

The Electronic Collaboration Study

Case Study AMAG

Reorganization of the Spare Parts Business

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About “The Electronic Collaboration Study”

The “Electronic Collaboration Study” is a joint project of the Institute of Information Management at the University of St. Gallen (Switzerland) and the Glassmeyer/McNamee Center for Digital Strategies at the Tuck School of Business at Dartmouth College in Hanover, New Hampshire (USA).

Both institutions collect case studies for transinstitutional electronic collaboration. The goal is to put together examples which demonstrate how companies can gain competitive advantages from the use of information technology. The results are recommendations for successful electronic collaboration.

Prof. M. Eric Johnson, PhD, Director of the Glassmeyer/McNamee Center for Digital Strategies, and Prof. Dr. Hubert Österle, Director of the Institute of Information Management and Chief Technology Officer of the “Information Management Group” (IMG), are the principal investigators for the project. They are supported by Prof. Dr. Walter Brenner and Prof. Dr. Elgar Fleisch of the University of St. Gallen, as well as Prof. Hans Brechbühl and Prof. Stephen Powell, PhD of the Tuck School of Business, in attaining the goals of this project.

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Connecting Links

Case Study Database:	http://cases.iwi.unisg.ch
Center for Digital Strategies:	http://www.tuck.dartmouth.edu/digitalstrategies
Institute of Information Management:	http://iwi.unisg.ch

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Summary

Swiss Volkswagen importer AMAG reorganized its spare parts supply process through a new method of collaboration between Volkswagen, AMAG's central warehouse and regional warehouses, and service stations. From the service station spare parts orders via replenishment by the VW spare parts warehouse in Kassel (Germany) and by other suppliers, to Swiss customs, inventory levels in the central and regional warehouses, and the delivery to the service stations, the entire process utilizes the same database in real time. This enables AMAG to eliminate an existing sales and warehousing step and to manage the rapidly growing complexity of spare parts logistics resulting from frequent design changes and wide variety. Additionally it creates one central point of contact for the customer ("one face to the customer") which replaces the product group-based responsibilities of the past.

Zusammenfassung

Die AMAG, der schweizerische Importeur von Marken des VW-Konzerns und der Porsche AG, reorganisierte ihren Prozess der Ersatzteilversorgung durch eine neue Form der Zusammenarbeit zwischen Volkswagen, AMAG Zentrallager, AMAG Regionallager und Kraftfahrzeugwerkstätten (Garagisten). Von der Ersatzteilbestellung des Garagisten über die Nachbevorratung aus dem Volkswagen Ersatzteillager in Kassel und von anderen Lieferanten, über den Schweizer Zoll, die Lagerbestände und -orte im Zentral- und den Regionallagern bis zur Auslieferung an den Garagisten greift der gesamte Prozess in Echtzeit auf die gleiche Datenbasis zu. Damit kann die AMAG mittelfristig eine bestehende Handels- und Lagerstufe auflösen und die rasch wachsende Komplexität der Ersatzteillogistik aufgrund schneller Modellwechsel und Variantenvielfalt bewältigen. Sie realisiert zudem eine zentrale Anlaufstelle für den Kunden („One-face-to-the-customer“) anstelle einer Produktgruppenzuständigkeit in der Vergangenheit.

1 Company

Overview. AMAG (Automobil und Motoren AG) is the Swiss importer for the VW, Audi, Seat, and Skoda brand cars of the Volkswagen Group, and the brands of Porsche AG. AMAG services a total of 750,000 vehicles, for the most part VW passenger models.

