Section 7

Mine-protected vehicles

Buffalo

Technical Solutions Group, Inc , U.S.

Buffalo in operation

General description

The **Buffalo** is a mine and ballistic protected 6x6, diesel-powered vehicle, which can be fitted with steel wheels and a towed disc roller. The vehicle is also fitted with an articulated arm for attaching a variety of demining tools, such as a ripper, fork, and a disc roller. Other demining tools, such as a vegetation cutter can be added as well as various detector systems.The Buffalo offers protection against 45lbs explosive weight under the wheels and protection under the centre line of the chassis against up to 30lbs explosive weight. Ballistic protection against up to 7.62mm NATO rounds is assured.

Buffalo is also available as a control vehicle for remotely controlled detection equipment and as a mine clearance system (U.S. Army).

The Buffalo uses a commercially available drive-train and components to ensure worldwide logistics and maintenance simplicity. Parts are covered by the original manufacturer's warranties.

Working methodology

Steel wheels are used in order to attempt to detonate live anti-personnel mines, including bounding mines.

A towed disc-roller is used where stones or other solid objects in the ground might provide a shield to targeted ordnance. The disc rollers are designed to defeat obstacles.

Machines in use

- The Humanitarian Demining Department at Ft. Belvoir is due to deploy to Southeast Asia on operations with Buffalo.
- The U.S. Army plans to deploy two Buffalos fitted with steel wheels and towed disc rollers to Afghanistan.
- The U.S. Army possesses 12 Buffaloes in the mine-protected clearance role.

Engine, fuel, and oil

- Currently, Mack E-Tech Engines, but due to convert to Caterpillar C-12 Diesel engines.
- Standard hydraulic fluid and oils.
- Approximately 10-15mpg, depending on terrain.

Factory support

- TSG trains operators and mechanics.
- Training is part of purchase package. Instructional manuals are available in English.

- Manuals are part of te purchase package.
- TSG warranty for armour is two years. Factory back-up on all other components.
- TSG has extensive experience in demining and provides advice on how the equipment can be best used in various terrains.

Maintenance and support

- Diesel mechanic, no other additional skills are required.
- Recommended operators: two people in addition to mechanic.
- Required workshop facilities: standard mechanic's tool-kit, computer loaded software to deal with faults, welding equipment.

Test and evaluation

- Buffalo has been tested by the US Army as well as the Humanitarian Demining Department at Ft. Belvoir.
- The Buffalo's predecessor, Minekiller, has been used operationally since 1997. Basic concepts in use since 1991.

Buffalo with steel wheels and roller systems

Reported limitations and strengths

Limitations

- **Not suitable for marshy ground conditions.**

Strengths

- **Versatility.**
- **Good mine blast protection.**
- **High mobility.**
- **The vehicle is transportable by sea and C-17 equivalent air transportation.**
- **The vehicle is roadworthy on paved surfaces with tyres fitted.**

. Casspir
. RG-31 M

Alvis OMC, South Africa

Casspir Mine-Protected Vehicle

General description

Casspir is part of a series of mine-protected vehicles adapted for military, peacekeeping and humanitarian operations. The monocoque hull is constructed from high grade alloy and armour-plated steel. The hull has been proven against anti-tank mine blasts and some types of high velocity projectile.

For the demining role, Casspir can exchange rubber road wheels for special steel wheels. The steel wheels are specifically designed to withstand detonation of most types of anti-personnel mines, but are not adequate protection against anti-tank mines. Tests have shown the steel wheels to be unaffected by anti-personnel mine blasts.[1] The steel wheels are attachable to Casspir and Tapir MPVs.

Casspir can be employed in multiple roles, e.g. personnel carrier, ambulance, utility freight carrier, tanker and recovery vehicle.

The vehicle crew is protected against up to three stacked anti-tank mines under any wheel and two under the hull.[1] The operational effectiveness of the vehicle may however be compromised. Ballistic protection up to 7.62mm rounds, as well as shrapnel,[1] is achieved.

Casspir main components are commercially available. Specialist mechanics are not required. The vehicle requires little technical support and is usually field repairable after a mine detonation incident.

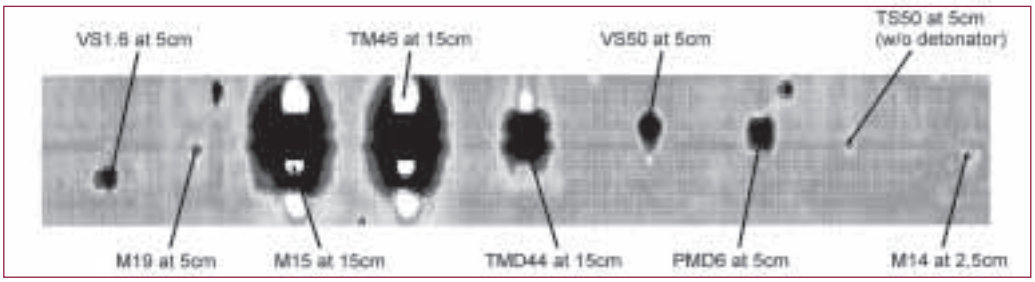
Powered by a TATA driveline, the Casspir MK 2C (I) is the latest in the manufacturer's range and provides excellent on/off road mobility as well as ease of maintenance, with a proven TATA drive line.

