INFORMATION LIABILITY: THE POSSIBLE CHILLING EFFECT OF TORT CLAIMS AGAINST PRODUCERS OF GEOGRAPHIC INFORMATION SYSTEMS DATA

JENNIFER L. PHILLIPS*

I. INTRODUCTION

"A picture is worth a thousand words"—that is the saying and therein lies the problem. What happens when that picture is created with faulty or incomplete information, and someone detrimentally relies on the depiction? Is the maker responsible for the harm? One could hardly say yes, but this situation will arise in the near future for producers of Geographic Information System (GIS)[1] mapping and data base analysis. If statutes and regulations are not enacted im-

* I would like to thank James Reed for my introduction to the world of GIS while working for a Florida county planning department.

1. Throughout this Comment, GIS is used to designate the term in both singular and plural forms.

mediately to standardize nationally GIS data and its dissemination,[2] GIS producers may be liable to GIS users for producing, designing, selling, or manufacturing inaccurate information.[3] The resolution of this issue will significantly affect not only the industry, but also the goods and services available to the public.

Although many people are not aware of the presence of GIS in their daily lives, GIS and geospatial technology have a profound impact. Air traffic controllers, for example, rely on GIS data to direct aircraft safely through the sky. United Parcel Service tracks packages from the points of origin to the destinations using global positioning system (GPS) satellites; this is an application of GIS technology.[4] At the local level, municipalities rely on GIS data to identify areas in the community that need road widening using demographic information combined with transportation modeling techniques.[5] A typical GIS representation can be found in Appendix A at the conclusion of this Comment.

Despite the technology's prevalence, not a single case to date has addressed the liability of a GIS producer to a GIS user for a user's reliance on data supplied by the producer. If liability issues survive judicial scrutiny, the viable employment of GIS as a useful method of data analysis and graphic representation will be severely restricted.[6]

Recently, Vice President Al Gore addressed the need for expanding the use of GIS technology.[7] He encouraged increased public access and the sharing of geographic data as a part of an overall goal "to put more control, more information, more decision-making power into the hands of families, communities, and regions."[8] In keeping with this goal, the Vice President also announced initiatives to provide grants to "enable communities to get and display federal information on easy-to-understand computerized maps," so that citizens would be better able to predict the future growth of their communities.[9] While these goals and initiatives are laudable, their viability depends on the judicial response to the inevitable wave of future claims against GIS producers.

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2. *See* discussion *infra* Part III.

3. *See* discussion *infra* Part V.

4. GPS is a collection technique whereby earth-based computers transmit satellite signals to locate structures on the earth.

5. *See* STAN ARONOFF, GEOGRAPHIC INFORMATION SYSTEMS: A MANAGEMENT PERSPECTIVE 19 tbl.1.2 (1989) (providing a sample of municipal GIS applications).

6. *See* discussion *infra* Part VI.

7. *See* Vice President Al Gore, *The White House, Office of the Vice President, Remarks by Vice President Al Gore, The Brookings Institution* (Sept. 2, 1998) (visited Jan. 27, 1999) <http://www.pub.whitehouse.gov/urires/I2R?urn:pdi://oma.eop.gov.us/1998/9/3/3. text. 1>.

8. *Id.*

9. *Id.*

This Comment begins in Part II by defining GIS and its parameters for use and describing various methods of data collection and distribution. Part III discusses the potential technical and professional standards associated with producing GIS. Part IV details liability for government-generated data versus privately created data and explores the future of GIS-producer liability for incorrect data in the absence of case law addressing this issue. Part V examines possible theories of GIS-producer tort liability, as well as contract theories that can be used to reduce or avoid liability. Part VI offers suggestions for changing current state and federal legislation regarding GIS to allow GIS producers greater freedom to create and distribute their valuable data. Part VII concludes this Comment by noting that GIS producers will likely be chilled from sharing or distributing their information if, as my analysis suggests, GIS producers are liable or potentially liable for data that is inaccurate either with or without fault of the producer.

II. WHAT IS GIS?

A. Definitions

Before launching into an in-depth discussion of GIS, basic terms and theories regarding the use and production of geographic information must be defined. Although many have attempted to define GIS, few have agreed upon a definition that adequately relates the breadth of GIS use to the layperson. GIS has been defined as "any system of spatially referenced information or data."[10] Another GIS author offers that GIS is "designed for the collection, storage and analysis of objects and phenomena where geographic location is an important characteristic or [is] critical to the analysis."[11] A description that may best define GIS to the layperson, however, is a system for "capturing, storing, checking, integrating, manipulating, analyzing and displaying data which are spatially referenced to the earth."[12] Although initially used primarily in federal military projects for about twenty-five years,[13] GIS is presently used in a variety of markets, including navigation, market analysis, utilities management, transportation routing, environmental planning, and voter redistricting.[14] This vastly expanded use is likely to produce potential claims against GIS producers and redefine the use of GIS.

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10. Ron J. Aschenbach, *Geographic Information Systems as a Decision Making Tool*, 52 OHIO ST. L.J. 351, 351 (1991) (citation omitted).

11. ARONOFF, *supra* note 5, at 1.

12. IAN MASSER & MICHAEL BLAKEMORE, HANDLING GEOGRAPHICAL INFORMATION: METHODOLOGY AND POTENTIAL APPLICATIONS 4 (1991).

13. *See* ARONOFF, *supra* note 5, at 31.

14. *See id.* at 2-3. GIS is also an internationally recognized medium for addressing planning concerns. *See* Anchalee Kongrut, *City Plans to Use GIS as Database to Tackle*

B. GIS Production

GIS information flows through four basic components: the GIS technology providers,[15] information providers,[16] GIS personnel/producers,[17] and GIS users.[18] This Comment focuses on the information providers, GIS producers, and GIS users. Initially, information providers compile spatial information about the location of features[19] and tabular information, or nonspatial data, associated with features of the spatial data.[20] GIS allows spatial and tabular data to be stored and relayed simultaneously and in a simpler form than if the data types were produced independently.[21] Combining the data enables the GIS producer to layer many kinds of spatial and tabular information, which facilitates simultaneous analysis.[22] When attempting to create a GIS data set, the data must be collected, repackaged, and distributed to another party, manipulated by that second party, and then analyzed.[23] Each of these steps creates special liability concerns, and when the steps are added together, the potential liability grows exponentially.[24]

Data collection is perhaps the most important step in the GIS process.[25] When a GIS producer undertakes any request for information output, a series of questions arise regarding the intended use of the output. Without knowing how the data will be used, the GIS producer cannot begin the task of creating an appropriate data set. Even if all the necessary data is available, the GIS producer still needs to determine how this data can be best manipulated to achieve the de-

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Emerging Public Utility Projects, BANGKOK POST, Feb. 19, 1997, at 2; *see also GEOWorld* (visited Feb. 6, 1999) <http://www.geoplace.com> (declaring that *GEOWorld*, formerly known as *GISWorld*, is "dedicated to the understanding and application of GIS technology worldwide").

15. GIS technology providers include the creators of GIS software and hardware.

16. Information providers create and distribute gathered data.

17. GIS personnel/producers include persons who directly manipulate data sets, as well as those charged with overseeing data manipulation, analysis, output, and distribution.

18. GIS users could potentially include the public at large.

19. *See* Aschenbach, *supra* note 10, at 352. For an example of spatial data, see the county boundary *infra* Appendix A.

20. *See* Aschenbach, *supra* note 10, at 352. For an example of tabular data, see the "map" *infra* Appendix A, which includes tabular data in the form of whether an evacuation route is primary or secondary.

21. *See* Aschenbach, *supra* note 10, at 355.

22. For example, the U.S. Department of Justice currently uses GIS to identify crime patterns by combining population demographics and crime statistics within the geographic location of the crime. *See* Luba Vangelova, *Information Technology: GIS Puts Information on the Map*, GOV'T EXECUTIVE, Oct. 1, 1997, *available in* 1997 WL 9254840, at *7.

23. *See* Jeff P. Johnson & H. Bishop Dansby, *Liability in Private Sector Geographic Information Systems*, GIS LAW, Summer 1995, at 18, 19.

24. *See id.* at 18-19.

25. *See id.* at 19. Data collection is accomplished by a variety of public and private organizations such as the U.S. Census Bureau or a local community planning agency.

sired result.[26] This initial collection effort largely determines the ultimate reliability and functionality of the data.

Data collection, therefore, may be a step in the process where liability concerns may be limited in the future. For instance, while a data collector may have full knowledge of which entity originally compiled the data, it may be difficult to verify the data independently or eliminate inherent "human" error.[27] Economist Richard Epstein notes that the benefits of obtaining the information must be weighed against the risks of possibly obtaining faulty information. Therefore, the search for the best information actually entails a search for "the best information worth searching for."[28] All persons who search for data to contribute to a GIS data set face this dilemma.

In the next step of GIS production, the data collector reconfigures the data into a usable format for use by a second party in the GIS production chain.[29] If errors occurred in the initial phase of data collection, the errors compound as they mix with other collected data sets. Errors can also result if data is corrupted in the process of combining data sets. Mix new errors with compounded previous errors and the result is obvious.

In the third step of production—the manipulation of data—the "producer" enters the picture and more problems arise.[30] Typically, GIS producers have a background in geography, environmental studies, planning, computer science, or a related field.[31] There is an inherent possibility that the party in charge of the data in this phase of GIS production will not use the collected and reformulated data according to the intent of the original collector.[32] A data collector usually creates "metadata"—information about data—to detail the data collection techniques that subsequent users may reference.[33]

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26. *See* ARONOFF, *supra* note 5, at 133-34.

27. Spatial data collection can occur in a variety of ways, including traditional surveys, aerial mapping, and GPS data collection. Traditional surveys include "field" work using personnel to collect data independently. Aerial mapping is achieved by using aerial photography to identify geographic features. This type of work is typically completed by photogrammatrists trained to identify land uses. The GPS method of data collection is described in *supra* notes 4 and 27. Further, tabular data can be gleaned from public records, which inevitably contain errors.

28. Richard Epstein, *Development of Spatial Information Systems in Public Agencies*, 13 COMPUTER, ENV'T, & URBAN SYS. 141, 143 (1989).

29. *See* Johnson & Dansby, *supra* note 23, at 19. This second party could be located either at the same facility as the data collector or at a wholly unassociated facility. At this point, the data may or may not be in a computerized format.

30. *See id.*

31. *See, e.g.*, FLA. STAT. § 452.013(2)(b) (1997).

32. For example, when a county GIS department analyzes data sent by a local water utility company to determine the county's future water needs, its decision to pursue a greater water supply may be unfounded if the original data regarding minimum and maximum load capabilities is misinterpreted or misapplied.

33. Metadata is data that helps a user understand the specific "content, quality, condition, and other characteristics of data." Federal Geographic Data Committee, *FGDC*

The GIS producer must take into account a number of factors to determine precisely what type of manipulation will effectively provide the information needed or requested. These factors include what data is needed, why it is needed, how it will be used, who will use it, and where the data will be used. All of these factors combine to give a huge amount of professional discretion to the GIS producer. The GIS producer will create what she believes, in her professional expertise, to be the best possible product for what is requested.[34]

In the final stage of the GIS production chain, professional modelers and statisticians analyze the data output.[35] Usually the persons responsible for data manipulation do not perform this analysis. Moreover, when creating output, this group of professionals must ask how others in the industry achieve similar results for a similar type of information request. Although GIS software companies have gone as far as establishing telephone hot lines to help address these types of issues,[36] errors are bound to occur either through a misreading or a misuse of the outputs.

At each point along this production chain, a high likelihood of a combination of errors exists,[37] irrespective of GIS-producer fault. The most readily identifiable sources of liability are a GIS producer's use of inaccurate or incomplete data or a misuse of data output.[38] These sources of liability lead to the following discussion regarding the possible theories of liability and production standards applicable to the GIS profession.

