



The Geospatial Technology Report—2001

A Survey of Organizations Implementing Geospatial Information Technologies



Executive Summary

This study is presented by GITA's Industry Trends Analysis Group (ITAG) as an information exchange tool to assist in the education of GITA's members and others about how geospatial information technology (GIT) is being used, and how trends in the development of GIT and related technologies affect utility operations today and into the future. As GIT and its role in business operations evolve, studies such as this will help users and developers of GIT have a better understanding of how the technology is being used and what value there is in the many applications and interfaces associated with GIT.

A great deal of value can be derived from this report, particularly for those who are trying to develop a better understanding of the technical and application trends that are shaping GIT. This is true particularly in terms of conversion, enterprise deployment, and the development and implementation of applications and system interfaces. Additionally, as this is the fourth annual edition of this study, trends have emerged that can only be validated with data from a multiyear study such as this.

Please note that the word "utilities" is used in this executive summary for brevity when discussing data that pertains to all utilities, in addition to pipeline and telecommunications companies.

This year's edition of *The Geospatial Technology Report* has undergone a few changes, all of which are designed to provide for more comprehensive reporting of GIT industry trends. Among the changes are:

- Combining the water and waste/storm industries into one section: Previously reported as separate sections, these two have been combined into one section this year and will be reported as one section in future years. This is because many of the study participants are in both the water and waste/stormwater business, the categories that are tracked are very similar for both industries, and the vendors serving these industries for their GIT solutions are virtually identical.
- Addition of more demographic, system, and vendor data: To provide a more complete picture of study participants and of the GIT industry, these have been added for each of the five vertical industries. These data appear in the introduction section for each industry.
- Combination of categories: Some of the individual categories within each industry have been combined into one category. This has been done where the category descriptions or titles were so close that it made more sense to combine them in order to get a better picture of both specific and overall market trends.

As noted above, this year’s study provides more thorough demographic, system, and vendor data. The results of these areas are summarized below.

The number of participants grew by over 50% this year, yielding higher-quality data for better industry information and, over time, better trending information.

Table 1. Statistical summary of study participants

	Electric	Water/Sewer/Storm	Gas	Telecomm	Pipeline*
Number of Participants	78	34	24	10	11
High	5,482,000	350,000	1,600,000	3,600,000	—
Low	12,000	100	10,000	25	—
Median	100,000	88,500	280,000	—	—
Mean	510,067	110,487	611,372	—	—

*Pipeline recorded by miles of transmission pipeline; see pipeline industry section for more information.

Table 2. Operating systems summary by industry, and overall

	Electric	Water/Sewer/Storm	Gas	Telecomm	Pipeline	Overall*
Windows	78%	75%	72%	90%	78%	77%
UNIX	3%	4%	9%	10%	0%	4%
UNIX/Windows	18%	14%	14%	0%	22%	16%
Other	1%	7%	5%	0%	0%	3%

*Weighted percentages.

Windows-based operating systems have taken a leadership position in the GIS industry, but there is still room for UNIX, particularly in larger implementations where the more robust UNIX is used at the server level and Windows-based operating systems are used at the client level. For more detail on operating systems usage, each industry’s introduction (with the exception of pipeline, which had limited data for such a summary) includes a breakdown of operating system usage in smaller systems (those with fewer than 10 seats) and larger systems (those with more than 10 seats) in addition to the overall data.

Table 3. Leading GIS system vendors by number of projects, by industry, and overall

	Electric	Water/Sewer/Storm	Gas	Telecomm	Pipeline	Overall*
Enghouse	12%	0%	0%	0%	5%	5%
ESRI	26%	69%	15%	0%	36%	33%
Autodesk	13%	6%	0%	0%	0%	9%
Intergraph	17%	8%	23%	30%	0%	16%
GE Smallworld	17%	0%	42%	10%	0%	16%
Other	16%	17%	20%	60%	64%	21%

*Weighted percentages.

Admittedly, the vendor data is incomplete. Ideally, this would include vendor data by dollar volume; this will be included in next year's report. ESRI is fairly strong across the board, with a pronounced presence in the water/sewer/storm industry, continuing their dominance in local government-driven markets. Intergraph's strongest market is telecommunications.