RG-31M: Derived from the successful RG-31, the RG-31M features a military wiring harness, central tyre inflation and several other new features. It is a 4x4 mine-protected armoured vehicle with a crew of five and a weight of 8,400kg. The all-steel, welded armour, monocoque hull protects the crew against small arms fire and anti-tank mine detonations. According to the manufacturer the vehicle is blast resistant against the detonation of a double TM57anti-tank mine (the equivalent of 14kg of TNT) under any wheel, or a single TM57 under the hull.

The RG-31M has been designed to fulfil a wide spectrum of applications including humanitarian demining.

Specifications

- **Casspir** can be employed in multiple roles, e.g. personnel carrier, ambulance, utility freight carrier, tanker and recovery vehicle.



Detection performance

- Although the vehicle would be damaged, the crew is protected against up to three stacked AT mines (up to 21kg TNT).[1] Effective ballistic protection up to 7.62mm, as well as shrapnel.[2]
- Casspir can be equipped with VAMIDS.
- VAMIDS can detect zones of ground of 2-6m in diameter. Paint spray nozzles mark mines or UXO (or areas of interest) while moving up to 10km/h. The detection heads can be mounted at either side or at the rear of Casspir. Casspir is suited to area survey, route survey, area reduction and Quality Assurance (QA).
- The Casspir has been modified to accommodate the VAMIDS system. The vehicle dimensions and weight differ from the original specification.
- VAMIDS performs good scanning at the relatively high speed of 10km/h.[1]
- The diagram below shows detection data collected at U.S. Army Fort AP Hill, Virginia, using a two metre flexible array at approx. 1m/sec.

Technical data for VAMIDS system:

One-Meter Flexible Array Segment

Effective detection width:	1,000mm (39.40")
Dimensions:	1,168mm (45.60") wide, 613mm (24.10") deep
Weight:	27kg (59lbs)
Number of detection heads:	8
Bend angle per detection head:	+/- 2°
Bend angle per segment:	+/- 14°
Operational temperature range:	-40°C to +85°C
Storage temperature range:	-55°C to +85°C

The given weights and dimensions include the VAMIDS frame. For wider array of detector heads add 1,000mm (39.40") in width and 27kg (59lbs) for each additional metre of segmented detector head.

RG-31 M

Machines in use to date

- Mechem has 8 Casspir/Tapir vehicles fitted with steel wheels between Croatia and Mozambique.
- More than 10 million square metres of ground covered by steel-wheeled Casspir. Over 10 years, more than 10,000 anti-personnel mines have been detonated by steel wheels without crew injury.[1]
- Mechem have employed one Casspir and one Tapir equipped with VAMIDS in Mozambique as well as trials in South Africa since 1997.
- NPA is using the Casspir with steel wheels in Angola.

Engine, fuel and oil

- Casspir is equipped with a six-cylinder in-line 124kw turbocharged diesel engine with 124kw.
- The engine has a pressurised liquid cooling system.
- The auxiliary engine for the VAMIDS detection system requires diesel.
- The fuel capacity for the vehicle is 220l.

Factory support

For the VAMIDS system:

- Mechem can supply all spare parts. Many parts are available on international commercial market.
- Main spares for pneumatics by the international firm Festo.
- Technical and operator training manuals are included in purchase price.
- Manuals are available in English.
- One year warranty on complete VAMIDS system.
- The system with complete crew can be hired from Mechem.

Steel wheels:

- Mechem can supply new or reconditioned steel wheels on order. Delivery period of 6-8 weeks from date of order.

The manufacturer has not provided further information.

Maintenance and support

Casspir vehicle:

- Main components are robust and commercially available. Time and money saved. Specialist mechanics not required.
- The vehicle is usually field-repairable after a mine detonation incident.

VAMIDS:

- The VAMIDS system requires an operator familiar with Windows 95/98 or 2000. Basic knowledge of computer and software diagnostics, installing drives and software, Windows Explorer and e-mail. Basic knowledge of electronics and pneumatics.
- Basic hydraulic knowledge required for the system.

Steel wheels:

- Minor maintenance required.
- Simple to replace.

Tests and evaluations

VAMIDS:

- Mechem carried out significant evaluations of the system over a four-year period and assess it as a highly useful tool.
- Test reports of the system available from Mechem on request.

