HOW ON EARTH TERRESTRIAL LAWS CAN PROTECT GEOSPATIAL DATA

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INTRODUCTION

> In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.[1]

> Authors shall enjoy, in respect of works for which they are protected...the rights which their respective laws do now or may hereafter grant to their nationals....[2]

Laws are a byproduct of conflict and exist in anticipation of conflict, seeking to guide conduct in a way to minimize situations in which reasonable and unreasonable minds could differ. If conflict were not an inherent part of society, laws would largely be unnecessary. It is unsurprising, then, that in an area of the law that presupposes action among its participants without conflict, an aim of perfect convergence may be frustrated, especially when juxtaposed with another legal field where conflict not only is expected, but also influences the body of law itself.

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[1] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. IX, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[2] Berne Convention for the Protection of Literary and Artistic Works, art. V, 828 U.N.T.S. 221, S. Treaty Doc. 99-27, Sept. 9, 1886 [hereinafter Berne Convention].

Such is the case when considering the dual legal regimes of outer space and intellectual property. As noted in the Outer Space Treaty, "States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance."[3] This suggests an interaction among states that relies upon conflict avoidance to be successful, preserving outer space as the neutral zone in legal battle. But as technology improves, capabilities grow, and imagination expands, private actors are better able to utilize outer space in ways that inspire profit-seeking activities, relying upon the laws of the individual states to protect their individual ventures.

Remote sensing technology and the availability of the geospatial data it generates present examples of such a development. Location of the sensor in orbit notwithstanding, the ability to protect geospatial data in raw and imaged format may be essential to the encouragement of competition among actors, both private and public.[4] This protection is likely to occur under the umbrella of intellectual property, specifically copyright. Copyright is the arm of intellectual property law which protects original works of authorship, which collections of data usually are.[5]

With the simple introduction of intellectual property to outer space, conflict exists, and it is multifold. The mere policy of intellectual property is necessarily privatized in nature. Not only does it primarily concern the individual author, but it is also governed on a national, rather than international, basis. As such, the policy interests of intellectual property laws clash with those represented by the laws of outer space, creating a situation where the broad policies of the two regimes must be prioritized in order to proceed.

Moreover, conflict arises between individual states, which may have fundamentally different approaches to protection of

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[3] *See* Outer Space Treaty, *supra* note 1, at art. IX.

[4] *See, e.g.*, Tare Brisibe, Assistant Director, Legal Services and International Cooperation, National Space Research and Development Agency, Nigeria, Remarks at the Conference, *Divergences and Convergences: A Symposium Addressing Space Law and Intellectual Property Regimes*, National Center for Remote Sensing, Air, and Space Law, University of Mississippi School of Law (Sept. 19, 2006).

[5] *See, e.g.*, 17 U.S.C. § 101 (definition of "compilation").

any geospatial work in question. An initial conflict is procedural in nature, questioning which jurisdiction in fact governs the application of substantive copyright law to the work. Attempts have been made to provide analogies between outer space to the law of the seas, creating a tension between law of the crew and law of the flag.[6] In the world of remote sensing, and of outer space jurisdiction generally, even more players emerge, causing issues of potential applicable jurisdictions for territory and for choice of law to multiply.

The secondary conflict is that within substantive copyright and intellectual property laws. Copyright may protect images generated with geospatial data, but may fail to protect raw geospatial data transmitted from satellites en route to Earth in a completely intangible, and perhaps indistinguishable, form. Mechanisms may exist under a pure copyright regime to protect against the unauthorized appropriation of such data, but not if the subject matter of the data is considered to be outside the scope of copyright laws in the first place. Under other protective regimes, additional mechanisms have been introduced which may protect even basic facts from unauthorized appropriation from a database. Thus, choice-of-law problems thus may arise when an author is from a pure copyright regime and an infringer is not, or vice versa; and privatization of geospatial data, originating from the satellite collectors in outer space, opens conflict in an area of the universe which initially touts international cooperation as a primary goal.[7]

Part I of this article explains remote sensing technology and examines the role that intellectual property promises to play in connection with the future commercialization of geospatial data. Part II discusses the governing principles of outer space law and intellectual property law, identifying the potential conflicts arising from the clash of these two bodies of law. Part III then considers the conflict between the two regimes, not only using choice of law rules in the United States as a model to test how they might affect claimants of infringement in jurisdictions un-

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[6] *See, e.g.*, BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 623 (Clarendon Press 1997)..

[7] *See* Outer Space Treaty, *supra* note 1, at pmbl.

der the respective database protection regimes, but also considering that choice of law difference to highlight the divergent policy goals between intellectual property law and outer space law.

Part IV has two aims. It first addresses the substantive laws of copyright-based regimes and database-right regimes, discussing the protections that copyright, and specifically copyright as encoded by the United States, can offer to authors of works comprised of geospatial data. Part IV then considers a *sui generis* database right, which may be available to protect geospatial data as a result of statutory protections offered in Europe and the European Union Database Directive,[8] and the potential conflicts that its existence generates. Finally, Part V questions whether one regime or the other will be forced to adapt to maintain principles of uniformity or, in the alternative, if intellectual private property can coexist in geospatial data and other property in the auspices of outer space law. It suggests some conclusions that can be drawn from the clash of the regimes of intellectual property law and space law and raises issues that will have to be resolved in order to craft a framework sufficient to safeguard intellectual property in future remote sensing activities.

This article assumes the geospatial data in question are being generated, used, and copied for primarily commercial, non-military purposes not intended to invade individuals' privacy. This article does not address the interception of data for reasons contrary to national security and does not intend to address a course of action in those circumstances.

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[8] This article recognizes that other states offer copyright-based or *sui generis* protections as well, and refers primarily to the United States and Europe for the purpose of explanation.

I. THE INTELLECTUAL PROPERTY ISSUE PRESENTED BY REMOTE SENSING

Since the first satellite in the *Landsat* system was launched in 1972,[9] the United States has been gathering geospatial data via satellite. Before the introduction of satellite technology, geospatial data and images could be collected and assembled through surveying activities, cartography, and aerial photography;[10] it had its beginnings "starting with photographs of the disposition of Confederate trenches from balloons during the American Civil War."[11] Satellites both eased the data-gathering process and redefined geospatial data for the world. In its modern definition, geospatial data are "data files that are comprised of geographically-referenced features (i.e., land cover or soils [sic] types) that are described by geographic positions and attributes in a digital format."[12] Familiar uses of geospatial data include weather forecasting, natural disaster monitoring, and military applications.[13]

Geospatial data are collected by satellite via the technology of remote sensing. In its simplest form, "[r]emote sensing is simply the collection of information from a distance about an object or an area without any direct physical contact."[14] More specifically and in the context of data-gathering from space, during remote sensing satellites "detect... a continuous stream of digital data, [which] ...are transmitted to ground reception stations, processed to create defined data products, and made

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[9] *Landsat* is "[a] series of remote-sensing satellites in sun-synchronous, polar orbit that began in 1972." S.A. DRURY, A GUIDE TO REMOTE SENSING: INTERPRETING IMAGES OF THE EARTH 188, (Oxford Science Publications 1990).

[10] *See, e.g.*, W.G. REES, PHYSICAL PRINCIPLES OF REMOTE SENSING 2 (2d ed. 2001).

[11] DRURY, *supra* note 9, at 3.

[12] Report to the Chairman, Subcommittee on Department Operations, Nutrition and Foreign Agriculture, Committee on Agriculture, House of Representatives: USDA Service Centers: Multibillion Dollar Effort to Modernize Processes and Technology Faces Significant Risks, United States Gen. Accounting Office, GAO/AIMD-98-168 USDA Service Center IT Modernization, 5 (Aug. 1998).

[13] For a detailed discussion of applications of geospatial data, *see, e.g.*, Drury, *supra* note 9, at 6-21.

[14] CHENG, *supra* note 6, at 572.

available for sale to users on a variety of digital data media."[15] The Principles Relating to Remote Sensing of the Earth from Outer Space[16] (the Principles) identify various applicable stages of the remote sensing process "not only [as] 'the operation of remote sensing space systems, primary data collection and storage stations,' but also [as] 'activities in processing, interpreting and disseminating the processed data.'"[17]

A great deal of creativity may go into the manipulation of geospatial data in order to create images that are not only representative of the electromagnetic data received by satellites from the earth, but also visually pleasing. W.G. Rees begins the second edition of *Physical Principles in Remote Sensing* with a series of plates: a false-color infrared aerial photograph of the Tay reed beds on the Firth of Tay, Scotland; a thermal infrared image of Death Valley; and an interferometric image of the Hector Mine earthquake area in California.[18] Each, while produced with geospatial data, is distinct, with distinguishing color schemes and manipulations.

The value of such remote sensing activities is incalculable. As Bin Cheng notes:

> Remote sensing can provide accurate, detailed and, given the resources, almost instant information, which is not otherwise available or at least not easily available, on topographic features, including inaccessible jungles and mountain ranges, geological structure, soil types, crop species, crop health and crop yield, mineral resources, hydrocarbon resources, water pollution, coastal changes, ice floes and icebergs, and marine resources. Such information is obviously of tremendous value to national economic planning and the exploitation by either the State or by individuals of the natural resources of the world, including agriculture and forestry, fishery, and mining, as well as many related activities, such as shipping, cartogra-

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[15] *See* Columbia University, Center for International Earth Science Information Network, CIESIN Thematic Guides, http://www.ciesin.org/TG/RS/sattech.html (last visited Sept. 17, 2006).

