

## WHITE PAPER

# Business Value Analysis of Autodesk Topobase in Utilities

Sponsored by: Autodesk

David Sonnen (ISSI)

Randy Perry

November 2007

## EXECUTIVE SUMMARY

Topobase is Autodesk's platform for integrating infrastructure design and management. This study details the business benefits of using Topobase within utilities. We conducted this study using standard IDC methods for assessing business value in terms of return on investment. We also outline industry trends that drive utilities toward integrated information management platforms like Topobase. We include two case studies from established Topobase users. Our intent is to provide information useful to decision makers who are considering solutions for reducing costs and improving process efficiencies within their information systems.

Topobase is Autodesk's platform for integrating infrastructure design and management.

To evaluate the business benefits of integrated computer-aided design (CAD) and geographic information systems (GIS) data supporting business processes, IDC interviewed executives at six companies — in North America and Europe — using Autodesk Topobase and asked a series of questions about the impact of Autodesk's Topobase solution on their operations.

The largest area of benefits came in hard costs reductions. IDC found that the companies surveyed were able to increase their project load by 31% yet reduce their equipment and operational costs by an average of \$1.8 million per 100 users.

IDC found that the companies surveyed were able to increase their project load by 31% yet reduce their equipment and operational costs by an average of \$1.8 million per 100 users.

Half of the companies surveyed were government organizations, and as such their revenue was controlled and growth was limited. Even so, on average, companies were able to increase their revenue by almost \$100,000 annually per 100 Autodesk users. This includes users of all Autodesk products, including AutoCAD, AutoCAD Map 3D, Autodesk Utility Design, MapGuide, and Topobase.

By automating and integrating CAD and GIS data, companies were able to increase their user productivity by 8%, which included reducing time for designing workflow as well as reducing the number of users per project and at the same time reducing project completion times. Combined user productivity benefits totaled \$1.0 million annually per 100 users.

For the Autodesk Topobase customers surveyed, the total benefits averaged more than \$2.9 million annually per 100 users. The companies invested an average of more than \$1.1 million over three years in deploying the Autodesk Topobase solution, resulting in a net present value for the three-year savings of almost \$5.7 million per 100 users.

The payback period from deploying the Autodesk Topobase solution averaged 11.6 months for the companies surveyed, yielding an average return on investment of 518%.

Based on these numbers, the payback period from deploying the Autodesk Topobase solution averaged 11.6 months for the companies surveyed, yielding an average return on investment of 518% (see Table 1).

**TABLE 1**

ROI Analysis for Deploying Autodesk Topobase Solution per 100 Users

Metric	Value
Three-year cost of investment	\$1.1 million
Annual benefits	\$2.9 million
Net present value of three-year savings	\$5.7 million
Payback period	11.6 months
ROI over three years	518%

Source: IDC, 2007

**INTRODUCTION**

Utilities have been gathering data about their infrastructure and operations in spatial systems for years — some for decades. Traditionally, utilities have used different information systems like CAD, GIS, and ERP to support different processes like design, construction, operations, administration, finance, and customer services.

Logically, we know that these processes are all related — information from each process is useful in other processes. But until recently, managing data logically across the processes was difficult. Topobase changes that. It allows utilities to manage information from planning, design, construction, customer service, and ongoing operations in workflows that match the ways that utilities work.

Topobase is implemented and well-established in over 500 installations. Users have found improvements in efficiency and reductions in cost. But how much? Just what is the hard business value of Topobase? Is it really worth the money? Those are the questions Autodesk asked. IDC conducted this study to answer them.

Topobase is implemented and well-established in over 500 installations. Users have found improvements in efficiency and reductions in cost. But how much?

**Survey Demographics**

IDC interviewed six end-user companies — from the United States and Western Europe — that had deployed Autodesk's infrastructure design and management solutions. Interviews with end users focused on the real costs of managing spatial information across multiple departments and processes and the value of the benefits of the Autodesk Topobase solution.

The companies included public and private utilities and averaged 1,200 employees.

