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In this Issue

Cover story:
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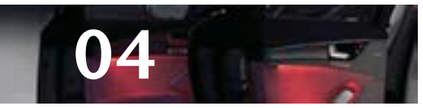


Emotional Interior Lighting

The Best Golf Ever

Familiar Values

Innovative Accents

Editorial

Mobility is a term with several different meanings. Firstly, we associate it with our own personal ability to move about on foot, on two wheels, by bus or train, in cars or in aeroplanes. Secondly, mobility is a synonym for adaptability and flexibility. In the automotive and aerospace industries both of these characteristics are important success factors which enable companies to accommodate change. New technologies, the trend for more environmentally friendly mobility and the wide variety of models and variants on offer demand high levels of flexibility from the market players, so that increasingly complex solutions can be developed cost-effectively to meet the challenges of the future. The purpose of the value added chain is to create state-of-the-art products which comply with legal requirements and fulfil the individual wishes of end users.
Bertrandt provides support services for all types of complex projects from the initial idea, development, validation and prototyping right through to volume production. These services are available individually, covering specific technical areas, as overall project or process management functions. The Bertrandt Projektgesellschaft (BPG) supports our business units and departments with its extensive interface expertise in order to ensure that projects which require high levels of management and organisation run as smoothly as possible. From page 32 onwards of this issue of the Bertrandt magazine, you will find insights into the cross-departmental function of the BPG within the Bertrandt group, including its standardised tools and highly customised solutions.

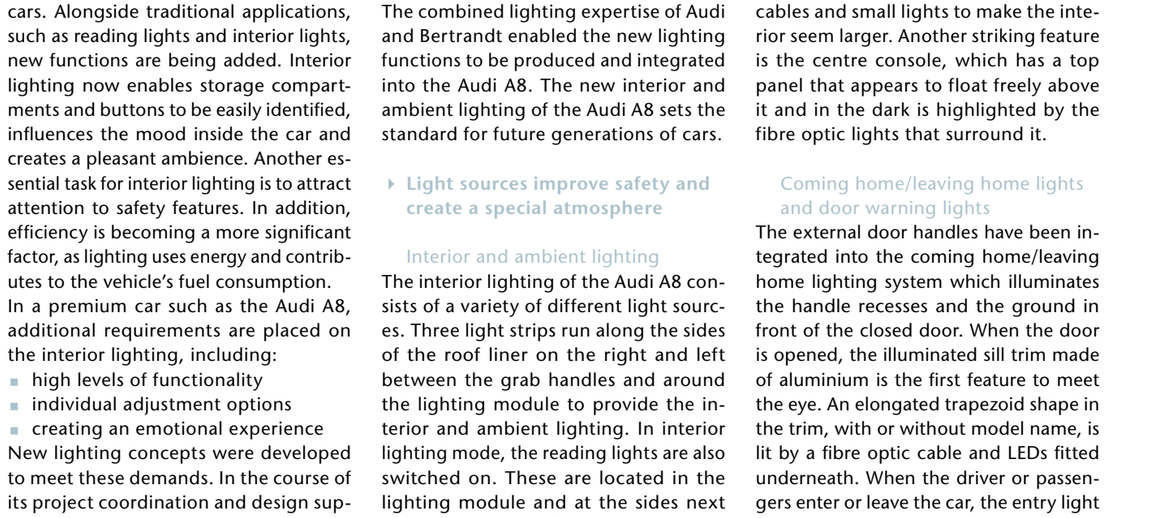
In addition, there are articles on a variety of interesting projects which highlight the range of services we offer. We provide our international customers with bodywork and interior development, simulation, testing, prototyping, model making, electronics, powertrain and engineering support services, on land or in the air, by combining high levels of technical expertise with flexibility in the course of challenging projects.

The magazine also offers you the opportunity of finding out about other new things that are happening at Bertrandt. We have a whole spectrum of subject areas, ranging from multimedia and e-mobility to hybrid powertrains and the visualization of moving fluids, in the automotive and aerospace sectors and, via Bertrandt Services, other industries of the future, such as energy. We are on the move on your behalf, acting as a forward-looking, flexible and reliable partner.

Dietmar Bichler

HighLIGHT

Emotional interior lighting in the Audi A8



Major changes have taken place in vehicle interior lighting in recent years. The simple light fitted to the roof liner has been replaced by integral concepts that provide ambient mood lighting. This change in direction has been accompanied by new developments in the field of light sources. Until just a few years ago, only conventional bulbs were used for interior lighting, with a very few exceptions. Nowadays, light-emitting diodes (LEDs) are becoming more common. Their small size, long service life and low power consumption open up completely new opportunities for lighting design. This potential has been fully exploited in the Audi A8. Bertrandt Ingolstadt partnered Audi in the technical implementation of the newly designed lighting components.

Project requirements

Interior lighting is playing an increasingly important role particular in luxury class cars. Alongside traditional applications, such as reading lights and interior lights, new functions are being added. Interior lighting now enables storage compartments and buttons to be easily identified, influences the mood inside the car and creates a pleasant ambience. Another essential task for interior lighting is to attract attention to safety features. In addition, efficiency is becoming a more significant factor, as lighting uses energy and contributes to the vehicle's fuel consumption.
In a premium car such as the Audi A8, additional requirements are placed on the interior lighting, including:

- high levels of functionality
- individual adjustment options
- creating an emotional experience

New lighting concepts were developed to meet these demands. In the course of its project coordination and design support activities, the "Lighting and Vision Systems" team from Bertrandt Ingolstadt also contributed to the technical implementation. As well as providing project management services, including development for volume production, Bertrandt created the concept designs and developed the new lights in close collaboration with the systems suppliers. The combined lighting expertise of Audi and Bertrandt enabled the new lighting functions to be produced and integrated into the Audi A8. The new interior and ambient lighting of the Audi A8 sets the standard for future generations of cars.

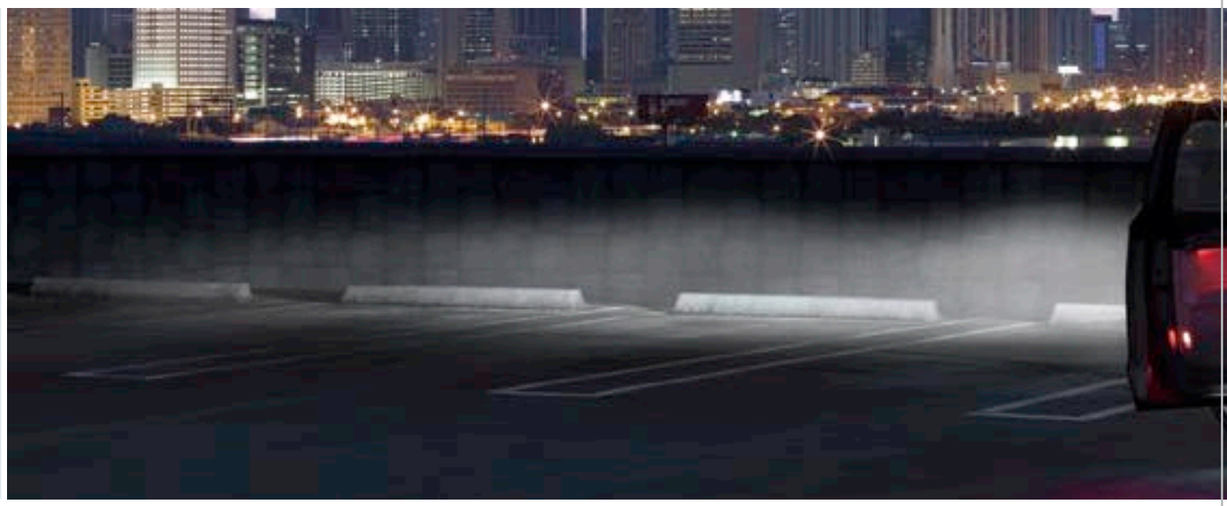
Light sources improve safety and create a special atmosphere

Interior and ambient lighting

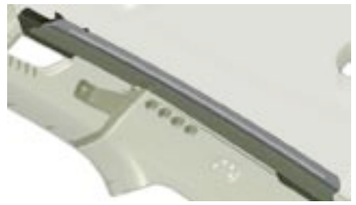
The interior lighting of the Audi A8 consists of a variety of different light sources. Three light strips run along the sides of the roof liner on the right and left between the grab handles and around the lighting module to provide the interior and ambient lighting. In interior lighting mode, the reading lights are also switched on. These are located in the lighting module and at the sides next to the light strips. This provides bright lighting for the entire interior of the car, in particular at night. In contrast, in ambient lighting mode the light strips shimmer to create a pleasant atmosphere when the car is on the move. In this mode, larger areas such as the upholstery, door pockets and footwells are also illuminated discreetly using fibre optic cables and small lights to make the interior seem larger. Another striking feature is the centre console, which has a top panel that appears to float freely above it and in the dark is highlighted by the fibre optic lights that surround it.

Coming home/leaving home lights and door warning lights

The external door handles have been integrated into the coming home/leaving home lighting system which illuminates the handle recesses and the ground in front of the closed door. When the door is opened, the illuminated sill trim made of aluminium is the first feature to meet the eye. An elongated trapezoid shape in the trim, with or without model name, is lit by a fibre optic cable and LEDs fitted underneath. When the driver or passengers enter or leave the car, the entry light built into the door trim illuminates the ground to allow any obstacles to be easily identified. At the same time, the red door warning light is switched on to make passing vehicles aware that the door is open, which offers additional safety benefits.



Bertrandt Ingolstadt created the reading light concept. The housing, lens, push button and accompanying retainers were designed and engineered by Bertrandt.



The light strips in the roof liner between the grab handles act as interior and ambient lights. Bertrandt designed the connector, the fibre optics and the two-part housing.

Supplier management

As part of the development process, Bertrandt managed the interface between the OEM and the systems suppliers. This included DMU (digital mock-up) data management, producing technical documentation, positioning the lights in the virtual vehicle and coordinating with the different departments at Audi, such as design and surfacing. The requirement for an even distribution of light presented a special challenge, which Audi and Bertrandt met by providing support to Audi's standard suppliers. New ideas were put into effect in concept designs and validated by Audi using simulation processes.

Creating lighting scenarios

The latest trend in vehicle interior lighting is to move away from individually controlled light sources and to create integral lighting scenarios. This concept has been applied consistently in the case of the Audi A8. The individual light sources are grouped together to form lighting scenarios, so that the lighting experience begins as soon as the car is remotely unlocked. The light spreads evenly across the driver's seat, the passenger's seat and the rear seats. In addition, the leaving home function is activated and the relevant lights are switched on. Another scenario comes into play when one door is opened. The light focuses on the seat inside the door and invites the driver or passenger to climb aboard. At the same time, the interior lighting is dimmed slightly.
When the driver turns on the ignition, ambient lighting mode is activated. The interior lighting is switched off and discreet ambient lighting is turned on, with the settings (brightness and colour scheme) being selected by the user. When the key is removed from the ignition switch, all the interior lights come on at full brightness.
As the driver locks the car, the lights are turned off first for the rear seats, then for the passenger seat and finally for the driver's seat. Only certain exterior lights which are controlled separately by the coming home function remain illuminated.

Controlling and customising the lights

The interior lighting in the Audi A8 is managed by a newly developed control unit, known as the ambient lighting module, and by the main lighting module. All the light functions are networked, so that they can be adjusted centrally via the multimedia interface.
The brightness of the ambient lighting can be adjusted for the entire interior or separately in four different zones. In addition, the driver can choose from three different colour schemes. The colours available are polar (bright white), ivory (off white) and ruby/polar (red/bright white), depending on whether the occupants want a cool (polar), pleasantly warm (ivory) or sporty (ruby/polar) ambience.

Trendsetter

New design requirements are constantly raising the bar for modern lighting technology. LEDs and fibre optics are under ongoing development. Improved fibre optic materials, more powerful LEDs and the use of the latest simulation software for designing and refining lighting elements are increasing the efficiency of the development process. Bertrandt's contribution to a range of Audi projects in the form of the design, simulation and prototyping of fibre optic lights has enabled the company to become fully familiar with these trends. The expertise it has acquired in these areas has been put to good use in the case of the Audi A8. Bertrandt is currently working on another technology for the future: organic light-emitting diodes (OLEDs). In contrast to LEDs, which function as spot lights, OLEDs can provide uniform illumination for larger areas. This new technology gives light designers and developers more freedom to put their ideas into effect.
The new interior and ambient lighting of the Audi A8 demonstrates the future trends in interior lighting. The light sources are almost exclusively LEDs and offer end customers extensive customisation options. The integrated scenarios transform the lighting into an experience. Bertrandt is looking forward to continuing to provide Audi with lighting expertise. ■

Daniel Fuhrmann, Ingolstadt

Scope of the Audi A8 interior and ambient lighting project in brief

Project management
- *Project coordination*

Development of interior electronics systems
- *Concept designs*
- *Light development*
- *Integrating lighting functions*
- *DMU data management*

Supplier management
- *Managing systems suppliers*

Production support services
- *Development for volume production*

The Best Golf Ever

Bertrandt Wolfsburg helps to develop the sixth-generation Golf

With more than 27 million buyers, the Golf is not only a bestseller but also the market leader in the segment that bears its name: the Golf class.
Since October 2008, the new Golf VI has been a common sight on roads throughout the world. The requirements that the new Golf has to meet can be briefly summed up: it has to be perfect in its class.

Development partner with complete vehicle know-how

The design department of the Wolfsburg office was responsible for the development and implementation of various requirements. Throughout this process, the Bertrandt teams from the Body-in-White, Doors and Closures, Exterior, Add-On Parts and Lighting and Vision Systems attained a high level of efficiency due to their close cooperation and interlinking of the individual development processes. Their proximity to the customer's factory in Wolfsburg also enabled them to consistently respond to the customers' requirements in the shortest possible time.

Partnership-based and interdisciplinary product development

Body-in-White

Experts from the Body-in-White department were integrated into the team working on the new Golf VI. Above all, the Golf was given a more striking and sporty appearance due to the "tornado line" styling of the upper shoulder contour. These lines are supported by the headlights, the wings, the front and rear end and the rear lights that extend into the side section. A further task facing the Volkswagen special departments was the assembly of the side wall reinforcement frame as a carry-over part (COP) and its integration into the system platform.

Doors and Closures

Using a great deal of know-how and innovation, the door modules (2-door and 4-door models, closures, glazing) were designed as a complete development in the Doors and Closures team, from the initial design model right through to SOP. The result met the requirements regarding both design and engineering in equal measure. For the first time, the 2-door and 4-door models were developed in parallel rather than consecutively, as is usually the case.

Lighting and Vision Systems

Further support was provided by Bertrandt's Lighting and Vision Systems team, which produced installation space models, cross-sections and drawings for the design of the rear lights. A further area of focus was the surfacing of the technical surfaces in the headlights (halogen and adaptive light system). In this case, Bertrandt was responsible for project management in the field of Surfacing and was in direct contact with the suppliers.

Bumpers

The Exterior team supported the development of components such as the bumpers, plastic assembly brackets, spoilers, headlamp cleaning systems and the M-Easy concept (self-adjusting front end). In addition to these components, the rear bumpers and the front bumpers with side markers for the North American region (NAR) were designed.

Add-On Parts

The Add-On Parts team also mastered the challenges presented by the project to the fullest satisfaction of the customer and delivered absolutely successful results. Among other things, the team took on the task of designing the wheel arch shells at the front (two-part) and rear as well as the rocker panel covers for the GTI.
Furthermore, the engineers took responsibility for developing the plastic under-ride protection for the engine plus the support bracket, the acoustic encapsulation with positioning of the resonators, the C_d floor panelling and air guidance components. For the entire Golf VI project, all practice-relevant software tools were used in the product design process. These included the CAD systems CATIA V5, ICEM Surf and LucidShape. ■

Thomas Klingner, Wolfsburg

The rear bumper, rear lights, glazing and door modules were among the components designed by Bertrandt.

Scope of the Golf VI project in brief

Doors, Closures, Glazing
- *Door modules: complete development*

Body-in-White
- *Outer side parts, front wing assembly, rear light mounting component and reinforcement, sealing channel, insert box for tank closure, reinforcement of lid buffer, adapter for longitudinal beam*

Exterior
- *Design of front and rear bumper module*
- *Design of rear bumper and front bumper with side markers for NAR*

Add-On Parts
- *Design of wheel arch shells, rocker panel covers, engine under-ride protection, acoustic encapsulation, C_d floor panelling, air guidance components*

Lighting and Vision Systems
- *Surfacing of the technical surfaces in the headlights*
- *Design support for rear lights*

Familiar Values

Mercedes-Benz E-Class Coupé and Cabriolet

Many years of co-operation and mutual trust formed the basis for the Bertrandt project team's participation in the development of a new vehicle generation: the Mercedes-Benz E-Class Coupé and the recently launched Cabriolet. From June 2004 to the end of 2009, Bertrandt teams comprising up to 15 members were involved in supporting Daimler AG in a wide range of tasks, from body-in-white as well as doors and closures development right through to technical documentation and dimensional management.

