TERRITORIALITY AND INCENTIVES UNDER THE PATENT LAWS: OVERREACHING HARMS U.S. ECONOMIC AND TECHNOLOGICAL INTERESTS[1]

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1. By mistake and without the author's knowledge or permission, the Journal of the Patent & Trademark Office Society published an incomplete version of the July 2006 draft of this article in its September 2006 issue, 88 JPTOS 761-795. The Patent & Trademark Office Society has apologized for this mistake and is publishing that apology in the November 2006 issue of the JPTOS.

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I. INTRODUCTION

The U.S. patent laws are all about incentives. They create incentives for invention and for detailed public disclosure of inventions. Equally important, they incentivize investment to commercialize the resulting products and processes. We expect these incentives to promote U.S. prosperity.

Surprisingly, a 1984 addition to the U.S. Patent Act creates substantial perverse incentives. Sections 271(f)(1) and (f)(2) of the Act (collectively, "Section 271(f)") reach beyond the traditional territorial limits of patent law. More important, from a practical standpoint, they do so in ways that harm U.S. producers and the U.S. economy while failing to serve any U.S. interests.

Section 271(f) establishes a new type of "infringement" to protect holders of U.S. patents against a broadly defined form of competition from U.S. producers in *foreign* markets. Section 271(f) allows the patent holder to forbid everyone else from exporting *unpatented* components for inclusion abroad in combination products of the type claimed in the U.S. patent. Under Section 271(f), such export generally constitutes infringement

even though the combination product will not only be made, but also sold and used, strictly abroad and will never be brought into the U.S.

A key point here is that U.S. laws cannot reach competition by *foreign* producers in *foreign* markets. Accordingly, Section 271(f) restricts only U.S. suppliers of the relevant components. Effectively discriminating against U.S. producers, it leaves all off-shore producers—including U.S. companies that choose to produce the components off-shore or to contract for their off-shore production—free of any restraints.

This discriminatory effect escaped criticism when Congress enacted Section 271(f), and it would not have seemed very serious in the 1970s and '80s where that provision originated. Commercial and technological developments since that time, however, have made this effect serious and unmistakable. Recent court decisions have extended the application of Section 271(f) and magnified its negative consequences. Newly published studies of the U.S. patent system further illuminate the shortcomings of that provision.

As detailed below, Section 271(f) has an extraordinarily bad cost/benefit profile: it fails to enhance the incentives for innovation or investment while creating serious risks for companies that produce, or consider producing, technologically advanced components in the U.S. for world markets. In the last two years, that provision has produced huge, highly publicized awards of damages—based on worldwide product sales—and similarly broad injunctive orders. During the same period, another prominent decision emphasized the safety of producing the same products anywhere in the world *except* in the U.S. It is hard to imagine a worse combination of patent-based incentives from the standpoint of U.S. employment, U.S. technological and productive capacity, and the U.S. economy.

The potential beneficiaries of Section 271(f) have also shifted since its enactment. That provision gives added leverage and increased potential damages awards to holders of certain types of U.S. patents. When Congress enacted Section 271(f), U.S. entities held the great majority of outstanding U.S. patents and were receiving the great majority of newly issued U.S. patents. Now, though, non-U.S. entities receive and hold roughly half of all U.S. patents being issued. The reverse is true, however, as to the *targets* of Section 271(f) claims. Section 271(f) burdens only U.S. producers, i.e., entities that make products, employ persons, and pay taxes in the U.S.—those that help maintain our technological strength. Accordingly, horribly ironic results seem likely in the near future under Section 271(f). For example, a Japanese company owning a U.S. patent could use Section 271(f) to bar U.S. producers of non-patented components from

markets around the world even though producers of the same components in Japan, China, and other countries would remain free to compete in world markets.[2]

Some of the "patent reform" proposals circulated on Capitol Hill in the last two years would have overruled recent judicial extensions of Section 271(f) or repealed the provision entirely. Likewise, a case now pending before the U.S. Supreme Court could narrow the application of that provision in some respects.[3] All of the substantial patent reform proposals, however, died with the recently completed session of Congress. Likewise, even if the Supreme Court limits the application of Section 271(f) as much as possible in the case now pending before it, a broad range of present and prospective U.S. producers will remain subject to the discriminatory burdens and perverse incentives that provision creates.

Section 271(f) discourages investment in U.S. productive facilities, production of technologically advanced components in the U.S., and the employment of workers in U.S. technology sector jobs. This tends to undermine U.S. technological strength. At the same time, as we shall see, it produces no incremental incentives for innovation. Moreover, better, nondiscriminatory alternatives are available to provide patent protection in foreign markets. No other country seems to have a law similar to Section 271(f). Congress should recognize the wisdom of all other patent-granting countries and repeal Section 271(f). Until that happens, U.S. courts should cut-back its operation as much as possible. Traditional principles of statutory interpretation, if used in place of the Federal Circuit's recent avowedly expansionist approach, will support some of the needed cut-backs.

Part II of this Article reviews the background and origins of Section 271(f), including its departure from the traditionally territorial character of patent laws and the unusual circumstances that created an apparent justification for such a provision in the first place. This Part also examines the limited legislative history and stated rationale for the provision and explains why its application has remained unclear in several important respects for more than twenty years.

Part III then examines the major judicial extensions of Section 271(f) in the last two years. These reflect the Federal Circuit's recent abandonment of significant limitations previously thought to narrow the application of Section 271(f). Part III also recounts the very recent objections of several Federal Circuit judges to some of these extensions, and it describes

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2. *See infra* text accompanying note 160.

3. AT&T Corp. v. Microsoft Corp., 414 F.3d 1366 (Fed. Cir. 2005), *cert. granted*, 127 S. Ct. 467 (2006).

the case now pending before the Supreme Court which presents one or two of these extensions for high-court review. Finally, Part III describes: (i) the huge economic impact Section 271(f) can have on U.S. producers and (ii) a recent Federal Circuit decision recognizing a particular limitation on the reach of Section 271(f), which, unfortunately, merely increases the discriminatory effects and perverse incentives that provision creates.

Part IV assesses the merits and faults of Section 271(f). It first considers the adequacy, *vel non*, of the available information to support such an assessment. Part IV then reviews the extent to which Section 271(f) furthers the objectives of the patent laws, the objectives of U.S. trade and economic policy, or other widely shared objectives such as efficiency and perceived fairness in patent enforcement. Part IV also considers whether Section 271(f) significantly burdens U.S. production and examines the incentives it creates for U.S. and foreign companies planning investments in productive facilities. Part IV concludes that Section 271(f) fails to further the objectives of the patent laws or other U.S. interests while burdening U.S. producers and creating all the wrong incentives with respect to investment, production, employment, and technological capacity. Finally, Part IV explains why Supreme Court review or Federal Circuit en banc review could modestly reduce, but could not come close to eliminating, the ill effects of Section 271(f).

The concluding Part V notes the potential application of Section 271(f) in some new areas if Congress and the courts fail to repeal it or substantially limit its scope. Part V also briefly addresses the special usefulness of Section 271(f) for a particular category of patent enforcers derisively termed "patent trolls."

