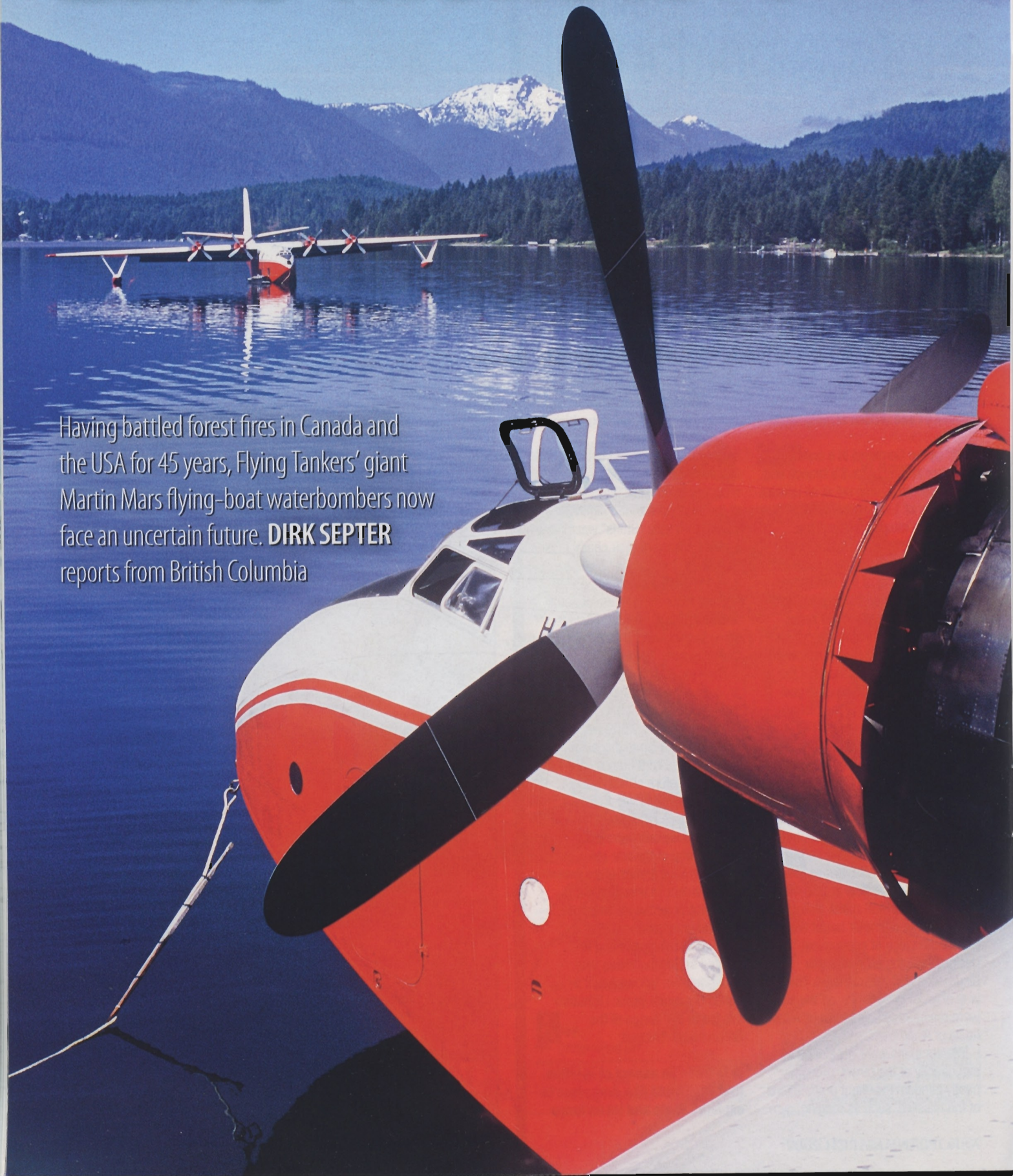


Twilight of the Lake Monsters?