On average, each company had incorporated 76% of all spatial information sources into Topobase and had Topobase in production for four years. Five of six companies also had deployed MapGuide. Across the board, respondents had 83% of their engineering, planning, and maintenance/operations employees using Topobase as well as 75% of executives and 33% of finance.

---

## Trends in Spatial Technology

Users want to integrate spatial capabilities into enterprise information systems. This basic need drives most new growth in the spatial information management (SIM) industry. IDC expects spatially integrated enterprise systems to continue to grow and mature over the next several years. During this period, these systems will be driven by broad IT dynamics rather than the specialized requirements that have driven technologies like GIS and CAD in the past.

Systems will be driven by broad IT dynamics rather than the specialized requirements that have driven technologies like geographic information systems and computer-aided design in the past.

IDC expects the following trends to shape spatially integrated information systems for the near term and the midterm:

- ☒ Increasing awareness of spatial capabilities and their value will increase as consumer-based applications like Google Earth/Maps, Microsoft Local.Live, personal navigation, and location-based wireless services become ubiquitous. Enterprise users will come to expect the simple interfaces and performance typical of consumer-oriented systems.
- ☒ Deep integration of all types of data and applications, including spatial, will continue as an imperative in maturing enterprise IT systems.
- ☒ In highly integrated systems, data is continually merged from many sources. This means that information systems have to be designed from the ground up to maintain predictable data quality. The user has to know that the data being used for a particular application is fit for the purpose at the time of use.
- ☒ Commoditization of basic spatial functions and data will be offset by new requirements for integration with enterprise systems and by requirements like advanced operational analytics and real-time, location-specific, and repeatable decisions.
- ☒ Higher-quality spatial data will be increasingly available from diverse sources such as tracking devices; networked sensors; satellite, aerial, and ground-based imagery; and location-specific information extracted from tabular data streams.
- ☒ Enterprise IT capabilities like service-oriented architecture (SOA), Web services, and enterprise solutions platforms will make SIM implementations easier and a lower risk for the customer.
- ☒ IT governance will become more sophisticated. The aim is to make all enterprise IT systems work together to support business goals. Vendors, systems integrators, and in-house implementors will have to adapt traditionally segregated and independent geospatial systems to meet new governance requirements. Topobase represents a direct response to this trend.

### ***Specific Drivers and Constraints That Influence the Demand for Topobase and Related Autodesk Products***

The following four factors shape the value of Topobase within utilities:

- ☒ Users need consistent, accurate information about infrastructure and customers across all processes. This means that one version of information is used across processes like planning, design, construction, operations, and finance.
- ☒ Some utilities still use separate systems for each process. In these utilities, common data has to be reentered in each independent system. This reentry process inevitably introduces data errors that have to be found and corrected. Still, a predictable percentage of errors go undetected until they cause expensive operational problems.
- ☒ Information about customers and the infrastructure that they touch must be accurate and continuously synchronized. For example, at Stadtwerke Augsburg, changes in a customer's electric connections or capacity are quickly reflected in the customer's billing records in Stadtwerke's SAP customer billing systems.
- ☒ Utilities need to respond effectively to changing situations like regulation, mergers, and natural disasters. While these situations present different challenges, they are each easier to face if basic infrastructure and customer information is consistent, accurate, and accessible.

### ***Topobase Capabilities***

From finance and planning to maintenance, engineering, and beyond, virtually every department within utility organizations uses — and generates — spatial information to carry out day-to-day processes. These processes include engineering projects, mapping, cadastre, land and parcel management, asset-based accounting, emergency management planning, and facility maintenance. With an enterprisewide view of spatial information, each of these processes is more efficient, accurate, and cost effective. Also, executives can gain insight into the factors impacting their organizations' infrastructures so that they can make better decisions.

With an enterprisewide view of spatial information, each of these processes is more efficient, accurate, and cost effective.