Steel wheels:

- Steel wheels have been used extensively in Mozambique and Croatia.
- Technical tests have been conducted. Results available from Mechem on request.

The manufacturer has not provided further information.

Early version of Casspir mounting steel wheels

Reported limitations and strengths of the Casspir

Limitations

Steel wheels:

- Very heavy system requiring special equipment to fit to the vehicle. Requires special arrangements for transportation.
- Maximum speed is 10km/h.
- Special driver training required. Incorrect driving techniques could damage the drive train of the vehicle.

VAMIDS:

- Although the system can detect mines with minimum metal content, it becomes impractical when deployed to areas with high occurrence of metal debris.

Strengths

Steel wheels:

- Robust.
- Good for most terrain.
- Claimed to detonate more than 80 per cent of anti-personnel mines in area covered.
- Requires little technical support.

VAMIDS:

- The system is useful for QA, area reduction, surveying and detection of mines with higher metal content e.g. PMN, PMD and anti-group mines.

1. According to the manufacturer.

DINGO 2

Krauss Maffei Wegmann, Germany

DINGO2 All Protected Carrier Vehicle

General description

The **DINGO** is a light mine-proof vehicle based on the renowned Commercial Unimog chassis by DaimlerChrysler.

The Dingo has excellent mobility in varied terrain. Support services are provided by DaimlerChrysler's worldwide service network, with an inexpensive spare parts package.

The specially designed hull is proven to withstand the blast effects of anti-tank mines.

Specifications

- DINGO 2 can be employed in multiple roles, e.g. personnel carrier, reconnaissance vehicle for EOD or demining staff, or ambulance.
- The crew is protected against anti-tank mines up to 7kg of TNT and common types of anti-personnel mine.
- Effective ballistic protection up to 7.62x54 anti-personnel rounds (Dragunov).
- A wide range of optional features are available.

Vehicles in use today

Today, 170 Dingo 1's are in service with the Bundeswehr (German Army). The vehicles are operational with German forces in Afghanistan, Kosovo and Macedonia.

Engine, fuel and oil

- COTS Daimler-Chrysler Unimog chassis.
- Engine: 170 kw DC engine (EURO 3 Standard).
- Semi-automatic gearbox.
- Range 1,000km.
- 220l fuel capacity.

Factory support

The DINGO 2 is supported by the company's worldwide support and maintenance network. Spare parts are available worldwide through the DaimlerChrysler sales network.

Maintenance support

- Main components are of rugged design and commercially available through the worldwide servicing network.
- KMW is contracted for maintenance in several conflict and post-conflict areas around the world.

Test and evaluation

Before procurement, the German Army tested the DINGO 1 extensively. The vehicle has proven operational effectiveness from several missions worldwide.

Independent test reports are not available.

Reported limitations and strengths

Lack of independent test reports. No information can be provided.

POOKIE 2000 LMVD

Force Ware Gmbh., Germany

POOKIE (original version)

General description

The **POOKIE 2000 Land Mine Detection Vehicle** (LMDV) is the latest generation development of the mine detection unit that saw operations in Rhodesia (now Zimbabwe) in the 1970s and 1980s.

More than 75 working units have been in operation and have successfully located in excess of 550 mines of various types.

This light-armoured, two-seater vehicle was initially designed to clear mined roads during the height of the Rhodesian counterinsurgency. It has now been improved to detect in open areas and serves well as a quality control system. Other variants of the system are a reconnaissance vehicle and an ambulance.

The unit is currently manufactured in South Africa. Negotiations are underway to manufacture the vehicle in Europe.

Working methodology

The unit's primary function is as a blast- and fragment-protected detection support platform. The unit is driven like any normal vehicle. According to the manufacturer, the vehicle can be equipped with a specially designed detection system that can locate mines while moving at between 5 and 40 km/h. Speed of detection depends on the mine type encountered and the terrain of operation.

The unit is operated by a crew of two: a driver and an observer for the detection system.

A combination of a lightweight body trailing arm, independent suspension and special tyres contribute to excellent weight proportion. Therefore, the vehicle is able to traverse suspect areas without detonating anti-tank or anti-personnel mines. Detecting pans are fitted to the centre of the body and are able to detect even low-metal-content mines within the path of the vehicle.

As a reconnaissance vehicle, experienced observers can locate mines visually in support of the detection system.

The vehicle can be fitted as an ambulance for fast casualty evacuation over difficult terrain.

The vehicle can also be fitted with a pre-detonating device to initiate tilt-rod-activated mines, such as the Yugoslav TMRP6.

Machines presently in use

More than 75 units have been manufactured and deployed for operations. A number of re-engineered units are currently in operation in Africa and the Middle East.