II. ORIGINS AND ENACTMENT OF SECTION 271(F)

According to its proponents, Congress enacted Section 271(f) to close a "loophole" in the U.S. patent laws that was revealed in the U.S. Supreme Court's 1972 decision in *Deepsouth Packing Co. v. Laitram Corp*.[4] *Deepsouth* displayed the long-recognized principle of territoriality in patent law operating in extreme and unusual circumstances. The Justices split 5-4 on the result, and the outcome seemed harsh and hyper-technical. That decision, together with a major shift in U.S. patent protection in the early 1980s, led to the enactment of Section 271(f).

4. Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972).

A. *Deepsouth* and Traditional Principles of Territoriality in Patent Law

From the earliest days of U.S. patent law, territorial principles have strictly confined the offense of infringement. Unauthorized exploitation of a claimed invention could infringe but only if it took place within the United States, including its territories and possessions.[5] The main infringing acts were, and continue to be: (i) making, using, and/or selling a claimed product *in the U.S.*; (ii) practicing a claimed process *in the U.S.*; and (iii) importing claimed items *into the U.S.* from abroad.[6]

Over many years, numerous courts and scholars have emphasized this territorial principle.[7] Similar territorial principles govern the patent laws of

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5. 35 U.S.C. §§ 154(a)(1), 271(a), (c), (e), (g) (2000 & Supp. III 2003); *see* 35 U.S.C. § 100(c) (2000).

6. 35 U.S.C. §§ 154, 271 (2000 & Supp. III 2003). Likewise, in codifying the related common law doctrines of secondary liability for "inducing" infringement and "contributory infringement," Congress limited their application with the phrase "within the United States" or a variation thereof. *See* 35 U.S.C. § 271(b), (c). The 1988 Process Patent Amendment Act added Section 271(g) to the Patent Act, making the importation into the U.S. of a product made abroad by a process patented in the U.S. an act of infringement. Subsequently, pursuant to the Trade-Related Aspects of Intellectual Property ("TRIPS") agreement of the 1994 Uruguay Round General Agreement on Tariffs and Trade ("GATT"), Congress amended 35 U.S.C. §§ 154 and 271 to add "import[ing the invention] into the United States" as an act of infringement. *See* 35 U.S.C. §§ 154, 271 (2000 & Supp. III 2003); World Trade Organization, A Summary of the Final Act of the Uruguay Round, http://www.wto.org/english/docs_e/legal_e/ursum_e.htm#nAgreement (last visited Nov. 7, 2006). The same legislation added "offering for sale" a claimed invention in the U.S. as a further act of infringement. *See* §§ 154, 271.

7. *See Deepsouth*, 406 U.S. at 531. The Court wrote:

> Our patent system makes no claim to extraterritorial effect; "these acts of Congress do not, and were not intended to, operate beyond the limits of the United States," . . . and we correspondingly reject the claims of others to such control over our markets. . . . To the degree that the inventor needs protection in markets other than those of this country, the . . . congressional intent [was] to have him seek it abroad through patents secured in countries where his goods are being used.

Id. (citations omitted); *see also* MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp., 420 F.3d 1369, 1375 (Fed. Cir. 2005); Rotec Indus. Inc. v. Mitsubishi Corp., 215 F.3d 1246, 1251 (Fed. Cir. 2000) ("These extraterritorial activities . . . are irrelevant to the case before us, because '[t]he right conferred by a patent under our law is confined to the United States and its territories, and infringement of this right cannot be predicated of acts wholly done in a foreign country.'" (quoting Dowagiac Mfg. Co. v. Minnesota Moline Plow Co., 235 U.S. 641, 650 (1915))); U.S. Patent & Trademark Office, Treaties and Foreign Patents, http://www.uspto.gov/web/offices/pac/doc/general/ treaties.htm (last visited Nov. 3, 2006) ("Since the rights granted by a United States patent extend only throughout the territory of the United States and have no effect in a foreign country, an

other countries.[8] These principles derive support, in part, from *comity*—i.e., respect for the sovereignty and laws of other countries—and, in part, from national self-interest and the exclusionary nature of patent rights as to the territory in which they apply.[9] No country wants the laws of another country to limit commercial activity within its borders, and countries almost never choose to restrict the commercial activities of, or the benefits available to, their own citizens more than the competing activities of, or corresponding benefits for, citizens of other countries.[10] Another explanation, of course, is the difficulty a country ordinarily experiences in enforcing limitations on commercial activities outside its own borders. In short,

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inventor who wishes patent protection in other countries must apply for a patent in each of the other countries or in regional patent offices.").

8. *See, e.g.*, Patents Act, 1977, c. 37, § 60(1) (Eng.) ("[A] person infringes a patent for an invention if, but only if, . . . he does any of the following things in the United Kingdom in relation to the invention without the consent of the proprietor of the patent…."); Paris Convention for the Protection of Industrial Property, Mar. 20, 1883; RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW § 415, cmt. i (1987) ("Patents are considered territorial, having legal effect only in the territory of the issuing state."); GRAEME B. DINWOODIE, WILLIAM O. HENNESSEY, & SHIRA PERLMUTTER, INTERNATIONAL AND COMPARATIVE PATENT LAW § 1.03, 30 (2002) ("[T]he starting point for any study of international patent law [is that] patent laws operate territorially, and patent rights are thus national in scope.").

9. A patent confers the right to exclude others from making, using, or selling the inventory in the territory to which that right extends. *See* provisions *supra* notes 5, 6.

10. See, e.g., Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, as amended, Articles 2 and 3, recognizing the territorial application of the patent laws of each of the countries that are signatories to that convention and requiring them to accord the citizens of other countries equal rights in invoking their patent laws as to their respective territories:

> Article 2:
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> (1) Nationals of any country of the Union shall, as regards the protection of industrial property [i.e., patents, etc.], enjoy in all the other countries of the Union the advantages that their respective laws now grant, or may hereafter grant, to nationals; . . . . Consequently, they shall have the same protection as the latter, and the same legal remedy against any infringement of their rights. . . .
>
> (2) . . .[No] requirement as to domicile or establishment in the country where protection is claimed may be imposed upon nationals of countries of the Union for the enjoyment of any industrial property rights.
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> Article 3:
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> Nationals of countries outside the Union who are domiciled or who have real and effective industrial or commercial establishments in the territory of one of the countries of the Union shall be treated in the same manner as nationals of the countries of the Union.

the territorial limitations on patent protection are based not only on tradition but also on considerations of national self-interest, sovereignty, and practicality.

Territorial principles can affect patent claims in various ways.[11] Further, like most legal principles, territoriality in patent law can produce seemingly harsh results when applied in unusual circumstances. This is what happened in *Deepsouth*, and that case became the "poster-child" scenario on which Section 271(f) was based.

In *Deepsouth*, Laitram Corporation held a U.S. patent on a machine for removing shells and veins from shrimp. Laitram also held foreign patents on those machines which, for unexplained reasons, it did not discuss or utilize. Deepsouth Packing Company also held U.S. patents for, and produced and sold, machines for de-veining shrimp. In litigation, Laitram's U.S. patent claims prevailed over those of Deepsouth, and Laitram obtained damages and an injunction against Deepsouth's production and sale of its de-veining machines.

