

SATISFYING THE CUSTOMER

THE CITY OF SUNDERLAND'S INTERNATIONAL AUTOMOTIVE CONFERENCE DISCUSSED HEAVYWEIGHT ISSUES OF TECHNOLOGY AND PRODUCTIVITY, WRITES **MATT YOUSON**

The need for innovation is a theme common to virtually every motor industry gathering and while the recent Automotive Industry

Conference (IAC) hosted by the City of Sunderland in the UK is no exception to the rule, it suggested that the way in which we think about innovation might be due for revision.

The IAC is held in a city keen to establish itself as fertile ground for inward industrial investment. The Nissan factory in nearby Washington and the local supplier infrastructure that supports it is the jewel in the crown of Sunderland's automotive industry. But while the three-model plant is the biggest producer in the UK manufacturing car parc, it isn't the whole story. A burgeoning Tier 1 industrial base, led by huge investment from TRW, has also established itself, making the annual IAC an event well attended by both local and international concerns.

IAC is something of a freeform conference, with sessions spanning topics ranging from manufacturing management techniques to the electronic content of the car of the future, but even with such an eclectic scope commonality shone through in many of the presentations. In the past vehicle manufacturers, system suppliers and engineering consultants may have concentrated their presentations on old, familiar ground: the doctrines of cost down, rationalized supply chains, lean manufacturing and pioneering new technology. While these tenets were certainly still present at IAC 2003 they were part of a more holistic attitude

toward the process of manufacturing vehicles that emphasized the value of making the best use of what you have, rather than looking to break new ground.

Day One

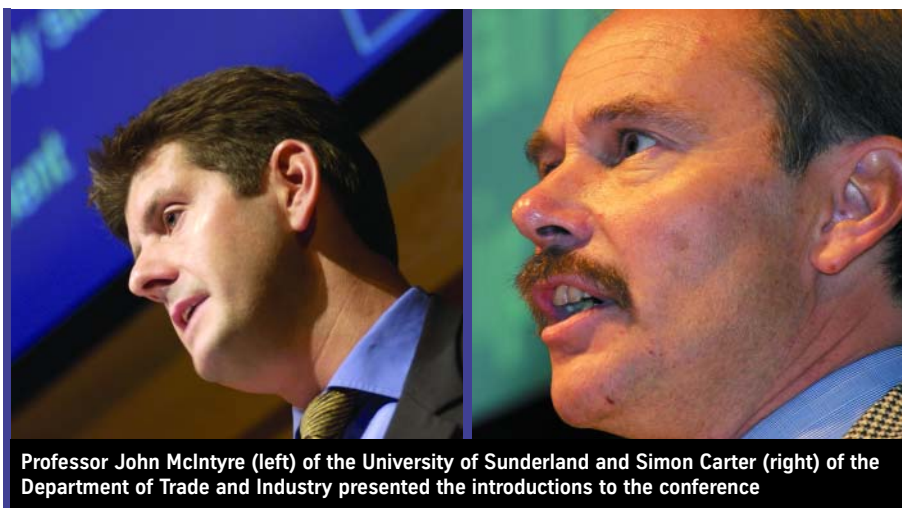
The inaugural session was a heavyweight affair. Following introductory presentations by professor John McIntyre, chair of automotive business development at the University of Sunderland and Simon Carter, UK Department of Trade and Industry business relationship manager for Asian-based companies in the UK, the main part of the session comprised papers from Nissan and Renault.

Nissan

A theme that ran through the entire conference was that leaner production cycles and intelligent black boxes are not what sells cars; giving the consumer what they want is. As was appropriate for the

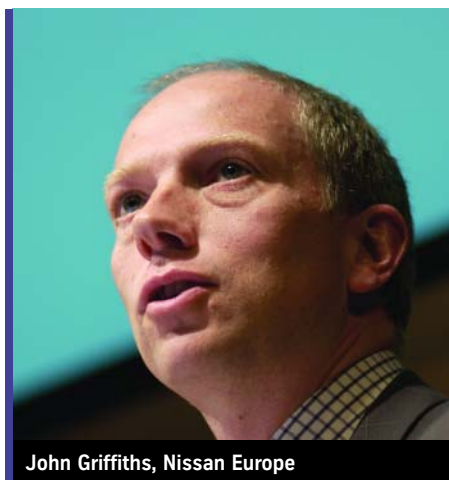
location, Nissan took the lead in this discussion. "My presentation was nothing about manufacturing efficiency or the cost reduction process – instead the theme was very much about us thinking another way, and that other way is to give the customer the exact car he or she wants, exactly when he or she wants it. It's going to be important in capturing customers in the future to be able to do that," said John Griffiths, vice president for supply chain management, Nissan Europe.