III. STANDARDS THAT CONTROL GIS DISSEMINATION?

Whether an information provider follows the appropriate professional or technical standards for the collection, manipulation, and analysis of the information, output is of principal importance. These issues are substantial because many federal, state, and local agencies are promulgating rules and standards for the use and distribution of GIS, and the judiciary has yet to determine the force and effectiveness of existing standards.[39]

Metadata (visited Jan. 27, 1999) <http://www.fgdc.gov/metadata/metadata.html>. When the metadata is obvious and apparent to the user, it can potentially alleviate liability issues. For example, a producer may attempt to limit the application of its map based on the scale depicted.

34. *See* discussion *infra* Part III.B.

35. *See* Johnson & Dansby, *supra* note 23, at 19.

36. Each software supplier has its own help line.

37. *See* ARONOFF, *supra* note 5, at 142 tbl.5.2 (detailing the "common sources of errors encountered in using a GIS").

38. *See* Johnson & Dansby, *supra* note 23, at 18.

39. *See infra* note 47.

A. Technical Standards

In 1994 President Clinton issued an executive order creating the National Spatial Data Infrastructure (NSDI) to "support public and private sector applications of geospatial data."[40] This executive order authorized the Federal Geographic Data Committee (FGDC) to develop standards for implementing the NSDI.[41] Unfortunately, no definitive GIS standards have been issued.[42] The FGDC, however, is working to create a national data standard for all GIS information to be used in the federal, state, local, private, and academic realms.[43] This standard will attempt to determine the proper scope for the availability, fitness, access to, and transfer of geospatial data sets.[44] Further, the standards could form a basis for determining where liability would lie for the inaccurate presentation of GIS data. Until the standardization of GIS data is implemented, negligence and strict liability standards will prove difficult to apply to GIS. Since so many of the questions surrounding GIS liability emanate from the state of the data itself, current liability analogies may prove inappropriate.

The strategy for implementing a nationwide GIS standard recognizes that a GIS user may not know the information is incomplete or incompatible because many data sets are so poorly documented.[45] The use of metadata can potentially avoid these pitfalls. Access to metadata, however, may be unfeasible. The user may not know the metadata exists or be able to use the metadata appropriately. One is-

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40. Exec. Order No. 12,906, 59 Fed. Reg. 17,671 (1994).

41. *See id.* at 17,672.

42. In 1941 the U.S. Bureau of the Budget initially promulgated National Map Accuracy Standards. *See* Office of State Planning & Info. & Comm. Servs. Div., Hawaii Dep't of Budget & Finance, *Hawaii Statewide GIS Digital Data Standards and Guidelines (1st Rev.)* (visited Jan. 27, 1999) <http://www.hawaii.gov/dbedt/gis/stand.htm> [hereinafter Hawaii, *Standards*]. However, since the standards were last amended in 1947, the promulgators of the standards could not have contemplated application of the standards in the GIS context. These standards, as amended, can be found in Appendix B.

The National Map Accuracy Standards (NMAS) were identified in the recent controversy surrounding the Ellis Island dispute. The controversy involved establishing the accuracy of a map representing the portions of the island accorded to New York and New Jersey. *See* New Jersey v. New York, 1997 WL 291594 (Mar. 31, 1997) (report by Special Master to the United States Supreme Court); *see also* Wallace v. Oklahoma, 935 P.2d 366, 374 (Okla. Crim. App. 1997) (using the NMAS to determine that the convict's murders occurred in the state in which he was prosecuted).

43. *See* Federal Geographic Data Committee, *Strategy for NSDI—Index: A Solution* (visited Jan. 27, 1999) <http://www.fgdc.gov/nsdi/strategy/solution.html>. The strategy for NSDI was reviewed in November 1996 and was renewed. *See* Federal Geographic Data Committee, *Strategy for NSDI—Renewal of the Strategy* (visited Jan. 27, 1999) <http://www.fgdc.gov/nsdi/strategy/renewal.html>.

44. *See* Federal Geographic Data Committee, *Content Standard for Digital Geospatial Metadata* (visited Jan. 27, 1999) <http://www.fgdc.gov/metadata/contstan.html>.

45. *See* Federal Geographic Data Committee, *Strategy for NSDI—Index: The Problem* (visited Jan. 27, 1999) <http://www.fgdc.gov/nsdi/strategy/problem.html>.

sue apparently not contemplated by the NSDI strategy is the necessity of implementing a means for standardizing the update and maintenance of GIS data sets. Some cases dealing with cartography suggest that a GIS producer may be liable if the producer implements a data set maintenance policy which it then fails to follow.[46] However, what about the situation in which GIS data sets originate from a *series* of producers? In such a situation, who has the responsibility to keep the data current, usable, and reliable? These issues regarding standards remain unanswered.[47]

B. Professional Standards

Persons who work in a "professional" capacity are often subject to a higher standard of care than the "reasonableness" standard applied to nonprofessionals. Although courts have not determined whether GIS employees are professionals, we could proceed by analogy. In *Natural Gas Pipeline Co. v. Odom Offshore Surveys*,[48] the court concluded that surveyor services are professional when special training is required.[49] The court denied insurance coverage to Odom Offshore Surveys for damage caused by the professional service of a surveyor.[50] Moreover, the court found that its decision conformed to the relevant state law defining professional service as "services performed by one in the ordinary course of the practice of his profession."[51] Using this definition, the daily duties of a GIS employee,

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46. *See, e.g.*, De Bardeleben Marine Corp. v. United States, 451 F.2d 140, 149 (5th Cir. 1971) (stating that the government was not liable when it complied with statutes regulating updates to navigational charts).

47. Adding to the confusion regarding national GIS standardization is the creation of several state standardization authorities. California, Florida, Kentucky, Louisiana, New Hampshire, and Vermont have passed statutes creating GIS standardization boards and authorizing GIS standards to be promulgated, although these states have not yet set the standards. *See* Act of Oct. 8, 1997, 1997 Cal. Adv. Legis. Serv., ch. 814, § 7 (Deering) (codified as CAL. HEALTH & SAFETY CODE § 25299.97 (West 1997)); Act effective July 1, 1996, ch. 96-390, § 1, 1996 Fla. Laws. 2411, 2412 (codified as amended at FLA. STAT. § 282.404 ((Supp. 1998)); Act of July 15, 1994, 1994 Ky. Acts, ch. 327, §§ 4-5 (codified as amended at KY. REV. STAT. ANN. §§ 61.958.959 (Banks-Baldwin 1997)); Act of June 28, 1995, 1995 La. Acts 922 (codified as amended at LA. REV. STAT. ANN. §§ 49:1051-.1057 (West 1996)); Act of July 12, 1996, 1996 N.H. Laws, ch. 70 (codified as amended at N.H. REV. STAT. ANN. § 4-C:3 (1996)); Act of June 1, 1994, 1994 Vt. Laws, ch. 204 (codified as amended at VT. STAT. ANN. tit. 10, §§ 121-123 (1997)). Hawaii has promulgated GIS data standards to be reviewed and updated every two years. *See* Hawaii, *Standards*, *supra* note 42. However, these standards were implemented in 1993 and have not yet been updated. *See* HAW. REV. STAT. § 225M-2 (1998).

48. 889 F.2d 633 (5th Cir. 1989).

49. *See id.* at 636 (using Odom's insurance policy to determine that any person "required to exercise professional judgment, derived from special training" was delivering a professional service).

50. *See id.*

51. *Id.*

whether public or private, may be construed as professional in nature.

By contrast, other courts have declined to impose the professional service label on computer programmers where a contract for goods rather than a contract for services was at issue.[52] When special expertise combines with the rendering of computer-programming services, computer programmers may face the liability and higher standard of care associated with performing professional services.[53] Because GIS professionals arguably produce both goods and services,[54] determining the applicable standard of care may be difficult.

A determination of whether a GIS producer uses discretion and independent judgment may help define whether the producer is a "professional." The court in *Pezzillo v. General Telephone & Electronics Information Systems*[55] analogized a computer programmer to an architectural draftsman, stating that the programmer and the draftsman sometimes perform "mechanical operations," while some architects and computer analysts act as professionals.[56] Relying upon the regulations of the Wage and Hour Division of the Department of Labor regarding the overtime exemption for professionals,[57] the court based its "mechanical operations" distinction on the overall discretion and independent judgment exercised by a computer analyst or architect in the course of employment.[58] Although *Pezzillo* suggests that not all suppliers of computer services should be labeled professionals[59] because of the present "variation in standards and academic requirements" and the lack of "universally accepted standards for employment in the field," GIS producers, nonetheless, may be subject to the professional label.[60]

Many GIS employees may be subject to the higher standard of care of professionals when creating, maintaining, and disseminating GIS data because a Wage and Hour Division regulation now includes specific language regarding the professional status of persons employed in computer-related occupations.[61] The regulation provides

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52. *See, e.g.*, Rockport Pharmacy, Inc. v. Digital Simplistics, Inc., 53 F.3d 195, 199 (8th Cir. 1995). The court concluded that Digital owed Rockport only the standard of care owed by an ordinary person in the design and maintenance of a customized computer system. *See id.* at 197.

53. *See* Susan H. Nycum & William A. Lowell, *Common Law and Statutory Liability for Inaccurate Computer-Based Data*, 30 EMORY L.J. 445, 456 (1981).

54. *See* discussion *infra* Part V.A.1.

55. 414 F. Supp. 1257 (M.D. Tenn. 1976), *aff'd*, 572 F.2d 1189 (6th Cir. 1978).

56. *See id.* at 1268.

57. *See id.* at 1265 (citing 29 C.F.R. § 541.302(h) (1976)).

58. *See id.*

59. *See id.*

60. 29 C.F.R. § 541.302(h) (1976).

61. *See* 29 C.F.R. § 541.303 (1998). Several courts have rejected the introduction of a "computer malpractice" tort, finding that the standard of care owed to consumers by computer professionals supplants the need for this new cause of action. *See, e.g.*, Conopco, Inc.

that the application of a "professional" title depends on that particular employee's "application of systems analysis techniques and procedures . . . design, development, documentation, analysis, creation, testing, or modification of computer systems or programs . . . [or] design, documentation, testing, creation or modification of computer programs related to machine operating systems."[62] Whether GIS producers are professionals providing services, nonprofessionals providing services, professionals providing goods, or nonprofessionals providing goods is an important factor in determining potential GIS-producer liability. A higher professional standard of care will profoundly impact the scope of such liability. Ultimately, technical GIS standards will need to be in place before definitive GIS professional standards of care and liability can be determined.

C. Evidentiary Standards

In some jurisdictions, computer-generated maps and statistics are being used for evidentiary purposes in the courtroom.[63] While using GIS in the courtroom may help to support a greater understanding for what GIS is and does, it could also create a higher expectation for accurate and reliable GIS information. This could heighten the standard of care required of GIS producers if they are labeled "professionals."

Some courts admit into evidence only those computer-generated maps that accurately represent what they purport to show.[64] However, other courts admit computer-generated evidence as a basis for expert testimony,[65] independent relevance,[66] and reasonable adminis-

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v. McCreadie, 826 F. Supp. 855, 863 n.3 (D.N.J. 1993), *aff'd*, 40 F.3d 1239 (3d Cir. 1994) (noting that the language of the plaintiff's "professional negligence and malpractice" claim concerned the standard of care owed by management consultants); Chatlos Sys., Inc. v. National Cash Register, 479 F. Supp. 738, 740-41 n.1 (D.N.J. 1979), *aff'd*, 635 F.2d 1081 (3d Cir. 1980) (rejecting the plaintiff's argument that greater liability must attach as the complexity of the activity increases).

62. 29 C.F.R. § 541.303(b) (1998). This rule "applies only to highly skilled employees who have achieved a level of proficiency in the theoretical and practical application of a body of highly specialized knowledge in computer systems analysis, programming, and software engineering." *Id.* § 541.303(c).

63. For a discussion of the overall evidentiary issues regarding the introduction of maps into evidence, see Aschenbach, *supra* note 10, at 361-64.