Having battled forest fires in Canada and the USA for 45 years, Flying Tankers' giant Martin Mars flying-boat waterbombers now face an uncertain future. **DIRK SEPTER** reports from British Columbia



RISING COSTS HAVE finally caught up, it seems, with the only two remaining Martin JRM-3 Mars flying-boats, after 45 years of aerial firefighting. On November 10, 2006, TimberWest Forest Corp, their sole owner/operator, put them up for sale.

When the Mars waterbomber operation was set up in the early 1960s, a consortium of five companies owned Forest Industries Flying Tankers Ltd (FIFT). By 1998 there were only two; MacMillan Bloedel (MacBlo) Ltd and TimberWest. After American timber giant Weyerhaeuser took control of MacBlo it considered the \$2 million (£1.02m) annual operating costs too high, and in September 2000 it pulled out. Vancouver-based TimberWest and FIFT started seeking another partner.

The bombers' continued use depended on the financial viability of Flying Tankers Inc (FTI), the wholly-owned subsidiary of TimberWest that operates and maintains the two Mars and a Cessna 210 to protect TimberWest's vast resources. "The bottom line is you have to make a buck", says Terry Dixon, FTI's general manager.

To offset costs TimberWest contracts the aircraft out to other forest companies and provincial or state governments. In 2004 the hourly cost was about C\$15,000 for one Mars or C\$26,800 for both. Two years later the hourly rate had risen to C\$18,000, making them very costly.

From mid-July to mid-September 2003 British Columbia (BC) experienced one of its most dev-

astating forest fire seasons. In one day 218 new fires were reported, and 768 broke out during a six-day period. More than 60,000 hectares of forest were devastated and three pilots died, including the crew of a Lockheed L-188A Electra waterbomber. It became a record year for the two Mars, which logged 293hr on 66 fires in BC. They not only paid for themselves, but yielded a profit.

But every forest fire season is different. Dixon is cautious about predicting another record year. "This year [2006] they only flew 32 times", he notes. "There are fewer fires caused by logging operations these days, and for the last few years Vancouver Island has had fewer lightning-caused forest fires."

TimberWest put a December 31, 2006, deadline on tenders, by which time there had been more than a dozen "expressions of interest" from BC, the USA and even Europe. At time of press, no final decision was expected until the end of March.

The aircraft were advertised as having tourism potential as well as unsurpassed firefighting capabilities. Lobbying to get the BC provincial government to purchase the Mars was known to be growing. The City of Port Alberni, their home base, is spearheading the drive to persuade the Liberal government to buy them to ensure that BC's forests and cities are protected. "They are a rare and unique firefighting commodity, especially suited to interface fires, where residential

OPPOSITE Leviathans of Sproat Lake: Martin JRM-3 Mars C-FLYL *Hawaii Mars* and C-FLYK *Philippine Mars*, the last survivors of their type, afloat at their base at Port Alberni, Vancouver Island, British Columbia, in June 1998. MARK MUNZEL photograph.

Mars: long-range, weightlifting god of war

DESIGNED BY THE Glenn L. Martin company during the Second World War as long-range, high-altitude patrol bombers, the Mars were the biggest operational flying-boats ever built. The prototype, the XPB2M-1, became the XBP2M-1R when modified as a transport with reinforced floors, larger hatches and loading equipment. Called "The Old Lady" by the US Navy (USN), it flew 78 Pacific round-trips before retirement.

The Mars made its first Service flight as a naval transport in December 1943, flying from the Naval Air Station at Patuxent River, Maryland, to Natal, Brazil, carrying 13,000lb of freight non-stop over 4,375 miles, the take-off weight being 148,500lb. On part of the return journey the aircraft carried a 35,000lb load. Early in 1944 the Mars completed a 4,700-mile round trip to Hawaii in 27hr 26min, delivering 20,500lb of cargo.

