Information Portals for the After-Sales Service

Services and Solutions for Optimising After-Sales Processes
Due to innovations, commercial vehicle manufacturers (on-road, non-road) are experiencing steady increasing product complexity and customer-driven diversity of variants. The other side of the coin is the requirement of designing the processes in the services area as efficiently as possible worldwide and with the highest quality, in order to guarantee permanent customer satisfaction.

Manufacturers in the after-sales services area face new challenges by implementing legal requirements to provide repair and maintenance information (RMI) for other market participants. Intelligent after-sales portals facilitate this implementation.

The aim is to support the customer optimally by offering the best possible service and to guarantee high vehicle availability by reducing repair and service times. This increase in efficiency and cost reduction makes the total cost of ownership (TCO) more calculable.

However, this can only be guaranteed by efficient processes and systems that create and provide exactly the right vehicle-specific information required for each product, such as working methods, labour times, diagnostic information, schematic diagrams, spare parts and software configurations comprehensively and in detail, in the required languages, without redundancies, and make them available worldwide on the same day.

Technicians spend a significant amount of their working time researching information in different systems which are characterised by different data classification systems and search paths.

Intelligent after-sales portals for information retrieval and the corresponding authoring systems are based on identical systems and consistent data structures. To ensure an optimised support for technicians, a standard workflow is developed on the basis of a common business process.

The information is edited, modularised and made available to the user vehicle-specific for the respective purpose (service literature, labour times, schematic diagrams, etc.).

Intelligent after-sales portals include support and service over the entire product lifecycle.

### Challenges for manufacturers
- Increasing amount of electronics
- Complex software in the products
- Diversity of variants and versions
- Increasing warranty costs
- Growing number of full-service contracts
- Calculable TCO
- High availability

### Challenges for after-sales systems
- Optimising data supply and authoring costs
- Interfaces to ERP systems
- Worldwide availability of latest information
- One stop shop concept
- Implementation of the legal requirements for providing RMI
Intelligent after-sales portals make it possible to have standardised access to various information domains using a standard operational concept. The authoring system is used for information filling (data supply), while the information portal is used during operation.

Authoring systems serve to record and update the information. Portal systems are used for providing information and supporting the service processes. Depending on the respective specific customer requirements, information modules – such as parts identification and documentation, service and customer literature as well as labour times and diagnostics – can be included. Therefore, interfaces to upstream IT systems (ERP, Engineering) and to multimedia data sources, terminology databases and to the translation are required on the authoring site. Apart from that, the portal site usually contains interfaces to central ordering and enterprise resource planning systems, dealer management and workshop disposition systems and also to the vehicle diagnostics.

Integrated authoring system (back office)
Application specific editors and CMS systems with workflow control guarantee a coordinated, continuous development process, from editing to publication. The information is created once by the editors in form of reusable information modules, which are provided with validities, are independent of layout and can be used for all publication media (single-source, multiple-publishing).

Efficient publication process
The information transfer, necessary between the single source authoring systems (ERP systems as SAP/R3) and the service data bases, which are accessed by the portal applications, needs an efficient, automated publishing process that provides the service information daily updated and worldwide available.

After sales service information portals (front office)
A smart retrieval system supports users, such as technicians, etc., in all individual work steps of their tasks and guarantees a continuous process, based on a consistent, cross-linked information allocation.

Services for integrated systems
- Technology, process and system consulting
- Project planning and implementation (concept, specification, prototype)
- Realisation using solution modules (COTS products, SXP frameworks)
- Integration & test
- Rollout & lifecycle support
The diagnostics system supports the technician during troubleshooting and repair of electronic components. The availability of vehicles and systems will be improved.

Module: Diagnostics

**Motivation**
As in the automotive sector, the number of electronic and electric components is also increasing disproportionately in the commercial vehicle sector. The quantity and distribution of functions combined with the networking of control units are also making troubleshooting more complicated. Thus, to enable the technician to perform the maintenance correctly, information about symptom and error correlations as well as the appropriate repair measures to be taken must be provided.