GE Smallworld, still relatively new to the North American GIT industry, has made inroads, especially in the electric and gas utility industries. Also of note, they have changed the market share in these industries since 1994, when their presence in North America was established, cutting into the market share of other industry leaders.

The bulk of this report covers each of the five industries included in the study, with each industry chapter broken down into four main sections: landbase management, facilities management, facilities applications, and facilities interfaces.

Landbase Management

Landbase management can be very costly. Effective landbase management programs require sophisticated technology and large amounts of staff time—both of which add up quickly. Landbase management is also an area where GIS can have a significant impact on an organization's effectiveness and bottom line. This study demonstrates that companies are investing in geospatial technology for landbase management, and that there is still considerable room for growth in this technology area.

Landbase Accuracy

The data again indicate that extreme precision in landbase data is not a requirement for most utilities, as has been the case in each of the last four years. One change this year is that for the first time, one industry—water/sewer/storm—reported landbase accuracies of over 50% for the combined six-inch and two-foot levels. While this is a new level from anything reported in previous studies, the overall data clearly indicates a limited need for landbase data with accuracies of less than five feet.

	6"	2'	5'	10'	50'
Electric	9	27	18	19	28
Gas	4	28	24	28	24
Pipeline	0	7	14	36	43
Telecomm	9	45	9	9	27
Water/Sewer/Storm	24	34	10	21	10

Landbase Conversion and Sophistication

Utilities across the board still use very little raster data in their landbases. The highest level of raster-only data use is in the pipeline industry at 8%. Raster is used more often, however, in combination with vector data. The majority of utilities are including a seamless coordinate system, centerline data, and street right-of-way data in their landbases.

	Raster	Vector	Raster & Vector	Seamless	Centerline	Right-of-Way
Electric	1	51	47	87	98	66
Gas	0	58	42	84	84	72
Pipeline	8	17	75	63	75	38
Telecomm	0	50	50	67	67	67
Water/Sewer/Storm	6	23	71	71	79	74

Landbase Maintenance Cycle

The frequency of landbase maintenance continues to be relatively low. It is apparent that the vast majority of utilities have not been chosen to invest in the necessary staffing levels to maintain more frequent landbase maintenance cycles. One other possibility is the need for some process redesign work to enable more automatic or seamless data updates.

	Daily	Weekly	Monthly	Longer/Other
Electric	7	31	23	40
Gas	13	13	13	61
Pipeline	0	8	8	83
Telecomm	8	8	25	58
Water/Sewer/Storm	7	11	26	56

Property and Right-of-Way

The inclusion of property and right-of-way data is still not mainstream in utilities, as evidenced by the minority of utilities reporting inclusion of this type of information in their landbases. The most common to be included across all utilities are property and easement data, although in the telecommunications industry, permit data have a higher inclusion rate at 50%. The property and easement rates are highlighted below.

Electric	47%
Gas	40%
Pipeline	not asked
Telecomm	17%
Water/Sewer/Storm	56%

Facilities Management

Facilities management, like landbase management, can be quite costly. Effective facilities management programs require sophisticated technology and significant staff time, which can quickly add up. Facilities management is also an area where GIS can have a real impact on an organization's effectiveness and bottom line. This study demonstrates that companies are investing in geospatial technology for facilities management, and that there is considerable room for growth in this area.

Facilities Conversion and Sophistication

As is the case with landbase data, the use of raster-only data remains low, but is more common when used with vector data. The inclusion of validation of facility and connectivity rules is down slightly from last year's study, which is surprising given their importance and the relatively high rate in last year's study.

	Raster	Vector	Raster & Vector	Val F	Val C	Ancillary Images
Electric	1	67	31	63	77	41
Gas	0	67	33	66	72	36
Pipeline	10	20	70	38	38	44
Telecomm	0	67	33	75	67	50
Water/Sewer/Storm	4	40	56	24	35	59

Facilities Maintenance Cycle

Facilities maintenance cycles are noticeably higher than the landbase maintenance cycles. For instance, over half of the electric utility respondents report facilities maintenance cycles of daily or weekly, the first time this level of maintenance activity has been achieved. One could develop a number of theories as to why these rates are higher than the landbase rates, but a leading theory would likely include the fact that utilities are more facility-intensive (equipment, parts, O&M) than land-intensive; that is, the location might be important, but detailed information about the land or its location does not have the high relative importance.