64. *See* Pennsylvania Dep't of Envtl. Resources v. Hamilton Contracting Co., 665 A.2d 849, 853 (Pa. 1995) (using the scientific evidence standard to determine that the map at issue was not an accurate representation of what it sought to depict).

65. *See, e.g.*, Perma Research & Dev. v. Singer Co., 542 F.2d 111, 115 (2d Cir. 1976) (allowing a computer simulation to help expert witnesses make an ultimate conclusion about the defendant's perfection of its product).

66. *See, e.g.*, Chesser v. State, 491 S.E.2d 213, 215 (Ga. Ct. App. 1997) (finding that the use of a display map and computer summary of a firefighter's fire reporting activity had independent relevance to his motive for committing arson, apart from its use to show his culpability in setting the fires).

trative determinations.[67] A Michigan statute regarding surveying, for instance, admits GIS into evidence when the record is provided in the form of a certified copy as long as "the substance of the record is properly admissible" under Michigan law.[68] Ultimately, then, the proper admission of GIS data into evidence should depend on the technical and professional standards attached to the GIS data. Until the GIS industry solidifies these standards, courts and state legislatures throughout the country will lack informed guidance on the use and reliability of disseminated GIS information.

In addition to the problems surrounding the lack of technical and professional standards for GIS, GIS producers and information disseminators need to realize that the future liability of the industry compounds when combined with the potential liability for distributing either government or private entity geographical data.

IV. PRIVATE VERSUS GOVERNMENT PRODUCTION OF GIS DATA

In today's GIS market, both private companies and the government produce and disseminate GIS data.[69] A fee is charged in nearly all cases for goods and services rendered. In private industry, the fee may be more significant, but even government organizations sometimes charge at least a nominal fee to cover supply costs.[70] Notably, the government production of GIS occurs on the federal, state, and local levels.[71] GIS data, however, is primarily gathered and maintained on the local level.[72]

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67. *See, e.g.*, Surfrider Found. v. Dalton, 989 F. Supp. 1309, 1325 (S.D. Cal. 1998) (noting that an administrative agency's determination to deny construction was reasonably based on data revealed through GIS surveys). For a broader discussion regarding the use of computer-generated evidence, see Kathlynn G. Fadely, *Use of Computer-Generated Visual Evidence in Aviation Litigation: Interactive Video Comes to Court*, 55 J. AIR L. & COM. 839 (1990), and Carole E. Powell, Note, *Computer Generated Visual Evidence: Does Daubert Make a Difference?*, 12 GA. ST. U. L. REV. 577 (1996).

68. MICH. COMP. LAWS § 54.276(16)(1) (1997).

69. The rights and liabilities associated with access to GIS are not discussed in this Comment. For a thoughtful discussion on these topics, see Henry H. Perritt, Jr., *Should Local Governments Sell Local Spatial Databases Through State Monopolies?*, 35 JURIMETRICS J. 449 (1995).

70. *See, e.g.*, TENN. CODE ANN. § 10-7-506(c)(1)-(2) (1992) (authorizing fees for maps of geographic information produced by a government entity to cover labor, design, and reasonable maintenance costs).

71. *See* Aschenbach, *supra* note 10, at 355-56 (noting that approximately 21 federal agencies use land information even though there is no national GIS standard and that state and local governments have varying policies regarding the maintenance of land information).

72. *See id.* at 356.

A. Government Production of Government Data

1. Federal Government

Courts around the country are holding government agencies liable for publishing inaccurate information that causes injury. As a general rule, the government "has a duty, when publishing and disseminating aeronautical charts, to represent accurately those features it attempts to portray. Where such information is inaccurately and negligently indicated, and such negligence is a proximate cause of plaintiff's injuries, the government is liable for such damages as are caused."[73] However, the government may not be liable if the damage is caused by the map user's failure to use an updated version of the map if she had reasonable notice of its availability.[74]

In *Reminga v. United States*,[75] the court held the government liable for the death of a pilot who relied upon an aeronautical chart produced by the Federal Aviation Administration (FAA) that erroneously portrayed the location of the tower responsible for the pilot's death.[76] Conversely, in *De Bardeleben Marine Corp. v. United States*,[77] the court did not hold the government liable when a barge operator used an out-of-date Coast and Geodetic Survey Chart to lay its anchor, causing a natural gas pipeline to rupture.[78] The government could have been liable if the updated charts had not been produced and disseminated with due care.[79] In both of these cases, the government's liability concerning the statutorily-mandated production and dissemination of navigation charts was implicated.[80]

In its effort to avoid liability in *Reminga*, the government attempted to show that the chart was not being used as intended.[81] This argument failed because the court found that FAA publication of a navigation chart created reliance on that chart and the FAA

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73. Allnutt v. United States, 498 F. Supp. 832, 838 (W.D. Mo. 1980) (quoting Reminga v. United States, 448 F. Supp. 445, 460 (W.D. Mich. 1978)).

74. *See* De Bardeleben Marine Corp. v. United States, 451 F.2d 140, 142 (5th Cir. 1971) (holding that "the [g]overnment's duty under the federal standard . . . for a faulty chart terminates at the time a prudent shipowner reasonably would have learned of the true condition" through the government's relevant channels of notice).

75. 631 F.2d 449 (6th Cir. 1980).

76. *See id.* at 452.

77. 451 F.2d 140 (5th Cir. 1971).

78. *See id.* at 149.

79. *See id.*

80. *See Reminga*, 631 F.2d at 452 (stating that the FAA is authorized, but not required, to disseminate aeronautical navigation charts); *De Bardeleben*, 451 F.2d at 147 (stating that the federal government has "virtually preempted the field of control of navigation including . . . the publication of charts and notices"); *see also* 49 U.S.C. § 44721 (1994) (regarding FAA chart authorization, noting that the charts must be depicted accurately); 33 U.S.C. §§ 883a-d (1994) (providing for the collection, correlation, and dissemination of basic charts for safe navigation).

81. *See Reminga*, 631 F.2d at 451.

must use "due care to see that [the charts] accurately depict what they purport to show."[82] Similarly, the government attempted to avoid liability in *De Bardeleben* by showing that it was exempted from liability under the Federal Tort Claims Act (FTCA) and, therefore, under the Suits in Admiralty Act.[83] Ultimately, the government was not liable in *De Bardeleben*, not because the federal statute precluded liability, but because the barge operators did not have the current navigational chart on board that corrected the error in the chart upon which the operators relied.[84] Although the Coast Guard has a duty to disseminate accurate information concerning establishments, changes, discontinuances, and certain deficiencies in the operation of aids to navigation according to a "Notice to Mariners" warning,[85] the Coast Guard in this case was absolved of liability. No liability attached because the chart on board the vessel was obsolete, and the revised chart depicting accurate information, though available, was not on board.[86] Thus, *De Bardeleben* demonstrates how a chart producer potentially escapes liability when the chart user is negligent in some way, while *Reminga* demonstrates that a chart producer may be liable for lack of due care in the product's creation.

In *Allnutt v. United States*,[87] a pilot and two passengers were killed when their aircraft struck power lines strung over a river. Power lines were not marked on the navigational chart used by the decedent. The United States was not liable because rules promulgated by the Inter-Agency Air Cartographic Committee did not re-

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82. *Id.* at 452; *see also* 49 U.S.C. § 44721(a)(2) (1994) (charging the government with the responsibility of updating and publishing aeronautical charts).

83. *See De Bardeleben*, 451 F.2d at 142-43 & n.6 (citing 28 U.S.C. §§ 1346(b), 2674; 46 U.S.C. § 742). The FTCA confers jurisdiction to the federal courts for the following:

> injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.

28 U.S.C. § 1346(b)(1) (Supp. II 1996). The government's liability under the FTCA does not apply to employees who use discretion to perform a statutory duty. *See* 28 U.S.C. § 2680(a) (1994); *see also* Indian Towing v. United States, 350 U.S. 61, 69 (1955) (holding that the United States was liable under the FTCA to use due care to see that a lighthouse under its operation was kept in working order, and if the light became extinguished, the United States was further obligated to discover the need for repair and repair it or warn mariners that the light was not functioning).

84. *See De Bardeleben*, 451 F.2d at 149 (stating that the government's duty to produce an accurate chart ceased "at that time in which a prudent shipowner-navigator would have reasonably received . . . publication of a revised chart correctly portraying the condition in question"). Since the barge owner had failed to replace the faulty chart with the correct chart within a reasonable amount of time, the court did not hold the government liable. *See id.*

85. *See* 33 C.F.R. § 72.01 (1998). According to the regulations, the charts are updated and distributed weekly. *See id.* §§ 72.01-.10(b).

86. *See De Bardeleben*, 451 F.2d at 141.

87. 498 F. Supp. 832 (W.D. Mo. 1980).

quire the depiction of power lines on aeronautical charts.[88] Further, in *Britt v. United States*,[89] the court held that the government was not liable for flood damage caused to the Britt's home even though the map Britt relied upon to determine whether his homesite was in a flood plain had been created and distributed in accordance with the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.[90] The court relied on the fact that the flood hazard maps at issue were developed in accordance with the Flood Control Act of 1928, which expressly immunizes the government from liability for damage created by floods.[91] Thus, it appears that if a government GIS product is made in accordance with controlling statutory or regulatory authority, the government can avoid liability unless the product contains inaccuracies.

2. State and Local Government

The cases discussing the federal government's liability in the previous section also implicate possible state and local government liability. Where a state or local regulation is promulgated regarding the use or distribution of GIS, state and local government may also be able to limit liability statutorily. A Kansas statute specifically immunizes government employees from tort liability for providing, distributing, or selling GIS information developed either by the government entity or in cooperation with a private company.[92] Although the statute appears to bar all tort claims against government employees, the question remains whether the statute would also prevent all claims for liability against a private organization's employees working jointly with the government on a GIS project.

A common practice in the GIS industry involves awarding government contracts for GIS projects to private organizations and allowing them to work with the government on GIS projects. It is difficult to imagine how the private organization's work product could be wholly separated from the work product of the government unless very specific plans were drawn to delineate each entity's responsibilities on the project.

A further look at the Kansas statute reveals a flaw in that it flatly prohibits imposing liability on employees when acting within their

88. *See id.* at 841 (finding that the power lines in question had no "landmark value" and did not need to be depicted on the chart).

89. 515 F. Supp. 1159 (M.D. Ala. 1981).

90. *See id.* at 1162.

91. *See id.*; *see also* Flood Control Act of 1928, ch. 569, § 3, 83 Stat. 534, 535-36 (current version at 33 U.S.C. § 702c (1994)).

92. *See* KAN. STAT. ANN. § 75-6104(u) (1996). For illustrative purposes, only the Kansas statute will be discussed in depth. For a listing of other state statutes relating to GIS technology, see *supra* note 47.

scope of employment.[93] It does not seek to prohibit liability against the government entity. Public policy would seem to allow a general prohibition against government employee liability provided that liability would attach if the employee or organization failed to maintain or verify its product according to a standard of reasonable care regarding the provision, distribution, or sale of GIS data.[94] Thus, in seeking to limit the scope of GIS-producer liability, it instead creates the potential for greater government liability.[95] Another question that the Kansas statute raises and fails to resolve is whether private contractors of a government entity will fall within the Kansas exemption. While at present Kansas is the only state to limit specifically GIS-producer liability by statute, other state legislatures ought to consider this statutory option to promote growth in GIS use.

