

LMV

Light Multirole Vehicle

003-0310

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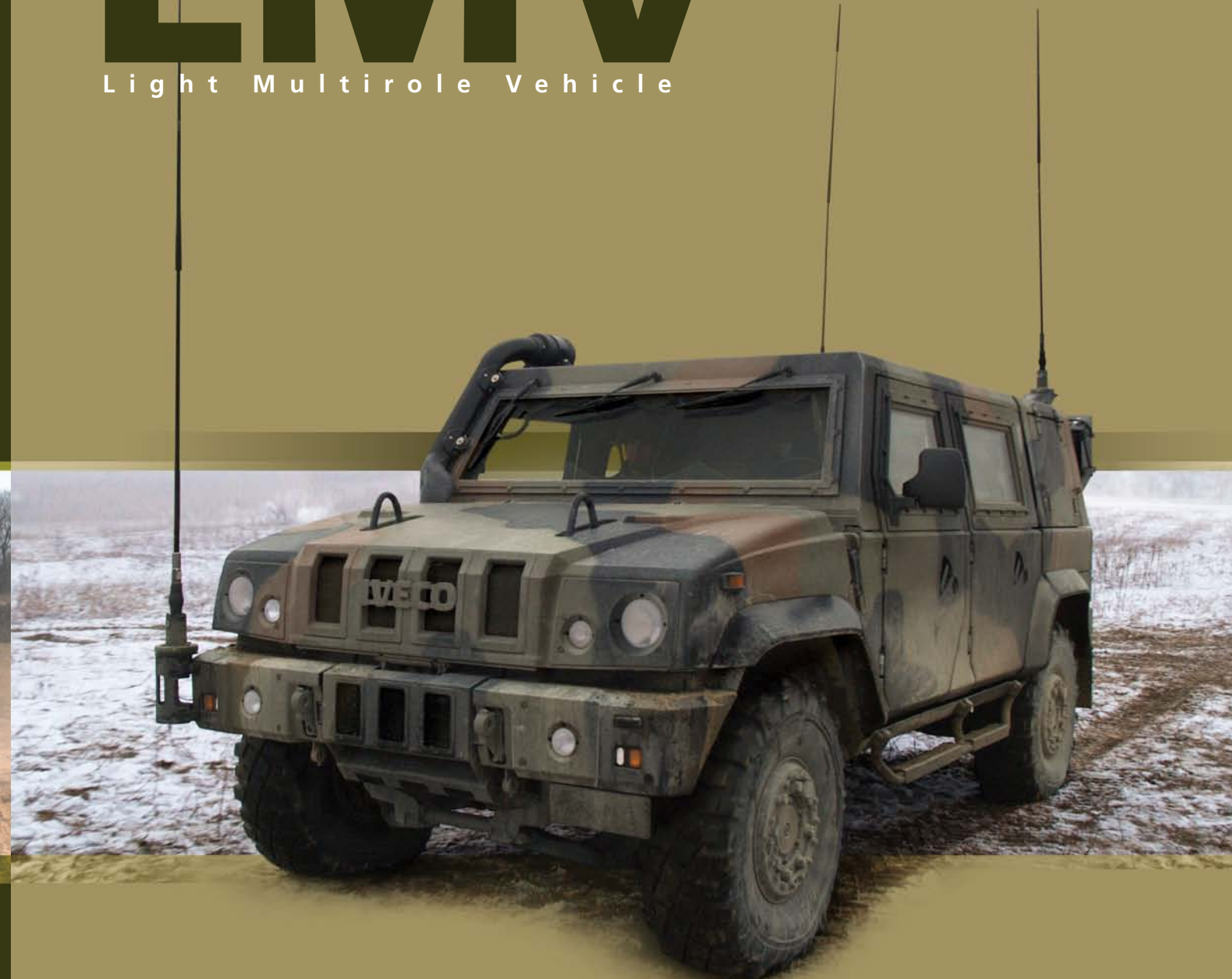
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LMV

Designed to meet the challenges of an uncertain world

In today's operational environment, nothing is certain except for uncertainty. The demands posed by an evolving threat and challenging terrain make it essential that light tactical vehicles are as capable and flexible as possible in order to complete the full spectrum of missions demanded of them. Iveco Defence Vehicles identified this trend early on, undertaking extensive research to identify and quantify the key factors which were likely to drive the user's requirements in the conflicts of the early 21st century.

Based on the output of this research, and on the company's own extensive experience of the market sector, a programme was initiated to develop an innovative and highly adaptable Light Multirole Vehicle (LMV). The LMV was designed to fill a wide variety of roles including:

- ▶ Command, reconnaissance and liaison vehicle
- ▶ Patrol vehicle, with four dismounts
- ▶ Light weapon systems platform

- ▶ Medevac
- ▶ Logistic carrier
- ▶ Artillery tractor

Meeting these roles effectively was paramount. Accordingly, the design process began by identifying the most demanding military requirements and ensuring that the specification met these in terms of:

- ▶ Crew protection
- ▶ Versatility/modularity
- ▶ Mobility
- ▶ Payload capacity
- ▶ Reliability and maintainability
- ▶ Towing capacity
- ▶ Low observability
- ▶ Transportability



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Crew protection

Crew protection was accorded particular priority, reflecting the importance of achieving mission success with the minimum of risk to personnel.

The protection system is based on a crew cell, or citadel, with the remainder of the vehicle being configured around this central feature.

In this weight class of vehicle, blast effect can only be reduced by venting the blast away from the crew cell and by absorbing and managing the residual energy. In order to achieve this, the crew cell is decoupled from other components, minimising the transmission of blast energy from the chassis. Both the front and rear of the vehicle are designed to be sacrificial, and can be blown off, enabling further mitigation of the blast energy.