The local Nissan plant has, with some monotony, been a serial winner of the title 'most productive car plant in Europe', and the 2003 WMRC European Automotive Productivity Index shows that the 297,719 vehicles produced by the plant in 2002 were made at a rate of 99 per equivalent employee, still some way ahead of its rivals. While this is a source of some pride in the north-east of England, Nissan recognize that it isn't a statistic liable to



Professor John McIntyre (left) of the University of Sunderland and Simon Carter (right) of the Department of Trade and Industry presented the introductions to the conference

improve its market share. Of more interest to the consumer is the sort of performance that can maintain consistent quality while minimizing delivery times.



John Griffiths, Nissan Europe

Nissan's current production target for Sunderland is to manufacture a car within six days of it entering the production system. The physical task of manufacturing takes place on the final day of the process, with the rest of the time being given over to the supply and logistics operation. Therefore, understanding the supply chain is a critical part of Nissan's process. Supply chain review is an ongoing and crucial component of the company's plans. "The area of improvement for us is all about trying to make that sixth day run smoothly," confirmed Griffiths. "What we want to do is make all of our relationships and all of our processes flexible but very, very strong to achieve those goals. Our challenge is to work with everybody on a cross-functional, cross-company basis in order to make this happen."

Clearly Nissan's six-day targets rely on the input of a number of Tier 1 suppliers, but the process is only as robust as the weakest link in the chain. Therefore the initiatives and best practice doctrines that Nissan espouse are not targeted at the first tier to the exclusion of the rest of the chain; rather the manufacturer, wanting to see global suppliers respond to its needs, is also keen for those suppliers to in turn develop abilities down the chain.

"We have to recognize that we have a global supply chain, it's not just a relationship between the OEM and the immediate supplier," agreed Griffiths. "Everyone has to understand those chains and manage them effectively – only through this will we be able to produce the goods for the end customer. We've worked very, very closely with our suppliers for a long period of time to develop good relationships and

high performance," said Griffiths. "I think the challenge is to make sure that, as we evolve our business, they evolve their relationships with suppliers and improve their flexibility and the way in which they support our future needs. We've invested a huge amount in developing our relationships with the supply base, and working to develop their performance. And we'll continue to work with them through supply chain reviews."

Renault

Philippe Klein, vice-president for industrial performance within Renault's manufacturing division, followed Griffiths. Klein detailed a remarkable turnaround in the company's production methodology, charting the company's cathartic surgery which transformed the French manufacturer from a rigid hierarchical structure into a smaller and more flexible operation, halving the number of plants it operates and massively increasing capacity at the surviving eight sites. By leaning out its operations and employing aggressive continuous improvement strategies Renault, formerly a poor performer in terms of productivity, has dragged its operations to the top of the European charts bettered only by Nissan.

When questioned on the best philosophy and methodology of continuous improvement to employ, Klein's answer said a lot for the dogged way in which

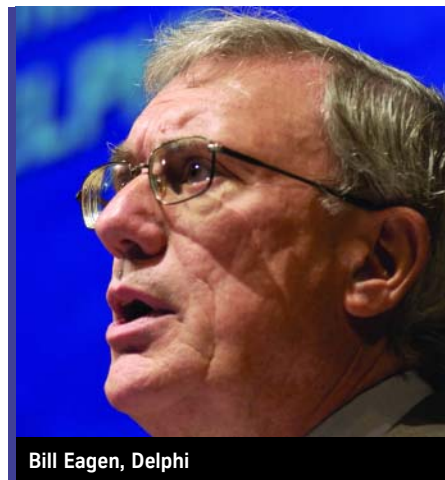


Philippe Klein, Renault

Renault has gone about its transformation: "It doesn't matter what system you use," he said, "as long as you stick with it all the way through. Basically, just do it."