The body-in-white: extremely strong

Occupant cell and side walls

The two highlights of the Mercedes-Benz model range are characterised by a sophisticated combination of emotion and efficiency interpreted from new perspectives. Both dynamic and sporty and as a consistent further development of the saloon, the Coupé and the Cabriolet represent a new generation in the era of the upper mid-size segment.

One difference from the saloon that is immediately apparent is the lack of a B-pillar. Bertrandt was involved in developing a concept that ensures that both the Coupé and the Cabriolet have the required stiffness without the need for a continuous B-pillar.

The developers focused their interest not only on the design, however, which the Bertrandt team helped to develop through their work on the interrupted B-pillar. Particular attention was also paid to safety. The body of the two cars was optimised in a joint project involving both teams. The Coupé and Cabriolet each have four independent crumple zones that ensure that forces are distributed over a wide surface area and are transferred away from the occupant cell. As a result, the occupant cell proves to be an almost non-deformable structure both in front or rear impacts and in side impacts (or rollover events). Passengers are protected in the intact occupant space even in the event of high impact velocities. The use of high-strength steels and sheets with a higher material thick-

Scope of the Mercedes-Benz E-Class Coupé and Cabriolet in brief

Body-in-White
- *Wings*
- *Main floor*
- *Rear end*
- *Side walls/roof*

Doors and Closures
- *Bonnet*
- *Boot lid/roof compartment cover*
- *Door systems*

Documentation
- *Technical documentation*

Dimensional Management
- *Tolerance calculation/simulation*

High strength of the roof pillars, the roof frame and the side longitudinal beams provide best protection of the passengers.

ness plays a key role in achieving this, as does the installation of additional load-bearing beams. Bertrandt provided support for the wide-ranging and complex body engineering measures that guarantee the torsional stiffness of the body in the two attractive Mercedes-Benz models without an upper B-pillar. The single-part side walls have individually welded inner shells which provide high strength for the roof pillars, the roof frame and the side longitudinal beams. In some cases, additional sheet steel reinforcements were added to the load-bearing components, for example on the A-, B- and C-pillars. In addition, the A-pillars are fitted with high-strength steel tubes that are able to withstand even extreme loads such as those encountered in the roof-drop test. The high torsional stiffness and targeted lightweight design of the two models also form the perfect basis for outstanding driving dynamics. The high strength of the roof pillars, the roof frame and the side longitudinal beams provides optimum protection for the passengers.

Doors and closures

For the doors and closures development, fast and efficient working at the highest level was guaranteed by familiar working processes and specialised knowledge on both sides. Within the framework of the project, the Bertrandt teams supported the implementation of the door systems, which are identical for the Coupé and the Cabriolet as part of the common parts concept. Due to the differences in design of the two cars, an additional reinforcement for the side doors was developed to enable the Cabriolet to have the same high safety level as the Coupé. This made it possible to equalise the different crash load paths.

A further area of the project to which Bertrandt contributed was the Active Bonnet. This innovation includes three impact sensors in the front section as well as special bonnet hinges that are pre-tensioned and arrested by powerful springs. Upon impact with a pedestrian, the sensors send information to the electronic control unit which, in turn, instantaneously activates two solenoids in the hinges. These solenoids release the arresters so that the rear section of the bonnet is pushed upwards by 50 millimetres by means of spring force. It all takes just a fraction of a second. The Active Bonnet has the effect of enlarging the deformation area in order to reduce the severity of an impact, thus helping to avoid serious head and spinal injuries.

A further special feature of this Mercedes-Benz-system is its reversible release mechanism. Drivers can reset the active bonnet to its original position and reactivate the system themselves.

Dimensional management: sustainable developments

Within the framework of dimensional management, engineers from both companies developed a general procedure for tolerance simulation. There are plans to use the procedure for further projects.

Direct transfer: a special mark of confidence

The dedicated communications link that was set up during the development of the Mercedes-Benz S-Class formed the basis for archiving the project data in Smaragd, Daimler AG's own documentation system. This direct transfer is based on the long-standing good relationship between the two companies and offers a very high level of security.

Conclusion

With their Mercedes-Benz E-Class Coupé and Cabriolet, Daimler AG has developed a vehicle generation that sets new standards in automotive engineering. Bertrandt is pleased to have been able to make a contribution towards this new success story by being involved in various projects. ■

Tamara Lopez-Belmonte, Ingo Schulz, Ehningen

Renault Mégane

High-quality components and equipment features developed

The Mégane is Renault's flagship in the compact class and is therefore a strategic model series for the French car maker. With a share of more than one third on the European car market, this market segment is still the one with the largest production volume. As a development partner for interior and exterior components and features, Bertrandt has set innovative accents for its customer Renault with this project, which offers considerable potential for the future.

The Mégane forms the core series in Renault's model range and is available in different versions: 4-door and 5-door saloon, coupé, estate, coupé-cabriolet and two compact MPV versions, the Scénic and Grand Scénic. From 2006 to the end of 2008, Bertrandt was responsible for developing and controlling the geometrical stability and dimensional accuracy of interior and exterior equipment features and components as a project partner. The Bertrandt teams were employed at Renault's "Technocentre" location in the metropolitan area of Paris and worked closely with Renault and its suppliers to develop the optimum solution that fulfilled both design and construction requirements – and to deliver the results on schedule. These requirements were reliably implemented: the Mégane saloon and the coupé were launched in January 2009, while the Scénic and Grand Scénic compact MPV versions came onto the market in the spring of 2009.

Cockpit – successfully setting milestones

The Bertrandt teams were involved in the development, quality strategy and technical validation of the cockpit. This is produced in two main versions – one for the saloons and the coupé and one for the MPVs. Furthermore, electric locking for the glove compartment is provided for the estate and coupé-cabriolet versions. For the cockpit, the focus was on innovation. Instead of a plastic base material, the cockpit is made of a 12 mm compound material finished using SLUSH technology, which produces soft surfaces that are pleasant to the touch. A further specification by Renault to the design department required a new design language for the air vents, the implementation of which at the interface to the

Scope of the Mégane project in brief

Cockpit
- *Development support*
- *Technical validation*

Front Apron/Exterior Add-On Parts (lights, wash/wipe function)
- *Pre-development/development*

Project Management
- *Control of geometrical stability and dimensional accuracy*
- *Quality management*

Supplier Management
- *Monitoring and optimisation of assembly*

cockpit proved to be a demanding task. For the two Scénic models, Renault had also specified that all information instruments for the driver had to be arranged in the centre of the cockpit. This requirement was fulfilled by the use of a very elongated instrument cover that offers protection against reflection and therefore guarantees good visibility. A further technical speciality of the project was that the steering wheel should not only offer vertical adjustment but also be adjustable for reach. As a result, the shell below the steering wheel must conceal all technical components in all possible steering wheel positions. A further highlight: Renault took the opportunity to use this development to introduce a new sound system generation that sets new standards. The milestones and schedules were reliably adhered to. A particularly positive aspect for Bertrandt was that, when the project was completed, Renault expressed its full satisfaction with the service provider's performance. The first cooperation between Bertrandt and Renault in the area of the instrument panel is already being continued in the form of on-going cooperation with the car maker's cockpit department.

Exterior development with experimental approaches

Bertrandt was also given responsibility for the pre-development and development of the front apron and exterior add-on parts, as well as the wash/wipe function and the lights. The body design required completely different technical performance features. This demanded an overall new development, in some cases with experimental approaches, in order to comply with the new standards, corrosion protection requirements and assembly specifications. The development of the front apron in particular was strongly influenced by new standards for pedestrian protection. The aim of the work was to optimise the front apron in order to comply with crash requirements in the lower leg/thigh and thigh/hip areas. Energy absorption tests with 500 joules for impacts at the height of the leg and 700 joules at hip height confirmed the soundness of the calculations carried out by the Bertrandt team. This standard also had influences on the development of the cowling grille and the windscreen wiper mechanics. Connecting these two elements on the passenger side required a special innovation: in order to guarantee a perfect leak-proof seal between the grille and the wipers, the team designed an element that is mounted on the wiper arm and provides a seal with the cowling grille by means of a compound moulded rubber sealing component. As a result, the element remains fixed in relation to the grille but at the same time allows the wiper arm to move inside. Special attention also had to be paid to a side connection component developed under the project name OLGA (OLGA = obturateur latéral de grille d'auvent/side cowling grille seal). This forms a connection between the cowling grille, the windscreen and the pillar. Normally, the body design department is responsible for these components. In the Mégane series however, OLGA production also includes a plastic component, which is why the team had to achieve a viable compromise between the requirements of different departments when designing the parts. The result is a reliable and effective component with an appealing design and flawless execution.

Controlling geometrical stability and dimensional accuracy – focus on the process

From December 2007 to January 2009, one Bertrandt team was given responsibility for controlling the geometrical stability and dimensional accuracy of the two Scénic models. Its task was to guarantee product feasibility on the basis of continuous processes. In the development phase, the technical validation of the design proposed by Renault was performed with the aid of dimensional chains. Subsequently, the development of special control instruments enabled each individual component to be quality tested. During the prototype phase, the Engineering department was also given responsibility for supplier management for the various intermediate stages. The first components, including body components, were then assembled in practice. During this phase, the geometrical joinability was confirmed to ensure that no problems occur during assembly. Wherever required, action plans were determined with the suppliers involved in order to directly rectify any component defects. The parts quality is tested using a special tool developed by Renault. As soon as the specified quality level has been achieved, the vehicle is handed over to the responsibility of the production department. ■

Nathalie Bottreau, Charles Correia, Christine Fouchard, Jean Christophe Gaboury, Angel Moran, Olivier Tronquoy, Bièvres

Daimler AG Makes Safety Visible

Bertrandt supports Interseat Protection in the ESF 2009

The ESF 2009 Experimental Safety Vehicle made the progress achieved so far clearly visible to mark the year of safety anniversaries at Mercedes-Benz. By combining trailblazing innovations in the field of safety, the research vehicle already shows possible technologies of the future. As a long-standing development partner of Daimler AG, the engineering service provider Bertrandt also demonstrated its expertise in the ESF 2009: the "Interseat Protection" safety system integrated into the rear seats prevents head and shoulder collisions between the vehicle occupants and also provides value-added as a comfort element.

In demand: interaction protection

With the ESF 2009, Daimler AG is clearly demonstrating its innovative power as a premium manufacturer. The Experimental Safety Vehicle, which is based on a Mercedes-Benz S 400 Hybrid, combines more than a dozen safety innovations – most of them already fully functional. Bertrandt was the development partner for an innovative protective pad aimed at protecting rear-seat passengers. The service provider was given the task of designing and developing this interaction protection to separate the rear-seat passengers and to install it as a model in the experimental vehicle.

The development was based on findings from Mercedes-Benz accident research. A thematic analysis of head and chest curves showed that, in the event of a side impact or rollover accident, rear-seat passengers can be injured by colliding with each other, even though they are wearing a three-point seatbelt. The aim was therefore to find a solution for the rear-seat passengers that could be quickly implemented and which offered high value-added.

Design

The technical product designers at Bertrandt Technikum in Ehningen provided the first draft designs of the new safety system quickly and with a high level of competence. The following requirements were taken into consideration during the development process:

- The element should be stable and fixed in order to support the head and shoulders.
- At the same time, the solution should offer a certain level of variability in order to adapt to different body sizes.
- The component should have a rounded form and be positioned in the centre of the rear seat bench or between two single seats.
- The perceived quality of the visible components should be very high.

Daimler selected the suitable geometries from the designs presented. In addition to achieving a very attractive appearance, the focus was on functionality and feasibility due to the high safety requirements.

Before the design data were implemented in hardware, the Bertrandt engineers simulated all motion sequences of the new system.

Scope of the ESF 2009 Interseat Protection project in brief

Interior
- *Concept*
- *Functional and feasibility study*
- *Design*
- *Kinematics development*

Electrics/Electronics
- *Control circuits*

Modelmaking
- *Structure and integration*

Development

As the development process continued, Bertrandt's engineers focused on a protective pad that was to be integrated directly into the installation space above the folding centre armrest of the rear seats or the through-loading compartment and activated as part of the vehicle's PRE-SAFE® system. As soon as PRE-SAFE® registers a side impact, the entire system is activated within fractions of a second and the protective function is deployed. As a special feature, the protective pad is designed to be used to support the shoulders of the rear-seat passengers, while headrests above extend to provide support for the head.

In order to achieve the correct dimensions of the storage component and the headrests fitted above and to ensure functionality and feasibility, the Bertrandt designers carefully simulated all motion sequences of the new system using the CATIA kinetics program. For example, when considering the detailed design of the protective pad, the specialists decided to use a four-link hinge. The advantage is that, when at rest, the hinge is extremely flat but when required it can cover a large distance and also offers very high stability. During the development process, the engineers also made sure that Bertrandt would be able to manufacture the components required for building the model themselves. Only the electric motor was to be a bought-in part. The designs of the individual components were examined and coordinated with those responsible at Daimler AG.

Modelmaking

The building and integration of the unique component into the research vehicle was carried out in Bertrandt's Modelmaking department. To ensure that the process ran smoothly, Daimler AG provided an additional seat unit that was available as a seating buck for the modelmakers at Bertrandt Technikum. The components for the storage box were milled from strong plastic; the mechanical components were made from steel and the whole system was covered in leather. The control circuits and circuit boards that ensure full functionality in an emergency were provided by Bertrandt from its Electronics competence centre.

The result of the design is a protective pad that not only functions as an innovative safety system but also offers a new comfort function as an additional feature. The pad is designed to be manually extended by the passengers at the touch of a button, when it can be used as a head and shoulder support for a comfortable sleeping position in the rear seats during long journeys.

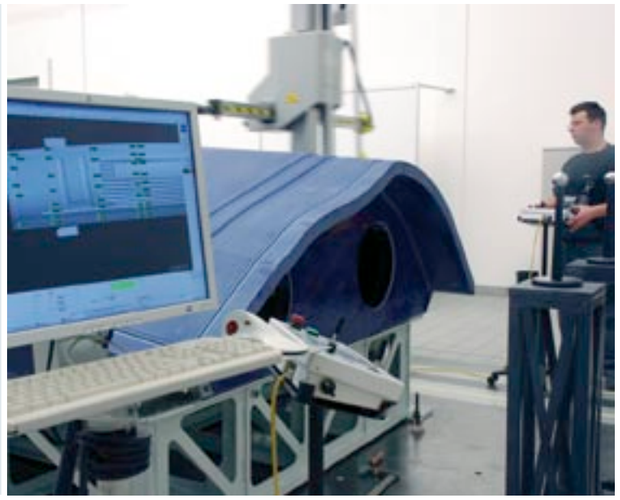
Investing in the future today

In only four months, Bertrandt developed and integrated the new "Interseat Protection" system into the ESF 2009. Research vehicles such as the ESF 2009 Experimental Safety Vehicle show that it is necessary to invest in innovative solutions at an early stage in order to bring sustainable solutions with series-production readiness to the market at a later date. Bertrandt is very pleased to have acted as a partner with Daimler AG and to have provided comprehensive development competence that contributed to a groundbreaking solution. ■

Franz Jerg, Anja Schauser, Ehningen

Aerospace

Demonstrator for process validation



The modelmaking/rapid technologies department in Ehningen manufactured a stringer positioning device for an aircraft fuselage segment. In order to validate the production process for CFRP fuselage segments, a testing device on a 1:1 scale was required. Given that the finished product would be 12 m by 3 m in size, this represented a real challenge.

Requirements for the test system

The test device forms the inner skin of a specific area of the aircraft fuselage and contains pockets for positioning the stringers (rib structure). The CFRP (carbon fibre) fabric is compressed by applying a vacuum to it. Therefore, the surface of the test device must be vacuum-tight and the vacuum must be maintained for a specified period without the use of a pump. The production tolerance requirements are also very demanding, with a maximum tolerance of only 0.4 mm over the entire 12 m length of the device.

Production processes

Similar tools are often made from aluminium. However, the use of this material makes the devices more time-consuming and difficult to construct, because the aluminium panels have to be forged to create approximately the correct contours and then have to be welded. In addition, the pockets for the stringers make the production process more complex. Fitting a vacuum system to the underside of the device after it has been constructed, in order to guarantee that the vacuum is applied evenly to the surface, represents a further challenge.

Concepts using a new technology

Polyurethane solid casting technology, which has already given positive results in design and data control models, was successfully used to produce the positioner. The blank for the device was cast in advance as a homogeneous component complete with the entire ribbing. This casting method also allowed the vacuum system to be incorporated simply and securely. As a result, the long and complicated assembly process in areas that were difficult to access was no longer required. One further benefit is the relative ease with which the plastic component can be reused during another revision loop if changes are made, because the plastic walls are thick enough to be machined. The solid casting technology and the early incorporation of the vacuum system during the planning phase have enabled the production time and costs to be reduced for all types of surface geometry.

