From The Sea With Wings: Maryland and The Flying Boat

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FOR PERHAPS TEN THOUSAND YEARS MUSCLE-POWERED CRAFT REIGNED ON Chesapeake Bay. Sail appeared on the Bay about three hundred years ago, and the serpent of steam appeared in the Eden of sail perhaps a hundred and fifty years ago, only to be superseded by the concoctions of Otto and Diesel. A unique form of vessel appeared in Maryland about half a century ago, flourished for forty years, and then totally disappeared. It was the flying boat, built at Hagerstown, Dundalk, and Middle River. Of the eleven aircraft factories which at one time or another flourished in Maryland, four built boats.

The first flying boat built in Maryland was the P3M, a twin-engined monoplane built in 1929 by Glenn L. Martin in his new plant at Middle River. The Navy purchased ten, sending them to VP–10S squadron. Martin's PM–1 and PM–2, twin-engined biplanes, began delivery next year and totalled fifty-five boats. All these craft had aluminium alloy hulls and fabric-covered flight surfaces. Both the P3M and the PM were steps in the evolution of flying boats that would be capable of linking the United States with Alaska, Hawaii, and the Philippines. Navy doctrine considered such craft to be tactical and strategic necessities. The XP2M–1 was an experimental link between PM and P3M.

The next boat chronologically was built for the Coast Guard by Fokker at Dundalk in 1932. Fokker had moved to Maryland from New Jersey after merging with other companies to become part of General Aviation, a General Motors property. One of their designs was the AF–XI–A (American Fokker), a single-engine flying boat which served as the forerunner of the AF–15. In keeping with Fokker's practice, the wing was made of wood with an aluminium alloy hull. These "flying life-boats" were to land in the open sea, take aboard victims of shipwreck or accident or illness, and fly them to safety. The five purchased by the Coast Guard were named after stars: Altair, Acrux, Acomar, Arcturus, and Antares; the latter had tractor (in front of the engine) instead of pusher (behind the engine) propellors. In addition to the real dangers of rough water operation, the conical aftersection of the hull acted like a megaphone, and the creaks and groans of the structure working under load were magnified and sent forward to worry the crew.

In 1931 Pan American Airways asked the industry to bid on construction of three multi-engined boats with a range of 2,500 miles and a crew of four, to carry 300 pounds of airmail and twelve passengers. Martin bid low and by 1935 his

