Registry of Ex Military Land Rovers

TECHNICAL DATA

Land Rover 6 x 6

Reference No. 0137 G

Land Rover Limited
Lode Lane, Solihull,
West Midlands B92 8NW
ENGLAND

Telephone : 44 21 722 2424

Fax : 44 21 742 5012

Telex : 338 641 LANDROVG

Land Rover Australia
P.O. Box 59,
Liverpool, N.S.W. 2170
AUSTRALIA

Telephone : 61 2 600 1333

Fax : 61 2 600 8935

Telex : AA 120222

MAY 1991

CONTENTS

PRELIMINARY INFORMATION

This data describes the Land Rover 6 x 6 vehicle derivatives and features, which to date have been developed to meet the requirements of the Australian Army for a 2 tonne military payload cross country vehicle. The Australian Army contract was awarded to the Land Rover 6 x 6 after extensive durability, climatic and user trials in competition with the Mercedes Benz U1300 Unimog.

All Land Rover 6 x 6 vehicles now feature a wider cab and matching wider track front and rear axles – each about 200mm wider than the standard Land Rover components – significantly enhancing the cabin accommodation and vehicle stability.

The wide range of derivatives which have been developed for the Australian Army and specialised civilian users form a very satisfactory base for the development of additional derivatives for other markets. Left hand drive has been accommodated as has a large variety of optional equipment.

Derivatives which have been developed or are being considered for development include:

- Cargo/Personnel Vehicle
- Air Defence Vehicle – Rapier
- Air Defence Vehicle – RBS70
- Ambulance
- General Maintenance Vehicle
- Electronics Repair Vehicle
- Long Range Patrol Vehicle
- Cab Crew Vehicle
- Logistics Vehicle
- Fire Fighting Vehicle
- Communications Vehicle
- Command Post
- 105mm Gun Tractor
- Recovery Vehicle
- Light Armoured Vehicle
- Personnel Carrier
- Lightweight Helicopter Transportable Vehicle

Land Rover 6 x 6 vehicles are now available world wide through Land Rover distributors and other selected agents.

Some of the major competitive features of the Land Rover 6 x 6 are:

- Spare parts commonality with other Land Rover vehicles.
- High payload carrying capability (the basic chassis cab vehicle provides an allowance of 3.0 tonnes for optional fittings and equipment, rear body, payload, driver and passenger luggage).
- Low rear chassis height.
- Air transportable in C130 Hercules without preparation.
- High level of corrosion resistance (the cab frame and chassis are both hot dip galvanised).
- High standard of cross country ride and stability.
- Good cross country mobility.
- Easy rear body fitment (bodies can be attached directly to the Land Rover 6 x 6 vehicle's rigid chassis).
- Large capacity heavy duty direct injection diesel or V8 petrol engines.
- Vehicles are proven and in current production.
- A wide range of derivatives are available sharing common base components.
- The vehicle specifications can be tailored to suit a customer's specific requirements.

Land Rover 6 x 6 vehicles are available in a wide range of specifications to suit a customer's individual requirements.

The summary below describes the features of the basic Land Rover 6 x 6 chassis cab vehicle.

Model	Land Rover 6 x 6
Engine	Isuzu 4BD1T Turbocharged Diesel
Transmission	Land Rover LT95A heavy duty 4 speed gear box / 2 speed transfer box
Front Axle	Land Rover Spiral Bevel / 4 pinion differential
Rear Axles	Twin Salisbury 8HA
Brakes	Disc brakes front and rear, power assisted
Chassis	Hot dip galvanised tube frame construction
Front Suspension	Coil springs and telescopic dampers with leading arms and panhard rod
Rear Suspension	Load sharing leaf springs and telescopic dampers
Steering	Power assisted recirculating ball
Tyres	7.50 R 16 LT x 8 ply steel belted radial
Spare Wheel	Under rear of chassis on wind down carrier
Electrics	12 volt suppressed vehicle electrics
Fuel System	Twin 65 litre fuel tanks
Cab	Wide normal control cab with hot dip galvanised steel space frame and seating for driver and two passengers
Gross Vehicle Mass	5.60 tonnes
Gross Combination Mass	7.10 tonnes

The Land Rover 6 x 6 has been designed as a 2-3 tonne payload cross country vehicle for military and specialised civilian applications, having a high component commonality with the Land Rover 1104 x 4.

Early vehicles utilised a Land Rover 110 cab mated to a galvanised tube frame chassis with uprated Land Rover 110 front axles and suspension, and a load sharing leaf spring rear suspension on wide track rear axles. A 3.9 litre Isuzu 4BD1T turbocharged diesel engine was specified.

The Australian Army called tenders in 1982 for the supply of 1 tonne and 2 tonne payload vehicles, under the code name Project Perentile, to supplement their existing 4 tonne Mercedes Unimog U1700L 4 x 4 and 8 tonne Mack RM 6866 RS 6 x 6 trucks. A short listing of the tendered vehicles resulted in the selection of the Land Rover 110 4 x 4, Mercedes 300 GD and Jeep J10 in the 1 tonne payload category and the Land Rover 110 6 x 6 and Mercedes Unimog U1300 in the 2 tonne category for competitive evaluation.

Three samples of each vehicle were exhaustively tested by the Australian Army for over two years. One of each vehicle were subjected to extensive performance and durability trials of the Australian Army's Trials and Proving Wing, while the remaining vehicles were allocated to a special Army unit which was formed for the vehicle evaluation. Specific climatic and user trials were conducted at Army bases and training areas around Australia to evaluate each vehicle's suitability for the role.

The trials led to the selection of the Land Rover 4 x 4 in the 1 tonne category, and the Land Rover 6 x 6 for the 2 tonne role.

The original 'narrow cab' Land Rover 6 x 6 vehicle has now been replaced by a new uprated model. The uprating primarily involves the fitment of a larger cab (with the ability to carry three troops), wider track front and rear axles (200mm wider than the Land Rover 4 x 4) and an uprated Isuzu 4BD1T diesel engine with water cooled turbocharger (maximum power increasing from 79 kW to 90 kW at 3000 rpm).

Three representative 'wide cab' Initial Production Vehicles were supplied to the Australian Army and used for further durability and user trials, and for the development of vehicle derivatives.

The basic Australian Army contract involves the supply of 588 Land Rover 6 x 6 vehicles to the Australian Army between 1989 and 1991, and covers eight separate derivatives:

- Cargo
- Cargo with Winch
- Air Defence FFR with Winch – Rapier
- Air Defence with Winch – RBS70
- Ambulance FFR with Winch
- General Maintenance Vehicle with Winch
- Electronics Repair Vehicle

- Long Range Patrol Vehicle with Winch

These derivatives have been developed in close consultation with the Australian Army with emphasis being placed on meeting the needs of the vehicle users.

A number of other derivatives have been developed or are being investigated. These include:

- Crew Cab Vehicle
- Logistics Vehicle
- Fire Fighting Vehicle
- Communications Vehicle
- Command Post
- 105mm Gun Tractor
- Recovery Vehicle
- Light Armoured Vehicle
- Personnel Carrier
- Lightweight Helicopter Transportable Vehicle

Land Rover 6 x 6 vehicles are now being marketed worldwide through the Land Rover Limited sales network for both civilian and military applications.

Vehicles will be available in left or right hand drive and with Isuzu diesel or Land Rover V8 petrol engines, together with a wide variety of specifications to suit a customer's individual requirements.

GENERAL FEATURES

The Land Rover 6 x 6 is the highest payload derivative in Land Rover's range of specialised cross country vehicles. Features of the vehicle are:

- Payload

  The Land Rover 6 x 6's gross vehicle mass of 5.60 tonnes is applicable to both highway and cross country operation, and provides a basic chassis cab vehicle with an allowance of 3.0 tonnes for the fitment of specialised equipment, bodywork and payload.

- Engine

  The turbocharged Isuzu 3.9 litre 4BD1T direct injection diesel engine provides the vehicle with very acceptable highway and cross country performance when fully loaded and excellent fuel economy. The engine is a heavy duty truck derived unit, and features replaceable chromed cylinder liners, fully baffled sump and sealed flywheel housing and starter motor. The turbocharger is water cooled – ensuring that reliable performance is achieved under all operating conditions.

  Land Rover's 3.5 litre aluminium V8 petrol engine is optionally available. This rugged engine provides comparable performance to the Isuzu diesel, and increases the vehicle's commonality with Land Rover's vehicles.

- Filtration

  A high standard of air, oil and fuel filtration is provided to meet the most demanding cross country roles. The air filters feature primary and secondary elements and filter service indicators, while spin on oil filters are used for maximum efficiency and ease of servicing.

- Transmission

  The Land Rover 6 x 6 uses Land Rover's heavy duty LT95A four speed all synchromesh gearbox and integral two speed transfer box. A bevel gear differential in the transfer box distributes drive to the front and centre axles for on road operation. A fascia mounted vacuum switch is provided to lock the transfer box differential and to engage the rear axle for cross country applications.

  The transmission has been significantly uprated for the Land Rover 6 x 6 with a higher strength reverse gear train, taper roller bearings to support the transfer box intermediate shaft, and replaceable bushes and thrust washers and heavy duty cross pins in the transfer box differential.

