Nir, could you please tell our readers a little bit about your background and your current role at Plasan?

I am a vehicle designer who has been leading vehicle design at Plasan for almost 15 years. My current position as Director of Design encompasses both the traditional (military) armoured market of Plasan, as well as our fast growing civilian automotive structural composites division. By focusing on design, and not just engineering, Plasan has demonstrated a comprehensive and creative approach to vehicle lightweighting. My role is part of a triple hit of engineering, manufacturing and vehicle design, and this has been a big differentiator for Plasan to all of our partners.

What are the most interesting projects you have worked on?

My most prominent projects have been in designing most of the vehicles procured by the US Government for their military over the last decade. The Navistar MaxxPro MRAP, Oshkosh M-ATV, and Oshkosh JLTV (which is replacing the iconic Humvee) were all Plasan designs that started life on my drawing table. By designing them for maximum survivability they have saved countless lives and become a common sight both on the news and in the movies. Balancing the demanding needs of large military customers while adding value through design in terms of lightweight, ergonomics, comfort, safety, and yes, even aesthetics, was a major challenge. For these projects, and others for the British, Australians, and many more, we developed mass-produceable composite vehicle architectures and production techniques that we are now bringing to the passenger car market. As is often said though, my most interesting projects are the ones that I am working on right now and cannot talk about. We revolutionised the way that armoured vehicles are designed and manufactured. We are now doing the same for cars.

Navistar MaxxPro MRAP

We revolutionised the way that armoured vehicles are designed and manufactured. We are now doing the same for cars.
What do you see to be the major trends within automotive lightweighting in Europe and across the globe in the next 3-5 years?

I doubt very much that we’ll be seeing new models that are heavier than their predecessors any more. That trend of the last 40 years has peaked. Multi-material architectures are rapidly becoming the rule, rather than the exception. The days of the welded steel monocoque are numbered and in the short term this is being replaced by a largely aluminium/steel hybrid structure. No longer the sole domain of premium cars, this is becoming the mainstream architecture and will be found on increasing numbers of cars over the next 5 years. The recent controversies regarding the real world emissions of diesels, and the continuing shift towards vehicles with heavy battery and hybrid powertrains, have reconfirmed that more extreme lightweighting is a necessary and welcome move, improving both efficiency and handling regardless of the power source. What we’ll be seeing over the next few years is advanced composites following the path that aluminium has been taking for the last 20 years; starting with premium cars and trickling down to the mainstream as production facilities are ramped up and costs fall. We are already seeing increasing use of carbon-fibre in hidden structural roles where the decision was purely engineering, rather than marketing led. This understanding that carbon-fibre can actually be the next most cost-effective way to take additional weight out of a car, rather than just an expensive luxury for supercars, or a differentiator for range-topping models, will become more accepted in the coming years.

Nir, your presentation at the upcoming 5th Global Automotive Lightweight Materials Europe conference will focus on composites part integration into aluminium/steel body. Could you give our readers a quick snapshot of what to expect without revealing too many details?

Having made that move from the homogenic steel monocoque that has been ubiquitous for the last century, to a multi-material architecture, car manufacturers now have a world of options for alternative materials. Advanced composites are not only for hang-on parts or for expensive composite monocoque tubs. They can be integrated into an aluminium/steel structure, replacing both of those metals in the places where strength and stiffness requirements are driving the thicknesses and weight up. We have been working with OEMs on integrating composite parts that are designed for cost-effective mass-production, and combining them with other materials and processes to reduce weight where it hurts the most, in the areas of the car that do most of the work in crash events. Plasan’s great experience in advanced dynamic FEA of metal-composite combinations in our blast-resistant vehicles, and mass production of composite vehicles for environmentally demanding climates, has allowed us to ease concerns of an automotive industry that is understandably risk-averse. Once the “unknowns” have been turned into “knowns”, many of the barriers for integrating composites into cars assembled on existing production lines have been lifted. I will be showing how concentrating advanced composites where they have the biggest weight-saving impact, and designing the vehicle so that these parts can be cost-effectively mass-produced, results in a cost/weight trade-off that is attractive not only for expensive cars

“...This understanding that carbon fibre can actually be the next most cost-effective way to take additional weight out of a car, rather than just an expensive luxury for supercars, will become more accepted in the coming years...”