B. Private Production of Government Data

Two cases significantly address the liability of a private organization using governmental data in the area of cartography: *Aetna Casualty & Surety Co. v. Jeppesen & Co.*[96] and *Brocklesby v. United States.*[97] In *Aetna*, the court found Jeppesen, a private company, strictly liable for producing a defective approach-procedure chart that contributed to an airplane crash.[98] The FAA designs and publishes instrument approach procedures for airports throughout the country in tabular form; Jeppesen then charts the FAA data to represent the approach procedure in a graphic form.[99] Although the FAA provided concededly accurate data, Jeppesen improperly depicted the data by presenting the airport's approach procedure in two different

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93. *See* KAN. STAT. ANN. § 75-6104(u) (1996). The relevant part of the statute provides that a government employee acting within the scope of employment is not liable for damages resulting from the following:

> providing, distributing or selling information from geographic information systems which includes an entire formula, pattern, compilation, program, device, method, technique, process, digital database or system which electronically records, stores, reproduces and manipulates by computer geographic and factual information which has been developed internally or provided from other sources and compiled for use by a public agency, either alone or in cooperation with other public or private entities.

Id.

94. *See, e.g.*, *De Bardeleben Marine Corp. v. United States*, 451 F.2d 140 (5th Cir. 1971). This is not to suggest that a government organization or its employees would not be held liable if it maliciously or recklessly produced, distributed, or sold a product that it knew to be faulty.

95. By creating a reasonable care standard instead of a more stringent "professional" or "technical" standard, the Kansas statute fails to afford GIS data sufficient protection. *See* discussion *supra* Part III.

96. 642 F.2d 339 (9th Cir. 1980).

97. 767 F.2d 1288 (9th Cir. 1985).

98. *See Aetna*, 642 F.2d at 342-43.

99. *See id.* at 341-42.

scales.[100] After describing Jeppesen's chart as a product, the court found the chart producer liable under the state's strict products liability law, reasoning that the pilot's reliance upon the defective chart caused the crash.[101] Thus, Jeppesen's intervening manipulation of the FAA's data shielded the FAA from potential liability.

In a similar case also involving both Jeppesen and the FAA, the *Brocklesby* court found Jeppesen strictly liable for its defective approach procedure chart, even though the defect may have stemmed from allegedly inaccurate FAA data.[102] Jeppesen argued against strict liability because it had no control over the FAA's approach procedure.[103] The court, however, rejected Jeppesen's argument and held that the chart producer assumed the responsibility for "insuring that the charts [were] not unreasonably dangerous in their intended use."[104] It found Jeppesen had failed to detect and correct the FAA's error, even though Jeppesen's internal operations required such quality control procedures.[105] Thus, consistent with the strict liability doctrine imposed in *Aetna*, Jeppesen's intervening manipulation of the FAA data not only shielded, but also absolved, the government from liability in *Brocklesby*.

These cases bolster the contention that private GIS producers may be liable if their maps cause harm, even when the data displayed was arguably an accurate representation of data supplied by the government. Whether liability stems from a duty to correct reasonably ascertainable defects or from a duty to display information at an equal and appropriate scale, GIS producers will find themselves struggling to limit potential liability at several stages of the GIS production process, including data collection and data manipulation.[106]

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100. *See id.* at 342. The court noted that the trial court found the chart at issue "radically departed" from Jeppesen's usual graphic presentation. *Id.*

101. *See id.* at 342-43 (relying on the trial court's conclusion that "the conflict between the information conveyed by the words and numbers and the information conveyed by the graphics rendered the chart unreasonably dangerous and a defective product"). The concept of strict liability is discussed further *infra* Part V.A.1.

102. *See Brocklesby*, 767 F.2d at 1295 (noting that the defects of the Jeppesen chart may have come from the FAA's alleged failure to provide a safe instrument approach procedure).

103. *See id.* at 1295.

104. *Id.* at 1298.

105. *See id.* at 1296 (describing how Jeppesen's production specifications manual directed its employees to determine any procedure's "validity and completeness"). The court affirmed the district court's jury instruction, which required the jury to find Jeppensen liable if they found the chart defective, irrespective of whether they found that the FAA approach procedure was also defective. *See id.* at 1295.

106. *See* discussion *supra* Part II.

C. *Private Production of Private Data*

Finally, cases reviewing private industry's liability for disseminating data gathered by another private industry source are plentiful and touch upon a variety of uses, including use of a securities publication,[107] a survey map,[108] a geology report,[109] a general inventory map,[110] and the marking of an electrical cable.[111] Not all of these information providers were held liable.[112] In the cases where the court found liability, the information provider was in a direct position to foresee the harm that occurred and had an opportunity to avoid the harm.[113] In some instances, the court did not impose liability where the data user failed to detect the mistake, even though the opportunity to do so existed.[114] The information provider may have been liable, however, if there had been a knowing misstatement of the facts at issue.[115] Finally, in one case, an action for liability survived dismissal because there was a possibility that a private geology survey purporting to show the existence of oil on a specific plot of land was fraudulently or negligently created.[116]

The theories applied in these cases readily lend themselves to the GIS context where the information is supplied by one party and relied upon by another. Cases allowing avoidance of liability because the user had an opportunity to detect a mistake in the data,[117] while *relevant* in a GIS context, are not particularly helpful. GIS users are not usually capable of verifying information themselves, particularly where the GIS producer has obtained data from more than one original source. With the amount of information likely to be displayed

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107. *See* First Equity Corp. v. Standard & Poor's Corp., 869 F.2d 175 (2d Cir. 1989).

108. *See* Rozny v. Marnul, 250 N.E.2d 656 (Ill. 1969).

109. *See* Columbia Petroleum, Inc. v. Waddell, 680 F. Supp. 1348 (W.D. Mo. 1987).

110. *See* AHV Properties v. Columbia Gas Transmission Corp., 963 F. Supp. 460 (E.D. Pa. 1996).

111. *See* McCain v. Florida Power Corp., 593 So. 2d 500 (Fla. 1992).

112. *See AHV Properties*, 593 So. 2d at 463; *First Equity*, 869 F.2d at 180.

113. *See McCain*, 593 So. 2d at 504 (noting that the inaccurate marking of an underground electric cable was done on-site in the presence of those persons who would be placed at risk); *see also Rozny*, 250 N.E.2d at 658-59 (regarding the surveyor's guarantee of accuracy placed on a residential survey).

114. *See First Equity*, 869 F.2d at 180 (stating that the user was obligated to weigh the danger of possible inaccuracy of the data supplied); *AHV*, 963 F. Supp. at 463 (noting that the map supplied to indicate the location of an underground pipeline was not to be used as an exact indicator of the pipeline's location and that the plaintiff had a responsibility to discover the precise location of the pipeline). In *First Equity*, the publisher specifically issued a disclaimer stating that the information came from sources "believed to be reliable, but [the information's] accuracy and completeness . . . [were] not guaranteed." *First Equity*, 869 F.2d at 176.

115. *See First Equity*, 869 F.2d at 180.

116. *See* Columbia Petroleum, Inc. v. Waddell, 680 F. Supp. 1348, 1349 (W.D. Mo. 1987).

117. *See* De Bardeleben Marine Corp. v. United States, 451 F.2d 140, 149 (5th Cir. 1971).

through one GIS product, it would be virtually impossible for an individual user to verify discrete bits of information. The recent trend of disseminating GIS information over the Internet[118] supports an even stronger argument against a user's ability to verify information. Should the inability of a user to verify information, however, automatically make a GIS producer liable for incorrect or incomplete data relied upon by the user? One would hope not, since not all GIS dissemination can be foreseen or intended by the producer; this would effectively create insurmountable liability for the GIS producer.

In *McCain v. Florida Power Corp.*,[119] the court stated that the greater the risk of harm to the user, the greater the duty of an information provider to display information accurately.[120] The court apparently believed that the risk of electrocution to persons working near underground cables was a risk requiring greater precautions than other risks of less serious injury. Does this mean that a GIS producer of hurricane evacuation route maps—given the inherent risk of personal injury that may ensue from its use during emergency situations—has a greater duty of accuracy than the GIS producer of a county-wide park siting? How can a producer realistically gauge the necessary accuracy required of her product when she does not know the purpose for which the data may ultimately be used and, therefore, the harm that can be foreseen?

> [E]ven the most careful preparation will not avoid all errors. The potential for meritless or even fraudulent claims is high, and the cost of even successful defenses may be prohibitive if publishers are to be exposed to discovery and trial based solely on allegations that a plaintiff relied upon an erroneous summary.[121]

Based on the previous discussion regarding the public or private status of the information supplier, GIS producers in both sectors face the strong possibility that liability may survive ostensible immunity rules in the public sector. The imposition of liability on wholly private data collectors and producers is even greater.

V. LIABILITY THEORIES

Because GIS is unlike any product or service currently available, applying an appropriate liability paradigm is difficult. To categorize GIS dynamics properly, it is sensible to define it as both a product and a service because a request for a service or information creates

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118. *See* Vangelova, *supra* note 22, at *3.

119. 593 So. 2d 500 (Fla. 1992).

120. *See id.* at 503. The court described a legal duty arising "whenever a human endeavor creates a generalized and foreseeable risk of harming others." *Id.*

121. First Equity Corp. v. Standard & Poor's Corp., 869 F.2d 175, 180 (2d Cir. 1989) (citations omitted). This is not to suggest that a purposeful informational inaccuracy should not be punished.

some product. To date, there is not a single case that addresses the liability of a GIS producer to a GIS user for a user's reliance on data supplied by a producer. However, several cases addressing the issue of liability for inaccurate cartography in the field of navigation may be instructive.[122] Further, the law relating to the liability of a publisher and seller of information in the area of computer law[123] and book publication[124] may prove helpful in determining what theory of liability should attach to a GIS producer. Ultimately, a GIS producer may be held liable for publishing or releasing inaccurate information that causes damage if a reasonable opportunity existed to detect and correct the error. Keep in mind, however, that liability can only be minimized; it can never be entirely eliminated.[125]

There are inherent risk factors associated with the production of GIS information. Basically, errors can arise in three instances: where inaccurate data is used; where incomplete data is used; and where data outputs are misapplied.[126] A related issue regarding liability for a GIS producer concerns deciding who has the responsibility for gathering correct data and maintaining its effectiveness.[127] Since these types of errors occur in any data compilation, courts generally determine liability based on whether an information producer exercised due care in producing and maintaining the information.

A. Tort Law Possibilities

Tort law provides the best theories for attaching liability to GIS producers. These theories include strict liability and negligence as applied in the areas of charting, computerized technology, and publishing. As will be seen, contract principles regarding disclaimer and privity may help to limit liability.[128]

1. Strict Liability: Product Versus Service

(a) Product

For the most part, courts addressing the issue of whether a navigational chart is a product or a service have held that the charts are products.[129] The courts have reasoned that the strict liability doctrine

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122. *See* discussion *infra* Part V.A.2.a.
123. *See* discussion *infra* Part V.A.2.b.
124. *See* discussion *infra* Part V.A.2.c.
125. *See* Harlan J. Onsrud & Robert I. Reis, *Law & Information Policy for Spatial Databases: A Research Agenda*, 35 JURIMETRICS J. 377, 392 (1995).
126. *See* Johnson & Dansby, *supra* note 23, at 18.
127. These issues are yet to be decided. *See* discussion *supra* Part III.
128. *See* discussion *infra* Part V.B.
129. *See, e.g.*, Brocklesby v. United States, 767 F.2d 1288, 1295 (9th Cir. 1985) (concluding that the defendant's navigational approach chart was a product); Saloomey v. Jeppesen & Co., 707 F.2d 671, 676 (2d Cir. 1983) (accepting the trial court's conclusion that

is best served when the costs of injuries sustained from defective products are borne by the producers of the products rather than the powerless victims.[130] The court in *Saloomey v. Jeppesen & Co.*[131] stated:

> [Jeppesen's] position that its navigational charts provide no more than a service ignores the mass-production aspect of the charts. Though a "product" may not include mere provision of architectural design plans or any similar form of data supplied under individually-tailored service arrangements, the mass-production and marketing of these charts requires Jeppesen to bear the costs of accidents that are proximately caused by defects in the charts.[132]

Further, the *Restatement (Second) of Torts* provides that liability should attach to anyone who sells a defective product that is unreasonably dangerous—even if "the seller has exercised all possible care in the preparation and sale of his product."[133] Similarly, the *Brocklesby* appellate court affirmed a jury instruction allowing liability to attach to Jeppesen, even though the defect in Jeppesen's product could have been "traced to a component part supplied by another."[134]

The GIS implications from these holdings and rules are tremendous and raise more questions. Is a GIS producer liable for all data sets it uses in production?[135] How would a determination be made as to whether a GIS product is unreasonably dangerous? Using a previous example, it is more likely that a hurricane evacuation route map would be unreasonably dangerous than a park-siting map.[136] Would all GIS data sets be scrutinized as to whether the data contained within them could be unreasonably dangerous? This seems a daunting and frivolous undertaking but would be required nonetheless.

