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Liability in the use of GIS and geographical datasets

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As GIS becomes more widely used, the consequences of its use are more likely to be disadvantageous to some people. In some cases, those suffering will be the users of the software or data; in other cases, they will be people affected by decisions taken on the basis of the use of GIS. Liability is a creation of the law to support a range of important social goals such as avoidance of injurious behaviour, encouraging the fulfilment of obligations established by contracts, and the distribution of losses to those responsible for them. Minimising losses for users of geographical data products and reducing liability exposure for creators and distributors of such products is achieved primarily through performing competent work and keeping all parties informed of their obligations. This chapter outlines some of the key areas in which liability is likely to be incurred and uses GIS scenarios to illustrate the law of contract and tort. It is stressed that the detailed basis of much of what is described is American law but similar or equivalent concepts exist in many other legal systems. It is also stressed that other liability burdens may arise under legislation relating to specific substantive topics such as intellectual property rights, privacy rights, anti-trust laws (or non-competition principles in a European context), and open records laws though these are not addressed here because of limited available space. In a situation where the various legal aspects of the use of GIS are becoming ever more important, sound legal advice is essential for many organisations and individuals operating them.

1 INTRODUCTION¹

Liability is a subject of great interest and concern in the GIS community. Use of GIS data and software inevitably results in some action or decision. If errors or shortcomings have resulted in inappropriate actions or decisions and parties are harmed, the spectre of liability arises for dataset and software producers as well as for all other parties involved in handling geographical information.

As a general proposition, legal liability for damages is a harm-based concept. For instance, those who have been hired specifically to provide data for a database or those who are offering data for sale to others are responsible for some level of competence in the performance of the service or for

some level of fitness in the product offered. If others are damaged by mistakes that a producer should not have made or by inadequacies that should not have been allowed, the courts have reasoned that producers should bear some responsibility for the damages. But for their mistake or defective product, the damages would not have occurred. In commercial settings, liability exposure often may be reduced through appropriate communications, contracts, and business practices. However, liability exposure may never be eliminated completely. Nor as a society would we want it to be. Modern societies generally support the proposition that individuals and businesses should take responsibility for their actions if those actions have unjustifiably caused harm to others.

However, the law does not require perfection. The law exists and responds to a realistic world. No general-purpose dataset will ever be complete for all potential purposes that users might desire. Nor will the accuracy of data ever meet the needs of all conceivable uses. It is also inevitable that errors and blunders will be contained in any practical database. Thus, the law holds that those in the information chain should be liable only for those damages they had a duty to prevent. Establishing the nature and extent of rightful duties has traditionally been accomplished under theories of tort or contract law. Legislation may impose additional or alternative liability burdens. Such legislation affecting liability for spatial datasets and software might typically be found in statutes addressing such issues as intellectual property rights, privacy rights, anti-trust issues, and access rights.

The liability in data, products, and services related to computerised GIS is complicated by legal theory uncertainties surrounding liability for maps. This is compounded by the complexities and uncertainties in liability for information system products and services generally. Liability in GIS is further confused by the wide array of current and potential applications of geographical information technologies. Each application requires integration of information specific to the application and often will involve different attributes, analytical methods, spatial features, and accuracy requirements. The specific software and end-users will also vary depending on the application to which the technology is being applied. Thus, the complexity of the legal questions surrounding GIS liability – combined with the diversity of problems to which geographical information technologies are being applied – has tended to create diffuse, changing, and often undefined liability concerns for all parties involved in geographical information production and use (Johnson and Dansby 1995).

People purchasing GIS software, datasets, products, and services are often disappointed in their expectations. Representations that software will accomplish certain tasks or that a dataset is complete or sufficient to accomplish specified tasks may be false or misleading. Datasets may contain errors and software may achieve inconsistent or wrong results. In these instances, the disappointed purchaser or user usually has a contract relationship with the technology product or service provider

upon which to assert their claim. Thus, any discussion of liability with regard to GIS should probably begin with consideration of liability in the context of contract and licensing arrangements. Whether GIS products or services are custom-developed or software and datasets are sold pre-packaged for the general consumer market, the relationships between the producer and purchaser or user will probably be affected foremost by contract law principles.