Detection

The vehicle is presently equipped with basic pulse induction metallic detectors developed in South Africa. In the foreseeable future and with the advancements in technology, ground penetrating radar (GPR) will be included in support of a metal detector.

The standard detectors fitted are two VALLON VMV4 flat pans fixed to each side of the body, equidistant from the axle sub-assemblies. They sit approximately 300mm above the ground and each pan can be either 2 or 3 metres in length. They are said to be durable and able to operate in different weather and climate conditions. The unit has been designed for the integration of other multi-sensor systems as they are developed.

The search head contains eight detector coils, which carry the signal to a computer. The central electronic unit processes the measured signals from the detector coils and provides either an audio or a visual display on a PC and/or printouts.

The vehicle and system can be fitted to a Global Positioning System (GPS) for positioning purposes.

The client may select the detector to be mounted.

Mechanical data

The original horizontally aligned, petrol-powered 1600cc Volkswagen engine has been replaced with a 170 IDI diesel injection 1,686cc engine. The diesel engine improves general performance of the detection system, decreasing static interference on the detecting units.

- Body configuration: twin cabin mine-proofed, armoured monocoque body hull sitting 700mm above ground level on a retrofitted Isuzu chassis. With optional armoured glass windscreen and rear view windows.
- Transmission: 5-speed gearbox, automatic transmission is optional
- Suspension: trailing arm Rubrax independent suspension four-wheel drive.
- Fuel capacity: 40l diesel.
- Tank is situated above the chassis and to the rear of the cab and engine for safety reasons.

Factory support

Other than the monocoque hull all parts of the unit are commercially available. The manufacturer will supply running and maintenance spares for two years of operations as part of the purchase package. Due to the simple design of the POOKIE, spares are easily available from any company purchasing motor vehicles.

Any damage to the monocoque hull caused by accident or a mine detonation can be repaired in any field workshop. Chassis are interchangeable in approximately one hour.

Training is part of the purchase package. Operators should ideally have some mechanical experience. Operator training lasts one day and can be conducted from any base with access to rugged terrain areas. Operators should have a working knowledge of the detection system. Operations may require support from qualified staff with access to workshop facilities.

Instruction manuals are in English but can be ordered in an alternate language upon request of the purchaser. Service and maintenance manuals and documentation are also included in the purchase package.

Maintenance and support

Vehicle maintenance is routine, however the detection system requires special maintenance facilities with trained staff.

Test and evaluation

The POOKIE has been tested in difficult operational conditions in Africa. The original vehicles have been extensively used in operations for more than five years, completing well over one million kilometres of road clearance.

The monocoque hull was field blast-tested using different types of anti-tank mines and withstood multiple detonations. It is unlikely that there would be injuries to the driver and observer if they are properly secured with seat belts. Blast overpressure can be countered by the use of special helmets.

Mine blasts occurring during operations were few and were a result of remote command-initiated mines. There are no known casualties as a result of these blasts.

No impartial or independent test results are available.

POOKIE 2000 MRRV

Reported limitations and strengths

Limitations

- Not suitable for heavy terrain conditions.

Strengths

- Rugged and simple design.
- High level of crew protection.
- Easily transported.

Wer'wolf MkII MPV

Windhoeker Maschinenfabrik Pty Ltd (WMF), Namibia

The Wer'wolf MkII Modular Mine Protected Vehicle personnel carrier

General description

The **Wer'wolf MkII Modular Mine and Ballistic Protected Vehicle** (MPV) is the product of collaboration between Military International Ltd. (MIL) of Canada and Windhoeker Maschinenfabrik (1998) Pty Ltd (WMF) of Namibia. The first WMF Mine Protected Vehicle (MPV) was produced in 1977.

All WMF vehicles are based on commercially available MAN (Germany) automotive components. MAN is a manufacturer with worldwide logistic support. The Wer'wolf MKII is in full series production, currently in service with the Namibian Defence Force.

Wer'wolf comprises a full running chassis fitted with mine-protected belly armour and a ballistic double-cab at the front. The rear of the vehicle is a flatbed configuration, twist-locked onto the forward cab, enabling different rear modules to be fitted within minutes depending on the task. Nine modules are available to facilitate different roles, including recovery, ambulance, command and mobile workshop.

The vehicle is suitable for mounting mobile detection equipment. The automatic transmission version can be converted to remote control operation.

Specifications

Wer'wolf features a six-speed manual transmission providing six synchronised forward gears and 1 reverse gear. Automatic shift transmission is available and can be fitted to the vehicle without modification.

The driver can select tractive effort through 4 pneumatically activated switches. In addition to permanent 4 X 4 drive, the operator can select front and rear differential locks independently. Transfer case lock-up for high/low range selection as well as a 50:50 tractive effort split in 4-wheel drive mode. Power steering is standard.