As a result of the prototype's success with the US Naval Air Transport Service (NATS), 20 Mars were ordered. The first was completed in the summer of 1945, but the USN contract was later reduced to five. On the production JRM-1s, delivered in 1946, a single fin and rudder replaced the twin fins, both the bow and rear hull steps were lengthened and the hatches were redesigned. Internally, the hull was stripped, one bulkhead was removed, and frames with openings to allow the passage of vehicles, ordnance etc, replaced the other bulkheads. A 5,000lb-capacity cargo hoist on an overhead track ran out 20ft under each wing. Aft of the main cargo hold was a stairway to the upper deck, where all bulkheads were replaced by open frames. Trapdoors 50in long and 24in wide in the upper-deck floor admitted low-density freight. The stairway permitted the loading of stretcher cases.

The flight deck accommodated a duty crew of four, and there were four bunks for use during long flights. Four more were provided on the upper rear deck.

With ample space for seven Jeeps or other bulky equipment, the JRM-1 could be rapidly converted into an ambulance carrying up to 84 stretcher cases and 25 attendants. Alternatively, it could carry 50 passengers in reclining chairs on the main deck, or 132 troops.

Only seven Mars were built: the prototype patrol bomber, five JRM-1 transports and one JRM-2. The USN's air transport mainstay on the San Francisco-Honolulu run from 1946 to 1956, they carried a quarter of a million passengers and many tons of freight. The fleet averaged five transpacific round trips a week in the first five years, and two trips a week for the next five years, logging some 87,000 accident-free hours. In their first 18,000hr they achieved direct and indirect costs of \$4.04 per aeroplane mile; the cost per ton-mile on some test flights was just over 44 cents!

With USN Air Transport Squadron Two they set distance and weightlifting records. One carried a cargo of 68,327lb from Patuxent River to Cleveland, Ohio. On May 19, 1949, *Marshall Mars* carried 301 USN personnel from Alameda, California, to San Diego. A later record of 308 passengers stood for many years. When the last operational flight was made, in 1956, the three older JRM-1s had logged between 18,000 and 20,000hr each. From 1957 the four survivors rested on the beach at Alameda Naval Air Base, but sometime around 1959 they were auctioned off for scrap.

BELOW Mars prototype c/n 1520 is launched from the Martin factory into Middle River, Maryland, USA, on November 5, 1941. In its initial XPB2M-1 version, the type had twin fins and rudders rather than a single tail unit. Conceived as a "Flying Dreadnought", the first Mars had its keel ceremonially laid on August 20, 1940; it did not fly until July 3, 1942.





ABOVE Mars en masse. This mighty formation was photographed during the type's US Navy service. Nearest the camera is 76820 Philippine Mars, followed by 76821 Marianas Mars and 76823 Hawaii Mars, with one more too distant to identify.

properties are threatened by wild fires," says Port Alberni's mayor, Ken McRae. "No other aircraft can deliver the massive, 60,000lb payload as quickly as the Mars, and continue to deliver it every few minutes sustained over several hours."

As well as affecting the 25 or so people who keep the Mars operational, their sale will also affect Port Alberni, where they have become an important tourist attraction at Sproat Lake. McRae says their loss would thus be a double economic blow for the city. Port Alberni has been offered one of the aircraft when its useful life ends, one condition of the sale being that it be donated to the city as a heritage attraction. "But what are we going to do with it?" McRae wonders. "We would need quite a bit of money to move it. Where do we put it?"

Mars, the god of rain

In Canada waterbombers are often the only way to control or extinguish forest fires, and in BC most coastal fires occur in active logging areas. With highly valuable timber resources at stake, the objective of forestry managers is to keep the burned area to a minimum and return it to production as quickly as possible. The two bad years of 1956 and 1958 showed that better methods had to be found, and one technique considered was the waterbomber.

Ontario's provincial forest service conducted experiments in which de Havilland Canada Beavers and Otters dropped relatively small quantities of water on fires, mostly using a water-filled "missile". On very small fires this was sometimes effective, but it was expensive and posed a hazard to ground crews. Douglas Aircraft had de-

veloped land-based DC-7 tankers to fight forest fires in California. Carrying 1,300gal of water, they operated from specially equipped airfields for reloads after the drops.