New dimensions

The sheer size of the device, which is approximately 12 m by 3 m by 2 m, also presented a challenge. Even Bertrandt's large milling machines, with travel of 6 m by 3.5 m by 2 m, appeared at first glance to be too small for the job. The solution was to divide the device into two segments and fit it to a supporting steel subframe. At the same time, the modelmakers calculated the precise wall thickness which would allow the forces that were released to be absorbed. The use of suitable bearings enabled the system of bolts on the subframe to be fixed firmly in place, despite the different coefficients of expansion of the plastic and the steel. The concept also took into consideration the detailed features of the device, such as the vacuum which had to be available at the right points via the vacuum ducts cast into the plastic. After the device had been manufactured, all the components were measured and documented on the 18-metre measuring machine.

Transport challenges

Although the device was not moved until the very end of the process, transport was one of the first subjects to come under consideration during the planning phase. The specialists were able to measure 18-metre long objects, but the maximum usage length of the tool was determined also by other criteria. The total weight of around 16 tonnes meant that both an overhead crane (10 tonnes) and a heavy 18-tonne forklift were needed to lift and move the tool. In addition, the widths of all the passages, the floor loading in the building and the ceiling height had to be considered in advance.

New experience

Bertrandt took up the challenge and created a new production process. The experience it has gained during the course of the project will be developed for the benefit of its customers. ■

Rudolf Scheuring, Ehningen

Scope of the stringer positioner project in brief

Rapid prototyping

- *Plastic technology*

Modelmaking

- *Polyurethane solid casting technology*
- *Production of a positioning device*
- *Validation and measuring*
- *Technical documentation*

“Safety First” in a New Package

b.safe – Demonstrator for Driver Assistance Systems

A realistic driving experience: simulation of the light and visibility conditions in the interior of the demonstrator.

In order to satisfy the growing need for technical communication, Bertrandt Altenburg has developed a demonstrator for driver assistance systems. With the aid of sophisticated graphics, acoustics and dynamic tilting technology, various traffic situations are simulated and complex safety systems are clearly illustrated, enabling users to experience them in a short time.

Music is playing on the car radio, neon advertising signs flash by in the twilight. Not far to go now before you are home. Your working day went on much too late – meetings, telephone calls, the project in France. The winding road has a sharp bend. Suddenly, there’s a car blocking the road in front of you. You pull on the steering wheel and just manage to avoid an accident …
Many drivers experience these and similar events. Bad light, wet roads or dazzling headlights from oncoming vehicles lead to poor visibility and result in accidents. The German Federal Statistical Office has found that emergency services are called out most frequently in the months of October to December. But it is not only bad weather that makes the situation on our roads and motorways difficult. Bad light can also be a cause of accidents.

Improved safety

In the lighting and visibility sector, intelligent vehicle lighting is therefore an effective means of recognising the risks in road traffic more quickly and driving more safely in the dark. Automatic activation of the vehicle’s lights in poor light conditions or in underpasses has already been implemented as a safety feature. Terms such as „Cornering Light“ and „Dynamic Bend Lighting“ have already become familiar. “Adverse Weather Light“, „High Beam Assistant” or „Highway Light“ on the other hand are new expressions that need to be communicated more intensively.

Modern equipment

In order to enable car buyers to experience the benefits of safety and convenience systems in an illustrative manner, Bertrandt has developed the “b.safe” demonstrator in a modern small car design. In the interior, leather sports seats and a 46-inch monitor provide a comfortable ambience. The screen, which is perceived as the windscreen, takes the driver on a trip through a summer landscape. As the light slowly fades, different lighting systems are illustrated and explained on the route. The tilting of the frame is synchronised with the driving event to allow various manoeuvres to be simulated convincingly. In combination with the film, this produces a realistic driving experience.

Modern design in a small car package.

Sporty ambience in the interior.

Scope of the Demonstrator project in brief

Development of module/derivatives
- *1st phase: development and concept of the demonstrator*
- *2nd phase: development of light systems*

Supporting services
- *Technical support*
- *Logistics*
- *Training*
- *Event planning*

Development and concept

The basis for the demonstrator was a development order from BOSCH, in which Bertrandt Altenburg was asked to develop exhibits to communicate the Electronic Stability Programme ESP. This included technical support, logistics and event planning for European events.
The subsequent project involved developing a new trade fair exhibit for the communication of ABS and ESP vehicle functions in the BRIC countries. Key specifications were determined in the design and concept phase. This was followed by the development of the design details, which, in close consultation with BOSCH, resulted in the demonstrator in its present form. Ideas for improvement potentials in the body and the transport/operating concept of the new demonstrator were included. Large, rubber-rimmed castors, a removable front and a low weight allow the demonstrator to be transported easily and set up quickly. A 230 V power socket is all that is needed to operate the demonstrator.

New feature “Intelligent Light Systems”

In total, four demonstrators were produced for BOSCH and are used worldwide for the presentation of the safety systems ABS and ESP. Delivery to the BOSCH locations in the BRIC countries included intensive training in the use and maintenance of the demonstrators. This successful cooperation led to the idea of also using the demonstrator for the German-speaking region. For this application, Bertrandt extended the demonstrator by adding an additional feature: „Intelligent Light Systems“. In this way, Bertrandt is reacting to a dealers’ survey which found that light systems are among the most frequently ordered optional equipment, but it is not always possible to fully explain and illustrate them to the customer. This is where the extended demonstrator comes in.
This integrated design reduces the need for dealers to have demonstrator vehicles with different levels of optional equipment. The light system can be presented at any time.

Equipped for all purposes

The leasing of the demonstrator by Bertrandt Altenburg includes event planning, transport, assembly/disassembly and on-site support. If the demonstrator is leased for a longer period of time, training is provided to ensure that customers can operate the demonstrator themselves. Individual solutions and brand-specific modifications can be implemented with little effort. The platform can be used to display all types of driving situations, accidents and even presentations.

Conclusion: technology made easy

In the sales showroom or as a centrepiece at fairs, exhibitions and market launches, the demonstrator is an ideal instrument for presenting safety and convenience systems and bringing them closer to the customer. As an innovative marketing product, it will be a particularly valuable asset in the events sector at car dealers and manufacturers ■

Sarah Kohl, Gunnar Paulick, Altenburg

For further information, please visit
www.bertrandt.com/demonstrator

Innovation and Mobility

The new Freecross

A different concept of mobility was the objective for the specialists at Bertrandt Cologne who developed a prototype for a new type of exercise machine on behalf of FreeCross GmbH.

The initial stages

The project involved producing a prototype for a whole body exercise machine which could be used both as a means of transport and as a stationary home trainer. In addition, the prototype had to simulate the effect of Nordic walking by means of pedals with an elliptical movement in order to provide strenuous ergonomic exercise. The high-quality machine is aimed specifically at the European and American fitness markets.
Bertrandt's task was to improve the functions of the model, which was made of components from recumbent bikes and home trainers, in order to create a market-ready product. The project was based on the initial prototypes produced by FreeCross GmbH. Bertrandt focused in particular on improving the frame geometry and its impact on the ride characteristics. Following a kick-off meeting in which the basic conditions were determined, two design proposals were produced that then underwent further CAD development. At the same time, the existing prototype was subjected to intensive testing and the results of the tests were used to refine the designs. An adjustment gauge was produced during the course of the tests which enabled the relative steering angle to be set correctly.

Implementation

As keeping costs low was also an important aspect of the project, a combination of the existing designs was chosen. For example, standard bicycle parts were used in the development process right from the beginning. In order to allow the Freecross to be transported easily, it was important to ensure that it would fit in a medium-sized car, as requested by the client. This challenge was successfully overcome using a folding system which enables the Freecross to be transported easily by car. One benefit is the natural shape of the hand grips and pedals, together with the connection between the handlebars and pedals. This ensures that the training machine is ideally suited to human ergonomics and can easily be adapted to accommodate people of different heights. During testing of the first prototype a significant swinging movement in the front wheels was identified when the Freecross was travelling in a straight line. The solution: the developers incorporated a damping system using elastomer inserts into the front axle. Bertrandt also helped the customer to draw up a patent specification.

Cross trainer on the move

The innovative Freecross, a stable training machine on three wheels with a dynamic design which can be ridden on the road, has brought about a revolution in fitness training. This outdoor trainer, which is ideal for sportspeople of all kinds, is easy to use and can be steered simply by shifting your weight.

For more information, visit: www.freecross.de

Scope of the Freecross project in brief

Design
- *Preliminary design/Renderings*
- *Optimising the shape*

Simulation
- *CAD development*
- *FEM analysis*

Frame
- *Improving frame geometry*
- *Packaging*

Component testing
- *Function and endurance tests*
- *Development of an adjustment gauge for the relative steering angle*

Development and production support services
- *Support in drawing up the patent specification*
- *Optimising production processes*

Fine-tuning

The final precision adjustments were made to the second prototype. These included improvements to the appearance and small changes to the production process, which were presented to the customer and the man behind the idea, Wolfgang Eisenberg, in the form of design proposals. Other activities included ensuring compliance with the standards for road vehicle registration and stationary fitness machines. At the customer's request an FEM analysis of the frame of the Freecross was carried out in order to evaluate the basic static loads. The second prototype was manufactured on the basis of the design data by an external partner selected by Bertrandt in consultation with the customer.

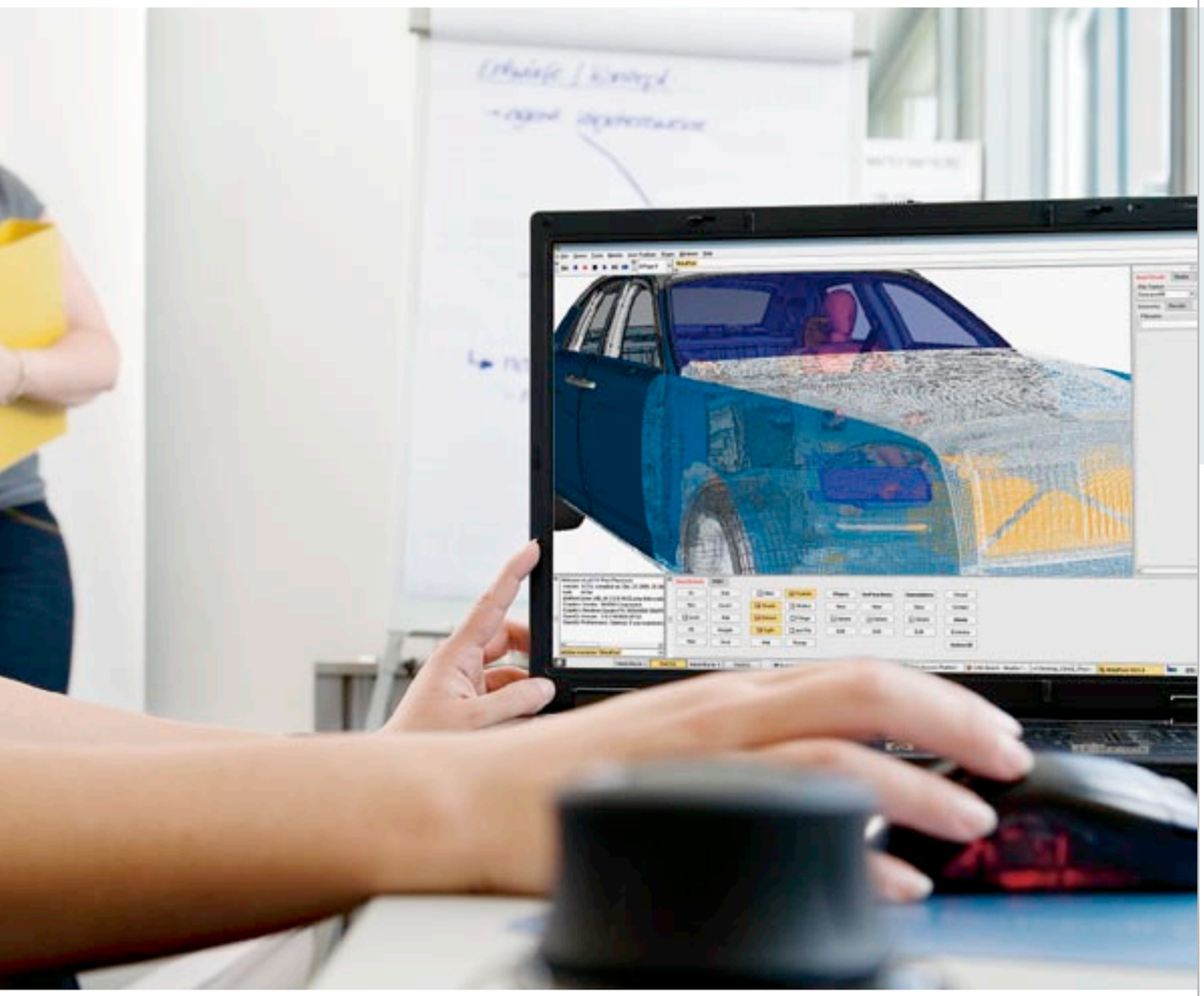
Premiere and market launch

The premiere of the Freecross was held at the leading international trade show for fitness, wellness and health, FIBO 2009, in Essen. The international market launch began in February 2010. The cross-departmental project involved team and project leaders from the design department, engineers from the simulation department, test specialists and technical product designers working closely together. The Bertrandt team would like to thank FreeCross GmbH for its confidence in the team and for the constructive cooperation between the two companies. The team members would also like to wish the Freecross every success on the market. ■

Andrea Novotny, Janine Lipke, Marcel Tschampel, Cologne

Rolls-Royce Ghost

A symbiosis of emotion, legend and perfection



The body of a Rolls-Royce must meet very high standards. The challenges which have to be overcome in order to guarantee the best possible ride comfort include specific requirements for stiffness, strength, acoustics and vibration characteristics. The standard by which everything is measured is the best possible product quality. This enables the company to do justice to the philosophy of the Rolls-Royce brand and to achieve maximum customer satisfaction. As a selected development partner, Bertrandt provided support for the process of developing the new Rolls-Royce Ghost and became deeply immersed in the world of Rolls-Royce Motor Cars.

The editorial team spoke to Axel-Artur Poweleit (left), project leader for bodywork and equipment on the Rolls-Royce Ghost at Rolls-Royce Motor Cars Ltd. and Oliver Frosch, head of project management and project manager for the Rolls-Royce Ghost at Bertrandt AG, on the subject of a very special development project.

Collaborative model

Bm: Axel-Artur Poweleit, the Rolls-Royce brand is a legend and the Ghost is the latest Rolls-Royce model to take to the road. The press referred, among other things, to "concentrated collaboration between engineers and designers". Bertrandt was given the opportunity to provide you with support as a development partner during the creation of this challenging and emotive product. Which criteria did you base your decision on when choosing Bertrandt and what was your experience of the collaboration?

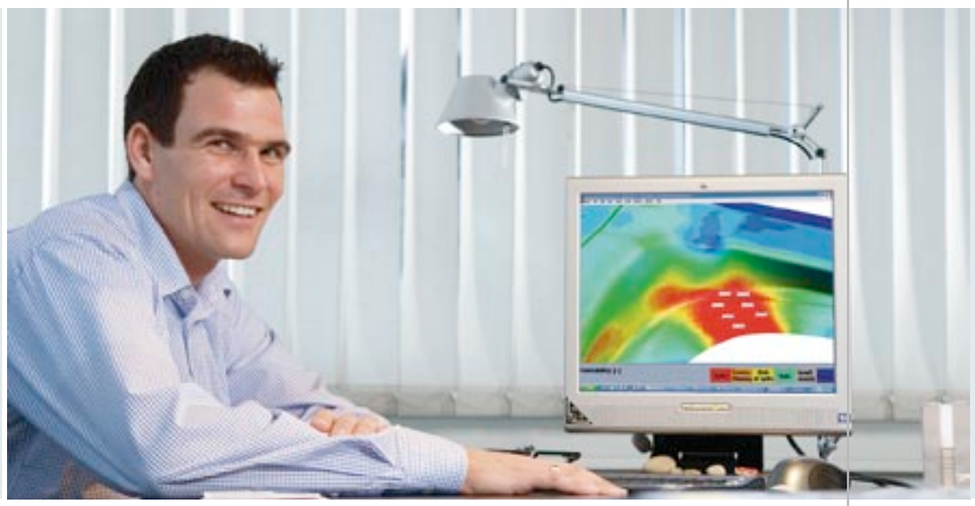
Axel-Artur Poweleit: The special challenge for us is living up to this automotive legend. From the very beginning, Charles Rolls and Henry Royce always wanted to build the very best car in the world and Henry Royce defined this aspiration from his own perspective, from the perspective of an engineer. Today, we remain committed to these original principles. A medium-sized company like Rolls-Royce Motor Cars cannot, of course, undertake large projects solely on the basis of its own resources. Therefore, we look for what we believe are the best partners for each project to provide support for our development teams. We are convinced that Bertrandt was the best partner for this particular project, in line with Henry Royce's philosophy "Take the best that exists and make it better". We ensured that Bertrandt shared our understanding of the process of developing a Rolls-Royce. Of course, only our customers can then decide whether it really is the best car in the world.