Top speed is 125 km/h with a cruising speed of 90 km/h on paved roads. Operating range is 960 km on a full tank. Wer'wolf can be driven up gradients of 70% and for its size, has a tight turning circle of 16m.[1]

The vehicle is of monocoque design, offering all-round protection against the most common ball rounds from as close as 10m. The Wer'wolf hull provides ballistic protection against mortar and artillery fragments.

Wer'wolf protects against triple anti-tank mine blasts (21 kg TNT) under any wheel and double anti-tank mine blasts (14 kg TNT) under the hull.

The vehicle protects against IED detonations of 14 kg of TNT, with a stand-off distance of 3m from either side.

Due to the axle design and spare axle capacity, the vehicle can be fitted with an add-on belly plate to provide protection against explosive formed projectile mines (e.g. TMRP-6).

Machines in use to date

- 72 units have been built to date.
- 2 vehicles are in service with the German NGO Menschen gegen Minen (MgM).

Engine, fuel and oil

- Wer'wolf MKII is powered by a MAN straight six, turbo-charged diesel engine fitted with an intercooler. The engine develops 224hp and 825Nm of torque, which translates into a power to weight ratio of 23hp/t.

Factory support

- Wer'wolf is based on a standard, commercial MAN vehicle.
- 12-month vehicle warranty with unlimited mileage from MAN.
- Spare parts logistical support through MAN international dealership (not through WMF).

Maintenance and support

- Access to the engine compartment is through a swing-open front grill for convenient engine checks. Engine and transmission pull out on a rail-mounted sledge for easy maintenance access. Engine replacement is fast and efficient.
- Air pressure point provided inside the engine compartment linked to the vehicle's air pressure system for checking and adjusting tyre pressures and cleaning air filters.

Tests and evaluations

- The Wer'wolf MkII has undergone blast and ballistic tests by the manufacturer in Namibia. Test results are available from MIL Canada and the GICHD.

Wer'wolf after detonation of 14kg of TNT under the front axle

Wer'wolf MkII personal carrier

Reported limitations and strengths

Limitations

- **Heavy due to extensive protection.**

Strengths

- **Based on widely-available MAN commercial automotive parts.**
- **Reliable defence against mine blasts.**

1. According to the manufacturer.

Technical data sheet Buffalo

a. Dimensional data

1.	Length without attachment:	8,200mm (323 inches)
2.	Length, total:	10,896mm (429 inches)
3.	Width without attachment:	2,470mm (97 inches)
4.	Width, total:	2,470mm (97 inches)
5.	Clearing/working width:	900mm
6.	Height, overall:	2,850mm (117 inches)
7.	Mass, basic vehicle:	17,272kg (38,000lbs)
8.	Mass, detachable units:	Steel wheels: 545kg (1,200lbs) each; towed disc roller: 1,636kg (3,600lbs)
9.	Mass, overall:	48,800lbs

b. Driving specifications

10.	Wheels/ tracks:	Steel wheels with cleats to fulfill traction and vegetation cutting
11.	Ground pressure, max weight:	3.07kg/cm^2
12.	Hill climbing ability:	20%

c. Clearance performance

13.	Working speed	
	• light soil/medium vegetation:	3 to 5mph
	• medium soil/medium vegetation:	3 to 5mph
	• heavy soil/dense vegetation:	1 to 2mph
14.	Control of clearance/working depth:	Function of pressure on initiation system

c. System specifications

15.	Engine:	Caterpillar C-12
16.	Fuel capacity:	110 US gallons
17.	Fuel consumption:	10-15mpg
18.	Cooling system engine:	Standard
19.	Oil capacity:	10 US gallons
20.	Hydraulic oil capacity:	16.54 US gallons
21.	Machines in use:	2 in Afghanistan (as of Dec. 2003), U.S. Army; 1 in Far East, U.S. Humanitarian Demining Programme (exact location unknown as of Dec. 2003)
22.	Other types:	Minekiller and Casspir use the same system

d. Comfort and security

23.	Air conditioning:	2 heavy duty air conditioners
24.	Operator comfort:	Ergonomically designed capsule, seating, etc.
25.	Armour:	Mine protection: 45lbs TNT on any wheel. 30lbs TNT centerline. Ballistic protection: 7.62x51mm NATO round Glass: 7.62x51 AP multi-hit

e. Costs

26.	Cost of system:	Base cost: U.S.$500,000; steel wheels: U.S.$16,675; disc rollers: U.S.$10,304
27.	Other costs:	
	• training:	On site: U.S.$15,000 for 10 days
	• spare part set chains/belts	Not required for chains, etc. Set of 2 spare steel wheels: U.S.$5,558; set of spare discs: U.S.$4,122; vehicle spares /air filters, etc.: U.S.$5,000
	• repair costs for one year:	US$15,000 to 20,000, which includes the above spare
28.	Transportation:	By sea, by air: C-17 or equivalent; by road: on normal road wheels
29.	Availability for hire:	Yes, long-term