By 1958 the flying tanker had become an essential part of the fireline team. In BC five Grumman Avengers and several Beaver and Otter float-planes with small float tanks were operating.

With its steep, high mountains, narrow valleys and rough air, coastal BC is tough flying country. Large land-based aircraft were not practical owing to the lack of airstrips. The province's countless sheltered inlets and numerous large lakes meant that flying-boats were the answer.

Veteran coastal pilot Dan McIvor developed the "gallons per hour" concept of using aircraft capable of dumping large amounts of water on forest fires. Dan had been involved in the early days of aerial firefighting, using such types as the Beaver and Grumman Goose. However, these small tankers carried too little water to be effective against bigger fires. McIvor's idea was to douse the fire before it got beyond the suppression crews' control, and he reasoned that a very big aircraft might actually extinguish a big fire.

At Alameda the four Mars were for sale. Unfortunately the Mars Metal Corporation, a scrap dealership, had just bought them for \$23,000. MacBlo, a pioneer BC logging company, deserves credit for saving the aircraft and bringing them to Canada.

Still without firm financial backing, McIvor acquired the aircraft for \$100,000, still a huge bargain. For a mere \$3,200 he also purchased about 90 tons of surplus Mars stores and equipment worth \$3-5 million, plus drawings and maintenance records. Although some 35 brand-new or zero-time rebuilt spare engines were available at \$300 apiece, only eight were initially purchased.

The scrap merchant had been told to dismantle and remove the aircraft from the naval base by a certain deadline. It was a race against time. On July 29, 1959, just before the deadline to dismantle the second aircraft, MacBlo forwarded a telegram confirming its purchase agreement.

Later that year six BC logging companies formed FIFT, with McIvor as general manager. An operational base for the Mars was established at the north-east end of Sproat Lake, near Port Alberni on the west coast of Vancouver Island.

Helped by US Navy pilots Jack Edwards and Harold Rogers, McIvor ferried the four Mars, CF-LYM, 'LYJ, 'LYL and 'LYK, to Victoria International Airport at Patricia Bay. *Marianas Mars* was first, on August 5, 1958, followed by *Caroline Mars* on August 27, *Philippine Mars* on September 5 and *Hawaii Mars* on September 12. *Philippine Mars*

BELOW *Hawaii Mars* on the step during its career with the US Naval Air Transport Service.

BELOW RIGHT *Hawaii Mars* is one of the two survivors; here is its flight engineer's position. The flight engineers double as maintenance groundcrew.





MICHAEL O'LEARY

was almost lost during its ferry flight when a trainee engineer inadvertently cut off all fuel to the engines and the aircraft dropped from 10,000ft to wave height. "There was some mad scrambling to feather the propellers and re-adjust controls to bring the engines and props back to life", McIvor recalls.

The aircraft were parked on dollies between the airport's old wartime hangars. Fairey Aviation of Canada started stripping the first two of their military gear. George Grover, an engineer on the ill-fated Avro Canada Arrow, did the conversion design and the engineering; 40 years later he was still doing engineering work on the Mars.

The aircraft were fitted with Douglas-fir plywood, glassfibred tanks holding some 7,200 US gal. Two pick-up probes were installed, allowing the aircraft to take on water while "on the step". The hydraulically operated probes fill the tanks in 25-30sec as the aircraft taxis across the water at 70kt.

The final payload was 60,000lb, equalling 6,000 Imp gal, based on the maximum gross weight of 162,000lb. "Because the aircraft was being loaded on the step, the Department of Transport allowed a considerable increase in weight."

Initially the engineers were not allowed to cut holes in the bottom of the aircraft. "If it didn't work, we might want to sell them," McIvor chuckles, "and the Navy tried to give them away and couldn't." So the first drops, using 'LYJ', were made out of the side. "There were four doors, two on each side, and the drop was made through those doors so it wouldn't cut up the fuselage. The bottom of the tank was flat, and I knew that the water wasn't getting out in an effective time."