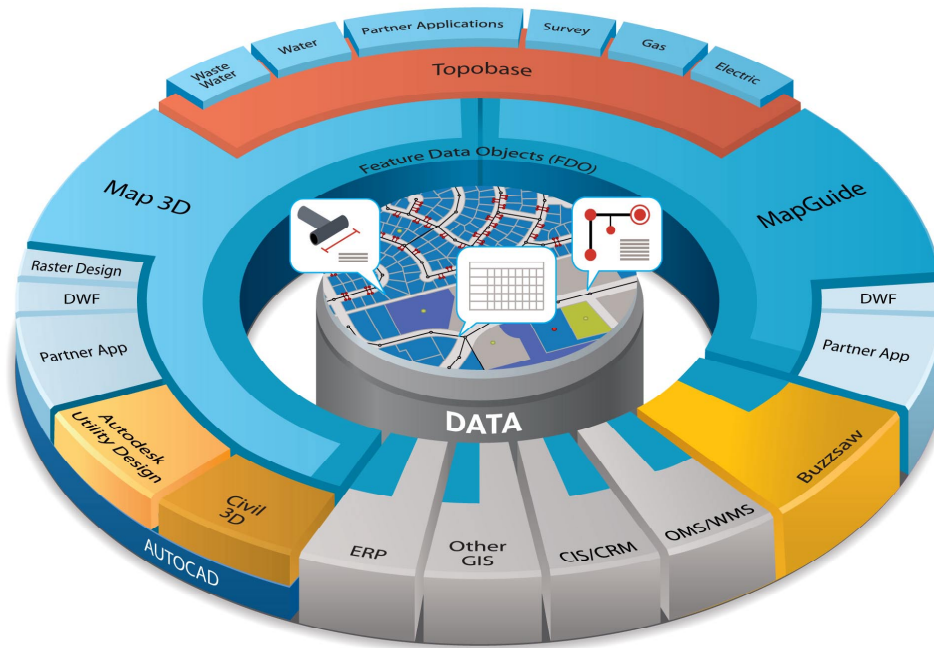
Unfortunately, many utilities find it virtually impossible to see the big picture that can be represented with integrated data. In these organizations, data does not flow smoothly from one process or department to the next. For example, a planning department and a water department managing the same areas routinely need access to each other's data to coordinate their projects. However, these departments commonly work with different technologies that are owned and managed independently. Consequently, data must be converted from one format to another — wasting time and inducing errors.

Topobase addresses these issues by providing centralized data management, workflow management, and rules-based models that are tailored to each organization's unique situation.

Topobase is an integral part of Autodesk's geospatial product offering. As shown in Figure 1, Topobase is part of a solution that can include Autodesk design products, AutoCAD Map 3D, MapGuide, Autodesk Utility Design, and virtually any other enterprise application.

**FIGURE 1**

**Autodesk Integration Architecture**



Source: Autodesk, 2007

Topobase is shown in the upper (red) section. The Topobase framework extends AutoCAD Map 3D and MapGuide, bringing additional functionality and tools like topology, business rules, jobs (versioning), and advanced network tracing and analysis.

Autodesk provides solution modules for specific vertical markets including water, waste water, electric, gas, and survey. These modules leverage Autodesk's experience with hundreds of customers in each of these verticals and provide focused data models, workflows, and analysis tools that support these industries. Out of the box, Autodesk models provide about 80% of what a customer needs. Autodesk Consulting and partners provide localization and configuration support.

The top center of Figure 1 shows partner applications. Topobase is structured so that Autodesk partners can develop industry-specific solution modules. Currently, there are over 40 solution modules for managing a variety of assets including applications for trees, street furniture, lighting, and even graveyards.

Since Oracle is the foundation database, any business intelligence, CRM, ERP, or other enterprise application can access and even update the other applications within the user's information system through Topobase.

This is a powerful but complex concept. The two case studies in the section that follows illustrate how the parts fit together.

Since Oracle is the foundation database, any business intelligence, CRM, ERP, or other enterprise application can access and even update the other applications within the user's information system through Topobase.

## TOPOBASE CASE STUDIES

---

### Las Vegas Valley Water District

Las Vegas, Nevada, is one of the fastest-growing metropolitan areas in the United States. With a population over a million now, Las Vegas has been growing at about 6% annually for the past 10 years. The large population increase and expanding urban environment mean supplying water for the Las Vegas Valley is a challenge. That's the job of the Las Vegas Valley Water District (LVVWD).