In disputes based on contract principles, the issue of warranty, either express or implied, will typically be raised as a basis of claim. In addition to warranty claims, the disappointed party may attempt to pursue a parallel tort claim, such as negligence, in order to expand the types and extent of damages that might be covered or to raise a broader range of duties on the part of the technology product producer. Statutes of limitations may also vary.

Tort theories come to the forefront when the goal of the law is to prevent harms to the public generally. Thus, tort concepts such as negligence and strict liability may often be invoked by third party users outside of, and independent of, contractual considerations. Certain geographical information technologies and products, if found defective, may be held by public policy to be unreasonably harmful to persons or property if offered to the public. In these instances, the tort theory of strict liability will be important.

Sometimes at issue may be an attempt by a dominant party to restrict the entrepreneurial activities of those entering into a contract with it. In such instances, anti-trust (or non-competition principles in a European context) may be relevant. Infringement of rights to intellectual property, personal privacy, and access to government information may also give rise to responsibility for damages.

Specific laws in regard to liability are dependent upon the particular laws of individual nations. This chapter uses as its foundation primarily US legal principles. However, in an attempt to remain more general, the chapter focuses on 'fundamental' legal principles and policies that remain germane regardless of the national jurisdiction. In a US context, many of these fundamental principles are best illustrated through reference to the various Restatement of Law documents and the Uniform Commercial Code (UCC).²

2 CONTRACT LIABILITY CONCEPTS

A contract may generally be defined as a mutual assent between competent parties, usually manifested by an offer and acceptance, upon a legal consideration to do or to abstain from doing some act. The mutual assent may be express or implied and the legal consideration is often cash in a GIS context. ‘The obligation of the seller is to transfer and deliver, and that of the buyer is to accept and pay in accordance with the contract’ (UCC, 2: 301). Once a contract exists, a party to the contract may recover for breach of contract by showing that the other party failed to perform as promised. It is not necessary to prove fault on the part of the breaching party. It is necessary only to show that the terms of the contract were not met. As a general proposition in regard to damages, parties are entitled to the benefit of their bargain and thus damages are calculated by determining the amount that would place the damaged party in the position that they would have been in had the contract been fully performed. As the UCC (1:106) states: ‘The remedies provided by this Act shall be liberally administered to the end that the aggrieved party may be put in as good a position as if the other party had fully performed but neither consequential or special nor penal damages may be had except as specifically provided in this Act or by other rule of law.’

In the USA, contracts for the sale of goods are subject to Article 2 of the UCC which generally applies to all goods offered for sale in interstate commerce and has been adopted in entirety or large part by most states. If no explicit contract exists between a supplier of goods and a consumer, the law applies the provisions of Article 2 to the sales relationship. If an explicit contract for the sale of goods exists but is quiet in respect to certain items that were not addressed by the contract but that are now in dispute, the UCC fills in the gap to clarify the relationship between the parties. GIS software, hardware, and datasets typically qualify as ‘goods’ and thus their sale often would be subject to UCC provisions. (State laws typically make leasing of goods subject to Article 2 as well, or apply Article 2A which specifically addresses leasing of goods.) Of course, the parties to a contract have leeway to develop

and agree to alternative provisions to those contained in the UCC. Contracts for the performance of services are not covered by the UCC. Other nations often have similar default statutory provisions that apply when a sale is not governed by explicit contract language.

2.1 Warranties

Warranties are often the issue in dispute in cases involving computer product contracts. The most basic warranty provided by a seller of goods is that ‘(a) the title conveyed shall be good, and its transfer rightful; and (b) the goods shall be delivered free from any security interest or other lien or encumbrance of which the buyer at the time of contracting has no knowledge’ (UCC 2: 312(1)). Such a warranty may of course be negated by specific language that the person selling does not claim title to the product or modified to claim only partial title in the product being sold (UCC 2: 312(2)). Because geographical datasets may sometimes be acquired through a string of successive sources that may each alter the dataset, a seller’s ability to sell or license full interests in a geographical dataset may be an issue in some cases. Additional warranties may be express or implied.