[16] Principles Relating to Remote Sensing of the Earth from Outer Space, G.A. Res. 41/65, U.N. Doc. A/RES/41/65 (Dec. 3, 1986) [hereinafter Principles].

[17] *See* CHENG, supra note 6, at 596 (citing Principles at I).

[18] *See* REES, supra note 10, at plates 2, 3, and 7.

> phy, the planning of trans-continental highways, and so forth.[19]

To the United States, the importance of remote sensing technology and geospatial data could not be clearer. According to the U.S. Office of Management and Budget, "[s]tudies indicate that roughly 80 percent of all government information has a geographic component."[20] Speaking about President George W. Bush's budgetary increases to the *Landsat 7* satellite program, Secretary of the Interior Gale Norton noted, "The funds will ensure that those who depend on these satellite images for public safety, research and planning will continue to receive them."[21]

Although the dominant policy in nations such as the United States has been to maintain remote sensing capabilities in the public sector,[22] governmental providers are not the only bodies hoping to benefit from the information remote sensing can provide. In recent decades, it has been become apparent that "all information of this nature will have important practical and commercial bearings"[23] as well. For example, the Earth Observation Satellite Company, or EOSAT, initially provided images costing from $50 to $200 each; images from its French counterpart, Spot-Image, were "freely available at £1,500 a time."[24] Twenty years later, the Google Earth function of the popular web site google.com and the introduction of GeoPortail, the recently-launched French equivalent which offers "more detail of

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[19] *See* CHENG, *supra* note 6, at 587.

[20] E-GOV, http://www.whitehouse.gov/omb/egov/c-2-1-geo.html (last visited July 28, 2006).

[21] Press Release, U.S. Department of the Interior, *President Bush Proposes Increase in USGS Landsat 7 Funding for FY 2006* (Feb. 4, 2005), *available at* http://www.doi.gov/news/05_News_Releases/050204a (last visited Sept. 11, 2006).

[22] For a discussion of the history of Landsat and the struggle of commercialization, see Joanne Gabrynowicz, *The Perils of Landsat from Grassroots to Globalization: A Comprehensive Review of US Remote Sensing Law with a Few Thoughts for the Future*, 6 CHI. J. INT'L L. 45 (Summer 2005).

[23] *See* CHENG, *supra* note 6, at 587.

[24] *Id.* at 588.

its territory than Google Earth"[25] demonstrate that competition exists for providers of geospatial data and the images derived from them. Commentators have noted that the trend toward commercialization is "irreversible," and "[t]he trend towards greater availability of images of higher and higher resolution is probably also inevitable."[26]

If, then, as Joanne Gabrynowicz has noted, "a stable, long-term, open, national civilian land imaging capability is the closest to reality it has ever been,"[27] that civilian imaging capability will be accompanied by civilians who expect their investments in remote sensing technology and geospatial data to be protected as personal, intellectual property. This property interest may come at one of the several stages in the creation of an image or an assembly of geospatial data from remote sensing; and as a result, geospatial information garnered from any or all of these remote sensing activities "may carry a great deal of independent input, creating problems of ownership and intellectual property rights"[28] at each of the various stages.

II. DIVERGENCES BETWEEN THE POLICIES OF OUTER SPACE AND INTELLECTUAL PROPERTY

That authors will seek to protect their creations of geospatial data is assured. For example, of the Rees examples above, some of the images bear a copyright notice; others specifically note that they are reproduced only with the courtesy or permission of the individual author.[29] The goal of intellectual property is to procure rights for these individual authors through the available mechanisms of national sovereigns. As the Berne

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[25] *See, e.g.*, Reuters News Service, *French Unveil Own Answer to Google Earth; Site Quickly Swamped*, (June 26, 2006), *available at* http://www.foxnews.com/story/0,2933,200946,00.html (last visited Sept. 11, 2006).

[26] *See* CHENG, *supra* note 6, at 589.

[27] Gabrynowicz, *supra* note 22, at 67.

[28] *See* CHENG, *supra* note 6, at 594. "A similar problem may arise regarding also primary and processed data when remote sensing has been commercialized, but this can probably be overcome in the authorization and licensing process." *Id.*

[29] The aerial photograph of the Firth of Tay notes the copyright of the Cambridge University Collection. The images of Death Valley and the Hector Mine earthquake are "Reproduced by courtesy." As demonstrated *infra*, this is due largely in part to the governmental source of the California images.

Convention, which governs copyright internationally, states, "[a]uthors shall enjoy, in respect of works for which they are protected...the rights which their respective laws do now or may hereafter grant to their nationals."[30]

On its face, however, this simple Convention statement creates a rift between the basic policies underlying intellectual property and outer space law. The focus of intellectual property law is naturally centered on individuals and the rights that individuals have in their creations with respect to one another. This suggests a fundamental conflict with the laws of outer space, which seek harmony among nations to achieve cooperation and mutual assistance.[31] This conflict between the fundamental policies of the laws of intellectual property and the laws of outer space led to one observation that "[w]hile the scientific community considers the outer space as the 'Great Unknown,' so too does the legal community consider the protection of intellectual property in outer space."[32]

P.P.C. Haanappel notes that some of the basic features of international space law were set forth in the United Nations General Assembly Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space on December 13, 1963, which include:

> ...use of outer space shall be for the benefit of all mankind; outer space ...shall be free for ... use by all States on a basis of equality...; outer space ...[is] not subject to national appropriation by claims of sovereignty, use, exploration or by any other means; States bear international responsibility for national activities in outer space, whether carried on by governmental agencies or non-governmental entities; in the ...use of outer space, States shall be guided by the principles of co-operation and mutual assistance; a State on whose registry an object

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[30] Berne Convention, *supra* note 2, at art. V.

[31] Outer Space Treaty, *supra* note 1, at art. IX.

[32] Leo B. Malagar & Marlo Apalisok Magdoza-Malagar, *Int'l Law of Outer Space and the Protection of Intellectual Property Rights*, 17 B.U. INT'L L.J. 311, 349 (Fall 1999).

> launched into outer space is carried shall retain jurisdiction and control thereof....[33]

Cooperation among the several nations is utmost in importance in the Outer Space Treaty. This is apparent in the corporeal world, encouraging countries to work together to share airspace, explore outer space, and facilitate the safety of astronauts and space personnel.

But even though the blanket statement has been made that "[t]here are no private rights in outer space, ...because outer space is *res communis*, not subject to appropriation, either in public or in private law[,]"[34] the interpretation of the Outer Space Treaty does not necessarily preclude intellectual property; its effect instead depends entirely upon the interpreter's viewpoint. This dichotomy is pointed out by Professors Reynolds and Merges, who note that the "treaty provisions could be read together to preclude [intellectual property] protection based on territoriality," or to "support the proposition that outer space is available for use by all, but that property rights, both tangible and intangible may be protected."[35] They note specifically that "under article VIII [of the Outer Space Treaty], states retain jurisdiction and control over objects launched into outer space,"[36] and that "under article VII, states are liable for the damages caused by objects or personnel under their jurisdiction and control."[37]

Professors Reynolds and Merges' discussion reflects interpretations in light of patent law, discussing the enactment of United States laws to cover space inventions. However, its extension to copyright principles is predictable. Just as article VIII of the Outer Space Treaty may apply to inventions launched into outer space, giving individual states jurisdiction and control, so too may it apply to works of authorship created

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[33] P.P.C. HAANAPPEL, THE LAW AND POLICY OF *AIR SPACE* AND *OUTER SPACE*: A COMPARATIVE APPROACH 8 (Kluwer Law Int'l 2003).

[34] *Id.* at 10-11.

[35] *See* GLENN H. REYNOLDS AND ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 345-46 (2d. ed. 1997) (1989).

[36] *Id.* at 345.

[37] *Id.*

in outer space. And, just as article VII may apply to damages incurred in outer space with respect to inventions, so too, it may apply to infringers of works of authorship created in outer space.

III. CONFLICT OF LAWS: WHICH LAWS APPLY, AND WHERE?

When the Berne Convention notes that the rights granted to individuals will be those that their "respective laws do now or may hereafter grant to their nationals,"[38] the discord inherent in this clause is twofold. In addition to the conflict between the policies of the two bodies of law noted above, the clause also suggests that individuals seeking intellectual property rights will not be governed by a uniform regime, but by each sovereign seeking to establish its own intellectual property laws governing its own citizens. Again from a standpoint contrasting the policy of intellectual policy with the policy of outer space law, which states "States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space...with due regard to the corresponding interests of all other States Parties to the Treaty,"[39] the two regimes seem to be fundamentally at odds. In one, international cooperation is paramount, opening the path for a legal system with a truly international set of laws. In the other, each state is free to employ its own system of developed laws, governing intellectual property.