With the side-drops the water came out in a large blob and then trailed a long, thin stream of spray, most of which did not reach the ground. "We put a load on, climbed up, dropped it and shut the doors after 3sec," McIvor explains. "We landed, went back to base, and measured the

depth of the water still left in the tanks." After experimenting with different sizes and shapes of tanks it was decided to go through the bottom of the hull to get all the water out in 3sec.

Compared with the original *Marianas Mars* there were substantial differences in tank size, construction and arrangement on the existing two Mars bombers. The arrangement of the water pick-up system and doors also differed.

The Mars can carry some 6,800 Imp gal of water and has a 4hr fuel supply. However, in mountainous terrain a smaller water load of 6,000gal proved more practical and economical. When flying a considerable distance from base the Mars can carry its own fuel and hose for refuelling. While working on the Stillwater slash fire, which was getting out of control, the aircraft dropped 40,500gal in seven drops.

With a 6,000gal water drop covering approxi-

ABOVE *Philippine Mars* over typically forested and mountainous terrain in British Columbia. This air-to-air photograph emphasises the vast bulk of the aircraft — with a wingspan of 200ft, a length of 120ft and a height of 48ft, it is very nearly twice the size of an Avro Lancaster or Boeing B-17 Flying Fortress.

Mars production compiled by Jerry Vernon and Dirk Septer

Variant	c/n	BuNo	Name	Remarks
XPB2M-1 XPB2M-1R	—	1520	<i>The Old Lady</i>	Prototype with twin tail. VR-2 NAS Alameda. 78 round trips to Hawaii. Retired
JRM-1	9263	76819	Not named	First production aircraft. Single tail. Not delivered to US Navy; crashed on test flight, Chesapeake Bay, August 5, 1945
JRM-1 JRM-3	9264	76820	<i>Philippine Mars</i>	US Navy; to FIFT as CF-LYK; Current in 2003
JRM-1 JRM-3	9265	76821	<i>Marianas Mars</i>	US Navy; to FIFT as CF-LYJ; Crashed and burned near Nanaimo, BC, June 23, 1961
JRM-1	9266	76822	<i>Marshall Mars</i>	US Navy; destroyed by fire near Honolulu, April 5, 1950
JRM-1 JRM-3	9267	76823	<i>Hawaii Mars</i>	US Navy; to FIFT as CF-LYL; Current in 2003
JRM-2	9268	76824	<i>Caroline Mars</i>	US Navy; to FIFT as CF-LYM; damaged by typhoon Freda, Patricia Bay, BC, October 13, 1962; reduced to spares

Waterbombing with the Mars

A MARS CREW consists of four people: captain, first officer, flight engineer and flight mechanic. Dispatch decides whether the Mars are required, and will identify the urgency and notify the hangar to put the crews on alert. In the "low" hazard status at least one Mars will be warmed up, usually with a taxi run on the Taylor Arm of Sproat Lake. In the high range of "moderate" or in "high" and "extreme" status the warm-up would already have been done. The crews reach their aircraft in a small motorboat and take to the air in about 10min. The sound of the four 2,500 h.p. Wright Cyclones thundering in unison gives aviation enthusiasts goosebumps. As it will create a 4ft swell on take-off, the Mars taxis to a secluded part of the well-populated Sproat Lake before taking off.

The captain decides whether it is safe to fly in over the fire area, considering terrain, smoke conditions and air turbulence. When flying in to pick up a water load he takes complete control. Descending fairly rapidly, he eases the aircraft down until it is planing through the water at exactly 70kt. When the aircraft is planing smoothly he lowers the probes to pick up water. During an operational mission the chemical fire retardant is injected into the tanks at this point. Meanwhile, the first officer is preparing flaps and trim controls for take-off. The moment the loading starts, the first engineer takes control of power. In the critical 20sec required to take on a full water load he must maintain the aircraft's speed, then boost power for take-off. During the pick-up the small probes scoop up some 30 tons of water in about 22sec. Once the tanks are full the captain calls for the scoops to be raised and for take-off power to be applied. When the aircraft is airborne again some 30gal of foam concentrate are injected into the water load, increasing its efficiency by up to 50 per cent. The concentrate remains inert until the load is released, when the tumbling action causes expansion, converting the water into foam.