Company	
<i>Founded</i>	1945
<i>Based in</i>	Zurich
<i>Industry</i>	Automotive
<i>Busines Areas</i>	Car imports/sales, spare parts business, leasing
<i>Company Structure</i>	Part of AMAG Group, which encompasses further activities in the automotive sector (such as car leasing, parking garages) in separate companies
<i>Homepage</i>	http://www.amag.ch
<i>Sales</i>	2002: 3,300 million Swiss Francs
<i>Renevue</i>	n/a
<i>Market Share</i>	Automobile trade: 20% (2002)
<i>Employees</i>	3,342 (incl. branch locations)
<i>Customers</i>	Spare parts business: > 10,000 customers
<i>Collaborative Process(es)</i>	Repair & maintenance
<i>Subprozess(es)</i>	Spare parts management
<i>SoftwareSolution</i>	SAP ET 2000 (SAP R/3 with the modules SD, MM, WM, adapted by VW), Warehouse management with LAPS (proprietary development)

Table 1-1: Snapshot of AMAG Automobil und Motoren AG

Competitive Challenges. Ownership of a vehicle includes regular maintenance and repairs and thus replacement of defective parts. Availability of spare parts impacts the length of time for repairs and thus use of the car by the owner as well as the reputation of the brand/make of car. Sale of new cars includes the obligation to provide spare parts for the vehicles. The VW Group makes parts important for maintaining their vehicles in good running condition available for 15 years after the end of serial production of a vehicle type.

AMAG's central spare parts warehouse for the makes it represents is located in Buchs (Zurich) and since 1957 has grown to its current size of 40,000 square meters. The organically expanding warehouse, which is governed by manual warehousing methods, contains an average of 150,000 stock parts, from tires and bumpers through special repair tools to boutique articles like VW clocks or Porsche key chains. It lists a total of more than 600,000 articles.

The complexity of warehouse management has grown consistently over several decades. The number of vehicle types increased, while the lifespan of a production cycle decreased

drastically. As a result AMAG must keep more and more replacement parts in stock. The biggest challenge for the spare parts business is to manage this complexity and to ensure the ability to deliver. A benchmark for this is the level of service, i.e. the share of orders which can be filled immediately upon receipt.

2 Initial Situation

Strategy. AMAG had a two-step system of supplying spare parts. The central warehouse in Buchs (Zurich) supplied 36 local supply depots through all of Switzerland. These in turn supplied the service stations within their territory. The central warehouse itself was organized into product-based specialty areas and received the spare parts directly from the producers, VW and Porsche.

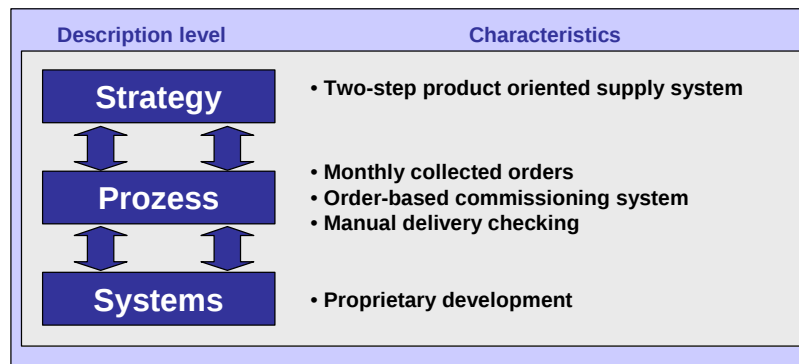


Figure 2-1: Brief Characteristics

Process. The three main processes of spare parts management are order processing, receipt of delivery, and commissioning. AMAG conducted its order processing in several steps. Customers bought their spare parts from the regional warehouse. These received their stock from the central warehouse, which in turn ordered from the producers. Figure 2-2 shows AMAG's previous spare parts management, focusing on order processing.

- *Orders by the regional warehouses:* The regional depots submitted their needs to the central warehouse on a monthly basis. The manual determination of needed parts and completion of the order took an average of 1-2 days. The central warehouse collected the requested parts and delivered them to the regional warehouse. These deliveries usually included over 2,000 parts. Delivery control, which checked each item separately, would therefore often turn up discrepancies. The result was a time-consuming reclamation process.