Cleverly, Deepsouth sought a modification of the injunction to allow it: (i) to continue producing *all* the components of its infringing machines at its factory in the United States; (ii) to assemble those parts in incomplete form in the United States; and (iii) to receive and accept orders for, and ship sets of, those partially assembled machines to foreign countries

11. A number of cases, including the recent, highly publicized BlackBerry litigation, provide interesting examples of products otherwise infringing a U.S. patent by sale or use in the U.S. but relying on a component located, or a step performed, outside the United States. Under the Federal Circuit's recent ruling in that case, a finding of infringement in this context depends on several technical distinctions including: (i) the type of infringing acts alleged and proved ("using" vs. "making/selling" the claimed invention) and (ii) the type of patent claims ("machine" claims vs. "process" claims) at issue. NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282, 1316-20 (Fed. Cir. 2005), *reh'g and reh'g en banc denied*, No. 03-1615, 2005 U.S. App. LEXIS 23112 (Fed. Cir. Oct. 7, 2005), c*ert. denied*, No. 05-763, 126 S. Ct. 1174 (Jan. 23, 2006). Specifically, the Federal Circuit held that infringement based on *using* or *practicing* the invention: (i) cannot exist as to method (process) claims if any claimed step is performed outside the United States, but (ii) can exist as to system (machine) claims where one of the claimed physical elements is outside the United States as long as the system as a whole is controlled and beneficially used by persons located in the United States. *Id.*

This Article does not address the BlackBerry-type situation because it involves the application of U.S. patents to limit competition in U.S. markets. Conceptually, this is a modest form of extraterritoriality, if it involves extraterritoriality at all; courts can apply the normal remedies for infringement without any special enforcement difficulties, without intrusion into competition in foreign markets, and without discrimination against U.S. producers. Instead, this Article considers the much more aggressive and problematic type of extraterritoriality that Section 271(f) calls for, namely applying a U.S. patent to restrict competition with its holder in foreign markets.

for final assembly and use at those foreign locations. Related circumstances made these steps even more obviously evasive than they might otherwise have been.[12] In Deepsouth's favor, however, none of the parts of the de-veining machines was new or patentable when Laitram applied for its patent, so the patent covered only the complete combination of all the claimed parts. Further, under Deepsouth's proposed modification, there clearly would be no "*use*" of the patented combinations in the United States. Thus, the case turned on whether the proposed activities would involve "*making*" or "*selling*" the complete patented machines *in the United States*.

Drawing on prior case law, a 5-4 majority of the Justices held that "making" or "selling" a machine in the United States required a *complete and operable assembly* of the machine here. Accordingly, the majority held that Deepsouth's continued production, sale, and shipment of sub-assemblies would not infringe Laitram's U.S. patent. The Court granted Deepsouth's requested modification of the injunction and stated that Laitram would have to rely on its foreign patents to protect it from the proposed type of competition by Deepsouth in foreign markets.[13]

Both the majority and the dissenters recognized larger considerations at work in this case. Their differing views illuminate the policy considerations underlying Section 271(f).

Perceptions of "unfairness" drove much of the dissenters' assessment. They stressed what they considered Deepsouth's "evasive" and "iniquitous" conduct in first infringing Laitram's U.S. patent and then trying to skate narrowly around it.[14] More significant, for present purposes, the dissenters acknowledged their disregard for traditional territorial limitations on the monopoly rights conferred by the U.S. patent laws. This disregard was appropriate, they argued, for two reasons. First, extending the reach of the U.S. patent laws to prevent U.S. producers from competing in foreign markets would protect patent holders' sales there and therefore encourage

12. Deepsouth shipped each set from the U.S. in three large boxes, each containing a sub-assembly. Together, the boxed sub-assemblies weighed 1.5 tons and comprised a complete de-veining machine. Deepsouth's literature generally referred to what it shipped as "de-veining machines," rather than "parts" or "sub-assemblies," and it said installation of the items as a complete operable machine at the foreign location would take "less than an hour." Deepsouth charged the same price for these partially assembled sets as it had charged for the fully assembled machines.

13. Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 527-31 (1972).

14. *Id.* at 533-34. See *infra* text accompanying notes 150-160 for a discussion of the fairness considerations relating to Section 271(f).

innovation—a highly doubtful proposition for reasons discussed below.[15] Second, they asserted a proposition that may have been plausible in the early 1970s but now seems entirely outdated: that U.S. manufacturers generally enjoyed economic advantages relative to their foreign competitors that justified subjecting them to restrictions in international markets not applicable to their non-U.S. competitors.[16] The dissenters also assumed that the holders of U.S. patents were U.S. enterprises. This was true as to 75% of all issuing U.S. patents (and a higher percentage of outstanding U.S. patents) at the time of *Deepsouth* but is now true only about 50% of the time.[17]

In contrast, the five-Justice majority endorsed the traditional view that each country's patent laws govern patent protection in that country's markets. They emphasized that U.S. inventors can secure patent protection in foreign markets by obtaining foreign patents in the countries where protection is desired. The majority agreed with Deepsouth that Laitram's U.S. patent gave Laitram "a monopoly only over the U.S. market" but did not confer on Laitram "the bonus of a favored position as a flagship company free of American competition in international commerce."[18]

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15. *Id.* at 534. See *infra* text accompanying notes 107-120 regarding the doubtful nature of this proposition.

16. *Id.* When the Court decided *Deepsouth*, many U.S. manufacturers enjoyed vastly stronger positions in relation to their foreign competitors than they do today. For example, General Motors had slightly more than 50% of the U.S. auto market (as opposed to approximately 23% in recent periods) in addition to strong positions in locomotives, refrigerators, and foreign auto sales. Similarly, IBM had market shares in computers that varied depending on the market definition but were often in the range of 90%.

17. *Id.* at 532-34. In 1970, residents of foreign countries received only about 25% of the total U.S. patents granted, but in the mid-1980s this percentage had risen to over 30%. Remarks of Representative Kastenmeier, 130 CONG. REC. H10522-34 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier); 130 CONG. REC. H12231-32 (daily ed. Oct. 11, 1984) (statement of Rep. Kastenmeier). According to the U.S. Patent and Trademark Office's ("PTO") statistics, foreign inventors accounted for 20% of the U.S. patents granted in the mid-1960s and for 35% of all patents granted from 1963 through 1989; but that percentage grew steadily and reached 48% in 2002-2005. *See, e.g.*, U.S. Patent Statistics Summary Table, http://www.uspto.gov/go/taf/us_stat.htm (last visited Nov. 4, 2006); U.S. Patent Statistics Reports, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm (last visited Nov. 4, 2006). Similarly, foreign individuals and entities owned 33% of all patents granted in 1963 through 1989, but that percentage grew to about 48% in the period from 2002 through 2005. The percentage of U.S. patents being issued to foreign inventor applicants now equals, or will soon equal, 50%. *Id.*

18. *Deepsouth*, 406 U.S. at 523. Criticizing the idea that the holder of a U.S. patent should be the only U.S. producer allowed to compete in foreign markets, the majority stated:

The majority's emphasis on foreign patents as the way to secure protection in foreign markets was non-controversial, and Laitram's failure to rely on its foreign patents remained unexplained. Nevertheless, the majority's narrow definitions of "make" and "sell" seemed hyper-technical given the extreme circumstances of the *Deepsouth* case, and Deepsouth's tactics seemed evasive and unfair. In addition, competition from non-U.S. manufacturers was less intense in 1972 than it has since become, and the holders of U.S. patents were more often U.S. entities. Thus, it may have seemed plausible, as the dissenters argued, that granting U.S. patent protection as to foreign markets—but only against U.S. producers—could provide meaningful protection in those markets for holders of U.S. patents and increase the incentives for U.S. innovation, all without harming U.S. interests. As explained below, this is no longer true.