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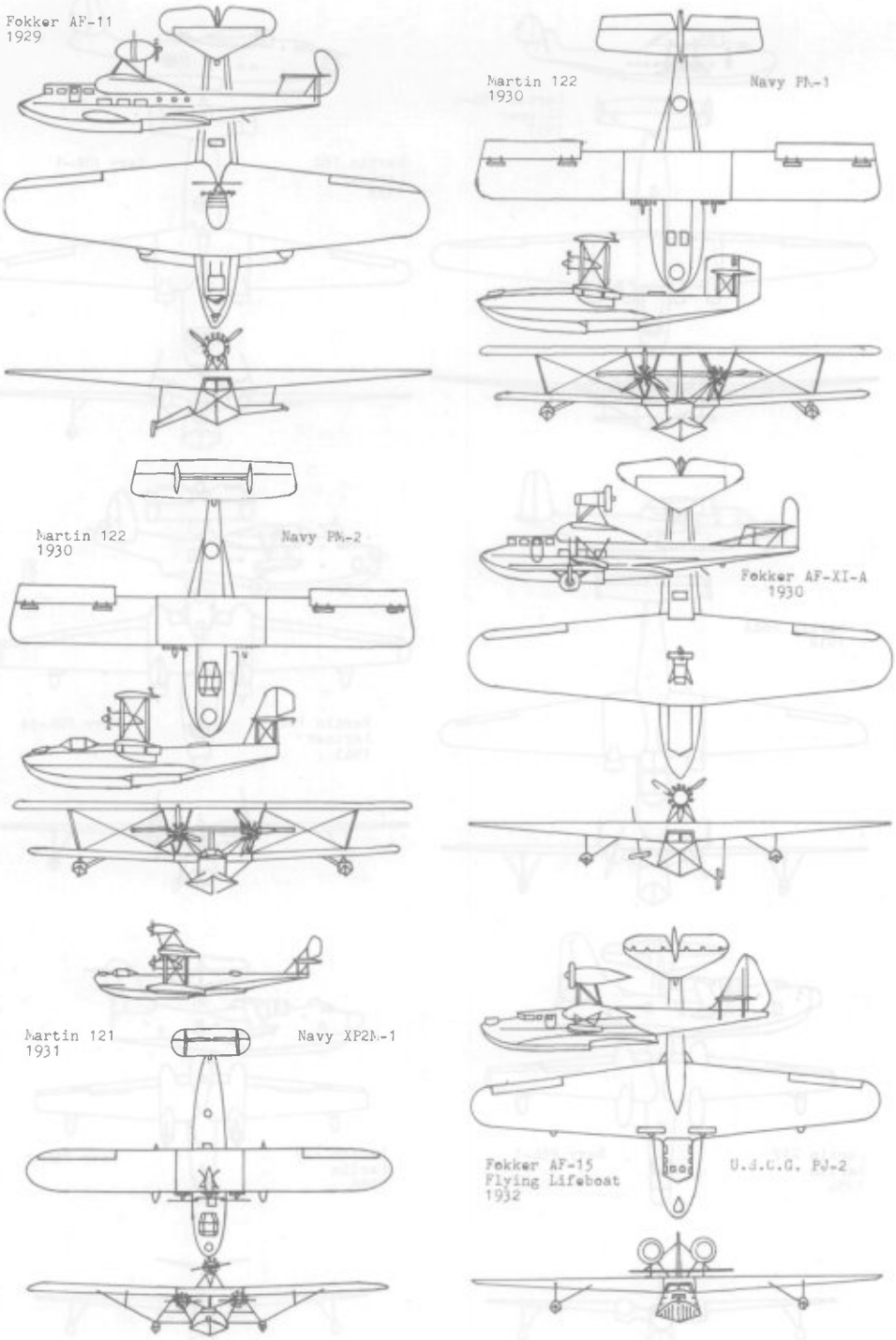
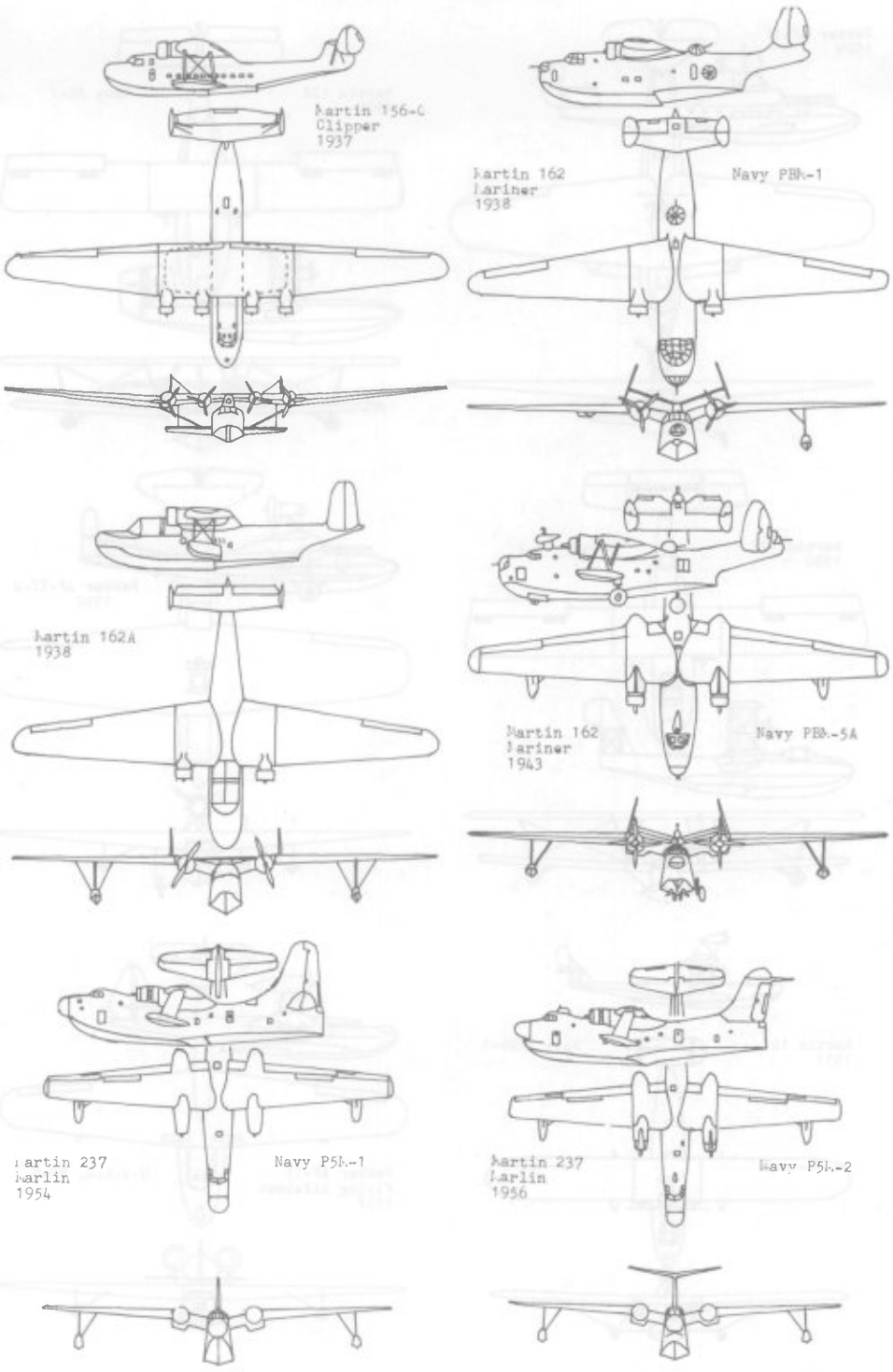
Maryland Flying Boats