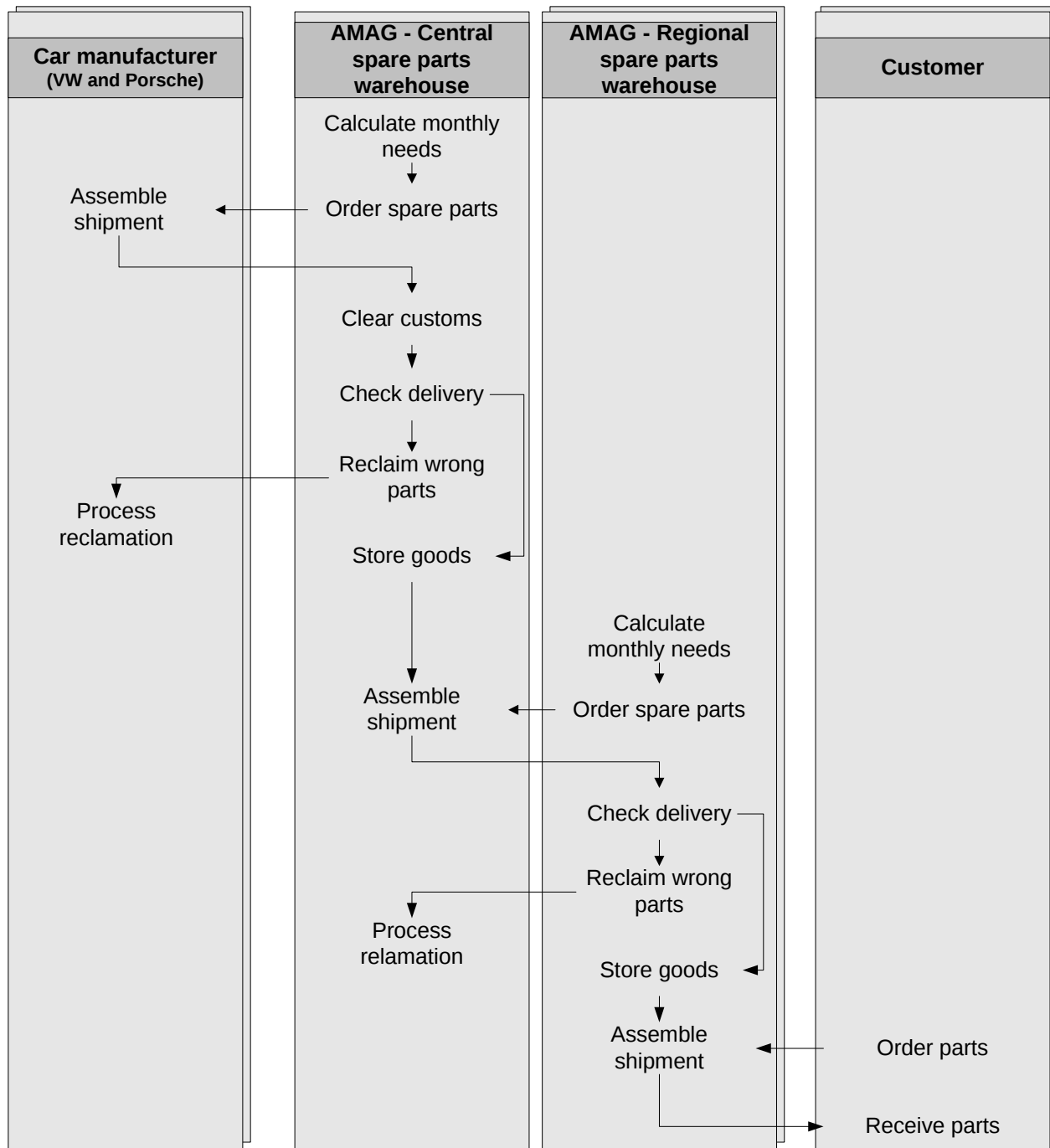


Figure 2-2: Previous Process

- *Order Processing with VW and Porsche.* Order processing between the central warehouse and VW and Porsche was organized similarly.
- *Receipt of Delivery.* Customs clearance determined the arrival of deliveries at the central warehouse. The goods could only be unloaded and stored after the customs technicalities had been completed.

- *Storage Processing (Commissioning).* Order-based commissioning took place in the central warehouse, i.e. one employee would process one order at a time and withdraw the ordered parts from storage by the best possible route.

