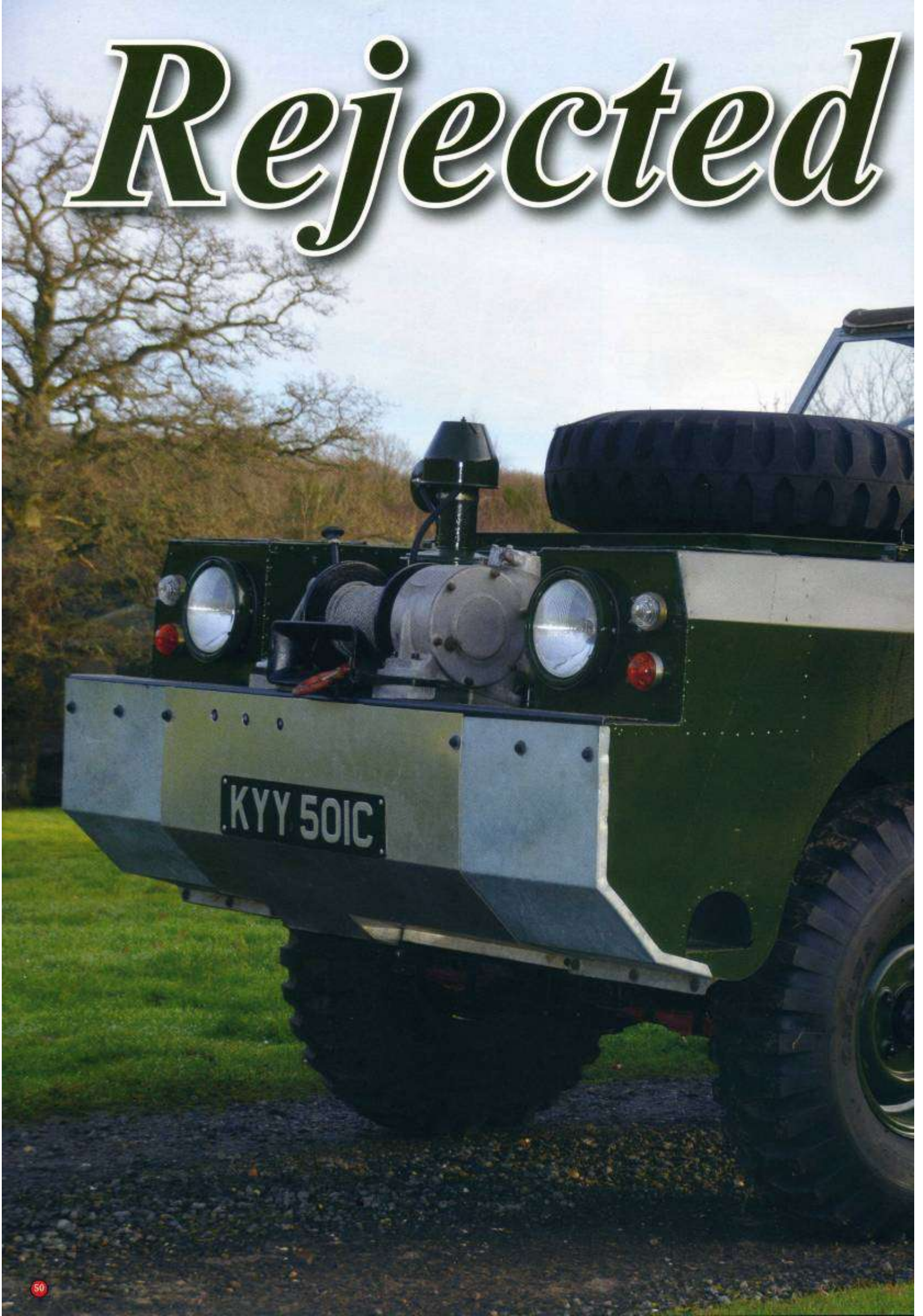
Rejected



The one-off One Ton Amphibious Land rover (OTAL) was designed to meet an Australian Army requirement for wading through flooded rice fields in Vietnam, but after testing in Australia it was rejected and sent back to Rover in the UK.