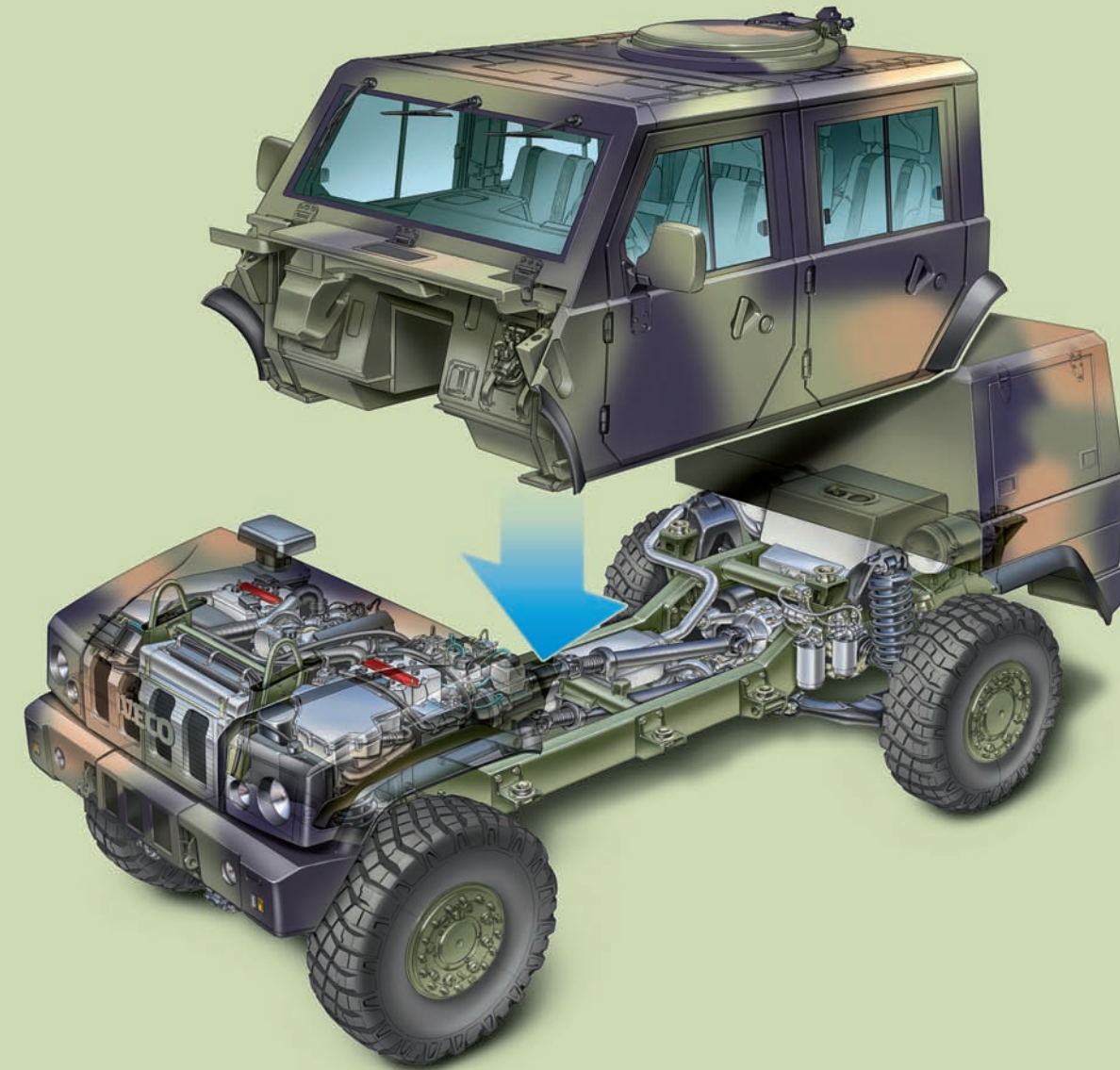
The principal driveline assemblies are located to the front and rear of the vehicle, preventing them becoming secondary projectiles in the event of a mine blast. The integrity of the crew cell is maintained through a series of design features. The bonnet is hinged to the chassis rather than the crew cell, and the rear cargo compartment and fuel tank are so designed that they will readily blow off, again allowing blast energy to dissipate.

The fuel tank is filled with explosive suppressant foam and the filler cap is positioned as far as possible from the doors to the crew cell further reducing risk in case of fire. The crew cell is unprotected in its basic form, with protection being afforded by a series of composite armour 'skins'. Depending on which is fitted, these provide a variety of protection levels which can accordingly be adapted to meet the predicted threat.

This protection solution exploits the latest armour developments and can be redesigned to incorporate further innovations as these become available, so future proofing the protection solution.

By virtue of an innovation patented by Iveco Defence Vehicles, the Customer can readily change the level of protection within the space of a few hours, even under field conditions, by replacing ballistic panels which fit between the internal structure and the outer cladding. This greatly facilitates replacement and upgrading of protected panels compared with monocoque vehicles.

The protection levels provided by the ballistic glass in the windows can also be increased to a level commensurate with the opaque armour, whilst maintaining the vehicle's external profile and inherent low observability.