Cases regarding book publication and distribution provide other grounds for imposing strict liability on GIS producers. In *Winter v. G.P. Putnam's Sons*,[137] the court discussed the application of strict liability to the publisher of a "how-to" book, the directives in which al-

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navigational charts constituted products under Colorado law); Fluor Corp. v. Jeppesen & Co., 216 Cal. Rptr. 68, 71 (Cal. Ct. App. 1985) (concluding that airport instrument approach charts should be considered products in determining the applicability of strict liability).

130. *See Fluor*, 216 Cal. Rptr. at 71.

131. 707 F.2d 671 (2d Cir. 1983).

132. *Id.* at 677.

133. RESTATEMENT (SECOND) OF TORTS § 402A (1965).

134. *Brocklesby*, 767 F.2d at 1295.

135. *See* discussion *supra* Part II (describing the problems inherent in obtaining and manipulating GIS data sets).

136. Flood warning "maps" produced during hurricanes are envisioned by a joint City of Tallahassee/Leon County GIS venture. *See* Catherine McNaught, *Local Data Converge at One Site*, TALL. DEM., Apr. 12, 1998, at A1; *see also infra* note 247 and accompanying text.

137. 938 F.2d 1033 (9th Cir. 1991).

legedly caused serious illness to a reader who followed them.[138] The court rejected a finding of strict liability because the publishing company neither wrote nor edited the book.[139] The court based its holding on the principle that freedom of ideas and expression should not be infringed upon unless disseminating those ideas and expressions would physically injure society where the potential victims would have no opportunity to protect themselves.[140] The court relied on charting cases to show that a "how-to" book is "pure thought and expression" while the chart is a physical product.[141] Following this line of reasoning, a GIS map is a product. This distinction, however, fails to recognize that a GIS "product" is a collection of data representing ideas contemplated by the data manipulator *and* their tangible output reproduced on every map.

(b) Service

It is possible that a court could define GIS data output as a service rather than as a product. Persons who produce GIS analysis and data perform a service, and the result is usually a tangible product. In *SDK Medical Computer Services Corp. v. Professional Operating Management Group*,[142] the Supreme Judicial Court of Massachusetts examined whether a company providing computerized data processing, record keeping, and billing services provided a service or a product. In holding that the computer company offered a service and not a product, the court reasoned that "the analysis and processing of customers' records are the heart of the matter, the reports rendered to the customers being merely the embodiment of those services."[143] Furthermore, although printed reports were distributed, the court noted that intangible services are usually performed with or produce some tangible aspect.[144]

When one considers that GIS professionals frequently handle specialized requests from both the public and private sectors, the argument that GIS producers perform a service is even more compelling. Specialized requests tend to require an amount of individualized service to produce the requested result. If a graphic representation of the analysis is requested, a tangible product results, but the product exists as an outgrowth of the service performed.

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138. *See id.* at 1034-36 (noting that mushroom enthusiasts relied on information in *The Encyclopedia of Mushrooms* when they ingested poisonous mushrooms).

139. *See id.* at 1034.

140. *See id.* at 1035.

141. *Id.* at 1036. However, GIS seems to fall somewhere in between a chart and a book. It is a mixture of graphical representations, words, and statistics to express what the graphic relates to a user.

142. 354 N.E.2d 852 (Mass. 1976).

143. *Id.* at 858.

144. *See id.*

If GIS producers indeed provide a service, rather than a product, the holdings of some cases suggest that strict liability should not apply.[145] "[T]he general rule [of professional services] is applicable that those who sell their services for the guidance of others in their economic, financial, and personal affairs are not liable in the absence of negligence or intentional misconduct."[146] The suggestion that liability without fault does not apply to professional services is premised on the fact that where services are concerned "[t]here is no mass production of goods or a large body of distant consumers."[147] In the context of navigational charts, mapping companies who distribute large quantities of data to distant users have been found liable for the damage caused by the deficiencies in the charts.[148] These cases support a theory of strict liability for the defective products supplied by GIS producers. Both the creator and distributor of GIS data, therefore, will likely be held to a strict liability standard.

(c) Approach of the Restatement (Third) of Torts: Products Liability

The *Restatement (Third) of Torts: Products Liability* briefly addresses imposing strict liability to a product-service combination.[149] The *Restatement*, however, characterizes product-service combinations in terms of product consumption: either a product is consumed while providing a service or a product is not consumed during performance of the service.[150] According to the *Restatement*, consumption suggests strict product liability, while nonconsumption suggests a service falling outside the confines of strict liability.[151] This conception of consumption, however, does not readily lend itself to the GIS product-service paradigm, since the GIS service has been performed prior to dissemination of the "product" and remains a component of the graphic representation.

Additionally, the *Restatement* contains even stronger language that could potentially expose GIS producers to liability for their graphic representations. The new language defines a product as

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145. *See, e.g.*, La Rossa v. Scientific Design Co., 402 F.2d 937, 942-43 (3d Cir. 1968) (refusing to extend strict liability to a company supplying and supervising the installation of coated pellets); Gagne v. Bertran, 275 P.2d 15, 20-21 (Cal. 1954) (refusing to impose strict liability on a test-hole driller). For a discussion as to whether GIS is a professional service, see *supra* Part III.B.

146. *Gagne*, 275 P.2d at 20.

147. *La Rossa*, 402 F.2d at 942.

148. *See supra* note 129 and accompanying text.

149. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 20 (1997).

150. *See id.* § 20 cmt. d. An example of consumption while performing a service would be having one's hair dyed at a salon, while an example of nonconsumption while performing a service would be enjoying a hot air balloon ride. The distinction involves the fact that the dye remains in one's hair after the service has ended, while one cannot take the balloon or ride home at the end of the day. *See id.*

151. *See id.*

"tangible personal property distributed commercially for use or consumption" and excludes commercially provided services.[152] The comments provide that "[c]omponent parts are products, whether sold or distributed separately or assembled with other component parts."[153] Further, raw materials are products "whether manufactured . . . processed . . . gathered and sold or distributed."[154] The comments also provide that maps and navigational charts fall within the *Restatement*'s definition of property, specifically as intangible personal property.[155] Perhaps the most serious strike *against* the GIS producer and *for* applying liability to the graphic representation is contained in the following comment:

> One area in which some courts have imposed strict products liability involves false information contained in maps and navigational charts. In that context the falsity of the factual information is unambiguous and more akin to a classic product defect. However, the better view is that false information in such documents constitutes a misrepresentation that the user may properly rely upon.[156]

Although the final sentence of this quote mitigates the extent of a chart producer's liability, the probability for liability inherently exists in the scope of the quote. According to the *Restatement*'s comment, a GIS producer will likely face the potential for strict products liability.[157]

Holding a GIS producer strictly liable for all inaccuracies that cause harm to GIS users seems untenable, at least in part because of the multiple sources of GIS data. Realizing that GIS is essential, for example, in future land-use planning, courts and legislatures ought to allow some discretion to GIS producers to avoid forcing them to distribute their valuable information under the oppressive weight of strict liability. Likewise, until professional and technical standards are implemented for the use and production of GIS, the imposition of strict liability would be premature. Before courts implicate strict liability in the use of a novel technology, the legal community should be responsible and wait to review the standards associated with the

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152. *Id.* § 19.
153. *Id.* § 19 cmt. b.
154. *Id.*
155. *See id.* § 19 cmt. d.
156. *Id.*
157. *But see* Birmingham v. Fodor's Travel Publications, Inc., 833 P.2d 70, 78 (Haw. 1992) (stating that the aeronautical charting cases were an "aberration" with respect to the strict liability standard imposed on the chart's producer and citing Winter v. G.P. Putnam's Sons, 938 F.2d 1033, 1036 (9th Cir. 1991)); Joel R. Wolfson, *Express Warranties and Published Information Content Under Article 2B: Does the Shoe Fit?*, 16 J. MARSHALL J. COMPUTER & INFO. L. 337, 371-72 (1997) (arguing that the *Restatement Third*'s draft language limits the scope of strict liability to the precise scenario involving aeronautical charts).

emerging technology. Because no standards have yet been issued on GIS data manipulation, analysis, and disbursement, judicial authorities should not impose a strict liability standard on GIS graphic representations.

2. Negligence

Perhaps the negligence theory of tort liability contains the strongest arguments for application to GIS liability when either incorrect or incomplete data is applied or the subject data is misapplied. There are three types of cases that readily adapt themselves to the GIS context: navigational charting, computer technology, and information publication. While none of these cases will predict exactly how GIS law will evolve, an examination of these paradigms can serve as a strong predictor of what is to come.

(a) Navigational Charting

In the context of navigation, Congress has empowered federal administrative agencies to regulate the production, maintenance, and distribution of navigational aids. Such regulations include arranging for the "publication of aeronautical maps and charts necessary for the safe and efficient movement of aircraft in air navigation"[158] and issuing "information concerning the establishment of aids to maritime navigation."[159] When these charts are published and someone "engenders reliance on them, [the producer] is required to use due care to see that they accurately depict what they purport to show."[160] This principle is applicable to all of the following cases discussed.

When charts are published, they must accurately depict information.[161] This principle also applies to those instances in which a chart producer is not statutorily required to depict some indicator on a chart, yet chooses to do so.[162] If latent defects exist in a chart, the

158. 49 U.S.C. § 44721 (1994).

159. 33 C.F.R. § 72.01-1 (1998). For a discussion of the liability for negligent charting, see Kathlynn G. Fadely, *Liability of the United States for Negligent Charting*, 21 TORT & INS. L.J. 171 (1981).

160. Reminga v. United States, 631 F.2d 449, 452 (6th Cir. 1980).

161. *See, e.g.*, Hahn v. United States, 535 F. Supp. 132, 136 (D.S.D. 1982) (noting that the transmission line involved in an aircraft crash was accurately reflected on aeronautical charts); Britt v. United States, 515 F. Supp. 1159, 1162 (M.D. Ala. 1981); Allnutt v. United States, 498 F. Supp. 832, 838 (W.D. Mo. 1980) (quoting Reminga v. United States, 448 F. Supp. 445 (W.D. Mich. 1978)).

162. *See Hahn*, 535 F. Supp. at 136 (finding that FAA standards did not require the FAA chart to show towers less than 200 feet high); *Britt*, 515 F. Supp. at 1162 (finding that a flood hazard map was "prepared and disseminated pursuant to the National Flood Insurance Act of 1968"); *Allnutt*, 498 F. Supp. at 841 (finding that a power line had no landmark value and did not have to be included on an FAA chart).

chart producer may be liable for any resulting injury or damage.[163] In *Brocklesby*, the charting company that produced aeronautical charts based on data supplied by the FAA was found negligent for failing to warn potential users of latent defects in its chart.[164] Although the charting company had a procedure for determining the "validity and completeness" of its products, the company failed to detect or correct errors in the chart at issue.[165] Similarly, in *Southern Natural Gas Co. v. Pontchartrain Materials, Inc.*,[166] the government was found negligent for failing to represent submerged gas pipelines in its charts, which resulted in a chart user rupturing a pipeline.[167] While one potential strike zone was relayed on the chart, two other pipeline structures, of the same type and in the same area as the first, were not included on the chart.[168] Therefore, by analogy, GIS producers may be liable for damages resulting from latent defects in their products.