Words by Grant Ford & Craig Watson. Modern photos by Grant Ford

Movie still showing extended exhaust.

The Australian Army took delivery of its first operational Land Rovers in March 1959, after a year-long trial of the vehicles. By the middle of 1963 the Army had purchased 1,841 Series 2 Land Rovers, in both 88" and 109" wheelbase, for a variety of roles – from General Service to Wire Laying and Ambulance, and even in an offensive role carrying the 106mm recoilless rifle.

This association continued with the release of the Series 2A Land Rover, with 4,776 purchased by the Army by April 1977, and was on-going through Series 3 and the Perentie 110 (see Issue 12).

The Government of Robert Menzies announced increased involvement in the Vietnam conflict in March 1965 and Land Rover looked to supply Australian forces with the perfect vehicle for operations in South-East Asia. Issues with crossing heavily flooded paddy fields had come to the fore and the Army thought it may have a need for a rapid all-terrain vehicle with the ability not just to wade, but swim.

Land Rover Amphibians

In 1961-'64 Land Rover had experimented with an amphibious Air Portable General Purpose vehicle to meet a British Army requirement – FV 18051 (Scheme A) APGP in Army-speak. Although field-tested by the Army, the vehicle was rejected mainly on the basis of its cumbersome separate floatation bags that had to be assembled, strapped to the body and inflated, its slow speed on water and the vulnerability of its air bags under fire.

The FV 18061 (Scheme B) of 1962 was a forward-control truck that reached mock-up stage and featured a 97" wheelbase with a body with inherent floatation abilities. An air-portable 4x4 with a 1-ton payload, powered by the 77bhp four-cylinder engine, confirms Land Rover had amphibious ambitions prior to the Australian requirement.

OTAL

The OTAL (One Ton Amphibious Land rover) was constructed by Land Rover Military Engineering Department, especially for the Australian Army as a Commanders/Radio car. Their brief was for "a vehicle which has all the characteristics of a Land Rover but in addition is able to cross inland water without special preparation and without using applique flotation kits".

Unlike the APGP, the OTAL had a boat-shaped flotation hull, similar to that of the GPA (sea-going Jeep) from the Second World War. This did away with the long setup times of the APGP to fit and inflate it's flotation bags.

Although a similar overall size to existing Land Rovers of the time, the OTAL didn't share their 88" or 109" platform, but was constructed on the same 97" wheelbase of Scheme B. Most of the running gear was standard Solihull fare, thus parts availability should not have been an issue.

However, it was powered by what was, at the time, a new and rare engine; a specially adapted and modified 2.6 litre straight-six petrol engine, with its origins from the P4 Rover 90 saloon, fuelled by a single SU carburettor.

In his definitive history of the marque, *Land Rover – 65 Years of the 4x4 Workhorse*, James Taylor says of the OTAL engine: "Exactly why the 6-cylinder engine was chosen for this vehicle remains unclear. Australian military Land Rovers of the time all had 2.25-litre petrol engines, and so it is unlikely that the customer demanded the engine. It is more likely Solihull thought it was necessary because of the OTAL's great weight. At 3,950lbs (1,791kg) unladen it was approaching the weight of a Forward Control..."

Fully loaded the OTAL tipped in at 2.83 imperial tons, which justifies the 83bhp and, more importantly, 128 ft lbs torque at just 1500rpm, provided by the increased capacity.

The first Land Rover with the 2.6lt six-cylinder was the 109" station wagon available in US from summer 1966, as a 1967 model. It may be that Land Rover was at that stage pushing the 6-cyl and wanted the Australian Army as a customer of the engine, which would have given them great kudos, but this is purely conjecture.

It may not be purely coincidental that the Australian Army Series 3 Land Rovers, introduced in 1977, featured the six-cylinder engine.