Crew protection



LMV

Light Multirole Vehicle

Crew protection

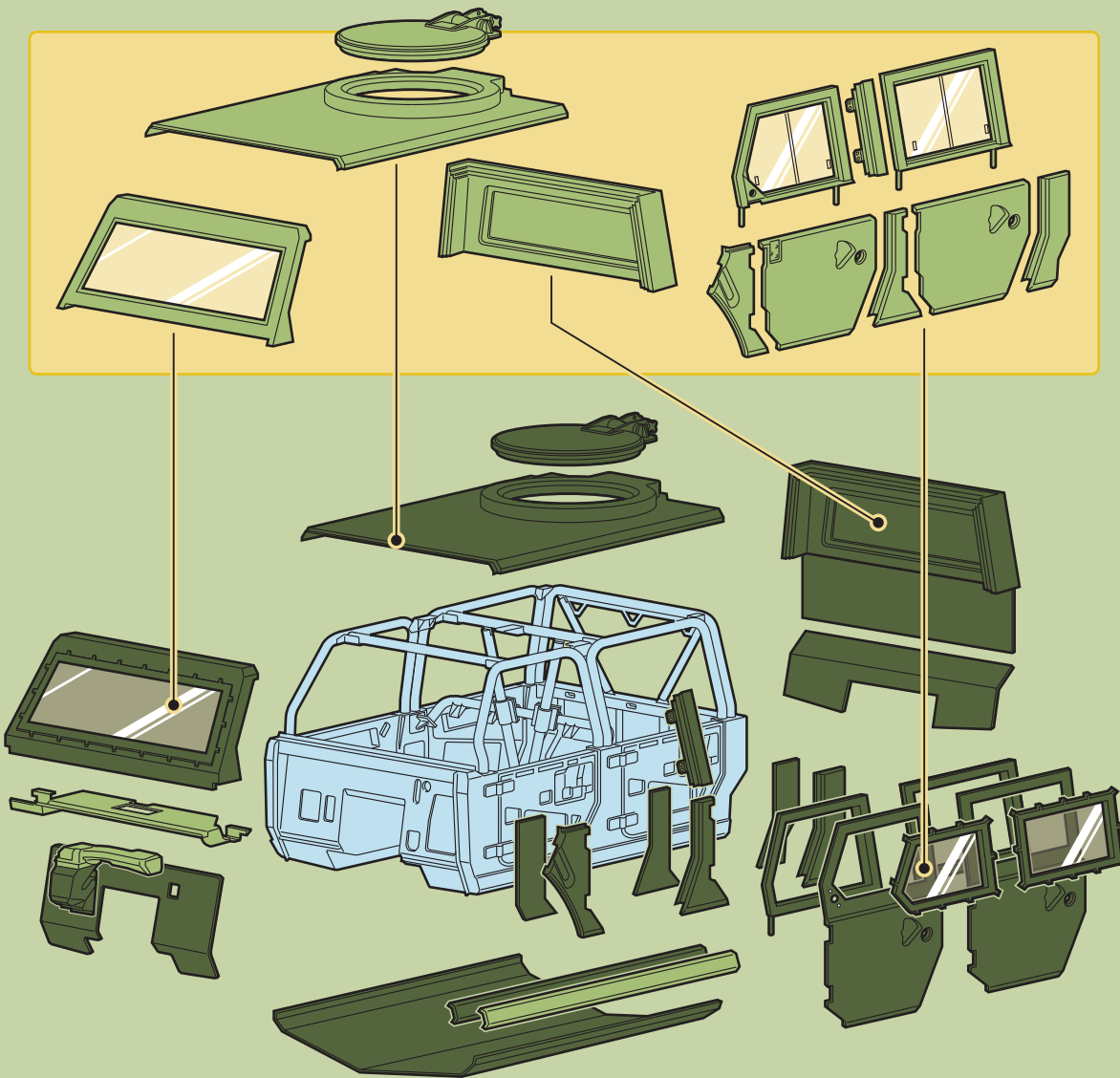
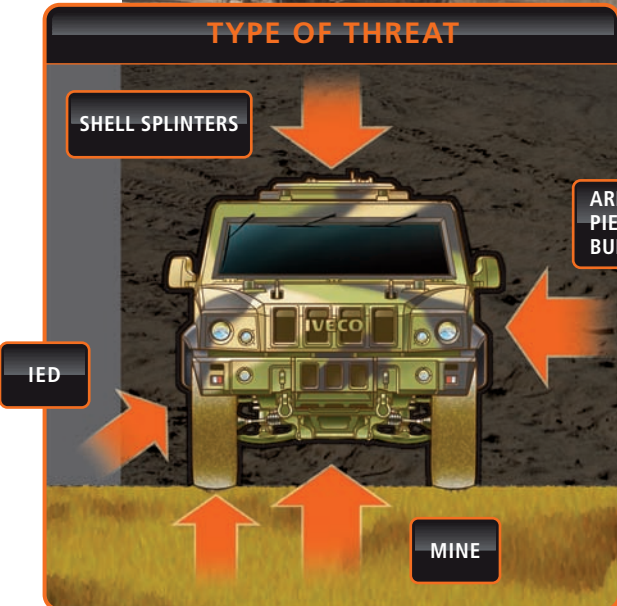
The vehicle can accordingly be fitted with Light, Medium or Heavy protection kits, depending on the mission profile - for example, on lower risk missions, a light protection kit could be used to maximize the payload. On missions judged to pose a higher risk, additional protection can be provided up to STANAG 4569 Level 3 (ballistic) and Level 2a (mine).

The general design features which contribute to the protection of the crew against mine attack, are complimented by a highly effective system of protection for the crew citadel against mine blast. This incorporates a multi-layered floor structure designed to manage and absorb both blast and fragments from smaller mines, with protection against anti-tank mines being provided by the installation of a blast shield.

Effective management of the blast energy through dissipation and absorption is achieved through a series of design features

Large tyres fitted with run-flat inserts provide absorption, whilst dissipation is enhanced by the fitting of deflectors along the wheel arches. All occupants are provided with specially designed shock dampened seats which are suspended on elastic mounts, avoiding direct transmission of blast shock to the crew. The seats incorporate moulded padding and five/six point seat harnesses to reduce sudden body movements caused by both the primary (rising) and secondary (falling) effects of blast, and possible negative "G" in the event of roll-over. Specially designed wrap-around head-rests provide protection from whiplash in case of Roadside IEDs.

The temperature resistant roof on the hardtop version, provides protection against shell fragments.



- Armoured
- Ballistic Glass
- Sheet metal and structure
- Unarmoured



Crew protection

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Crew protection

The roof of the LMV is readily adaptable to customer requirements and can be fitted with hatches that can be opened from inside or outside.

A weapon ring mount or protected cupola can be mounted on the vehicle roof structure, carrying a variety of weapons depending on the customer's need.



A remote weapon station is an increasingly popular option, with no fewer than 5 different models being mounted on the LMV fleet by different customers.

Internally, different types of roll bar are available, providing the vehicle's occupants with roll-over protection and withstanding acceleration up to 7.5 g.

Particular care has been taken to provide ergonomically sound and comfortable working positions for all occupants. The vehicle complements this by providing high levels of vibration control and shock absorption.

The vehicle's controls are designed to provide the perfect balance of automation and lightness of touch, making the vehicle responsive and easy to handle.



Light Multirole Vehicle

Signatures reduced across the spectrum

THERMAL

Reduced by running exhaust pipes inside the chassis rails, by shielding hot spots, such as the turbo-charger, and by using high capacity IR absorbent materials on the outside of the vehicle.

ACOUSTIC

Engine and exhaust noise reduced by using suitable sound deadening panels.

VISUAL

Minimised by the vehicle's low profile, by its uncluttered silhouette and by the use of low emission polychrome paint.

RADAR

Cross section reduced by designing out tri and di-hedrals on the vehicle, and by application of a non radar reflective coating.



UNARMoured



ARMoured



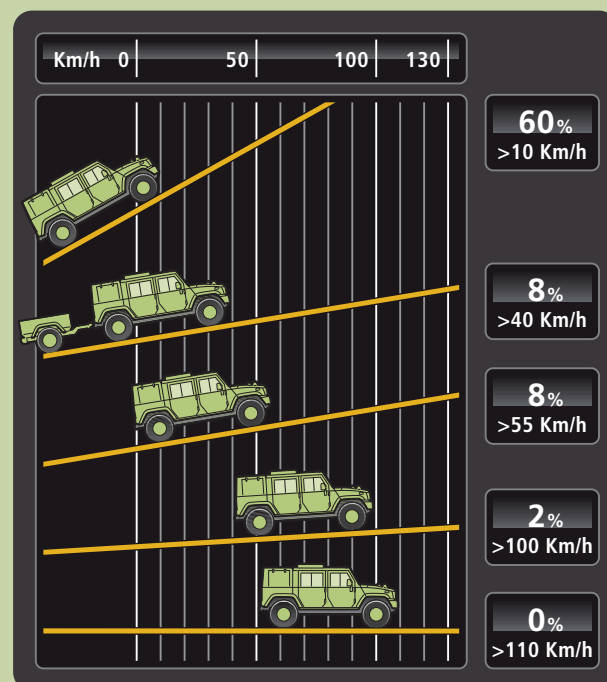
LMV

Mobility Operational and Tactical

The LMV is an extremely mobile and agile vehicle which is capable of operating across a wide range of demanding terrains. It is also well adapted to operations in demanding climatic environments, within temperature extremes of -32°C to +49°C including high humidity.