Bm: The project activities were based on a mirror image principle. What were the benefits of this approach?

Axel-Artur Poweleit: The development of the Ghost was an international project with core teams at different locations in Great Britain and elsewhere in Europe. One of the focal points for the bodywork was Munich. At the start of the project, the mirror image principle was the ideal approach to our collaboration with Bertrandt, because it ensured that both partners had the same knowledge base. As our development partner became more integrated into the Rolls-Royce processes and understood the responsibility involved, the employees acting as mirror images on the Rolls Royce side increasingly took on the role of consultants and our partner was soon able to carry out some of the tasks which formed part of the processes independently.

Bm: As a result of the process chain responsibility, Bertrandt was also your partner for technical supplier management. Can you give us some examples of this?

Axel-Artur Poweleit: Rolls-Royce Motor Cars has more than 400 suppliers throughout the world for the Phantom family and now for the Ghost. It relieves us of a huge burden to be able to work together with a partner that is also involved in the development of components and that has taken responsibility for technical supplier management in collaboration with us. Particular examples which are typical of the Ghost include the retraction mechanism for the Spirit of Ecstasy, the radiator grille concept and the panorama roof with three-part sun protection system, which is unique in a saloon of this class. These components demonstrate a high level of quality and maturity and provide excellent functionality.



From the original concept via development for volume production to the final cohesive product function

"These components demonstrate a high level of quality and maturity and provide excellent functionality."

Bm: Oliver Frosch, what, in your view, were the challenges involved in technical supplier management in the areas which Axel-Artur Poweleit has referred to? What specific requirements did Bertrandt have to meet with regard to the development of the bonnet mascot, the radiator grille and the panorama roof? These components make a major contribution to the design, but at the same time must also function perfectly.

Oliver Frosch: Bertrandt was given the task of technical supplier management. We were responsible for the process as part of the modular concept. For some system suppliers it was a paradigm shift to receive technical specifications directly from the development service provider.
Our main objective was intensive simultaneous engineering within the process chain, in order to meet the high levels of customer expectation placed on a Rolls-Royce. In the case of the Spirit of Ecstasy, for example, which is a Rolls-Royce trademark, it was essential that the retraction mechanism offered a high level of perceived quality and functioned silently and dynamically when raising and lowering the mascot, as this also contributed to its overall appearance. The result was the need for very close coordination with the process partners.
The imposing radiator grille also had to be designed to interface perfectly with the surrounding components in order to create a harmonious overall image of the front of the car. In order to highlight the depth of the grille, it was manufactured from a range of deep-drawn stainless steels. We were able to work very constructively with the new system supplier and extracted the maximum possible benefit from the physical forming parameters.

"Our main objective was intensive simultaneous engineering within the process chain."

These examples demonstrate how Bertrandt can meet the most demanding technical requirements and, at the same time, take a disciplined approach and show a readiness to integrate as part of the modular structure of the work. We were also able to manage the project throughout the entire process chain by coordinating the level of maturity of the components in an intensive, focused way, while simultaneously meeting challenging deadlines.
The spacious panorama roof and the newly developed, unique, three-part sliding roof panel also presented challenges in terms of function and appearance, in particular with regard to ease of opening and closing, watertightness and look-and-feel. In order to guarantee that the roof could be integrated into the body at the specified milestones, Bertrandt decided to choose an active resident engineering approach to project management on the supplier's site. The resulting short communication channels and the detailed change management process enabled us to meet the high quality standards required.
For the final validation of the retraction mechanism, the radiator grille and the panorama roof in the assembly process, we worked in close cooperation with our process partners at Goodwood.

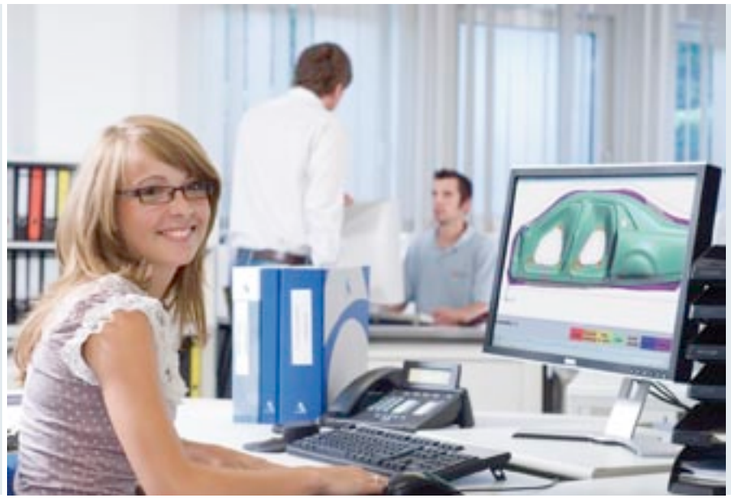
Bm: Axel-Artur Poweleit, your chief designer Ian Cameron summarised the concept of the Rolls-Royce Ghost as "forward-looking, modern, elegant and dynamic, with the unmistakable features of the luxury brand". On the basis of what he has said, it would be interesting if you could describe a specific example of the development process and I have one in mind: the side frame and the coach doors. Were there special development requirements in this area?

Axel-Artur Poweleit: The coach doors have become a defining feature of the current Rolls-Royce portfolio, including the Phantom family and the Ghost, since we reintroduced them for the Phantom saloon. In addition to the impact that they have when they are opened, they also make it much easier to get into and out of the car elegantly. The technical implementation of the doors was a major challenge for our joint team, right from the beginning. The design, the dimensions of the car and the technical constraints placed on the side frame from a steel drawing perspective had to be brought into line in order to allow the side frame to be manufactured in one piece and the coach doors to pivot. The process suitability of the side frame was called into question several times, but the desired result was achieved because of a combination of high levels of expert knowledge, simulation tools and hardware validation.

"The coach doors make it much easier to get into and out of the car elegantly."

Bm: Oliver Frosch, can you describe the internal development and validation of the project at Bertrandt using the example of the side frame and coach doors? It would also be interesting to hear about the specific procedure in terms of process and project management. To what extent did Bertrandt have overall responsibility?

Oliver Frosch: In order to meet the objectives, the mirror image organisation that has already been described involving the Rolls-Royce employees and Bertrandt was set up and the teams worked together using a unique process which was specific to the project.

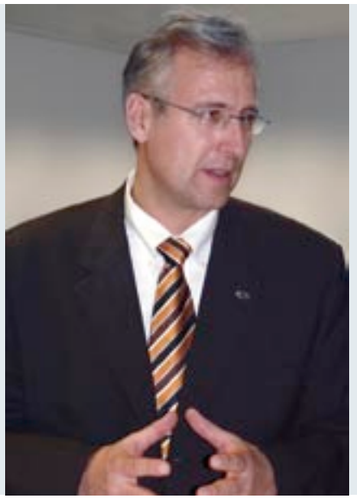


The process management function involved redesigning processes on the basis of the specific conditions at Rolls-Royce and the exclusive manufacturing concept. These processes were then put into practice using the modular approach alongside the design of the components. Subprocesses from the BMW Group were also taken into consideration.

> "The decisive factor in the success of the project was the high level of motivation shown by every individual."

The one-piece side frame and the coach door concept were developed using a newly designed tool process of this kind, which allowed the developers to take full advantage of the benefits of dimensional stability at the joints and to meet the high-precision surface and watertightness requirements. The members of the team worked closely together on the development and validation of the components as part of the bodywork process chain, taking into consideration the criteria specified for the vehicle as a whole.

Alongside the Spirit of Ecstasy and the radiator grille, the coach doors are another iconic Rolls-Royce feature. The challenges faced by the developers included the tolerances for the procedure of closing the front door after the rear door, because of the position of the hinges of the coach doors on the C-pillar, the importance of ease of entry to the rear of the car and a continuous door holder concept, together with the high quality automatic locking process. In addition to the design and close coordination with the suppliers, we took on responsibility for testing, electrical systems integration and preparation for sign-off.
Bertrandt's project management function was responsible for the coordination and operational management of bodywork and equipment within the project. The company's role was evaluated by means of regular acceptance procedures involving the process managers at Rolls-Royce. The mirror image organisation enabled the interaction between the Rolls-Royce procedures and Bertrandt processes to be constantly synchronised and improved. However, the decisive factor in the success of the project was the high level of motivation shown by every individual member of the project team.



Summary

Bm: Axel-Artur Poweleit, the Rolls-Royce Ghost has been in production for nine months at the Goodwood plant. When you look at the Ghost today, it represents perfection. I would like to ask you to focus on the joint work on the project from the same perspective. In your view, is there potential for improvement in this area?

Axel-Artur Poweleit: Perfection is one of our defining corporate values. Henry Royce highlighted this with the call to "Strive for perfection in everything you do". This is the benchmark for our day-to-day work and, of course, for the car itself. Every Rolls-Royce must represent perfection. At the end of the joint project, we carried out an analysis of the collaboration and a process partner survey. Both produced very good results.

Bm: Can I ask you what, in your opinion, makes Bertrandt stand out? Would you recommend Bertrandt to other organisations?

Axel-Artur Poweleit: Our motto of "desire and perfection" was the guiding principle behind the project. It is an accolade in itself to be part of the development team for a Rolls-Royce and to provide the necessary high levels of performance. We have achieved this on the Ghost project with Bertrandt, our internal process partner, and with our suppliers. In my view, this means that Bertrandt is qualified to work on new projects.

Bm: Oliver Frosch, when the project reached its peak, up to 85 Bertrandt employees were involved in the development of this prestigious car. What was your impression and that of your colleagues of working on the project?

Oliver Frosch: For all of us at Bertrandt, being part of the process of designing a car for Rolls-Royce Motor Cars was highly motivating and a clear demonstration of the company's trust in us. Both the internal Bertrandt processes and the new skills we developed because of the large number of employees involved were constantly adapted to the requirements and expectations of our customer using accompanying continuous improvement processes.
The partnership and cooperation along the entire process chain of the Rolls-Royce departmental and project organisation and within the Bertrandt project team has contributed to the creation of an elegant car which meets the highest standards. At Bertrandt, we are pleased to have been able to provide services for Rolls-Royce. On behalf of the Bertrandt management team, I would like to thank Rolls-Royce Motor Cars and Axel-Artur Poweleit for the high level of trust which they placed in us.

Bm: Axel-Artur Poweleit, could you finally tell me about the highlights of the car from your personal perspective?

Axel-Artur Poweleit: For me, the highlight is simply the overall appearance of the Ghost. I love the proportions of the elongated front end of the car, the elegant lines of the sides and the carefully proportioned, narrower rear end. It is a pleasure to travel as a passenger in the back of the car which gives a feeling of security and comfort. At the same time the panorama roof and the view through the windscreen create a sense of openness and light. But the best thing of all is to drive the Ghost yourself.

Bm: Thank you very much for giving us these interesting insights into the project and into the exciting world of Rolls-Royce Motor Cars. ■

Project management as a success factor in complex projects

The car manufacturers' external partners are more and more frequently taking on greater responsibility in complex projects. Projects increasingly comprise several modules from various technical departments, including functional validation. The increasingly complex and multifaceted nature of the projects requires a higher degree of control and organisation in order to guarantee a smoothly run project.
This is where Bertrandt Projektgesellschaft (BPG) comes in: with coordinated project management processes and informed interface competencies, it is an experienced partner in project management.

Jesko Hermann, head of Bertrandt Projekt-gesellschaft GmbH, explains the structure of BPG.

BPG – advisor in all relevant phases

"As I see it, the advantage for our customer is that we are close to them and their processes, both physically and strategically."

B*m*: Jesko Herrmann, Bertrandt Projektgesellschaft (BPG) stands for the professional application of project management tools. What does this statement mean in practice?

Jesko Herrmann: BPG brings together different competencies and functions within large projects. Valuable experience and business practices are made available to every office. BPG oversees every phase of these projects. Competencies are as much a part of the acquisition and quotation phases as they are of the planning, realisation and completion phases.

B*m*: Bertrandt is renowned for its decentralised company structure. Are you represented by a team at every office?

Jesko Herrmann: We operate with a high degree of flexibility from the headquarters in Ehningen, but we also have permanent contacts at every office. This works very well, because the BPG employees are not focused exclusively on particular customers or offices. Instead, they concentrate on advancing the technical knowledge within the management of the project. Our trans-departmental function in the Bertrandt network guarantees the long-term transfer of knowledge and ensures the success of the project, regardless of the location.

"Close cooperation between departments and offices lays the foundation for the successful implementation of projects."

B*m*: What does this kind of project management involve in practice?

Jesko Herrmann: Bertrandt has a very wide range of services, which are reflected not only in the range of technical subjects but also in the type of contracts awarded and the kind of responsibility within the projects. Bertrandt will take on both large and small customer-oriented projects in competence centres such as electrics/electronics, body and powertrain right through to supporting services during development. Particularly in complex projects, our achievements are often interdisciplinary, for example in the way we have combined the development of electronic and powertrain technologies. By doing this, we are already competent in project management in the e-mobility sector.

B*m*: How do you manage to organise these diverse projects in a cross-cutting manner? It must be very demanding…

Jesko Herrmann: Yes, it is, but that is our key competence. Our cross-divisional functions ensure that internal and external demands on the company are fulfilled to the best of our ability. The strong point of our activities is directed at all inter-office and interdisciplinary projects. The networking between departments lays the foundation for the successful implementation of the projects. This means that risks are minimised and even completely eliminated as early as possible.

"Bertrandt is renowned for its high level of customer orientation; this is already shown in our decentralised structure."

B*m*: You must know the market conditions very well for this?

Jesko Herrmann: Yes, we are continually observing the project environment, new methods and the demands of our customers. This means we can recognise changes at an early stage and adapt our project management processes accordingly. I see this support and further development as an important goal of BPG.

"We adapt our standards to the customers' processes."

B*m*: Which part of your organisational structure is most important for the customer?

Jesko Herrmann: Bertrandt is renowned for its high level of customer orientation; our decentralised structure shows that already. As I see it, the advantage for our customer is that we are close to them and their processes, both physically and strategically. Manufacturers and suppliers benefit from a high degree of transparency in the project, the consistent documentation and established, standardised processes. This is also reflected in the quality of our results and a high level of customer satisfaction.

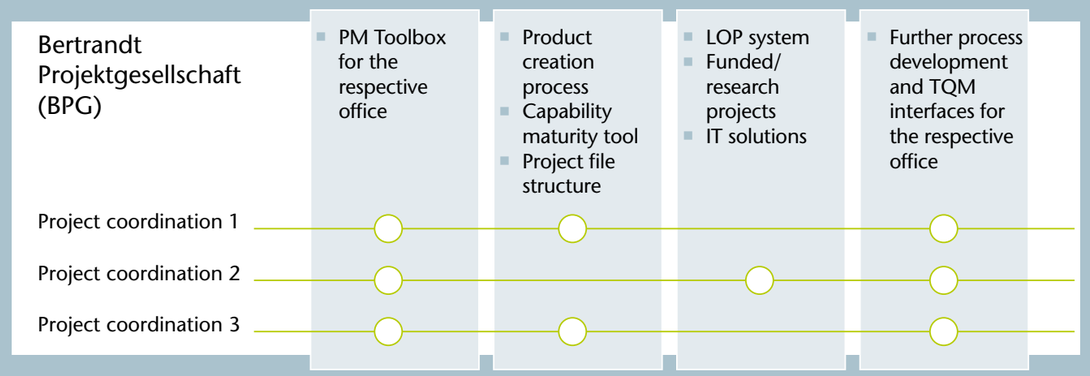
B*m*: How do you reconcile your standards with individual customer demands?

Jesko Herrmann: We adapt our standards to the customer's process. At first glance, that might look like an impossible balancing act, but thanks to our integrated basic structure it works very well. It forms the basis for individual adaptation to the customers' needs in our offices. Being close to the customer ensures a high degree of efficiency in project management while maintaining a high level of customer orientation.

B*m*: Thank you for this interesting description of BPG.

Interdisciplinary Function

Thanks to its special expertise, BPG takes on an interdisciplinary function in the Bertrandt engineering network, while responsibility for each project remains with the individual Bertrandt office. Expertise from other offices supplements the projects if required. BPG coordinates the various project processes.



Localised project management

The client benefits considerably from this organisational structure. All sizes of projects can be carried out locally, close to the customer, while at the same time the Bertrandt Group's entire expertise is integrated into the project. BPG ensures that the projects in the local offices are always customer-oriented and carried out competently and efficiently.