Systems. AMAG employed a system developed in-house in support of the spare parts business.

Pain points.

- A result of the product-oriented organization of the spare parts warehouse was that customers had to contact several people responsible for order processing. It was not possible to service a customer in an integrated fashion.
- The inflexible separation of the two business levels, import and wholesale, was as detrimental to the management of the growing complexity as the manual order processes.
- The increasing variety and size (e.g., auto body parts) of parts, led to space problems in the central warehouse and the regional warehouses.
- AMAG's quite flexible proprietary warehouse management system had a limited number of core customers. It became apparent that the recently begun consolidation of warehouses could not be completed with this system, since a distinctly larger number of customers had to be serviced after reorganization. In addition interface problems complicated communication with the manufacturers.
- Delays in customs clearance led to large capacity fluctuations. The sealed freight cars with the spare parts from Germany would get backed up at their destinations, which led to high fees of tens of thousands of Swiss francs and extended the delivery times.
- With the growing warehouse space, the order-based commissioning process led to longer routing times in putting together the orders. The growing number of orders also increased traffic in the warehouse and led to employees getting in each other's way.

3 Project

Goals. Because of the pain points in the spare parts business, AMAG searched for a reorganization of this sector that would allow a consistently high level of service despite increasing complexity. In AMAG's view this included greater process transparency, efficient communication with the manufacturers, and improvements in its own marketing structure. AMAG decided to reorganize its spare parts business, both organizationally and in terms of systems support.

AMAG had been operating an SAP R/3 system with Finance (FI), Controlling (CO) and Human Resources (HR) modules since 1998. AMAG expected cost savings and process improvements from an extension of the R/3 system to other business sectors, utilizing an integrated information system with common core data and interfaces between the individual modules.

The software decision was made easier by the fact that VW also employed SAP software in its central spare parts facility in Baunatal and in the German distribution centers. AMAG decided to adopt—in close association with the VW spare parts project—the solution SAP ET 2000, which had been developed by VW and included Sales and Distribution (SD), Materials Management (MM), and Warehouse Management (WM) modules. The intent was to align its processes as closely as possible with the SAP standard in order to minimize the expense of software leasing.

Execution. The spare parts management project was intensively supported by management. Hanspeter Soland, senior manager for Finance and Information Management, and Rudolf Bernhard, senior manager for Parts and Accessories and responsible for AMAG's central spare parts warehouse, were substantially involved in directing the project.

In addition to the two internal project leaders, Dr. Ursula Kloss (Information Management) and Heinrich Lienhard (Parts and Accessories), the project team consisted of 40 – 60 employees from Information Management and specialized departments that were completely or partially brought into the project. Each partial project was led by a specialist and a representative of the consulting firm IMG AG (which was involved in the implementation).

Beginning in the fall of 1998, proof of concept was first established in two project phases for the boutique, industry articles, and special tools categories. System-related delivery delays were less critical in these areas and any errors were easy to correct because of the relatively small amounts involved. After the introduction of the solution for these secondary sales products in October 1999, initial experiences/lessons were collected and funneled directly into the restructuring of the core business during phase two. AMAG made

allowances for follow-up projects already planned in connection with the reorganization of the spare parts business, such as the integration of the regional warehouses, and adjusted the concept of the spare parts management project accordingly. Until the completion of the project on June 5, 2000, a total of 2,000 man-days were expended.

The collaboration with VW was a particular challenge for the project. Balancing interests and waiting for completion of preliminary work at VW led to delays. In addition, the project began with a lengthy startup phase. To enable critical transfer of know-how, AMAG delegated two employees to the VW spare parts project, who participated intensively in the construction of the German pilot project in Munich and the foreign pilot in Sweden. AMAG's stated intention, to be as congruent as possible with the SAP standard, could not be achieved completely because of the number of changes made by VW in the SAP standard's first release (3.1). But with the release of SAP 4.6c, currently in the roll-out phase, the partners have been able to approach the SAP standard more closely again.