Courts have also held that negligently locating information on surveys and charts is a source of a chart producer's liability.[169] In *McCain v. Florida Power Corp.*,[170] the court held that an electric utility breached its duty to locate an electrical wire correctly and created a "zone of risk" for others.[171] The court additionally held that the liability for improperly marking the electrical wire was based on the fact that the surveyor "foreseeably and substantially" caused the injury that occurred.[172] The court also noted that the surveyor had a higher duty to correctly mark the electrical cable because "as the risk [to others] grows greater, so does the duty."[173]

Similarly, in *Reminga*, a pilot struck a TV tower that was incorrectly located on an aeronautical chart.[174] The government tried to avoid liability in this case by showing that causation was insufficient to impute liability to the government.[175] The court held, however, that once the government chose to publish navigation charts to be

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163. *See, e.g.*, Brocklesby v. United States, 767 F.2d 1288, 1297 (9th Cir. 1985); Southern Natural Gas Co. v. Pontchartrain Materials, Inc., 711 F.2d 1251, 1257 (5th Cir. 1983).

164. *See Brocklesby*, 767 F.2d at 1297.

165. *Id.* at 1296.

166. 711 F.2d 1251 (5th Cir. 1983).

167. *See id.* at 1259 (finding federal regulations imposed a duty on the government to indicate the locations of submarine pipelines in its charts).

168. *See id.* at 1258.

169. *See, e.g.*, Reminga v. United States, 631 F.2d 449, 458 (6th Cir. 1980) (holding that the government could be found negligent for publishing an aeronautical chart with an incorrectly located tower).

170. 593 So. 2d 500, 505 (Fla. 1992) (holding that an electrical utility could be liable for failing to indicate the location of an underground cable).

171. *See id.* at 502.

172. *Id.* The operator of electrical trench machinery struck an underground electrical cable, seriously injuring the machinery's operator. *See id.* at 501.

173. *Id.* at 503.

174. *See Reminga*, 631 F.2d at 451.

175. *See id.*

used for in-flight purposes, it was required to use due care to assure that the chart correctly depicted what it purported to show.[176] These cases illustrate that the negligent or incorrect location of represented data may subject GIS producers to liability.

Meanwhile, a chart company avoided liability when the chart user did not request an on-site inspection, which the chart company made available to the chart user. In *AHV Properties v. Columbia Gas Transmission Corp.*,[177] the inventory map supplied to AHV by Columbia, the charting company, offered AHV the choice to request an on-site pipeline location at its discretion.[178] Since AHV was aware that an on-site inspection was the normal mode of operation for Columbia, the chart company did not have a duty to warn AHV that the inventory map only provided the approximate location of the pipeline.[179]

Chart companies have also avoided liability when the chart user did not use the chart appropriately.[180] In *De Bardeleben*, liability was avoided, for example, when a mariner did not have an updated "Notice to Mariners" on board a barge that sank, even though these notices were routinely and widely available.[181] The court held that the time had passed at which any reasonable mariner would have received an updated chart, and this exonerated the government from negligence liability.[182] Likewise, a pilot's failure to familiarize himself with the flight path precluded a finding of negligence on the government's behalf in *Hahn v. United States*.[183] The court specifically found that the pilot collided with a routinely unmarked transmission line when he became inattentive for more than a mile preceding the collision.[184] The pilot also neglected to report the layout of his airport approach and failed to observe the same transmission line on a previous flight earlier that day.[185]

The application of these navigational and charting cases to the GIS context demonstrates that GIS producers face a real potential for liability.[186] It is significant to note that there is as yet no statutorily-imposed duty to prepare and distribute GIS information. If and

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176. *See id.* at 452.

177. 963 F. Supp. 460, 463 (E.D. Pa. 1996).

178. *See id.* at 462.

179. *See id.*

180. *See, e.g.*, De Bardeleben Marine Corp. v. United States, 451 F.2d 140, 149 (5th Cir. 1971) (holding the government free of liability for damages incurred when mariners failed to take notice of revised coastal survey charts).

181. *See id.* at 141.

182. *See id.* at 149.

183. 535 F. Supp. 132, 137 (D.S.D. 1982).

184. *See id.*

185. *See id.*

186. *See* Wolfson, *supra* note 157, at 368-69 (arguing that the charting cases allow a unique type of liability to attach to defective, dangerous charts).

when the NDSI establishes its guidelines for GIS data,[187] GIS producers will be faced with a duty to produce and present reliable updated information. The theories advanced above demonstrate the need to depict information accurately and to avoid negligently locating information, which are difficult to achieve in the GIS field due to the issues involved in first obtaining accurate data and then updating that data.[188] GIS producers will be at a significant disadvantage if liability is applied to all inaccurately depicted information, regardless of the data's origin.

The issue of whether the harm caused is foreseeable[189] is again problematic in the GIS area because GIS producers, particularly governmental GIS producers, can never fully intend the breadth or depth of dissemination of the data they produce. Add to that the possibility that the more "important"[190] a chart may be, the more duty that attaches,[191] and a GIS producer's potential liability seems limitless. Finally, liability should not be imputed to GIS producers when uninformed chart users use the information incorrectly. Even when GIS users are provided with the information to relate the intended source and usage of GIS data distributed, the user often ignores the GIS producer's warning. In such cases, liability should not automatically fall on the GIS producer.

(b) Computer Technology

An area of law dealing with computer technology aids in the discussion of a GIS producer's liability. First and foremost, it must be recognized that a computer is only as good as its human programmer.

> Holding a company responsible for the actions of its computer does not exhibit a distaste for modern business practices . . . . A computer operates only in accordance with the information and directions supplied by its human programmers. If the computer does not think like a man, it is man's fault.[192]

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187. *See supra* notes 40-44 and accompanying text.

188. *See* discussion *supra* Part II.

189. *See generally* McCain v. Florida Power Corp., 593 So. 2d 500, 502 (Fla. 1992) (noting that there was sufficient evidence in the record to support a finding that the defendant power company's conduct foreseeably created a zone of risk).

190. *See supra* notes 119-21 and accompanying text.

191. *See McCain*, 593 So. 2d at 503 (discussing the principle that as risk increases, so does the duty).

192. State Farm Mut. Auto. Ins. Co. v. Bockhorst, 453 F.2d 533, 536-37 (10th Cir. 1972).

Accordingly, companies that render incorrect computerized summaries of data have been held liable for the negligent production and dissemination of information.[193]

In *Independent School District No. 454 v. Statistical Tabulating Corp.*,[194] the court refused to dismiss a suit against a statistical service company whose allegedly inadequate assessment of a school building's property value caused the school district to underinsure a building that was eventually destroyed by fire.[195] In this case, a direct relationship existed between the school district and the statistical company, making it foreseeable that the school district would rely on the information supplied by the statistical company.[196]

Similarly, in *State Farm Mutual Automobile Insurance Co. v. Bockhorst*,[197] Bockhorst's car insurance was reinstated due to the insurance company's confusion in data entry processing.[198] The court refused State Farm's petition to repudiate the reinstated insurance coverage on the grounds that if the company's computer program had been sophisticated enough to credit Bockhorst's account at the precise time that payment was received, Bockhorst would not have been insured at the time of his car accident.[199] The erroneously reinstated policy "effectively extended coverage for the period during which Bockhorst's accident occurred."[200]

One example of a computer error that did not result in liability turned on the information user's ability to verify the information's accuracy. The court in *First Equity Corp. v. Standard & Poor's Corp.*[201] denied recovery to securities investors who relied on a summary report of various securities provided by a Standard & Poor's newsletter.[202] Based on public policy, the court held that the investors should bear the costs of failing to verify the report's accuracy because the investors were in the "best position to weigh the danger of inac-

193. *See id*. *But see* First Equity Corp. v. Standard & Poor's Corp., 869 F.2d 175, 179 (2d Cir. 1989) (refusing to hold a company liable for distributing summary information where the company included a specific disclaimer that the information was not guaranteed to be accurate or complete).

194. 359 F. Supp. 1095, 1095 (N.D. Ill. 1973).

195. *See id.* at 1096.

196. *See id.* at 1098.

197. 453 F.2d 533 (10th Cir. 1972).

198. *See id.* at 534-35. The timing of the insurance suspension is important because if his insurance had been suspended up until that exact time when his insurance payment was received, he would have been uninsured when the accident occurred. *See id.* However, since the computer summary produced by the insurance company showed that his insurance was reinstated prior to his accident, the insurance company was forced to insure the loss. *See id.* at 536-37.

199. *See id.* at 536.

200. *Id.* at 537.

201. 869 F.2d 175 (2d Cir. 1989).

202. *See id.*

curacy and potential loss arising from a particular use of a summary against the cost" of examining the original documents.[203]

Importing these theories of liability into the GIS arena could render a GIS producer liable for several different computer-related reasons. First, if the GIS data is disseminated to a particular consumer for a particular use, liability is likely to attach if the information given is inaccurate.[204] Second, if the GIS data production method fails to avoid errors that are potentially avoidable, liability may occur.[205] Finally, it is unlikely that any GIS user will be in a better position than the data collector, manipulator, or analyst to detect inaccuracies or omissions in the data because the user is wholly outside the GIS data production effort.[206]

(c) Information Publication

An examination of cases involving the liability of publishers leads to the conclusion that GIS producers may be exposed to liability for inaccurate, incomplete, or misapplied data. Some of these cases, however, reject the imposition of liability.[207] Unless the publisher guarantees accuracy of the information published, there is no liability for negligence because there is no duty to exercise due care.[208] A publisher *can* assume the duty to "investigate the accuracy of the contents" of the publication, "but there is nothing inherent in the role of [a] publisher or the surrounding legal doctrines to suggest that such a duty *should* be imposed."[209] The First Amendment guarantee of free access to ideas and information and the right of publishers to disseminate these ideas have been cited as reasons for excusing book

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203. *Id.*

204. *See, e.g.*, Independent Sch. Dist. No. 454 v. Statistical Tabulating Corp., 359 F. Supp. 1095, 1098 (N.D. Ill. 1973) (refusing to dismiss a suit against a statistical company for alleged errors in its calculation of property values).

205. *See, e.g.*, *Bockhorst*, 453 F.2d at 536-37 (holding that an insurance company could be held responsible for computer errors that improperly reinstated an insurance policy).

206. The court in *First Equity*, however, refuted the proposition that data analysts are always in a better position than users to detect errors. The court stated that where financial information is being provided to investors, the investor is in a better position to verify its accuracy. *See First Equity*, 869 F.2d at 180.

207. *See, e.g.*, Winter v. G.P. Putnam's Sons, 938 F.2d 1033 (9th Cir. 1991) (holding that mushroom enthusiasts could not recover under a products liability theory against a book publisher); Alm v. Van Nostrand Reinhold Co., 480 N.E.2d 1263 (Ill. App. Ct. 1985) (holding that an injured party had no cause of action against the publisher of a tool-making book); Cardozo v. True, 342 So. 2d 1053 (Fla. 2d DCA 1977) (holding that liability of a book dealer could not rest upon a warranty theory where a purchaser was injured as a result of an alleged failure to warn).

208. *See Winter*, 938 F.2d at 1035, 1037; *see also Cardozo*, 342 So. 2d at 1056 (holding that a book publisher had no duty to investigate the book's contents or to warn its readers of potential dangers arising from the book's contents).