B. Enactment of Section 271(f)

After decades of relative weakness, patent law was in resurgence in the early-and mid-1980s.[19] Proponents of strengthened U.S. patent protection

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> . . . [W]e note that what is at stake here is the right of American companies to compete with an American patent holder in foreign markets. Our patent system makes no claim to extraterritorial effect; "these acts of Congress do not, and were not intended to, operate beyond the limits of the United States," Brown v. Duchesne, 19 How., at 195; and we correspondingly reject the claims of others to such control over our markets. *Cf.* Boesch v. Graff, 133 U.S. 697, 703 (1890). To the degree that the inventor needs protection in markets other than those of this country, the [patent laws] reveal a congressional intent to have him seek it abroad through patents secured in countries where his goods are being used. Respondent [Laitram] holds foreign patents; it does not adequately explain why it does not avail itself of them.

Id. at 531.

19. From roughly the late 1920s through the 1970s, U.S. patent protection was relatively weak. Courts frequently narrowed or denied patent rights on arguable legal grounds, and patent protection in general was frequently subordinated to widespread distrust of monopolies and anti-competitive activity. The early 1980s brought many changes, spurred mainly by concerns about lagging U.S. innovation and increasing foreign competition, which often came to dominate industries that were based on U.S. research or inventions. *See, e.g.*, 1 DONALD S. CHISUM, CHISUM ON PATENTS, 11-15 (Cumulative Supp. 2006) (noting the repeated swings in the U.S. Supreme Court from pro-patent to anti-patent and back again); COMMITTEE ON INTELLECTUAL PROPERTY RIGHTS IN THE KNOWLEDGE-BASED ECONOMY BOARD ON SCIENCE, TECHNOLOGY, & ECONOMIC POLICY, A PATENT SYSTEM FOR THE 21ST CENTURY 31-38 (Stephen A. Merrill, Richard C. Levin & Mark Myers, eds., The National Academies Press 2004) (2001), *available at* http://newton.nap.edu/html/patentsystem [hereinafter NAS REPORT] (pointing out an anti-patent orientation beginning approximately in 1930 and a pro-patent period in the 1980s and since); FEDERAL TRADE COMMISSION, TO PROMOTE INNOVATION: THE PROPER BAL-

characterized the result in *Deepsouth* as a "loophole" in U.S. patent protection and sought a legislative response. The extreme facts and overly clever conduct in *Deepsouth* buttressed the "loophole" argument. Having taken major steps to strengthen U.S. patent protection little more than a year earlier,[20] Congress passed the Patent Law Amendments of 1984.[21] This statute enacted Section 271(f) of the Patent Act and made other pro-patent changes. Until the final Congressional action, the legislation also contained a precursor of the Process Patent Amendments Act, which was subsequently enacted in separate legislation and codified as Section 271(g) of the Patent Act.[22]

ANCE OF COMPETITION AND PATENT LAW AND POLICY 14-23 (2003), *available at* http://www.ftc.gov/os/2003/10/innovationrpt.pdf [hereinafter FTC REPORT]. The FTC REPORT notes that: (i) despite the enactment of the Sherman Act in 1890, the U.S. courts gave little attention to the intersection of patent and antitrust law until the early 1900s; (ii) the courts generally refrained, through most of the 1920s, from limiting even "rather substantial overreaching" by patent owners including a variety of post-sale restrictions on patented products; (iii) an "antitrust backlash" began as early as 1917, reached great strength in the decades following 1930, and continued through the 1970s; and (iv) a strong pro-patent swing, including both pro-patent legislation and judicial decisions that strengthened patent rights, began in the late 1970s or early 1980s and continues to this day.

Reflecting the dominance of antitrust considerations prior to the 1980s, the Supreme Court stated in *Deepsouth*:

> [W]e must consider petitioner's claim in light of this Nation's historical antipathy to monopoly . . . and of repeated congressional efforts to preserve and foster competition. As this Court recently said without dissent: "In rewarding useful invention, the "rights and welfare of the community must be fairly dealt with and effectually guarded. . . . To that end the prerequisites to obtaining a patent are strictly observed, and when the patent has issued the limitations on its exercise are equally strictly enforced."

406 U.S. at 530-31. *See also infra* text accompanying notes 123-127.

20. In the Federal Courts Improvement Act of 1982, Pub L. No. 97-164, 96 Stat. 25, Congress created the United States Court of Appeals for the Federal Circuit, consolidating the appeals of essentially all patent cases into that court, along with jurisdiction over a few other types of cases. Congress intended for the Federal Circuit to bring more consistency into patent law, and it was also generally expected that the new court would strengthen patent rights for the purpose of stimulating U.S. innovation.

21. Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

22. *See* 130 CONG. REC. H10522-34 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier); 130 CONG. REC. H12231-32 (daily ed. Oct. 11, 1984) (statement of Rep. Kastenmeier). Under Section 271(g), infringement generally includes importing a product into the U.S if that product is made by a U.S. patented process.

As enacted, Section 271(f)[23] consists of two parts, which have largely similar effects. They both make it a new form of "infringement" for anyone to produce, in the United States, unpatented parts usable in a larger product that is claimed in a U.S. patent and supply those parts for assembly with other parts abroad. Clause "1" resembles pre-existing Section 271(b) of the Patent Act defining *inducement of infringement.* It applies only where the components supplied from the United States make up all or a "substantial portion" of the combination claimed by the U.S. patent. Clause "2" resembles pre-existing Section 271(c) on *contributory infringement*. It applies where only a single component or a small portion of the total patented combination is supplied from the United States, if the nature of the component and the intent of the supplier more strongly imply the claimed combination will be made abroad. Conspicuously absent from the statute is any definition of its key terms such as "component" and "combined."

The legislative history of these provisions is sparse and largely uninformative, consisting of brief statements widely scattered among the much more extensive discussions of different provisions in the House and Senate bills.[24] Nevertheless, recent judicial decisions have claimed support in that

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23. Section 271(f) states:

> (1) Whoever without authority supplies or causes to be supplied in or from the United States *all or a substantial portion of the components* of a patented invention, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.
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> (2) Whoever without authority supplies or causes to be supplied in or from the United States any component of a patented invention that is especially made or especially adapted for use in the invention and not a staple article or commodity of commerce suitable for substantial noninfringing use, where such component is uncombined in whole or in part, knowing that such component is so made or adapted and intending that such component will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.