**Solution**
A software-supported diagnostics and test system supports the technician while he is establishing the operational capability and availability of vehicles and systems. The tasks cover troubleshooting and repair, coding, start-up and testing as well as programming.

**Components**
In form of an authoring system platform (ASP) and an internet-based operation system, ServiceXpert provides a flexible and proven solution for the diagnosis lifecycle of commercial vehicles and mechatronic systems. Information for reprogramming and parameter adjustment of the controls is provided in the course of repair and maintenance services.

### Diagnostics
- Troubleshooting and repair
- Coding/parameterization of control units
- Start-up and testing
- Programming (flashing)
The technical documentation provides the technician with repair and maintenance instructions. For optimized troubleshooting schematic diagrams supply vehicle-specific information without any media discontinuity.

**Module: Technical documentation and interactive schematic diagrams**

**Motivation**
The creation of technical documentation and interactive schematic diagrams, as well as the translation process are subject to permanent cost pressure also in the commercial vehicle sector. Furthermore, there is an increasing demand for an up-to-date supply and a possibility of incremental updates. Suitable solution approaches are characterised by modularisation and the increasing reuse proportion.

**Solution**
In contrast to the solutions currently used, the information is no longer created in book-form (PDF format), but rather on information unit levels and independent of layout (XML format). Information created once can thus be published (single-source, multiple-publishing) via several media (paper, CD-ROM, Internet, etc.). In order to support the optimized troubleshooting, interactive schematic diagrams can be integrated modularly and are able to display interactively the information that the technician needs, vehicle-specific and without media discontinuity.

**Components**
The information is created with established XML editors (e.g. Arbortext editor, XMETAL). A commercially available content management system is used for administrating the information. Our self-developed frameworks as reusable software components (SXP.NET, CBF) are used for the portal components.
Labour times are the key information for integrated systems in service. R&M jobs and parts lists are used to control the workshop process. In addition, they serve the leveling of warranty claims from dealers or external workshops.

Module: Labour times / R&M jobs

Motivation
Against the background of continually increasing vehicle complexity, the requirement for detailed and up-to-date information relating to the maintenance and repair of vehicles is increasing in the area of overall customer service organisation. This information allows the manufacturer to take a clear position in cases of warranty and service repair contracts. Dealers and workshops are able to create detailed workshop plans (e.g. qualifications required from technicians, procedures, special tools, technical data, time targets) and costing. The workshop’s services and price calculations are rendered transparent and comprehensible for the end customer as a result of this information.

Solution
Comprehensive R&M master job structures, provided with applicability, are created for the individual product ranges. Each of the required specific work steps can be selected from these, using the vehicle constructions described by the parts lists, and are displayed in the retrieval system.

Components
In order to record the repair methods, labour times and linkage to other information types, an authoring system is created based on self-developed frameworks. The recorded information is stored in standard data bases. Our self-developed frameworks as reusable software components (SXP.NET, CBF) are used for the portal components.

Module: Parts and tool information

Motivation
To minimise the number of incorrect orders during repairs, the technician must be able to research quickly and accurately the required spare part and the tools needed for the replacement. In order to do this, he requires information about the specific vehicle construction. For control units, information about the vehicle-specific software version and the parameter set must also be available.

Solution
The required information is provided to the workshops in a vehicle-specific catalogue, which is updated daily. ServiceXpert also has got the expertise to integrate interfaces to the ordering system and enterprise resource planning system, as well as to the ERP system from the creation page.

Components
The information is provided by using standard data base systems. The data bases are completed using intelligent interface modules to ERP systems (e.g. SAP/R3). Our self-developed frameworks as reusable software components (SXP.NET, CBF) are used for the portal components.
R&M CONTRACTS & FLEET MANAGEMENT

Equipment- and deployment-specific calculation models are the basis of cost-efficient fleet deployment. For these, R&M contract and fleet management systems are used.

Module: R&M contract management

Motivation
As well as manufacturing costs, warranty and goodwill payments also have a considerable influence on the OEM’s financial statement. Validated projections are required both for estimating the costs required within the scope of new developments and also for structuring and standardising the costing of the field organisations and/or as the calculation basis for full-service contracts.

