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GEARS OF WAR

Modern warfare demands a new breed of rapid, agile and super-tough vehicles. **Richard Webber** hitches a ride in the latest 'MRAPs'

PHOTOGRAPHY AL STALEY





These wheeled Leviathans may look lethal to the untrained eye, but their primary raison d'être is saving lives, not taking them. In military shorthand they are known as MRAPs – mine-resistant, ambush-protected vehicles – and are designed to withstand ballistic (projectile-based) threats as well as blast-inducing weapons such as land mines and the notorious improvised explosive devices (IEDs), which have been the biggest killer of coalition troops in Afghanistan.

Older protected patrol vehicles such as the British Army's lightly armoured Snatch Land Rover, which was originally developed for use in Northern Ireland in the early 1990s, and the US military's Humvee were ill-equipped to face the proliferation of IEDs in Iraq and Afghanistan, so a new solution was needed – and fast. That's why the US alone built 27,000 MRAPs between 2007 and 2013, and why the British Army is now equipped with a range of them, including the eight-metre-long, 23.5-tonne Mastiff 6x6 and the newer, smaller Foxhound 4x4.

We're at the International Armoured Vehicles show in Farnborough to see and ride in some of the latest MRAPs. But why are they so big, and why not just use tanks? →

UNIVERSAL ENGINEERING RANGER 8X8 STREIT TYPHOON

TEXTRON COMMANDO ELITE



Crew	Two plus 10
Top speed	81mph
Kerb weight	25,000kg
Length	8350mm
Width	2500mm
Height	2900mm
Engine	6 cyls, 12,400cc, turbodiesel
Power	533bhp at 1900rpm
Torque	1834lb ft at 1050rpm
Gearbox	12-spd automatic

This new Dorset-built MRAP is designed to withstand detonation of a 10kg explosive from beneath. Cabin gear (including seats) is roof-mounted to reduce shocks from below. Its double-wishbone suspension's ability to trounce four-foot ridges was astonishing, as was the ride at the 60mph we hit. Yet, as our helmsman said, "your mum could drive it".



Crew	Two plus eight
Top speed	62mph
Kerb weight	13,000kg (approx)
Length	6894mm
Width	2466mm
Height	3010mm
Engine	6 cyls, 8800cc, turbodiesel
Power	394bhp at 2100rpm
Torque	1200lb ft at 1300rpm
Gearbox	6-spd automatic

The Canadian-built Typhoon 4x4's buyers have included the UN. The example we rode in used prototype double wishbones, and while harnesses were required to keep us in place, the agility, four-wheel drifts and 1.5m wading depth impressed. However, the sensory deprivation of the dark, noisy rear cabin would do little for the nerves in enemy territory.



Crew	Three, plus up to four dismounts
Top speed	65mph
Kerb weight	14,742kg
Length	6630mm (approx)
Width	2740mm (approx)
Height	3020mm (approx)
Engine	6 cyls, 8898cc, turbodiesel
Power	360bhp at 2100rpm
Torque	1113lb ft at 1500rpm
Gearbox	6-spd automatic

The Commando Elite, which can climb a 60 per cent gradient, is a descendant of the vehicles used during the Vietnam War. The view out is limited, but TFT screens relay images from video and heat-sensitive cameras. Primarily an intelligence-gathering vehicle, but its optional roof-mounted weapons system can detect and automatically retaliate to attacks.

"IEDs have been around for decades," explains Andrew Elwell of event organiser Defence IQ. "But the devices used by insurgents in Iraq and Afghanistan were much bigger than we'd seen before, so armed forces had to find new solutions. This involved using V-shaped hulls [pioneered by the South African military in the 1970s] to deflect the blast, which in turn meant the vehicles had to be much higher. Tracked vehicles are very difficult to engineer with a V-shaped hull and, as operations transition to more urban and irregular



Typhoon's eight-seat cabin is secure but dark and noisy

Never mind the Ranger's blast-resistant hull, just feel the ride quality



environments, wheeled vehicles offer greater manoeuvrability, they're faster, and they look more familiar so are less threatening to civilians in the battle for hearts and minds."