But this recognition of national sovereignty gives rise to even more potential tension. First, Professors Reynolds and Merges write that the articles of the Outer Space Treaty making it possible for the ownership of intellectual property refer to the States' "jurisdiction and control." A question of the appropriate jurisdiction naturally follows, and must be addressed. Second, the intellectual property administrations of each nation may vary, despite the Berne Convention's edict. Therefore, in addition to the issue of where a case may be heard, the issue of

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[38] Berne Convention, *supra* note 2, at art. V.
[39] Outer Space Treaty, *supra* note 1, at art. IX.

which sovereign's intellectual property laws apply must be taken into account.

A. Jurisdiction of Intellectual Property in Space

Jurisdiction is "[a] government's general power to exercise authority over all persons and things within its territory."[40] Jurisdiction gives the government not only police power over activities within its bounds, but also the judicial power to adjudicate disputes and interpret the relevant laws of the land. In a system such as intellectual property, that relies solely on law for the very existence of the rights afforded the owner, the determination of jurisdiction is of utmost importance.

Doctor Bin Cheng notes three separate types of jurisdiction that may apply in questions of outer space. The first is territorial jurisdiction, which Doctor Cheng defines as "the jurisdiction enjoyed by a State over its own territory, and all persons and things within it."[41] This territorial jurisdiction heeds the physical borders of each state, and gives the government of the territory jurisdiction over persons and property within it much in the nature of *in rem* jurisdiction in the United States.[42]

The second type of jurisdiction, Doctor Cheng terms "quasi-territorial jurisdiction." Under quasi-territorial jurisdiction, the State enjoys authority "over ships and aircraft of its nationality, and all persons and things on board."[43] Quasi-territorial jurisdiction is the law of the flag, used in maritime law to declare its authority over those on board vessels duly registered and operating under the laws of an individual sovereign.

Finally, Doctor Cheng recognizes personal jurisdiction, "the jurisdiction enjoyed by a State over its nationals, whether corporate or natural persons."[44] This use of personal jurisdiction is akin to the use of general *in personam* jurisdiction in the United States, which gives a state the authority to hear any action

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[40] BLACK'S LAW DICTIONARY 687 (7th ed. 2000).
[41] *See* CHENG, *supra* note 6, at 622.
[42] *See, e.g.*, International Shoe v. Washington, 326 U.S. 310 (1945).
[43] *See* CHENG, *supra* note 6, at 622.
[44] *Id.*

against a citizen as long as the person is domiciled in that forum state.

The problem with the layers of possible jurisdiction that may or may not apply in outer space law is, of course, the potential for multiple states with claims to jurisdiction over an actor or object in space. As Doctor Cheng notes:

> [T]here can often be a concurrence of jurisdictions even in fairly normal circumstances. Thus a person on board a ship which is anchored in the port of a third State would simultaneously be under the jurisdictions of three separate States: (i) the territorial jurisdiction of the territorial State, (ii) the quasi-territorial jurisdiction of the flag-State of the ship, and (iii) the personal jurisdiction of his national State.[45]

In addition to the multiple jurisdictions possible in connection with a property in outer space, further jurisdictional complications emerge when that property is intellectual in nature. In the United States, "[b]ecause a copyright is an intangible, incorporeal right, it has no situs apart from the domicile of the proprietor, and hence, a copyright infringement action must be based on *in personam* jurisdiction."[46] *In personam* jurisdiction relies upon the nature of the defendant's contacts with the forum state, so as long as the contacts are of a quality sufficient to demonstrate a connection between the defendant and the forum state, jurisdiction may attach.[47] Because a defendant may be mobile, then, general *in personam* jurisdiction may be found in any forum with which the defendant has had systematic and continuous contacts;[48] and specific *in personam* jurisdiction may be found where the cause of action arises so long as the contacts meet Constitutional due process.[49] In interpreting these stan-

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[45] *Id.* at 623.

[46] MELVILLE B. NIMMER & DAVID NIMMER, 3 NIMMER ON COPYRIGHT § 12.01[C] 12-33 (Matthew Bender 1985 – 2002).

[47] *See International Shoe*, 326 U.S. at 310.

[48] *See* Helicopteros Nacionales de Colombia, S.A. v. Hall, 466 U.S. 408, 418 (1984).

[49] In order for the contacts to rise to the level of fairness dictated by Constitutional due process, the defendant must have purposefully availed itself of the benefits and protections of the forum state so that it could reasonably anticipate being haled into court there, so that the exercise of jurisdiction would not offend the notions of fair play and substantial justice. *See, e.g.*, Hanson v. Denckla, 357 U.S. 235, 255 (1958); World-

dards in U.S. courts, Nimmer notes that "over the years such jurisdiction has grown sufficiently capacious" so that even an offer of a sale for work has been held to invoke jurisdiction in the courts, "even if there is no actual sale."[50]

The combination of the two regimes leads to a jurisdictional quagmire that may have myriad possibilities when considering the specific problem of geospatial data as a result of remote sensing. Under the intellectual property approach of *in personam* jurisdiction, jurisdiction may possibly attach where the data is created, where the author resides, where the damage is incurred, or where the defendant infringer is located.

Using territorial jurisdiction, more questions are raised. First, the physical territorial limits of space are indefinite. Doctor Cheng notes that the absence of an agreement can lead some states that are particularly sensitive to having data gathered from them to extend their terrestrial territorial boundaries, thus extending the same boundaries in outer space. He notes that "[t]he result would be that it could be claimed that [remote sensing] satellites are operating within [nations'] territorial space and could in future continue to do so only subject to their consent."[51]

The ramification of the continued spread of physical territory, or the lack of clear delineations between states, on jurisdiction for intellectual property ownership and infringement is clear. If a "sensed" nation claims that satellites operating within its territorial boundaries are operating according to the laws of that nation, it is possible that the nation would perceive that any data or images taken of that nation due to the satellite's position above the land (or expanding coastline) are in fact subject to the intellectual property laws of the "sensed" nation.

Under quasi-territorial jurisdiction, the galactic law of the flag, jurisdiction would attach to the sovereign that put the satellite generating the data into space. This, of course, may be different from the vertical territory where the satellite is lo-

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Wide Volkswagen Corp. v. Woodson, 444 U.S. 286, 292 (1980), and Asahi Metal Co. v. Superior Court, 480 U.S. 102, 112 (1987).

[50] NIMMER, *supra* note 46, at 12-33 – 12-34.

[51] *See* CHENG, *supra* note 6, at 582.

cated, and could be different from the jurisdiction over a defendant. This raises further questions when the entity placing the satellite into orbit is not the governmental body of any one sovereign, but is a multinational corporation, again possibly subject to personal jurisdiction in several States.

B. Analysis of Potential Conflict of Laws

The same circumstances, physically and conceptually, that raise issues of jurisdiction will also raise corresponding issues of choice of law. Specifically, in light of the conflicting laws which protect different aspects of geospatial data acquired from remote sensing technology, a detailed analysis may be required to determine which law would apply to govern disputes over data. Because "there is no sovereignty in outer space,"[52] and because of the mandate from the Berne Convention, recognizing the "respective laws" of the sovereigns, there may be nowhere else to look than to the individual sovereigns' laws to determine which law can direct us to the "right" answer.

As a default, the law of the forum is the law which applies to a case filed in that forum, *lex fori*.[53] However, when the parties are from different forums and the interests of those forums are in conflict, a court must often choose which jurisdiction's laws to apply to the situation. In the United States, courts generally use one of seven methodologies to determine which law would be of interest in a tort action;[54] only three state jurisdictions[55] use the *lex fori* approach. The most popular approaches

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[52] HAANAPPEL, *supra* note 33, at 23.

[53] *See, e.g.*, JOSEPH STORY, COMMENTARIES ON THE CONFLICT OF LAWS, § 18, 19 (Boston: Hilliard, Gray & Co., 2d ed. 1841) (1834) (noting as a general maxim that "the laws of every state affect, and bind directly all property, whether real or personal, within its territory; and all persons, who are resident within it, whether natural born subjects or aliens, and also all contracts made, and acts done within it").

[54] EUGENE F. SCOLES, PETER HAY, PATRICK J. BORCHERS & SYMEON C. SYMEONIDES, CONFLICT OF LAWS, § 2.20, 86 (4th ed. 2004). Around the same time that individual states in the United States were abandoning the traditional *lex fori* approach, European scholars were doing the same, focusing on relationships as opposed to geography. *See, id.* § 2.6, at 15-18 (discussing the writings of Carl Georg von Wächter, who opined that judges should move on from *lex fori* choices if they produce an inequitable result, and Friedrich Carl von Savigny, who proposed consideration of legal relationships).

[55] Kentucky, Michigan, and Nevada. *Id.* § 2.20, at 86.

are *lex loci delicti*, applying the law of the place of the where the injury occurred,[56] and the Second Restatement, applying the law of the state with the "'most significant relationship' to the occurrence and the parties."[57] Other approaches include "interest analysis,"[58] "comparative impairment,"[59] and the "better law."[60] Each of these choice-of-law methodologies either employs a policy consideration in its factors or offers a policy exception to the rigid application of its rule.[61]

Principle IV of the Principles Relating to Remote Sensing of the Earth from Outer Space[62] "provides that remote sensing activities shall be conducted among other things on the basis of respect for the principle of full and permanent sovereignty of States and peoples over their own wealth and natural resources, and 'shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State.'"[63] With respect to geospatial data, this choice-of-law framework inherently points back to the conflict of policy: Because geospatial data physically originate in outer space, suggesting the harkening to the principles of cooperation and mutual assistance, the potential conflict of national laws regarding the intellectual property of geospatial data highlights a tension between the policies of regimes that may in fact be irreconcilable.

