			
Type:	Road Wheels:	Track Return Rollers:	
Torsilastic	9 pairs of dual/track	5 dual/track	
Drive Sprockets:	Idlers:	Shock Absorbers:	
17-tooth rear drive	Dual compensating at front of track	None	
Track:			
Center guide, single pin, steel with inverted grouser			
Width:	20.75"	Pitch	5"
		Shoes/Track:	134
Ground Contact Length:		229.25"	

The LVTP5 was a large vehicle with an inverted V-shaped bow that made for more efficient water operation, and it broke with previous LVT designs by having the tracks set low in the hull with an internal return channel rather than the all-round track design of its predecessors. Infantry access was via a bow ramp, and the crew and passenger compartment was at the front of the vehicle, with the power plant to the rear. There were one large and two smaller access hatches over the passenger compartment, and two more small hatches provided access to the engine. The vehicle tracks were made with inverted grousers which propelled the LVTP5 in the water and also served as center guide teeth. There were two track pins, inner and outer, on each shoe, which left a hole in the middle of the track block that allowed the grouser to operate more efficiently in the water. The road wheels on the LVTP5 were paired on either side of the center guide teeth, giving a total of 36 wheels per track. One wheel was surrounded by a solid rubber tire, and these carried the vehicle under normal circumstances. The other wheel was steel-rimmed and helped absorb shock loads. When fitted, the machine gun cupola was installed at the front of the vehicle between the driver and commander. When operating in the water, weight for the LVTP5 was reduced to 81,780lbs (37,100kg), and it could then carry only 25 passengers. The ground clearance down the center of the vehicle was 18" (46cm), which tapered down toward the tracks.

Modifications to the LVTP5's engine air intake and exhaust system produced the LVTP5A1. The most obvious external difference was a large housing on the vehicle's rear roof above the engine.

References:

AFV Database: <http://afvdb.50megs.com/>



AAVP7A1

General Information				
Date of First Acceptance - 1983		Total Acceptances - 333 + 853 converted from LVTP7		
Crew - 3 Men + 25 Passengers				
Commander in weapon station		Driver in hull left front		
Assistant driver in hull left center		Troop commander in hull left front		
24 Combat Equipped Marines				
Armor:				
Maximum	1.75"	Minimum	1"	
Armament:				
Type	Mount	Ammunition	Traverse	Elevation
.50cal M85	Armament station on	250 rounds ready	360°	+60° to -15°

Machine Gun	hull right front			
40mm Automatic Grenade Launcher Mk. 19	Armament station on hull right front		48 rounds ready	360° +60° to -15°
Dimensions:				
Combat Weight (land)	56,552lbs	Height		130.5"
Length	321.3"	Gun Overhang Forward		0"
Width	128.72"	Tread		123.8"
Ground Clearance	16"	Ground Pressure, Zero Penetration		8.7 psi
Performance:				
Max Level Road Speed	45 mph	Max Water Speed		8.2 mph
Max. Trench	96"	Min. Land Turning Diameter		Pivot
Max. Vertical Obstacle	36"	Max. Grade		60%
Angle of Approach		Angle of Departure		
Cruising Range Roads	300 miles	Cruising Range Water		56 miles
Automotive:				
Engine:	Cummins VT400; 8 cylinder, 4 cycle, vee, turbo supercharged diesel			
Transmission:	FMC HS-400-3A1, 4 speeds forward, 2 reverse			
Steering:	Hydrostatic, steering wheel			
Brakes:	Mechanical			
Suspension:				
Type:	Road Wheels:		Track Return Rollers:	
Torsion tube over bar	6 individually sprung dual/track		Flat track	
Drive Sprockets:	Idlers:		Shock Absorbers:	
11-tooth front drive	Dual adjustable at rear of track		On first and last road wheels/track	
Track:				
Center guide, single pin, steel with detachable rubber pad				
Width:	21"	Pitch	6"	Shoes/Track: 84
Ground Contact Length:		155"		

A service life extension program was instituted in the early 1980s to bring the LVTP7 up to speed in reliability, communications, and safety. The Cummins VT400 diesel engine replaced the GM 8V53T, and this was driven through FMC's HS-400-3A1 transmission. The hydraulic traverse and elevation of the weapon station was replaced by electric motors, which eliminated the danger from hydraulic fluid fires. The suspension and shock absorbers were strengthened as well. The fuel tank was made safer, and a fuel-burning smoke generator system was added. Eight smoke grenade launchers were also placed around the armament station. The headlight clusters were housed in a square recess instead of the earlier round type. The driver was provided with an improved instrument panel, a night vision device, and a new ventilation system was installed. These upgraded

vehicles were originally called LVTP7A1, but the Marine Corps renamed the LVTP7A1 to AAVP7A1 in 1984. Another improvement was added in the form of a Cadillac Gage weapon station which was armed with both a .50cal machine gun and a 40mm automatic grenade launcher. Appliqué armor kits were developed for the AAVP7A1, and the added weight of the new armor necessitated the addition of a bow plane kit when operating afloat.

In November 1998, a program to further prolong the life of the AAVP7A1 began. Under this AAV Reliability, Availability, Maintainability/Rebuild to Standard (AAV RAM/RS) plan, the AAVP7A1 will inherit the engine and transmission of the M2 Bradley infantry fighting vehicle.

References:

AFV Database: <http://afvdb.50megs.com/>



Expeditionary Fighting Vehicle (USMC)

General Information				
Date of First Acceptance -		Total Acceptances -		
Crew - 3 Man + 17 Passengers				
Commander		Driver		
Gunner		17 Combat Equipped Marines		
Armor:				
Maximum		Minimum		
Armament:				
Type	Mount	Ammunition	Traverse	Elevation
25 mm Bushmaster II Cannon	Turret	150 Rounds Ready	360°	+45° to -10°
7.62 mm M240 Machine Gun	Turret	800 Rounds Ready		
Smoke Grenade Launchers	16 in Hull 16 in Turret:			
Dimensions:				
Combat Weight (land)	74,500 lbs	Height Over Turret		125.5"
Length	358.2"	Gun Overhang Forward		0"
Width	144"	Tread		138.8"
Ground Clearance, Sides	16"	Ground Pressure, Zero Penetration		8.9 psi

Performance:					
Max Level Road Speed	45 mph	Max Water Speed	25 Knots		
Max. Trench	96"	Min. Land Turning Diameter	Pivot		
Max. Vertical Obstacle	36"	Max. Grade	60%		
Angle of Approach	32°	Angle of Departure	30°		
Cruising Range Roads	300 miles	Cruising Range Water	65 miles		
Automotive:					
Engine:	MTU MT883; 4 Cycle, 12 Cylinder, 90° Vee, Turbocharged diesel				
Transmission:	Allison Six Speed Transmission				
Steering:					
Brakes:					
Suspension:					
Type:	Road Wheels:	Track Return Rollers:			
Hydropneumatic	7 Rubber Tired, Dual per Side	3 per Side			
Drive Sprockets:	Idlers:	Shock Absorbers:			
11 tooth					
Track:					
Aluminum, Double Pin, Rubber Bushed, with Replaceable Pads					
Width:	21"	Pitch	6"	Shoes/Track:	103
Ground Contact Length:		203.5"			

References:

AFV Database: <http://afvdb.50megs.com/>

Federation of American Scientists: <http://www.fas.org/man/dod-101/sys/land/aaav.htm>