Year	Builder	Designation			Dimensions				Performance		Seats	Engines			Power	Remarks
					Wing span	Hull Length	Wing Area	Max. Weight	Top Speed	Range		No.	Builder	Name		
		Builders	Popular	Service	ft.-in.	ft.-in.	sq. ft.	lbs.	knots	n. mi.					BHP	
1929	Martin	120	–	P3M-1	100	61–9	1,115	15,265	103	910	5	2	P. & W.	Wasp	450	Monoplane, metal and fabric
1929	Martin	120	–	P3M-2	100	61–9	1,115	17,977	105	915	5	2	P. & W.	Hornet	525	
1930	Martin	122	–	PM-1	72	49–0	1,162	16,117	108	1,185	5	2	WAC	Cyclone	525	Open cockpit, single fin, biplane
1930	Martin	122	–	PM-2	72	49–2	1,162	19,062	108	1,220	5	2	WAC	Cyclone	525	Enclosed, twin fins
1930	Fokker	AF-XI-A	–	–	59	45–10	550	7,200	105	780	6	1	P. & W.	Hornet	575	Dural hull, wood wing; amphibian
1931	Martin	121	–	XP2M-1	100	61–3	1,204	20,100	127		5	3	WAC	Cyclone	550	
1932	Fokker	AF-15	Flying Lifeboat	PJ-1	74–2	51–8	754	11,700	109	473	7	2	P. & W.	Wasp	420	Dural hull, wood wing; pusher tractor
1932	Fokker	AF-15	Flying Lifeboat	PJ-2	74–2	51–8	754	12,000	131	725	7	2	P. & W.	Wasp	500	
1935	Martin	130	Clipper	–	130–0	90–7	2,315	52,000	163	2,900	24–52	4	P. & W.	Twin Wasp	830	
1935	Fairchild	A942	Baby Clipper	–	56–0	46–8	483	9,700	157	600	10	1	P. & W.	Hornet	750	Amphibian
1937	Martin	156C	Clipper	–	157–0	91–10	2,300	63,000	165	2,280	33–53	4	WAC	Cyclone	850	
1938	Martin	162	Mariner	PBM-1	117–0	77–2	1,408	41,139	204	3,130	9	2	WAC	Cyclone	1,600	Retract. floats; X had straight tail
1938	Martin	162A	Quarter-scale Mariner		30–0	19–3	88	2,571			1	1	engine in hull		210	Straight tail
1942	Martin	162	Mariner	PBM-3	118–0	77–2	1,408	58,000	180	1,940	9	2	WAC	Cyclone	1,700	Fixed floats
1943	Martin	162	Mariner	PBM-5A	118–0	79–10	1,408	60,300	191	1,900	9	2	P. & W.	Double Wasp outboard	2,100	Amphibian
1943	Allied Av.			XLRA-1,-2	70–0	36–7	502	7,016	163	–	12	1			35	Plywood and fabric amphibian
1946	Martin	170	Mars	JRM-1,-2	200–0	117–3	3,686	165,000	200		143	4	P. & W.	Wasp Major	3,500	Originally XPB2M-1R
1954	Martin	237	Marlin	P5M-1	118–2	91–0	1,406	78,000	228	2,550	8	2	WAC	Turbo Compound	3,250	
1956	Martin	237	Marlin	P5M-2	118–2	101–0	1,406	78,000	224	2,650	8	2	WAC	Turbo Compound	3,500	Tee-tail
1956	Martin	237	Seamaster	P6M-1	100–0	134–0	1,900	160,000	600+	3,000	4	2	P. & W.	J-75	10,000	