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[56] *Id.* § 17.2, at 713. Eleven states embrace this approach, including Alabama, Georgia, Kansas, Maryland, Montana, New Mexico, North Carolina, South Carolina, Virginia, West Virginia, and Wyoming.

[57] *Id.* § 17.24, at 759. Twenty-one states use the Second Restatement: Alaska, Arizona, Colorado, Connecticut, Delaware, Florida, Idaho, Illinois, Iowa, Maine, Mississippi, Missouri, Nebraska, Ohio, Oklahoma, South Dakota, Tennessee, Texas, Utah, Vermont, and Washington.

[58] Interest analysis focuses on examining the governmental interests in having its law applied in a case. *Id.* § 17.12, at 726.

[59] Comparative impairment "calls for the application of the law of the state 'whose policies would be most seriously impaired if its law were not applied.'" *Id.* § 17.20, at 750, *citing* La. Civ. Code art. 3515.

[60] The better law approach is the "superiority of one rule of law over another in terms of socio-economic jurisprudential standards." *Id.* § 17.21, at 752, *citing* R. Leflar, *Choice Influencing Considerations in Conflicts Law*, 41 N.Y.U. L. REV. 267, 296 (1966).

[61] *See generally* SCOLES, *supra* note 54, § 17.34, at 786-789.

[62] Principles, *supra* note 16.

[63] *See* CHENG, *supra* note 6, at 596 (citing Principles, *supra* note 16, at IV).

IV. A STUDY IN CONFLICT: INTELLECTUAL PROPERTY PROTECTION OF GEOSPATIAL DATA

The conflicts inherent in the intellectual property protection of outer space actually come to light when considering the laws which would actually be utilized to protect raw and imaged geospatial data. As noted above, intellectual property protection of this data has been claimed, but not yet tested or justified. Framing the conflict directly in the context of geospatial data highlights the conundrums that remain to be solved. On one hand, the presentation of data has been protected through a pure copyright regime, which the laws of the United States represent. On the other hand, intellectual property regimes have created a right *sui generis* for the specific protection of databases, which has the effect of protecting some of the data themselves as well. The European model is such a regime. The models of the United States and Europe are contrasted below.

A. Protection of Geospatial Databases through Copyright

The primary way to protect an expression of information is through copyright. In particular, copyright protects "literary works" and "pictorial works," both of which can be used to convey geospatial data.[64] Thus, although copyright may not be used for the protection of facts[65] or ideas,[66] it may be used to protect the expressions of those data. With geospatial data, that expression can occur as a database, as a map, or as a photograph.[67] Private ownership of any of these expressions may be protected by the anti-circumvention provisions of the Digital Millennium Copyright Act and may be compromised by problems with fixation, public domain status, or a fair use defense.

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[64] *See* Copyright Act § 102(a), 17 U.S.C. § 102 (2006) [hereinafter Copyright Act].

[65] Feist Oybl'n, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 344 (1991).

[66] Copyright Act, *supra* note 64, at § 102(b).

[67] This is, of course, mindful of the fact that certain geospatial data has been considered to be open to access by all. *See, e.g.*, Gabrynowicz, *supra* note 22, at 52 (noting "the most important principle in remote sensing law and policy was...nondiscriminatory access").

1. Protection as a Database or Map

In the United States, a database may receive protection through copyright. By definition, copyright extends to original works of authorship that are fixed in a tangible medium of expression;[68] a "database" is "a comprehensive collection of related data organized for convenient access...."[69] A database may be protected in the U.S. Copyright Act through its protection afforded to compilations[70] – that is, works "formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship."[71] What may be protected under the Copyright Act, therefore, is not the underlying data themselves, but the selection, arrangement, and coordination of these preexisting materials in the format of the database.[72]

The scope of protection that a database receives was examined by the Supreme Court in *Feist Publications Inc. v. Rural Telephone Servs. Corp.*[73] In *Feist*, the Court considered and denied copyright protection to a "white pages" telephone directory.[74] The *Feist* Court interpreted the white pages to be a section 103 compilation and looked for the requisite originality in the selection, coordination, and the arrangement of the data. In doing so, the *Feist* Court noted that the copyright protection for a compilation of facts is necessarily "thin,"[75] offering protection against infringement only if the copying is "very close...because

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[68] Copyright Act, *supra* note 64, at § 102(a).

[69] RANDOM HOUSE WEBSTER'S UNABRIDGED DICTIONARY 508 (2001). *See also* the definition of "databank": "a fund of information on a particular subject or group of related subjects...." *Id.*

[70] Copyright Act, supra note 64, at § 103(a).

[71] *Id.* at § 101.

[72] *Id.* at § 103. The copyright in a database "is independent of, and does not affect or enlarge the scope, duration, ownership, or subsistence of, any copyright protection in preexisting material." *Id.*

[73] *Feist*, 499 U.S. at 340.

[74] *Id.* at 342. The "white pages" of a telephone directory are the pages "in which [individual] subscribers are listed alphabetically." WEBSTER'S, *supra* note 69, at 2169.

[75] *Id.* at 349.

the majority of the work is unprotectable."[76] The Supreme Court articulated a two-part test that assists a court to determine whether the work is in fact sufficiently original for copyright protection: the work must have been created by the author independently of any preexisting work, and the work must possess a minimal degree of creativity.[77] The Court found that because there is only one logical way to arrange a telephone directory, and because the selection was dictated by the subscribers of the telephone service, no there was no minimum creativity, and no originality could exist.[78] Therefore, regardless of evidence of wholesale copying, the database could not be protected.[79]

The *Feist* decision and the body of law surrounding compilations are directly related to geospatial data as delivered to Earth-bound entities via satellite. As Dennis Karjala notes, "[t]oday's comprehensive geographic information systems may simply constitute electronically stored collections of spatial and nonspatial data, which under traditional copyright law are more naturally classified as 'compilations' rather than 'maps.'"[80] Traditionally, a "map" is "a representation, usually on a flat surface, as of the features of an area of the earth or a portion of the heavens, showing them in their respective forms, sizes, and relationships according to some convention of representation";[81] and maps have been expressly protected in American copyright from the first Copyright Act in 1790.[82] Applying the *Feist* decision squarely to the definition of "map," because the features of the earth are shown "in their respective forms, sizes, and relationships," it can be deduced that the selection, arrangement, and coordination of a map is far from creative and represents the same degree of originality found in a white pages telephone

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[76] *See* Beaudin v. Ben and Jerry's Homemade, Inc., 95 F.3d 1, 2 (2d Cir. 1996) (finding cow pattern hat not infringed by other cow pattern hats).

[77] *Feist*, 499 U.S. at 345.

[78] *Id.* at 363.

[79] *Id.*

[80] *See* Dennis S. Karjala, *Copyright in Electronic Maps*, 35 JURIMETRICS J. 395, 396 (Summer 1995).

[81] WEBSTER'S, *supra* note 69, at 1173.

[82] An Act for the Encouragement of Learning, 1 Stat. 124, ch. 15 (May 31, 1790) (repealed 1802). Maps have been expressly covered in each revision of the Copyright Act, which occurred in 1831, 1870, 1909 and 1976.

book. As Professor Kajala warned, "[i]f *Feist* applies to these maps, they will be denied copyright protection even against slavish takings, such as photocopying."[83]

Yet copyright protection for maps has been far from lacking. Soon after the *Feist* decision, the Fifth Circuit squarely addressed the issue of copyrightability of maps in *Mason v. Montgomery Data, Inc.*[84] In *Mason*, the works at issue were real estate ownership maps, pictorially portraying "location, size, and shape of surveys, land grants, tracts, and various topographical features within the county."[85] The author "drew the corners of lines of the surveys onto topographical maps of the county that were published by the United States Geological Survey (USGS),"[86] further enhanced the maps, and "used substantial judgment and discretion to reconcile inconsistencies among [his] various sources."[87] The court, while qualifying the author's maps as "compilations of facts,"[88] found them to be original, finding that the author exercised "creativity that far exceeds the required minimum level."[89] In addition, the *Mason* court protected the maps as "pictorial, graphic, and sculptural works," as specified by the Copyright Act, noting their "inherent pictorial or photographic nature that merits copyright protection."[90]

As with the data in *Mason*, several geospatial mapping services include enhancements that entitle the map to copyright protection. For example, data enhancements on a single weather map can include "'built-up' areas, political boundaries, and coastlines."[91] As potential enhancements for its user, Google Earth also offers as map "layers" three-dimensional buildings, roads, parks and recreational areas, and places for

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[83] *See* Karjala, *supra* note 80, at 398.

[84] Mason v. Montgomery Data, Inc., 967 F.2d 135 (5th Cir. 1992).

[85] *Id.* at 136.

[86] *Id.*

[87] *Id.* at 136-137.

[88] *Id.* at 141.

[89] *Id.* at 142. The court also rejected the contention that the idea of the surveyed land and their expression had merged, subjecting it to a challenge under section 102(b) of the Copyright Act, discussed *supra*. *Id.* at 138.

