

Meeting “Mr Armour”

Interview with Mr. Ulf Deisenroth, President and CEO Of IBD Deisenroth

IBD Deisenroth is widely acknowledged as one of the world's leading centres of excellence for the development of advanced armour solutions – a position that is apparently out of proportion with the company's small size. Given the sensitiveness of the activities they are engaged into, it is perhaps not surprising that IBD is a rather publicity-shy company, and one that under normal circumstances would not wish to attract too much open attention.

The Editor-in-Chief of MILITARY TECHNOLOGY, Dr. Ezio Bonsignore recently had the rare opportunity of a long and frank discussion with “Mr. Armour” himself at the company's brand new R&D centre in Lohmar, near Bonn.

MT: *Could you please provide a short history of your company, and explain its exact nature? What are you – a manufacturing company, an R&D centre, an engineering think-tank, or what?*

Deisenroth: Well, the company was founded in 1981. We came basically from the warhead development sector. I am personally an explosive chemist, and at that time I got in contact with the German MoD for the development of a very safe explosive for reactive armour. Through this activity I found interfaces and points of contact with armour itself, and thus with armour devel-



Ulf Deisenroth (left), President and CEO of IBD Deisenroth during the interview with Dr. Ezio Bonsignore, Editor-in-Chief of MT.

oping activities. Very short afterwards we got the first order from the German MoD in armour technology development, and this turned out to be a special niche for us – sort of between an armour manufacturing industry and a research institute.

From the very beginning it was our advantage to be very flexible and capable of reacting very quickly, and this led to this company enjoying a very, very fast growth in the armour development field.

MT: *Based on this background and experience, would you suggest that armour and anti-armour development activities should run in parallel, or rather a barrier should be set between the two lines?*

of armour to counter a given threat can be decided upon. Without such a basic scientific and technological knowledge, it is very difficult to achieve something.

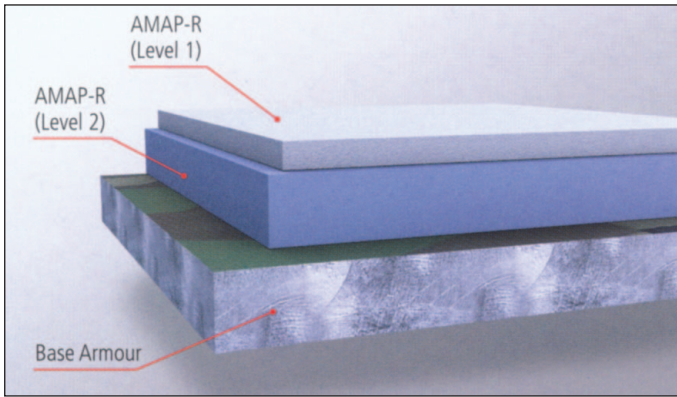
MT: *Would you be prepared to discuss the current ownership of the company and whether there are changes in the pipeline?*

Deisenroth: Well, in 2006 we had some major changes. As you know, there were two companies: IBD as a development, research and engineering company, and Chempro as our production company. The production company was sold – or you could say Rheinmetall Weapons and Ammunition has bought a 51% stake in it. This was a strategic move as to get a strong industrial partner in order to satisfy the strong demand in the armour field, for which we had to expand the company. IBD on the other hand remains a completely independent company, and nothing has changed on this one.

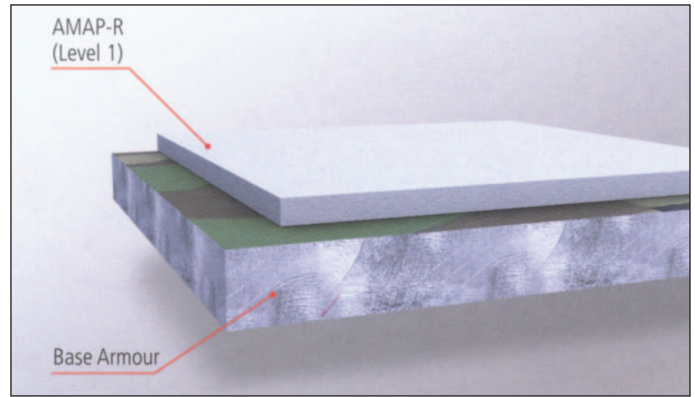
We also founded ADS Gesellschaft für Aktive Schutzsysteme mbH as the responsible company for final development and preparation for series production of our active defence system. Here again Rheinmetall bought a 25% stake. The background for this decision was to accelerate and smooth the industrialisation process of the system, because ADS has no series manufacturing capabilities of its own. We were looking for an industrial partner with a solid competence in electronics, explosives and other related aspects, and Rheinmetall is definitely a competent partner for this. 2008 will be a decisive year for ADS, as we are working very hard towards preparation for series production.