- Axles

  Heavy duty wide track axles are fitted to the vehicle – Land Rover spiral bevel front drive/steer axle and Salisbury 8HA rear axle set. These feature cast centres with high strength steel side tubes, four pinion differentials, larger diameter involute splined half shafts, and remote axle breathers.

- Braking System

  Dual line disc brakes are fitted to all axles – with vacuum power assistance via an engine driven vacuum pump and tandem brake booster.

  A cable activated drum type parking brake is fitted to the transfer box output shaft.

- Chassis

  The Land Rover 6 x 6 vehicle's relatively rigid chassis is fabricated from 350 MPa minimum yield steel tubing and selected steel pressings, and is finished by hot dip galvanising the entire chassis frame as an assembly. This provides an extremely high level of corrosion protection and durability.

  The mounting of rear bodies to the chassis is simplified by the chassis rigid construction, its constant cross section, and by the provision of body mounting points on all chassis.

  The chassis incorporates front brushguard mounts, front and rear helicopter slinging, vehicle recovery and shipping tie down points, mountings for a mechanical drum winch and winch driveline, together with accommodation for a rear under chassis mounted spare wheel.

- Suspension

  Long travel coil springs are used for the front suspension, supplemented by heavy duty double acting telescopic dampers and progressive rate bump rubbers. Front suspension geometry is controlled by long leading arms and a transverse panhard rod.

  The rear suspension utilises a pair of dual rate semi-elliptic leaf springs on each axle – linked via their shackles on each side to a rubber brushed load sharing rocker beam – and double acting telescopic dampers.

  The low friction and generous axle articulation provided by this suspension endows the vehicle with excellent cross country ride and mobility.

- Steering System

  Land Rover 6 x 6 vehicles use a power assisted variable ratio worm and peg type steering box. On diesel engined vehicles, the power steering pump is gear driven from the engine. A telescopic steering damper is standard fitment, together with a heavy duty steering track rod and cross rod.

  Vehicles are available in either left or right hand drive.

- Wheels and Tyres

  Standard tyres are 7.50 R LT x 8 ply steel belted radial ply tyres. These are mated to heavy duty 6.00 F 16 pressed steel road wheels with high strength centres and increased thickness rim materials.

  A range of alternative wheel and tyre types and sizes are available if requested.

  The spare wheel and tyre is located at the rear of the vehicle under the chassis. This is slung from a winch type hanger which is activated by the wheel brace from the left hand side of the vehicle.

- Fuel System

  Twin 65 litre mid mounted fuel tanks are standard fitment on the Land Rover 6 x 6. The tank fillers are high mounted in the cab side panel and feature large diameter threaded filler caps. Fuel supply to the tanks is controlled by a fascia mounted switch which activates a chassis mounted motorised change over valve and also the fuel gauge units – so that the fuel gauge indicates the volume of the fuel in the tank which is being utilised.

- Electrical System

  Diesel engined vehicles are fitted with a fully suppressed 12 volt vehicle electrical system (to MIL STD 461A, level REO 5) fed by a belt driven 70 amp alternator / vacuum pump. A fully sealed geared starter motor is also used.

  Petrol engined vehicles are fitted with a 12 volt vehicle electrical system (suppressed to commercial standards) with a 65 amp alternator and sealed starter motor. A suppressed electrical system to MIL STD 461A REO 5 is optionally available.

  An engine compartment mounted 98 amp hour low maintenance lead acid battery is fitted with both engines.

- Cab Construction

  The 6 x 6 vehicle's wide cab is based on a hot dip galvanised steel space frame, which includes the roof ranks and body side panels. Galvabond toe boxes and aluminium alloy roof, back panel, seat box and floor panels are riveted to the space frame with a polyurethane supplementary sealant / adhesive between the panels.

  Standard Land Rover aluminium alloy wing panels are fitted to the cab, together with a new glass reinforced plastic grille support and bonnet. The bonnet is screwed to a hot dip galvanised steel frame on which the bonnet hinges, striker, buffer and release mechanism are mounted.

- Cab Dimensions

  The Land Rover 6 x 6 vehicle's cab is 200mm wider, 65mm deeper and 50mm higher than the standard Land Rover cab, and provides adequate seating for three persons. The three full size front seats are all adjustable for reach and rake.

- Cab Trim

  The cabin roof, side and back panels are trimmed using vacuum formed ABS moulding – providing a high quality easily cleaned surface. Rubber mats are fitted over the seat box, toe box and foot well areas.

- Dash and Instruments

  A heavy duty dash and instrument cowl are fitted in the vehicle cabin. The dash incorporates a storage compartment on the passenger's side, with a hinged lid. The instrument cowl accommodates the standard Land Rover speedometer, fuel gauge, water temperature gauge, voltmeter and warning lamp module, and provides additional space for supplementary warning lights and either a tachometer or two 50mm dia gauges.

- Doors and Windows

  Standard Land Rover side doors and sliding glass rear window are used, together with a new single piece laminated glass windscreen and opening quarter light windows behind the side doors. The cab is also fitted with traditional Land Rover opening fresh air vents below the windscreen.

- Mirrors

  A flat glass interior mirror and twin door mirrors are provided on the vehicle. The door mirrors are mounted on fabricated steel arms which can be notched back against the door panel or fastened in an intermediate position.

- Cab Header Panel

  A panel is fitted across the cab roof just behind the windscreen, on which the sunvisors, interior rear vision mirror and interior light are mounted.

  The interior light is mounted on a removable panel which can be used as a supplementary switch panel.

- Seats

  Three full size front seats are fitted in the cab, and are adjustable for rake and reach. Civilian vehicle seats are trimmed in black vinyl with heavy duty gray fabric facings. The seat cushions are removable to provide service access to the under seat area.

- Seat Belts

  Lap sash inertia reel seat belts are fitted to the outboard seating position, while a fixed lap belt is provided for the centre passenger's seat.

- Heater / Demister

  The Land Rover 6 x 6 is fitted with a heater / demister system controlled by twin dash mounted control levers, and a rocker switch for the two speed fan.

  Additional cabin ventilation is provided via twin air vents below the windscreen and the opening quarter vents in the rear cabin rear side panel.

- Dash Control and Fittings

  Standard Land Rover 6 x 6 dash controls and fittings include:

  – Heater temperature and direction control levers
  – Ashtray
  – Cigar lighter
  – Transfer box control vacuum switch
  – Fuel tank change over switch
  – Hazard warning switch
  – Interior light switch

- Steering Column Controls

  The steering column cowl accommodates the following controls:

  – Direction turn indicator and horn
  – Headlamp / parking lamp switch
  – Windscreen wiper / washer control
  – Engine hand throttle

- Cab Durability

  Both our own testing and exhaustive Australian Army trials have shown that the new cab is extremely durable and maintains its rigidity after extensive cross country operation.

  The cab is rigidly mounted to the chassis frame at its forward end but uses four heavy duty Silentbloc rubber mounts at the rear, providing some isolation of the cab from chassis movement and vibration.

- Cab Finish

  The cab is finished with an etch primer, plus an epoxy primer and a chemical agent resistant polyurethane top coat. This in conjunction with the hot dip galvanised frame and galvabond and aluminium panels, results in an extremely durable assembly even under the most arduous operating conditions.

- Fleet Commonality

  The Land Rover 6 x 6 shares a high replacement parts commonality with other Land Rover vehicles and has similar driving characteristics – providing significant advantages when operating in conjunction with other Land Rovers.

OPTIONAL FEATURES & EQUIPMENT

The following optional features and equipment have been developed for the Land Rover 6 x 6 vehicle range to meet the specific requirements of the Australian Army and other potential users.

Additional options can be developed for other customers.

- Petrol Engine

  The Land Rover 6 x 6 has been designed to accommodate Land Rover's 3.5 litre aluminium V8 petrol engine as an alternative to the turbocharged Isuzu diesel.

- Electrical Systems

  A 24 volt FFR electrical system is available to supplement the standard 12 volt vehicle electrics. This comprises:

  – An EDE 28 volt / 100 amp fully screened brushless military alternator, driven by twin vee belts from the engine crankshaft (diesel engined vehicles), or a 28 volt / 90 amp Lucas AB172R alternator (V8 petrol vehicles).

  – A matching distribution box mounted on the cab back panel behind the left hand front seat.

  – Three distribution outlets on the rear face of the cab back panel.

  – Twin 12 volt / 95 amp hour deep cycle batteries in a slide out box under the left hand corner of the rear body.

  – An engine hour meter and 150-0-150 amp ammeter in the instrument cowl on the fascia.

  The 24 volt electrical system is suppressed to MIL STD 461A levels CEO7 and REO5.

  This split 12 / 24 volt electrical system separates the vehicle and radio electrics, which simplifies the fitment and operation of radio equipment, and ensures that the vehicle can always be started when the radio batteries are depleted.

  A single 24 volt electrical system can be supplied if required using either of the above alternators or a lighter Lucas AC5 RS 24 volt / 55 amp brushed wadeable unit, in either fully suppressed or partially suppressed forms.

- Military Lighting

  The military lighting system which has been developed for the Land Rover 6 x 6 to meet the requirements of the Australian Army consists of:

  – a fascia mounted three position blackout switch with normal, reduced headlamp and blackout lighting positions. (A four position blackout switch with an additional full blackout position can also be supplied.)