En route to the fire the first officer maintains radio communications with the pilot of the "bird dog", who ideally has identified the first target and determined the best line of approach. The captain of the Mars must evaluate the conditions of smoke, air turbulence and terrain, and decide if and how he will make the bombing run. The bird dog officer then ensures that ground crew and equipment are clear of the targeted area and leads the air tanker to its target.

Before starting his run the captain often flies over the target to confirm the instructions from the bird dog pilot. He then makes the water drop. Once committed he concentrates entirely on his approach course and altitude. For its size the Mars is highly manoeuvrable, though somewhat slow to respond to the controls. The first officer takes over the throttles, maintaining 120kt. The water, usually dumped all at once, can be released from either side on *Philippine Mars* and from the bottom on *Hawaii Mars*. Once past the target he applies climbing power to ensure a safe exit from the fire area.

The fourth crewmember on the flightdeck, the second engineer, watches the maze of instruments on the console to ensure that all systems are "running green", and makes frequent inspections of the water tanks and miscellaneous auxiliary power units.

The flight engineer station, 30ft behind the pilot, contains a vast array of instruments, including all basic flight instruments, engine monitoring instruments, throttles, mixture controls, and fuel and propeller management controls. A recording accelerometer monitors gust forces, shock and turbulence on the aircraft.

Another unique feature is the flight deck operation. Most of the throttle work is done by the flight engineer on voice command from the pilot. Because the crew is concentrating on winds and looking through smoke and low visibility, things are kept as simple as possible for the pilot.

The radio person at the base alerts the base crew of any repairs or supplies the aircraft may require upon its return. The Mars are fuelled from onshore tanks, connected by a pipeline running across the lake bottom and emerging at a fuel buoy. On a normal sortie the aircraft are fuelled for 6hr of flying. The Mars can fly for 5½hr non-stop, or longer if necessary, putting it within quick reach of even the remotest corner on the BC coast.



ABOVE A fine view of the flightdeck — and typical Sproat Lake scenery beyond. The Mars operates with four crew, and during firefighting the flight engineer handles the throttles.

mately 4 acres, the Mars is a very valuable fire-fighter. The Grumman TBM and the Douglas A-26 carried only 500 and 800 Imp gal respectively. Even much larger tankers, such as the Douglas DC-6B, do not carry more than 2,500 Imp gal.

The forward cargo area holds the main water tank. In 1987 three fire-retardant-foam tanks were installed in the aft section. This foaming agent is added to the water to provide extra cooling of the fire.

During the summer of 1960 a technical evaluation of the Mars was carried out using 'LYJ'. It made 26 drops on six fires, delivering 127,000gal of water. During the first operational trial, fighting a tough wildfire on Ramsay Arm at the end of Bute Inlet on Vancouver Island, the Mars proved very effective. As it had not controlled any of the fires on its own these first-year results were inconclusive, but justified continuing the operation with one aircraft.

In 1961, after performing well on two fires, *Marianas Mars* was lost during the third. On its first run it crashed in heavy timber at Northwest Bay, close to the target area, killing the four crewmen. It was speculated that it failed to drop its load due to a door release malfunction and that it was bombing uphill and thus, when the doors failed to open, the loaded aircraft could not outclimb the rising ground.

"If anything happens, such as an engine failure, you must be able to leave the fire zone going downhill", McIvor explains. "And don't ever go into dense smoke. If you can't fight the fire without going into thick smoke, find some other way of getting at it. Even if you don't hit it directly, you can still stop it from moving."