A LEOPARD 2 MBT fitted with IBD add-on armour including the AMAP-R ultra-light roof protection concept. (All photos: IBD Deisenroth)



AMAP-R ultralight plus EFP-Protection.



AMAP-R ultralight.

MT: So, could we say that you intend to focus your activities on research and development, and then have series production implemented through joint venture agreements such as with Rheinmetall and possibly other companies as well?

Deisenroth: Yes, that's basically the idea. However I would like to stress that while here in our new Development Centre we definitely focus on R&D, it was always our strength to bring our products up to the pre-production status. That means, here in our facilities we are building complete functional prototypes. And, we perform complete tests including installation on vehicles. Our engineering facilities and mechanical workshop are perfectly able to equip complete vehicles. It is only after having reached this maturity status that a product is handed over to the production people.

MT: How many people work here?

Deisenroth: Currently, there are 45 people at IBD and the same figure at ADS. This is a relatively small company compared to our competitors. At IBD we don't see any real necessity of getting bigger. On the other hand ADS will grow considerably in the future.

MT: Who are your customers? Are you selling to armoured vehicles manufacturers, or to end-users – i.e. armies and MoDs?

Deisenroth: We have a large number of customers which are vehicle manufacturers. But – and this is our strength – we also have many governments with whom we are working in R&D activities towards advanced technologies, performing threat analysis, protection studies and so on, whereby we get the relevant awards directly from the governments. This has principally not changed over the years.

MT: So, it could be either an AFV manufacturer offering their vehicles already incorporating your armour solution, or an official procurement agency specifying the adoption of a IBD design for a new vehicle.

Deisenroth: This is normally not the direct way. There are some governments which handle their AFV programmes through their own arsenals or state-controlled plants, with their respective production and integration departments. In such cases we will be delivering hardware directly to the government. In other cases, however, we have to work through local AFV manufacturers and at least partially through li-

cence production agreements as well, because more and more in some countries we have a situation where the government insists that critical technologies such as armour have to be manufactured domestically. So, we have a total of 35 licences around the world which are partially direct deliverers such as Krauss-Maffei Wegmann and some other big vehicle manufacturers. And they have their own armour producing departments.

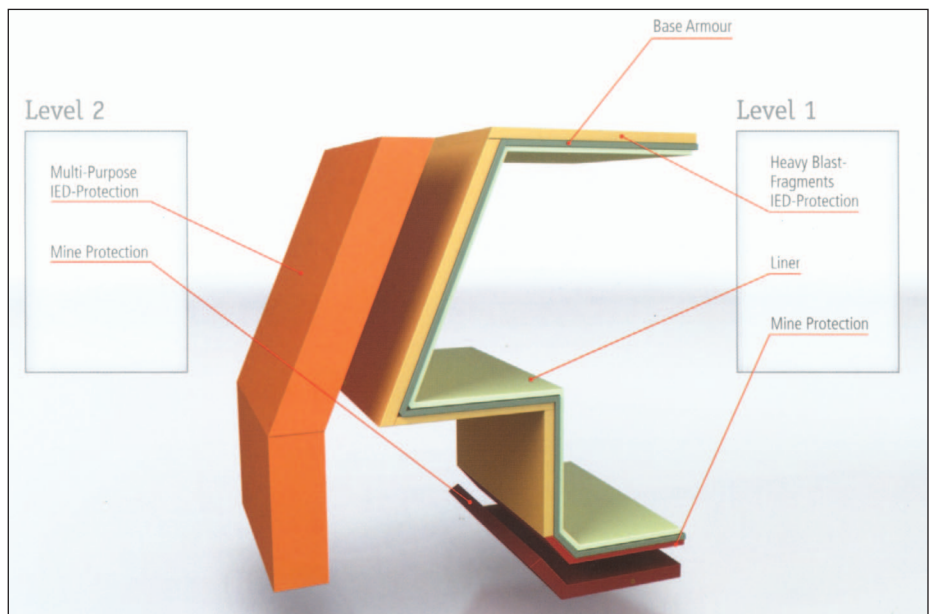
MT: In the world of armour, there are some very large AFV manufacturing companies investing considerable sums in their own R&D departments. Plus, most major armies maintain their own R&D centres, which again benefit from considerable investments through the courtesy of the taxpayer. How could it be that a small company such as yours is so successful in this highly competitive field, to the point of having some of these major players themselves asking to buy your products? What is the secret of your success?