  – Reduced headlamps on the front wing panels.

  – Light Emitting Diode (LED) type blackout lamps at front and rear.

  – A convoy light shining on the rear axle differential cover (painted white).

  – A rheostat in the fascia to control the instrument lights.

  – A map reading light on a flexible stalk in the passenger compartment.

- High Level Air Intake

  A sealed induction system with a high level air intake is optionally available.

- Jerry Can Mountings

  Mountings for the two standard jerry cans can be provided under the right hand front corner of the rear body.

  A similar mounting can be fitted on the left hand side if radio batteries are not required.

- Tool Boxes

  Twin tool boxes can be provided under the rear corners of the rear body. The tool box lids are hinged along their lower edge and are fitted with 'budget' type locks and rubber seals.

- Heavy Duty Military Jack

  Australian Army vehicles are fitted with a four tonne capacity two stage hydraulic jack and separate base board – in lieu of the standard vehicle's single stage hydraulic jack. The jack is stowed in a dedicated mounting in the left hand tool box.

- Brake Pad Wear Indicators

  Pad wear indicators for the disc front brakes are optionally available.

- Winch

  A front mounted mechanical drum winch installation has been developed for the Land Rover 6 x 6 vehicle range. This consists of:

  – A Thomas T9000M heavy duty worm gear driven winch of 40kN bare drum capacity mounted between the front chassis rails. The winch is fitted with 45 metres of 11mm diameter wire core steel cable, plus 2 metres of chain and matching hook.

  – Large diameter hardened steel fairlead rollers mounted on phosphor bronze brushes.

  – A transfer box mounted power take off driven from the gearbox output shaft. The power take off incorporates an automatically resetting torque limiter which limits the torque applied to the winch drive line to a pre-set figure – proportional to the cable load – contributing significantly to the safety of winch operation.

  – A two piece universally jointed shaft linking the power take off to the winch.

  – A power take off engagement lever on the seat box, attached to a push / pull cable.

  The chassis and transmission of all vehicles incorporate mountings for the winch, the winch drive line and power take off.

- Power Take Off

  A rear facing power take off with torque limiter is available as an alternative to the front facing winch power take off. This has a maximum torque capacity of 150Nm.

- Brush Guard

  Australian Army vehicles are fitted with a tubular steel front brush guard in lieu of the standard vehicle's front bumper.

  The brush guard incorporates the front slinging, tie down and recovery points, and is finished by hot dip galvanising and powder coating.

- Bull Bar

  A heavy duty bull bar is available which in addition to the slinging, tie down and recovery points, incorporates side protection bars, vehicle side steps, and high lift jacking and mounting points.

- Vehicle Doors

  Land Rover side doors with wind up windows are standard fitment on the Land Rover 6 x 6. These can be supplied with or without locks.

  Side doors with sliding glass windows can be provided if required. These incorporate large fibreglass door bins.

- Slinging, Tie Down and Recovery Points

  Front and rear slinging and tie down points are provided on the Australian Army vehicles to MIL STD 209. Emergency towing lugs to DEF (AUST) 575 are also fitted.

  The front slinging, tie down and recovery points are incorporated in the front brush guard.

  The rear slinging points are housed in the rear chassis rail when not in use, while rear tie town points and recovery points are welded to the rear of the chassis.

- Air Transportability

  All Australian Army Land Rover 6 x 6 derivatives are air transportable in a Hercules C130 aircraft (2 per aircraft) without preparation.

  This dictates a rear body internal height of approximately 1.44 metres for rear bodies with full width flat floors, but this can be increased to approximately 1.80 metres internal height in the centre area if a stepped rear floor is used.

  Cargo, Long Range Patrol and Logistics derivatives are also parachute droppable from a C130 aircraft in a suitable pallet with minimum preparation of the vehicle super-structure.

- Radio Installation

  All Australian Army Land Rovers have provision for fitting a VHF radio in the cabin behind the centre seat, with a hand set mounted on the fascia and an antenna in the right hand front wing.

- Cabin Electrical Outlets

  In addition to the 12 pin NATO plug and 7 pin commercial plug in the rear of the chassis, all Australian Army vehicles are fitted with twin 12 volt military electrical sockets in the fascia – plus a cigarette lighter.

  FFR derivatives are also fitted with three outlets from the 24 volt distribution box in the cab rear panel.

- Towing Equipment

  A NATO standard rotating towing pintle can be provided on the rear crossmember together with a NATO standard 12 pin trailer plug.

  An additional 7 pin plug can also be provided to power any rear body mounted tail lamps or interior lights.

- Fire Extinguisher

  A 1.5 kg BCF fire extinguisher is mounted behind the driver’s seat on Australian Army vehicles.

- Rifle Mountings

  All Australian Army vehicles incorporate butt boxes and stock clips to mount two Steyr AUG 1 rifles between the three front seats. Mountings for M16 rifles are also available.

- Unit Sign Holders

  Two unit sign holders are fitted to the front wings of Australian Army Land Rover 6 x 6 vehicles, and two to the crossmember.

- Front Seats

  The three front seats on Australian Army vehicles are all adjustable for reach and rake and are trimmed in heavy duty green vinyl. The seat squabs can be folded forwards to provide access to the stowage area behind the front seats.

  The centre seat has a modified folding mechanism and a restraining catch, allowing it to be folded down flat against the seat cushion. A heavy duty aluminium panel is fitted to the back of the seat squab, permitting it to be used as a platform when using the vehicle cupola.

- Cupola

  A cupola is fitted in the roof panel of Australian Army vehicles. This provides a 540mm x 590mm aperture. It is side hinged and incorporates a tie down clip to hold the cupola lid in the open position. The cupola can also be fixed in a partly open position to provide additional cabin ventilation.

- Overhead Switch Panel

  Space is provided in the cabin header panel for the fitment of specialised switch gear and equipment. On Australian Army ambulance vehicles, this space is utilised to mount the siren controls.

- Tyre Inflation Pump

  A twin cylinder tyre inflation compressor will be fitted as standard to some Australian Army derivatives. This is belt driven from the engine and provides for easy and rapid adjustment of tyre pressures, either to optimise vehicle mobility or for tyre repair. The pump can also be used to power air operated hand tools. It has a nominal capacity of 140 litres / min and can deliver pressures of up to 4000 MPA.

- Wheels and Tyres

  Australian Army vehicles are generally fitted with locally sourced Olympic Steeltrek 105 pattern 7.50 R 16 LT x 10 ply steel belted radial ply tubed tyres. These are relatively rugged tyres which provide a good compromise between highway and cross country operation. They are mounted on heavy duty 6.00 F 16 single piece drop centre pressed steel road wheels.

  A wide range of alternative tyre makes, types and sizes can be provided. Split rim road wheels are also available.

- Vehicle Tools

  A driver's tool kit is provided for Australian Army Land Rover 6 x 6 vehicles containing sufficient tools for normal daily servicing. These are fitted in a canvas tool roll. A hand operated tyre pump and tyre pressure gauge are also provided, housed in the rear tool boxes alongside the vehicle jack, base board, wheel base and wheel chocks.

- De-Ditching Tools

  All Australian Army Land Rover 6 x 6 vehicles are fitted with bonnet mounted de-ditching tools – spade, pick and axe – on heavy duty quick release brackets.

- Rear Body Mountings

  Common rear body mounting points are provided in Land Rover 6 x 6 vehicle chassis – along the inverted channel sections above the rear chassis longitudinals and at the ends of the rear chassis crossmembers. The vehicle's rigid chassis construction and long wheel travel allows the rear body to be fixed directly to the chassis.

  The bodies fitted to the Cargo / Personnel, Air Defence, Ambulance, Maintenance and Logistics Vehicles all share common mounting points and fixings, and can be relatively easily interchanged from one vehicle to another.

- Vehicle Finish

  Australian Army vehicles are finished in chemically resistant, infra red reflective, low gloss polyurethane paint with an olive drab base colour plus a tan/black disruptive patter. This complies with Australian Army specification GPC-P-154, which specifies 1000 hours salt spray corrosion resistance.

  A range of colours, gloss levels and disruptive patterns are available.

  External canvas components are printed with an olive drab/tan/black disruptive pattern.

- Support Literature

  Full NATO standard support literature is available for each of the Australian Army derivatives as they are introduced. This comprises:

  – User Handbook

  – Electrical and Mechanical Engineering Instructions (EMEI's). This is the military workshop manual and comprises separate Technical Descriptions, Servicing Data, Unit Repair Manuals, Field Repair Manuals and Base Repair Manuals for each derivative

  – Repair Parts Scales (RPS) – NATO standard military spare parts lists for each derivative.

  All the Australian Army derivatives will be fully NATO codified.

  Training wall charts are also available providing details of the vehicle's major mechanical systems.

DERIVATIVE DESCRIPTIONS

LAND ROVER 6 X 6 CARGO / PERSONNEL VEHICLE

These are general purpose vehicles which are used for the carriage of troops and equipment.

Three persons can be accommodated in the vehicle cab, plus twelve fully equipped troops in the rear body. Alternatively, a fully equipped vehicle with driver can carry a payload of 2.0 tonnes.