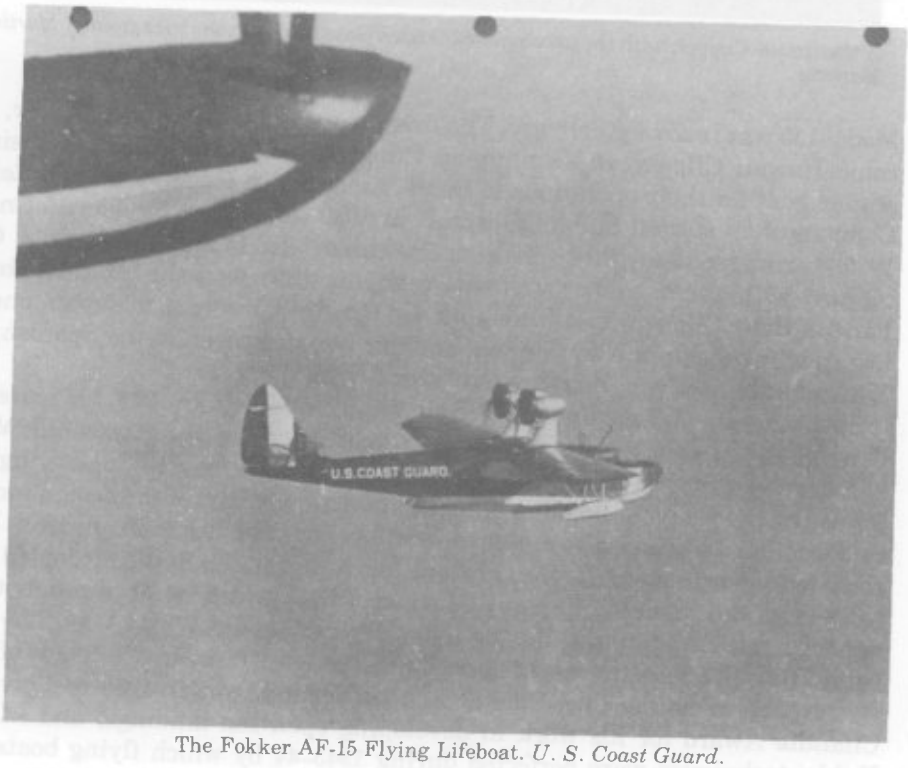
Flying Boats of Maryland, 1929–32



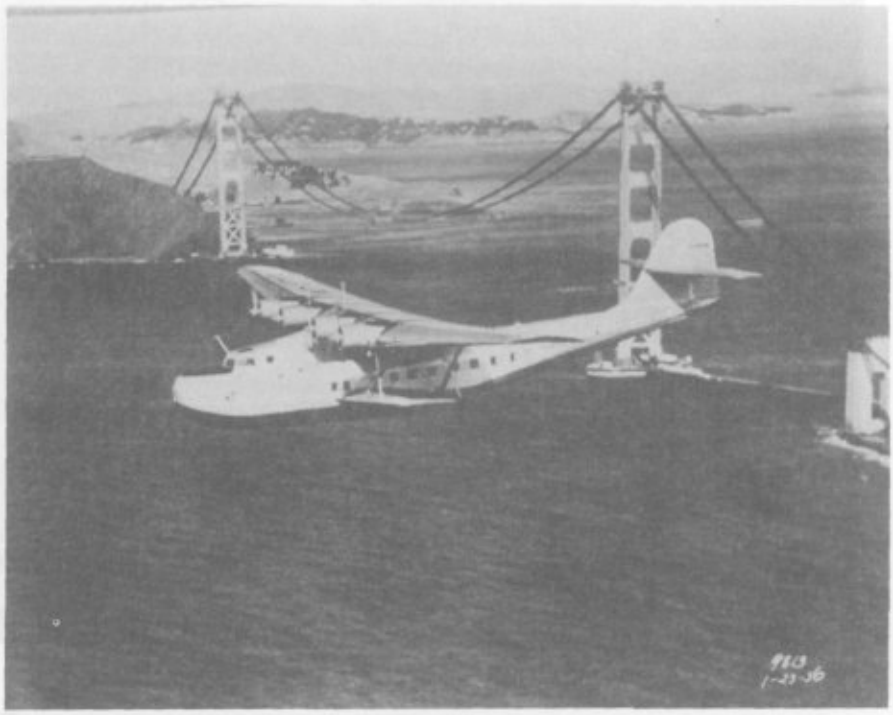
Flying Boats of Maryland, 1937–56



The Martin P3M-1. *Martin Marietta.*



The Fokker AF-15 Flying Lifeboat. *U. S. Coast Guard.*



A Martin 130 Clipper, with the uncompleted Golden Gate Bridge in the background. *Martin Marietta.*

Model 130 was ready for delivery. The first boat was named China Clipper, then came Hawaii Clipper and Philippine Clipper. PanAm also desired a single-engine boat for their operations in South America. In Hagerstown the Reisner Company had started building aircraft in 1920. It became Kreider-Reisner in 1925, turning out a sturdy little sport/trainer. In 1929 the Fairchild Corp. merged with them, and it was this company that won the contract for the PanAm Baby Clipper. Two were built for PanAm, two went to Japan, one was lost in a hurricane in New Guinea, another was destroyed in the Spanish Civil War, and the last was shot down in World War II.