Delphi

Delphi is another company that has spent the past few years creating a leaner, more responsive organization. Bill Eagen,



Bill Eagen, Delphi

purchasing director responsible for Europe, the Middle East and Africa followed the lead of Griffiths and Klein by reiterating the importance of extending lean enterprise culture throughout the supply chain. Hearing a Tier 1 discuss how it proposes to manage relationships *vis à vis* its customers is fairly common fodder, but to hear a senior Delphi executive discuss quality and relationship issues with those further upstream was something of an eye-opener. The Delphi production system – modeled like so many others on the Toyota benchmark – has spread a lean manufacturing ethos across its entire manufacturing business and the next stage is to push that philosophy down the chain. "For most of our suppliers it is an opportunity waiting to happen," said Eagen.

Anticipating some resistance, Eagen is at pains to stress that the process is not about squeezing suppliers and nor is it specifically about getting prices down. Rather the philosophy revolves around taking costs out of processes and taking cost out of parts.

"I don't agree with the premise that the supply chain is based on collaboration and not on cost. What we're trying to get to is the business based on cost, but to do that we have to go through a collaborative process, so one supports the other," he said. "The collaborative process helps you to understand cost and which supplier is the lower cost manufacturer, letting you award that business a lot earlier in the design cycle, as opposed to most current cases where the supplier is not nominated until the end of the design cycle. "At that point it is too late to influence low cost designs and in some cases it is also too late to develop a low cost manufacturing facility because you're making your judgments based on price."

Consultants' view

After lunch a Research & Development session saw the conference move in a distinctly mechanical direction. Guy Morris, senior manager within Visteon's Powertrain Systems division opened proceedings with a presentation about new start-stop technology [see box on page 18] and the session ended with Dave Gorshkov, vice president, operations, at sensor manufacturer Axeon discussing that company's VindAX real time 'virtual' sensor modules. The meat of the session, however, was taken up by a series of presentations from some of the world's best know consultancies.

Hugh Blaxill, chief engineer for R&D at Cosworth Technology (CT) gave a presentation that put the role of consultant in a new, diversified context. Blaxill explained that the consultancy business has become more competitive in recent years as a



Guy Morris, Visteon

result of 'consultant convergence', which is caused by various consultancies expanding out of their traditional niches to become multi-skilled (he mentions Ricardo's new vehicle design skills as an example). Exacerbating this is an increased use of competitive tender by vehicle OEMs, rather than a reliance on established relationships.

Given that the consultants' skills are in demand now more than ever, the consultancies that prosper will be those, says Blaxill, that create a larger and more diverse customer base (CT itself now works on a respectable number of non-automotive projects), explore joint-ventures and geographically diversify to be near clients.

Another factor considered by Hugh Blaxill was the sheer number of consultancies that exist today. This was particularly apposite as his presentation was



Dave Gorshkov, Axeon

followed by that of Luke Barker, director of Integral Powertrain, a consultancy set up by former CT engineers to specialize in high technology powertrain engineering services. Barker suggested that, while many consultants focus on 'virtual test bed' solutions, IP has carved a niche for itself by looking at ways to improve the up-stream design process itself. One such example is its Automated Intelligent Engine Design (AIED), a set of engine design modules linked to a parametric modeling tool that incorporates 3D modeling tools – including those for the head, block, crank, con-rod, piston and valve train. The consultancy business, explained Barker, is called upon increasingly to work in niche fields where heavy investment just isn't viable. AIED and other tools like it are valuable in the new automotive economy because they can cut development time and costs, giving niche vehicles a better chance of seeing the showroom.

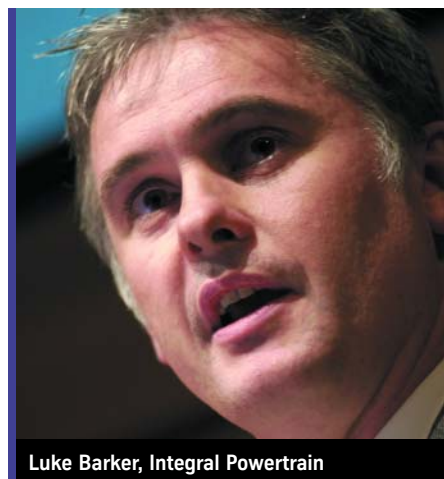
Another facet of the consultancy business in the new economy is a willingness to run self-financed projects. One particularly fine example is the Active Torque Dynamics (ATD) system developed by



Hugh Blaxill, Cosworth Technology

Prodrive for 4WD vehicles. Pete James, chief engineer (electronics) gave a presentation detailing some of the system's characteristics. ATD modulates torque distribution to individual wheels to increase the rate at which the vehicle will turn. Using data from wheel speed, yaw rate and steering wheel angle sensors the system compares what the driver is requesting, in terms of directional change, with what the vehicle is currently providing.