2.1.1 Express warranties

Express warranties by the seller are created by the following (UCC 2: 313(1)):

- 1 Any affirmation of fact or promise made by the seller to the buyer which relates to the goods and becomes part of the basis of the bargain creates an express warranty that the goods shall conform to the affirmation or promise.
- 2 Any description of the goods which is made part of the basis of the bargain creates an express warranty that the goods shall conform to the description.
- 3 Any sample or model which is made part of the basis of the bargain creates an express warranty that the whole of the goods shall conform to the sample or model.

‘It is not necessary to the creation of an express warranty that the seller use formal words such as “warrant” or “guarantee” or that he have a specific intention to make a warranty . . . ’ (UCC 2: 313(2)).

2.1.2 Implied warranties

Implied warranties are of two fundamental types, implied warranties of merchantability and implied warranties of fitness for a particular purpose.

- 1 A warranty that goods are merchantable 'is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind' (UCC 2: 314(1)).
- 2 Goods to be merchantable must be at least such as
 - (a) pass without objection in the trade under the contract description; and
 - (b) are fit for the ordinary purposes for which such goods are used; and
 - (c) run, within the variations permitted by the agreement, of even kind, quality, and quantity within each unit and among all units involved; and
 - (d) are adequately contained, packaged, and labelled as the agreement may require; and
 - (e) conform to the promise or affirmations of fact made on the container or label if any.
- 3 Other implied warranties may arise from course of dealing or usage of trade (UCC 2: 314(2&3)).

Implied warranties of fitness for a particular purpose are established under the language of UCC (2: 315): 'Where the seller at the time of contracting has reason to know any particular purpose for which the goods are required and that the buyer is relying on the seller's skill or judgement to select or furnish suitable goods, there is unless excluded or modified under the next section an implied warranty that the goods shall be fit for such purpose.'

Language in the contract tending to negate or limit an express warranty is construed, whenever reasonable, as consistent with the express warranty but, where consistent construction is unreasonable, the negation or limitation is inoperative (UCC 2: 316(1)). Implied warranties of merchantability and implied warranties of fitness may be waived in the contract. Warranties 'whether express or implied shall be construed as consistent with each other and as cumulative' (UCC 2: 317).

2.2 Warranties in GIS cases

2.2.1 Scenario 1

Let us assume that an individual has purchased off-the-shelf GIS software from a merchant. The purchaser leaves the store, tries the software, and is disappointed because it does not meet his or her

expectations. The product carries with it an implied warranty of merchantability as well as potential express warranties that might be included, for instance, on the packaging. Whether the purchaser may receive return of purchase price will depend on whether these warranties have been breached. Software, system, and data sellers typically are able to avoid damages for breaching implied warranties of merchantability by meeting the requirements of 2-314(2) of the UCC listed above and are able to avoid damages for breaching express warranties by not blatantly overstating or misrepresenting the capabilities of their products. Thus, in the typical business-like sale of pre-packaged software or data it is unlikely that these warranties have been breached. Of course, further consumer laws in some jurisdictions or custom in the trade may allow return of undamaged products within specified time periods with no need for explanation. There is also considerable case law authority supporting the invalidity of 'shrink-wrap license' provisions under US law³ and therefore a waiver of merchantability contained in a licence inside a software or dataset package probably would be unenforceable against a consumer.

2.2.2 Scenario 2

In another instance, let us assume that an individual is engaged in the business of selling health care products by mail. The individual reads sales literature about a GIS database and software system that will allow better profiles of potential customers and their physical relationships to a wide range of environmental hazards to be constructed. Updates of information on the purchasing patterns of households and environmental hazard ratings are provided on a regular bi-weekly basis under the terms of the licence with the system supplier. The signed standard-form license supplied by the system supplier states that 'the software system and data are supplied *as is* without warranties of any kind, either expressed, implied, or statutory, including but not limited to warranties of merchantability and fitness for a particular purpose.' After suffering greatly decreased sales through the latest mailing efforts, as evidenced by the worst sales in ten years, the purchaser discovers that a recently introduced non-intentional defect in the current version of the GIS software has resulted in the mailings going to the least likely purchasers of their health care products rather than the most likely purchasers. From the

purchaser's perspective, the software did not do what the sales literature promised and resulted in very substantial losses to the business.