There's no doubt that MRAPs have greatly reduced armed forces casualties. At the show we meet Australian Brigadier Bill Sowry, who tells us his army's Bushmaster 6x6 vehicles – a breed apart from its 'soft-skinned' Mercedes-Benz G320 CDI 6x6s – have sustained 80 attacks without casualty, while Britain's Mastiffs negotiated an astonishing 330 attacks before the only fatalities to date occurred in April last year.

Part of the MRAP's improved safety record is down to the materials used in the armour. While steel is still used for defence against ballistics, composites are more adept at blast absorption and are significantly lighter. Such materials include high-performance polyethylene (also seen in applications as diverse as cut-resistant gloves and fishing lines), aramid fibres and the more familiar glassfibre-reinforced plastic.

And while most MRAPs still employ megacube, torque-oozing, truck-derived six-cylinder turbodiesel engines, other bits of hardware are becoming more sophisticated, such as electronically governed automatic gearboxes and differentials, an increasing uptake of independent suspension and even air springs. Combined with weight savings, the composure these developments lend

means modern MRAPs are able to cover even rough ground at high speeds. We experienced this newfound pace and agility in Universal Engineering's Ranger 8x8 and the Streit Typhoon 4x4 (see sidebar, left). A former US Marine riding with us in the Typhoon marvelled at how much quicker it was at negotiating challenging terrain than the equivalents he'd used a decade earlier.

These attributes draw clear parallels with motorsport. British engineering company Ricardo worked on the Land Rover Snatch 2 and the Mastiff and co-developed the new Foxhound using F1-derived technology for its composite-encased cabin. The company has also been involved in F1, the WRC and Le Mans, had a hand in the likes of Renault's Mégane RS 225 and the Bugatti Veyron and supplies engines for McLaren's road cars.

As coalition forces withdraw from Afghanistan, the glut of American MRAPs means some are being scrapped, while others are sold to allies or gifted to the US police. Indeed, the 'blue light' market for MRAPs is growing as police forces face the increasing challenges posed by border protection and internal security. Such demand is greatest in the developing world, but violent public unrest such as the 2011 England riots could mean that lighter, purpose-built armoured vehicles will soon be roaming closer to home. **A**



Pte Webber samples the high-tech cabin of the Commando Elite



Mighty 533bhp 12.4-litre six-pot diesel delivers incredible off-road pace

ARMOUR-LITE



BMW 760LI HIGH SECURITY

This BMW limo is by armoured car company CJL Exec. Reinforced steel and glass can stop 7.62mm bullets and kit includes a self-sealing fuel tank and an internal oxygen supply. Weighs 4000kg yet hits 62mph in 7.5sec. Yours for £2100 a day, including driver and back-up 4x4.



FORCE PROTECTION FOXHOUND

A combat zone replacement for the Snatch Land Rover, the 3.2-litre Foxhound carries a crew of six. It took just 18 months from concept to prototype and now numbers around 400. Top speed is 68mph, the engine can be replaced in 30 minutes and it can drive minus one wheel.



OVIK CROSSWAY

Purpose-built on an in-house chassis by Dorset firm Ovik, the Crossway is rated to stop 7.62mm bullets. It's rear drive with on-demand 4x4 and is powered by a 197bhp 3.2-litre turbodiesel or a 5.0-litre V8. Set to make its debut in select UK police forces in May. Yours for around £114,000.



Force Protection Mastiff

Adapted from the US Marines' Cougar 6x6 by NP Aerospace in Coventry, this third-gen Caterpillar-powered Mastiff now accommodates a crew of 10. It has a top speed of 56mph. There are over 500 in the British Army, the last ones estimated to have cost around £730,000 apiece.