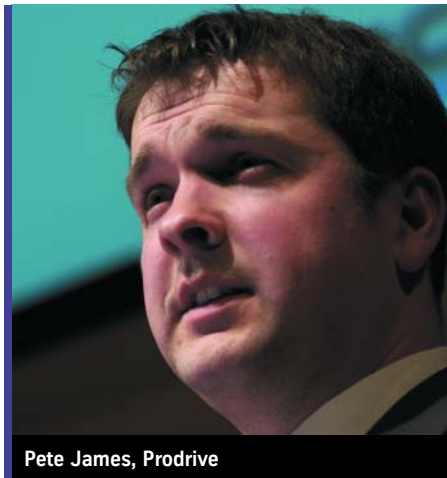
ATD is obviously aimed at the ESP market, though in application it feels considerably more refined than any brake-based stability system. *Automotive Sourcing* test-drove an ATD-equipped prototype at Prodrive's Warwick test track before the IAC conference. The system, for which Prodrive has an as yet unnamed European OEM client, uses active center, front and rear differentials by locking or



Luke Barker, Integral Powertrain

releasing them to dynamically modulate the torque applied to each wheel. In the basic implementation, ATD locks the rear differential as the vehicle begins to oversteer during emergency avoidance maneuvers.

In more sophisticated implementations, the system is able to modulate the torque at each of the four wheels in real time. This allows the vehicle to enter a corner with the favorable dynamics of a rear-wheel drive car, and then progressively increase torque to the front wheels as it moves around the corner. As the vehicle leaves the corner, the torque split is biased toward the front wheels to provide maximum straightening force and to help prevent a spin. Modulation of torque from side to side, based on yaw and wheel-speed data, is used to further increase stability, particularly on low-grip surfaces and in emergency situations.



Pete James, Prodrive

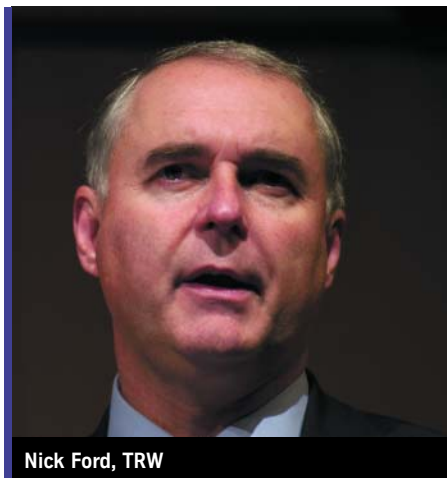
Day Two

No automotive symposium is complete without discussion about the car of the future and Day Two began with that.

TRW

Nick Ford, director of product planning for steering systems at TRW, is a passionate advocate for the safety advantages of by-wire technology and other driving aids. Ford spoke in the session devoted to safety, detailing the work that TRW has put into designing the safety systems of the future and, in particular, the complementary technologies of adding more sensors to the vehicle and replacing mechanical assemblies with electric and electronic systems, adding the rider that only new legislation or a step-change in industry-thinking is likely to promote the wholesale take-up of new technologies. He quoted the studies done using Eaton's Vehicle On-board RADar (VORAD) in the North American trucking community, and the recorded 80 percent reduction in the following collision it engendered, as a prime example of what even relatively cheap sensing technology can achieve.

After the session while speaking to



Nick Ford, TRW

Automotive Sourcing he clarified this position. "It is worth making the point that the automotive industry doesn't recognize the value of software. It likes to buy boxes: whether it's a casting, a forging or an electronic control unit, it sources physical things. I think the shape of the future has to see some change in that attitude and a change in the perception of the value of software, as we have seen in other commercial sectors."