Unless the purchaser lives in a jurisdiction that bans the exclusion of implied warranties, there may be little chance of prevailing on a contract claim since all warranties were explicitly waived in the contract. The purchaser might argue that the contract as a whole was so one-sided at the time it was made that it was unconscionable under the circumstances. This situation is summarised by UCC 2: 302(1) as:

'If the court as a matter of law finds the contract or any clause of the contract to have been unconscionable at the time it was made the court may refuse to enforce the contract, or it may enforce the remainder of the contract without the unconscionable clause, or it may so limit the application of any unconscionable clause as to avoid any unconscionable result.'

However, let us assume for the sake of argument that the court finds otherwise, perhaps because the contract was among reasonably sophisticated business parties of relatively equal bargaining power and the parties freely negotiated the terms of the contract or had a reasonable opportunity to do so. This raises the question of whether a tort action based on negligence, misrepresentation, fraud, or strict liability might be brought in lieu of, or in parallel with, the contract claim.

3 TORT LIABILITY CONCEPTS

A tort is a private or civil wrong or injury to a person or property which does not arise as the result of a breach of contract. There are no fixed and rigid classifications for torts. Two major policies supported by tort law are punishing wrongdoers for their conduct and compensating injured parties (Restatement (Second) of Torts, 1964: 901). If both policies can be supported by transferring money from the wrongdoer to pay for the damages of the party harmed, the rationale is strong for granting tort relief. Although there are no rigid classifications for judge-made tort law, there are some traditionally recognised or classic tort situations. Three traditional classes of tort liability have been for intentional harms, negligence, and strict liability. Additional classes of claims that may be relevant to disputes involving GIS

products and services include products liability, defamation, wrongful invasion of the right of privacy (see Curry, Chapter 55), and misrepresentation. The primarily judge-made law of torts has been summarised in the USA in Restatement of the Law (Second) Torts. Legislation relative to tort law in individual states has often mirrored the provisions of this document.

3.1 Negligence

Negligence is conduct that breaches a duty of care for the protection of others against unreasonable risk of harm (Restatement (Second) of Torts, 1964: 282). Each person owes a duty to act as a reasonable person would under the same or similar circumstances (Restatement: 283). Thus, negligence does not involve intent to cause harm but only failure to meet a sufficient degree of care. The greater the risk of harm involved, the greater the care that a reasonable person can be expected to take. Under negligence, the duty to act reasonably to avoid foreseeable risks of physical injury extends to any person. If this duty is breached, a plaintiff can recover for personal injury or property damage caused by a product. However, purely economic loss is not typically recoverable in a negligence action. The duty to avoid foreseeable risks of solely economic injury runs only to those with whom the product producer has a special relationship⁴.

In some situations the defendant is able to present a defence that the plaintiff's own actions failed to provide sufficient self-protection. In such cases, a combination of the plaintiff's and defendant's actions may have caused the injury and, if so, liability for damages is distributed among the parties using the doctrine of comparative negligence or the older doctrine of contributory negligence.

In most instances, those whose cause of action against a GIS product or service provider is based solely on economic damages will have a contractual relationship with that provider. For instance, even under principles that support extension of contract warranties to other reasonably foreseeable users of the product, those parties without a contractual relationship would typically be excluded from claiming for economic loss unless they were also injured in person (UCC 2: 318). Since negligence claimants seeking only economic damages would in most cases also have a contract with the GIS product provider, this raises the issue of whether

they might bring a parallel action in negligence or bring such an action in lieu of a contract claim. It is important to remember that plaintiffs often desire to pursue tort claims such as negligence because of the possibility for expanded damages and a broader range of duties imposed on the defendant.

