

## CHAPTER 2

## INTRODUCTION

## 2.1 Introduction

2.1.1 All the countries in NATO employ fleets of wheeled or tracked light armoured vehicles (LAVs), such as the M113, VAB, TPz 1, Piranha/LAV, FV430 series, etc. These aging light armoured vehicle (LAV) fleets are still being used to perform troop carrying, combat support and logistics functions even though they lack the protection, mobility, firepower and capacity needed on the modern battlefield. Although a portion of these fleets has been replaced by modern infantry fighting vehicles (IFV) the cost of IFVs is too great for them to be employed in support roles. It will therefore be necessary for NATO countries to replace these LAVs with more capable platforms at an affordable cost. Some countries have already started national programs to replace these vehicles after the turn of the century and others are in the planning process. [An opportunity therefore presents itself for potential cooperation leading to lower procurement and ownership costs, and to the possibility of achieving a high level of LAV standardisation and inter-operability within the Alliance.]

2.1.2 NATO Army Armaments Group (NAAG) Panel II consequently formed a Working Group of Experts, WGE.5, to draft an Outline NATO Staff Target (ONST) for a family of LAVs to fulfil the perceived future requirement. The resultant concept was a vehicle family founded on a common multi-purpose base armoured vehicle, MBAV.

2.1.3 A NATO Industrial Advisory Group (NIAG) was invited to meet with WGE.5 in February 1991 to explore the need, scope, and adequacy of documentation for a NIAG prefeasibility study (PFS) on the MBAV concept. At their Plenary meeting of 27 March 1991, Heads of NIAG Delegations examined the recommendation of the Exploratory Group that a NIAG PFS should be conducted as the best approach to proceed to the development of a NATO Staff Target (NST). In consideration of this recommendation, the NIAG formed an Exploratory Group on a MBAV to organize the study effort.



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ACCELERATION

MG Lehowicz  
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Dear General Lehowicz:

The Light Contingency Vehicle (LCV) as envisioned within Thrust B of the DoD Research and Development program continues to be of great personal interest to me. The overall need to enhance the survivability, mobility and combat effectiveness of our rapidly deployable forces is a widely accepted lesson learned from Desert Shield. The detailed understanding of the types of combat systems that best serve to satisfy the needs of early entry forces must be developed through the Battle Labs process that TRADOC has chartered. There is also the potential need to work closely with our NATO allies as their concepts for out-of-area rapid reaction forces begin to emerge. The need to configure rapid response forces for peacekeeping and peacemaking missions is reinforced by the rapidly expanding United Nations need for security forces.

During a recent trip to Germany, I had the opportunity to observe and examine the new 495 family of vehicles at Thyssen Henchel. The design goals are: 1) air transportable by C-130 (with some removal of armor panels), 2) a reconfigurable armor suite, and 3) reduced observables. The tracked vehicle engine bay is designed to accept a Detroit Diesel engine. The contractor has tried to save time and money by using an existing turret in the infantry fighting vehicle version of the system, but there is broad flexibility for accepting other turrets. It struck me that this vehicle could be useful for "tinkering" and this may help in defining the LCV requirement. I understand the vehicle could be leased for initial trials and be made available through existing testing agreements between the U.S. and Germany. I have included a contractor brochure in order to better describe the vehicle characteristics.

Please let me know if I can be of any assistance.

Sincerely yours,



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21 May 1993

*Dear Herr Massman*

Many thanks for hosting my excellent visit to your Kassel production facility on 18 May and also for an interesting discussion the evening before during dinner at the Peffermühle. I wish I had had more time to continue with our dialogue - perhaps another time.

Even though my programme limited the time I could spend with you, I came away with the impression of a dynamic company offering a diversified product range. Your strategy for future business development was most impressive, as was the new training wing which we were able to visit. All in all, a most positive preparation for the difficult times ahead.

Please extend my thanks to all your team for providing a very thorough briefing of your products and in particular to Dr Piasecki and his staff, who demonstrated the company's wide range of vehicles on your test track which I very much appreciated. [The TH 495 ICV family was particularly interesting and such features as air portability, clip-on armour, varying road wheel numbers, fibre optic highway, power pack options and variable turret templates all showed a market orientated approach which I applaud.] I hope [ ] with whom you mentioned your [ ] are fully aware of your work.

# Thyssen Henschel's TH 495 MICV

by Wolfgang Schneider

For more than three decades, Germany's efforts concentrated on the development of high-endurance, versatile multi-purpose armoured fighting vehicles (AFVs). These became bigger and increasingly complex, optimized for the defense of a Central Europe threatened by Warsaw Pact forces superior in both general combat and anti-tank capabilities. This resulted in clumsy, heavy tanks and infantry fighting vehicles exceeding 50 and 40t respectively.