Without a change in attitude and a rapprochement with software-defined systems, Ford believes that only through legislative effort will the full potential of by-wire be reached. "If we rely upon normal market forces and the gradual adoption of these technologies, then I think suppliers and OEMs alike will be very unlikely to step over the line in the sand that takes you from supporting the driver and the driving process to taking over responsibility from the driver," he said. "Especially with systems that are no longer mechanically linked: steer-by-wire or brake-by-wire technology adds another complexity to the political or legal viability risk that vehicle manufacturers and suppliers find themselves facing. I think that it is unlikely that there will be any major move unless there is the political will to legislate for the adoption of this technology."

Unlikely or not, Ford believes that the adoption of such systems, from a starting point of the devices available today, will ultimately profit the driving community. "I believe very strongly that an awful lot of gain can be passed to society in terms of reduction of accidents and the mitigation of the seriousness of accidents by the adoption of relatively cheap and simple levels of functionality. Just by the adoption of a simple forward looking sensor on the vehicle – the VORAD system I mentioned in my presentation – accident rates are cut dramatically. If we translate that across to the normal driving population of a first world country with their high levels of vehicles on congested roads, I feel that the new forms of safety technology can have a significant benefit."

Improved sensors

Much of what TRW hope to do is dependent on the development of new and improved sensor technology, and much of the session that followed was devoted to this topic. Christian Burrer, marketing director of sensor manufacturer Infineon, followed Ford. Burrer identified the

motivation behind the development of pressure-based side airbag systems and explained how the development of sensors for a new generation of systems focuses on the higher integration of logic to better control fire/no fire reactions.

Next up was Roy Grelland of Sensoron (acquired by Infineon since the call for papers). Grelland is product manager for Sensoron's TPMS range. With the US TREAD Act coming into force, tire pressure monitoring systems have been one of 2003's hot topics, and Sensoron one of its leading practitioners. Grelland detailed the advances in electronics manufacturing and packaging that have taken TPMS sensor design forward in the past few



Christian Burrer, Infineon

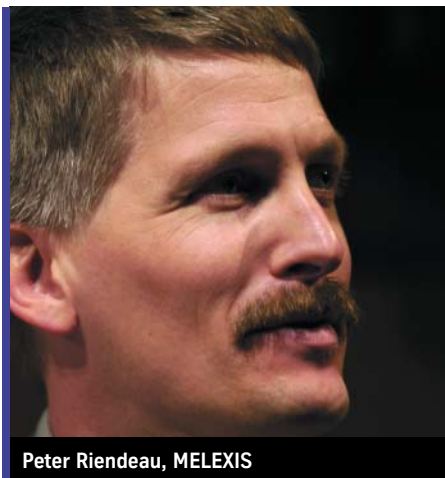
years. The SP12 system currently on offer from Sensoron measures pressure, temperature, battery voltage and radial acceleration and is integrated with an ASIC in one package and is a good example of the current level of technology that so rarely registers in the consumer's consciousness.

TPMS

TPMS was to be a continuing theme throughout the session with Sascha



Sascha Kunzmann, ALPS



Peter Riendeau, MELEXIS

Kunzmann, project manager at IQ-Mobil following Grelland with a presentation about the alternative TPMS technology developed by the German innovator. The RDKS system is a batteryless TPMS device that communicates via Bluetooth. While still viewed with suspicion by many in the industry, the use of Bluetooth for TPMS operations has the ability to connect almost all other information carriers (mobile telephones and global telemetric networks for example) though costs are still high. [While not presenting at IAC, Carl Wacker, vice president, marketing and sales, for Schrader Electronics, who has a massive interest in the TPMS market worldwide joined the panel for a lively discussion session. For his views on the future of the TPMS market, please see *Automotive Sourcing* August 2003.]

In late September, Schrader Electronics

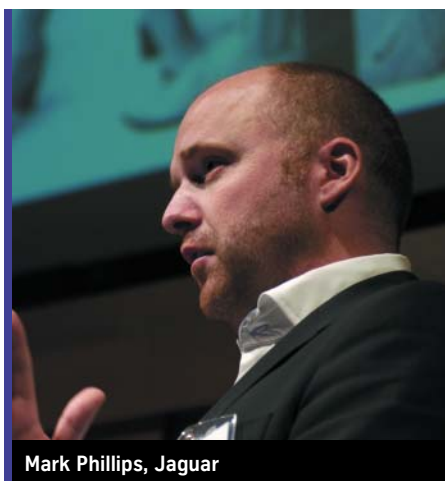


Carl Wacker, Schrader Electronics

announced a major expansion of its manufacturing operations with the opening of a new production facility in Northern Ireland. Schrader Electronics is currently the largest manufacturer of tire pressure monitoring systems (TPMS) in the world.