Critical Success Factors. In addition to the collaboration with VW, which ensured a high interface compatibility at the process and systems level, Rudolf Bernhard believed the tie-in with the business areas to be a critical factor for success. A good mixture of business and IT experts promotes the transfer of knowledge within the project team. It allowed the technical knowledge of the consultants to be combined with the spare part business experts' experience with the process. This required that key employees with the necessary overview of their specialty's complexity be identified and brought into the project. Common physical project space proved to be important for creating team cohesion. Dr. Ursula Kloss and Rudolf Bernhard considered a common grasp of problems and good informal relations as the basis for a successful project: "the greatest formalisms are useless if people can't talk to each other."

Another important factor was the engagement of senior management with the project. Short decision pathways and the ability to make decisions quickly and without uncertainty are necessary, even if this leads to later corrections. Project managers therefore instituted weekly—and if necessary, more frequent—project meetings.

Communications with associates and customers was another critical factor for success. Business partners were informed early on about the project and its goals and trained for the resulting changes. Associates at first received weekly written bulletins, but it became apparent that information within the framework of the regular information sessions at six month intervals was sufficient.

Motivation of the project team members, on the other hand, not only requires intensive communication, but also attention to development perspectives. Employees who became specialists within the project were also be part of future projects, depending on interests and possibilities. Several project team members changed from their business function to information management, where they saw new work potential for themselves. Rudolf Bernhard saw the double stress of project work and daily business concerns as unavoidable, if competent experts were to be part of the project team. In order to reduce their daily business burden at least partially, however, AMAG decided to forgo several activities and deliberately accepted delays in dealing with administrative processes.

4 New Solution

Strategy. AMAG restructured its spare parts marketing to make it process-oriented. The 36 distribution centers had already been combined into five regional warehouses. The central warehouse has also taken on the role of regional warehouse for eastern Switzerland and delivers directly to dealers, service stations, and end customers. A combination of the import level (central warehouse) and the wholesale level (regional warehouses) is currently in progress. The five regional warehouses thus become branches of the central warehouse, which has assumed responsibility for personnel and budget. The regional warehouse in Lucerne has been incorporated into the central warehouse in organization and technical systems support since January 1, 2002. Moving goods has become the restoring of goods and does not initiate internal order and billing processes.

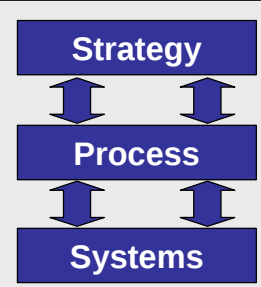
Description level	Characteristics new	Characteristics old
 Strategy Process Systems	• Customer-group oriented distribution • Combining of import and wholesale • Automatic order disposition • Call center for customer orders • Warehouse zone-oriented commissioning • Partially automated delivery • SAP ET 2000 • Proprietary software LAPS	• Two-step product oriented supply system • Monthly collected orders • Order-based commissioning system • Manual delivery checking • Proprietary software

Figure 4-1: Comparative characteristics

Individual orders are delivered twice a day to dealers and service stations by a company-owned delivery service (approximately 90 vehicles for all of Switzerland). AMAG replaced its hitherto product-oriented spare parts management with a process-oriented organization. A call center functions as interface for the customers.

Process. The reorganization of the spare parts business affected the order process, the delivery process, and the warehouse process (commissioning).