[90] *Id.* at 142. *See also* Copyright Act, *supra* note 64, § 101 ("'Pictorial, graphic, and sculptural works' include ... maps, globes, charts....").

[91] SDI Cookbook, *Chapter 5, Implementation Approaches, available at http://www.gsdi.org/pubs/cookbook/chapter05a.html* (last visited Aug. 27, 2006).

gas, food and lodging, to name a few,[92] and with each enhancement that the user desires, a new copyright notice appears. However, as noted above, these enhancements are likely entitled to only a "thin" copyright, protecting only against direct copying.

2. Protection as Photographs

Another way to address the copyrightability of geospatial data images is as a photograph. Geospatial imagery providers classify geospatial data images as photography; the NOAA[93] Satellite and Information Service boasts that "[c]urrent weather satellites can transmit visible or infrared *photos*, focus on a narrow or wide area, and maneuver in space to obtain maximum coverage" from its Geostationary Operational Environmental Satellites.[94] And, as photography is "the process or art of producing images of objects on sensitized surfaces by the chemical action of light or of other forms of radiant energy, as x-rays, gamma rays, or cosmic rays,"[95] the classification may be appropriate for collections of geospatial data, if not more so.

Like maps, photographs are expressly covered as copyrightable subject matter in the Copyright Act.[96] However, as Nimmer appropriately points out, "[a] rich literature surveys the terrain, discussing whether a photograph simply captures an uncopyrightable fact or qualifies as a work of authorship."[97] It has been argued that because of the mechanical nature of a photograph, this modicum does not exist; the camera merely records the "manual operation...of transferring to the plate the visible rep-

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[92] Google Earth, *at* http://earth.google.com.

[93] National Oceanographic and Atmospheric Administration.

[94] NOAA Satellite and Information Service and National Environmental Satellite, Data and Information Service (NESDIS), *Satellites*, *at* http://www.nesdis.noaa.gov/satellites.html (last visited Aug. 27, 2006) (emphasis added).

[95] WEBSTER'S, *supra* note 69 at 1459.

[96] The Copyright Act extends protection to "pictorial, graphic, and sculptural works," Copyright Act, § 102(a)(5), which in turn are defined to include "two-dimensional and three-dimensional works of fine, graphic, and applied art, photographs." Copyright Act, *supra* note 64, § 101. The Supreme Court has extended protection to photographs. *See* Burrow-Giles Lithographing Co. v. Sarony , 111 U.S. 53, 60 (1884) (finding a photograph to be "an original work of art").

[97] NIMMER, *supra* note 46, § 2.08[E].

resentation of some existing object."[98] The Supreme Court in *Burrow-Giles Lithographing Co. v. Sarony* dismissed this idea, noting that the photograph came entirely from the plaintiff's

> own original mental conception, to which he gave visible form by posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement, or representation, made entirely by plaintiff, he produced the picture in suit.[99]

As a result, the *Sarony* Court found the photograph to be "an original work of art."[100]

Sarony seems distinguishable, however, when the photographed subject is merely a truthful, factual representation of the Earth. While some "creativity" may be said to exist when determining the position of the satellite/camera over the Earth, the contributing factors on which *Sarony* relied to enforce protection – accessories, light and shade, expressions, and other representations – are plainly absent when relying on a data stream from the satellite transmitter to fill out the image. With the creativity lacking, so too is the protection, perhaps conceding to a geospatial "photograph" only a thin copyright such as is offered to factual databases.

3. Protection under the Digital Millennium Copyright Act

Another way in which copyright could protect against the unauthorized appropriation of a database or photograph is through the Digital Millennium Copyright Act of 1999 ("DMCA").[101] The DMCA prohibits the circumvention of "a technological measure that effectively controls access to a work pro-

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[98] *Sarony*, 111 U.S. at 59.

[99] *Id.* at 60.

[100] *Id.* Because the case was one of first impression in the United States, the Supreme Court looked overseas for guidance. The English copyright act of 1882 had already authorized the photographer to have rights over "reproduction and multiplication" of a photograph, which had been upheld by the English courts. *Id.*

[101] DMCA, 17 U.S.C. 512 *et seq.* (effective Aug. 5, 1999).

tected under [the Copyright Act]."[102] It is logical that the DMCA could be extended to the unauthorized appropriation of the database or photograph, as long as the satellite contains the technological measures that would control the access to the work in the first place. And, as Charles McManis points out, "a party engaging in circumvention of technological protection measures ... associated with an ostensibly uncopyrightable compilation of data apparently bears the risk that the database will turn out to contain copyrightable subject matter, thereby subjecting the party to liability under the DMCA."[103]

4. Problems with Copyright Protection of Geospatial Data

Although it is apparent that copyright protection can serve to protect geospatial these data images, several questions must be answered before concluding that it will in fact protect any unauthorized appropriation of the database, map or photograph, however the presentation of data is categorized. Satellite data feeds are at issue, especially with questions of fixation, of the public domain, and of fair use.

a. Fixation

Explicit in the Constitutional mandate to Congress regarding intellectual property is the idea that copyright extends to "Authors" to protect their "Writings."[104] Implicit in this clause is the notion that it is the physical expression of an idea, rather than the idea itself, which is necessary for copyright protection to accrue.[105] Congress embodied that manifest into the Copyright Act,[106] declaring that in order for a work to be protected by copyright, the work must be "fixed in a tangible medium of expression, now known or later developed, from which [it] can be perceived, reproduced, or otherwise communicated, either di-

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[102] *Id.* § 1201(a)(1)(A).

[103] Charles R. McManis, *Database Protection in the Digital Information Age*, 7 ROGER WILLIAMS U. L. REV. 7, 17 (Fall 2001).

[104] U.S. CONST., art. I, § 8, cl. 8.

[105] NIMMER, *supra* note 46, § 1.08[B] (*citing* Goldstein v. California, 412 U.S. 546 (1973)).

[106] Copyright Act, *supra* note 64, § 101 *et seq.*

rectly or with the aid of a machine or device."[107] The flexibility of this definition has led courts to ensure its liberal application with the expansion of technology into new media, such as computer-perceived read-only memory,[108] random access memory,[109] and clean feeds from satellites.[110] This extension, however, presupposes that a traditional "work" exists, in that the technological medium through which it is "perceived, reproduced or otherwise communicated for a period of more than transitory duration"[111] could easily translate into a form of expression that traditional copyright would in fact acknowledge.[112]

Obviously, if a printed version of the image is misappropriated, that printed image is "fixed," and thus eligible for copyright protection. What happens to the protection, however if an image is intercepted *en route* to the intended receiving apparatus, after the data is gathered but before the image from the data can be created? According to the current standard put forth by the Copyright Act, no change in the protection will occur. Section 101 of the Copyright Act states that "[a] work consisting of sounds, images, or both, that are being transmitted, is 'fixed' ...if a fixation of the work is being made simultaneously with its transmission."[113] With respect to mapped or enhanced

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[107] *Id.* § 102(a).

[108] *See, e.g.*, Williams Electronics Inc. v. Artic Intern., Inc., 685 F.2d 870, 874 (3d Cir. 1982) (finding a computer video-game to be sufficiently permanent to be fixed). Read-only memory, or ROM, is "a memory not capable of being changed by program instruction." THE OXFORD AMERICAN DICTIONARY AND LANGUAGE GUIDE 868 (Oxford University Press, 1999).

[109] *See, e.g.*, MAI Systems Corp. v. Peak Computer, Inc., 991 F.2d 511, 518 (9th Cir. 1993) (finding software loaded into computer's random access memory to constitute a "copy" for infringement purposes). Random-access memory, or RAM, is "internally stored software or data that is directly accessible, not requiring sequential search or reading." OXFORD AMERICAN DICTIONARY, *supra* note 108, at 825.

[110] *See, e.g.*, National Football League v. McBee & Bruno's, Inc., 792 F.2d 726, 732 (8th Cir. 1986) (protecting the live satellite broadcast of a professional football game).

[111] Copyright Act, *supra* note 64, § 101.

[112] For example, the examples above concerning ROM and RAM memory concern a computer program, defined in the Copyright Act to be "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result," and the example regarding the professional football game regards the transmission of a copyrightable "performance or display...whereby images or sounds are received beyond the place from which they are sent." *Id.*

[113] *Id.*

data, if a protectable image is the ultimate result of the data to be transmitted, this clause in the fixation definition applies.[114]

The question of raw data destined to be arranged into a database raises additional issues. *Feist* defines raw data as "wholly factual information not accompanied by any original written expression."[115] If the protection in a database is limited to the selection, arrangement, and coordination of data, as noted above, the protection may be compromised if there is not yet an arrangement or coordination to protect. For example, if an infringer intercepts data intended for a geographic information system ("GIS data"),[116] it does not intercept an expression, but merely the data that have not yet been arranged or coordinated. Absent a "fixation," there may be no copyrighted expression to protect.

Even if the clause regarding broadcast fixation could be extended to the data feed, the lack of visible fixation may make it even more difficult to protect an arrangement that is not easily perceived. A user misappropriating data from a satellite feed might be able to perceive the material in a substantially similar arrangement as the arrangement the database author intended, in which case, infringement would occur.[117] However, "a copyrighted arrangement is not infringed ... if a machine can perceive the arrangement only after another person uses the machine to re-arrange the material into the copyrightholder's arrangement."[118] While there may be no question that the expression of the database had been intended to be fixed somewhere, the manipulability of the data makes the copyright holder's intended arrangement of that data very difficult to discern.