Soviet Russia ordered an enlarged clipper from Martin in 1937, his model 156. It was shipped knocked-down and never heard from again. Meanwhile Martin had been working on the design of a twin-engine monoplane (single wing) boat for use by the Navy for bombing and reconnaissance. Part of the design included construction and testing of a quarter-scale version, Model 162A, in 1938. It had room for one rather small man. Lessons learned from the flying model led to the success of the Model 162, Navy Mariner PBM, which went through twelve versions and 1,366 aircraft during and after the Second World War. The Coast Guard used it for rescue work, operating in ten-foot seas. In the hands of brave and capable men like Cdr. Donald B. MacDiarmid, who in 1950 was given the Chanute Award for his work in developing open sea landings, and Lt. John Vukic, techniques were perfected during 1943–44 by which flying boats could

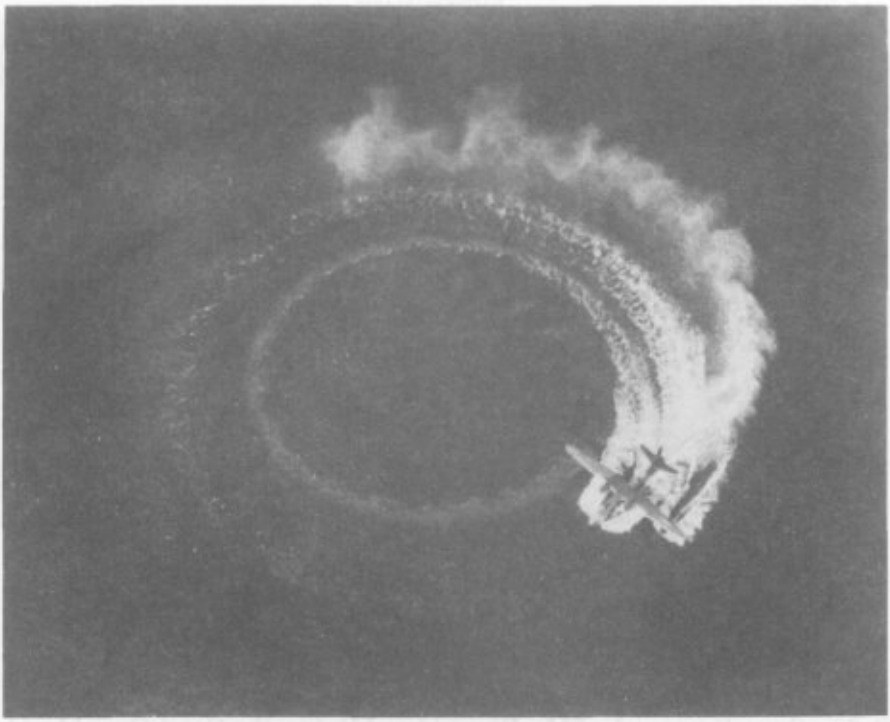
land and takeoff in seas which had previously prohibited operations. The PBM served nobly, despite the fact that from inside the hull one could watch the stern work in flight, twisting and bending and shaking. But none of the 1,366 ever fell off, for they were designed to flex.