- *Processing of customer orders.* A central call center handles the orders. About 40% of all orders are placed within the so-called rush hour from 8:30 to 11:30am. The goods are delivered to customers twice a day. This results in capacity peaks for the delivery timetable. A process that handles these peaks automatically makes high demands on the system resources which cannot be used outside of these peak hours. AMAG therefore decided to combine manual and automated process steps in such a way that customer interaction peaks can be brought under control by human intervention/efforts.
- *Processing of orders with VW and Porsche.* The integration of central warehouse and regional warehouses allows central disposition of goods and billing. Orders for VW and Porsche are automated. An automatic disposition system has replaced manual disposition, which had become more and more difficult with the increasing complexity of the spare parts business. In addition to inventory, the automated order process pays attention to critical levels, seasonal factors (for instance in body parts) and life cycles of automobile series.
- *Deliveries.* AMAG registers delivered spare parts with a barcode scanner and compares the numbers shown with the delivery documents. The deliveries cannot be entered automatically, since they have to be cleared by customs first. The customs authorities have meanwhile given AMAG permission to handle the customs assessment directly through specially trained employees (with the status of “authorized receiver”). One reason for this is the improved tracking capacity for the movement of goods with the new spare parts management system. The regular backups experienced previously at the delivery destinations happen now only at sporadic inspections by the Swiss customs authorities. Within a few hours AMAG can enter the parts into the system and they can then be seen in the warehouse. The customs problem still prohibits entering into the system in real time.
- *Commissioning.* The central warehouse is divided into 22 storage zones. Orders are assigned to these zones. Therefore, if needed, up to 22 employees will be working on collecting one delivery. The order is assembled in the delivery zone. Individual orders are sorted according to customer and routes. The drivers can use barcode-based delivery lists to check that their routes are complete.

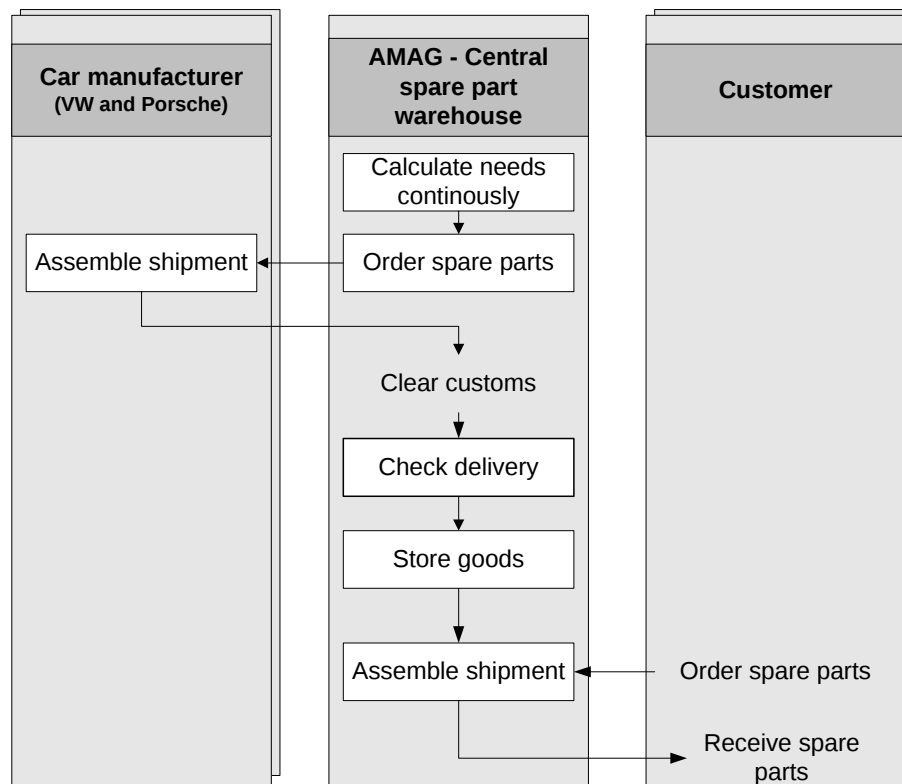


Figure 4-2: New Process

Systems. The new spare parts solution combines SAP ET 2000 with the commissioning system LAPS (Warehouse Processing and Planning system) developed in-house. Figure 4-3 provides an overview of the system architecture.