The rear body has a flat floor and is constructed from heavy duty aluminium extrusions. Two identical side boards are fitted on each side, with a single piece tailboard. The side boards and tailboard are of heavy duty double skinned construction and are readily removable.

The headboard consists of an extruded aluminium lower member with a steel frame / steel mesh upper section.

The headboard, side boards and tailboard are supported by removable tubular galvanised steel posts which fit into recesses in the supports which fit under the body and tie the rear body coamings to the chassis crossmembers. These supports accommodate four large shackles on each side which are used to tie down heavy cargo – thereby feeding these loads directly to the vehicle chassis.

LAND ROVER 6 x 6 CARGO/PERSONNEL VEHICLE (CONT.)

Six additional tie down rings are recessed into the rear cargo floor, while the rear body side coamings are slotted to provide further tie down capability.

Two longitudinally mounted front seats are provided in the rear body. The seat mountings allow the seats to be fitted along the body sides facing inwards or down the centre of the body facing outwards. The seat cushions are split to provide maximum loading flexibility and fold up flat against the squab to increase cargo space. The seat squabs and cushions are fitted with removable vinyl trimmed covers with closed cell foam pads.

Two tubular aluminium canopy bows are fitted, linked longitudinally by extruded aluminium corner cappings and ridge capping. The ridge capping provides a platform for the fitting and camouflage nets. A heavy duty disruptive pattern canvas canopy is fitted.

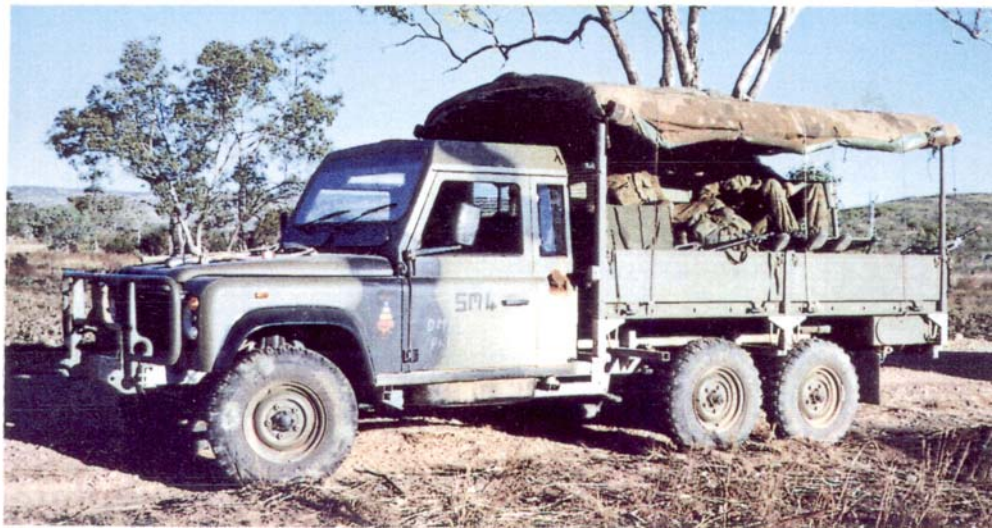
The floor panels and lower headboard are bronze anodised while the remaining aluminium components are olive drab powder coated.

The rear body has useable internal dimensions of 3085mm x 2082mm and a height of 1483 mm to the underside of the hood.

The vehicle can be loaded and unloaded into a C130 Hercules aircraft without preparation, and is also capable of being parachute dropped.

12 Volt vehicle electronics are utilised, while the vehicle has provision to accommodate a full 24 volt Fitted-For-Radio electrical system.

The Cargo/Personnel rear body can be relatively easily interchanged with the specialised rear bodies fitted to Air Defence, Ambulance, Maintenance and Logistics Vehicle derivatives.



LAND ROVER 6 x 6 AIR DEFENCE VEHICLES

Two variations of this Land Rover 6 x 6 vehicle will be used by the Australian Army – to suit Rapier and RBS 70 missile systems.

The base chassis cab and rear bodies of the two vehicles are identical, but different racking is required.

The Air Defence vehicle is fitted with the 24 volt FFR supplementary electrical system consisting of a 28 volt / 100 amp military alternator, its matching distribution box and outlets, twin 12 volt / 95 amp hour radio batteries and fascia mounted engine hour meter and ammeter.

A tyre pumping compressor is fitted to the engine to aid in quick tyre repair and to encourage the use of the correct tyre pressures, particularly when towing the Rapier Fire Unit and Radar Tracker.

A unique rear body has been developed for the Air Defence vehicle, of extruded aluminium construction like the cargo vehicle's body, but with longitudinal instead of transverse floor planking. The rear section of the body has been recessed to provide a low platform to permit the easy loading and storage of the optical tracker and camera and electronic unit.

LAND ROVER 6 x 6 AIR DEFENCE VEHICLES (CONT.)

Identical rear racking has been developed for all three Rapier activities – Fire Unit, Radar Tracker and Support Vehicle – and each vehicle carries six missiles, fitted longitudinally down the body sides.

The RBS 70 vehicle uses unique rear racking, with twelve missiles carried transversely at the front of the rear body. The missiles are stowed in sealed plastic tubes with quick release cast aluminium lids.

The rear racking of both derivatives is used to support the hood bows, while the corner and ridge cappings and disruptive pattern canopy are similar to those used on the basic Cargo / Personnel Vehicle.

MODULAR REAR BODIES

The Australian Army's 2 tonne payload vehicles were originally to be used for specialised roles by fitting customised shelters to the rear body of a Cargo vehicle.

The shelters were specialised containers which could be quickly loaded or unloaded from a vehicle and which could be used as free standing units if required. The sides of some shelters were designed to expand to increase the interior space, and shelters could be clipped together off the vehicle to further expand their space.

The Australian Army's 2 tonne vehicle trials highlighted a number of difficulties with this approach:

- The mass of the shelter and its payload often exceeded the 2 tonne mass by a significant amount (due to full utilisation of the space available in the shelter).
- The shelter needed to be unloaded from the vehicle for air transportation (due to interior height limitations in Hercules transport aircraft).
- The cross country mobility of the vehicle with loaded shelter was reduced compared to a basic cargo or troop carrying vehicle (due to the mass of the fully equipped shelter and its high centre of gravity).

MODULAR REAR BODIES (CONT.)

In order to overcome these limitations, the shelters were replaced with specialised 'modules'. Like the shelters, the modules are essentially a box, but in this case have been designed to fit directly to the Land Rover 6 x 6 vehicle's chassis rather than be mounted onto the rear body. The modules feature stepped floors, mounted low against the chassis crossmembers in the centre, but raised down each side to clear the road wheels at full bump – and also the tool boxes, radio batteries and jerry cans.

The modules provided a number of significant advantages:

- Fitting the module direct to the chassis saved over 500kg mass and significantly reduced costs (due to the deletion of the heavy duty rear body, its seats, hoodbows and canopy).

- The centre floor of the module was over 500mm lower than the floor of the shelter (due to the module's stepped floor and the deletion or relocation of the shelter's fork lift pockets).

  This considerably eased entry into and exit from the rear body, and significantly lowered the vehicle's centre of gravity.

- By careful attention to detail design and by optimising the Land Rover 6 x 6 vehicle's low chassis height, it has been possible to provide an interior height of 1.8 metres in the rear module, and still allow the complete vehicle to be loaded into a Hercules aircraft without special preparation.

The modules are constructed using fibreglass inner and outer skins bonded to a galvanised steel tube frame. This provides a very durable assembly which is easily repaired and is adaptable to a wide variety of roles.

The Australian Army's Ambulance, General Maintenance and Electronics Repair vehicles are based on the module concept, whilst this same approach is most likely to be followed for future Command Post and Communication derivatives.

The modules are fixed direct to the vehicle chassis using the same mounting points and fixings as the Cargo, Air Defence or Logistics Vehicle rear bodies. The bodies can be readily interchanged for fleet rotation or vehicle maintenance.

LAND ROVER 6 x 6 AMBULANCE

The Land Rover 6 x 6 Ambulance comprises a modular rear body fitted to a Land Rover 6 x 6 chassis cab vehicle.

The vehicle can carry up to three people in the vehicle plus a medical attendant in the rear and either for stretcher patients, two stretcher and four seated patients, or eight seated patients.

A high capacity air conditioning system is fitted, with the condenser and evaporator mounted in the module roof, linked to an engine mounted air conditioning compressor. A separate heating system is also provided. Additional ventilation is achieved via roof mounted intake and extractor vents.

Access to the module is gained via the large lift up rear door and fold down centre step. The rear door is supported by high capacity gas struts with separate locking stays.

Considerable attention has been paid to the loading and unloading of stretcher patients – particularly from the top frame. The frame is folded down from its stowed position against the module wall, then is pulled out to provide maximum clearance to the rear door aperture. The ends of the stretcher runners can then be extended rearwards to provide a loading or unloading ramp.

LAND ROVER 6 x 6 AMBULANCE (CONT.)

The lower stretchers are located further inboard than the upper ones. This provides a large storage pocket against the module wall for unused stretchers or other equipment, and optimises the accessibility of the upper and lower stretcher patients.

Storage shelves and cupboards are built into the module interior to provide stowage for blankets and medical equipment.