Project management know-how

To ensure efficient project management, the BPG employees do not concentrate on a particular customer or office. In addition to their wide knowledge of project management, they possess extensive technical knowledge in selected specialist fields. This means that all the offices have access to a solid knowledge base that can be used in each phase of the project, from acquisition to project completion.

Communication

BPG employees have fixed contacts in each office, guaranteeing sustainable processes that are optimally adapted to the customer's requirements. This is enabled by regular communication on general and specific project issues as well as cooperation in decisive phases of the projects.

PM Tools from a User's Perspective

"I see BPG's approach as a very helpful addition to customer processes."

Kay Schrader is Programme Manager at Bertrandt in Cologne and coordinates employees and processes in complex projects. In this interview he gives the reader an overview of his job.

B*m*: Kay Schrader, what do you associate with the concept "project management"?

Kay Schrader: Throughout my ten years as a project engineer and later as team leader in the Development Services department, I have always been closely involved with project management. I was able to use this knowledge in the last two years as programme manager for a large project in Cologne, involving, at its height, 70 engineers and technicians in the Interior, Exterior, Electronics, CAE and Design Modelling departments.

B*m*: How does cooperation with BPG in such a project work?

Kay Schrader: BPG's support was already helpful at the tendering stage and was also particularly helpful in terms of the project structure or using the calculation tool. Overall, it was reflected in the adjustments made in the project management forums and steering committees as well as in our regular appointments. To sum it up: the team in Cologne implemented the project. Offers and the development of more concrete methods were taken on by our colleagues at BPG.

B*m*: How do you reconcile Bertrandt's internal standards with the individual demands and process of your customers?

Kay Schrader: The structures themselves are set taking into account the customer processes 100 percent. We adapt them right at the start of the project. Our internal PM Toolbox then serves as a basis to develop the project as a sort of derivation. This also equips us for future process and can provide us with the respective models and standards.

B*m*: Do you use the toolbox regularly?

Kay Schrader: Yes, in the current project for example we have used specific elements like the calculation tool or various templates.

B*m*: Bertrandt is organised locally, but also has central bodies like BPG. What do you see as the advantages of this structure?

Kay Schrader: Localised and centralised bodies profit from each other. I see BPG's approach as a very helpful addition to customer processes. We can use them to proactively introduce suggestions, such as the toolbox for example, as practical additions to the customer process. And of course there is the "lessons learned" factor – on the one hand, from one project to the next at a branch level, but also within the Bertrandt Group. The toolbox can be used as a basis for anything that increases efficiency and guarantees the high quality of our performance.

B*m*: In your opinion, what are Bertrandt's strongest points when it comes to project management?

Kay Schrader: Firstly, we have a detailed understanding of the customer process. Secondly, the high level of flexibility in our project management, which we always adapt to the different conditions of every project, is a big advantage. I would say that our entire range of services is outstanding however. In a nutshell – the challenge is to find the right thing to do at the right time and to implement it as quickly as possible.

B*m*: Thank you for this insight into your working methods!

LOP System

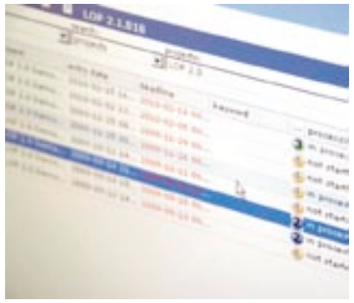
The LOP system is a digital web-based tool that logs a list of open tasks and enables the coordination of project participants across several locations.

Georg Schürle, project coordinator with a particular emphasis on IT solutions and funded projects.

When individual themes and current tasks of a project need to be documented, edited or observed, the LOP system offers a digital tool that can record all open tasks and assignments relevant to the project in a central location. This documentation of the working process is a further development of the Excel-based scheduled maintenance and activity lists. Due to the web-based application in the Bertrandt intranet portal, the LOP system enables the integration of employees, suppliers and customers across multiple locations.

Projects securely and clearly organised

The system records any changes or documents uploaded to the portal and can be viewed on a common user interface by all users with intranet access. A reminder function warns the user of upcoming deadlines. An escalation function is triggered when a deadline is missed, and informs the project leader of the missed appointment by email.
In addition there is a sorting and search function, as well as an automatic data output option in accordance with Bertrandt's protocol.
The "project structure" function enables a purposeful structuring of the project's open tasks and assignments. The secure data-sharing platform "bertrandtInterchange" can also be integrated into the LOP system.
The LOP system can be accessed via the intranet or the Bertrandt Portal www.bertrandt.biz. ■



PEP Modules

PEP (product creation process) modules visualise the entire development process. They provide employees with a general overview of the progression of the project and guarantee a team-oriented, interdisciplinary way of working.

Melanie Weigel, project coordinator for the automotive and aviation departments, with a particular focus on measuring capability maturity and PEP modules.

BPG has derived PEP modules for various departments, including Interior, Electrics/Electronics and Doors & Closures from the Bertrandt creation process (PEP) for a complete vehicle. These PEP modules are available in brochure form from Bertrandt. They contain comprehensive information about all the participating technical departments and external partners and show the interdependence of all the individual departments. A product development timeline is shown using a 48-month-long development process along with Bertrandt's internally defined quality gates and milestones.

Achieving goals systematically

The PEP system, with its defined goals, offers a transparent basis for a structured variance analysis of the project process. The PEP modules identify the project's most important activities, which are sorted chronologically by the quality gates and combined with the other project information. In addition, simulations and tests for each module are represented in a matrix and once again sorted using the quality gates.

The PEP modules also include Bertrandt's internal guidelines, regarding construction phases, quality gates and release guidelines for example, translated into the respective OEM languages. Bertrandt's use of processes and interfaces shows their comprehensive understanding of function development and provides their customers with convincing evidence of their competence. ■

Process Tool Kit

The PM Toolbox provides standardised project management tools and creates the foundations for a successful project.

Gennaro Placentino, sub-project manager, with a focus on project and process management.

In order to continuously enhance existing project management processes, Bertrandt has created a digital tool kit that can be used on all projects as a standardised tool. It provides all the necessary processes and documents for various project scenarios with different levels of development and responsibility and enables projects to be successfully completed. Standardised methodologies serve as a basis for the development of working methods, which are adapted to different manufacturers. Experience gained on national and international projects provides a solid foundation for the development of these methods. It is possible for all Bertrandt engineers to achieve success with these methods.

Quick reactions, standardised tools

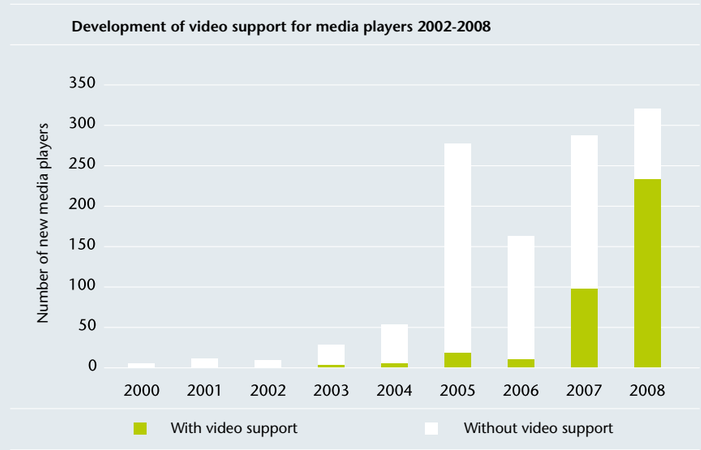
There are many advantages for both Bertrandt employees and customers:

- Consistent documentation of the project enables the customer to closely follow and monitor the progress of the project.
- Internally, standard processes and tools help projects to be strategically carried out, save time and guarantee security.

The specialists can concentrate on the technology and the end product. Customers and project teams benefit from the systematic approach. ■

Multimedia Meets Automobile

Infotainment Test Centre



The Infotainment Test Centre at Bertrandt Ingolstadt brings function development, safety and production support for infotainment devices together under one roof. It combines the complex requirements of infotainment development with experience from multiple projects in order to cope with the increasing demand for vehicles with multimedia functions.

The requirements placed on multimedia functions in vehicles have increased sharply since the introduction of MP3 players, multimedia mobile phones and portable navigation systems. Compared to the automotive engineering sector, the consumer electronics (CE) sector is fast moving and constantly changing. The customer constantly expects devices that have a wide range of functions and are fully compatible with their needs. Bertrandt Infotainment Test Centre provides support to the international automotive, consumer and communication electronics industries to help meet these expectations.

Multimedia vehicle interfaces

From the continuous market analysis of the latest CE devices and mobile phones and support for the connection of these devices to prospective vehicle systems, right through to compatibility testing and the release of mass-produced products – the Infotainment Test Centre covers the complete life cycle of a CE device, from its development to installation in a vehicle.

To this end, Bertrandt has developed a trend scouting database. This monitors all the functions and characteristics of a player and enables new developments such as the integration of video player functions, supported audio and video formats and different communication protocols to be analysed.

When it comes to connectivity, the vehicle-to-phone connection is tested both manually and automatically. The automated tests use a robot that imitates the actions of the customer, guaranteeing completely realistic and accurate customer behaviour. Results are documented using digital image processing and are saved centrally for recording and evaluation purposes.

As well as functional development (conception and specification), engineers and technicians at the Infotainment Test Centre are also involved with manual and automated tests on test structures, driver testing, error documentation and bug fix verification. They also develop and introduce applications such as WLAN/UpNP, address book synchronisation via PBAP or SAP (SIM Access Profile) to the production line.

From functional development to the complete system

The development of the voice dialogue system functions involves, among other things, the specification, validation and evaluation of the voice recognition device itself. When the recognition rate of the commands is optimal, the executable functions are tested. Production-ready models are qualitatively and quantitatively tested for recognition and function in up to 16 foreign languages and then released.

Just like voice recognition, functions such as networking, diagnostics and audio management must also be developed and integrated into the overall system. Test scenarios play an important role for application and protocol tests when integrating these CE devices. Tools such as VAS Tester, CANoe, Optolyzer or ODX Toolchain ensure that each specific function is properly integrated. Automated tests can be used to produce and examine different conditions and variations. Rare events are repeated and processes with so-called “test trees” are used again and again in different combinations (for example for stress and regression tests).

Bertrandt Infotainment Test Centre’s main development focus

- Connectivity/multimedia
- Voice dialogue system
- Complete system development
- Software and tool development
- “Robust Design” testing (Reliability Testing)

Test automation and tool development

Up to now, the use of manual random testing of vehicle infotainment systems and mobile devices has been enhanced by professional test automation, transparent process control and wide test ranges. An automation solution for media players, phones and voice recognition tests, developed at the Infotainment Test Centre, offers the possibility of generating reproducible events without interfering with the infotainment/CE devices. This means that the devices are comprehensively tested. The advantages of automation include its capacity for comparing and understanding the tests, as well as the fact that it can easily be adapted for other systems.

Complete process reliability must be guaranteed for a complete and integrated use of the function and system support. With this in mind, a process tool chain that specifies, controls, documents and interprets ongoing activities was developed.

Infotainment testing with a focus on reliability

The options for the reliability testing of these CE devices range from classic environment simulation tests to complex simulations and monitoring as well as parametric testing. The test lab carries out the release tests required by system suppliers before they can mass produce the relevant components.

The focus of these tests lies in the reliability of the component over its entire lifespan. A test component should experience the most realistic conditions possible i.e. a specified lifespan of 15 years or 300,000 km – in fast motion. Particular attention is paid to the quality of the functions. The greatest challenge lies in the complexity and variety of the components being tested and the sheer number of test components. The aim is to ensure that all the relevant parameters of the test components are consistently and continuously observed, to guarantee a high degree of validity and to meet the customer’s economic requirements.

For its infotainment component tests, Bertrandt Ingolstadt uses conventional tools for current and voltage measurements, MOST bus interfaces, audio and video rails as well as camera systems, to stimulate and observe all the functions. Meanwhile, the development of individual test media for various operating modes as well as software “b.GTS” (integrated audio stream analysis including FFT evaluation and frequency analysis) serve as a reference for the release testing of infotainment components.

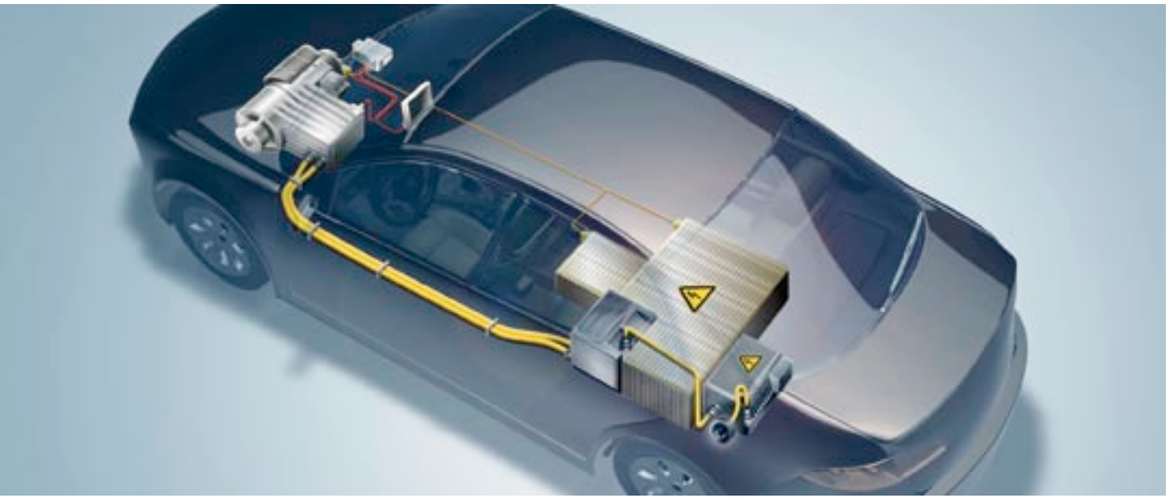
All-in-one solutions

The combined technical competencies of vehicle knowledge, system integration, environmental simulation/test apparatuses and specific infotainment knowledge all under one roof make the Infotainment Test Centre the perfect partner for the automotive and consumer electronics industries. ■

Lutz Kleinschmidt, Ingolstadt

E-Mobility

Modular control unit for electric vehicle concepts from the electronics development department

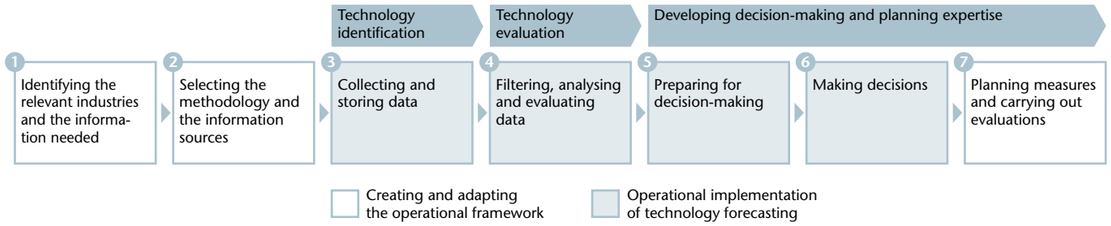


The rapid pace of change in the world of electronics means that technological skills have to be constantly updated. In order to identify the main technology drivers and enablers relating to the electrification of the powertrain from the perspective of electronics development, Bertrandt's electronics department uses the process of technology forecasting. This allows the technological requirements to be determined and these can then be transferred to the Bertrandt portfolio of services via the department's centres of competence.

The technology forecasting process as a methodological backbone

In order to provide its customers with forward-looking services, the electronics department is focusing on new technologies. Its objective is to identify the trend-setting changes in the world of technology at an early stage, to evaluate their importance and benefits and to become well-versed in the relevant technologies by taking a targeted approach to technological skills development.

For this purpose the electronics department has put in place a technology forecasting process. Internal and external networks of experts are used to obtain the necessary information and the methods developed during the course of creating the process are applied in order to verify the data. Technological developments identified as having a specific level of innovation are stored as trend indicator messages in a data management system and evaluated using a standardised catalogue of criteria. Trend indicator messages with a positive status are used to create a report which specifies the key features of the technology, possible application scenarios and recommendations for action. This technology report forms the basis for decisions about moving into new areas of technology and makes these areas transparent and easily understood.