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[114] *See, e.g.*, *McBee & Bruno's*, 792 F.2d at 732.

[115] Feist Publ'n, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 345 (1991).

[116] "The Association for Geographic Information defines GIS as: A system for capturing, storing, checking, integrating, manipulating, analyzing, and displaying data which are spatially referenced to the Earth [sic] (usually) land surface." *See* Nicholas Short, Section 15, *Geographic Information Systems – the GIS Approach to Decision Making*, *in* REMOTE SENSING TUTORIAL, for the National Aeronautics and Space Administration, *available at* http://rst.gsfc.nasa.gov/Sect15/Sect15_4.html (last visited Sept. 10, 2006).

[117] *See* Matthew Bender & Co. v. West Pub. Co., 158 F.3d 693, 702 (2d Cir. 1998) (holding arrangement of public domain case law on a CD-ROM not infringed).

[118] *Id. See also* EPM Communications, Inc. v. Notara, Inc., No. 00CIV.4299(LMM), 2000 WL 1154315 (S.D.N.Y Aug. 14, 2000) (extending *Matthew Bender* to apply to an Internet database).

b. Public Domain

Another general problem is the idea that the U.S. federal government cannot create a copyrighted work. Several geospatial data programs are missions of the National Aeronautics and Space Administration (NASA), a government agency. *Aqua* is a satellite featuring six different Earth-observing instruments on board and obtaining approximately 89 gigabytes of data per day.[119] A joint project with NOAA, Geostationary Operational Environmental Satellites ("GOES") hover continuously over one position on the Earth's surface and constantly monitor atmospheric "triggers" for severe weather conditions.[120] The *Landsat* Program satellites have been collecting information about Earth from space since 1972, taking specialized digital photographs of Earth's continents and surrounding coastal regions.[121] These and several other programs provide invaluable data and countless opportunities.

Works authored by the U.S. government, however, do not receive any protection whatsoever. "A government publication is not subject to copyright protection because the work is in the public domain."[122] The Copyright Act expressly states that copyright protection "is not available for any work of the United States Government,"[123] and defines a "work of the United States Government" as "a work prepared by an officer or employee of

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[119] NASA, *Mission News*, *at* http://www.nasa.gov/mission_pages/aqua/index.html (last visited Sept. 10, 2006).

[120] NASA, *GOES-N Mission*, *at* http://www.nasa.gov/mission_pages/goes-n/main/index.html (last visited Sept. 10, 2006).

[121] NASA, *The Landsat Program*, *at* http://landsat.gsfc.nasa.gov/news/soc_articles.html (last visited Sept. 10, 2006).

[122] JOHN COSGROVE MCBRIDE & THOMAS J. TOUHEY, 9 GOVERNMENT CONTRACTS: CYCLOPEDIC GUIDE TO LAW, ADMINISTRATION, PROCEDURE, § 52.160[4] 52-199 (2006). The "public domain" is "the status of a literary work...whose copyright...has expired or that never had such protection." WEBSTER'S, *supra* note 69, at 1562.

[123] Copyright Act, *supra* note 64, at § 105. To use an example, as discussed above, McBride and Touhey note that "[a] map published by the Government is not subject to copyright, and a person who republishes it privately is not entitled to a monopoly thereon," but "[i]f the person publishing that map...adds something new to the map, the novel features are copyrightable." MCBRIDE, *supra* note 122, § 52.160[4], 52-200 (*citing* Woodman v. Lydiard-Peterson Co., 192 F. 67 (8th Cir. 1912)).

the United States Government as part of that person's official duties."[124]

The U.S. government is not, however, precluded from owning the copyright of a work "transferred to it by assignment, bequest, or otherwise."[125] As a result, government contractors are able to create copyrighted works privately and then assign those works to the government as a condition of the contract. "An agency...may not impose restrictions or limitations on a contractor's ability to copyright data unless the agency determines that the limitations are necessary to the furtherance of agency mission objectives, needed to support specific agency programs, or necessary to meet statutory requirements."[126] Therefore, if a copyrighted work, such as a geospatial data set, is "authored" by a government contractor and assigned back or licensed to the U.S. government, copyright protection will continue to protect the work and not send it into the public domain. Moreover, the U.S. government may commission a work that ultimately is subject to copyright.[127]

The public domain treatment of copyrighted works leaves two questions respecting its treatment of geospatial data. First, even if the data are created by the federal government, it is possible that the data set would be selected, coordinated, or arranged by a private entity, government contractor, or government commission for manipulation into the final image or presentation to customers. In that respect, a data set beginning as public domain receives some level of copyrightability, much as a book or database of judicial opinions. As such, copyright protection still exists.

Second, even if the data-generating satellites begin as governmental entities, a question emerges if the governmental entity transfers or privatizes the satellite. As such, although the

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[124] Copyright Act, *supra* note 64, § 101. *But see* MCBRIDE, *supra* note 122, § 52.160[4], 52-200 ("When an employee of the United States secures a copyright on a document prepared by him in the course of performing his official duties, the copyright is held by that employee in trust for the Government....").

[125] Copyright Act, *supra* note 64, § 105.

[126] MCBRIDE, *supra* note 122, § 52.170[1], 52-202, *citing* 48 C.F.R. § 27.404(g)(3).

[127] *See* Schapper v. Foley, 667 F.2d 102, 110 (D.C. Cir. 1981) (finding television series commissioned by U.S. government protected by copyright).

government satellite is "creating" or "authoring" a geospatial data set, would that data stream continue to be authored by the federal government if the government transferred the data to another entity midstream? Because copyright extends to the expression, not to the apparatus, a transfer such as this may create a copyrighted work.

c. Fair Use

Policy reasons suggest that no one entity should be the owner of facts, as this would stymie creativity and dissemination of information and run afoul of First Amendment rights of speech and the press. To date, certain ventures have recognized these policy reasons for precluding protection and have rendered intellectual property protections moot by allowing liberal access: Joanne Gabrynowicz writes that nondiscriminatory access – "the most important principle in remote sensing law and policy" – was established early in the *Landsat* era,[128] although the government retains ownership of *Landsat* data.[129]

This tension between the private ownership of intellectual property and the desire to have it accessible for use by all is codified in the Copyright Code as fair use. Fair use, a statutory defense to copyright infringement allowing certain uses of copyrighted works, is triggered upon certain protected activities – "criticism, comment, news reporting, teaching, scholarship, or research"[130] – so that the private ownership of the intellectual property right will not prevent further expressions if used by a later party for one of these statutorily-defined purposes. Congress set out a four-factor test which a court must consider when determining whether to apply fair use: "the purpose and character of the [secondary] use...; the nature of the copyrighted work; the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and the effect of the [secondary] use upon the market for or value of the copyrighted

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[128] *See* Gabrynowicz, *supra* note 22.
[129] *Id.* at 63.
[130] Copyright Act, *supra* note 64, § 107.

work."[131] The factor that implicates mapped geospatial works is the nature of the copyrighted work. Generally, works that involve a lesser degree of creativity are generally more susceptible to a defense of fair use against infringement.[132] Geospatial data translated into an image that accurately represents that which it is supposed to portray involves less creativity than a book, portrait, or musical work,[133] and may be more likely to be used fairly by second comers.

However, because of the remaining factors required to be considered in a fair use analysis, it is uncertain that a single factor could be dispositive of a fair use finding. If the secondary use of a copyrighted work is purely commercial, such as a printed topographical map displaying hiking trails, that use could weigh against a finding of fair use.

B. Protection under Database Rights (and the Conflict that Results)

Copyright, which protects against the copying of the expression of the data, is one way in which the provider of data can be protected against infringement or unauthorized appropriation. However, as noted by the Commission of the European Communities, "it is frequently the raw data itself and the fact that it can be easily retrieved and readily updated, which is of value, rather than the way in which the work was originally written,"[134] and "the form of expression of the information is of lesser importance than the substance of the information itself."[135] Because this important material is often not protected by copyright, the European Union created a *sui generis* right to protect not only the expression of the database, but the content

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[131] *Id.*

[132] *See* NIMMER, *supra* note 46, § 13.05[A][2][a], 13-183 ("It is...true that copyright protection is narrower, and the corresponding application of the fair use defense greater, in the case of factual works than in the case of works of fiction or fantasy.").

[133] *Id.*

[134] *Green Paper on Copyright and the Challenge of Technology – C*, COM (1988) 172 final (June 17, 1988).

[135] *Id.*

of the database itself.[136] Where copyright fails to protect a raw data stream, it is possible that this innovative approach toward databases may enable authors to protect their products without rising to the level of originality that copyright requires.