This new 4,350m² factory will more than double the company's production capacity and will create 200 new jobs in automotive electronics. The new facility will strengthen significantly Schrader Electronics' future capability to satisfy growing global market demand for its TPM systems and will provide additional capacity to support the production of the company's expanding range of automotive electronics products.

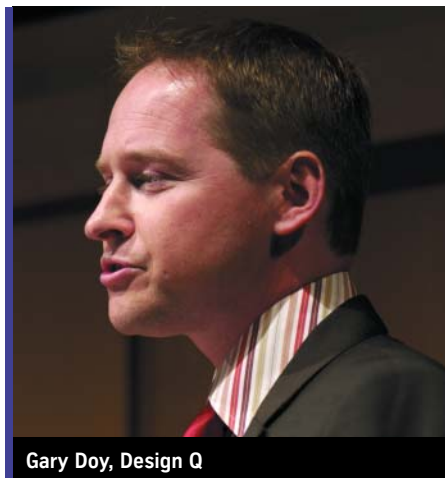
The closing session of IAC 2003 tackled the subjects of interior design and personalization. Leading off was Jaguar designer Mark Phillips whose presentation, if anything, revealed that designing a world-class product is only half the battle. Knowing your market, and making sure that your market knows you is equally important. In recent years Jaguar has



Mark Phillips, Jaguar

lowered progressively the age of the demographic it targets. The two-car lineup of 1997 has given way to the younger and cheaper S- and X-Types, opening up new markets for Coventry's finest. Concept cars such as this year's R-D6 and the much-mooted Jaguar MPV pointing to an even younger prospective Jaguar owner, and so the company is currently examining its use of design language and paying plenty of attention to outside influences.

Definitely from the old school, however, was the utterly absorbing presentation given by Gary Doy, design director of Design Q. While the company has designed interiors for everything from 747s (Virgin Atlantic) to ocean-going yachts (Princess) in recent times, Doy's presentation, billed as 'the ultimate personalized interior' detailed a refit his company has recently carried out on an Aston Martin V-8. While the price of the work remains outside the realms of practicality (it falls into the 'if you have to



Gary Doy, Design Q

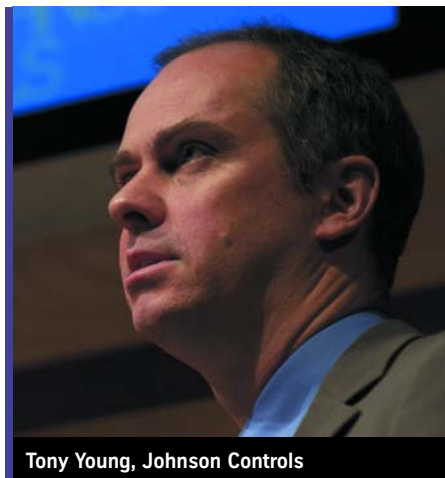
ask... ' category) it does serve to highlight a trend that is becoming more apparent: the vehicle interior as fashion accessory.

JCI

More in the mainstream is the work carried out by Tony Young, process leader at Johnson Controls' European Craftsmanship & Perceived Quality Design Studios. Success or failure in the field of interior design is frequently a matter of perception; the look of the thing has become almost as important as the thing itself. Of course, perception is an intangible, and is therefore difficult to measure. But, as Young explained, it's well worth the effort.

In the JCI studio a battery of scoring criteria are used to assess the perceived quality of vehicle interiors across all the mainstream segments of the European market. Naturally the company is reticent to discuss exactly what its judging criteria are, though Young allows that the perceptual nature of the assessment means that many of the tests have an aesthetic rather than an engineering bent: color matching is in, impact protection is out.

Johnson Controls' scoring system acts



Tony Young, Johnson Controls



Andrew Little, Navigation Technologies

as both a provider of benchmarking data and also as an instrument to define future direction, highlighting to customers areas where their products are currently weak. "Craftsmanship doesn't always cost money," said Young. "If you know where your product is failing today and you put a plan in place early enough to correct it for the next generation, it shouldn't cost too much. It might be a different story where a material needs to be upgraded, but maybe you have to do that anyway to maintain a competitive position in that sector and it is a cost you just have to accept."