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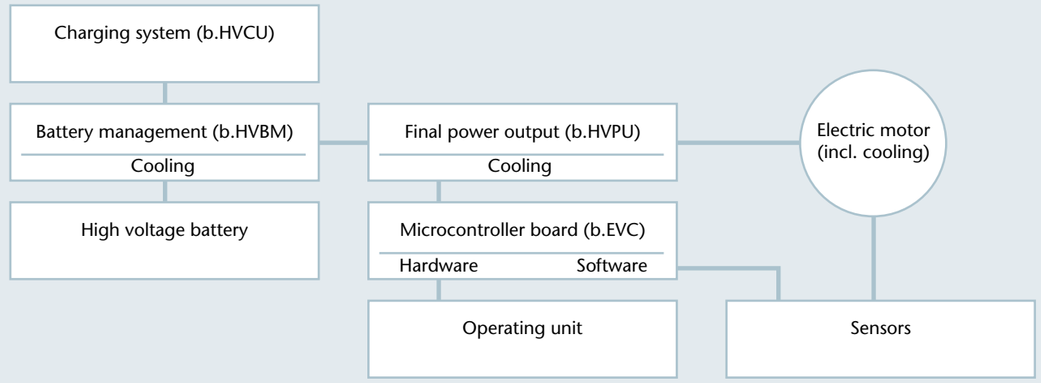


Block diagram of the electrical subsystem.

b.EVC: the microcontroller board as the central component

The electric vehicle controller or b.EVC is a development platform created by Bertrandt which represents a modular embedded control unit and forms the basis for the development of modular power systems. In summary, in future electric vehicle concepts it will perform the same function as the familiar engine control units from internal combustion engines.

The b.EVC is based on the TriCore 1797 microcontroller and has been developed in a modular way to meet vehicle requirements. In the internal b.BEV project (battery-powered electric vehicle), it is used as the control unit for the high voltage charging unit (b.HVCU), the high voltage energy management system (b.HVEM) and the electric motor high voltage power unit (b.HVPU). It was developed by the electronics hardware centre of competence.

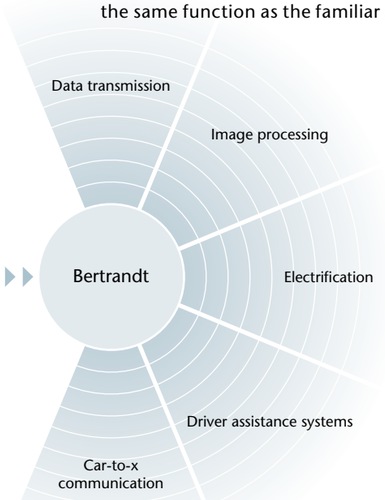
The hardware architecture includes the controller, the sensor inputs, the communication interfaces, the power supply, the activation unit and interfaces to the interchangeable power output units. The power output unit is independent of the electric power supply and is replaceable. This enables different levels of power to be supplied, up to three-phase, with the same control unit. The electronic system which identifies the speed and direction of the electric motor uses digital and analogue sensors, such as encoders, incremental sensors and resolvers.

The basic structure consists of the electric power supply unit and the Hybrid-Kit2 inverter system to activate the 3-phase motors. The base software was developed by the embedded software centre of competence with standard software components, while the application software was created in Matlab/Simulink using a model-based approach. The software/simulation centre of competence established the chain of tools for the implementation and code generation processes.

Future prospects

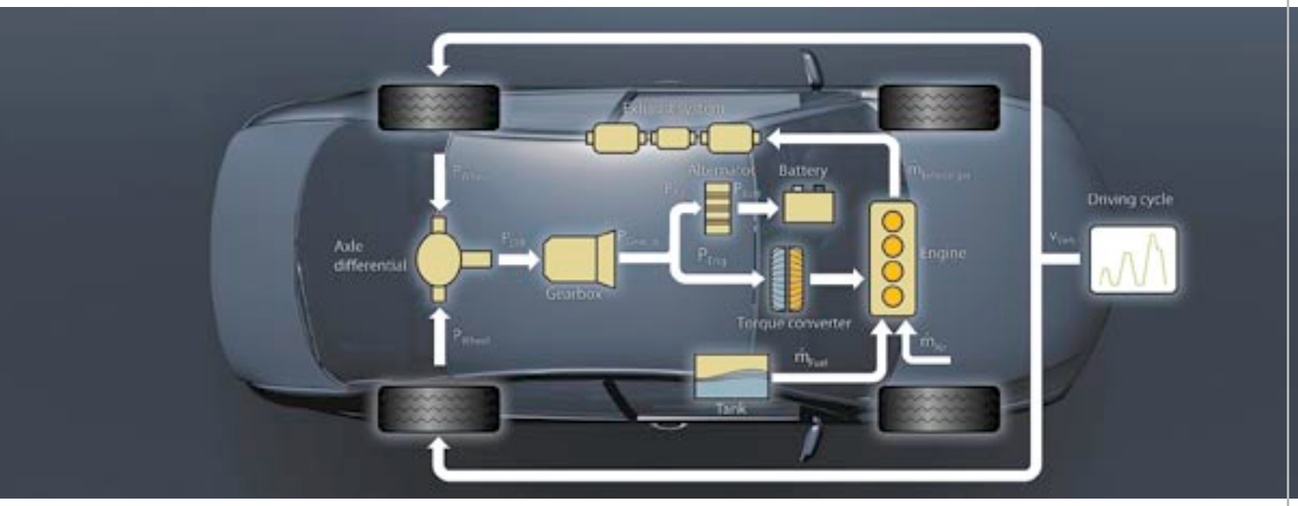
The department's centres of competence are currently working on further components which will extend their range of skills and form a basic framework for synthesising electric drive systems. As a result of overlaps with a simulation-based approach to systems and with other Bertrandt departments, it will be possible to create an extended toolkit for future module and derivative developments in the forward-looking field of e-mobility. ■

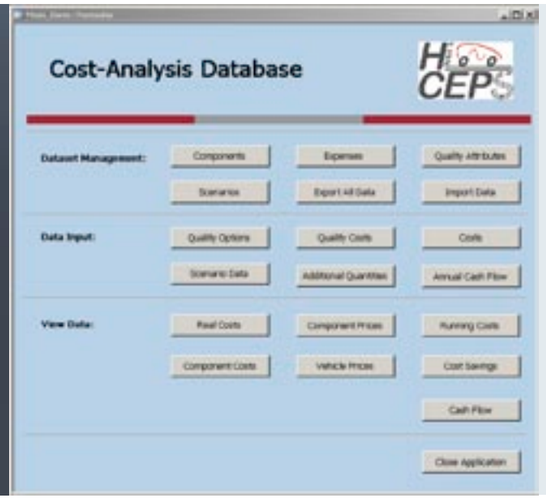
Johannes Köttler, Ralf Schoenen, Ingolstadt;
Christian Ruland, Bertrandt AG



Hi-CEPS: Developing Hybrid Powertrains

Bertrandt plays a cross-disciplinary role in a collaborative EU project





The EU Hi-CEPS project (Highly Integrated Combustion Electric Propulsion Systems) involves the development of innovative, cost-effective and highly integrated hybrid concepts for use in the volume production of cars and light commercial vehicles. In the context of the project, Bertrandt created a cost analysis tool to represent and evaluate the marketability and customer acceptance of a hybrid vehicle.

Objective: producing the best possible hybridisation concepts

Bertrandt became involved in the Hi-CEPS project via the European Automotive Research Partners Association (EARPA) which the company has been a member of since 2005. The overall objectives of the Hi-CEPS project are to reduce pollutant and particle emissions at a regional level and to help in cutting worldwide CO_2 emissions by identifying the ideal hybridisation concepts for different applications. Three complex hybrid variants are being investigated during the course of the project which are based on different combustion engines (petrol, diesel and natural gas) and have appropriate exhaust gas treatment systems. These are:

- a small car with a natural gas combustion engine and an electromagnetic split hybrid architecture (EMCVT transmission)
- a city car with a petrol engine and a power-split hybrid architecture, in which the petrol engine powers the front axle and the electric motor the rear axle
- a light commercial vehicle with a diesel engine and a combined hybrid architecture with dual clutch, in which the diesel engine and the electric motor can be operated independently of one another

These vehicles are being developed on the basis of the Fiat Bravo, Fiat Panda and Ford Transit and are intended for use as demonstrators. The objective is to achieve the best possible fuel consumption, emission levels, purchase and running costs, performance, handling and comfort.

The project covers all the important aspects of developing hybrid vehicles, including analysis, simulation and validation of the hybridisation strategies, design and integration of thermal systems, integration of an energy management system and investigations into the impact on vehicle safety.

Bertrandt cost analysis tool

As part of Hi-CEPS, the powertrain department is performing an important cross-disciplinary function which consists of recording and evaluating the costs of hybridisation using the basic vehicles. This role is important because all the subprojects have to take costs into consideration to a varying degree.

Bertrandt has developed a tool for this purpose which allows all the costs arising from the integration of hybrid powertrains to be managed. The tool is based on a Microsoft Access database. It was created following a detailed analysis of the necessary powertrain components and is designed to meet the needs of the partners involved in the project. The costs of the various components and assemblies that make up the hybrid system can be entered flexibly and easily. It is possible to evaluate ongoing development phases and the manufacture of prototype and production components, together with the costs of the entire vehicle, logistics and tools, or the influence of the number of units produced.

Hi-CEPS is funded by the EU's Framework Programme 6 for sustainable surface transport. The collaborative project involves 22 well-known companies and institutions from 10 European countries which have come together to advance hybrid technology. They include car manufacturers, suppliers, research institutes, development service providers and universities. The project activities are coordinated by the Centro Ricerche Fiat. The project duration is 4 years and it will come to an end in 2010. The funding for the Hi-CEPS project amounts to 19.3 million euros, of which 9.9 million has been provided by the EU. This large-scale project aims to highlight the importance of hybrid technologies for the European automotive industry.

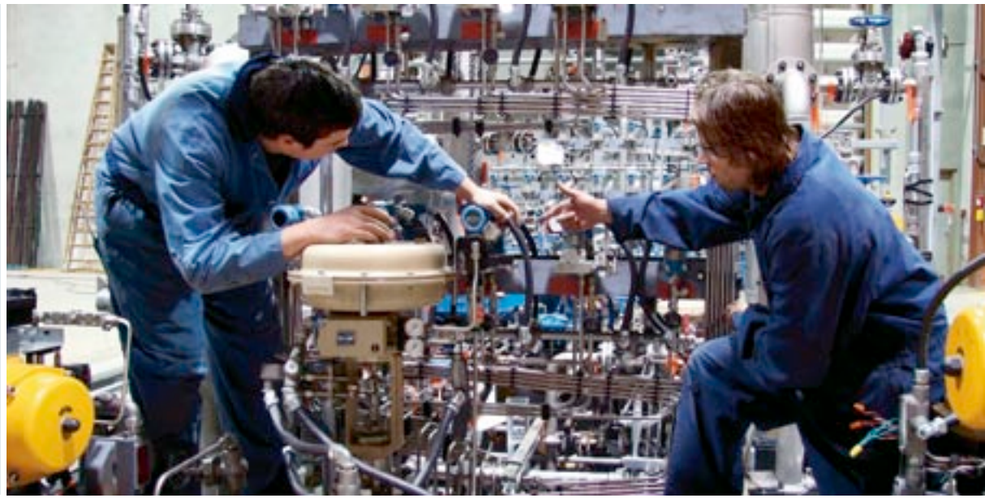
The software tool allows a variety of calculations to be made. In the simplest case, for example, the entire development costs could be allocated to one unit. Additional influences can also be taken into account, such as the impact of changes in quality standards on the costs. The tool works with specific data, such as fuel, tax or insurance costs, in order to calculate the period over which the additional costs for the hybrid version of a vehicle will pay for themselves. This period can then be compared across different scenarios, such as customer-related costs, specifications for different cities and countries, tax models, energy costs and the underlying production volumes.

By developing the cost analysis tool, Bertrandt is providing support for the important cost/benefit analyses which are a decisive criterion in evaluating the marketability and customer acceptance of a hybrid vehicle. After undergoing various tests, the tool has achieved high levels of acceptance within the project. Because of its flexible design, it is possible to integrate more advanced data processing or graphical presentation functions. An increase in the funding has already been authorised for this purpose. Hi-CEPS demonstrates that Bertrandt can play a successful role within an international research project. The company has a strong presence in the field of research and a comprehensive network of partners. ■

Bernd Deibler, Walter Finkenzeller, Ingolstadt

A Breath of Fresh Air for the Energy Sector

Bertrandt Services: development partner in the power network



Energy means economic growth and prosperity. The increasing demand for energy worldwide, dwindling fossil fuel reserves and progressive climate change means that a new approach to energy is needed. As a development service provider, Bertrandt Services offers tailor-made, flexible modular solutions for conventional and sustainable methods of energy production such as wind and solar power, from conception to operation.

An integrated approach to building power plants

A viable world for future generations and a cost-efficient and effective world energy market can only be achieved through responsible business practices and the continuous further development of power plants and technologies. Power plant construction in particular, with its particular features, takes on an important role in energy generation. Planning a production site demands knowledge of basic engineering such as plant planning, as well as detailed engineering such as equipment, machine and pipeline planning. In addition, knowledge of primary and secondary steel structures, system networking and a deep understanding of interdisciplinary tasks such as interface management, coordination of different technical disciplines, logistics and environmental management are an essential foundation for all-embracing achievements and a reliable end product.
These influential factors show how important an integrated approach to the project is, in order to achieve the end goal, i.e. to combine construction engineering elements such as design planning, detailed planning and approval planning with classic plant and machine construction aspects such as the actual positioning of a component, turbine or plant in a building or in a virtual plant.

Optimising the potential of wind farms

The demands as well as the potential for development and optimisation can be seen just as easily in sustainable energy plants such as wind farms and in power plants which generate energy conventionally.
In the renewable energy sector, specialised construction engineering is also combined with machine construction. Structural analysis, noise vibration harshness, structural integrity and earthquake proofing, interface management, logistics, process, quality and environment management, as well as costs and cost-effectiveness must all be reduced to a common denominator. In addition, an increasing demand for wind farms has emerged. In order to cope with this demand, further potential for development and cost savings in process planning are necessary, for example in the automation of components and component manufacture or in the planning of a plant.

Solid knowledge of development as a factor for success

The growing demand for wind farms and their increasingly shorter construction times makes cooperation with businesses like Bertrandt Services, based on their high process and interface competencies, particularly attractive. Bertrandt is also familiar with materials like CFRP and GRP from their work in the aviation and aerospace industries and can bring this knowledge to a project.
Bertrandt's long-standing knowledge, gained from complex tasks and development projects, also in research and electronics development, makes them a competent and reliable partner with fresh ideas who can develop ambitious solutions and achieve lasting value for the energy customer. ■

Jörn Beier, Ehningen,
Giuseppe Manolio, Düsseldorf

The integrated approach to complex development projects offers potential for the improvement of quality, environment and cost-effectiveness.

bertrandt services

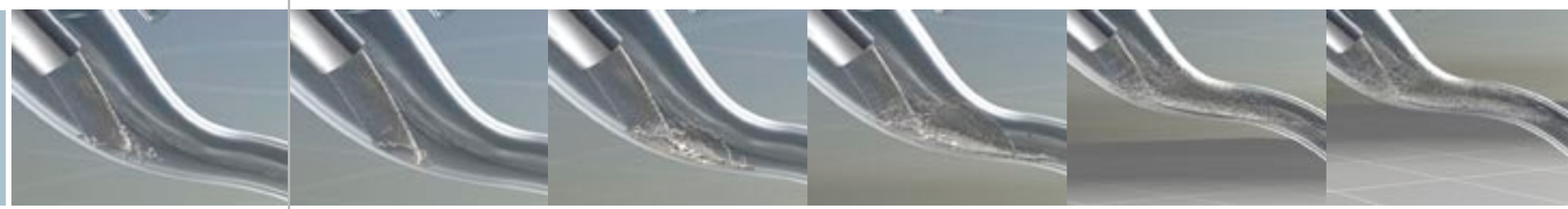
Project preparation	Design planning	Project planning	Execution	Project Management
■ Feasibility and profitability studies ■ Basic assessments and evaluations ■ Budget calculations and subsidies ■ Building regulations ■ Standards ■ …	■ Benchmark ■ Preplanning ■ Design/draft planning ▪ Design2Function ▪ Design2Performance ▪ Design2Cost ▪ Design2Environment ■ Architectural models ■ Cost calculation/quotes ■ …	■ Planning permission ■ Design ■ Technical documentation ■ Coordinating the technical disciplines ▪ Physical/acoustic construction ▪ Planning construction of supporting structures ▪ Environmental technology ■ Invitation to tender ■ Allocation and awarding of contracts ■ …	■ Implementation planning ■ Site management ■ Overall site management ■ Logistics ■ Organisation ■ Interface management ■ Handover of the plant and the necessary documents ■ …	■ Project management ■ Invoicing ■ Contracts ■ Controlling ■ Official approval and planning ■ Cost and capacity planning ■ …

In a State of Flux

Virtual fluids in motion

Preliminary work: coordinating the details on the storyboard.

Pouring mineral water into a glass is something that many of us do every day. But it is almost impossible to describe the process in words to someone who has never seen it. Even a photo cannot give an adequate impression. Moving liquids need moving pictures. In the world of engineering there are numerous processes involving fluids which are difficult to understand and cannot easily be observed. In these cases, animated simulations can help. They provide high quality images of effects which cannot be represented in any other way.