The traditional test in allowing a negligence action in parallel with the contract action for breach of a duty established by the contract was whether there was misfeasance (improper performance) as opposed to nonfeasance (failure to perform)⁵. In nonfeasance or non-performance, one may only resort to contract damages.

Another possibility for maintaining a parallel negligence action would be through a claim of 'professional malpractice'. Malpractice occurs when an individual does not perform to the expected standards of their profession. Professional standards of care are higher than those imposed on the average citizen. Under this approach, the plaintiff would argue that a duty independent of the contractual duty arose in the specific instance. The plaintiff would argue that a 'special relationship' existed between the parties. Proving such a relationship would involve showing that the plaintiff was relatively unsophisticated, the plaintiff needed to depend on the defendant's expertise, the plaintiff did depend on that expertise, and the defendant held itself out as having the required special expertise. If shown, the plaintiff could maintain both breach of contract and negligence claims (Perritt 1996: 227).

3.2 Negligent and fraudulent misrepresentation

Liability for negligent misrepresentation is established by Restatement (Second) of Torts (1964: 552) as follows:

'One who in the course of his business, profession, or employment, or in any other transaction in which he has a pecuniary interest, supplies false information for the guidance of others in their business transactions, is subject to liability for pecuniary loss caused to them by their justifiable reliance upon the information, if he fails to exercise reasonable care or competence in obtaining or communicating the information.'

Liability for fraudulent misrepresentation is established by Restatement (Second) of Torts (1964: 525) as follows:

'One who fraudulently makes a misrepresentation of fact, opinion, intention, or law for the purpose of inducing another to act or to refrain from action in reliance upon it, is subject to liability to the other in deceit for pecuniary loss caused to him by his justifiable reliance upon the misrepresentation.'

Perritt argues that in a contract setting, establishing the duty in a misrepresentation case above and beyond what the contract requires of the parties is often very difficult. He additionally argues that 'the modern law of fraudulent misrepresentation is only subtly different from the modern law of breach of contract' (Perritt 1996: 239). He makes this argument both with regard to damages recoverable and in establishing the elements of the case. As such, when a contractual relationship exists there would appear to be only infrequent situations where it would be beneficial to pursue a misrepresentation claim over a contract claim. One instance might be where the time to bring a cause of action has passed the statute of limitations for bringing tort claims but not a longer statute of limitations for contract claims (Perritt 1996: 243, referencing 604 F. 2d 737 (2d Cir. 1979)).

3.3 Fraud in the inducement

The complexities and confusion caused by bringing a tort action within a contract setting and the tendency of courts to defer to the written contract as the final agreement between the parties sometimes may be overcome by claiming 'fraud in the inducement' of the contract (Perritt 1996: 243). The objective of the plaintiff in such an action is to focus the court's attention solely on the events that occurred prior to and separate from the contract. Alleged fraud, such as evidenced by fabricated testimonials or test results, that occurred before consideration of a contract could justifiably be considered as tortious conduct separate from the contract. The wrongful conduct led the party into a contract which directly resulted in damages. Fraud in the inducement may be pursued independent of contract claims. Thus, by this approach the plaintiff advocates disposition of the dispute by establishing duties and breach of duty standards through tort concepts and ignoring the contract language, except perhaps in evidencing the amounts and kinds of damages suffered.

3.4 Strict products liability

For public policy reasons, suppliers of defective products are often held strictly liable to consumers and other product users for injuries caused by defective products. The primary objective of strict products liability theory is to provide an incentive to manufacturers to keep unsafe defective products off the market. The incentive is provided by reducing the burden of proof on harmed parties and making the manufacturer and others in the supply chain responsible for damages caused by unsafe defective products. If only negligence theory applied, suppliers could often escape liability for defective unsafe products by showing that industry-wide standards for design and manufacture were reasonably met. A product might be unsafe, yet still meet usual industry standards for quality control and design. Due to space limitations, further discussion of strict liability concepts is beyond the scope of this chapter.