The vehicle's particular mobility features include:

- ▶ Independent suspension.
- ▶ Permanent four wheel drive.
- ▶ ADM (Automatic Drive-Train Management) as an option.



- ▶ ABS system designed specifically for on/off road conditions.
- ▶ Air-over-hydraulic braking system, allowing rapid braking even when heavily laden.
- ▶ Mechanical hand-brake allowing immediate movement when required.
- ▶ A 140 kW (190 HP) engine delivering a power to weight ratio of some 20 kW/T.
- ▶ A six speed automatic gearbox with hydro-dynamic coupling converter with two gear transfer-box (flanged to the rear differential).
- ▶ Central Tyre Inflating System (CTIS) allowing the tyre pressure to be adjusted to terrain conditions from within the cab and while on the move.
- ▶ The transfer-box is integrated in the rear differential therefore allowing better weight distribution, an underneath flat floor and allowing optional mine blast resistance.

One of the key innovations which has been made in the drive train is the adoption of inboard brakes positioned near the differentials and fixed elastically to the chassis. This reduces the unsprung mass of the vehicle, so enhancing performance, whilst also significantly increasing protection from anti-personnel mine blasts and fragmentation.



LMV's overall configuration takes full account the joint requirements of protecting against mine blasts and negotiating obstacles.

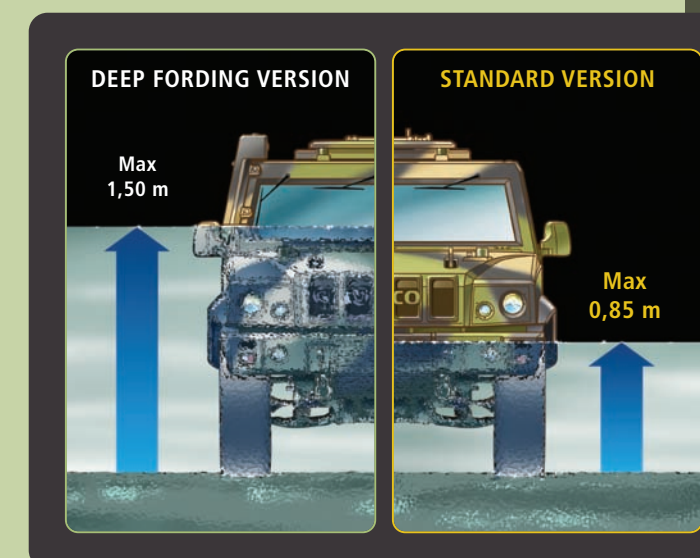
Features which contribute particularly to the vehicle's exceptional mobility include:

- ▶ High approach and departure angles.
- ▶ Excellent ground clearance.
- ▶ Independent suspension with long travel.
- ▶ High level of stability on longitudinal and transverse slopes.
- ▶ 325/85R16 tyres or 335/80R20 with CTIS, providing an excellent mean maximum pressure (MMP).
- ▶ CTIS with electronic pressure regulation and monitoring, ensuring outstanding terrain accessibility.
- ▶ Tyres high traction.
- ▶ High power-to-weight ratio combined with compact size ensures ease of use on mountains tracks and public roads alike.
- ▶ Reduced turning circle.
- ▶ Large wheels in combination with automatic transmission, locking differentials, 2 speed transfer case and independent suspension systems enable use in extreme off-road conditions.

In its basic configuration, LMV is capable of fording depths of 0.85 m unprepared by virtue of its waterproof electrical system.

As an option, this can be extended to a depth of 1.5 m under STANAG 2805 conditions by adding extensions to the air intake and exhaust.

For night driving, the vehicle is designed to be compatible with thermal imaging driving aids and NVG.