To keep up, the LVVWD lays down over 250 miles of water transmission and distribution pipe every year. At any one time, it has more than 1,500 active projects. The LVVWD AM/FM/GIS Division processes over 200 new projects and work orders per month. (AM/FM/GIS stands for Automated Mapping/Facilities Management/Geographic Information Systems.)

The AM/FM/GIS Division supports systems that handle information to and from the following internal and external customers:

- ☒ **Engineering design.** Process new engineering service requests from developers and their engineering and architectural contractors for new residential and commercial building projects
- ☒ **Planning division.** Process and deliver information regarding water usage to support planning for new distribution systems
- ☒ **Inspection and major construction.** Support requests for inspections at new construction and rehabilitation of existing systems
- ☒ **Customer service.** Manage information from enterprise customer information and financial data applications to support customer service inquiries
- ☒ **Water supply operators.** Provide as-built drawings of the distribution networks for maintenance and repairs of facilities

The primary job for the AM/FM/GIS Division is to keep an accurate record of the as-built information for all LVVWD projects. These "as built" form the foundation for ongoing operations. This means that all design and construction data has to be verified and maintained as the massive LVVWD water system is continuously built out and maintained.

Data comes from new construction projects, developer and major construction activities, and changes to existing infrastructure resulting from maintenance activities and system repairs. Each project may involve several contractors and LVVWD crews, each producing independent data streams. All this grows at about 6% a year.

To keep up, LVVWD had to gain control of a number of legacy systems, including both CAD and GIS, and bring them together into one manageable framework. In 2006, LVVWD brought in Topobase to serve as the controlling framework. With the help of Autodesk Consulting, it brought Topobase online in November 2006.

Today, it uses Topobase to manage a number of workflows, including the creation and maintenance of as-built drawings and the flows of information to and from other LVVWD systems.

The hard business results include the following:

- ☒ Time needed to complete projects dropped by 20%. This means that the AM/FM/GIS Division has a better chance of keeping up with increasing workload without additional staff.
- ☒ Effort required for data review and correction dropped by 15%. LVVWD estimates that this factor alone accounted for an annual savings of about \$250,000. It also thinks that the improved data quality saves other LVVWD groups additional money.
- ☒ Reduced system operation and maintenance costs by about 60%. The AM/FM/GIS Division estimates this saves about \$460,000 every year.

LVVWD told IDC that it believes that Topobase paid for itself in about six months.

---

## **Stadtwerke Augsburg**

The city of Augsburg, Germany, was established in 15 B.C. as a Roman garrison. Today, Augsburg is a thriving city with a population over 270,000. Stadtwerke Augsburg is an independent utility company that delivers a wide range of services including gas, electricity, water, district heating, and local public transport to Augsburg and its surrounding areas. Stadtwerke Augsburg serves a total of about 350,000 customers.

As one might imagine, delivering such a wide range of services in a historic but growing city is complicated. Stadtwerke Augsburg had, like most utilities, acquired a number of different information systems to handle processes like customer billing, installation scheduling, design, construction, and operations. And like many utilities, the hodgepodge of different systems became harder and harder to manage as the city grew. Today, Stadtwerke Augsburg processes about 200 new construction projects per month, with a backlog of about 500.

According to Juergen Biedermann, a manager in Stadtwerke Augsburg's central documentation and data processing services department, "Maintaining our asset data sets cost us a great deal of time and made it difficult for us to respond to customers as quickly as we wanted. We were also concerned about the data quality. With multiple data sets, costly data errors and inconsistencies between systems were inevitable."

In 1999, Stadtwerke Augsburg started using Autodesk products like AutoCAD Map 3D to handle GIS-related tasks. It was using other Autodesk products for engineering tasks like design and construction. In 2002, Stadtwerke Augsburg acquired Topobase to manage all of its engineering processes. It also linked Topobase to its SAP system for a direct interface with processes like customer billing, asset information, and cost accounting. Oracle is the underlying database for both Topobase and SAP.