The Fairchild A942 Baby Clipper. *Fairchild Industries.*

The Martin PBM-1. *Martin Marietta.*

Allied Aviation Corporation's XLRA, a plywood glider. *U. S. Navy.*

Martin JRM-1 Mars dropping approximately 8,000 gallons of water in a test of its fire-fighting ability. *Martin Marietta.*



Martin P5M-1 Marlin showing its turning radius in water. *Martin Marietta.*

Martin P6M-1 Seamaster in the Chesapeake Bay. *Martin Marietta.*

MARTIN SEAPLANES

TYPE	NUMBER BUILT
P3M-1	9
P3M-2	9
PM-1	27
PM-1B (Brazil)	3
XP2M-1	1
Model 130 (Clipper)	3
Model 156C	1
XPBM-1 (Model)	1
XPBM-1 (Mariner)	1
PBM-1	20
XPBM-2	1
PBM-3	32
PBM-3R	18
PBM-3C	274
PBM-3S	95
PBM-3D	260
PBM-5	1,319
XPBM-5A (Amphibian)	1
PBM-5A	37
XPB3M-1 (Mars-"Old Lady")	1
JRM-1 (Mars)	4
JRM-2 (Mars)	1
XP5M-1 (Experimental Seaplane)	1
P5M-1	1
P5M-2	1
M-270 (Experimental Seaplane)	1
XP6M-1 (#1) (SeaMaster)	1
XP6M-1 (#2) (SeaMaster)	1
YP6M-1 (SeaMaster)	6
P6M-2 (SeaMaster)	8
T4M-1	102
PM-2	28
TOTAL	2,268

Before the valiant work of MacDiarmid and Vukic, the Coast Guard had been concerned with the problem of rescue work by flying boats in rough water. One of the approaches was the use of a glider boat which could be towed by powered aircraft and cast loose over the site of trouble, to land at sea. It would perform the rescue and then either be recovered by a "snatch" pickup or motor home like a lifeboat. In 1943 Allied Aviation Corp. of Baltimore, which had been formed the year before to build plywood and plastic parts for aircraft, won the contract to build the plywood XLRA-1 and -2. The -1 had tricycle landing gear, the -2 was conventional. The wheels could be jettisoned or retracted. But the success of the Martin PBM rough water trials led to cancellation of the Allied contract.

Inspired by the success of the Clippers, the Navy asked Martin to build them a big bomber. It appeared as the XPB2M in 1946, already eclipsed by the B-29 which was then bombing the home islands of Japan. It was redesignated as a transport, JRM, and set a record for safety and reliability on the Hawaii-California route. The five boats were named Caroline Mars, Marshall Mars, Hawaii Mars, Philippine Mars, and Mariannas Mars. Unlike previous boats which were hauled from the water for servicing after each flight, the Mars boats remained in the water for six or eight months at a time. Some of them are still in service as fire-fighters in British Columbia. Their holds full of water, they fly over forest fires and dump fifteen tons of water per flight.

The PBM series was in use for ten years after the war before the Navy found it necessary to replace them with more modern boats, and then the Martin Marlin P5M was chosen. This was an advanced design into which Martin and the Navy put all their accumulated knowledge of boats. It flew beautifully and was a most

forgiving aircraft. Her stall was gentle, control easy, and she had no vicious habits. On the water her long hull made her stable, and hydraulic steering flaps aft gave her a tight turning circle and good maneuverability. However, the high-strength 75ST aluminium alloy was prone to salt water corrosion and her thoroughbred turbo-compound engines had to be babied; the type, though superior in performance to Mariner, was more difficult to maintain.

The last boat was the apotheosis of flying boats, and resulted from Air Force-Navy competition for available funds. The aircraft industry conceived the notion of an air force, fighters and bombers, of flying boats. The oceans would be their airfields; supply would be by submarine. If hull repairs were needed, a submarine would surface gently beneath the boat, lifting it from the water to make the hull accessible. Refueling and docking by submarine was tried with a Marlin. The idea worked and the Navy was sold. The fighter was to be the SeaDart by Consolidated Aircraft in San Diego, and the bomber was Martin's P6M SeaMaster. Both were jet aircraft, and both suffered grievous losses during flight tests. As a result the project languished, the concept was replaced with a reliance on nuclear submarines, and the fourteen P6M boats were redesignated as mine-layers, but never employed. The day of the flying boat was over, ending an unusual manifestation of Maryland's long love affair with the sea.