1. The European Union Database Directive

Adopted in 1996, the European Union Database Directive (the "Database Directive") acknowledges copyright's role of protecting databases but also creates a *sui generis* database right (the "database right") for the protection of databases and their content.[137] This database right extends to all databases representing a collection of "data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means,"[138] and covers the protection of databases "in any form."[139] To merit protection for the database, the creator of the database must show a substantial investment in obtaining, verifying, or presenting the contents of the database.[140] This investment may be evaluated qualitatively or quantitatively.[141]

Once it has established that the database deserves the protection of the database right, the database creator has various recourses against a party that has misappropriated data. First, the creator can prevent a party from "extracting" substantial amounts of the data from the database or from repeatedly and systemically extracting insubstantial parts of the database.[142] Under the Database Directive, "extracting" data is the "perma-

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[136] Council Directive 96/9/EC, 1996 (L 77 1996-03-27) 20 – 28) (of the European Parliament and the Council of 11 March 1996 on the legal protection of databases) [hereinafter Database Directive].

[137] *Id.* at art. 3 (noting the selection and arrangement constituting the author's own intellectual creation shall be protected by copyright, which protection shall not extend to the contents themselves of the database).

[138] *Id.* at art. 1, § 2.

[139] *Id.* at art. 1, § 1.

[140] *Id.* at art. 7, § 1.

[141] The "investment" component of the Database Directive directly counters the *Feist* court's holding that the "sweat of the brow" theory – "the underlying notion ...that copyright was a reward for the hard work that went into copying facts" – was invalid under the Copyright Act. *See Feist*, 499 U.S. at 359-60.

[142] Database Directive, *supra* note 136, at art. 7, §§ 2, 5.

nent or temporary transfer of all or a substantial part of the contents of a database to another medium by any means or in any form,"[143] and may be measured quantitatively or qualitatively.[144] Second, the creator may prevent a party from "reutilizing" the data in its own product or from repeatedly or systematically reutilizing insubstantial amounts of the data,[145] defining reutilization as "any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on- line or other forms of transmission."[146]

To date, this author has not found an instance where the Database Directive has been applied to geospatial satellite data, but neither has the author found an instance expressly declining to apply the *sui generis* protection to a raw data feed. Although not geospatial data that results from remote sensing technology, a raw data feed from a satellite has qualified as data that may be protected using the database right.[147] It therefore follows that geospatial data may also be protected, despite a question to the data's individual accessibility, in accordance with the broad definition outlined in the Database Directive. It seems certain that a substantial investment is expended when collecting satellite data; for example, the U.S. President's budget request for fiscal year 2007 for the NASA mission that encompasses *Landsat* was 2.21 billion dollars.[148]

However, application of the Database Directive to potential unauthorized appropriations of geospatial data is not certain. The "substantial investment" was recently considered to "be un-

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[143] *Id.* at art. 7, § 2(a).

[144] *Id.* at art. 7, § 1. "Qualitative" extraction may attach if even a small portion of the database contents is of great or potentially great commercial value.

[145] *See id.* at art. 7, § 2; art. 10 § 1.

[146] *Id.* at art. 7, § 2(b). Like extraction, the reutilization must be of a quantitatively or qualitatively substantial portion of the contents of the database, or consist of the repeated and systemic reutilization of an insubstantial part. *Id.* at art. 7, §§ 1, 5.

[147] Case C-46/02, Fixtures Mktg. Ltd. v. Oy Veikkaus AB, 2004 E.C.R. I-10,365; Case C-203/02, British Horseracing Bd. Ltd. v. William Hill Org., 2004 E.C.R. I-10,415; Case C-338/02, Fixtures Mktg. Ltd. v. Svenska Spel AB, 2004 E.C.R. I-10,497; Case C-444/02, Fixtures Mktg. Ltd. v. Organismos Prognostikon Agonon Podosfairou AE, 2004 E.C.R. I-10,549 (Nov. 9, 2004).

[148] NASA's FY 2007 Budget Estimates, *available at* http://www.nasa.gov/pdf/142458main_FY07_budget_full.pdf (last visited Sept. 11, 2006).

derstood to refer to the resources used to seek out existing independent materials and collect them in the database, and not to the resources used for the creation as such of independent materials."[149] This raises the question: Does a satellite merely "collect" the data in a database, or does it simultaneously "create" the data that it collects in the compilation or database of data? Depending on the answer, satellite collections of geospatial data may be exempted from the protections of the Database Directive altogether. Furthermore, the Database Directive recognizes potentially applicable permissible non-commercial extractions or reutilizations: data may be extracted or re-utilized in scientific or academic fields as long as the source of the data is credited and the use not for a commercial purposes, and data may be used for matters of public security.[150]

The Database Directive directly conflicts with U.S. copyright law because it expands intellectual property protection to cover that which the Supreme Court expressly said copyright could not: facts, and unexpressed facts at that. While the term of protection offered under the Database Directive is short – a mere fifteen years compared with the potential "life plus seventy" offered by the U.S. Copyright Act – the scope of protection is much broader.[151] Furthermore, with the expansive definition of what constitutes an "extraction" or "reutilization" of data, what constitutes an illegal activity under the Database Directive is much less specific than under copyright.[152]

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[149] British Horseracing, 2004 E.C.R. I-10,415, at ¶ 1.

[150] *See id.* at art. 9.

[151] *Compare* Database Directive, *supra* note 136, at art. 10, § 1, *with* Copyright Act, *supra* note 64, at § 302(a), (c).

[152] Infringement of a copyright is identified by section 501 of the Copyright Act as a violation of "any of the exclusive rights of the copyright owner," which rights include the rights "(1)to reproduce the copyrighted work in copies...; (2) to prepare derivative works based upon the copyrighted work; (3) to distribute copies ... of the copyrighted work...; ...[and] (5) to display the copyrighted work publicly." Copyright Act, *supra* note 64, at §106.

2. The Potentially False Conflict: Database Rights or a Pure Copyright Regime?

Often among cases within the borders of the United States, courts identify "false" conflicts, where "only one of the involved states would be interested in applying its law...."[153] Such a false conflict exists, for example, when considering the preference of the United States to abide by copyright in order to protect the various expressions of the data above. The Database Directive does not discourage the use of copyright to protect the expressions of data; in fact, it encourages it.[154] To the extent one is arguing the copyright protection of the data, absent differences in implementation among the nations, no true conflict exists.

Instead, the difference comes in the decision of the individual jurisdiction whether to apply the *sui generis* database right to protect those data falling outside the acceptable copyright parameters. While it is possible that the differences among the nations regarding database rights is in fact an academic exercise, "[c]ases involving facts that cross national boundaries may be affected by policies and considerations not present in interstate cases....Government interests may be more sharply identifiable, and the contrast between competing rules of law with corollary preference for the forum's own rules may be more striking."[155]

Predictably, the law that will be applied by the United States with respect to database protection will be the federal Copyright Act, which preempts state rights that "come within the subject matter of copyright as specified by sections 102 and 103."[156] This easy solution may not work, however, if the reviewing court determines that the misappropriated data are in the public domain or otherwise fall outside of the subject matter of section 103, which states that it "does not imply any exclusive

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[153] SCOLES, *supra* note 54, at 28.

[154] Database Directive, *supra* note 136, at ch. II (discussing the object of protection, authorship of a database, and listing restricted acts and their exceptions).

[155] LUTHER L. MCDOUGAL, III, ROBERT L. FELIX & RALPH U. WHITTEN, AMERICAN CONFLICTS LAW, § 6, 10 (Ardsley, NY 5th ed. 2001).

[156] Copyright Act, *supra* note 64, at § 301.

right in the preexisting material."[157] As Tyler Ochoa points out, the preemption clause of the Copyright Act sought to ensure that states could not extend copyright to raw data where they lacked the originality otherwise necessary for protection under federal copyright law.[158]

What is less clear is whether a state court can apply its own choice-of-law rules in order to impose a right not extended by the Copyright Act. It has been held that "[a] choice of law provision...merely designates the state whose law is to be applied to the extent its use is not preempted by nor contrary to the policies of the 1909 and 1976 Copyright Acts."[159] Therefore, to the extent that the property right conferred in preexisting material to be included in a compilation is outside a database, the possibility exists, however remote, that a state's choice of law rules could apply to consideration of whether a foreign plaintiff "owned" a right to exploit the data which it compiled in its database.

As noted above, in the United States, various choice-of-law methodologies are applied among the several states, and each either employs a policy consideration in its factors or offers a policy exception to the rigid application of its rule.[160] Because recognition of the Database Directive may be contrary to the policy interests of the United States,[161] it would perhaps be more surprising if a U.S. court determined that the Directive should be interpreted or enforced. In the event that this happened, however, U.S. defendants sued in their home forums by extra-jurisdictional plaintiffs may ultimately be subject to the database right depending on the choice of law regime present in a

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[157] *Id.* § 103(b).

[158] Tyler T. Ochoa, *Origins and Meanings of the Public Domain*, 28 U. DAYTON L. REV. 215, 228-229 (Symposium 2002) (discussing legislative history of section 301).

[159] Fantastic Fakes, Inc. v. Pickwick Int'l, Inc., 661 F.2d 479, 483 (5th Cir. 1981). *But see* Edward Lee, *The New Canon: Using or Misusing Foreign Law to Decide Domestic Intellectual Property Claims*, 46 HARV. INT'L L.J. 1, 4 (Winter 2005) ("[C]hoice of law should [not] be used to alter the domestic law's express regulation of the terms and conditions of [intellectual property] rights created by domestic statute.").

[160] *See generally* SCOLES, *supra* note 54, § 17.34, 786-789.