35 U.S.C. § 271(f) (emphasis added).

24. The only items relevant to the interpretation of Section 271(f) are brief and scattered statements in the following: (i) an October 1, 1984 Section-by-Section Analysis of the non-final bill, S. REP. NO. 98-663 (1984) *as reprinted* in 1984 U.S.C.C.A.N. 5827, which also appears in S. REP. NO. 98-663, cited below; (ii) 130 CONG. REC. H10522-34 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier); 130 CONG. REC. H12231-32 (daily ed. Oct. 11, 1984) (statement of Rep. Kastenmeier); (iii) Patent Law Amendments

legislative history for major extensions of Section 271(f).[25] Closer review shows the absence of such support, and instead strongly suggests that Congress did not intend the Federal Circuit's recent expansions of the scope of Section 271(f).[26] At bottom, four relevant points emerge from the

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of 1984, S. REP. NO. 98-663 (1984); and (iv) the statement by President Reagan on the signing of the bill into law, 20 WEEKLY COMP. PRES. DOC. 1818-19 (Nov. 9, 1984).

25. *See, e.g.*, Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005). See *infra* note 42 and accompanying text for a further discussion of this case.

26. The portions of the legislative history referring to what became Section 271(f) state, with no further elaboration or explanation, the following (all emphasis added by the author for later reference):

> (i) Section 271(f) "will prevent copiers from avoiding U.S. patents by supplying components of a patented product in this country so that the assembly of the components may be completed abroad. This proposal responds to the United States Supreme Court decision in Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972), concerning the need for a legislative solution to close a loophole in patent law." Section-by-Section Analysis, *supra* note 24, 1984 U.S.C.C.A.N. at 5828. This Analysis is repeated with the remarks of Representative Kastenmeier dated October 1, 1984. *See supra* note 24. A subsequent portion of the Section-by-Section Analysis emphasized the concerns of Congress to stimulate U.S. innovation via revisions to the patent laws, but this remark was also made in connection with unrelated provisions in the same bill: "During the past three Congresses, much has been heard about the need to improve American creativity. The fostering of technological change and the stimulation of innovation have become our goals." *Id.* at 5837.
>
> (ii) Clause "1" of Section 271(f) corresponds to the provisions in Section 271(b) on "active inducement" of infringement, and the "components" for purposes of that clause can be "staple articles or commodities of commerce" suitable for substantial non-infringing use. Clause "2," on the other hand, corresponds to the provisions in Section 271(c) on "contributory infringement," and the components referred to there must not be "staple article[s] or commodit[ies] of commerce suitable for substantial non-infringing use[s]." Section-by-Section Analysis, *supra* note 24, 1984 U.S.C.C.A.N. at 5828, repeated in S. REP. NO. 98-663 (1984), *supra* note 24.
>
> (iii) Section 271(f) is intended to "declare it to be patent infringement to supply components of an invention patented in the U.S. for final assembly abroad if the purpose of the shipment abroad is to circumvent a U.S. patent. . . . This provision is a response to the Supreme Court's 1972 *Deepsouth* decision, which interpreted the patent law not to make it infringement where the final assembly and sale are abroad. . . . The bill simply amends the patent law so that when components are supplied for assembly abroad to circumvent a patent, the situation will be treated the same as when the invention is 'made' or 'sold' in the U.S." S. REP. NO. 98-663 (1984), *supra* note 24.
>
> (iv) "The bill is needed to help maintain a climate in the U.S. conducive to invention, innovation, and investment. Permitting the subterfuge which is allowed under

legislative history: (i) the prominence of the *Deepsouth* fact pattern in Congressional thinking; (ii) concerns about foreign competition, without identification of any meaningful link between the new statutory provisions and any effect on foreign competition; (iii) use of broad language in some parts of Section 271(f), which allows application of the provision to a broad range of U.S. exports not involving the narrow *Deepsouth* fact pattern; and (iv) Congress' apparent expectation that other vague but important terms in the statute would be read and applied narrowly. These points deserve further explanation.

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the *Deepsouth* interpretation of the patent law weakens confidence in patents among businesses and investors." *Id*. at 3.

(v) The ability of the U.S. "to foster innovation is a central element of our national security, for without technological and scientific developments, we could not maintain our current standard of living or hope for the diminution of unemployment caused by foreign competition." 130 Cong. Rec. H10522-34 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier), *supra* note 24.

(vi) One main aim of the proposed bill was to "to avoid encouraging manufacturing outside the United States." Section-by-Section Analysis, *supra* note 24, 1984 U.S.C.C.A.N. at 5827. This goal was attributed to a section of the bill that contained both the proposed amendments to the process patent infringement provisions (which were dropped from the bill before its enactment but were later enacted in slightly revised form in separate legislation and are now codified as Section 271(g)) and the proposed new Section 271(f). While this goal was certainly widely shared, it may have been thought of more in connection with the process patent amendments than in relation to Section 271(f).

(vii) Section 271(f) and the other measures enacted with it "address specific, narrow concern[s] in the patent law. However, without enactment of these housekeeping-oriented measures, the patent system would not be responsive to the challenges of a changing world and the public would not benefit from the release of creative genius." 130 Cong. Rec. H10522-34 (daily ed. Oct. 1, 1984) (statement of Rep. Kastenmeier), *supra* note 24.

(viii) Only "a minimal amount of controversy" was expressed about the provisions contained in the legislation, and essentially all of that concerned provisions other than those relating to Section 271(f). *Id*.; 130 CONG. REC. H12231-32 (daily ed. Oct. 11, 1984) (statement of Rep. Kastenmeier), *supra* note 24.

(ix) The new Section 271(f) "closes a loophole in existing law which permit[s] copiers to export jobs and avoid liability by arranging for final assembly of patented machines to occur offshore. . . ." Statement by President Reagan on the signing of the bill into law, *supra* note 24; *see also* 20 WEEKLY COMP. PRES. DOC. 1818-19 (Nov. 9, 1984).

First, the recorded statements and debate referred to the *Deepsouth* case with great prominence. The whole of Section 271(f) was identified as a "response" to that case and the "loophole" it illustrated. None of the statements mentions any other case, fact pattern, or problem to be addressed.[27]

Second, the only concrete objectives identified for Section 271(f) were: (i) to promote confidence in U.S. patents and thereby foster U.S. innovation and reduce U.S. unemployment caused by foreign competition and (ii) to "avoid encouraging manufacturing outside the United States."[28] There was no explanation of how Section 271(f) would reduce foreign competition or discourage manufacturing outside the United States. The legislative history also contains no mention of three main realities of international patent protection: (i) that any benefits the new provision might provide were already provided by U.S. law *if* the U.S. patent claimed any of the components sent abroad—as opposed to just the full combination assembled abroad; (ii) that a method of obtaining patent protection in foreign markets had long been well recognized, namely for the inventor to apply for patents in the respective foreign countries; and (iii) that the alternative approach implemented in Section 271(f) imposes restrictions on U.S. producers that do not apply to producers located anywhere else in the world. It seems likely that Congress' failure to consider these points reflected the extreme but deceptively simple fact pattern of *Deepsouth*.[29]

Third, despite following the *Deepsouth* facts in most respects, Section 271(f) deliberately extends well beyond those facts in one respect, thereby vastly expanding its reach. As noted above, the U.S. producer in *Deepsouth* supplied 100% of the parts of the patented de-veining machines for assembly abroad, as well as instructions for the essentially trivial final assembly process. The wording of Section 271(f), however, sets an entirely different threshold for infringement under that Section—ranging down to a single unpatented component in many cases.[30] This vastly low-

27. *See, e.g.*, *supra* note 26, at (i).