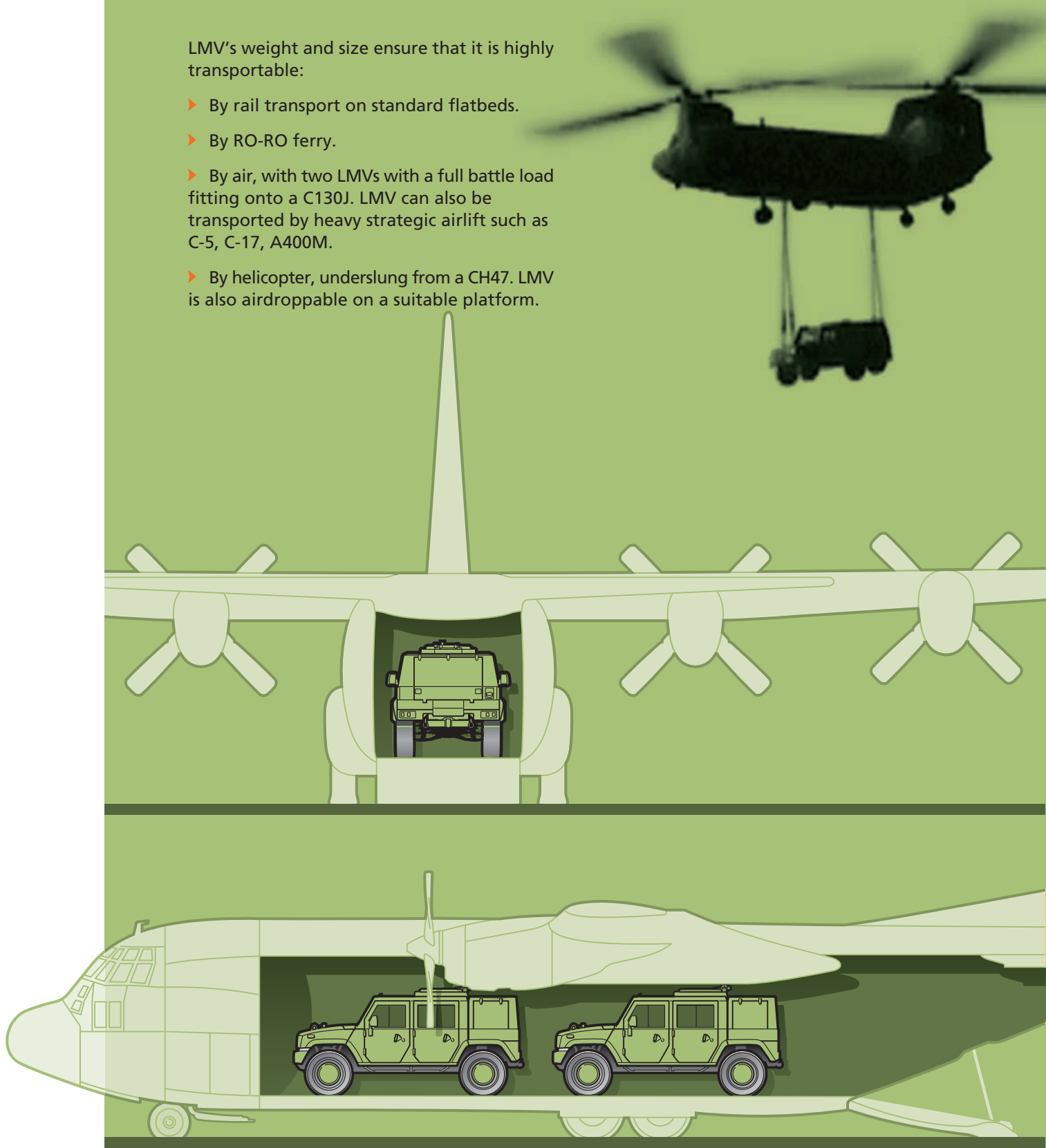


LMV

Transportability Strategic Mobility

LMV's weight and size ensure that it is highly transportable:

- ▶ By rail transport on standard flatbeds.
- ▶ By RO-RO ferry.
- ▶ By air, with two LMVs with a full battle load fitting onto a C130J. LMV can also be transported by heavy strategic airlift such as C-5, C-17, A400M.
- ▶ By helicopter, underslung from a CH47. LMV is also airdroppable on a suitable platform.



Light Multirole Vehicle

High reliability, ease of maintenance and low through life costs were key considerations during the design of LMV.

The vehicle benefits particularly from Iveco's engineering experience on its truck range which has allowed incorporation of a number of innovative design features.

The use of COTS main assemblies such as the gearbox and engine ensures that performance and reliability have been proven over many millions of road miles in demanding environmental conditions. This provides an outstanding level of reliability and consequently excellent fleet availability.

The design has led to a reduction in Level 1 maintenance requirements.

LMV is fitted with a 2nd generation high speed CANBUS which links the electronic control units of the engine, gearbox and ABS. By interrogating the system with a diagnostic tool, the maintainer can gather diagnostic and prognostic information in real-time, enabling pre-emptive maintenance to be planned.

Ease of maintenance has received a very high priority, with ready access being provided to undertake checks and routine servicing tasks, and maximum use being made of repair by replacement. All Level 1 checks can be carried out by the crew without dismantling any major assemblies, or using special tools.

An innovation designed to allow the crew to move out of immediate danger, even when the vehicle has malfunctioned, is the limp home facility. This is controlled by an onboard system integrated into the engine management software and is aimed at allowing a sufficient degree of mobility, albeit with limited power, in the event of an onboard automotive system or sensor malfunction. An over-ride facility is also provided for this device.

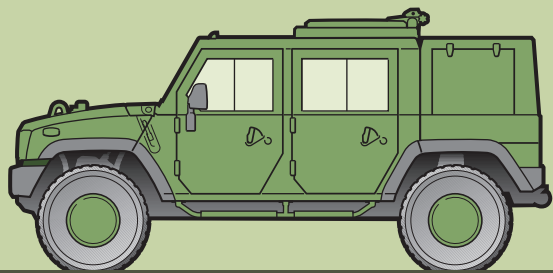


In order to prove the outstanding reliability characteristics of the LMV, vehicles have been subjected to a number of testing regimes, totalling over 500,000 km. In addition, over 1000 vehicles are currently in service covering an aggregate fleet mileage of well over 5 millions kilometres.

Reliability and Maintainability

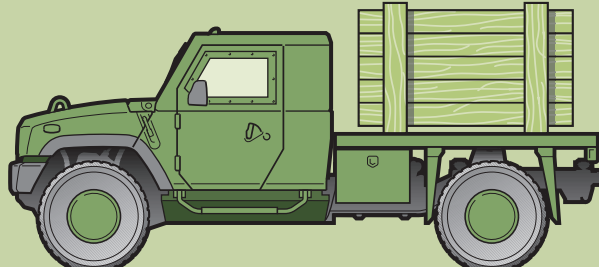
LMV

Payload and Towing Capacity

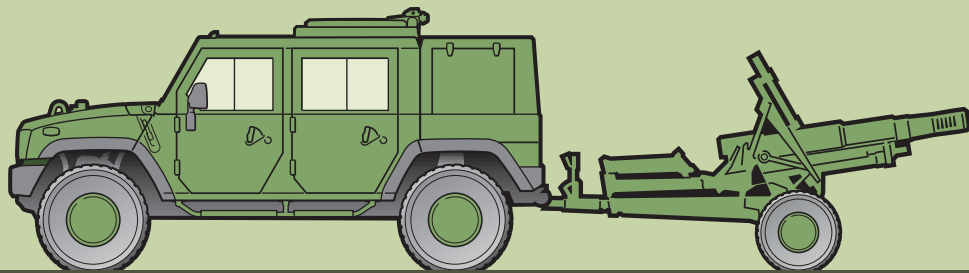


In its standard version, the vehicle is designed to carry 5 men complete with their personal equipment, a roof mounted weapon and combat supplies for a 24 hour/500 km battlefield mission.

kg 2600
max



The short cab configuration (crew 1+1) has a longer wheelbase of 3520 mm and can be fitted with a load platform, a cargo body or various superstructures for specific roles. The maximum payload in this configuration, with an armoured cab, is 2600 kg.



By virtue of its air over hydraulic brakes, LMV can tow trailers of up to 3,5 tonnes, with air-brakes.