Technical data sheet — Casspir as standard personal carrier

a. Dimensional data

1.	Length total:	6,900mm
2.	Width total:	2,450mm
3.	Height, overall:	2,850mm
4.	Weight, basic vehicle:	Not given
5.	Payload:	Not given
6.	Gross vehicle mass:	10,800kg

b. Driving specifications

7.	Wheels/ tracks:	4 wheels 1,400x20
8.	Ground pressure, max weight:	Not given
9.	Hill climbing ability:	Up to 60%[a)]
10.	Maximal speed:	98 km/h
11.	Turning circle diameter:	18,360mm

c. System specifications

12.	Engine:	Six-cylinder in-line 124kw turbocharged diesel engine
13.	Fuel capacity:	220l
14.	Fuel consumption:	25l/h
15.	Tracking:	4x4
16.	Cooling system engine:	Pressurised liquid cooling
17.	Oil capacity:	Not given
18.	Hydraulic oil capacity:	Not given
19.	Vehicles in use:	1 (with VAMIDS), 8 Casspir/Tapir with steel wheels
20.	Location of use:	Croatia, Mozambique

d. Comfort and security

21.	Air conditioning:	Only dual expeller fans
22.	Operator comfort:	Not given
23.	Armour:	Not given
24.	Remote control:	Not given

e. Costs

25.	Cost of system:	Not given
26.	Other costs:	Not given
27.	Availability for hire:	Not given

a) According to the manufacturer.

Technical data sheet RG-31M

a. Dimensional data

1.	Length total:	5,740mm
2.	Width total:	2,200mm
3.	Height, overall:	2,565mm
4.	Weight, basic vehicle:	7,500kg
5.	Payload:	Not given
6.	Ground clearance:	353mm

b. Driving specifications

7.	Wheels/ tracks:	335/80R20 with RFI
8.	Ground pressure, max weight:	Not given
9.	Hill climbing ability:	60%
10.	Maximal speed:	120km/h
11.	Turning circle diameter:	18m

c. System specifications

12.	Engine:	VM motorisation HR 694 Hi3, 6 in line, 4,164ccm, 128kw
13.	Fuel capacity:	148l
14.	Fuel consumption:	Not given
15.	Tracking:	Not given
16.	Cooling system engine:	Not given
17.	Oil capacity:	Not given
18.	Hydraulic oil capacity:	Not given
19.	Vehicles in use:	Not given
20.	Location of use	Not given

d. Comfort and security

21.	Air conditioning:	Yes
22.	Operator comfort:	Left or right hand, fun-flat inserts
23.	Armour:	As described
24.	Remote control:	No

e. Costs

25.	Cost of system:	Not given
26.	Other costs:	Not given
27.	Availability for hire:	Not given

Technical data sheet Dingo 2 long wheelbase

a. Dimensional data

1.	Length total:	6,100mm
2.	Width total:	2,300mm
3.	Height, roof:	2,350mm
4.	Mass, basic vehicle:	9,200kg
5.	Crew:	8 passengers
6.	Gross vehicle mass:	11,900kg

b. Driving specifications

7.	Wheels/tracks:	Permanent four-wheel drive
8.	Fording capacity:	1,200mm
9.	Hill climbing ability:	33°/14°
10.	Maximal speed:	approx. 100km/h

c. System specifications

11.	Engine:	DC 170kw, 4,800ccm
12.	Fuel capacity:	220l
13.	Range:	1,000km
14.	Location of use:	Afghanistan, Kosovo, former Yugoslav Republic of Macedonia

d. Comfort and security

15.	Air conditioning:	Yes
16.	Operator comfort:	N/A
17.	Armour:	AT mines, 7.62x54 AP
18.	Remote control:	N/A

e. Costs

19.	Cost of system:	Not given
20.	Other costs:	Not given
21.	Transportation:	Air transport C-160, C-130
22.	Availability for hire:	Not given

Technical data sheet Pookie 2000 LMDV

a. Dimensional data

1.	Length without pre-detonating attachment:	4,400mm
2.	Length total:	4,800mm
3.	Width without detector pans:	2,300mm
4.	Width total (max. with pans):	6,000mm
5.	Clearing/working width	Depending on pans fitted.
	• pans are either 2,000mm:	4,000mm
	• or 3,000mm:	6,000mm
6.	Height, overall:	1,050mm
7.	Mass, basic vehicle:	2,500kg
8.	Mass detachable unit (2 detection pans):	110kg
9.	Mass, overall:	2,650kg

b. Driving specifications

10.	Wheels/tracks:	4 specially engineered wide-rimmed non-treaded tyres inflated to 0.2bars
11.	Ground pressure:	5lbs/sq. inch
12.	Hill climbing ability:	45° slope
13.	Clearance depth:	Metallic detector 50-200mm, GPR: 150mm. Detection capability/depth depends on the terrain condition, soil type and mine type.