Given recent emphasis upon UN-controlled crisis management, the unified German forces realized that they lacked an effective combat vehicle suitable for strategic movement. Even the 17t, 2.98m-wide 6x6 Fuchs is not air-transportable except by Starlifter or Galaxy aircraft. Faced with the possibility of significant politically led policy changes concerning Bundeswehr involvement with European rapid reaction forces, procurement planning has been suspended until a decision is made. Thus, despite limited funding, it was logical that the major German defense manufacturers should begin development of light AFVs suitable for crisis-management roles. Examples include the Diehl/Krauss Maffei Puma (as a possible M113 replacement) and the Krupp-MAK CV-90. Another interesting approach is the Thyssen Henschel TH 495, the first prototype of which recently had its roll-out in Kassel.

The first TH 495 prototype was built in a MICV configuration and forms the nucleus of a family of tracked vehicles able to meet all the requirements of an out-of-area mission. One of the main demands was that the vehicle should be transportable by C-130 Hercules. This limited weight to less than 20t, and both width and height to 2.8m. Nevertheless, it was decided to maximize protection by incorporating modular armour panels which could readily be altered to meet a specific threat. Otherwise, the MIVC-version resembles the Marder 2, with the engine at the front, a rear troop-carrying compartment and a central cannon-armed turret to provide a favourable centre of gravity.

Good all-around (including overhead) protection is provided by spaced and/or special armour packages each of which can be removed or fitted by two crewmen within a few minutes. Spare or additional armour-modules could, for example, be transported in a second aircraft together with the crew, fuel, and ammunition to reduce vehicle weight, thereby increasing aircraft range. (In the prototype configuration seen at Kassel - mounting an OTO-Melara T 25 turret - the TH 495 has a combat weight of 28t. Thyssen Henschel pointed out that any other comparable turret can be fitted with the TH 495 according to customers choice). Without its add-on armour modules the vehicle is only 2.72m wide. An internal spill-liner, NBC system, fire-suppression system (optional), and

explosion-proof fuel tanks also raise crew protection beyond the standard for light armoured fighting vehicles.

The MICV has a crew of three and carries seven in the troop compartment. The driver is on the left of the engine and is provided with three integral periscopes in the single-piece hatch, one of which can be replaced by an image-intensifier for night driving. The commander and gunner sit in the turret. In the spacious rear compartment an infantry section is seated in two rows facing inwards. Up to four soldiers can fire personal weapons from the two roof hatches; the side-hinged rear doors have two weapon-ports. When closed down, the section can view the battlefield on two monitors linked to side-mounted cameras.

Emphasis has been placed upon a low infrared signature which has been achieved by ventilating the gap between the spaced

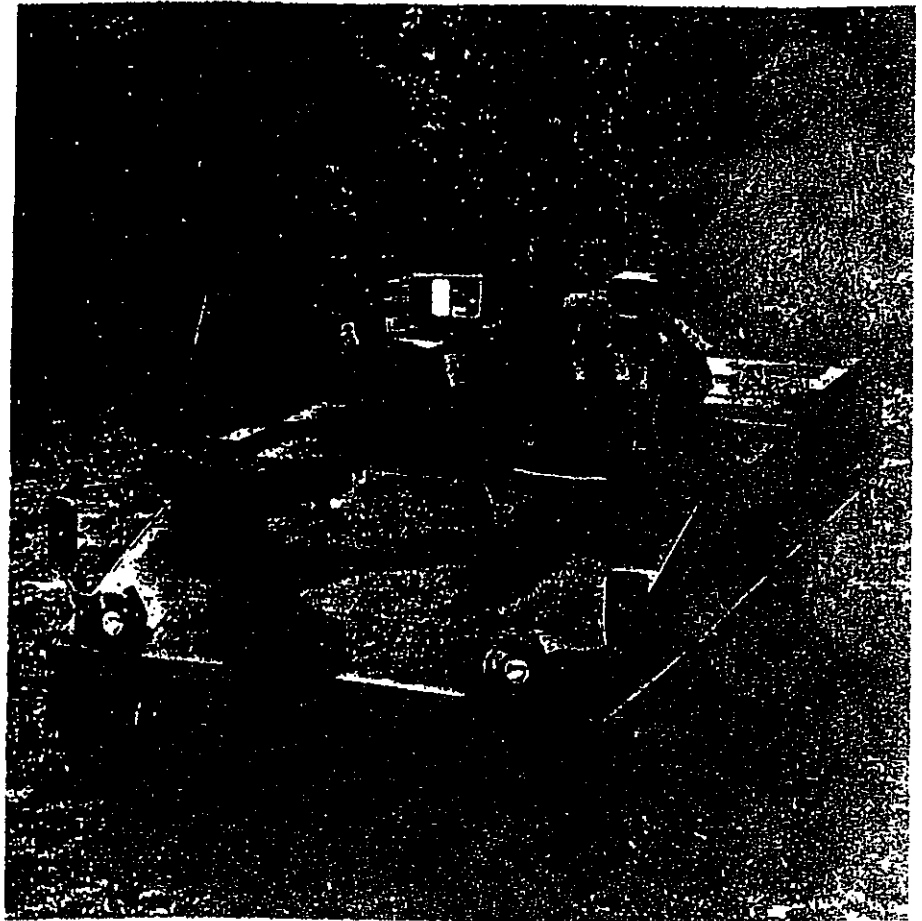
**Thyssen Henschel seems to have anticipated the shift in German requirements away from heavy armoured vehicles towards more mobile modular designs with its private-venture TH 495 family.**