24 Volt electrical power is supplied to the module via the vehicle's FFR electrical system – including 28 volt / 100 amp military alternator and twin 12 volt / 95 amp hour deep cycle batteries. This feeds all the module electrics except the rear door lights which are wired to the 12 volt vehicle electrical system via the seven pin plug in the rear chassis.

LAND ROVER 6 x 6 AMBULANCE (CONT.)

Normal and red lens blackout lights are recessed into the module ceiling, while individual patient lights are provided near the head of each litter, plus two centrally mounted litter lights on flexible stalks. Two rotating beacons are fitted in the front corner of the module, while two broad dispersal scan lights are recessed into the module sides.

A three mode siren is mounted behind the vehicle brush guard. This also includes a loud speaker system. The control unit and switchgear are located in the cabin header panel.

A dirty linen locker is provided in the front right hand corner of the rear module, while the oxy-viva unit and the module fire extinguisher are located on the left hand side. Lockable doors on both sides of the module provide external access to the dirty linen locker and the oxy-viva and fire extinguisher stowage areas.

Wall mounted oxygen outlets are provided in the body sides while infusion rails and hooks are fitted to the ceiling. A 24 volt electrically driven suction pump with wall mounted inlets is also provided.

A sleeve is fitted around the sliding glass rear window in the cabin to provide waterproof communications between the vehicle cabin and the rear module. A large push out acrylic window is also located in the lift up rear door. Blackout curtains are provided for both windows. The rear blackout curtain can be fitted to the outside of the rear window to reduce reflections during camouflage operations.

The module incorporates stiffening ribs in the roof panel to accommodate the stowage of camouflage nets and poles without damaging the body. Tie down points for camouflage nets are included in the module roof and sides.

Lap type inertia reel seat belts are provided for the rear attendant and seated patients.

A fibreglass stowage bin is fitted to the cab roof to carry the patients’ personal equipment.

LAND ROVER 6 x 6 GENERAL MAINTENANCE VEHICLE

Like the Land Rover 6 x 6 Ambulance, this vehicle is based on a Land Rover 6 x 6 chassis cab fitted with a specialised modular rear body.

A mock-up of the rear module was first manufactured and subjected to a series of modifications and user evaluations to finalise its production specification. A representative Initial Production Vehicle was then produced, which underwent further extensive durability and user trials prior to the commencement of volume production.

The General Maintenance Vehicle will be used by units to carry out a variety of maintenance tasks associated with the repair of vehicles, weapons, electrical equipment, aircraft or as a welder's vehicle. It will operate as a lone repair vehicle, as part of a main repair activity in association with other repair vehicles and shelters, or as a roadside repair service.

It has been designed to provide a work place for two tradesmen, working alongside the vehicle or in it.

Large lift up panels are fitted on each side supported by gas struts. These provide some shade and weather protection and permit external access to internal equipment. A large lift up rear door is also utilised, giving good access to the vehicle interior via a fold down centre step.

LAND ROVER 6 x 6 GENERAL MAINTENANCE VEHICLE (CONT.)

Heavy duty C channels are fitted in the raised platforms along the module sides, allowing a wide variety of equipment to be securely stowed such as:

- work benches
- bin packs
- pedestal drill
- stowage baskets / cabinets
- welding equipment mountings

A heavy duty fold down work bench with a quickly removable vice is provided on the left hand side, for use when working outside the vehicle.

240 volt and 415 volt three phase power to the module is provided by an external generator – either trailer mounted or a separate generator which can be stowed inside the module for transportation. 24 volt dc power is also supplied via two vehicle chassis mounted 12 volt / 95 amp hour cycle batteries, which are charged via an engine mounted 24 volt 60 amp commercial alternator and also a 240 volt module mounted trickle charger. (Alternatively, a full supplementary 24 volt electrical system can be fitted, including a 24 volt / 100 amp military alternator and matching distribution box).

An additional work bench is provided along the front wall of the module. Fold out stools are fitted to the front and side benches.

Heavy duty aluminium tread plate flooring is used, with recessed tie down rings to restrain sundry loose equipment.

LAND ROVER 6 x 6 GENERAL MAINTENANCE VEHICLE (CONT.)

240 volt fluorescent lights are fitted to the module ceiling and to the underside of the lift up side panels. Blackout lighting and blackout curtains are also supplied. A 24 volt light is mounted in the module ceiling for use when the generator is not connected.

A vinyl sleeve links the aperture in the module front panel to the sliding glass rear window in the vehicle cab. A large push out acrylic window is fitted in the lift up rear door.

The module is fitted with a recirculating heater system, while additional ventilation is available through the cabin communications window, the lift up side panels, and via flaps and extractor vents in the roof panel.

LAND ROVER 6 x 6 ELECTRONICS REPAIR VEHICLE

The Electronics Repair Vehicle comprises a specialised module fitted to a basic Land Rover 6 x 6 chassis cab.

The production vehicle layout was developed via the use of a visually representative mock-up, which enabled a wide range of alternative arrangements to be evaluated. An Initial Production Vehicle was then produced and subjected to extensive durability and user trials prior to the start of volume production.

The module will primarily be used by two tradesmen working within the module, who will be engaged in the field repair of telecommunications and radio equipment.

Access to the module is provided by a vertically hinged door in the rear panel, together with a rear chassis mounted fold down step. Additionally, the entire rear panel can be unbolted and hinged upwards to provide major servicing access to the module interior.

Heavy duty C channels in the platform down each side of the module permits the fitting of a wide variety of fittings and equipment such as

- work benches
- bin packs
- stowage racks

A work bench is fitted across the forward wall of the module. Two fold out stools are provided – attached to the forward and side work benches.

LAND ROVER 6 x 6 ELECTRONICS REPAIR VEHICLE (CONT.)

240 volt and 415 volt 3 phase power is supplied to the module – via an externally located generator set. 24 volt dc power is provided via two 12 volt / 95 amp hour batteries which are located on the vehicle chassis and trickle charged via the 240 volt system. (A full 24 volt supplementary electrical system can also be provided, including a vehicle engine driven 28 volt / 100 amp fully screened alternator and matching distribution box.)

a high capacity air conditioning system is fitted to the module, with the compressor driven by a 240 volt electric motor. A 240 volt fan heater is also provided.

Heavy duty aluminium tread plate is used for the module floor and side platforms, and equipment restraining tie down rings are provided in the centre floor area. Loose anti-static rubber mats are also provided for the centre floor.

240 volt fluorescent lights are fitted to the module ceiling, together with a blackout lighting system, and a 24 volt supplementary light for use when the generator is not connected. Blackout curtains are provided for the front cabin and rear door windows.

LAND ROVER 6 x 6 LONG RANGE PATROL VEHICLE

This is the latest and most specialised of the currently approved Australian Army derivatives.

It uses a unique integrated body, mated to a modified chassis, but with substantially standard mechanical components. The body structure is based on the 6 x 6 vehicle's wider cab and utilises a hot dip galvanised steel frame and aluminium alloy outer panels.

The scuttle structure is reinforced to accommodate a front machine gun mounting, while the body sides accommodate two spare wheels on each side and two longitudinal stowage bins. Space is provided in the rear body for the stowage of up to ten jerry cans.

Seating for a crew of three is provided – two in the front compartment, and one in the rear, facing rearwards. Additional passengers can be carried on the side stowage boxes. Rake adjustment, head restraints and fold up armrests are provided for all seats. The two front seats have fore and aft adjustments while the passenger's seat is also adjustable for height. The seats are trimmed in heavy duty green vinyl and are fitted with removable disruptive pattern fabric covers.

LAND ROVER 6 x 6 LONG RANGE PATROL VEHICLE (CONT.)

A mid mounted 275 litre fuel tank is provided, plus a 50 litre auxiliary tank. This gives an on-road range of approximately 1800km.

Olympic Steeltrek 105 pattern 7.50 R 16 LT x 10 ply tyres are fitted on standard 6.00 x 16 heavy duty pressed steel road wheels. Four spare wheels are carried in the body side panels. An engine driven tyre pumping compressor is also provided.

A heavy duty bull bar is fitted to the front of the vehicle, which in addition to the helicopter slinging, vehicle tie down and vehicle recovery points, also accommodates mountings and lifting points for a high lift jack. A steering protector plate is fitted across the front of the chassis.

A motor cycle mounting frame sits across the rear of the vehicle. This incorporates a removable loading ramp and attachment points for motor cycle attachment straps as well as slinging, tie down and recovery points and a swivelling towing pintle.

A Thomas T9000M military drum winch of 40kN capacity is mounted at the front of the vehicle, with 45 metres of 11mm diameter cable. This is driven mechanically from a transfer box mounted power take off via an automatically resetting torque limiter. A 12 volt 98 amp hour vehicle battery is provided in the engine compartment, charged by the vehicle’s 12 volt / 70 amp alternator / vacuum pump. The vehicle electrical system is suppressed to MIL STD 416A REO 5.

LAND ROVER 6 x 6 LONG RANGE PATROL VEHICLE (CONT.)

A roll over protection structure is built across the back of the front compartment, with a brace to the centre of the scuttle, housing a wire cutting device. A removable windscreen (with windscreen wipers) and a canvas canopy with hood bows is provided for long distance transits. Camouflage nets can be carried across the roll over bars.