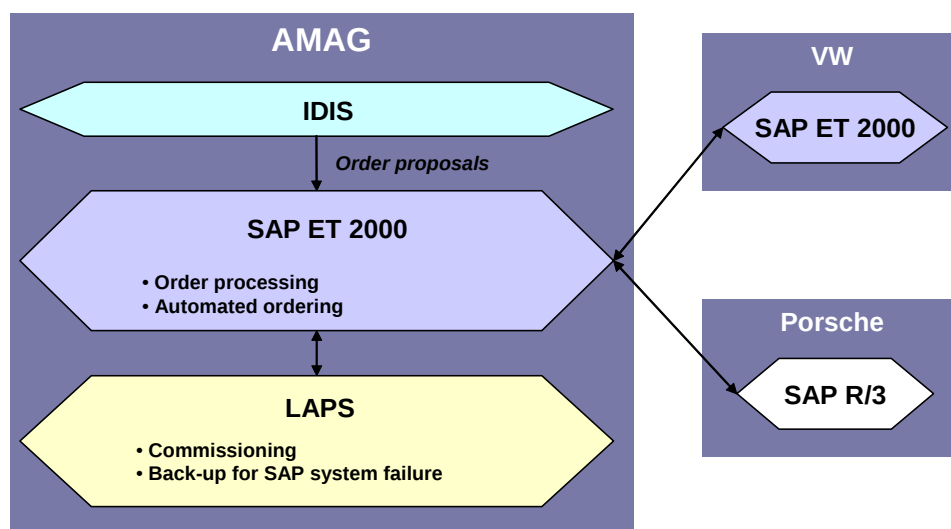


Figure. 4-3: System architecture

AMAG does its order processing with SAP ET 2000. The processes reflected in the system conform to the extent possible with the standards set by SAP or VW. Special solutions exist for customs clearance (not necessary for the VW system) and the delivery process, which has been simplified in comparison to the standard. The standard also made no allowances for the consumer business or the integration of regional warehouses, so that this area also required further proprietary development, such as the implementation of credit card billing. Added to this was support for three official Swiss languages (German, French, and Italian) with the requisite forms, as well as AMAG-specific evaluations. With the integrated disposition system (IDIS), a supplementary component of SAP ET 2000 developed by VW is activated, which makes automated parts replenishment possible. Twice a day orders go out to VW, and AMAG receives billing and delivery dates from VW. The data exchanged in IDOC format contain order number, amount, material number, and price, among other items. AMAG developed a similar component for ordering from Porsche.¹

Management of physically moving goods is controlled by LAPS. This includes splitting an order for the 22 storage zones and printing the barcode labels. The orders are continuously fed from SAP ET 2000 via IDOC format into LAPS and after processing back into the ET-system. For the purposes of the emergency function integrated into LAPS (SAP ET 2000 failure) the parts inventory is reconciled with SAP ET 2000 at night. Even though no deliveries can be entered in LAPS, the commissioning is possible on the basis of the latest data reconciliation. If system SAP ET 2000 is not available (e.g., during an inventory or system failure), 90% of the usual order volume can be processed the first day, and even as much as 70% on the third day.

Costs and Benefits. Despite increasing parts variety AMAG was successful in maintaining its level of service through the restructuring of its spare parts management and the implementation of cooperative processes with VW and Porsche. Additionally the reorganization of its spare parts marketing and the increased process transparency allowed AMAG to reduce the safety inventory margin for each warehouse position. An improved customs clearance process saves up to 200,000 Swiss francs per year in standing fees.

The introduction of the new warehouse management system based on SAP ET 2000 and LAPS led to a drastic reduction in the number of changes to the application. Whereas under the old system, approximately 20 requests for change were regularly pending (all requiring a great deal of work and effort), utilization of the standard software allowed easier adaptation through customization and greater latitude for further development. The im-

¹ Porsche AG also runs an SAP system, which is not comparable to SAP ET 2000, however.

plementation of the new solution required a work effort of 2,000 man-days. The total expense (not including the salary expense of the AMAG employees) amounted to 5-6 million Swiss francs. In the Information Management department four people work on the ET-system; approximately 20% of their time is needed for support and smaller corrections/improvements. The rest is allocated to further development and new projects. Table 4-1 provides an overview of the costs and benefits of AMAG's spare parts management project.