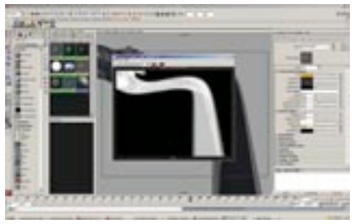
The task

The visualisation specialists at Bertrandt have used virtual means to make the processes that take place in a fuel tank visible. A more detailed look at the components of a fuel supply system shows that they perform a variety of functions, including filling the system with fuel, pumping the fuel, ventilation, cleaning the vapours and preventing fuel leaks. In addition, all of this occurs in differing operational situations. The challenge was to make all of these processes visible in a compressed form lasting only a few minutes.

The implementation

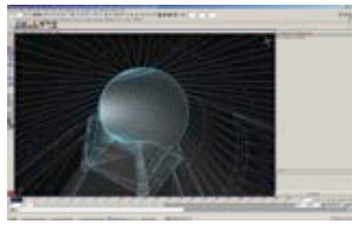
The first step in creating an easily understood visualisation is to identify the essential processes and produce a storyboard. After this the CAD data for the relevant components is imported into RTT DeltaGen, a real-time visualisation software package, sorted by component, cleaned up, tessellated (the geometry data is broken down into polygons) and then combined. A wide variety of software tools is used to create the individual scenes. RealFlow flow simulation software from Next Limit simulates the surfaces and movements of the fluids. AutoDesk Maya produces animations and renders the scenes (simulating an image from a 3D scene) and a compositing program coordinates the results. An individual mix of fluid simulation, special effects and 3D animation, overlaid with text and sound, is used to ensure that the processes can be easily understood in each scene.

Fluid simulation



The clean geometry data relating to the tank and the fuel lines is imported into RealFlow via Maya. The data is used as the template and the basic structure for creating fluids in RealFlow. A combination of all the individual settings, such as the particle volume, the behaviour in controlled collisions, the speed and the surface tension, is used to simulate a jet of particles which behaves like a fluid in accordance with the laws of physics. The basic conditions also involve simulating the earth's gravitational pull. The viscosity setting and, finally, the generation of a polygon net for each individual frame in a film sequence determine the form of the jet of particles. Each sequence is simulated several times to produce more accurate results.

Animation and rendering



The individual polygon nets are now imported into Maya via an interface, positioned and included in the time flow. A Maya shader, which defines the surface properties of geometries, gives the simulated fluid geometries the appearance of water or, in this case, fuel. The material properties of the other components, such as metal, glass or plastic, are also defined using the shader. The decisive factor in determining the quality of the visualisation is the lighting of the scene and several different virtual light sources are used. The next step is to animate the parts and components in order to represent their functions. In addition, the camera position and movements are determined. After this Maya renders (simulates) the individual film sequences.

Compositing

The compositing package Autodesk Combustion is used to combine the film sequences created in Maya and to add graphical elements. The addition of effects and colour changes rounds off the work on the scenes. Subsequently, the individual elements of the film can be re-simulated and the final version of the film created.

Future prospects

People's viewing habits are changing and visual communication technology is developing at an incredibly fast pace. The visualisation specialists at Bertrandt are using this technology to demonstrate processes that it was previously impossible to represent. They have already given some thought to their next step. In the long term, the specialists are looking at the concept of real-time fluid simulation. ■

Ertan Kilinc, Hartmut Mezger, Klaus Riehs, Christian Scharf, Ehningen

Production Planning

Bertrandt Wolfsburg adds to its range of services

With the aim of offering customers high-quality, specialist production planning services, in May 2007 Bertrandt Wolfsburg began adding to its portfolio in the field of bodywork planning, assembly planning and the digital factory. Now a total of 45 experts can offer individual bodywork planning, assembly, digital factory, production equipment design and quality planning services.

A new core competence: quality planning

Following close collaboration with customers, a targeted approach has been taken to developing areas such as planning for add-on parts or material flow simulations. There is also a focus on extending the use of new methods and technologies (for example vPPG) in the planning process. In October 2009, another core competence was added to the portfolio: quality planning. The main emphasis for the engineers and specialists in this area is on reference point systems, functional dimension concepts, test feature plans and tolerance analyses.

Networking services and developing new technologies

In order to add the finishing touches to its range of production planning services, Bertrandt Wolfsburg is currently introducing areas such as plastics planning and materials handling/logistics planning. Within the field of production planning, the focus is on more intensive networking in order to offer customers further added value. Some examples of initial successes include bodywork planning and simulating production plants. ■

Martin Tentlewitz, Wolfsburg

Reference point systems (RPS)

An end-to-end system for lifting and moving parts is essential in order to guarantee that all the components of a vehicle are assembled efficiently. Reference point systems ensure that changes in lifting points and increased tolerances on the end product are kept to a minimum or avoided altogether, with the aim of significantly reducing reworking costs.

Functional dimension catalogue

Functional dimension catalogues are used to measure assemblies and individual parts, in order to safeguard quality features and preserve functions which are specific to the vehicle and relevant for production purposes and which have been defined together with the customer. Tolerance analysis, which includes the identification of reference points and their influence on functional dimensions, is used to monitor and confirm the functional dimensions. Finally the results are documented in a functional dimension catalogue.

Test feature plans

Reliable test feature plans are needed to create functional dimension catalogues, so that the quality features and functions they contain can be tested. Firstly the relevant test concepts are created in close collaboration with the customer's development, planning and quality assurance departments. Then the test feature plan is drawn up on this basis using CATIA and additional tools.

Tolerance analyses

Tolerance analyses can be used to predict the attainable production quality on the basis of the tolerances of individual components and assemblies. Bertrandt provides overviews of the analysis results and indicates potential for improvement in parts, assemblies and production processes. Complete documentation of the tolerance analysis is the final service in the portfolio.

Designing Visions

Aviation and aerospace forum at Bertrandt Technikum

Dr. Rolf-Jürgen Ahlers, LR BW's Chairman at the opening of the forum.

Bertrandt is usually seen as a specialist in the automotive industry, but there is more to the company than that: on 4th March 2010 the Aviation and Aerospace Forum Baden Württemberg (LR BW: Forum für Luft- und Raumfahrt Baden-Württemberg) met at Bertrandt, Ehningen, for their sixth members meeting. Bertrandt Technikum has been a member of the LR BW for four years and takes part in the forum's working groups as well as in the Future Aerospace Network (FAN) cluster initiative.

Exchanging industry information

Many interesting and important themes on the subject of aviation were discussed at the LR BW forum. After it was opened by Neil L. Walker, Manager of Bertrandt Technikum GmbH, and Dr. Rolf-Jürgen Ahlers, Chairperson of the LR BW, the regional FAN network, created as a cluster initiative of the LR BW, was presented in detail. Among other things, FAN and its activities enable participants to network.

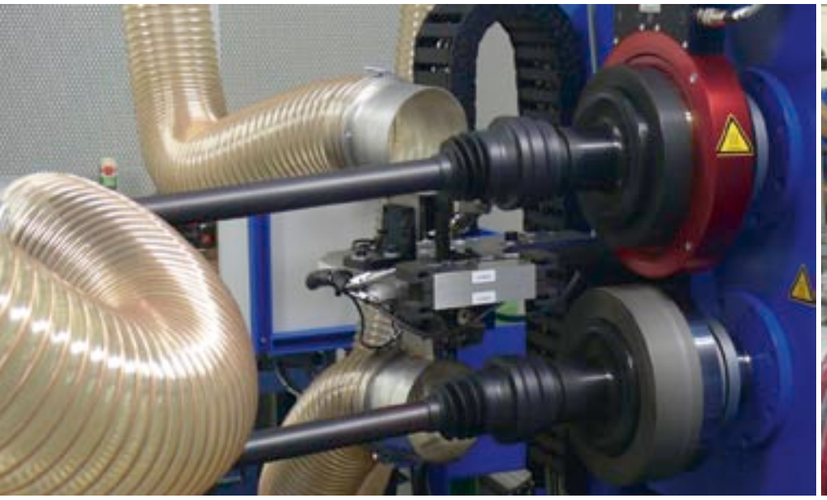
CEO Dietmar Bichler welcomed the guests to the meeting and gave some background on Bertrandt's aviation activities: "About ten years ago now we became involved in aviation development because, despite the many differences of the individual industries, there were also interesting similarities. Both are highly developed industries, characterised by a strong dynamic and concerned with similar themes for the future." Franz Jerg, Division Manager for Design, Model Building and Rapid Prototyping, and team leader Matthias Sturm then introduced Bertrandt's specific aviation production methods. The complete development process chain can be carried out on site in cooperation with Bertrandt Aeroconseil. The process involves aircraft architecture and specifications, calculation, structure design, cabin development, system integration, manufacturing/construction and support, prototype building/testing and modification. Bertrandt was already able to develop complete small aircrafts for series production, and they can manufacture the necessary tools for producing larger aircrafts.

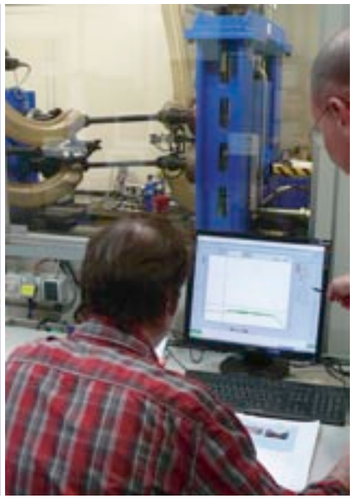
After a look into the future of astronautics with technical project manager Dr. Michael Gräßlin, the meeting ended with a chance to discuss the themes covered at Böblingen airfield. ■

Jochen Faller, Ivana Jarnjak, Ehningen

First Sideshaft Test Bench at Bertrandt

Drive shaft testing at Bertrandt supports Daimler AG





The sideshaft provides the connection between the transmission and the drive wheels. It transmits power and allows the steering mechanism and the suspension to move. In a bid to increase performance, Daimler contracted Bertrandt to build a new sideshaft test bench. Among other things, the test bench enables shorter lifetime tests under simulated steering and suspension conditions for the drive shafts of a range of vehicles from Smart to Maybach.

Sideshaft test bench project

Daimler AG contracted Bertrandt Technikum's engineers to develop a drive shaft test bench. The test bench project was executed at Bertrandt Technikum's plant in Ehningen. Both the accessibility (assembly and dismantling of the test items, and maintenance) and safety-related standards (noise control and protection against flying debris) of the test bench needed to be guaranteed. All this was successfully achieved by the Bertrandt engineers from the EE/testing department in cooperation with the TQM (total quality management) department.
The drive shafts are tested in pairs. Torque, spring motion and link angles are applied using servohydraulic rotation cylinders and long cylinders. The most important benefit for the customer is the test bench's ability to reproduce in-house test conditions. Existing test programmes can be carried out on a one-to-one basis at Bertrandt's test bench.

Accurate testing for the best results

The drive shaft has an essential effect on the drive of a vehicle, on the comfort, noise and vibration levels, the efficiency and weight optimisation. The drive shaft must be tested accurately, in particular when there are technical changes such as new surface finishes and geometries or when new lubricants are used, for example. Bertrandt's test bench allows accurate testing under realistic conditions.

Test bench offers potential for further research

With the drive shaft test bench, which is a further development from an existing model, Bertrandt is laying the foundation for further research into the different add-on parts for drive shafts. The test bench is a unique selling point for Bertrandt and further develops its core competencies in this sector. ■

Ivana Jarnjak, Ehningen

IT and Development Support

Diagnostic User Help Desk for Daimler AG

Bertrandt Technikum GmbH's Diagnostic User Help Desk (DHD) provides standardised user support for Daimler AG. The DHD, developed by Bertrandt, comprises a full range of support and user models for all the diagnostic tools and systems in the Electrics/Electronics sector. This means a significantly reduced need for customer support, because one contact person provides support for all the diagnostic tools.

Fast responses to all questions

In order to be able to react quickly to the user's questions, the DHD is represented on site, and has a central phone number and its own page on the intranet.
At the first level of support, i.e. user support, the DHD employees deal with receiving enquiries, acquiring hardware and software, licence management and installation. Bertrandt has developed a set of the "top ten questions and solutions" for users, because, based on experience, about 80 percent of enquiries are concerned with similar topics.
At the second level of support, Bertrandt has developed and carried out training courses to explain to users how the diagnostic tools function. Individual workshops for teams can also be held at different locations on request.
The third level of support, i.e. expert support and requirements management, provides answers for the questions that were not resolved at either of the first two support levels. The third level of support therefore functions as a central interface between technical departments and software providers.
Here, the most important area of responsibility is to accommodate, coordinate and define new customer demands when using the tools and to refer them to the relevant software provider.

Working together to achieve our goals

In order to offer approximately 4,500 active users in the development department the best possible quality of support, good cooperation with Daimler AG and with software and system providers was, and is, an important basis for high user satisfaction. All enquiries are entered and logged in Daimler's own ticket system, and are consulted as part of the process of improving the system. The tickets create transparency and are also an important element of the monthly reports. ■

Ivana Jarnjak, Ehningen

b.LIN

Mobile testing device and data logger for the LIN bus

As part of the work on a dissertation project, Bertrandt Wolfsburg has developed a new mobile testing device for LIN components. The result is a tool which is ideal for use in testing and functional evaluations of LIN components in vehicles and on HiL test benches. The integral USB port enables the device to store the data traffic from the LIN bus on a variety of removable media and therefore allows it to be used as a data logger.

The challenge

LIN components are increasingly widely used in modern vehicles, for example in climate control applications. During the process of testing these systems, engineers are faced with the challenge of checking the LIN bus and identifying faults quickly and efficiently. The current test equipment consists of PC-based software tools, which require detailed technical knowledge of the LIN bus and are very expensive. As a result, there is a need for a cost-effective, flexible tool which is easy to operate and is designed for use as a test support device.

b.LIN development project

In master mode, the b.LIN is used to control individual LIN nodes. Depending on the type of node, all its signals appear in text form or as a physical value with a unit on the display. In addition, standard values can be entered using the keypad and sent to LIN components (actuators). In slave mode, the b.LIN emulates a node in the LIN network, for example a pressure sensor. The node's signals can be altered using the keypad and sent on the LIN bus if a query is received from the master node.

LIN bus data logger

The subsequent development phase involved implementing data logger functionality for the LIN bus. Data can now be stored on removable media, such as USB memory sticks or USB hard disks, via the integral USB port. This provides enough memory storage for longer test series and enables the data to be transferred to a PC for evaluation purposes.

Demo case

A demo case has been created using LIN climate components for use in demonstrations and training courses.

Looking ahead

The b.LIN is planned to go into small-scale production in the near future. ■

Dr. Dieter Döring, Matthias Drewitz, Carsten Fischer, Carsten Stand, Wolfsburg

Product description	
Power supply:	battery and external power supply (12 V)
Operation:	integral keypad, 4 x 4
Display unit:	128 x 64 graphic LCD display, illuminated
LIN connection:	SubD9-m, standard configuration
Port:	USB
Enclosure rating:	IP40
Dimensions:	185 x 120 x 35 mm (hight x width x depth)
Operating temperature:	-20 to +70 °C (no icing)
Weight:	approx. 700 g

Applications

- Vehicle testing
- HiL test benches
- Laboratories
- Research and development

Electrics/Electronics

Competence Days – Hands-on electromobility

In February and March 2010, Bertrandt Ingolstadt arranged two competence days on the theme of electrics/electronics. Bertrandt was represented alongside specialist presentations by partners and customers.

Electronic know-how in a network

The motto of the first Ingolstadt competence day was "Driver assistance systems and integral vehicle safety", while the second was devoted to the theme of "Energy and environment". The presentations were concerned with technical operative issues such as "Requirements and challenges in the development of electrical energy management" on the one hand and on the other hand with general issues which looked to the future, such as "Electromobility from the viewpoint of the German electrical industry".

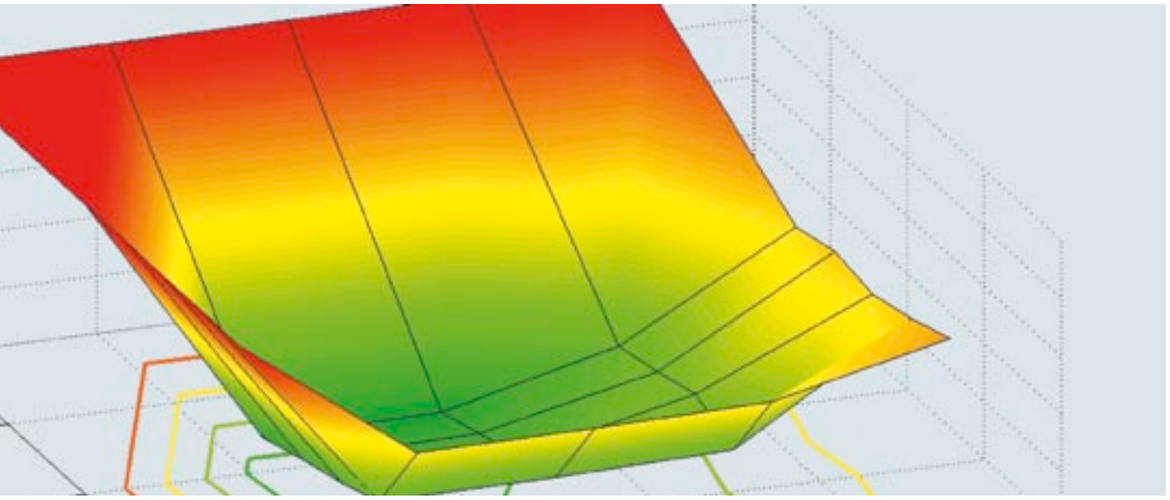
Among others, highlights were the test system b.measure developed by Bertrandt, which is used for fault detection during development as well as the validation of navigation, driver assistance and vehicle safety systems, and the electric vehicle from KACO new energy GmbH.