The Department of Transport's lengthy inquiry found no indication of malfunction or structural failure. "It was pilot error, nothing else", McIvor exclaims. "There was nothing wrong with the aircraft, nothing wrong with the concept."

FIFT's directors ordered the conversion of another Mars. But the accident might have influenced the change to multi-drop doors. The second aircraft was ready for service early in 1962, but as this was a low-fire-hazard year it saw relatively little action, a total of 118,000gal being dumped on five fires. However, the largest fire showed the Mars's real potential. Still plagued by mechanical problems, the operation remained under critical scrutiny at the end of the season. It was argued that any other type was equally vulnerable, especially during initial operations. A reserve tanker would clearly solve some of these problems.

A year later *Caroline Mars*, the fourth aircraft slated for service, was written off in totally different circumstances. It was awaiting conversion when, on October 13, 1962, the tail end of typhoon *Freda* struck Victoria Airport. Although the flying-boat was anchored with eight heavy ½in steel cables, the gale hurled it 200yd, breaking its back. It was scrapped, all reusable components being added to the spares stock and the hulk being sold to Capital Iron of Victoria.

During the 1963 season the Mars really showed its worth. For the first time it completely extinguished a fire without groundcrew support. During a fast-moving fire caused by lightning it wetted-down bulldozed fireguards, allowing firefighters to work close to the fire front. Also, in

Martin JRM-1 Mars data

Powerplant: Four 2,500 h.p. Wright R-3350-8 18-cylinder radial air-cooled engines, driving 15ft 2in-diameter four-bladed Curtiss Electric propellers

Dimensions

Wing span	200ft 0in
Length	120ft 0in
Height	48ft 0in
Wing area	3,686ft ²

Weights

Gross	162,000lb
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Performance

Cruising speed	180 m.p.h.
Water pickup time	25–30sec
Maximum load	6,000 Imp gal
Cruising speed to fire	175 m.p.h.
Drop speed	140 m.p.h.
Alighting approach speed	110 m.p.h.
Touchdown speed	80 m.p.h.
Fuel consumption (cruise)	350gal/hr
(operations)	650gal/h
Fuel capacity	11,000gal
Area covered (single drop)	3–4 acres
Dimension of drop pattern	250ft x 800ft
Desired drop height	150–250ft

Note: While the JRM-1 used the 148,000lb gross Wright engines, the JRM-2 used the 165,000lb gross Pratt & Whitney R-4360-4Y "corncob" engines. JRM-3 brought JRM-1 aircraft up to JRM-2 standard

two instances, the Mars soaked fire-threatened timber edges to prevent the start of crown fires.

In September, on southern Vancouver Island, several logging operators started their yearly controlled slash burning. The usual autumn rains held off; instead the weather turned hot and dry. Fanned by strong winds, many slash fires were soon out of control. Consequently the Mars flew more sorties in three days than in any of the preceding three years. In 32 runs the tanker dropped some 177,000gal on a number of fires. Until the ocean became too rough, salt-water pick-ups were made offshore from the fire, round trips taking 10min.

A record 495,000gal were dropped on nine fires in 1963. The Mars had shown it could make a major contribution, so FIFT decided to bring a reserve into service in the coming year. However, 1964 was a very slow year. Only after four wet summer months was the Mars finally called out. During the whole season only two fires required its help. Base activities, however, were intense. New Mars tanker 'LYL was nearing completion, and major improvements were built into 'LYK.

During the summer of 1965 the two aircraft dropped more than a million gallons of water on 17 forest fires in BC, reaching the million-gallon mark for the first time. By the end of 1998 they had dropped nearly 50 million gal of water and foam over an average of 20 forest fires a year.

In 1962 FIFT used a "bird dog" for the first time. The Grumman Goose later replaced this Cessna 195 floatplane. In waterbombing operations a bird dog is indispensable. In addition to making the tanker operation more accurate, it improves safety. Arriving first over the fire, the pilot quickly assesses the situation, identifying the target



ABOVE A Mars fighting fires near Osoyoos in inland BC, 180 miles east of Vancouver, in July 2003.