Planned Future Developments. The system is running well, but demands for further development come up regularly, either for internal process improvements or through outside requests. These are considered in monthly coordination meetings by a group of six spare parts business experts and four IT representatives, who decide how to handle them and are instrumental in further improvement efforts for spare parts management. Steady improvement of the data exchange with VW is a high priority. After the integration of the Lucerne regional warehouse, all other regional warehouses are now scheduled to be integrated in succession at the organizational and information systems levels. AMAG sees great potential in the automation of the entire warehouse management. AMAG is planning the introduction of a warehouse featuring high shelving systems. The warehouse management system LAPS cannot support this type of storage. A deciding factor in the selection of the new system will be whether it is able to maintain warehouse operations temporarily in the case of an SAP system failure.

Overview AMAG Spare Parts Management			
Project			
Project			
Time span	20 months		
Phase 1 – Ancillary products	12 months (October 1998 – October 1999)		
Phase 2 – Core business	8 months (October 1999 – June 5, 2000)		
Project team	40-60 people		
Area specialists	40-50 (part time)		
IT	4-5		
External consultants	7-8 (at 100%)		
Project expense (man-days)	2,000		
Project expense	5-6 million Swiss francs (without work effort of AMAG employees)		
Software expense	1.6 million Swiss francs		
Operation			
Support and smallest demands	1 employee		
SAP Basis / Operating / Network	1-2 employees		
Benefit of prototype realized by AMAG Spare Parts Management:			
	AMAG	Manufacturer	Customers
STRATEGY			
Customer / Partner			
Service lock-in	through one-face-to-the-customer	---	---
Employees			
Career possibilities	for project team members	---	---
Reduction of routine Activities		---	---
Organization			
Reduction of one business level	through combining central und regional warehouses	---	---
Development of IT Know-how	SAP-knowledge for further projects	---	---
Process of COOPERATION			
Process expense	Inventory safety margins reduced by 10-20% per article Standing fees for freight cars ca. 200,000 Swiss francs	---	---
Speed	Shortened processing times through: simplified customs clearance with “authorized receiver” status and simplified processing of business with private customers	<u>Shorter processing times</u> through simplified spare parts sales	---
Quality	Fewer errors in commissioning through control via barcode labels. Improved knowledge of process through combining all necessary data	---	Level of service 98% (+1%) one-face-to-the-customer
Flexibility	Improved peak coverage in commissioning	---	---
SYSTEMS			
Reduced Adaptation Expense	Achieved through customizing and ability to update	---	---

Table 4-1: AMAG Spare Parts Management – Costs and Realized Benefits

5 Conclusions

Through adoption of a process-oriented spare parts management and the necessary information technology support, AMAG can stay on top of the increasing complexity in the spare parts business. The integration of the regional warehouses eliminates duplicate work and reduces interfaces. The information systems support allows time savings and reduction of errors by automating process steps. And finally, increased transparency in the spare parts business makes it possible to maintain a constant level of service despite a more complex framework. The AMAG case shows the following particularities:

- **AMAG restructured the processes in the spare parts business to be customer-oriented.**
- **The ability to access data for the processes in the spare parts business in real-time makes it possible to eliminate one business step in the medium term.** This allows AMAG to maintain its high level of service despite increasing complexity in the spare parts business.
- **Car manufacturers strongly influence the organization of the spare parts business, since they are currently in a position to dominate dealers and importers.** In the implementation of its system, AMAG adapted itself as much as possible to its main supplier, VW.
- **AMAG adapted its processes to the system and not the other way around.** It places a higher value on the release capability of the software and thus the minimization of the restructuring expense than on the support of special processes. Standard software requires an economically sensible balance between exact-fit process support and maintenance of release capability.

Expert Interviews

Bernhard, Rudolf, CEO, Parts and Accessories, AMAG Automobil- und Motoren AG, Buchs (ZH), August 14, 2002

Kloss, Dr. Ursula, P.I. SAP Group, Project Leader, AMAG Automobil- und Motoren AG, Buchs (ZH), August 14, 2002

Co-Interviewer: Cäsar, Marc, Research Associate CC BN 2, Buchs (ZH), August 14 2002