3.5 Tort liability in GIS cases

3.5.1 Scenario 2

In scenario 2 discussed previously, the only damages alleged by the health care products distributor are economic. In that case the clear showing of a defect in the software that resulted in the system malfunctioning – rather than not working – may be sufficient to meet the requirement of misfeasance. If so, this would allow the parallel action in negligence and raise the possibility of recovering damages beyond those allowed under contract liability principles. However, even if negligence is found in failing to meet the requisite duty, the fact remains that the waiver of express and implied warranties in that specific contract might still be upheld.

3.5.2 Scenario 3

Let us assume that a small two person ‘timber finding’ business reads about the possibilities of finding pockets of hardwoods through the use of GIS and image processing software in combination with satellite imagery. A large GIS consulting firm advises the timber finding business that they have already developed the system that the timber finding company needs, they have numerous clients using the system, and those clients have all increased their hardwood finds by at least 200 per cent over conventional ‘ground cruising’ methods. The timber

finding business enters into a contract with the GIS consulting firm for delivery of a fully operational system including the imagery they need for the large land mass that they are interested in investigating. The signed contract between the parties states that ‘damages recoverable by the purchaser in the event of a breach of this contract by the seller are limited solely to return of the price of the contract’. The GIS consulting firm fails to provide the system and in fact no system has ever been developed. The timber finding company relies on the consulting firm’s promise to deliver the system on time and suffers substantial reliance damages due to timber finding contracts it was forced to breach because the new capabilities were not delivered as promised.

In this case the claimed losses are solely economic. They are arguably the result of non-performance as opposed to improper performance. Thus, the traditional test for allowing a negligence action in parallel with the contract action is not met. Yet the plaintiff would still prefer suing in tort since tort actions may allow the possibility for a greater range of damage recoveries.

One approach that the timber finding company might take is to argue the malpractice claim that a duty independent of the contractual duty arose in this specific instance. In arguing the ‘special relationship’ elements of such a case the timber finding company would argue that their company is relatively unsophisticated, they needed to depend on the expertise of the consulting company, did in fact do so, and the consulting company held itself out as having the required special expertise to implement the complex technological system for them. If the court rejects these arguments, defers to the contract as the final agreement between the parties, and holds that the contract is not unconscionable, the provision limiting the contract damages is likely to be upheld.⁶

Negligent or fraudulent misrepresentation may also be potential causes of action in the case. If the plaintiff can prove through a preponderance of the evidence the mis-statements of facts as alleged, they probably have a good case for fraudulent misrepresentation. For instance, evidence of fabricated written testimonials of the other purported clients of the GIS consulting firm would be solid evidence of fraudulent intent and misrepresentation of facts. If the only evidence of fraud is oral, the danger exists that oral statements prior to the contract will be treated as ‘puffery’ on

the part of the seller which any reasonable purchaser should have treated with caution and the court may lean towards the contract as evidencing the full and final agreement between the parties.

A claim for ‘fraud in the inducement’ of the contract also offers possibilities for success by the plaintiff. Here the objective is to convince the court that the alleged fraud involved separate and distinct actions prior to and extraneous to the contract. If the court is convinced that the fraud was a sufficiently separate occurrence there is less likelihood of deferring to the contract language to resolve the matter. This would undoubtedly be to the plaintiff’s benefit as it would avoid imposition of the contract language limiting damages.

3.5.3 Scenario 4

Assume that a farmer buys a ‘precision farming’ system consisting of software, computer hardware, and computerised variable rate farming equipment from a large equipment manufacturing company. The new computer-controlled system tracks the location of farm machinery very precisely through the use of a global positioning system receiver (see Lange and Gilbert, Chapter 33) mounted on the farm equipment and is able to apply fertilisers, pesticides, and herbicides at variable rates in order to match the needs of the soil and ground cover conditions, as identified in a digital spatial dataset for the farmer’s fields. The system is also able to measure the productivity of each square metre of soil as crops are harvested. The farmer hires a local engineering consulting firm to accomplish soil tests in a dense grid over his fields and to insert this information along with other physical data specified by the manufacturer into the computerised system. The farmer implements precision farming of his fields. After one of the best growing seasons on record, the farmer experiences one of the worst crops he has ever had. Through an investigation the farmer discovers that chemical fertilisers, weed sprays, and insecticides were sprayed by the automated machinery in reverse locations to where they were needed due to a software error in the latest version of the software. The inappropriate spraying resulted in poisoning of the ground in some areas, killing off the crop in other areas, and allowing insect infestations in other areas. Evidence shows that the engineering firm made no errors in data collection and inserted the required information as directed by the manufacturer’s instructions. The