"We liked the fact that Autodesk Topobase offered us a way to integrate all our asset data within the Oracle Spatial database and then maintain the data in the normal course of our work," explains Biedermann. "The whole solution is based on open data. That helps to both protect our investment and use our asset data with other applications, including our SAP customer accounts system."

After implementing its integrated system, Stadtwerke Augsburg realized that employees without engineering expertise, such as customer service agents, managers, and field crews, would benefit from ready access to the asset and spatial information by speeding business decisions and customer support. Stadtwerke Augsburg turned to Autodesk MapGuide to make the data available over the Internet.

Biedermann notes that Autodesk MapGuide has been so successful among desktop users that Stadtwerke Augsburg decided to expand data availability even further. He says, "Using GPS-enabled handheld mobile devices, our field technicians can access the coordinates of all transformer locations. If there is a disturbance on a line, they use the information for navigation, which allows them to respond faster."

Today, Stadtwerke Augsburg has about 350 users for Topobase and MapGuide. Since Topobase has been in operation since 2002, the benefits are accepted as a normal part of business. For example, a "Call Before You Dig" request used to involve five people from three different departments — gas, water, and electric. The customer had to go from department to department to get an answer. Today, there is a central desk, staffed by two people who can answer questions immediately and print the appropriate map on demand. About 60% of these requests are handled over the Internet.

The list of examples is long, but here are two more that illustrate key points. In 2000, there were 24 people involved in documenting Stadtwerke's network. Today there are 13 people handling a higher volume of work than the 24 people in 2000 did.

According to Beidermann, "We have to compete for our customers. Our customer turnover is only about 1–2%. Other utilities around here see a turnover of 5–10%. I think that our quick access to information and responsiveness is the main reason. Topobase is responsible for at least 50% of that."

## **IDC'S ROI METHODOLOGY**

To quantify the business benefits of IT management, IDC has developed a return-on-investment (ROI) methodology that measures the total life-cycle costs and the sum of the benefits achieved. The methodology calculates the ROI in a three-step process:

1. **Ascertain the investment** made in the purchase and implementation of the solution and the associated training and maintenance costs. To get an accurate assessment of the investment in deploying, IDC asked for the deployment, setup, upgrade, and maintenance costs as well as the total cost of the software and training. This investment included the loaded costs of the incremental staff required to operate the Topobase solution.

2. **Measure the benefits** in IT staff and user productivity from deploying the solution as well as the cost savings from increased efficiency and lower capital and operating expenses. Finally, look at the impact on revenue — adding increased revenue and reducing lost revenue:

❑ **Productivity savings.** IT staff productivity indicates how effectively IT managers and their staff use their time. Besides reducing operations costs, gains in IT productivity can free up staff to implement new initiatives more rapidly, helping to create a competitive edge.

❑ **User productivity.** IT solutions impact user productivity in three ways — automation, integration, and performance. Automating routine tasks allows organizations to move labor assets to higher-value activities such as implementing new business initiatives. Automation of business processes can enable users to complete tasks more quickly with fewer errors. Integrating systems, solutions, and data places more control of operations into fewer labor assets while also creating new functionality. Companies are increasingly dependent on service uptime as organizations become progressively more network centric. When users are unable to access network resources, their productivity may be severely impaired. Since users often are able to perform other business tasks when service interruptions or performance degradations occur, only a portion of the potential user impact time is counted toward the final ROI result.

❑ **Hard cost savings.** Optimizing IT environments reduces both capital and operational costs. Capital expenditures for hardware and software are typically reduced through automation, integration, consolidation, and better management practices. Operational costs can be cut by improving efficiency, which is a measure of how well the organization can achieve economies of scale and scope of work with its people, tools, and practices. To remain competitive, companies must be able to grow their operations at a faster rate than the staff required to support them. Skilled labor continues to be scarce, so companies are expecting existing staff to take on more work and responsibilities. If business units are unable to achieve the required economies of scale and scope, they restrain corporate managers' business decisions and discourage aggressive deployment of technology to gain a competitive advantage.