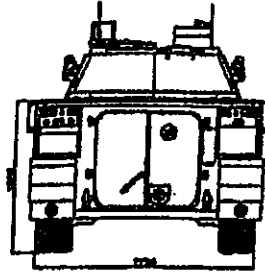
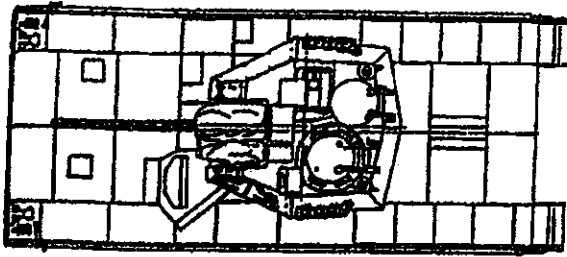
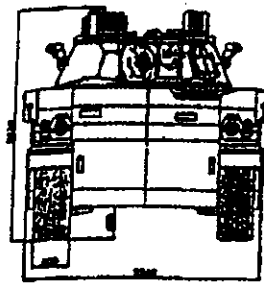
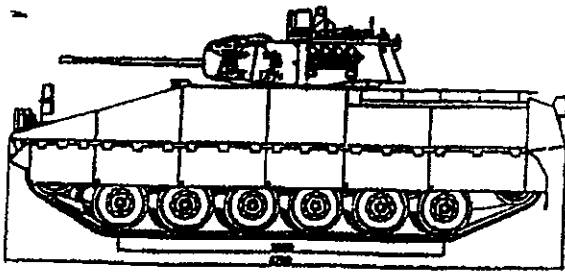
as by careful layout of the exhaust and engine-cooling systems. Two cooling systems are located at the rear above each sponson; hot gases from the exhaust and cooling system are mixed with cold air in an "IR grating", and then vented downwards from grill on the rear-right of the

vehicle. The hot spot usually easily visible through a thermal sight is not identifiable from the front. Radar reflection is reduced by a combination of the vehicle's smooth surface and an absorbent coating.

## Mobility

The TH 495's mobility is also good. The prototype is powered by an MTU 183 T 22, 441kW (600hp) diesel, giving a power-to-weight ratio of more than 17kW (23HP/t). The track width of 450mm makes for a ground pressure of 72.7kPa in the MICV configuration and considerably less as an APC. The Th 495 is easily driven thanks to the improved ZF LSG 1500 full automatic transmission, good ergonomic and high safety standards. The driver's station, together with all controls and information displays is vertically adjustable. When driving with the hatch open, drive information is displayed on a panel mounted between hull roof and add-on armour. A digital power supply is fitted; micro-processors control all systems currently fitted, as well as monitoring the





The TH 495 MICV forms the basis of the range; the layout is conventional, and a variety of turrets can be fitted. Spaced armour and exhaust coolers reduce the thermal signature, whilst the smooth hull and special coatings do the same for its radar signature.

operation, reporting faults to a diagnosis system combined with an integrated control system. The vehicle uses subsystems

and components already in series production and proven in non-military vehicles, thereby ensuring a high degree of reliability and reduced maintenance.

### TH 495 armoured vehicle family

Construction is progressing on a second prototype with a hull 780mm shorter, and five instead of six road wheels. Roll-out is

features of the suspension (torsion bars, three return rollers, hydraulic shock absorbers on the two front and rear wheel stations of each side, Diehl double-pin track) remain unchanged. Depending upon vehicle configuration, the weight can be reduced to under 15t. A potentially interesting variant would be an armoured cavalry vehicle fitted with a 90 to 120mm anti-tank gun. The rest of the family is more conventional, comprising:

- TOW-based tank destroyer,
- Stinger anti-aircraft vehicle,
- radar carrier,
- APC,
- armoured ambulance,
- supply carrier,
- maintenance vehicle,
- and a command and communications vehicle.

Though this Thyssen Henschel private initiative has involved considerable financial investment, the risk has been reduced by developing a promising AFV family which could be adapted to meet the needs of many potential customers. Compared with similar light AFVs, the TH 495 to some extent represents a "full-scale" fighting system with good growth potential. Nonetheless, competition is fierce and the attractions of buying alternative, cheaper, off-the-shelf vehicles such as the French VAB or the Swiss Piranha are self-evident.