c. System specifications

14.	Engine:	170 IDI diesel injection, 1,686cc positioned to rear of driver
13.	Fuel capacity:	40l class C diesel (can be increased to suit client's requirements)
14.	Machines in use:	75 original units have been manufactured in Rhodesia-Zimbabwe
15.	Other types:	POOKIE 200 is a new millenium upgrade of ther original unit that successfully operated in Rhodesia-Zimbabwe
16.	Location of use:	Re-engineered Pookies (original) are in operation in Eritrea, Sudan and Oman.
17.	Cooling system:	Standard radiator water colled
18.	Oil capacity:	5.5l

d. Comfort and security

19.	Air conditioning:	Optional extra
20.	Operator comfort:	Special ergonomically designed seats to cushion against a blast. Seat belts standard fitting.
21.	Armour:	Vehicle monocoque hull is armour plated to withstand triple mine blast to belly
22.	Remote control:	No

e. Costs

23.	Cost of system:	U.S.$160,000 FOB Durban, South Africa, without detector system. Client to negotiate detector system cost with Vallon GmbH
24.	Other costs:	Not given
25.	Availability for hire:	Not given

Technical data sheet Wer'wolf MkII

a. Dimensional data

1.	Length total:	6,360mm
2.	Width total:	2,500mm
3.	Height, overall:	2,650mm
4.	Weight, basic vehicle:	9,860kg
5.	Payload:	1,500kg
6.	Gross vehicle mass:	11,360kg
7.	Ground clearance:	355mm laden, 380mm unladen

b. Driving specifications

8.	Wheels/ tracks:	Four wheels and one spare, Michelin 365/80R20
9.	Ground pressure, max. weight:	Not given
10.	Hill climbing ability:	Up to 70% on paved roads)
11.	Maximal speed:	• 125 km/h on paved roads • 90 km/h on hard, even dirt road
12.	Turning circle diameter:	16m

c. System specifications

13.	Engine:	MAN D0826 LF – Euro 2 turbocharged, intercooled diesel engine with 224hp, 6.87l, six-cylinder in-line
14.	Fuel capacity:	240l
15.	Fuel consumption:	25l/h
16.	Transition:	Not given
17.	Cooling system engine:	Water & ethylene glycol mixture 1:1
18.	Oil capacity	Not given
19.	Hydraulic oil capacity:	Not given
29.	Brakes	
	• service brake:	Dual circuit full pneumatic with integral emergency brake
	• park brake:	Pneumatic spring actuated on rear wheels
	• exhaust brake:	Optional
21.	Gear box:	Six-speed manual – optional automatic transmission, synchronized on all forward gears, six forward and one reverse
	• power take off	Optional
22.	Vehicles in use:	72
23.	Location of use:	Namibia

d. Comfort and security

24.	Air conditioning:	Not given
25.	Operator comfort:	Not given
26.	Armour:	Not given
27.	Remote control:	Optional

e. Costs

28.	Cost of system:	Not given
29.	Other costs:	Not given
39.	Availability for hire:	Not given

COMPARATIVE ANALYSIS

	Buffalo	Casspir PC and RG-31M
a. Dimensional data		
1. Length without attachment:	8,200mm	
2. Length, total:	10,896mm	PC: 6,360mm; RG: 5,740mm
3. Width total:	2,470mm	PC: 2,450mm: RG: 2,200mm
5. Clearing/working width:	900mm	
6. Height, overall:	2,850mm	PC: 2,850mm; 2,565mm
7. Mass, basic vehicle:	17,272kg	PC: not given, RG: 7,500kg
8. Mass, detachable units:	steel wheels: 545kg each, towed disc roller: 1,636kg	
9. Payload:	—	Not given
10. Mass, overall:	48,800lbs	PC: 10,800kg
b. Clearance performance		
11. Working speed		RG. ground clearance: 353mm
• light soil/med. vegetation:	3 to 5 mph	
• med. soil/med. vegetation:	3 to 5mph	
• heavy soil/dense vegetation:	1 to 2mph	
12. Control of clearance depth:	Function of pressure on initiation system	
Driving specifications		
13. Wheels/ tracks:	Steel wheels with cleats to fulfill traction and vegetation cutting	PC: 4 wheels1,400x20; RG: 335/ 80R20 with RFI
14. Ground pressure, max weight:	3.07kg/cm^2	Not given
15. Hill climbing ability:	20%	Up to 60%[a)]
16. Maximal speed:	—	PC: 98km/h; RG: 120km/h
17. Turning circle diameter:	—	PC: 18,360m, RG: 18m
c. System specifications		
12. Engine:	Caterpillar C-12	PC: 6-cyl. in line 124kw turbo-charged diesel engine; RG: VM motorisation HR 694 Hi3, 6 cyl. in line, 4,164ccm, 128kw
13. Fuel capacity:	110 US gallons	PC: 240l; RG: 148l
14. Fuel consumption:	10-15mpg	PC: 25l/h; RG: not given
15. Tracking/transition:	—	PC: 4x4; RG: not given
16. Cooling system engine:	Standard	PC: pressurised liquid cooling; RG: not given
17. Oil capacity:	10 US gallons	Not given
18. Hydraulic oil capacity:	16.54 US gallons	Not given
19. Brakes		
• service brake:		
• park brake:		
• exhaust brake:		
20. Gear box:		
• power take off		
21. Vehicles in use:	2 in Afghanistan, 1 in Far East	PC: 1 with VAMIDS, 8 Casspir/ Tapir with steel wheels
22. Location of use	—	PC: Croatia, Mozambique
23. Other types:	Minekiller and Casspir use the same system	
d. Comfort and security		
24. Air conditioning:	2 heavy duty air conditioners	PC: only dual expeller fans; RG: yes
25. Operator comfort:	Ergonomically designed capsule, seating, etc.	Not given; RG: left or right hand, fun-flat inserts