The all-aluminium body of the OTAL was built in a sealed pod-style in four separate sections, with hand-constructed rear and

OTAL exiting the deep wading tank at Monegeetta, Vic.

Land Rover UK publicity shot, at Packington Park.

Testing its all-terrain capabilities.

Water abilities were minimal.

Report from Canberra Times, 7-8-'66

centre/cab sections. The front fenders are bolt-on watertight units, offering buoyancy, with easy removal providing greater access to the engine area, with a sealed toolbox hatch on top of each.

Any space suitable on the vehicle, including the chassis, under the floor and the front wing buoyancy tanks, was filled with polyurethane foam. As well as adding buoyancy it is unaffected by small-arms bullets, unlike the earlier floatation bags.

Interestingly, the conventional engine bay is not watertight and the waterline was level with the head gasket. This was successful on the prototype, but it is expected that in production the engine compartment would have been completely sealed, to provide even greater buoyancy and to give greater protection to the engine's electricals. The distributor, from a wartime Daimler Scout car, is sealed and sits on an extended 8" alloy housing.

Both engine and gearbox are sealed units, vented by pipework that remains above the waterline. Intake is via a snorkel sitting just behind the heavy-duty drum winch mounted on the front of the vehicle. The exhaust exits at the rear behind the driver, right on the waterline. An additional section of pipe would be attached before the vehicle entered deep water, which extended the exhaust to roof height.

Crew entry is via a folding door on each side, with non-slip step installed. Once closed these form a watertight seal, which was important as the OTAL had a very low freeboard (the height above the waterline).

The four-speed gearbox is of 1-ton specification, while a hydraulic pump powers the winch which is controlled from inside the cab.

The UK tests were carried out on and around the calm lake at Packington Park, a nature reserve in Warwickshire, and possibly at Eastnor Castle, home of Land Rover testing since 1961. There are also a few photographs of initial controlled water tests in a wading tank, that look precarious.

While few reports from the UK trials are available, one undated report from the Land Rover Engineering Department did confirm; "Cross-country performance is up to normal Land Rover standards with good approach and departure angles and adequate floatation on large tyres".

A silent, six-minute long, black & white film of these tests has recently been discovered, which confirmed the OTAL's off-road performance and ruggedness.

On-road performance was reportedly very good due to the six-cylinder engine.

However, the film shows that on the water, the OTAL's operation was, at best, marginal. Propulsion and steering were effected by the vehicle's wheels, which restricted its speed to an estimated 4 or 5 knots (nautical miles per hour).

However, according to the above report, reproduced on **remlr.com** (the Australian Registry of Ex-Military Land Rovers); "experiments with deflectors near the rear wheels and with propellers driven by the power take-off, suggest that the vehicle could be given enough speed to cope with most inland water flows."

Heading To Australia

Sadly, Army records of the tests carried out in Australia either no longer exist or are lost deep within the archives, as a search by the Army History Unit has failed to turn anything up.

However, we do know that the OTAL arrived in Australia for vehicle trials in the first half of 1966 and was tested at the Army's Trials and Proving Wing at Monegeetta, near Lancefield in Victoria.

Only one photo of the vehicle during this time is known to exist, which shows the OTAL exiting the Deep Wading Pool at Monegeetta and reveals the Army registration number (ARN): 108-430.

According to REMLR, research on this ARN has turned up a one-ton truck prototype, indicating that ADE (Australian Design Establishment) re-used these registrations.

Although we don't know to what extent the OTAL was tested in Australia, or over exactly what period, we do know that it was given a run on Lake Burley Griffin in Canberra, on 6 August 1966, "in front of Army and Industrial observers." A single photo and very brief description was published in the Canberra Time newspaper the following day, while another colour image shows the vehicle beside the lake.

Due to the lack of information available, it would appear that the OTAL never progressed on to tropical or outback trials. (NB: the Tropical Trials Establishment at Cowley Beach, near Innisfail, Queensland, was only established in that year.)