ABOVE Another action picture taken near Osoyoos, with plenty of smoke for the Mars to dodge.



ABOVE Photographed many years earlier, a Mars drops its vast load of water on a burning ridge.

"Flying Tankers never seems to have a problem attracting people to this unique operation. 'The right personality and a certain amount of dedication is required', chief pilot Steve Wall notes"

priority, and then warns crews working on the fireline of the approach of a waterbomber.

On several occasions in the late 1960s the Mars were used against major sawmill fires.

After the initial accident the two remaining Mars worked almost 40 years free of accident and incident. Averaging about 75–100hr a year, they have logged a total of nearly 3,000hr each, much of it accumulated on training and maintenance flights. "There was a lot more flying done in the 1960s and 1970s", Terry Dixon recalls. The biggest change, and part of the reason Weyerhaeuser pulled out, is that there is no more slash burning. "Probably 30 per cent of the early fires were slash-burn fire escapes. But slash burns are out of vogue now."

The aircraft are almost exclusively used for the company's own forest fire suppression operations. Dixon explains: "Up until now we've only worked for the BC Forest Service when they needed us as a last resort". The waterbombers have been used on large fires at Cowichan Lake and near Atlin in northwestern BC.

More recently the two Mars worked near Salmon Arm, BC, in 1998, where the huge "Silver Creek Fire" raged, forcing mass evacuations of this town in the province's dry Okanagan country. The aircraft flew 118hr, never missing a sortie, with turn-around times for each aircraft of 11 or 12min. They delivered 6,000gal of water and foam to the fire every six minutes.

Flying Tankers has occasionally operated in Alberta, Washington State and California. In 2000 the Mars worked in California for the first time, logging 44hr fighting the wild fires there. "That was a very good experience for all of us, including California, I think", Dixon observes.

Asked how much these big waterbombers are worth per hour, Dixon answers carefully: "Well, that all depends on which way you count it. Our normal tariff is \$12,000 an hour, but to operate them costs a lot less than that." The biggest proportion of the operating cost of the Mars is maintenance. "About 70 per cent of our cost is labour, predominantly maintenance, and to that you

have to add the infrastructure, overhead and the usual stuff." The hours flown since 2003 are significantly down on previous years.

Maintenance

Both engineers double as flight and maintenance crewmen. They must use ingenuity in handling emergency repairs in a hurry. Carried out on the water, repairs can be quite challenging and time-consuming.

Servicing the big Wright Cyclones is probably the trickiest job. Jutting out just in front of the wing leading edge, they hang inconveniently about 40ft up. Engineers have to come up with some ingenious solutions for each situation. Sometimes a floating workshop raft is towed out and tied to the aircraft's hull. Small platforms designed to fit on the engine mountings allow the engineers to work without the raft.

At the end of every fire season the aircraft are hauled out for intensive preventive maintenance and repairs. "Every year there are major overhaul projects. Fortunately we've got tons of spares and all the manufacturer's drawings, so we can repair a lot of our own parts."

Engine maintenance, good workshops and the availability of engines, parts and propellers eventually dictated how long the giants would remain flying. In 1990, for example, FIFT was running low on propellers. They found some and managed to buy those on a Lockheed Constellation stored at Mont Joli, Quebec.

Flying Tankers never seems to have a problem attracting people to this unique operation. "The right personality and a certain amount of dedication is required", chief pilot Steve Wall notes. "Many of these people here are making a personal sacrifice to be part of the operation and keep it going."

One of them, who chose flying the Mars rather than flying Boeing 777s for an Asian airline, sums it up. "Flying a flying-boat in the mountains is a real trip. When we eventually circle our chairs in the rest home, I figure we'll have a lot of listeners." **A**

BELOW A tranquil tailpiece with Philippine Mars at anchor on an almost glassy Sproat Lake. For how much longer will such an impressive sight be seen?



MARK MUNZEL