Dingo 2	Pookie 2000 LMDV	Wer'Wolf MkII
	4,400mm	
6,100mm	4,800mm	6,360mm
2,300mm	6,000mm	2,500mm
	4,000 or 6,000mm	
Roof: 2,350mm	1,050mm	2,650mm
9,200kg	2,500kg	9,860kg
Crew: 8 passengers	2 detection pans: 110kg	
		1,500kg
11,900kg	2,650kg	11,360kg
	Metallic detector: 50-200mm; GPR: 150mm; Detection capability/depth depends on soil condition, soil type and mine type	Ground clearance: 355mm laden, 380mm unladen
Permanent 4-wheel drive	4 specially engineered wide-rimmed non-treaded tyres	Four wheels and one spare Michelin 365/80R20
Fording capacity: 1,200mm	5lbs/sq. inch	Not given
33°/14°	45° slope	Up to 70° on paved roads
Approx. 100km/h	• 125 km/h on paved roads	125km/h on paved roads 90km on hard, even dirt road
		16m
DC 170kw, 4,800ccm	170IDI diesel injection. 1,686cc positioned to rear of driver	MAN D0826 LF – Euro 2 turbo-charged, intercooled diesel engine with 224hp, 6.87l, six-cylinder in-line
220l	40l class C diesel	240l
Range: 1,000km	25l/h	25l/h
	Not given	
	Standard radiator water colled	Water & ethylene glycol mixture 1:1
	5.5l	Not given
Not given	Not given	Not given
		Dual circuit full pneumatic with integral emergency brake Pneumatic spring actuated on rear wheels Optional
		6-speed manual- optional automatic transmission, synchronized on all forward gears, six forward and one reverse Optional
	75 original units have been manufactured in Zimbabwe	Approx. 400
Afghanistan, Kosovo, Macedonia	Eritrea, Sudan and Oman	Namibia
Yes	Optional extra	Not given
N/A	Ergonomically designed seats to cushion against a blast.	Not given

COMPARATIVE ANALYSIS

	Buffalo	Casspir PC and RG-31M
25. Armour:	Mine protection: 45lbs TNT on any wheel; 30lbs TNT centerline; ballistic protection: 7.62x51mm NATO round, glass: 7.62x51 AP multi-hit	Not given; RG: as described

e. Costs

27. Cost of system:	Base cost: U.S.$500,000; steel wheels: U.S.$16,675; disc rollers: U.S.$10,304	Not given
28. Other costs:	Not given	Not given
• training:	On site: U.S.$ 15,000 for 10 days	
• spare part set:	Set of 2 spare steel wheels: U.S.$ 5,558; set of spare discs: U.S.$4,122, vehicle spares/air filters:, etc.: U.S.$5,000	
• repair costs for one year:	U.S.$15,000 to 20,000, which includes the above spare	
20. Transportation:	By sea, by air: C-17 or equivalent; by road: on normal road wheels	
30. Availability for hire:	Yes, long term	Not given

Dingo 2	Pookie 2000 LMDV	Wer'Wolf MkII
AT mines, 7.62x54 AP	Vehicle monocoque hull is armour plated to withstand triple mine blast to belly	Not given
Not given	U.S.$160,000 FOB Durban, without detector system. Client to negotiate detector system with Vallon GmbH	Not given
Not given	Not given	Not given
Air transport C-160, C-130	Not given	
Not given	Not given	Not given