Rejected & Returned

Instead, the OTAL was rejected by the Army and the prototype sent back to Land Rover in England.

While the vehicle seemed quite capable on calm water, its low freeboard and slow speed would have made it inefficient at best in flowing rivers, and vulnerable to fire in a combat situation.

For the most part, the need for an amphibious vehicle was not realised with Australia's involvement in Vietnam. The Phuoc Tuy province in which Australian forces mostly operated did not require such a vehicle and Land Rovers were only deployed to Vietnam in fairly small numbers and most with specific roles. Few were employed in direct operations and the cost for a specialist amphibious vehicle would have far outweighed its operational viability.

Towing a bogged truck at Eastnor Castle.

At a military vehicle show in the 1970s.

As it arrived in the Dunsfold Collection.

Mid-resto. Inset: Restored chassis.

Civilian Life

The OTAL found its way to the 500-acre Eastnor Castle estate, where it received a coat of Ferguson Tractor grey paint and was adapted for use as a snowplough, with a 1969 civilian registration TVJ 237J.

Fitted with chunky Firestone Super All Traction tyres, the OTAL was often used to rescue everything from gas-cylinder delivery trucks, to holidaymakers and their caravans.

During its time at Eastnor it became apparent the steering was becoming heavy, making the amphibian more of a challenge to manoeuvre. Checks were carried out to isolate a fault, but mechanically nothing was discovered. Eventually, water was found inside the front wings; after drilling a hole in both, around 40 gallons escaped and the vehicle's drivability returned.

The OTAL was often seen at military vehicle shows during the mid-1970s, but by 1983 it resided with the British Motor Industry Heritage Trust at their museum, now the British Motor Museum, in Gaydon, Warwickshire.

A Lifelong Dream

During 2008 a rumour of vehicle opportunities from Gaydon reached the ears of Philip Bashall, who oversees the Dunsfold Collection; the world's largest private collection of Land Rovers.

As a nine-year-old, back in 1970, Phillip had first seen the OTAL, the "Landie" of his dreams, at a show and decided it was a "must-have" vehicle. 38 years later, the opportunity arrived. "It was the chance I couldn't turn down", he confirmed, and after some "horse trading" a lifelong dream was realised.

Showing just 3,571 miles, the amphibian, re-registered KYY 501C, sat in his workshops. Photos taken on arrival show the OTAL was in sore need of Philip's restoration talents. "Yes, it was a little rough but nothing worse than I had done before" he admitted.

The strip down was carefully carried out, with all parts catalogued, until just the chassis remained; which was in good order, considering the environment it had operated in. A complete blast and etch-prime for the chassis, with no welding required, was a good start.

Unfortunately, the front axle was bent, so a replacement case was sourced. The internals had little wear and reassembly soon followed. The rear axle was just stripped and repainted, as was the standard 1-ton gearbox.

Philip had got the engine running prior to removal but an inspection was prudent, so the cylinder head was removed. With minimal wear showing, new gaskets were fitted and the straight-six was reassembled prior to detailing. Luckily, everything was complete; "as the engine is a bit of a mongrel", Philip confirmed.

This prompted me to ask if he would have considered an alternate to the Rover unit? "Yes. Logic says a diesel would have been preferable certainly; ideally the power plant should have been isolated (from the water)".

Having spoken to one of the engineers involved in the project, the advice offered to Philip was that the engine is protected

View From The Pilot

OTAL restorer and trustee of the Dunsfold Collection Philip Bashall offers his thoughts on the delights of this unique amphibian....

What turned me on to it? Well, I guess it had to be the Banana Splits with their Amphicats six-wheeled buggy things. The thought as a nipper of having one of them never went away.

When I saw the OTAL, it reminded me of the excitement of having a vehicle you can just drive into a lake and out again (hopefully) and a Land Rover to boot. The Land Rover bug had bitten by then. I pestered my father to get it but it never happened. We always knew it was safe at Eastnor and hoped one day it might come up for grabs.