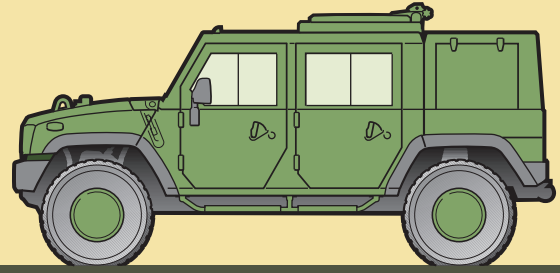
The LMV is built on a highly adaptable chassis, allowing it to provide the basis for a family of vehicles capable of filling a multitude of roles. The adoption of a modular approach to product development provides the customer with a number of advantages such as:

- ▶ product variety without unnecessary reengineering, so reducing timescales and costs.
- ▶ optimum combination of power, protection and payload.
- ▶ flexibility in operation and support through improved serviceability and ease of upgrade.

Two wheelbase lengths are available, and the cab can be standard, short, long or open. Three configurations which are capable of being further developed to meet specific roles are as follows:

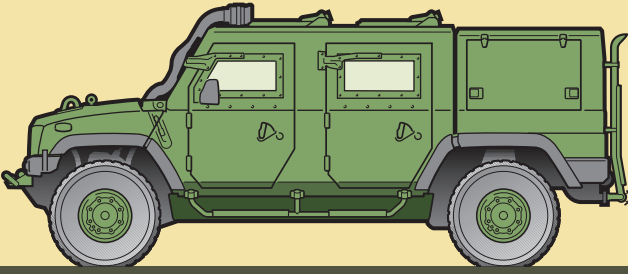
Standard (Crew 1+4)

This variant is provided with a basic level of protection which can be increased or modified to meet the predicted threat level whilst retaining the same outer structure by virtue of the modular armour system.



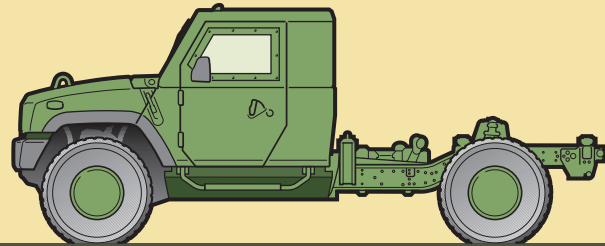
Long cab (Crew 1+4)

A longer cab mounted on the long wheelbase provides increased volume under armour for the crew, enabling the installation of substantial communication suites if required. Sufficient space is also available for a logistic load platform at the rear of the vehicle.



Short Cab (Crew 1+1)

This variant can be provided either in a basic form or with enhanced protection and can be used either as flatbed logistic carrier or fitted with a box body for roles such as command post, casevac, communications vehicle or mobile workshop.



Versatility

LMV

Light Multirole Vehicle

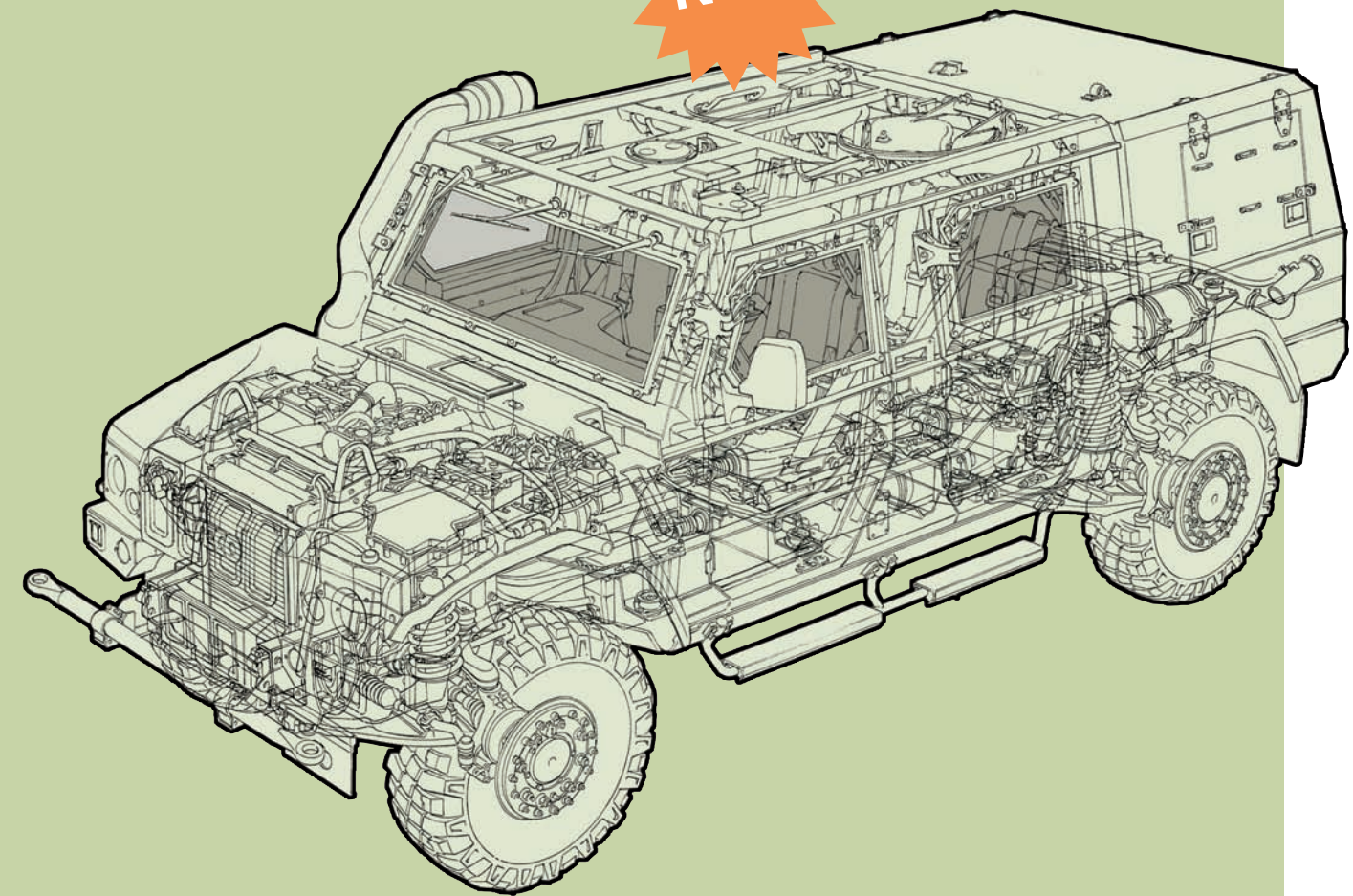
LMV Long Cab

The ability of the LMV design to accommodate the variety of design developments which are demanded by the user has enabled Iveco's engineering team to implement the vehicle family approach which has always underpinned the LMV design concept.