28. The related objectives of preventing "circumvention" and "avoid[ance]" of U.S. patents and closing the *Deepsouth* "loophole" were supportive of the main goals of creating greater respect for U.S. patents and greater incentives for innovation and, thereby, increasing manufacturing and employment in the U.S. rather than abroad. See *supra* note 26 at (iv) and (v), regarding objective (i) of § 271(f), and *supra* note 26 at (vi), regarding objective (ii) of § 271(f).

29. The unusual facts of *Deepsouth* apparently captured the thinking of those involved in the legislative process. Those facts gave no suggestion of any possible complications and were so extreme as to divert thinking from any other aspects of the subject being addressed.

30. *See supra* note 23 and accompanying text.

ered threshold converted a potentially narrow provision applicable only to the extreme circumstances of *Deepsouth* into a far broader provision applicable to a much wider range of exports.

Fourth, contrary to statements in some recent opinions discussed below, the legislative history suggests *narrow* readings of the key undefined terms in Section 271(f). These interpretive questions can affect the scope of that provision in significant respects. For example, Section 271(f) contains no clear, express requirement that the U.S. produced component(s) or the resulting foreign combination be tangible in order for the section to apply. The statute also uses the broad term "patented invention" in referring to the foreign combination. Thus, subject to the meaning of "components" and to some separate logical difficulties,[31] the provision could be read as extending not just to patents for physical products—as in *Deepsouth*—but also: (1) to patents claiming method (process) inventions and/or (2) to other cases where the U.S.-supplied "component," the foreign-assembled combination, or both, are intangible. A number of statements in the legislative history, however, indicate Congressional and Presidential assumptions that both the components and the foreign-produced combination would be tangible.[32] This reading would exclude all method patents and some other inventions and components from the reach of Section 271(f).

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31. See *infra* notes 49-55, regarding logical difficulties in applying Section 271(f)'s requirements to method (process) claims.

32. Examples of this assumption include: (i) the repeated use of the terms "component" and "assemble"—terms that usually connote physical objects physically attached to other physical objects—and the similar implications in the phrase "complete the assembly of [the] components abroad"; (ii) the references to "components" as "articles or commodities of commerce," the use of the term "patented machine" to describe the resulting combination made abroad, and the use of the term "manufacturing" as the activity Congress intended to retain within the U.S. (*see supra* note 26, at (ii), (ix), concerning the terms "article or commodity of commerce" and "patented machine"; *supra* note 26, at (vi), regarding use of the term "manufacturing"); (iii) the repeated references to the fact pattern of *Deepsouth*—since *Deepsouth* involved only physical components assembled abroad into a mechanical combination invention—together with the absence of any references to any other fact pattern; and (iv) the difficulty of conceptualizing how steps, acts, or other intangibles can be supplied from the U.S. and combined abroad with other "components." *See generally supra* note 26; *infra* notes 37, 51-55, 67 and accompanying text.

III. APPLICATION OF SECTION 271(F)—UNCERTAINTIES, JUDICIAL DECISIONS, AND THEIR EFFECTS

Lacking definitions of its key terms but reflecting the stark *Deepsouth* fact pattern, Section 271(f) presented substantial scope-related uncertainties: how far outside the context of machine patents and tangible, mechanical components should the new provision apply? For a decade after its enactment, U.S. patent holders seldom invoked Section 271(f), and its uncertainties remained largely dormant. A few decisions then recognized significant limitations on its reach, particularly as to method (process) patents.

Recently, however, the courts have cast aside nearly all limitations, with the exception of one that actually *increased* the perverse incentives that provision creates. Accordingly, under current case law, Section 271(f) provides for aggressively extraterritorial application of the U.S. patent laws against U.S. producers. Moreover, it does so broadly and without any distinctions like those applied in connection with less aggressive extensions of U.S. patents to off-shore equipment or activities.[33] The following summary of the extensions of Section 271(f) reveals their importance and illuminates the current operation and effects of that provision.

A. Applicability to Chemical Combinations

Deepsouth involved a machine patent that claimed a combination of mechanical parts. Consistent with this context, the word "components" usually refers to mechanical or electrical parts of a larger physical structure. Accordingly, courts might have deemed Section 271(f) inapplicable to patents for chemical combinations. U.S. defendants accused of infringing such patents by supplying particular unpatented ingredients for inclusion in foreign-made mixtures argued that "components," as used in the

33. *See supra* note 11. Its defenders have characterized Section 271(f) as not technically extraterritorial in its application because it penalizes actions taken in the U.S.—namely producing non-patented components in the U.S. and making them available for combination with other components abroad—regardless of whether the combination abroad actually takes place. While technically true, this misses the point: Congress intended Section 271(f) to limit competition in foreign markets, and Section 271(f) benefits its intended beneficiaries (i.e., holders of certain U.S. patents) only to the extent that it does so. Moreover, damages awarded under that provision are generally based on the actual combinations and sales made abroad, and that provision is superfluous to the extent that the combinations are returned to the U.S. because other provisions of the patent laws make such importation an infringing act regardless of Section 271(f). Further, while only U.S. production can lead to violations of Section 271(f), this is clearly not a virtue, but a shortcoming, of the provision that runs directly counter to the arguments made in favor of its enactment. *See supra* text accompanying note 28.

statute, did not reach chemical ingredients. District court decisions in 1988 and 1999 rejected this defense, finding no limitation of Section 271(f) to "machine" patents and holding that chemical ingredients are "components" of a resulting patented mixture.[34] A recent Federal Circuit decision involving chemical catalysts raised additional issues but lends support to this result.[35]

B. Applicability to Patented Methods/Processes

A second extension of Section 271(f)—and one of considerable importance—concerns method (process) patents. The wording and legislative history of Section 271(f) discourage its application to method claims because the words "components" and "assemble" are not normally understood as referring to *steps* or *acts*, which are the elements of a method (process) claim. As set out above, the legislative history of Section 271(f) refers to the creation of infringing combinations under that section as "manufacturing" or "assembly" of components, suggesting tangible objects and a physical combination invention. At a few points, it also refers to the resulting combinations as "products" or as "machines."[36] In contrast, neither the statutory wording nor the legislative history contains any of the terminology associated with method inventions or method claims, namely "processes," "method," "step," or "act." This omission of all terminology relating to method patents seems more significant than it might otherwise be because patented processes were the focus of the immediately preceding segment of the bills that became the Patent Act Amendments of 1984, namely the segment that would have enacted a precursor of the Process Patent Act, now codified as Section 271(g). Even if steps or acts could qualify as "components," neither *Deepsouth* nor anything else in the legislative history suggested how steps or acts could be "supplied from" the U.S. in "uncombined" form and then combined with other steps or acts abroad. The legislative history does not discuss anything along

34. Lubrizol Corp. v. Exxon Corp., 696 F. Supp. 302, 323-25 (N.D. Ohio 1988) (enjoining, without discussion, shipments of the key chemical ingredient abroad for use in the subject chemical combinations); W.R. Grace & Co. v. Intercat, Inc., 60 F. Supp. 2d 316, 320-21 (D. Del. 1999) (recognizing that the case law held Section 271(f) inapplicable to process/method patents but distinguishing it as not addressing chemical compositions; emphasizing the absence from the statutory wording of any exclusion of chemical compositions from the statute's coverage).