209. *Winter*, 938 F.2d. at 1037.

publishers from liability.[210] GIS producers may escape liability through a showing that the information contained in the publication was not wholly derived from their data sources or that the data sources came from a series of data collection efforts. A GIS publisher may not escape liability, however, if it represents the publication as accurate[211] or if the GIS producer knows the information will be used in an unreasonably dangerous situation.[212]

Furthermore, a recent Fourth Circuit case, *Rice v. Paladin Enterprises, Inc.*,[213] did not preclude the liability of a "how-to" book publisher.[214] In this case, the relatives of a murder victim sued the publisher of *Hit Man: A Technical Manual for Independent Contractors* for wrongful death, claiming the publisher aided and abetted the killer by publishing what was essentially a "how-to" book on murder that the killer used to plan and execute the crime.[215] The court reversed the summary judgment in favor of the publisher and held that the explicit subject matter of the book was not protected by the First Amendment.[216] Although the facts of this case are so unique that it is unlikely that another factual scenario will rise to this level of culpability,[217] the denial of summary judgment challenges the argument that GIS information publishers will not be liable for the information they distribute.

Without technical and professional GIS standards, it is difficult to predict how GIS publications will be treated under negligence law, even with reference to navigational charting, computer technology, and information publication. GIS standards should be adopted before liability can attach. The potential liability against a GIS producer under traditional tort principles of strict liability and negligence is too great to allow blanket liability without a GIS producer knowing how a court will treat the "product" of GIS technology. While the negligence theory of liability may offer a less exacting standard than strict products liability, GIS producers must carefully evaluate their

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210. *See Alm*, 480 N.E.2d at 1267 (stating that "the adverse effect of such liability upon the public's free access to ideas would be too high a price to pay").

211. *See* discussion *infra* Part V.B.1.

212. *See* RESTATEMENT (SECOND) OF TORTS § 402A (1965).

213. 128 F.3d 233 (4th Cir. 1997), *cert. denied*, 118 S. Ct. 1515 (1998).

214. *See id.* at 249.

215. *See id.* at 241.

216. *See id.* at 256.

217. *See id.* at 265-66. In what appears to be a test case to see if a book publisher can ever be liable for the information it disseminates, Paladin stipulated to a number of facts: a murderer used the book to commit a murder; in marketing the book, the publisher "intended to attract and assist criminals . . . who desire information and instruction on how to commit crimes;" the publisher intended and knew that the book would be used to commit murder; and the publisher aided the murderer in the particular crime for which he was charged. *Id.* at 241.

data collection and distribution techniques to avoid liability altogether.

B. Contract Law Implications

This Comment does not attempt to address the numerous possibilities for contract liability arising from GIS production.[218] The use of disclaimers and the doctrine of privity, however, are discussed briefly to demonstrate how GIS liability may be limited.

1. Disclaimer

The use of disclaimers on published materials avoids liability in some instances,[219] but a guarantee of accuracy imposes liability in other circumstances.[220] *Rozny v. Marnul*[221] involved the use of a surveyor's plat that, on its face, absolutely guaranteed the plat's accuracy.[222] Relying on the plat, Mr. Rozny built a house and garage that extended six feet onto a portion of his neighbor's adjacent land.[223] The surveyor, and not Mr. Rozny, was required to reimburse the neighbor for the encroachment.[224]

Still other cases have imposed liability where the disclaimer itself was misleading. In *Southern Natural Gas Co. v. Pontchartrain Materials, Inc.*,[225] a dredging barge ruptured a submerged oil pipeline.[226] While a chart on board the barge depicted some submerged pipelines, not all oil well structures such as the one ruptured were shown.[227] Since the cautionary language did not warn navigators about the routine existence of the type of pipeline ruptured in this instance, the

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218. For an in-depth discussion regarding contractual issues in the computer industry, see Robert A. Feldman, *Warranties and Computer Services: Past, Present and Future*, 10 COMPUTER LAW. 1 (1993).

219. *See, e.g.*, Laidlaw Envtl. Servs. v. Honeywell, Inc., 966 F. Supp. 1401, 1413 (D.S.C. 1996) (stating that Laidlaw avoided consequential and incidental damages by contractually agreeing to deny this type of recovery to Honeywell's use of Laidlaw's computer service).

220. *See, e.g.*, Rozny v. Marnul, 250 N.E.2d 656, 662 (Ill. 1969) (imposing liability because the surveyor absolutely guaranteed the accuracy of plat). *But see* First Equity Corp. v. Standard & Poor's Corp., 869 F.2d 175, 176 (2d Cir. 1989) (noting that the corporation specifically did not guarantee the accuracy nor completeness of the information contained within its report and was not held liable for a third party's reliance on the report's contents).

221. 250 N.E.2d 656 (Ill. 1969).

222. *See id.* at 658-59 (detailing the precise language of the limited disclaimer in the guarantee).

223. *See id.* at 659.

224. *See id.* at 666.

225. 711 F.2d 1251 (5th Cir. 1983).

226. *See id.* at 1252 (noting that a warning to mariners was misleading because it failed to warn of the existence of submarine gas pipelines).

227. *See id.* at 1253.

chart was not complete and the disclaimer was ineffective in avoiding liability.[228]

Finally, some cases reject the need for disclaimers in the book publishing context where no duty to warn exists.[229] Without a duty to determine the accuracy of the information contained within the publication, there can be no duty to warn of the possibility of inaccuracies contained.[230] Courts reject the imposition of a "mere warning label" when the law requires no duty to warn.[231] Additionally, while the book itself may have an "implied warranty of merchantability"[232] as to the physical product, no implied warranty attaches to the material communicated by the publication.[233] Without standards fixing the duty of GIS producers, the prediction of GIS producers' liability is suspect.

Typically, GIS professionals use their "maps" to present information and data summaries and not to represent that the information contained in the data is wholly accurate. The use of disclaimers on GIS publications is a routine practice of GIS professionals.[234] In addition, one state allows GIS producers to contract with users for the "development, acquisition, maintenance, distribution and marketing of GIS data,"[235] which limits the state's liability.[236] Furthermore, even when disclaimers are not explicitly used, the GIS user generally has access to the metadata[237] to describe the limitations associated with the data used to generate the information.

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228. *See id.* The court found that the government clearly had a duty to indicate the omitted pipelines on its charts. *See id.* at 1257.

229. *See, e.g.*, Winter v. G.P. Putnam's Sons, 938 F.2d 1033, 1037 (9th Cir. 1991) (holding that the publisher of *The Encyclopedia of Mushrooms* could not be held liable for negligence because there was no duty to exercise due care); Cardozo v. True, 342 So. 2d 1053, 1053-57 (Fla. 2d DCA 1977) (holding that the purchaser of a cookbook could not hold the book dealer liable for injuries allegedly caused by the lack of adequate warnings).

230. *See Winter*, 938 F.2d at 1037 (noting that the publisher of *The Encyclopedia of Mushrooms* was under no duty to warn of possible inaccuracies, since the publisher had no duty to determine the correctness of the published information); *Cardozo*, 342 So. 2d at 1056-57 (noting that the cookbook publisher was under no duty to warn of unknown potential dangers).

231. *Winter*, 938 F.2d at 1038.

232. U.C.C. § 2-314(2)(c) (1995) (providing that consumer goods are to be "fit for the ordinary purposes for which such goods are used").

233. *See Cardozo*, 342 So. 2d at 1056-57 (stating that reliance on the doctrine of implied warranty to hold a retail book dealer liable for the contents of the books sold would be contrary to the spirit of the Uniform Commercial Code).

234. The following is an example of the type of disclaimer used: "[the information] contained herein is unofficial and subject to change. The information is currently being reviewed . . . for a final product." CHARLOTTE COUNTY COMMUNITY DEV. DEP'T, LAND INFO. SERVS., CHARLOTTE COUNTY FUTURE LAND USE MAP (Draft July 17, 1996); *see also* disclaimer in the map *infra* Appendix A.

235. VT. STAT. ANN. tit. 10 § 123(c)(7) (1997).

236. *See id.* § 123(c)(8)(B).

237. Whether the user avails herself of the metadata is another issue. For a discussion of metadata, see *supra* note 33 and accompanying text.

While a GIS producer's disclaimer is unlikely to guarantee freedom from liability, the benefits to GIS producers for using disclaimers are apparent. The inability to guarantee accuracy is inherent in the nature of GIS data collection, manipulation, and analysis. Moreover, although using disclaimers and attempting to contractually limit a GIS producer's liability may be wise, a misleading disclaimer may still expose GIS producers to liability for inaccuracies or omissions contained within a data set. Additionally, if there is a duty for an agency to represent data sets accurately, particularly in the navigational context, there may also be a duty to warn of the potential failures of the data represented. While using disclaimers may limit a GIS producer's liability, it may not provide a shield against liability if the disclaimer is misleading.

2. Lack of Privity

Although the concept of privity[238] may no longer be a prevalent doctrine to assign or limit liability, a short discussion regarding privity is helpful. In the computer technology context, an information technology firm was found not to have a "special relationship" with its own computer services supplier (IBM) to allow a third party to indemnify IBM for fees paid on a prior lawsuit.[239] Because there was no contract between IBM and the firm and IBM received no compensation from the firm, the court concluded that IBM merely "served as a vendor in supplying computers" to the third party.[240]

The concept of privity, however, will not avoid liability in all contexts.[241] Since maps are mass-produced, they fall into the hands of many people; this eliminates any possibility that publishers will know precisely where their information is disseminated.[242] Thus, a privity requirement is not sustainable. Finally, in a charting context, the argument that privity must exist to find liability did not survive when the chart publisher guaranteed the accuracy of his plat.[243] The scope of the duty assumed by the surveyor, and not "the artificial concept of privity,"[244] led the court to determine that guaranteeing

238. Privity has been described as a "connection or relationship that exists between two or more contracting parties." BLACK'S LAW DICTIONARY 1199 (6th ed. 1990). In a broader sense, privity is a "mutual or successive relationship to the same right of property . . . as to represent the same legal right." *Id.*

239. *See* A.T. Kearney, Inc. v. IBM Corp., 867 F. Supp. 943, 944-45 (D. Or. 1994).

240. *Id.* at 946.

241. *See, e.g.*, Independent Sch. Dist. No. 454 v. Statistical Tabulating Corp., 359 F. Supp. 1095, 1097-98 (N.D. Ill. 1973) (holding that privity was not required when the reliance upon inaccurate information provided by a statistical company caused economic loss).

242. *See generally* La Rossa v. Scientific Design Co., 402 F.2d 937, 942-43 (3d Cir. 1968).

243. *See* Rozny v. Marnul, 250 N.E.2d 656, 659-60 (Ill. 1969).

244. *Id.* at 660.

accuracy to all who may use and rely on the plat established a duty on the surveyor's behalf to represent what he charted accurately.[245]

For the foregoing reasons, privity may not avoid liability in the GIS context, particularly where the information is distributed en masse. While contract law implications are not the focus of this Comment, the concepts of disclaimer and privity are revealed to show their unlikely effort to help GIS producers avoid liability for inaccuracies and misleading statements contained within their disseminated information unless the GIS producer is found to have no duty to relay wholly accurate information.

VI. CHANGES NEEDED TO REDUCE GIS LIABILITY

The preceding discussion highlights the various themes of GIS-producer liability. There is little GIS producers can do to avoid liability completely. Several suggestions, however, follow to assist GIS producers in partially avoiding the nearly inescapable liability.

The need for technical and professional standards to regulate what GIS is and how it should be produced is paramount. With sufficient and known standards regulating the production of GIS, anyone who comes into contact with GIS technology will have greater assurance regarding the reliability of the information disseminated. Creating uniform GIS standards will produce many benefits, especially in the planning-related industries where its use has grown significantly.

Secondly, GIS should continue to be used and have its use expanded as an evidentiary tool. Using GIS in this way will demonstrate further the benefits of GIS. If GIS is to be used as reliable evidence, however, a foundation must be laid for its contents and data collection efforts. The knowledge of how, why, for what, and for whom the data was created will enlighten the user, in this case, the judge and jury, as to the data's credibility and significance.