farmer’s standard form contract supplied by the instrument manufacturer states that ‘the software system and data are supplied *as is* without warranties of any kind, either expressed, implied, or statutory, including but not limited to warranties of merchantability and fitness for a particular purpose’. The software component of the system containing the defect was developed and distributed by a very large GIS software company with whom the farmer did not have a direct contract.

Under contract principles, the farmer might pursue breach of implied warranties of fitness for use and merchantability as well as any express warranties that might have been made. However, to pursue these warranties the farmer would have to overcome the clause in the contract stating that the ‘software system and data are supplied *as is* without warranties of any kind . . .’. The farmer might argue that the contract clause on its face is unconscionable since application of the disclaimer clause would allow the system producer to provide useless and harmful systems to consumers without any responsibility for the harm caused by the systems nor any contract benefit for the consumer. If the court as a matter of law finds the clause to have been unconscionable at the time it was made, the court would probably limit the clause so as to avoid any unconscionable result (see section 2.2.2). Resort to normal contract principles in determining damages would then seem appropriate. Deeming the entire contract unconscionable with resort in entirety to negligence principles for resolving the liability issues would appear to be inappropriate, except perhaps if the court found from the evidence an extreme disparity in bargaining power between the parties.

Because the dispute involves improper performance as opposed to nonfeasance, the possibility of pursuing a parallel negligence claim with the contract claim exists. Negligence in this case arguably involves both physical harm to property as well as economic damages. It appears reasonably foreseeable that a software error could cause physical damage to farmland and crops if the software was used in conjunction with computer-controlled farm equipment as intended by the suppliers and as used under normal conditions – as was done in this instance. Although pursuing a negligence claim in parallel with a contract claim is complex and gives rise to difficulties in meeting the conflicting underlying objectives of tort law versus contract law, protecting the public against the hazardous harms

caused by this type of defect and the argument that suppliers are in a better position than users to insure against the losses caused by defective products may be reason enough to allow the parallel action. It would be interesting to explore also whether a strict products liability claim might be successful in this case.

4 CONCLUSIONS

Liability is a creation of the law to support a range of important social goals such as avoidance of injurious behaviour, encouraging the fulfilment of obligations established by contracts, and the distribution of losses to those responsible for them. If decisions are made based on geographical data or products produced by someone other than the user, there will always be liability exposure. Minimising losses for users of geographical data products and reducing liability exposure for creators and distributors of such products is achieved primarily through performing competent work and keeping all parties informed of their obligations.

Liability in data, products, and services related to GIS is likely to be determined in most instances by resort to contract law and warranty issues. This is true whether geographical data products are custom developed for specific clients or mass produced for the general consumer market. Tort theories, such as negligence and strict liability, come to the forefront when preventing harms to the public generally arises as an issue.

In this chapter, fundamental contract and tort liability concepts (excluding strict liability) were reviewed followed by illustrations of how liability issues might arise and be addressed in a range of GIS conflict scenarios. Liability burdens arising under legislation relating to specific substantive topics such as intellectual property rights, privacy rights, anti-trust laws, and open records laws were not addressed by the chapter (but see Curry, Chapter 55; Rhind, Chapter 56). Assessing liability exposure arising under statutory law requires consideration of the specific language of the legislation in each nation or other jurisdiction. In addition, this chapter did not address the potential immunity of government agencies from liability for their geographical information products. Again, the availability of immunity for government agencies from damages varies among nations. In the USA it is probably safe to conclude that government GIS offices assume at

least some liability exposure in collecting and disseminating land-related data, whether or not they compete with the private sector in the sale of GIS data (Dansby 1992; Anderson and Stewart 1995). It is probably safe to conclude also that those GIS agencies or political subdivisions choosing to enter or compete with the commercial market in selling geographical information data, services, or products incur greater liability exposure than those government jurisdictions that do not, regardless of the business practices and contract language used by the GIS agency to minimise exposure (Anderson and Stewart 1995: 277; Perritt 1995: 314).