35. *See* Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co., 434 F.3d 1357, 1358 (Fed. Cir. 2006). There, a Federal Circuit panel held that the shipment of a U.S.-made chemical catalyst abroad for use there in a process claimed in U.S. patent constitutes infringement under Section 271(f). See the discussion in the immediately following Section regarding the logical difficulties associated with this conclusion.

36. *See supra* note 32 and accompanying text.

these lines. Rather, the legislative deliberations had an entirely different focus and apparent intent[37]

Accordingly, courts and commentators thought that Section 271(f) simply did not apply to such claims. A 1991 Federal Circuit decision so concluded in a brief and largely unexplained holding.[38] Three reported district court decisions concurred with and applied this rule, each with at least some discussion of the point.[39] A leading authority on patent law affirmed the inapplicability of Section 271(f) to method claims based on its use of the word "components" and without seeming to think additional authority was needed to support that conclusion.[40] Finally, the Federal Circuit's lan-

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37. *See also Union Carbide*, 434 F.3d at 1358 (Lourie, J., dissenting). Judge Lourie stated:

> The statute [Section 271(f)] itself speaks of supplying "components of a patented invention, where such components are uncombined . . . in such manner as to actively induce the combination of such components outside of the United States," . . . *the whole tenor of that provision relates to physical inventions, i.e., apparatus or compositions, not methods*.

Id. (emphasis added).

38. *See* Standard Havens Prods. v. Gencor Indus., 953 F.2d 1360, 1374 (Fed. Cir. 1992) (recounting various theories under which actionable infringement (or inducement of infringement or contributory infringement) of a *process* patent might be found where the defendant supplied a product for use abroad in the patented process and, after rejecting all other possible theories, stating that, likewise, it "do[es] not find the provisions of Section 271(f) implicated" in that context).

39. *See* Imagexpo, L.L.C. v. Microsoft Corp., 299 F. Supp. 2d 550 (E.D. Va. 2003) (denying Microsoft's motion in limine to preclude introduction of evidence of its foreign sales of software for calculation of damages under Section 271(f) because, although that provision does not apply in connection with method patents, the patent in question was not for a method but for a computer apparatus programmed with software like that provided by Microsoft); W.R. Grace & Co. v. Intercat, Inc., 60 F. Supp. 2d at 320-21, discussed *supra* note 34 and the accompanying text; Enpat, Inc. v. Microsoft Corp., 6 F. Supp. 2d 537 (E.D. Va. 1998) (granting defendant Microsoft's motion for partial summary judgment on Section 271(f) liability to preclude damages based on foreign use of software supplied from U.S. and allegedly performed patented process because, based on its legislative history, Section 271(f) applies only to the assembly of components into patented products abroad and does not apply to method or process patents).

40. *See* Donald F. Chisum, *Extraterritorial Application of U.S. Intellectual Property Law: Comment: Normative and Empirical Territoriality in Intellectual Property: Lessons from Patent Law*, 37 VA. J. INT'L L. 603, 607 (1997).

> Assessed in terms of economic policy, section 271(f) is ill-conceived. It was presumably an attempt to close a loophole created by *Deepsouth*, but its most immediate effect is to create one more incentive for U.S. companies [that] compete in foreign markets to move their manufacturing facilities abroad. Furthermore, the statute is incomplete. It covers the manufacture and export of unpatented components of patented ma-

guage and analysis in a recent decision addressing a separate question under Section 271(f) seemed to support this negative conclusion.[41]

Surprisingly, in this context, the recent Federal Circuit decision in *Eolas Technologies, Inc. v. Microsoft Corp.*,[42] discussed more fully in the following Section, adopted the opposite position without qualification and without mentioning any of these contrary considerations or authorities. Writing for the panel in *Eolas*, Judge Rader stated that Section 271(f) applied to the method claim as well as the product claim asserted there. His reasoning relied mainly on the use, in both clauses "1" and "2" of Section 271(f), of the broad term "patented invention" instead of narrower language that could have clearly excluded method claims from the scope of that provision.[43] Ignoring any possible limitations inherent in the words "components" and "assemble," he reasoned that nothing in Section 271(f) expressly limits its application to physical structures or precludes its application to method claims or to the "step" or "act" elements of which methods consist.[44] Further, he said, excluding method claims from the reach of Section 271(f) would amount to distinguishing among types of inventions without any principled basis. This, he argued, would contravene the policy of non-discrimination among types of inventions, as he read it in the 1994 TRIPS Agreement.[45]

> chines and other structural combinations. It does not cover manufacture and export of a component for use in a patented process—even though many valuable inventions take the form of new processes for using materials or components.

Id.

41. Pellegrini v. Analog Devices, Inc., 375 F.3d 1113 (Fed. Cir. 2004); *see infra* note 88.

42. Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005), *cert. denied*, 126 S. Ct. 568 (2005).

43. *Id.* at 1338. Such narrower language would presumably have been "patented machine" or, possibly, "patented machine, manufacture, or composition of matter." *See* 35 U.S.C. §101.

44. *Eolas*, 399 F.3d. at 1339.

45. *Id.* at 1339. The TRIPS agreement of the 1994 Uruguay Round GATT trade agreements states that patents "shall be available and patent rights enjoyable without discrimination as to the place of invention . . . [or] field of technology." World Trade Organization, A Summary of the Final Act of the Uruguay Round, http://www.wto.org/english/docs_e/legal_e/ursum_e.htm#nAgreement (last visited Nov. 7, 2006). Persons opposing software patents have pointed out the ambiguity of this provision and the provisions in the TRIPS Agreement and the WIPO Copyright Treaty that computer software is to be protected as literary works, i.e., by copyright laws. *See, e.g.*, Justin Mason: Happy Software Prole, TRIPS, WIPO, and the WTO Doing the Right Thing on Software Patents?, http://taint.org/2004/04/24/053238a.html (last visited Nov. 7, 2006).