It turned up in the then BMIHT collection and a deal and swap was carried out. Having done a ground-up restoration, a chance find of the original specification leaflet and a rake of photos helped the project along.

I really enjoyed the restoration and, I'm not just saying this, but it is one of the nicest Land Rover models to drive. The noise from the small bore exhaust and the rev limit, which seems very high, sounds superb and it will always draw a crowd wherever it goes.

Just to master the climbing in bit is an art, and I have many scars where a foot has slipped out of the tread strip inside the door.

I still have things to do, like the canvass door tops and plumbing in the winch, but with a good dose of WD40 and lots of silicone grease I am determined to re-float the old dear.

Having swum the APGP, Stalwarts, DUKWs, Weasels, Snowcats, Gamma Goats and my Amphibious Jeep GPA, this has to be the next one.

• *Sincere thanks to Philip Bashall for his assistance in producing this article.*

The Dunsfold Collection of Land Rovers is a registered charity dedicated to the preservation of Land Rover history.

The Collection was started in 1968 by Philip's father Brian, who realised that his love of strange prototype and pre-production Land Rovers was of interest to others.

To find out more and admire their vast array of Solihull's finest vehicles visit: **www.dunsfoldcollection.co.uk**

Rover 2.6lt 6-cyl engine.

by the bow wave all the time the OTAL is moving. It is only at a standstill that the water level becomes an issue.

"Also, as the tank tests proved in 1965, never reverse into the water; always forwards unless you want wet feet".

Another problem was that both fuel tanks were rusted out and were not useable. The complete wiring loom was given to specialists Auto-sparks, who bravely accepted the challenge and constructed a new one from scratch.

Philip found holes drilled everywhere, as the prototype had been unable to drain itself. These received specialist alloy welding repairs, with drain plugs installed, including both the front wings.

During initial water tests in 1966, a small bilge pump attached to a garden hose acted to remove unwanted flooding, but now even the centre tub area had holes that required repair and drains to be fitted.

Once all sections were watertight again, the body could be reassembled. Philip noted some hooks for buoyancy aids remained across the underside. Unfortunately the aids, originally attached by canvas straps, had long since gone. "These I will look to replace before I attempt my next 'must do' and that is to get the OTAL to swim again"; although Philip is sure they would not be compulsory because he wouldn't look to enter the water carrying a 1-ton payload.

The newly-fitted, custom-made hood compliments the gleaming paint and polished aluminium, all of which emphasise the attention to detail this restoration demanded over six months.

Taking A Spin

With seating for three up front it is far from cramped and remarkably comfortable.

As the straight-six roared into life, the lack of sound deadening reminds you this is a military vehicle.

Whatever failed to impress the Australian Army in 1966, I doubt it was the on-road performance, with ample power to remain with all but the fastest of modern traffic.

The OTAL did return to its original launch site at Packington Park in 2013, to star in the 65th anniversary celebrations of the Land Rover marque. Placed on the same slipway that it left in 1966 was a reminder to current custodian Philip Bashall of his ambition to re-enter the water when the chance permits.

Now housed within the Dunsfold Collection, the OTAL will next be on the move at their biennial open days, on 10-11 June 2017, along with 130 other rare and special "Landies" from the Midlands.

OTAL Body Dimensions

Wheelbase:	97" (2.46m)
Track:	53 ½" (1.36m)
Overall Length:	174 ¾" (4.44m)
Overall Width:	69 ¾" (1.77m)
Overall Height:	46 ½" (1.18m)
Loading Area:	20.5 sq ft (1.90 sq m)
Ground clearance:	11" unladen
Approach angle:	44° unladen
Departure angle:	45° unladen
Unladen weight:	3,950lbs (1,792kg)
Payload incl 3 pass:	1 ton (1,016kg)
Gross weight:	6,350lbs (2,880kg)