The standard vehicle's instruments – speedometer / odometer, fuel gauge, water temperature gauge and voltmeter – are supplemented by a dash mounted vehicle compass and electronic trip meter.

Mountings are provided in the front and rear compartments to suit both Minimi and Mag 58 machine guns. A 50 calibre machine gun can also be mounted in the rear compartment.

Two Initial Production Vehicles were produced and subjected to extensive user trials to prove the vehicle layout and durability prior to approval of the vehicle for volume production.

LAND ROVER 6 x 6 LOGISTICS VEHICLE

This vehicle is based on the Land Rover 6 x 6 Cargo / Personnel vehicle, but has the hard top cab replaced by a soft top cab without doors, and the flat floor extruded aluminium tray body replaced by a heavier hot dip galvanised steel rear body with a lowered centre section and centre tailgate.

The soft top cab is based on the front end of the Long Range Patrol Vehicle body and features:

- hot dip galvanised tubular steel frame with riveted aluminium and polyurethane sealant / adhesive.
- Seating for driver and one passenger. The driver's seat is adjustable for reach and rake, while the passenger's seat is also adjustable for height. The seats are fitted with removable disruptive pattern canvas covers.
- The full width fibreglass dashboard in the hard top is replaced by a two thirds width dash, leaving space for a weapon mount in front of the passenger's seat. The scuttle structure is reinforced to accommodate the weapon mount loads.

LAND ROVER 6 x 6 LOGISTICS VEHICLE (CONT.)

The Logistics Vehicle chassis and running gear is based on the standard Cargo / Personnel vehicle running gear. The standard power unit is the 3.9 litre Isuzu 4BD1 turbocharged diesel, while Land Rover's 3.5 litre aluminium V8 petrol engine can also be provided. The vehicle can be manufactured in left or right hand drive.

The heavy duty bull bar from the Long Range Patrol Vehicle is fitted, along with side protection bars, side steps and jacking points and mountings for the high lift jack.

The soft top cab form the Logistics Vehicle is interchangeable with the normal hard top cab, while its heavy duty low profile stepped floor rear body is similarly interchangeable with the Cargo / Personnel, Air Defence, Ambulance or Maintenance Vehicle rear bodies.

Variations on the Logistic Vehicle specification can be provided to suit individual customer's requirements.

LAND ROVER 6 x 6 LOGISTICS VEHICLE (CONT.)

- A heavy duty twin roll tube is fitted across the back of the cab, incorporating the upper mounting points for the inertia reel seat belts.

  A fore / aft support strut links the centre of the roll over bar to the centre of the vehicle scuttle. This tube has provision for the fitment of a wire cutting device.

- A removable transit windscreen is fitted across the scuttle incorporating the windscreen wiper system, rear vision mirror and twin sun visors. The windscreen is fixed to the central support strut and also accommodates mountings for two side support bars.

- A disruptive pattern canvas cab canopy is provided, which is attached to the windscreen frame and supported by the roll over bars and supporting struts and a removable rear hood bow.

- A large lockable stowage box is fitted between the front seats, while sufficient additional space is provided for the fitment of radios or other equipment.

- A supplementary trip meter is fitted to the centre of the dash panel.

Features of the low profile rear body are:

- The rear body is constructed using a steel frame with welded steel internal panels. The centre section is mounted low against the chassis crossmembers, while the sided are raised to clear the road wheels, tool boxes and jerry can holders. A heavy duty steel tailgate is provided in the centre of the load area.

  The rear body and tailgate are hot dip galvanised as assemblies after welding, providing an extremely corrosion resistant finish, while the outer panels are treated with sound proofing material.

- Two removable seats are fitted down each body side, facing inwards, with cushions which fold up against the seat squab. These provide seating for up to twelve fully equipped troops.

- Provision is made for mounting a heavy duty machine gun pedestal in the centre of the rear body.

- Provision is also made for fitting an additional spare wheel vertically to the front face of the rear body – supplementing the vehicle’s standard under the chassis mounted spare wheel.

- Twin aluminium hood bows are provided, linked by extruded aluminium corner cappings and ridge pole. A heavy duty disruptive pattern canvas canopy is provided.

- The hood bows and canopy can be mounted at two different heights – providing 1.20m or 1.54m headroom.

LAND ROVER 6 x 6 LIGHTWEIGHT HELICOPTER TRANSPORTABLE VEHICLE

This special purpose derivative of the Land Rover 6 x 6 vehicle has been developed to meet the requirement for a 1.5 – 2.0 tonne payload rapid deployment vehicle which can be carried as a slung load under a medium helicopter. It is based on the Land Rover 6 x 6 Logistics vehicle, but aimed at reducing the vehicle's mass without degrading its reliability or structural integrity. The vehicle remains largely unchanged mechanically, the mass reduction being achieved via material changes and reduced overall dimensions, primarily to the chassis, cab and rear body.

Features of the Land Rover 6 x 6 LHTV are:

- The base laden vehicle with diesel engine, full fuel tanks, windscreen, rear body and front and rear seats and canopies has a mass of 2500kg. Combined with a gross vehicle mass of 4500kg, this provides a cross country payload of 2000kg.

- It is built on a 2690mm intermediate wheelbase plus a short rear overhang, giving an overall reduction of approximately 700mm compared to the standard Cargo or Logistics vehicle, and a rear body internal length of 2.35 metres.

- The cab is constructed using a welded aluminium alloy tubing frame with bonded and riveted aluminium alloy skin panels. Fixed side panels are utilised, terminating approximately 350mm above the cab floor. These eliminate the need for cab side doors, and provide some protection for water wading.

LAND ROVER 6 x 6 LIGHTWEIGHT HELICOPTER TRANSPORTABLE VEHICLE (CONT.)

- An aluminium alloy roll over protection bar is fitted across the back of the cab, with an additional support bar linking the roll over bar to the cab scuttle.
- A folding aluminium alloy framed single piece laminated glass windscreen is provided. This is fixed to the roll over support bar in its raised position, or can be strapped against the bonnet when folded. The windscreen frame also accommodates the interior rear vision mirror, twin sun visors and the windscreen wiper system.
- Two lightweight vinyl trimmed seats are mounted in the cab. The passenger's seat is fixed, but the driver's seat is adjustable for reach and height.
- The two thirds vehicle width fibreglass dashboard provides waterproof accommodation for the cabin electrics – including the stop / start motor.
- The cabin canopy os supported by the windscreen frame and roll over bars, plus twin struts along each side. Removable side screens are fitted, which can be rolled up when not in use.
- A full width aluminium alloy bumper is fitted across the front of the vehicle. This incorporates the winch rollers and rigid tow hitching points.
- Twin bumprettes and access steps are located at the rear of the chassis.
- The chassis also incorporates helicopter slinging, shipping tie down and vehicle recovery points.
- The rear body provides seating for eight fully equipped troops, and is fitted with twin hood bows and a full length canopy.
- High level air intakes are provided for the cabin ventilation system and the sealed engine air intake.
- Twin 50 litre fuel tamks are fitted to the vehicle. These give an on-road range of 500 – 600km, depending on operating conditions. Removable gauze filters are located in the fuel filter necks.
- Twin side steps are provided to allow easy access to the vehicle cab.
- Two tool boxes are mounted at the end of the chassis to accommodate the vehicle jack and tools.
- A NATO style rotating towing pintle is fitted to the chassis rear crossmember.
- Single leaf constant rate composite springs are used to support the rear axles. These have lower friction levels than conventional multi-leaf steel springs, and offer significant

savings in vehicle mass.

LAND ROVER 6 x 6 LIGHTWEIGHT HELICOPTER TRANSPORTABLE VEHICLE (CONT.)

A wide range of optional features can be accommodated:

- The standard power unit comprises the Isuzu 4BD1 T direct injection turbocharged diesel engine mated to Land Rover's heavy duty LT95A four speed gearbox / two speed transfer box.
- Rear axles with vacuum actuated cross axle differential locks are available.
- A sealed 24 volt vehicle engine system can be provided. This incorporates:
  - A Lucas AC5 RS 24 volt / 55 amp heavy duty brushed wadable alternator.
  - Twin 12 volt sealed batteries.
  - Sealed 'Packard' type connectors in the scuttle with mating, quick connect plugs. 'Packard' connectors are also fitted to the front and rear lamps.
  - A multi-position 'Kostel' blackout lighting switch in the fascia.
  - LED (light emitting diode) blackout lights at front and rear, plus a convoy lamp illuminating the rear axle bowl.
  - 24 volt NATO type trailer plug in the rear crossmember.
  - A waterproof box on the front face of the rear body.

LAND ROVER 6 x 6 LIGHTWEIGHT HELICOPTER TRANSPORTABLE VEHICLE (CONT.)

- A stainless steel exhaust system can be provided with high level discharge to suit water wading. A spark arrester can be fitted to the exhaust tailpipe.

- A deep fording kit can be made available for depths of up to 1.2 metres. (The standard vehicle will accommodate 800mm without preparation.)