3. **Calculate the payback period and ROI for the deployed solution.** From the results of the interviews, IDC was able to calculate the average payback period and rate of return from investing in Autodesk Topobase as well as the net present value of the savings. IDC bases its calculations on a number of assumptions:

❑ Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and user productivity savings.

❑ Lost productivity benefits are a combination of reducing lost user time from errors and technology failures and increased job performance due to more reliable operations.

- ❑ The net present value of the three-year savings is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost.

Since not every hour of downtime equates to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of its survey, IDC asks each company what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

Further, because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis, then subtracts the deployment time from the first-year savings.

---

## **Determining the ROI and Payback Period**

From the results of the interviews, IDC was able to determine — based on increases in user productivity reductions in operational and capital costs and improvements in revenue generation — the average ROI and payback period that the surveyed companies realized from deploying Autodesk Topobase solutions.

### ***User Productivity***

Because Topobase integrates data, it impacts user productivity across multiple business units. Those enjoying the greatest benefits of Topobase solutions are users involved in construction or maintenance projects. Table 2 shows that Autodesk's Topobase solutions enhanced user productivity in three ways:

- ☒ **Complete view of operations.** Reduced the time requirements for managing workflows like CAD-GIS integration by 75%
- ☒ **Better management of operations.** Reduced the number of project staff per project by 25% while increasing the number of projects by 31%
- ☒ **Integration of all engineering, planning, and maintenance.** Increased productivity overall by 8% due to integrating data types

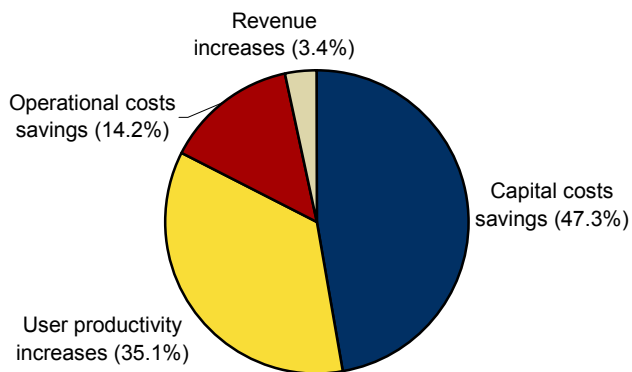
**TABLE 2****Key Performance Indicators — User Productivity**

Activity	Savings (%)
Time spent designing workflow	-75
Users assigned per project	-25
Sustained projects per month	31
Total project staffing	-1
User productivity increase	8

Source: IDC, 2007

A three-year analysis showed that the average company would see user productivity benefits of \$3.0 million per 100 users.

Figure 2 shows that user productivity increases accounted for 35.1% of annual benefits. Combined with capital costs and operational costs reductions and revenue increases, total annual benefits were \$2.9 million per 100 users.

**FIGURE 2****Annual Benefits of Autodesk Topobase per 100 Users**

Source: IDC, 2007

### **Revenue Generation**

Since 50% of the organizations in the study were government entities, their opportunity to increase revenue was limited. Government utilities have price controls, which means they can increase their efficiency and project turnover rate. But, they cannot unilaterally drop their prices to be more competitive. However, Table 3 shows that all the companies were able to speed up their project turnaround time by 29% (average — from 48 days to 34 days). Faster turnaround time, more efficient staffing, and integrated resources enabled companies to increase the number of projects by 65%. A three-year benefit analysis shows that the average organization would generate \$.3 million per 100 users.

**TABLE 3**

#### Key Performance Indicators — Revenue Generation

Activity	Savings (%)
Project turnaround in days	-29
New projects per month	65

Source: IDC, 2007

### **Cost Savings**

By integrating spatial data from multiple organizations, Topobase enabled the participants to optimize its use of internal resources, thereby providing benefits in both operational costs and capital costs. Cost benefits can be grouped into five benefits:

- ☒ **More efficient operations.** By eliminating paper handling and automating the collection and analysis of statistical data, companies were able to reallocate 1.5 FTEs and avoid hiring another 8.4 FTEs. Total labor savings came to \$412,444 million annually per 100 users.
- ☒ **Reduction of errors.** Table 4 indicates that companies were able to reduce errors created by bad data by 94%. Total savings associated with more reliable data were \$2,869 annually per 100 users.
- ☒ **Paper reduction.** Integrating systems meant lower reliance on paper output such as maps and drawings. Companies annually saved \$1,498 per 100 users.
- ☒ **Replacing other systems.** In many cases, Topobase replaced multiple software applications that were being used to manage separate data types. By consolidating hardware and software platforms, companies were able to save \$45,919 annually per 100 users in capital costs.