Many of the results produced by the perception survey are self-evident, but this doesn't diminish the value of having a repeatable system of measurement in place. This is especially true with the fragmentation and specialization taking place in the industry today and the move toward products that are tailored more specifically to customer demographics. It is an area of intense interest for JCI.

"In Europe the direction in which we're moving is toward multi-sense design," conceded Young. "We are looking at people's lifestyles, splitting populations into bands and grouping individuals with similar outlooks. After defining a lifestyle segment you can then design some themes that reflect that segment – then you can design a product that reflects those themes."

Car design has always had half an eye on demographics, as represented in the past by the odd concession to the elderly or female driver. The concepts behind lifestyle design are slightly more obvious as they seek to represent some sweepingly generalized personality types through interior design.

"There are designs for party people, and for the more introspective," explained Young. "This is as close as we're going to

get to personalization, but it's a big step forward for us, getting away from the gray and the beige and the black interior."

Future views

Finally, in an addendum to the personalization and interior design session, Andrew Little, marketing director of Navigation Technologies, and Robin Paling, engineering manager of TECD (32-bit embedded controller division) systems at Motorola gave presentations accounting their visions for the future of the industry. Little spoke of the growing market for satellite navigation systems, of which Navtech is a leading light, and spoke of the great leaps and bounds that have been made in content and compression. Little answered questions on subjects ranging from the provision of real time data ("hopefully an infrastructure will be developed to make this a real possibility") to the addition of speed camera position markers in Navtech maps ("we absolutely have no intention of doing anything like that"). One interesting issue which arose from the discussion was the way in which Little's company is looking beyond the dashboard, a decision exemplified by the recent announcement that Navtech maps are towering HP's iPAQ navigation system to offer route guidance on a handheld.

Paling spoke at length about the levels to which microcontroller technology is now being pushed. Motorola is heavily involved in, among other things, the FlexRay project, which has now progressed to making silicon. FlexRay is one of the

rival protocols under development to run by-wire systems in the next generation of vehicles. While initial take-up is, according to Paling, expected to be slow, by 2010 we can expect to reach a watershed of new by-wire applications, using FlexRay (or rival TTP) nodes.

The interest generated by the prospect of by-wire systems created a fitting end to proceedings in Sunderland. As was the case with many of the technologies and ideas put forward at the conference, the concept of by-wire systems is readily accepted, the technology is well on the way to being understood, but the idea of it entering production is still something to engender keenness and anticipation in the audience. It is surely a good omen for the consumers of the future that the industry is still able to generate enthusiasm within itself. **ES**



Robin Paling, Motorola

SPEEDSTART

Guy Morris, senior manager in Visteon's advanced powertrain systems engineering business used the Sunderland conference to unveil the company's new '20 percent more efficient than existing alternators' 12V belt-driven integrated starter generator (ISG). However, the company did more than provide a PowerPoint presentation, choosing to also provide a demonstrator vehicle for delegates to test drive.

In advance of the conference *Automotive Sourcing* test-drove the vehicle – a Ford Mondeo – around the streets of central London in the company of Mike Dowsett, Visteon's manager of advanced powertrain systems. Stop-Start technology has been around for a couple of years (indeed, Valeo made the news in September 2003 by signing a big deal with PSA for 2004 production units), but for anyone unfamiliar with the technology the driving experience can be mildly disorienting, although this is a transient sensation soon dissipated

and replaced with an instant recognition of the advantages. "While the consumer may struggle to appreciate the benefits of other [eg tailpipe] emissions-reducing technology, Stop-Start is easy to conceptualize," said Dowsett. "When the vehicle is stationary, the engine is shut down. SpeedStart12 quickly restarts the engine without the driver noticing any delay at all."

From the viewpoint of the OEM, however, Visteon's most persuasive argument for SpeedStart is likely to revolve around its clever packaging and the potential for easy adaptation. The system incorporates motor and power electronics in one unit, eliminating the starter motor, alternator, standard battery and belt system and, in some cases, the starter ring gear. SpeedStart12 has limited impact on the vehicle's existing powertrain and electrical network and is intended to be usable in most gasoline engines up to 3.0-liter, including current models.