By monitoring and anticipating the user's needs, and exploiting best engineering practice to meet them, Iveco has ensured that the LMV will continue to expand the roles it can undertake, moving seamlessly into the field of protected utility vehicles.

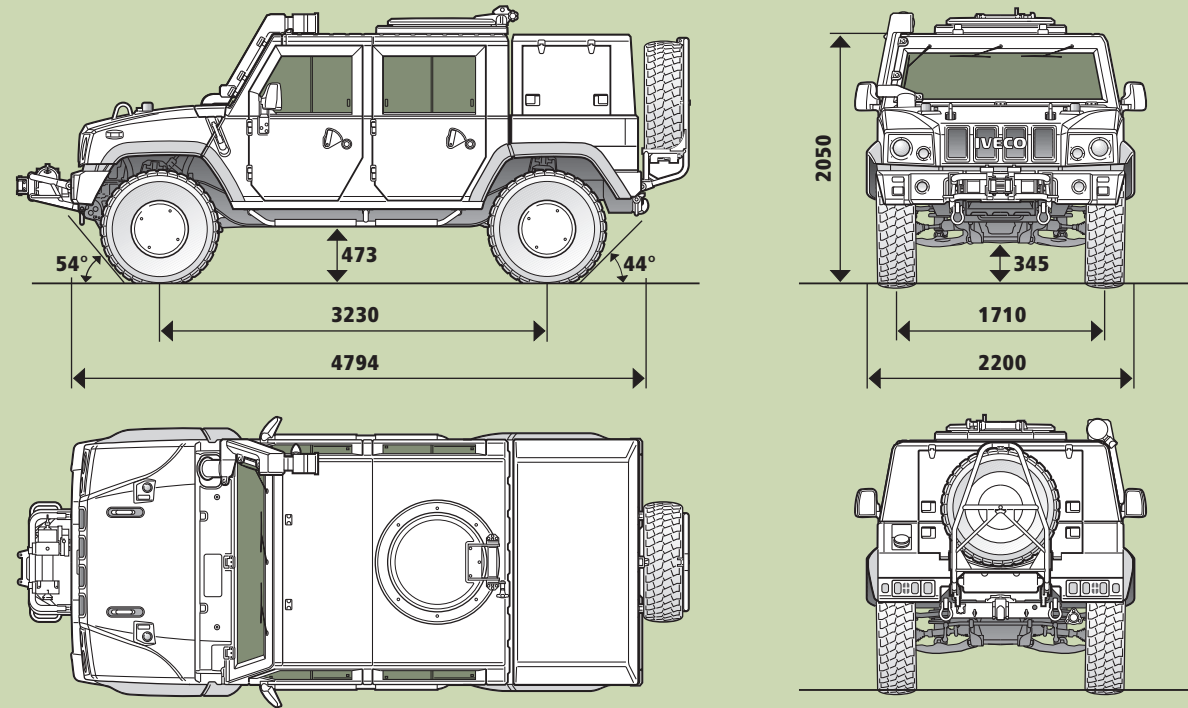
The evolving demands of the user brought Iveco's engineering team to focus on a longer variant derived from the standard LMV, with a 3520 mm wheelbase design. Besides enabling more room to be provided in the crew cell, this variant can also incorporate a longer stowage pod, substantially increasing the vehicle's capacity.

New design features include an integral hard top in place of a roll cage, altering the roof hatch design, incorporating new seats and changing the design of the transparent armour. At the same time, the allowable GVW of the vehicle has been increased from 7,000 to 7,500 kgs through developments on the frame, brakes and suspension.