AMAP-IED is an “intelligent” passive protection scheme which provides reliable protection against attacks by Improvised Explosive Devices.

Deisenroth: As I said before, our main strength has always been our very nature as a very flexible and economic-working company, specialising in R&D. We have a very good infrastructure and design department. We are working in close cooperation with research institutes and universities, and we have very good specialists at our periphery who are working towards us. All this is organised in a very economic and fast way. We are fast, and we use our development money in a very efficient way. This is something which you cannot maintain in big organisations. They are slow, and have a lot of red tape and bureaucracy. Thus, our unique organisation is what gives us an edge.

Also, the base line of our work for the past 26 years has been a very good material research and development. Most of the larger companies don't have an own material R&D activity, and rather rely on outside sources. This is a very big difference, especially here in critical technologies and in the new advanced technologies.

Another important advantage is the maturity of our products. We have produced some 30,000 armour kits from light to very heavy over the past 20 years, and these are in widespread service around the world. And, needless to say, our technologies are competitive and deliver unusual good performance.





BISON with Heavy Blast-Fragments IED-Protection.



CV 9040 C with IED-Mine-Protection.

MT: *We understand that you normally prefer to remain tight-lipped about your customers. Yet, could you provide some examples of particularly significant contracts, as a demonstration of what you can do?*

Deisenroth: We have to make a distinction between conventional armour, i.e. passive armour development, and the new active defence system. As regards the former, we are quite proud that our developments are produced in very large series. We are or have been involved in some of the biggest AFV programmes which are running or have run in the world, including for instance the STRYKER family and the ASV (Armoured Security Vehicle) in the US, both of which have proved to be very successful, certainly to a significant extent due to our technologies. Also we are very proud of our involvement in the new generation of AFVs for the Swedish Defence Forces, vehicles which are completely unique in their engineering and protection levels that are not reached by other solutions. This is especially true for the Strv-MBT 122 Main Battle Tank which is the best protected vehicle of its class, but also the CV-90 IFV family which we have equipped with advanced armour solutions. In addition to the Swedish Army's own vehicles, IBD technologies are incorporated in all CV90 vehicles sold so far to various customers.

MT: *You are or have been exploring several different types of armour technologies. What technology you feel is moving faster, and promises the best results in the near future?*

A Patria AMV 8x8 vehicle fitted with AMAP-ADS active defence system. The system does not require launchers of any sort, and its impact on the overall vehicle weight and silhouette is negligible.



Deisenroth: We are not involved in reactive armour, and thus I could not comment on that. As regards passive armour solutions, progress is slow now – actually much slower than what you could experience ten years ago. The required development time for advanced materials, nano-technologies and other such concepts keeps growing. Everything nowadays takes much more time, much larger investment and much more diagnostics and highly sophisticated measuring equipment. Yet these efforts are fully justified, because the output is already extremely encouraging. I'm confident that in the passive armour sector a technological breakthrough will be achieved within the next few years. This will bring us very much forward.

As regards active defence, the prospects of potential outstanding performance against a wide range of threats are currently very promising. What we experience in the development of active defence systems is that providing the performance of the system is basically the easiest and smallest portion of the total effort. A much larger and difficult part of the required

activities consists in providing the complete underlying bureaucracy, that is, the safety analysis and everything that is necessary to introduce such a system into service.

Actually this is the time consuming part. Too many people underestimate what it means to bring such automatic-reacting electronic systems involving explosives and so on into service. It is definitely underestimated.

MT: *Based on your experience and knowledge, do you feel that the vision of future AFV generations relying solely on active protection systems to defend against specialised anti-armour threats has any chance of ever becoming feasible?*

Deisenroth: No, I think it will never be feasible. If you are talking of a real full-spectrum active defence system, you will always have threats like long-rod KE penetrators fired with tank guns which you can defeat to a certain point – you can break them, you can deflect them, you can do a lot of things. But you have to expect that the penetrator or what remains of it will always hit your vehicle. That means the remaining energy of the penetrator will be transferred to your vehicle, and you have to deal with it even though penetration performance as such has been defeated.

This situation creates some specific challenges. On MBTs these can certainly be handled, on some medium vehicles it is conceivable that they could be handled – but as regards light vehicles, forget it. So, even a very efficient, full-spectrum active defence system will always need to be backed by a considerable amount of passive armour, depending on the weight class. For instance, today we say that STANAG Level 4 protection is the minimum required for light vehicles, equipped with an active defence system which will defeat shoulder-fired anti-tank weapons and missiles. For medium vehicles there are correspondingly higher protection requirements, including against some type of IEDs and other threats, which can only be met through an increase in the amount of passive armour.