Next, if liability is to be imposed on GIS producers when some duty and breach of duty are involved, a rule of strict products liability ought not be applicable. Although many cases, and even the *Restatement (Third) of Torts: Products Liability,* suggest that charts should be treated as products, the consequence of calling GIS a product may force GIS producers to reconsider making their products widely available for use. Perhaps limiting liability to the original data collector in negligence is one answer. Additionally, perhaps any subsequent distributor of the collected data should not be liable for inaccuracies contained in its production unless the subsequent distributor has incorrectly used the original information to create an omission or mistake. Applying current tort law to GIS products sug-

245. *See id.* at 662.

gests that all entities involved in the production chain may be held liable for intentional and unintentional errors. "Super liability" will not promote further GIS innovations.

Finally, GIS producers should consistently use disclaimers to limit liability. The GIS producer should clearly state that the information represented cannot be guaranteed for accuracy. The fundamental nature of GIS data involves constantly changing information. The disclaimer should also make all metadata known regarding the data used in that specific representation. Of course, access to the metadata must also be facilitated. Hopefully, these suggestions will be heeded when a court eventually encounters a GIS liability lawsuit.

VII. CONCLUSION

The emerging field of GIS and the public's introduction to a vast field of information and technology ought to be encouraged by a uniform and balanced system of liability. While the law must protect citizens, it must also nurture and promote new ideas and innovations by giving them room to grow. Since GIS is such a viable and useful new tool, the law must allow it, if not to thrive, at least to exist. If GIS producers become aware of the immense potential for liability from so many different areas of law, GIS producers will likely feel a chilling effect on their desire for new discoveries. GIS producers may cease sharing their data with other GIS professionals, cease making the information available to the public, or stop creating GIS data altogether if the risk of exposure to liability is as great as this Comment suggests. If any of these scenarios come to fruition, GIS producers will stop relying on the data of others and, instead, be forced to produce data used by them individually. This will not serve the GIS community or the public-at-large. The technology must be given a chance to define itself, in terms of what GIS users and GIS producers will set as professional and technical standards. Without time to experience a few growing pains, GIS will be doomed to a strict liability standard. The legal community cannot let this valuable technology die prematurely.

APPENDIX A

The following geographic representation[246] purports to show the location of evacuation routes and shelters for Leon County, Florida, when a severe weather event such as a hurricane occurs.

The county boundary was digitized from United States Geological Survey quarter quads at a 1:24000 scale. The location of the roads was obtained from digital orthophotography flown at a 1:200 scale, digitized according to street centerlines, and tied to GPS points. The placement of the roads is accurate to approximately six feet. The attributes of the roadways—the primary and secondary status of the evacuation routes—as well as the location of the shelters have been added by Leon County GIS at the request of the 911 Emergency Department. The location of the shelters is tied to the street addresses of those shelters.

Each data set has been manipulated for incorporation on this "map" to produce one cohesive and readable data set. For purposes of further discussion, the spatial data associated with this map is the location of the evacuation routes and shelters, as well as the county boundary. The tabular data includes the attributes associated with the evacuation routes—whether the route is a primary or secondary evacuation route.

Examples of data sets that could have been incorporated into this graphic representation include Federal Emergency Management flood plains or Leon County flood hazard spots. However, including either of these data sets at the scale depicted here would produce indistinguishable characteristics. Reading the disclaimer on this "map" may help the layperson as well as the sophisticated GIS professional to understand the implications raised by producing any GIS data set.

A joint City of Tallahassee/Leon County project to allow public access to its GIS data is now available.[247] The "map's" spatial data includes all city/county parcels, streets, water bodies, and flood hazard spots. The tabular data includes properties designated by use such as educational facilities, parks, or governmental buildings, street names, and parcel-specific information such as address, square footage of the parcel's building, and the year the building was built.[248] The City and County envision that the GIS website will eventually include such information as zoning categories, environmentally sensitive areas, and crime rates, with all information connected to individual parcels in the City/County database.[249]

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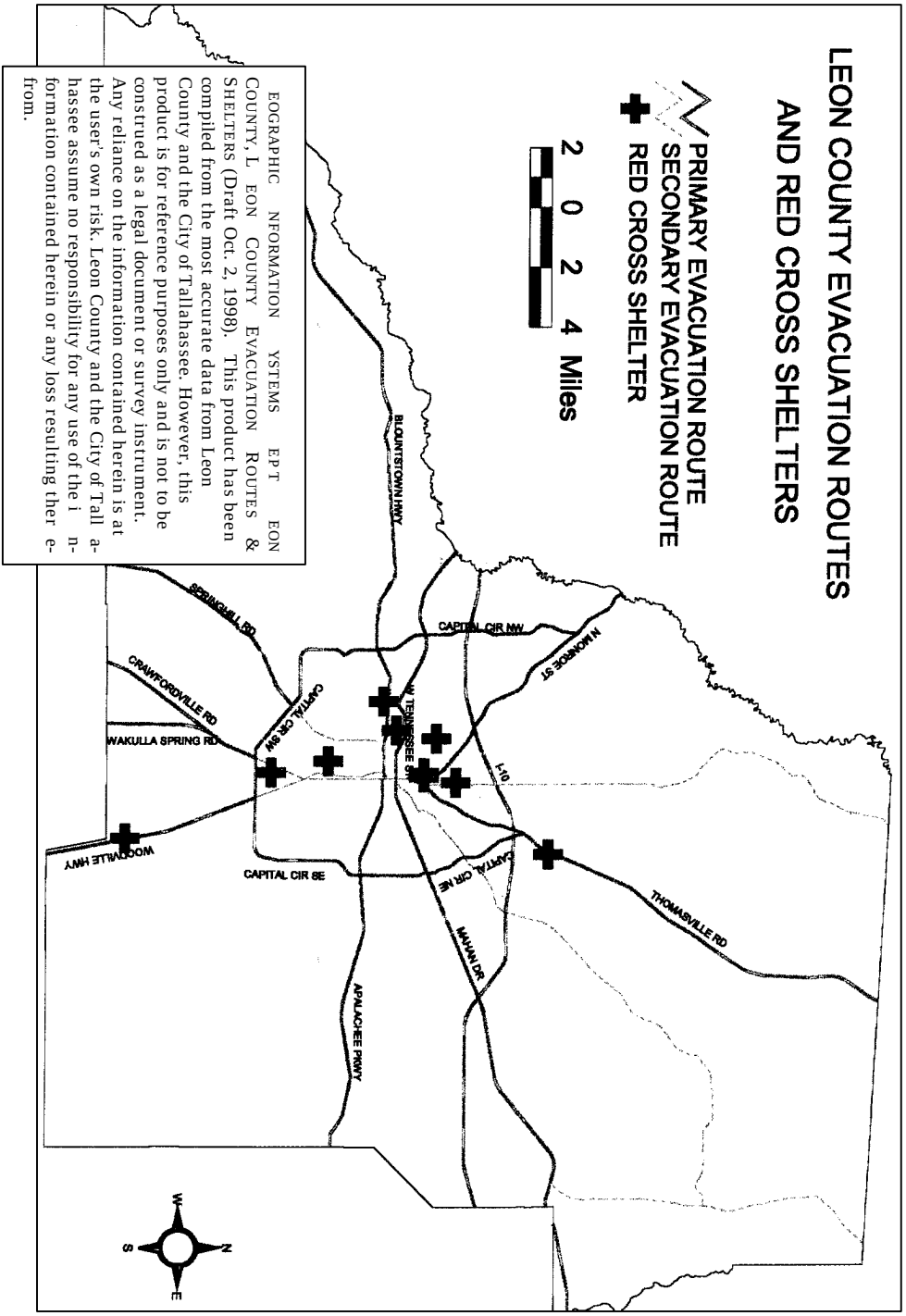
246. GEOGRAPHIC INFORMATION SYSTEMS DEP'T, LEON COUNTY, LEON COUNTY EVACUATION ROUTES & SHELTERS (Draft Oct. 2, 1998).

247. *See* Tallahassee-Leon County GIS, *Property Information Application (Parcels)* (visited Apr. 16, 1999) <http://tlcgis.co.leon.fl.us/templates/default.htm>.

248. *See id.*

249. *See* McNaught, *supra* note 136, at A4.


LEON COUNTY EVACUATION ROUTES
AND RED CROSS SHELTERS
PRIMARY EVACUATION ROUTE
SECONDARY EVACUATION ROUTE
RED CROSS SHELTER
2 0 2 4 Miles
EOGRAPHIC NFORMATION YSTEMS EPT EON
COUNTY, L EON COUNTY EVACUATION ROUTES &
SHELTERS (Draft Oct. 2, 1998). This product has been
compiled from the most accurate data from Leon
County and the City of Tallahassee. However, this
product is for reference purposes only and is not to be
construed as a legal document or survey instrument.
Any reliance on the information contained herein is at
the user's own risk. Leon County and the City of Tall a-
hassee assume no responsibility for any use of the i n-
formation contained herein or any loss resulting ther e-
from.
BLOUNTSTOWN HWY
SPRINGHILL RD
CRAWFORDVILLE RD
WAKULLA SPRING RD
WOODVILLE HWY
CAPITAL CIR SW
CAPITAL CIR NW
N TENNESSEE ST
N MONROE ST
I-10
CAPITAL CIR SE
CAPITAL CIR NE
MAHAN DR
APALACHEE PKWY
THOMASVILLE RD
W
S
N
E

APPENDIX B

NATIONAL MAP ACCURACY STANDARDS

The U.S. Bureau of the Budget promulgated the following standards in 1941 and revised them in 1947.[250]

> With a view to the utmost economy and expedition in producing maps which fulfill not only the broad needs for standard or principal maps, but also the reasonable particular needs of individual agencies, standards of accuracy for published maps are defined as follows:
>
> 1. Horizontal accuracy. For maps on publication scales larger than 1:20,000, not more than ten percent of the points tested shall be in error by more than 1/30 inch, measured on the publication scale; for maps on publication scales of 1:20,000 or smaller, 1/50 inch. These limits of accuracy shall apply in all cases to positions of well-defined points only[.] Well-defined points are those that are easily visible or recoverable on the ground, such as the following: monuments or markers, such as benchmarks, property boundary monuments; intersections of roads, railroads, etc.; corners of large buildings or structures (or center points of small buildings); etc. In general what is well defined will also be determined by what is plottable on the scale of the map within 1/100 inch. Thus[,] while the intersection of two road or property lines meeting at right angles would come within a sensible interpretation, identification of the intersection of such lines meeting at an acute angle would obviously not be practicable within 1/100 inch. Similarly, features not identifiable upon the ground within close limits are not to be considered as test points within the limits quoted, even though their positions may be scaled closely upon the map. In this class would come timber lines, soil boundaries, etc.
>
> 2. Vertical accuracy, as applied to contour maps on all publication scales, shall be such that not more than ten percent of the elevations tested shall be in error more than one-half the contour interval. In checking elevations taken form the map, the apparent vertical error may be decreased by assuming a horizontal displacement within the permissible horizontal error for a map of that scale.
>
> 3. The accuracy of any map may be tested by comparing the positions of points whose locations or elevations are shown upon it with corresponding positions as determined by surveys of a higher accuracy. Tests shall be made by the producing agency, which shall also determine which of its maps are to be tested[ ] and the extent of such testing.
>
> 4. Published maps meeting these accuracy requirements shall note this fact on their legends, as follows: "This map complies with National Map Accuracy Standards[.]"
>
> 5. Published maps whose errors exceed those previously stated shall omit from their legends all mention of standard accuracy.
>
> 6. When a published map is a considerable enlargement of a map drawing (manuscript) or of a published map, that fact shall be stated in the legend. For example, "This map is an enlargement of a 1:20,000-scale map drawing," or "This map is an enlargement of a 1:24,000-scale published map.["]

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250. *See* discussion *supra* note 42.

> 7. To facilitate ready interchange and use of basic information for map construction among all Federal map-making agencies, manuscript maps and published maps, wherever economically feasible and consistent with the uses to which the map is to be put, shall conform to latitude and longitude boundaries, being 15 minutes of latitude and longitude, or 7.5 minutes, or 3 [to] 3.4 minutes in size.[251]

251. Hawaii, *Standards*, *supra* note 42.