LMV

Technical Features



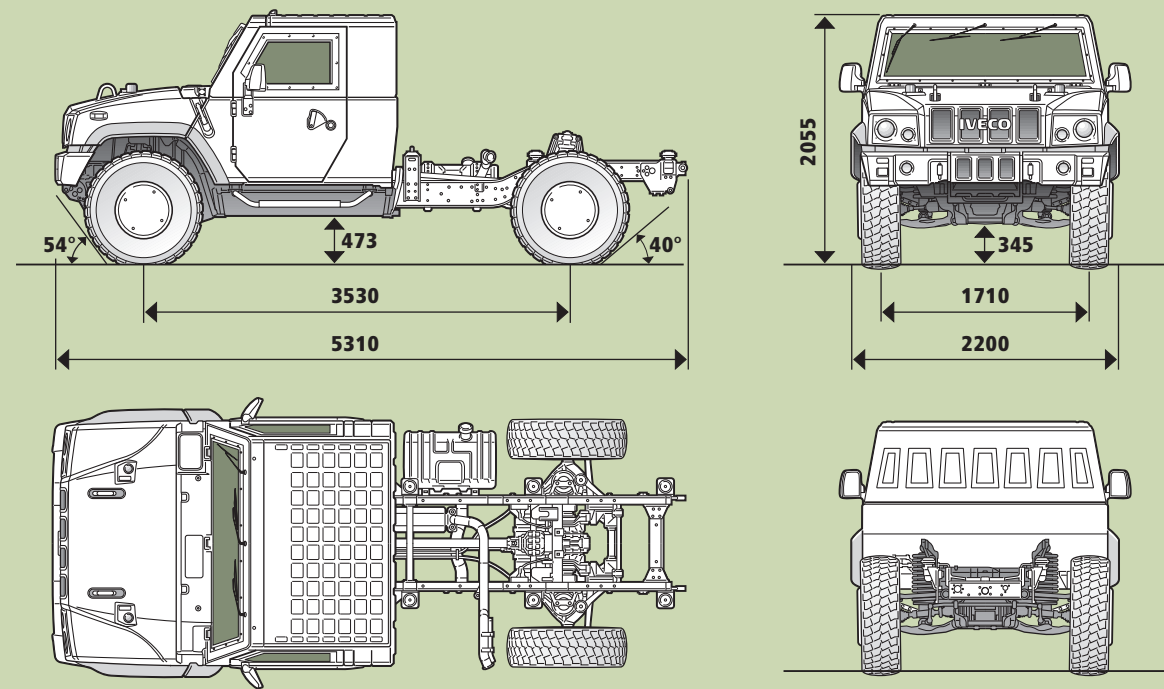
STANDARD CAB - SHORT WHEELBASE

Dimensions		7100	7500	Performance		7100	7500
Wheelbase	mm	3230	3230	Max speed on road, high range	km/h	110	110
Track	mm	1710	1710	Max speed on road, low range	km/h	65	65
Max width	mm	2200	2200	Max longitudinal slope gradient		60%	60%
Max width (with reduction capability to)	mm	2050	2050	Max transverse slope gradient, dynamic		30%	30%
Overall length	mm	4794	4794	Max transverse slope gradient, static		40%	40%
Height (cabin top line)	mm	2050	2050	Turning circle (kerb to kerb)	m	14.3	14.3
Min. height (under differentials)	mm	345	345	Fording depth (without preparation)	mm	850	850
Min. height (undercarriage)	mm	473	473	Fording depth (with preparation and specific maintenance)	mm	up to 1500	up to 1500
Front/rear incidence angles		54°/ 44°	54°/ 44°	Power/weight ratio	kW/t	19,0	18,0
Mass and payload							
Towing capacity		7100	7500				
Total mass on the ground	kgs	7100	7500				
Tare (in running condition)	kgs	6200	6300				
Pay load with protection	kgs	900	1200				
Basic towing load	kgs	2000	2000				
Max towing load	kgs	3500	3500				

The data contained in this brochure is purely indicative and Iveco D.V. reserves the right to modify or to upgrade in accordance with future technical developments without notice.

Light Multirole Vehicle

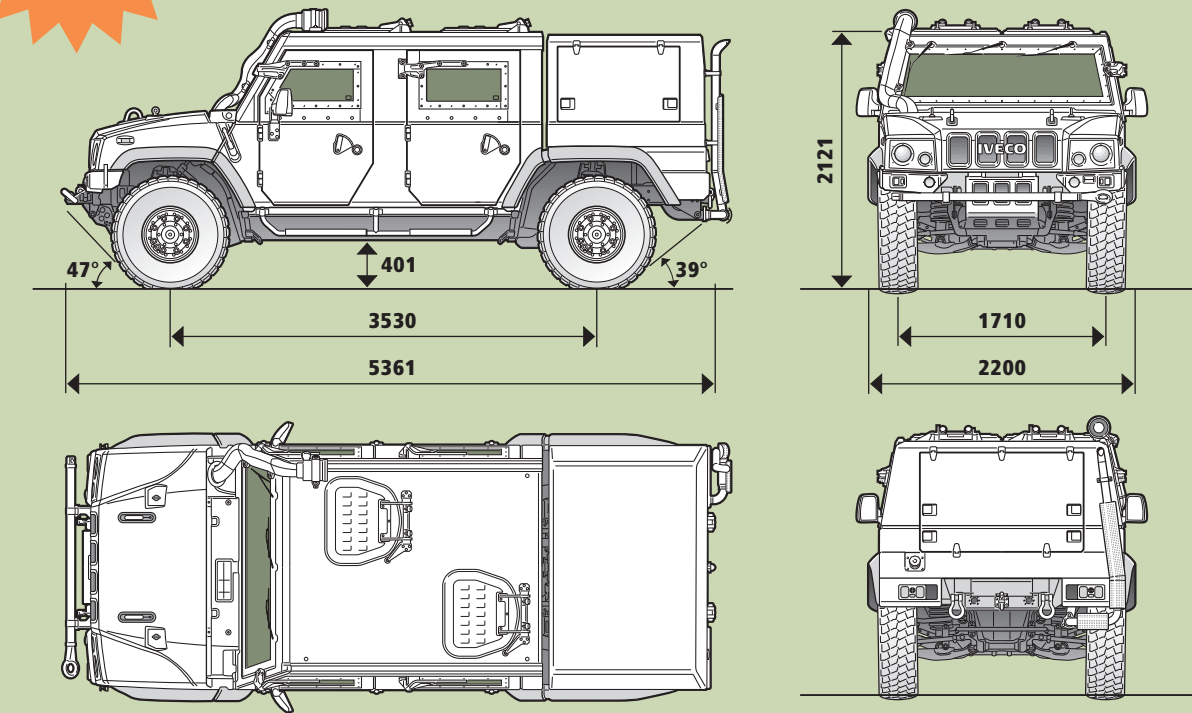
Light Multirole Vehicle



SHORT CAB - LONG WHEELBASE

Dimensions		7100	7500	Performance		7100	7500
Wheelbase	mm	3530	3530	Max speed on road, high range	km/h	110	110
Track	mm	1710	1710	Max speed on road, low range	km/h	65	65
Max width	mm	2200	2200	Max longitudinal slope gradient		60%	60%
Max width (with reduction capability to)	mm	2050	2050	Max transverse slope gradient, dynamic		30%	30%
Overall length	mm	5310	5310	Max transverse slope gradient, static		40%	40%
Height (cabin top line)	mm	2055	2055	Turning circle (kerb to kerb)	m	14.07	14.07
Min. height (under differentials)	mm	345	345	Fording depth (without preparation)	mm	850	850
Min. height (undercarriage)	mm	473	473	Fording depth (with preparation and specific maintenance)	mm	up to 1500	up to 1500
Front/rear incidence angles		54°/ 40°	54°/ 40°	Power/weight ratio	kW/t	19,0	18,0
Mass and payload							
Towing capacity		7100	7500				
Total mass on the ground	kgs	7100	7500				
Tare (in running condition)	kgs	4800	4900				
Pay load with protection	kgs	2300	2600				
Basic towing load	kgs	2000	2000				
Max towing load	kgs	3500	3500				

New



LONG CAB - LONG WHEELBASE

Dimensions		7100	7500	Performance		7100	7500
Wheelbase	mm	3530	3530	Max speed on road, high range	km/h	110	110
Track	mm	1710	1710	Max speed on road, low range	km/h	65	65
Max width	mm	2200	2200	Max longitudinal slope gradient		60%	60%
Max width (with reduction capability to)	mm	2050	2050	Max transverse slope gradient, dynamic		30%	30%
Overall length	mm	5310	5310	Max transverse slope gradient, static		40%	40%
Height (cabin top line)	mm	2055	2055	Turning circle (kerb to kerb)	m	14.07	14.07
Min. height (under differentials)	mm	345	345	Fording depth (without preparation)	mm	850	850
Min. height (undercarriage)	mm	473	473	Fording depth (with preparation and specific maintenance)	mm	up to 1500	up to 1500
Front/rear incidence angles		54°/ 40°	54°/ 40°	Power/weight ratio	kW/t	19,0	18,0
Mass and payload							
Towing capacity		7100	7500				
Total mass on the ground	kgs	7100	7500				
Tare (in running condition)	kgs	6300	6600				
Pay load with protection	kgs	800	900				
Basic towing load	kgs	2000	2000				
Max towing load	kgs	3500	3500				

Technical Features

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