☒ **More efficient supply.** Equipment supply is a critical function for utilities and construction companies. Topobase greatly enhanced the ability to ensure the right equipment (trucks, cabling, pipes, etc.) was ordered and delivered to the right location in a just-in-time fashion. The cost of these errors could be the travel costs and labor for sending the maintenance team to the wrong location, or fines associated with not meeting agreements. In addition, there are the labor costs to repair the bad data (reduced 50%) and the time lost to responding to help desk calls (reduced 88%). Improving equipment supply reduced the cost of overages and errors and was the most significant benefit, delivering an average of \$1.3 million annually per 100 Autodesk users.

Improving equipment supply reduced the cost of overages and errors and was the most significant benefit, delivering an average of \$1.3 million annually per 100 Autodesk users.

**TABLE 4**

Key Performance Indicators — Cost Reduction

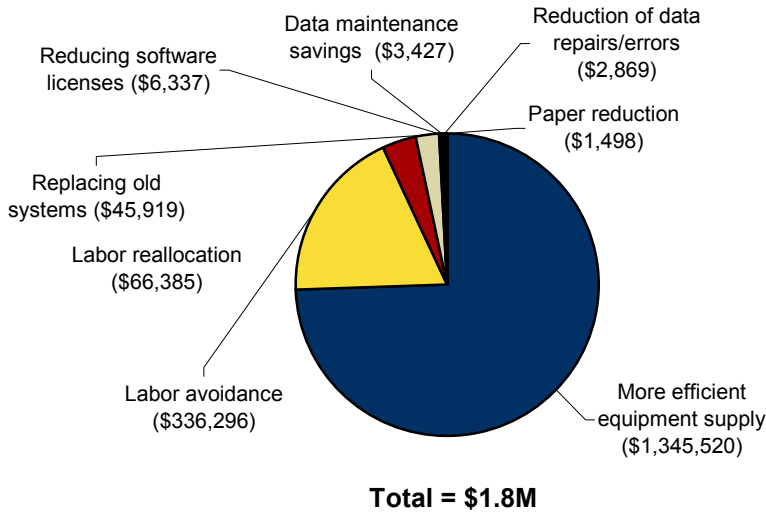
Activity	Savings (\$)
Data repairs per month	-50
Errors due to bad data	-94
Help desk/user complaints per month	-88

Source: IDC, 2007

Total cost reduction over the three years equaled \$1.8 million per 100 users. Figure 3 shows the breakdown.

**FIGURE 3**

Annual Hard Cost Savings Share per 100 Users



Source: IDC, 2007

***Payback and ROI***

Overall, the Autodesk Topobase customers surveyed enjoyed total benefits of more than \$2.9 million annually per 100 users. The companies invested an average of more than \$1.1 million over three years in deploying the Autodesk Topobase solution, including initial equipment and software costs and installation, IT training, annual licenses, and support and outsourced support. Benefits minus the investment resulted in a net present value for the three-year savings of almost \$5.7 million per 100 users.

Based on these numbers, the payback period from deploying the Autodesk Topobase solution averaged 11.6 months (or 6 months from completion of deployment) for the companies surveyed, yielding an average return on investment of 518% (refer back to Table 1).

**FUTURE OUTLOOK: INTEGRATED SPATIAL INFORMATION MANAGEMENT**

Spatial information management, including CAD and GIS, has transformed from a specialist application to a technology with broad relevance within many IT ecosystems. IDC expects technologies like Topobase to accelerate the use of SIM across most enterprise processes that have location-specific elements.