Solution
By introducing R&M contract management, equipment- and deployment-specific calculation models for vehicle use can be employed. Beyond creating, processing and managing service contracts, the system also provides ongoing support for the target/actual comparison of R&M contracts. In addition, a sub-system is required for managing repair, warranty and goodwill contracts.

Components
The recorded information is stored in standard data bases. Self-developed frameworks as reusable software components (SXP.NET, CBF) and report generators that are suitable for the web are used for the portal components.

R&M contract management
- Contract configurator with standard components
- Interface to operation data acquisition
- Target/actual comparison of R&M costs
- Module for customer-specific analyses
Module: Fleet management

Motivation
Mobile investment goods used in logistics (such as truck and forklift trucks) have to prove high operational capability and availability. Information about the performance of the commercial vehicle over the whole of its lifecycle is just as important to the customer as to the manufacturer: the customer needs this information for operational planning and optimisation, whereas the manufacturer (OEM) uses this information as a basis for product modifications and process optimisation.

Solution
Introducing a professional management system supports the direction, management and analysis of fleets. The fleet management system takes on the tasks of master data management, maintenance planning and production data acquisition and analysis, as well as access control.

Components
The recorded information is stored in standard databases. Self-developed frameworks as reusable software components (SXP.NET, CBF) and report generators that are suitable for the web are used for the portal components.

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<td>Production data acquisition/analysis</td>
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<td>Configurable prediction module</td>
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SERVICES FOR AFTER-SALES SERVICE INFORMATION PORTALS

The conception and realisation of after-sales portals takes place within the scope of a structured development process, based on the V-Model.

Structured procedure in the development process

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<th>Objectives</th>
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<td>Minimising project risks</td>
<td>Compulsory</td>
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<td>Improving and guaranteeing quality</td>
<td>Project management</td>
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<td>Containing total costs over the entire project and system lifecycle</td>
<td>Quality assurance</td>
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<td>Improving communication between everyone involved</td>
<td>Configuration management</td>
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Selected references

Integrated systems
(Spare parts, Service documentation, Schematic diagrams, Labour times, Diagnostics interface)
- RAPIDO - DAF Trucks N.V.

Diagnostics
- Pathfinder - KION GROUP GmbH

Service documentation
- SETIX - KION GROUP GmbH

Labour times
- ServiceRapido - DAF Trucks N.V.

Spare parts
- EPOS – Schmitz Cargobull AG

R&M contracts
- ProService - DAF Trucks N.V.

Fleet management
- Fleetmanager – STILL GmbH

Tasks for each procedure component

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<th>Requirement specification</th>
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<tr>
<td>Compiling system requirements</td>
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<td>Defining specifications for the project manual</td>
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Requirements analysis/specifications

- Surveying, documenting and managing requirements
- System-, process- and data-modelling

System development/implementation

- Specification and design
- Realisation, testing & integration
- Verification and validation

Acceptance and rollout

- Legacy data/legacy system migration
- Lifecycle optimising
ServiceXpert is the system and software house for technical information systems used by the leading companies in the markets for agricultural technology, construction equipment, forklift truck and commercial vehicles in Germany and Europe.

We are your specialist for complex processes and we assist you in the planning, implementation and operation of systems used for information management throughout the product lifecycle. We concentrate our systems and services on the areas of marketing/sales, development and after-sales service. Our solutions are based on smart applications with streamlined and standardised interfaces, built on software standard components.

ServiceXpert is a company of the ESG Group. As a subsidiary company of the ESG Elektroniksystem- und Logistik-GmbH, we collaborate closely with the ESG’s technology and innovation network. We use this know-how as a transfer agent and complete it for our customers and markets.

ESG Elektroniksystem- und Logistik-GmbH develops, integrates and operates electronic and IT systems for the armed forces, government agencies and the private sector. Its customers are drawn from the automobile, aerospace and defence industries as well as logistics and transportation companies.