Finally, even though many geographical information products are being transferred across international boundaries and geographical data forms a significant component of the global information infrastructure, this chapter did not address the likely effects of international agreements on liability for injuries resulting within world trade contexts. International agreements having an effect on trade in geographical data and products might include the International Institute for the Unification of Private Law (UNIDROIT) Principles of International Commercial Contracts, the General Agreement on Tariffs and Trade (GATT 1994) creating the World Trade Organisation (WTO) to deal with dispute resolution, the Trade Related International Property (TRIP) appendix to GATT, the various existing and proposed laws by the European Union (EU) affecting electronic databases, and the North American Free Trade Agreement (NAFTA). Perritt (1996: Chapter 14) provides an introduction to these arguments. All of these additional issues should be considered when relevant to geographical information supplier and consumer relationships.

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Endnotes

- ¹ This article provides information of a general nature only. It is not intended to provide legal advice and statements in it should not be acted upon without consultation with appropriate legal counsel. This work is based upon work partially supported by the National Center for Geographic Information and Analysis (NCGIA) under NSF grant No. SBR 88-10917. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.
- ² The American Law Institute issues 'Restatements of the Law' that are the work of highly competent group scholarship. The American Law Institute was established in 1923 'to promote the clarification and simplification of the law and its better adaptation to social need, to secure the better administration of justice, and to encourage and carry on scholarly and scientific legal work'. By restating the law through the efforts of leading legal scholars, the Institute attempts to address such problems as 'lack of agreement among members of the profession on the fundamental principles of the common law', 'lack of precision in the use of legal terms', 'conflicting and badly drawn statutory provisions', 'the lack of systematic development of the law', 'the great volume of recorded decisions', and the 'numerous variations (of the law) within the different jurisdictions of the United States' (<http://www.ali.org/>).

Similarly, the UCC has been used as the primary basis for achieving uniformity in commercial transaction law throughout American jurisdictions. From a practical perspective, the UCC in the USA is similar in concept, although narrower in the subject matter it covers, to the generally applicable contract law provisions found in the Codes of civil law countries. For a review of the major differences between civil and common law jurisdictions in Europe relative to the enforcement of contracts, see Chapter 2 of Chance and Clifford *European computer law: an introductory guide*.

For contract liability in an international trade context it may be important to consider the provisions of the 'United Nations Convention on Contracts for the International Sale of Goods' and, within the European Union, the 'Council Directive on Unfair Terms in Consumer Contracts.'

- ³ *Vault Corp. v. Quaid Software Ltd.*, 775 F. 2d 638 (5th Cir. 1988), *Step-Saver Data Systems, Inc. v. Wyse Technology*, 939 F. 2d 91 (3rd Cir. 1991), *Arizona Retail v. TSL* (D. Ariz. 1993), but see *ProCD v. Zeidenberg* (7th Cir. 1996).
- ⁴ Perritt (1996: 172), making reference to cases discussed in Ora Fred Harris and Alphonse M. Squillante, *Warranty law in tort and contract actions* §3.10 (John Wiley & Sons, Inc., 1989) and to *Purely economic loss: a standard for recovery*, 73 Iowa L. Rev. 1181 (1988).
- ⁵ Perritt (1996, 227) making reference to *Valhal Corp. v. Sullivan Assocs., Inc.*, 44 F. 3d 195, 228 (3d Cir. 1995) and *Janicek v. Kikk, Inc.*, 853 S.W.2d 780, 781 (Tex. CT. App. 1993).
- ⁶ §2-719(1)(a) UCC states that 'the agreement may provide for remedies in addition to or in substitution of those provided in this Article and may limit or alter the measure of damages recoverable under this Article, as by limiting the buyer's remedies to return of the goods and repayment of the price or to repair and replacement of non-conforming goods or parts . . .'.