10.06.2003 / System Integration at Hamburg Sanitation:

The Key to Waste Management Future

With a population approaching 2 million that produces nearly 1 million tonnes of waste annually, Hamburg, Germany's legion of sanitation workers and administrators must maintain strict schedules and deadlines to sustain the demanding hygienic standards that the city's residents have come to expect. One of the keys to reach this goal was the implementation of mySAP Utilities for Waste Management from SAP and its interplay with ESRI's GIS software.


Street cleaning

Long gone are the days of crews simply moving through neighborhoods to collect and empty trash-laden containers into trucks for transport to nearby incinerators. The sheer enormity of the job dictates that well organized, well managed teams perform the necessary duties. They have to adhere to the stringent schedules to collect, transport, and dispose of the mountains of trash generated each and every day in Hamburg, as well as to complete the other responsibilities of the Department of Sanitation (Stadtreinigung Hamburg, SRH), such as billing and route planning.

Originally acquiring its GIS in the late 1990s for mapping projects, the department soon realized that because of its versatility, GIS could be used as the integrating platform for both its existing account management and logistical planning applications. So, in 2000 the department began the development of its Betriebliche Leistungssteuerung und Gebührenabrechnung (BELUGA) or "Operational Efficiency, Control, and Billing System." The first step was to initiate SAP IS-Waste at the SRH, which was development partner of SAP, and going live with the billing process in March 2002. But apart from that, the goal of the BELUGA project was to create a system for the integrated processing of commercial, technical, and logistic data. So the second part was to implement the GIS and the tourplanning software.

Integration from route planning…

This integrated system, which includes SAP, GIS, and route planning software, is being designed by ÖKODATA, a software developer in Germany. The BELUGA system includes **mySAP Utilities** for Waste Management from SAP, which is used to manage all work order data and billing processes, Combitour by IVU traffic technologies for logistic planning and fleet management, and ESRI's GIS software, including ArcSDE, ArcView, and MapObjects, for geographic database management and analysis.

So for the second step the interface between the tourplaning program and a graphical user-interface for the tourplanning program had to be developed. Therefore a new graphical user-interface (**GUI**) for the tourplanning software using MapObjects from ESRI was developed. This GUI is interacting with the tourplanning program from IVU giving the user the possibility to work on some steps of the planning process in the tables of the planning program and to see the results immediately on the screen. The user also has the possibility to drag and drop the data and to calculate the result immediately in the planning program. SAP was defined as the leading system – all the data for the tourplanning program is delivered from the SAP system.

To manage this, the project team had to learn about the different transactions in SAP IS-Waste, and to define in which way the interface should react on the different data and how it should send the data back immediately. If someone changes data in the SAP system, for example by pressing a saving-button, all the tourplanning data are automatically given back to the interface. A short time later the employee at the planning desk will see that there have been some changes. He´ll then be able to immediately update the already planned routes.

The challenge was to make sure that all the changes were really sent to the interface as SAP IS-Waste offers various procedures to fill the system with data via different transactions. Because it was not allowed to modify the SAP system, the team had to find so called "user exits" in SAP. The use of reports was not possible, because the data should be transported immediately. The way back of the results such as work orders for management and billing statements to SAP is generated automatically via **BAPI**.

…to payment processing


Bulky refuse

The GIS therefore provides the integrating platform for BELUGA, incorporating both mySAP's business process administration and Combitour's route management applications, which allows a seamless managed process from route planning, through collection services, to payment processing. A primary reason for integrating the three systems was to eliminate the department's current time consuming and laborious manual planning and route optimization procedures. BELUGA supports the comparison and optimization of various route possibilities, allowing Hamburg's Department of Sanitation to better serve the needs of its customers while, at the same time, increasing efficiency to it's full potential.

ÖKODATA programmed the interfaces between the three systems, which regulate the data exchange between SAP-IS-Waste and GIS/Route Planning. BELUGA manages a variety of queries and data transfers. Single queries from SAP generate a prompt response from the GIS to the operator. Update Services is the automated delivery of newly acquired or changed work orders from the SAP system to the route planning system. A mass data transfer of all work order data from SAP to the GIS takes place upon the commencement of a data purge originating from the transfer process.

The GIS provides dynamic search capabilities of work order locations and related asset information that are managed by SAP. For example, bulky waste work orders are received by the department's Call Center and entered directly into the SAP system. Since the Call Center handles more than 700 pick-up orders per day, the daily routes are centrally planned for the entire City of Hamburg. When a customer calls the center, he is given possible pick-up dates and times, depending on his location. This pick-up information is provided by the Capacity Preview, a feature integrated into the SAP system.

Enhanced efficiency

As soon as the Capacity Preview is called up, a GIS interface is automatically activated in the background, displaying a map of the customer's residential area. This allows the Call Center operator to view the location while still on the telephone with the customer. The program also checks for any restrictions for the given address, such as closed streets on specific days and whether or not the street is passable for a normal bulky pick-up vehicle. The work order data is then transferred from the SAP to the Combitour system for route planning. After the completion of the route, the data goes back to SAP for the creation of work orders for management and billing purposes.


Cleaning of sidewalks

The Hamburg Department of Sanitation is also responsible for cleaning the city's sidewalks. The costs involved are charged to those businesses fronting the sidewalks, which requires that the sidewalk segment data stored in the GIS be sent to the SAP system. There, occupants liable for clean up costs are determined and the charges are calculated based on the registered street-front measurements. To accomplish this, the GIS includes landscape information from Hamburg's digital Assessor maps, walkway and sidewalk data from the Surveyor's department, property information from the Department of Transportation, and information from the Hamburg Automated Real Estate Registry.

The "going live" of the bulky-waste process was in September 2002, while the "going live" of Containerservices and the collection of waste bins (about 360.000 bins per week) was in May 2003. Concludes Frank Reiß, project leader for the Hamburg Department of Sanitation's Geoinformation und Tourenplanung, "Since implementing the BELUGA system, our planning process is much more efficient and the GIS interface to SAP makes our accounting procedures both easier and more understandable."

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