[161] *See generally* Christopher A. Bloom & Julie D. Cromer, Legal Protection for Databases in the United States: Is Sui Generis Protection Required?, Presentation, Computer Law Association Annual Meeting, Paris, France (Nov. 14-15, 2002).

specific jurisdiction. If anything, the database directive may be considered similar to a state-law unfair competition cause of action, which generally requires the examination of three interests: "regulation of conduct, protection of the injured party's business, and protection of the public," in many cases adopting "the reference to the place where the claimant was injured in his business."[162] In that respect, if the claimant is from a jurisdiction adopting the Database Directive or similar right, it is possible that a choice-of-law analysis could lead to the application of the right in the United States, if the injury is established to have occurred where the plaintiff was.[163]

Conversely, in jurisdictions that embrace the database right, injured parties may have no voice. The Database Directive refuses to confer reciprocal benefits of the database right upon any party that is not a citizen of the European Union or another country that has a corresponding database right.[164] As a result, the courts of the European Union Member states are effectively closed as forums to extrajurisdictional plaintiffs whose data violation injuries may fall outside the scope of traditional copyright protections, but which injury was caused by a defendant domiciled in the Member state. On the other hand, the Database Directive contains no limitations regarding the territoriality of a defendant; so long as the Member state can acquire jurisdiction, a defendant may be subject to the obligations of the database right and the applicable damages.

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[162] SCOLES, *supra* note 54, § 17.53, 870. Scoles and Hay note that "[r]ecent European codifications...employ a similar test." *Id.* § 17.3, 871.

[163] The "place where the plaintiff sustained injury" test is also used to determine personal jurisdiction in infringement actions, but does not necessarily mean the place where the plaintiff resides. *See* Indianapolis Colts, Inc. v. Metropolitan Baltimore Football Club, Ltd. P'ship, 34 F. 3d 410, 411-12 (7th Cir. 1994) (determining the "locus of the tort" to be where infringing sales are made). *But see* Reeves v. American Broadcasting Cos., 580 F. Supp. 84, 90 (S.D.N.Y. 1981), *aff'd*, 719 F.2d 602 (2d Cir. 1983) (finding reputation of plaintiff to be injured where plaintiff resided, although signal was broadcast from a different state).

[164] Database Directive, *supra* note 136, at cl. 56.

V. POTENTIAL CONSEQUENCES AND FUTURE ISSUES

Plainly, if we are to give weight to the policies behind both broad fields of intellectual property law and outer space law, there emerges a necessary impossibility: it is not possible to achieve uniformity regarding intellectual property among the several nations if their ideas about protecting the property remain disparate. This conundrum is best typified by the "irresistible force versus an immovable object": neither can coexist with the other. One of two possible scenarios is likely. Either one of the legal fields will make a concerted change to accommodate the other, or, each of the two fields will ignore the principles of the other and press forward as if no conflict exists.

Assuming that cooperation is a preferred goal for the intersection of intellectual property and outer space in the context of remote sensing, the field of intellectual property will have to change to achieve international cooperation and harmony. As a result, either the pure copyright regimes or the database right regimes will have to readjust in order to work together, aligning intellectual property with outer space. The database right under the European Union Database Directive has been in force in Europe for nearly ten years, providing sparse but adequate empirical evidence with which to assess its effectiveness. The first evidence of this inefficiency is in the legal interpretation of the Directive. After several conflicting cases in the lower courts of implementing states and some interpretation by the European Court of Justice, it is still unclear what exactly the scope and the effect that the data right has.

On December 12, 2005, as required by the Directive,[165] the Commission of the European Communities issued its Internal Market and Services Working Paper reviewing the Database Directive "to assess whether the policy goals of [the Database] Directive...have been achieved and, in particular, whether the creation of a special 'sui generis' right has had adverse effects

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[165] *Id.* at art. 16 (requiring committee review and comments).

on competition."[166] Upon review, the Commission determined that while the database right had done little to spur competition – the original purpose of the Database Directive – it had beneficial side effects that members of the industry had identified.[167] As a result, while the Commission considered changing the Directive or doing away with it altogether, it instead concluded that it is not necessary to repeal it. Therefore, based on its very recent standpoint, the European Union will remain an irresistible force in the area of database protection.

As a pure copyright regime, the United States, on the other hand, has tried several times to pass laws incorporating a database right similar to that created by the directive. In four different congressional sessions since 1996, legislation has been introduced to introduce this right to American jurisprudence.[168] The last two Congressional attempts were thwarted internally by dissension among two congressional committees, the Judiciary Committee and the Energy and Commerce Committee. Representing sets of two different interest groups, Judiciary introduced legislation mirroring the database right, while Energy and Commerce introduced a more watered-down version, becoming a database right in name only.

The introduction of the competing bills ensured that neither would pass, and all four bills died in the house before any action could be taken on them whatsoever. As such, it appears as if the United States promises to be an immovable object in the protection of databases, leaving the two types of regimes to tinker with their rights, hoping to achieve some middle ground.

Or, this can be an area where the intellectual property theorists agree to disagree, and continue, in a state of conflict, to oppose the cooperation sought by the Outer Space Treaty. Strictly speaking, these two areas of the law and their respec-

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[166] Commission of European Communities, *DG Internal Market and Services Working Paper: First evaluation of Directive 96/9/EC on the legal protection of databases* 1.1 (Dec. 12, 2005) [hereinafter Working Paper].

[167] *Id.* at 1.4. These effects include legal certainty, reduced costs, more business opportunities and ease of marketing.

[168] H.R. 3531, 104th Cong. (1996); H.R. 2652, 105th Cong. (1997); H.R. 354, 106th Cong. (1999); H.R. 1858, 106th Cong. (1999), H.R. 3261, 108th Cong. (2003), H.R. 3872, 108th Cong. (2004).

tive policies are not at theoretical odds and not competing with each other. Intellectual property seeks to protect the databases, whereas outer space is seeking equalization. Perhaps what is needed is a specific framework excluding geospatial data either from intellectual property laws altogether, or to exclude intellectual property from the goals of uniformity.

Regardless of the ultimate resolution, this article has identified several issues which should be addressed before such a policy or framework is promoted to the remote sensing community. First, it must be established where in the remote sensing process a protectable work is established. Does data constitute a work capable of being protected at the data collection stage? The transmission stage? The processing stage? Or, do we reserve protection for data once it is in imaged format?

The answer to this series of questions, about where intellectual property protection attaches, leads to the second and third questions -- about jurisdiction and choice of law. Will jurisdiction be awarded to the state that put the satellite into orbit, or to the state that is manipulating the satellite to collect the data? Will jurisdiction lie with the state that has the receiver, or the state where the data is processed and stored? In cases of infringement and/or unauthorized appropriation, do we consider the personal jurisdiction of the defendant? Or, as in intellectual property cases, do we consider where the most damage has occurred? Each of these questions can be asked in a choice of law context, with the additional question of which choice of law rule will apply to determine the appropriate intellectual property law to use.

The questions about possible protection of geospatial data under copyright lead to the fourth and fifth issues that should be addressed. The fourth issue would examine the remote sensing process critical to the issues of jurisdiction and choice of law to determine the point of fixation, securing copyright protection at a point in time under certain laws. The fifth issue would be to consider not the process of remote sensing, but the origins, determining whether a geospatial work with its origins in a governmental satellite could be granted rights outside the public domain, whether government contractors should be specially

treated, or if private copyright can be retrieved once that satellite is transferred into private, commercial ownership.

Once these issues have been addressed and perhaps resolved, scholars can revisit the question of which intellectual property model can best protect remote sensing activities and geospatial works of authorship. Perhaps the resolution of jurisdiction, choice of law, and fixation will lead to the conclusion that all along, the conflict was in fact false, presenting answers under a pure copyright regime. Or, the opposite truth may be reached, determining that finally justification may exist in the United States and other pure copyright regimes to implement a database right correspondent to that of the forward-thinking European Union. Once all issues are resolved, then possibly a framework can be attempted that encompasses both the cooperative goals of outer space and the competitive ends of intellectual property.

CONCLUSION

Because the majority of remote sensing projects have placed geospatial images and databases in the public domain, intellectual property considerations of the raw data from satellite feeds has largely been unexplored. The outright failure to recognize the ownership in geospatial products will not be sustained for much longer; remote sensing activities are too valuable. In addition to being of vital importance to the public goods of national security, meteorology, disaster management, and environmental protection, these data products are gaining in commercial value. And if we are, as Stephen Hawking has recently noted, truly to move into an interplanetary existence,[169] the value of "maps to the universe," turning the geospatial satellites outward, for space exploration may be immeasurable.

It is not impossible for intellectual property and outer space principles to coexist; they have before, and they must continue to do so. As they do in the terrestrial world, the regimes of

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[169] *See, e.g.*, Associated Press, *Hawking says humans must go into space*, MSNBC (June 14, 2006), *available at* http://www.msnbc.msn.com/id/13293390/ (last visited Oct. 31, 2006).

physical and intellectual space must coexist in outer space. Oliver Wendell Holmes wrote, "Man's mind, once stretched by a new idea, never regains its original dimensions."[170] It remains to be seen whether one dimension can or will be stretched to accommodate the policies and the ideas of the other.

[170] Oliver Wendell Holmes.