This near-future environment will be shaped by the following five factors:

- ☒ Increasing emphasis on enterprise issues such as data quality, security, and process-based integration

- ☒ Increasing emphasis on geospatial master data within enterprise systems (Organizations will maximize and exploit their spatial data and technology resources across their enterprises and external organizations.)
- ☒ Increasing geospatial capabilities from large Internet providers like Google, Yahoo!, Microsoft, and AOL (The simplicity and ease of use found in these consumer-facing applications will influence user expectations.)
- ☒ Sharply increasing impacts of location-determining technologies such as Global Positioning System (GPS), radio frequency identification (RFID), wireless LAN (WLAN), intelligent networked sensors, and cellular networks — technologies that are rapidly becoming ubiquitous
- ☒ Increasing systems and data integration opportunities focused on spatially enabling enterprise information systems

## CHALLENGES

The main challenges for Topobase have little to do with technology. After conducting this study, we are convinced that Topobase handles the technical side of spatial data and applications integration. Let's look at two interesting challenges that lie outside technical realms.

---

### Internal Political and Cultural Barriers

Generally, the toughest integration problems between departments or different organizations are matters of organizational structure. Legacy systems in different departments are often owned by different groups, and those groups compete for budget and resources. Often budget and staffing processes mandate a separation of resources between systems, at least implicitly. To complicate matters, strategic IT initiatives often ignore these implicit barriers. Sometimes labor contracts prohibit the sharing of resources. Sometimes the "CIO" is only a titular position with little real authority or ability to control.

Generally, the toughest integration problems between departments or different organizations are matters of organizational structure.

Utilities that want to enjoy the benefits that IDC found in this study will have to identify and address the political, cultural, and labor issues that make information integration difficult.

---

### CAD/GIS Differences

The differences between CAD and GIS are to some extent technical. However, the deep gaps are shaped by basic differences in the purposes for the technologies and the training and backgrounds of the primary users.

The differences between CAD and GIS are to some extent technical. However, the deep gaps are shaped by basic differences in the purposes for the technologies and the training and backgrounds of the primary users.

CAD is fundamentally a tool for engineering. Engineers use CAD to design, create, and manage our built environment, from the tiniest parts to massive structures and infrastructure. Engineers are trained to make all the parts work together in predictable ways. Sometimes engineered components are fixed to the earth — buildings, bridges, roads, public infrastructure, for example. But, the main concern is that the engineered component, whatever it is, does what it is supposed to do.

GIS technology is about geography — where people and things are and how they interact on the earth. People use GIS systems to capture and analyze information about geography, people, and things.

There is an overlap in functionality between CAD and GIS. For example, both technologies faithfully record geodetic coordinates and register things in space or on the earth's surface. Both technologies can produce magnificent maps. But the differences in technologies are still deep. Deeper still are the backgrounds, orientation, and jobs of the people who use the technologies.

Organizations that want to realize the benefits of integrated CAD and GIS will have to understand that real differences have valid foundations. Bringing the technologies together requires an organizational culture that encourages integration and a lot of patience and understanding.

## CONCLUSION

Just what is the hard business value of Topobase? IDC found that utilities saw a payback period from deploying the Topobase solution averaging 11.6 months, yielding an average return on investment of 518%.

We also found several examples of significant intangible returns like "better customer service" and "getting work done faster." The positive comments about Topobase from the people we interviewed were surprisingly consistent.

The best fit for Topobase is in organizations that need to manage large, complex workflows that have significant spatial elements. Utilities universally fit in that category.

Given the strong business value IDC found for Topobase, we expect Autodesk to build on its current success in utilities. Topobase's uptake will be driven by tangible returns to end-user organizations.

IDC found that utilities saw a payback period from deploying the Topobase solution averaging 11.6 months, yielding an average return on investment of 518%.

Topobase's uptake will be driven by tangible returns to end-user organizations.

---

## Copyright Notice

External Publication of IDC Information and Data — Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request. IDC reserves the right to deny approval of external usage for any reason.

Copyright 2007 IDC. Reproduction without written permission is completely forbidden.