The feedback from the participants was consistently positive. The third competence day, with a theme of "Integration of external components and media" is planned for the autumn. ■

Ivana Jarnjak, Ehningen

Powertrain

Developing a simulation environment

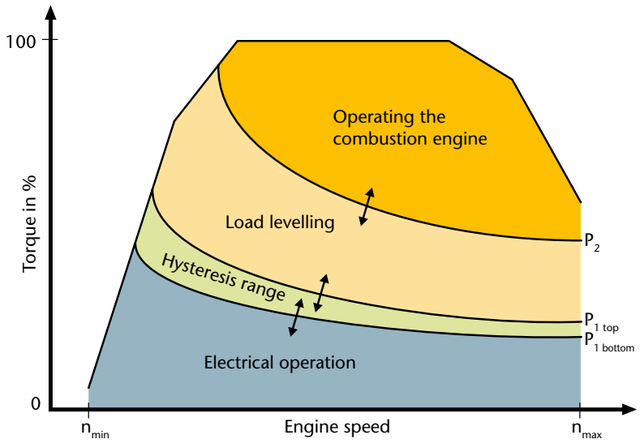


Determining the best combination of electric motor, battery and combustion engine in an electrification solution to produce the optimum fuel consumption.

The powertrain department has developed a simulation environment which enables the potential fuel consumption of different powertrain configurations to be analysed at an early stage of the development process.

The objective is to carry out quantitative and qualitative assessments of different measures, in order to provide support for the concept and volume production development processes, using a high level of analysis functionality for the different powertrain configurations, based on fuel consumption, CO_2 and pollutant emissions. Given sufficient computing power, validations with real vehicle comparison data can be used to confirm the reliability of the qualitative and quantitative data. The detailed white paper is available from powertrain@bertrandt.com. ■

Dr. Oliver Maiwald, Michael Kramer, Pamphile Poumbga, Neckarsulm; Matthias Rühl, Bertrandt AG



Sample operating strategy for a hybrid vehicle application

AUTOSAR Driver Development

Bertrandt develops a generator tool

Application Layer					
AUTOSAR Runtime Environment (RTE)					
System Services		Memory Services	Communication Services	I/O Hardware Abstraction	Complex Drivers
	Onboard Device Abstraction	Memory Hardware Abstraction	Communication Hardware Abstraction		
	Microcontroller Drivers	Memory Drivers	Communication Drivers	I/O Drivers	
Microcontroller					

AUTOSAR architecture

The electronics department at Bertrandt's Cologne site has developed a generator tool to create a FlexRay driver based on the specifications of AUTOSAR, the international consortium of OEMs, suppliers and software developers. A universally applicable and reliable solution has been developed in collaboration with the AUTOSAR initiative.

Features of BERTy

- Reading in a FIBEX version 2.0.1 database
- Hardware supported: FlexRay communication controller MFR4310 and E-Ray
- AUTOSAR support for E-Ray
- A variety of configuration options for the MFR4310

Starting point: networking functionality

Modern vehicles incorporate a large number of control units to perform a variety of tasks, including engine management, electronics for comfort and safety functions and driver assistance systems. These systems are distributed throughout the vehicle and exchange information with one another. Instead of connecting the different control units with cables, bus systems were developed to save space, reduce weight and cut costs. In order to ensure that there are no access conflicts, each participant must follow rules that differ from one bus system to another.

New FlexRay bus system

The CAN bus widely used in the automotive industry can no longer offer a sufficiently high transmission rate. In addition, priority-based architectures may result in information arriving at its destination late or not at all. These areas for improvement were taken into consideration in the development of a new bus system. The result was FlexRay, which was defined jointly by manufacturers and suppliers in the FlexRay consortium. FlexRay offers high transmission rates (2 x 10MBit/s), high levels of fail-safety, because of its two-channel structure, and guaranteed message transmission, as a result of its time-based architecture (TDMA).

AUTOSAR architecture: modular software

Because of the growing variety of models and the differing levels of equipment available, it makes sense to reuse as many as possible of the programs that run on control units. However, as these have generally been coded specifically for certain microcontrollers, porting them to other hardware is time-consuming and costly. This is where the AUTOSAR initiative comes in. It is a consortium of various OEMs, suppliers and software houses, which aimed to create a software architecture with defined interfaces in order to decouple the applications from the hardware.
The AUTOSAR infrastructure consists of software modules specified by AUTOSAR. The infrastructure can differ for each control unit and is generated specially in each case using the relevant tools. This makes it easy to exchange applications between differing control units. The AUTOSAR software modules simply have to be regenerated with a generator tool.

BERTy: the generator tool

The objective was to make it possible to create the FlexRay driver and FlexRay interface software modules for a FlexRay communication controller (E-Ray) automatically, depending on the network configuration. The component needed to achieve this is a standard file (XML), the so-called FIBEX database, which stores all the information about the network. The newly developed BERTy generator tool reads the file and displays parts of the information. This enables the user to select the relevant control unit and to change other settings. With the support of AUTOSAR, Bertrandt has developed a universally applicable, resilient solution. The next plan is to upgrade the tool to comply with the new FIBEX version 3.0 format. ■

Holger Kraft, Philipp Krumme, Cologne

Bertrandt Knowledge Portal

Increasing competencies systematically

The new Bertrandt Knowledge Portal opens the door to transparent and systematic competency building in the Bertrandt Group, offering almost 300 internal training seminars. After consulting with their managers, employees can plan an individual training programme, thereby gaining further skills which correspond to their particular role and to the demands of their customers.

"Our aim is to strengthen our employees' competencies on a long term basis," explains Anatol Siegel, head of the HR Department, when asked about the most important aims of human resources development. "It is important for us to supply the customers with highly qualified employees, which is why we put a lot of effort into developing good seminars internally. Obviously, these need to be made as accessible as possible to all employees. Ultimately, having employees with a wide range of competencies is a decisive competitive advantage for Bertrandt."

The intranet site displaying Bertrandt's internal further training and development opportunities has been completely redesigned and now offers the right option for everyone at the click of a mouse. Regardless of the employee's technical background or location, the Bertrandt Knowledge Portal groups together courses from the different technical departments and branches into a portfolio of general themes (like project management or quality assurance) as well as courses which increase methodological competencies. Whether the employee is looking for OEM-specific training or seminars on customer-oriented negotiation skills, professional conflict management or how to deal with customers confidently – the systematic overview allows employees to find a training course which corresponds to their level of knowledge and field of expertise. Further training and development offers genuine value and ensures that the employee's time is invested as effectively as possible. ■

Benjamin Finis, Ehningen

Daimler Supplier Award 2008

Bertrandt Technikum among the winners

Bodo Uebber and Dr. Heinrich Reidelbach invite Bertrandt Technikum GmbH's Managing Director Neil L. Walker onto the stage to be presented with the award.

On 12th March 2009, the "Daimler Supplier Award 2008" for outstanding business performance was awarded for the first time to 14 different companies. Bertrandt Technikum GmbH was one of the winners.

Bertrandt Technikum GmbH was awarded the "Daimler Supplier Award 2008" in the "IT, General Goods and Services" category, the sole engineering service provider in the International Procurement Services sector: a symbol of the appreciation and recognition of their exceptional commitment and long-standing partnership with Daimler.

Awards were given in several different categories for the outstanding performance of Daimler's key suppliers. A total of 500 internal and external guests were invited to the first Key Supplier Meeting at the Mercedes-Benz Centre in Stuttgart. The new supplier cooperation model "Daimler Supplier Network" was also introduced during the meeting.

Bertrandt Technikum GmbH's Managing Director Neil L. Walker was delighted to accept the award: "We are all very proud – the award acknowledges our commitment to high quality and our customer-oriented services."

By always guaranteeing reliable delivery, innovation and quality, Bertrandt also intends to be among the very best in the future. ■

Regina Baidinger, Ehningen

Corporate Calendar

04.-06.10.2010	19th Aachen Colloquium “Automobile and Engine Technology”, Aachen
06.-08.10.2010	6th International Suppliers Fair (IZB), Wolfsburg
13./14.10.2010	VDI Vehicle Electronics in Focus, Baden-Baden
19.-21.10.2010	Euro Car Body, Bad Nauheim
21.10.2010	VDI Recruitment Day, Fürth
09.11.2010	VDI Recruitment Day, Munich
11.11.2010	VDI Recruitment Day, Ludwigsburg
16.11.2010	Product Day Automotive Networks and Software Architectures, Fellbach
16./17.11.2010	SIMVEC, Baden-Baden
09.12.2010	Press conference and analysts’ meeting, Stuttgart/Frankfurt
16.02.2011	Annual General Meeting

izb®
CONNECTING CAR COMPETENCE.

Bertrandt at IZB 2010, Hall 5

This year’s International Suppliers Fair (IZB), Europe’s leading trade fair for the automotive supply industry, takes place from 6th to 8th October 2010 in Wolfsburg, the sixth time the city has hosted the fair. With its motto “Connecting Car Competence”, the fair and its partner countries the USA and Canada offer visitors three days full of excellent networking possibilities.

Bertrandt looks forward to welcoming you at their stand in Hall 5.

Bertrandt in Brief

+++ Design the “Ford Focus RS 2020”
Daniel Rauch from Cologne, a technical product designer in the second year of his training, has won the design competition run by English trade magazine Autocar in cooperation with Ford. Stefan Lamm, Ford’s head designer: “Daniel Rauch from Germany fully deserves his win in the international category. His drawings were of an exceptionally high quality and the design is clearly recognisable as the Focus RS. I can see the car on the road already. Great work!” +++

+++ “zisch” at Bertrandt
As part of the “zisch” (Newspapers at School) project, pupils from 15 schools in the Böblingen area received the free Böblinger Bote local newspaper every day for six weeks. Bertrandt allowed a class to see behind the scenes for a day, and offered three sessions with experts during which small groups of pupils came to Bertrandt and gathered information about three different subjects, in order to publish an article in the Böblinger Bote. +++

+++ Bertrandt exhibits at a medical trade fair for the first time
Bertrandt exhibited for the first time at MEDICA, the World Forum for Medicine, from 18th to 21st November 2009. Existing areas of expertise, including software, hardware and testing, were presented with the intention of identifying potential projects in new sectors. +++

+++ Universum Award
In the 2010 Universum Student Survey, Bertrandt received the Image Prize for a friendly working environment. +++

+++ Aircraft Interiors Expo 2010
From 18th to 20th May 2010, Bertrandt and its joint venture partner Aeroconseil were exhibitors at Aircraft Interiors Expo in Hamburg, the world’s leading show for aircraft interiors. +++

+++ “Best employer” rankings
The Trendence Institute has identified the most popular employers in the business and engineering sectors. Around 21,000 final year students placed Bertrandt at no. 91 in the engineering sector. +++

+++ 5. Capital Market Day
At the fifth Capital Market Day on 11th May 2010, CEO Dietmar Bichler presented Bertrandt AG’s performance for the first half of the business year 2009/2010. The meeting was rounded off with presentations by two experts from the transport industry. This was followed by the opportunity for the visitors to exchange ideas and information with participants from the banking, capital market and press sectors, as well as with the invited speakers. +++

+++ Hanover Fair – Efficiency, Innovation, Sustainability
Bertrandt Services and Bertrandt’s Electrics/Electronics competence centre were once again joint exhibitors at the Hanover Fair this year. The fair, with its keynote motto “Efficiency, Innovation, Sustainability”, has long been the best place to catch up on all the latest industry know-how, as well as many groundbreaking technologies, materials and ideas. Its aim was to expand the customer base in the electrical engineering, machine and plant construction and energy technology sectors. +++

+++ Roadshow at Johnson Controls
On 5th March 2010, Bertrandt was guest exhibitor at Johnson Controls, Burscheid, and presented its additional services and specialist departments, as well as its better known services such as interiors and testing. Various exhibits demonstrated the wide range of services available. +++

Thomas Martens

"Trust is a very important part of our business model."

About fifteen years ago, drilling elliptical holes was Bertrandt Wolfsburg's unique selling point, Thomas Martens, Bertrandt Ingenieurbüro GmbH's Managing Director, remembers with a smile. Today, the company covers all aspects of module and vehicle development and has seen the number of employees rapidly increase to over 900. And as for those unique selling points? These have taken on different forms in the last decade and a half, including one of the most accredited environment simulation divisions in the region at Bertrandt Wolfsburg (Tappenbeck).

Thomas Martens has led the development of Bertrandt's Wolfsburg-branch for 14 years. However, his first contact with Bertrandt came as early as 1990. During his automotive engineering studies at the University of Hamburg, he completed his main period of work experience at Bertrandt Heilbronn in the South of Germany. "For a northerner like me, it was Bertrandt's northernmost branch at the time," says Martens with a wink.

In those days, Bertrandt Wolfsburg was just a small white bungalow, which was expanded over time with various Portakabins, he recounts. Later, they also rented a neighbouring factory. It was all very pragmatic: paint on the walls and carpets on the floor – and the office extension was ready. "Back then, we had a heavy crane hanging from the office ceiling, and our first attempts at testing turned out rather strangely." One of the first acquisitions was a box column drill, which was impossible to get the hang of (think: elliptical holes). But despite such obstacles, Martens is happy to look back on these times. "These stories describe the optimistic mood of that time very well," he says, "and I feel that we have retained a lot from this time, like our commitment, our desire to find the best solution for our customers, and our team spirit."

Thomas Martens started as a designer in the Equipment department and soon after was able to support Volkswagen on an onsite project, an assignment which lasted two years. "It was an interesting time, and helped me to get to know the Volkswagen group. I really had no idea how much there was to learn," says Martens.

He is proud of the continuing long-term cooperation between the customer and the service provider. "We still have a special connection with our Volkswagen colleagues from that time – customers from the early days are still our customers today," he explains. "Trust is a very important part of our business model," he continues, emphasising the relevance and importance of long-term business relationships.

> "The bigger picture always depends on the quality of every individual achievement, no matter how small it might seem."

After his assignment at Volkswagen, he became a team leader in the Equipment department, and three years later was appointed Division Manager with additional responsibility for testing and electronics. He names projects like the VW Polo and VW Touareg as particular challenges. "They were a great experience and super achievements for the very young team that we were back then." Being promoted to Managing Director means the most to him, however, although he is quick to acknowledge that he did not achieve this on his own: "A motivated and loyal team, as well as superiors who believed in me, were an important part of my success."

These days, his job is to be as close as possible to the customer. It involves recognising trends, analysing the performance and organisation of Bertrandt's services, and, together with the management team, controlling investments and aspects of development from the technical department right down to individual branch strategy. There are currently 900 employees in ten development departments, with the main customer focus on the Volkswagen Group and its suppliers. For Martens, the Wolfsburg branch is characterised by qualities such as sustainability, flexibility, commitment and stability. This is reflected in the Bertrandt team's commitment as well as in the development of projects in which the Wolfsburg employees can support their customers.

"Our customers recognise Bertrandt as a reliable partner when it comes to developing bodywork and equipment," explains Martens. "Alongside our largest division – testing – the electronics division has also grown to a similar size, and subjects like acoustics, production planning, chassis, prototyping and project management have also established themselves firmly in the company's portfolio. And we haven't forgotten that the bigger picture always depends on the quality of every individual achievement, no matter how small it might seem," affirms Martens. "That was, and still is, our vision for the Wolfsburg office, for both Bertrandt and our customers."

In his private life, his wife Nicole and two children Ole and Jette are his main priority. "They give me the strength I need and help me to keep things in perspective". Seven years ago, they built their house in the countryside north of Wolfsburg, and it has been the family of four's pride and joy ever since. He has also been passionate about vintage cars since his apprenticeship at a small Volkswagen dealer and the restoration of his first 1965 VW Beetle. As well as another VW and a VW camper van from the 60s, the Martens family own a Porsche diesel tractor and an old Ducati – combining tradition and modernity, but with both feet firmly in the here and now. ■

Anja Schauser

Masthead

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