The dream of a thin-walled vehicle with a highly effective active defence system simply is not realistic.

MT: Active protection systems for AFVs is a new field, and many different approaches are being proposed by various companies involving different kill mechanisms and engagement sequences. We understand that you would not wish to discuss the detail of your design at this stage – but, are you confident that you have a winning solution?

Deisenroth: Actually, we have been studying active defence systems for the past 20 years, working under contracts from our Government as well as other foreign governments. We started activities in this field at a very, very early stage, and we have assessed a lot of different concepts. We studied and analysed many possible solutions, and the output was to develop this system what we have today.

To be completely honest, when you really see the disadvantages and the trade-offs of the different systems that are currently being proposed, you will see that some of them are definitely not suitable for the operational requirements and operating conditions of our time. They were developed basically for Cold War scenarios, and now their designers and manufacturers are sticking with these systems even though they cannot be used in asymmetric warfare scenarios. It is not a matter of details and refinements, but rather of basic operating concepts that cannot be changed. For instance, there are quite a few systems around based on fixed or trainable launchers, but I am highly sceptical as to whether we will ever see any such system being adopted for large-scale installation on AFVs.

We are quite confident that together with our customers, we have developed a viable and functioning system for all scenarios – not only conventional scenarios, but also asymmetric ones.

MT: What would you say is the critical factor for active defence system? The minimum engagement range, or the reaction time?

Deisenroth: It is a combination of both, in the sense that basically all depends on the system's reaction time.

An important issue is compatibility with light vehicles. Light vehicles are very

much endangered under the current operational conditions, and while medium and heavy vehicles can rely on other survivability solutions, active protection is absolutely critical for light vehicles. We need a system which can work on light vehicle structures, and this is another reason why I'm sceptical about launcher-based solutions. Launchers are quite heavy and require a lot of energy, which light vehicles cannot supply. This is where our system offers an important advantage.

MT: Over the past few years armour requirements have gone through a monumental progress of change. We have been moving away from the conditions of the conventional battlefield, where KE penetrators are the main threat, to a dramatically urgent need to protect originally light armoured or soft-skinned vehicles from non-specialised threats like IEDs, large mine traps and so on. What type of impact has this situation had on your activities, and how have you been changing your development directions to adapt your products to the new environment?

Deisenroth: We have customers who for many years have been driving vehicles protected with our technologies in wars and other conflict areas. And we receive a lot of feedback from them on what really happens there. It dawned to us very early that we had to change the very survivability paradigms on these vehicles, because the threat range has increased so much. Today light vehicles with very thin armour steel hulls, let's say 6 to 8mm, are loaded with such high energies from blast/fragmentation devices and other threats, that the structural component, i.e. the thin-walled hull, is mostly not able to take these loads and will collapse. So, to deal with these advanced threats we have to generate and develop technologies which at the same time are armour materials and very good structural components. And this

is definitely a very big change in armour development, a watershed in technology.

MT: Would you say the emphasis is now on obtaining lighter solutions for the same threat defeat performance, better performance for the same weight, or optimal performance irrespective of weight?

Deisenroth: No, it rather works in the way that today we are creating vehicles, which can take threats that were completely inconceivable for platforms in their weight class ten years ago. For instance take a look at the VML of the Italian Army and several other customers. This vehicle was designed together with IVECO from the very beginning, and this is the key to its success. It is a completely new vehicle concept, with a massive and strong space frame. At the time development was started, nobody thought about the threats we are facing today. But actual combat experience in Afghanistan and elsewhere has shown that a modern, well designed vehicle can take tremendous and not originally foreseen loads.

This is what we can do today with light vehicles, which have system and protection levels that were definitely not been dreamed of a few years ago. And this is the base line of the new technologies. We are trying to convince AFV manufacturers than when they are launching the development of a new advantage, it is in their own and their customer's interest to have us in the boat from the very first moment. By joining forces for the definition and optimisation of the right vehicle concept, we can create solutions that are much, much better than what can be obtained by first developing the vehicle and then adding armour to it.

MT: To conclude, what is the best armour material?

Deisenroth: There is no such thing. Armour solutions must be specifically tailored to the expected threats. Besides, there are many companies working in the light armour field and their solutions are relatively identical.

MT: Mr Deisenroth, thank you very much.