	Daily	Weekly	Monthly	Longer/Other
Electric	16	36	30	18
Gas	16	28	32	24
Pipeline	8	8	33	50
Telecomm	—	—	—	—
Water/Sewer/Storm	13	18	26	42

Facilities Applications

Once a GIS project is implemented, the value is often realized in two areas: applications and interfaces. This section looks at the rate at which the various market segments are building GIS and related applications.

This year's study indicates that, in general, the rate of applications being implemented is fairly steady, in terms of both fully implemented applications and those that are planned for future implementation.

This section provides a summary, but with the breadth of information here, the reader might want to "drill down" into the individual sections for more detailed information.

Maps & Views

The maps/views applications typically have the highest implementation rates of all the applications categories. This is, no doubt, due to the highly visual nature of GIT. The highest rates overall are in the gas utility industry, which saw growth in the implementation rates of all eight of the maps/views included in the study, with some growth rates of over 30 percentage points.

Operations & Maintenance

O&M applications do not reach the 50% implementation rate in any industry with any consistency. Of the 26 categories across the four industries (the pipeline industry uses significantly different measures), only two have implementation rates of over 50%, relating leaks to mains in gas utilities at 58% and duct occupancy management in telecommunications at 56%. Given the inherent value in applying GIT to O&M processes, the implementation rates should grow over time.

Engineering Work Order

Engineering work order applications are similar to the O&M applications above in that there is a great deal of inherent value in building these applications as part of a utility's GIT capabilities, but they are not implemented at levels that would make them considered commonplace. In general, the rates of implementation are highest in the electric utility industry, with the work print plots, work sketch, and design engineering applications implemented at 62%, 57%, and 48% respectively.

Distribution and Field Automation

The use of field automation as part of a utility's GIT strategy is showing some signs of growth in the gas utility industry, but these technologies, which continue to receive their share of press, are not showing growth across the board. There is clearly a great deal of potential in the use of these applications, including some growth in the telecommunications industry.

Miscellaneous Systems

The miscellaneous applications include those that are generally considered to be more corporate in nature. This includes customer targeting, business geographics, competitive analysis, and tax applications. The implementation rates of these applications continue to be low, with the highest being the customer targeting application in gas utilities at 28%.

Facilities Interfaces

Facilities interfaces, along with facilities applications, is the second noncore GIS area where great value is often realized. In general, there will be more interfaces between GIS and other systems as data become more standardized and open, and as utilities and other organizations leverage the value and power that GIS brings to the equation via tools such as spatial analysis and data management.

This section presents an overview of where GIS has been interfaced across the five market segments covered in this study.

Engineering Network Analysis

The engineering interface implementation rates are fairly consistent with last year's results, with gas utilities having the highest rates, averaging about 46%, followed by electric utilities, with a rate of about 29%. The design and development rates of these interfaces are generally higher than last year, indicating that some growth potential lies ahead.

Work Management

As is the case with the engineering applications above, the work management interfaces are being implemented at a similar rate as last year, with approximately one-quarter to one-third of the respondents indicating that these interfaces have been implemented. However, the design and development rates are up. Next year's study will tell us if these utilities have followed through with these plans.

CIS/Trouble/Outage

In last year's study, the CIS and trouble/outage interfaces were in separate sections. They were combined this year with some similar categories. These systems need to work together to be truly effective. Implementation rates are similar to last year's, generally in the 15% to 25% range, but again the rates of design and implementation are higher this year than last.

Miscellaneous Systems

The miscellaneous systems in this section have implementation rates that are higher than those in the facilities applications section. The rates are generally highest for the SCADA and document management interfaces. This is not surprising, given the benefits of tying real-time data about remote facilities (SCADA) and engineering documents about geographically diverse facilities (document management) together with GIT.



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