- A wide range of wheels and tyres can be fitted. These include:

  Wheels:

  15 x 7 Alloy
  15 x 7 Alloy
  16 x 6 Steel
  16 x 6 Split Rim Steel

  Tyres:

  255 / 75 R 15
  31 X 10.5 R 15
  10 R 15
  11 R 15
  750 R 16
  235 / 85 R 16
  255 / 85 R 16
  8.25 R 16

- An engine mounted tyre pumping compressor is available for the vehicle. This can be either manually engaged or engaged remotely via an electro-magnetic clutch.

- A tropical proof radiator with solder dipped core can be provided. This significantly enhances the durability of the vehicle cooling system in high humidity tropical operation.

- Full vehicle instrumentation can be provided, including:

Speedometer / Odometer	]	
Fuel Gauge	]	
Water Temperature Gauge	]	in instrument binnacle
Engine oil pressure	]	
Tachometer	]	
Voltmeter	]	
Ammeter	]	in dash panel
Engine Hour Meter	]	

- An uprated Thomas T8000 M mechanical drum winch can be specified. This accommodates a maximum line pull (bare drum) of 40kN and is fitted with 45 metres of 9.5mm dia galvanised cable.

LAND ROVER 6 x 6 CREW CAB

The Land Rover 6 x 6 vehicle's wide cab has been designed from the start to accommodate a crew cab derivative – having the same width and height as the basic wide cab, but 820mm deeper.

Standard Land Rover station wagon rear doors are used, while three full width rear bucket seats supplement the three front seats, providing ample accommodation for up to six people. The cabin interior is fully trimmed with durable moulded trim material on the sides and roof, and foam backed rubber floor mats.

The crew cab vehicle maintains a high degree of component commonality with the remainder of the Land Rover 6 x 6 vehicle range, and can be fitted with most of the 6 x 6 vehicle's optional equipment.

The crew cab reduces the vehicle's useable payload by approximately 500kg – providing a basic crew cab vehicle with an allowance of approximately 2500kg for optional equipment, body, payload and crew. Rear body overall widths of up to 2.2 metres and overall lengths of up to 2.4 metres can be accommodated.

LAND ROVER 6x6 INFANTRY VEHICLE

These are a specific purpose vehicle used for the carriage of ten fully equipped Infantry personnel, their equipment, supplies and ammunition for three days in an operational environment. Dedicated stowage is provided for up to10 jerry-cans, supplies and ammunition.

The aluminium rear body has a well floor with eight dedicated outward facing seats, each fitted with a four point, quick release restraint harness. The body has integral certified roll over protection frames front and rear for a high level of troop protection.

A light machine gun ring and pintle is located in the forward section of the roof with a gunner's stand below the same.

A 28-volt engine driven generator and power distribution box is fitted to provide power for radio equipment.

The vehicle can be loaded and unloaded into a C130 Hercules aircraft without preparation and is capable of being parachute dropped.

The vehicle has an unprepared wading depth of up to 1000mm

The body can be interchanged with any Perentie body or other Bushranger Phase I body.

LAND ROVER 6x6 MORTAR VEHICLE

These are a specific purpose vehicle used for the carriage of ten Mortar Crew personnel, their supplies, weapons, ammunition, up to 10 jerry-cans, communication, command and control equipment for three days in an operational environment.

The aluminium rear body has a well floor and is divided into a forward command post compartment and an aft compartment. The Command Post is blackout compliant and accommodates two operators on lower mounted seats and the aft compartment accommodates six mortar crew on outwards facing seats. Each seat has a four point, quick release restraint harness and the body has an integral certified roll over protection for a high level of personnel protection.

Stowage provision is provided for two sets of mortar equipment. A 28-volt engine driven generator and power distribution box is fitted to provide power for radio equipment.

The vehicle can be loaded and unloaded into a C130 Hercules aircraft without preparation and is capable of being parachute dropped.

The vehicle has an unprepared wading depth of up to 1000mm

The body can be interchanged with any Perentie or other Bushranger Phase I body.

LAND ROVER 6x6 ASSAULT PIONEER

These are specific purpose vehicles used for the carriage of eight fully equipped Assault Pioneer personnel, their supplies, weapons, ammunition, up to 10 jerry-cans and engineering equipment for three days in an operational environment.

The aluminium rear body has a well floor and is divided into two engineering equipment storage areas and a mid seating area. The storage area accepts a wide range of equipment and an intercom system allows communication between cabin crew and personnel in the rear body.

Each seat has a four point, quick release restraint harness and the aluminium body has integral, certified roll over protection frames front and rear for a high level of personnel protection.

The vehicle can be loaded and unloaded into a C130 Hercules aircraft without preparation and is capable of being parachute dropped.

The vehicle has an unprepared wading depth of up to 1000mm

The body can be interchanged with any Perentie or other Bushranger Phase I body.

SUPPORT DATA

The production status of the various derivatives in this presentation is as follows:

Truck Cargo

Full production of this derivative for the Australian Army commenced in March 1989.

Ambulance

Full production of this derivative for the Australian Army commenced in July 1989.

Air Defence Vehicle

Full production of this derivative commenced in March 1990.

Maintenance Vehicle

Full production of the Maintenance Vehicle and Electronics Repair Vehicle commenced in August 1990.

Long Range Patrol Vehicle

Full production of this derivative commenced in April 1991.

Logistics Vehicle

Production of this derivative commenced in October 1990.

Lightweight Helicopter Transportable Vehicle

This derivative is now undergoing military trials. Volume production is expected to commence in 1991.

Crew Cab

Production crew cab vehicles are available to order.

Left Hand Drive

Left hand drive production vehicles are now available to order.

V8 Engine

The installation of the V8 petrol engine in the Land Rover 6 x 6 with wide cab has now been finalised. Production vehicles are now available to order.

Note that Land Rover 6 x 6 vehicles are generally built to customer order. The normal lead time from the placement of firm order for a quantity of currently approved derivative to the completion of the first vehicles for shipment is approximately 40 weeks. However, sample vehicles for specific development or evaluation trials can usually be supplied more quickly – depending on the specification required.

Gross Vehicle Mass / Gross Combination Mass

The Land Rover 6 x 6 vehicle has a Gross Vehicle Mass (GVM) of 5.60 tonnes and a Gross Combination Mass (GCM of 7.10 tonnes).

The GVM and GCM are ultimately limited by the vehicle gradeability in both high and low range, and by legislative restrictions on the performance of the vehicle brakes when tested with the brake booster disconnected.

Basic Chassis Cab Vehicle

A basic diesel engined chassis cab vehicle with full water, oil and fuel but without rear body weighs approximately 2.60 tonnes. This provides an allowance for optional equipment, bodywork and payload of 3.0 tonnes.

Military Chassis Cab

An Australian Army chassis cab vehicle with full Army equipment together with a driver and his kit and a chassis mounted drum winch, plus full water, fuel and oil (including jerry cans and oil can), but without the rear bodywork, weighs approximately 3.10 tonnes. This provides an allowance of approximately 2.50 tonnes for the rear body and payload.

Military Cargo Vehicle

An Australian Army cargo vehicle with heavy duty flat floor rear body, seats and canopy plus a driver and his kit and chassis mounted drum winch and full water, fuel and oil weighs approximately 3.60 tonnes. This provides a Cargo with winch vehicle with a true payload of approximately 2.00 tonnes.

Air Defence Vehicle

A fully kitted out Australian Army Air Defence Vehicle (Rapier or RBS70) with a full compliment of missiles plus a crew of three and their personal equipment, weighs approximately 5.00 tonnes.

Ambulance

A fully fitted out Australian Army Ambulance vehicle with rear Ambulance Module and fittings including the supplementary 24 volt electrical system and front mounted drum winch plus full water, fuel and oil and a driver and his kit weighs approximately 4.60 tonnes. This provides an allowance of approximately 1.0 tonnes for the medical attendant and up to eight patients and their personal equipment.

Maintenance Vehicles

A fully kitted out Australian Army Maintenance Vehicle with benches, vice, bin, packs etc., plus full water, fuel and oil and a driver, co-driver and their kit weighs approximately 4.60 tonnes. This provides an allowance of approximately 1.0 tonnes for tools and equipment.

Long Range Patrol Vehicle

A Long Range Patrol Vehicle with full fuel tanks (325 litres), jerry cans (10), winch, windscreen, canopy, stowage bins and spare wheels (4), plus a crew of three and their personal equipment weighs approximately 4.10 tonnes. This provides an allowance of up to 1.50 tonnes for equipment – including the motor cycle.

Logistics Vehicle

This weighs approximately 3.80 tonnes with full fuel, oil and water, military equipment and heavy duty hot dip galvanised rear body.

Lightweight Helicopter Transportable Vehicle

A diesel engined vehicle with full fuel, oil and water weighs approximately 2.50 tonnes. This derivative has a Gross Vehicle Mass of 4.50 tonnes and a Gross Combination Mass of 6.50 tonnes.

Crew Cab

A basic diesel engined crew cab vehicle with six seats plus full water, oil and fuel but without a rear body weighs approximately 3.10 tonnes. This provides an allowance for optional equipment, bodywork and payload of 2.50 tonnes.

VEHICLE SPECIFICATIONS

Detailed specifications of the basic Land Rover 6 x 6 chassis cab vehicle are as follows:

1. VEHICLE

a. Manufacturer	Land Rover Australia (a division of JRA Limited) under license to Land Rover Limited
b. Model	Land Rover 6 x 6
c. Configuration	Compact, normal control 6 x 6 vehicle

2. ENGINE – ISUZU DIESEL

a. Type	Isuzu 4BD1 TRB-G Series Diesel
b. Configuration	Turbocharged, four cylinder in line, overhead valve, four cycle direct injection diesel engine
c. Capacity	3.856 litres
d. Bore x Stroke	102mm x 118mm
e. Compression Ratio	17.0 : 1
f. Injection System	Direct injection system with Diesel Kiki (Bosch type) in line pump with automatic timer
g. Maximum Power	90kW @ 3000rpm]
	] DNI 70020 (net)
h. Maximum Torque	314Nm @ 2200rpm]
i. No load maximum engine speed	3600rpm
j. Specific Fuel Consumption	214 grams / kW hour (min) @ 2200rpm
k. Engine Construction	Cast iron cylinder block and heads
l. Turbocharger	Water cooled Garret model ATD-T25
m. Engine Cooling System	Forced circulation type with thermostat controlled main and bypass passages. Fixed 430 mm dia engine cooling fan
n. Oil Cooling	Water cooled plate and tube type – 4 plates
o. Valve Arrangement	Overhead valve with valves actuated by rockers and push rods from gear driven camshaft
p. Vacuum System	Belt driven alternator / vacuum pump
q. Air Cleaner	Heavy duty two stage dry element type with serviceable primary element, safety element, and filter replacement indicator

3. ENGINE – V8 PETROL

a. Type	Land Rover 3.5 litre V8 petrol
b. Configuration	Naturally aspirated, V8, overhead valve, carburetted, petrol engine
c. Capacity	3.528 litres
d. Bore x Stroke	88.9mm x 71.1mm
e. Compression Ratio	8.13 : 1
f. Carburation	Twin SU semi-downdraught
g. Maximum Power	100kW @ 5000rpm
h. Maximum Torque	253Nm @ 2500rpm
i. Specific Fuel Consumption	288 grams / kW hour (min)
j. Engine Construction	Cast aluminium cylinder block and heads
k. Engine Cooling System	Forced circulation type with thermostat controlled main and bypass passages. Viscous coupled 400mm dia engine cooling fan
l. Valve Arrangement	Overhead valve
m. Vacuum System	Manifold Vacuum
n. Air Cleaner	Heavy duty two stage dry element type with serviceable primary element, safety element, and filter replacement indicator
o. Engine Electrics	12 volt with 65 amp alternator
p. Fuel Octane	89 R.O.N. (min)

4. CLUTCH

	ISUZU DIESEL	V8 PETROL
a. Make	Isuzu pressure plate, Repco driven plate	Land Rover pressure and driven plates
b. Type	Single dry plate diaphragm spring	
c. Diameter	275mm	
d. Actuation	Hydraulic	
e. Swept Action	2936cm^2	

5. GEARBOX

a. Make	Land Rover LT95A Heavy Duty
b. Type	Helical gear all synchromesh with integral transfer case
c. Number of Speeds	4 Speed plus reverse
d. Gear Ratios	1st 4.069 : 1 2nd 2.448 : 1 3rd 1.505 : 1 4th 1.000 : 1 Rev 3.664 : 1

6. TRANSFER BOX

a. Make	Land Rover LT95A Heavy Duty
b. Type	Helical gear constant mesh integral with main gearbox, incorporating a lockable inter axle differential
c. Number of Speeds	2 speed
d. Gear Ratios	Low 3.321 : 1 High 0.996 : 1 (Isuzu Diesel) 1.123 : 1 (V8 Petrol)

7. FRONT AXLE

a. Make	Land Rover Heavy Duty – Wide Track
b. Type	Fully floating axle with spiral bevel drive gear, 4 pinion differential, high strength involute splined half shafts and enclosed constant velocity joints. Heavy duty housing with cast centre section and steel side tubes.
c. Capacity	1800kg (nominal)
d. Gear Reduction	4.70 : 1

8. REAR AXLE

a. Make	Salisbury 8HA - Heavy Duty Wide Track
b. Type	Fully floating axle with hypoid drive gear, 4 pinion differential and high strength side tubes and involute splined half shafts.
c. Capacity	2050kg/axle (nominal)
d. Gear Reduction	4.70 : 1

9. STEERING

a. Position	Right hand drive (left hand drive also available)
b. Make	Adwest integral power steering box. Isuzu gear driven power steering pump.
c. Type	Variable ratio worm and roller type
d. Gear Reduction	4.70 : 1

10. FRONT SUSPENSION

a. Type	Beam front axle located by leading arms and panhard rod. Supported by long travel coil springs and double acting telescopic dampers.
b. Number of Springs	2
c. Spring Rate	50 N / mm (Isuzu Diesel) 42 N / mm (V8 Petrol)
d. Capacity	1800kg (nominal – Isuzu Diesel) 1600kg (nominal – V8 Petrol)

11. REAR SUSPENSION

a. Type	Dual rate semi-elliptic leaf springs linked via shackles to a rubber bushed load sharing rocker beam. Two heavy duty double acting telescopic dampers fitted to each axle, together with steel cable rebound straps.
b. Number of Springs	4
c. Spring Rate	Primary - 69 N / mm Secondary - 102 N / mm
d. Capacity	4100kg (nominal)

12. FUEL SYSTEM

Description	Twin 65 litre underseat fuel tanks with screw on filler caps in side panels and motorised electric change over switch in fascia.

13. ELECTRICS

a. Potential	12 volt negative earth
b. Alternator	Hitachi 70 amp (Isuzu Diesel) Lucas 65 amp (V8 Petrol)
c. Battery	12 volt 95 amp hour low maintenance lead acid type on tray in engine compartment
d. Starter	Mitsubishi geared type sealed starter (Isuzu Diesel) Lucas sealed starter (nominal – V8 Petrol)

14. BRAKES

a. Type	Disc brakes front and rear with vacuum assistance
b. Size - Front	298mm dia disc with 4 piston calliper
- Rear	298mm dia disc with 4 piston calliper
c. Lines	Dual line brakes with failure warning indicator
d. Master Cylinder	Bendix Tandem
e. Booster	PBR 11 inch tandem type with 4.0 : 1 boost ratio
f. Parking Brake	Mechanical 254mm dia drum brake fitted on rear of transfer box output shaft
g. Service Brake Lining Area	
- Front	$244cm^2$
- Rear	$378cm^2$
h. Service Brake Swept Area	
- Front	$1656cm^2$
- Rear	$3312cm^2$
i. Legislation	Braking system meets Australian Design Rule 35A – Commercial Vehicle Braking System

15. WHEELS & TYRES

a. Type of Wheels	Heavy duty pressed steel disc type
b. Wheel Size	6.00 F x 16 (7 off)
c. Tyre Type	Goodyear Wrangler steel belted radial ply – tubed
d. Tyre Size	7.50 R 16 x 8 ply (7 off)
e. Spare Wheel / Tyre	Mounted on winch type carrier under rear of chassis

16. CAB

a. Configuration	Bonneted cab with welded space frame and riveted / bolted skin panels
b. Material	Hot dip galvanised steel space frame with aluminium alloy skin panels, and glass reinforced plastic bonnet and grille. Flexible reinforced injection moulded polymer front wheel arch flares.
c. Seating	Three seats provided – all adjustable for rake and fore / aft position/ Vinyl seat trim with fabric facings.
d. Cab Fittings	Twin sun visors. Inertia reel lap / sash seat belts fitted to outboard seating positions, with static lap belt for centre passenger.
e. Heating/Cooling	High capacity heater / demister
f. Glass	Laminated flat glass single piece clear windscreen with zone tinted upper band. Hinged quarter light glass behind safety doors. Sliding glass rear window, clear safety glass in back and side panel and doors.
g. Controls	Column mounted waterproof switches for indicators, head and side lamps, horns, wipers and washers. Fascia mounted hazard warning, fuel changeover and heater blower switches.
h. Instruments	Fascia mounted speedometer / odometer (including trip meter), water temperature gauge and voltmeter
i. Warning Lamps	Oil Pressure Ignition Brake Fail Direction Indicators Main Beam Low Fuel Centre Differential Lock Park Brake Side Lamps On 6WD Engaged

17. DIMENSIONS

a. Overall Length		6001mm
b. Wheelbase	- Overall	3940mm
	- Intermediate	3040mm
c. Front Overhang		878mm
d. Rear Overhang		1183mm
e. Width over Mirrors		2430mm
f. Width over Wings		1980mm
g. Tyre Track - Front and Rear		1698mm
h. Width over Tyres – Front and Rear		1910mm
i. Overall Height – Unladen		2100mm
j. Approach Angle – Laden		41
k. Departure Angle – Laden		30
l. Ramp Angle – Laden		152
m. Turning Circle – Wall to Wall		17.2m
n. Unladen Mass (basic civilian chassis cab)		2600kg
o. Gross Vehicle Mass		5600kg
p. Gross Combination Mass		7100kg

18. PERFORMANCE

a. Maximum Speed	- Isuzu Diesel	100km/h
	- V8 Petrol	115km/h
b. Maximum Gradeability		60%
c. Vehicle Range	- on Highway - Isuzu Diesel	650km
	- V8 Petrol	500km