On little more than this,[46] Judge Rader broadly asserted that "steps" and "acts" are the "components" of method/process inventions and that Section 271(f) is fully applicable to method claims.[47] Subsequently, in *Union Carbide Corp. v. Shell Oil Co.*,[48] another opinion by Judge Rader, an overlapping panel of the Federal Circuit, followed *Eolas* and applied Section 271(f) to method claims. As detailed below, however, other Federal Circuit judges have recently criticized the *Eolas* and *Union Carbide* results. This criticism and the other considerations discussed below undermine the *Eolas* and *Union Carbide* conclusions, particularly vis-à-vis potential future review of the question by the Federal Circuit en banc or by the Supreme Court.

The *Eolas* reasoning has an appealing surface simplicity, but it lacks any supporting authority and seems shallow compared to the contrary implications in the statutory wording and legislative history. Moreover, its result leads to two logical problems which several Federal Circuit judges have identified in two recent opinions criticizing *Eolas*.

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46. Without indicating its relevance, Judge Rader also noted that software code alone qualifies as a patentable process and that it can also be patented in conjunction with physical structure—citing cases decided, respectively, 10 and 15 years after the enactment of Section 271(f). *Eolas*, 399 F.3d at 1339-40. Congress probably would not have shared this view when it enacted Section 271(f) because software was not generally deemed patentable at the time. Furthermore, the independent patentability of an element or "component" of a claim is generally not relevant to the validity or infringement of that claim. It is unclear why such independent patentability would be relevant to whether something could be deemed a "component" for purposes of Section 271(f). After all, none of the separate components of the patent at issue in *Deepsouth* was independently patentable.

47. Judge Rader stated, for the court:

> [The] statutory [wording does] not limit Section 271(f) to patented "machines" or patented "physical structures." Rather every form of invention eligible for patenting falls within the protection of Section 271(f). By the same token, the statute did not limit Section 271(f) to "machine" components or "structural or physical" components. Rather every component of every form of invention deserves the protection of Section 271(f). . . . A "component" of a process invention would encompass method steps or acts. *See, e.g.*, 35 U.S.C. § 112, ¶ 6. A "component" of an article of manufacture invention would encompass a part of that construct.

Id. at 1339 (emphasis added). Section 112, ¶ 6, cited here by Judge Rader, has nothing to do with the scope or interpretation of "components" or Section 271(f). It merely indicates that "steps" or "acts" are the elements of method (process) claims.

48. 425 F.3d 1366 (Fed. Cir. 2005), *reh'g & reh'g en banc denied*, 434 F.3d 1357 (Fed. Cir. 2006).

First, for Section 271(f) to apply to method claims, it is also necessary: (i) that the key "component(s)"—i.e., one or more of the claimed "steps" or "acts" that make up the method—be "supplied in or from the United States" in "uncombined" form; and (ii) that this be done for the purpose of "combining" them, abroad, with the other claimed steps or acts to satisfy all the elements of the relevant method claim(s). These statutory requirements are easy to understand and apply with respect to physical components—tangible objects are routinely produced in one place, shipped to another, and combined with other physical objects there. They are essentially incomprehensible, however, as to steps or acts.[49] The facts in *Eolas* tended to obscure this problem but did not solve it.[50] Because of this conceptual problem, dicta in an August 2005 Federal Circuit panel decision expressed disagreement with this *Eolas* holding.[51] Similarly, at least three of the Federal Circuit judges who dissented from the 2006 denial of rehearing en banc in the *Union Carbide* case noted above did so in part be-

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49. According to Judge Rader's analysis set forth *supra* note 47, the "components" of a patented method are the steps or acts that comprise that method. It would seem, therefore, that those steps or acts would have to be supplied from the U.S. in uncombined form to a foreign location for combination there. See the italicized portion of the quotation from the Federal Circuit's recent decision in the highly publicized BlackBerry case set forth *infra* note 51, pointing out the incongruity of the Section 271(f) language as to method/process claims.

50. It was difficult to perceive this problem on the *Eolas* facts because the U.S.-supplied "component" there was computer code, i.e., instructions for computer-accomplished steps or acts that were among the claim elements of the patent. Coded instructions for steps or acts, however, are not the same as the steps or acts themselves, which Judge Rader's *Eolas* reasoning seemed to require be supplied from the U.S. *See supra* note 47.

51. NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282, 1322 (Fed. Cir. 2005), *reh'g and reh'g en banc denied*, 2005 U.S. App. LEXIS 23112 (Fed. Cir. Oct. 7, 2005), c*ert. denied*, 126 S. Ct. 1174 (Jan. 23, 2006). The NTP panel refused to apply Section 271(f) to the furnishing of BlackBerry handheld devices to U.S. customers in connection with an international system for wireless e-mail communications that the court found to infringe NTP's U.S. patent. The NTP panel's revised decision pointed out the difficulties in applying Section 271(f) to method patents:

> Although [the] *Eolas* [decision] was correct to observe that Congress did not expressly limit [S]ection 271(f) to a specific type of invention, we have held that the very nature of the invention may compel a difference . . . . A method, by its very nature, is nothing more than the steps of which it is comprised. . . . *[I]t is difficult to conceive of how one might supply or cause to be supplied all or a substantial portion of the steps of a patented method in the sense contemplated by the phrase "components of a patented invention" in Section 271(f).* . . .

Id. (emphasis added). The panel went on to cite *Standard Havens*, a Federal Circuit decision widely interpreted as holding Section 271(f) inapplicable to method claims. *Id.*

cause of the incongruity of the wording of Section 271(f) in the context of method claims.[52]

Second, the *Eolas* equation of Section 271(f) "components" with "steps" or "acts" in order to apply that provision to method claims should logically preclude many, if not most, potential applications of Section 271(f) to method claims, but Judge Rader and the remainder of the *Union Carbide* panel refused to recognize that logical result. To be specific, perhaps the most common fact pattern where the holder of a U.S. method patent may allege infringement under Section 271(f) is U.S. production of a physical object or substance that is then shipped abroad for use in the claimed processes. The recent *Union Carbide* case provides a good example.[53] In such cases, however, the U.S.-supplied "component" is not a "step" or "act," as the *Eolas* reasoning would require. Nevertheless, the *Union Carbide* panel reversed the district court's holding that Section 271(f) could not apply in this context and remanded the case for determination of additional damages under the U.S. patent from use of the process abroad. While Judge Rader spent several paragraphs arguing that Section 271(f) could apply in this context, he never dealt directly with the logical inconsistency between his *Eolas* reasoning and his result in this case.[54] The three-judge dissent from the denial of rehearing en banc in that case forcefully criticized this logical lapse.[55]

Eolas survived a petition for rehearing and rehearing en banc in the Federal Circuit and a petition for a writ of certiorari in the Supreme

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52. Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co., 425 F.3d 1366 (Fed. Cir. 2005), *reh'g and reh'g en banc denied*, 434 F.3d 1357, 1358-59 (Fed. Cir. 2006) (Lourie, J., dissenting).

53. In *Union Carbide*, Shell supplied a tangible, unpatented catalyst from the U.S. and was charged with infringement under Section 271(f) because that catalyst was used abroad in a process claimed in Union Carbide's U.S. patent. *See* 425 F.3d at 1379-80.

54. *Id.*

55. 434 F.3d at 1358-59. The dissenters stated, in part:

> [Section 271(f)] speaks of supplying "components of a patented invention . . . ." The whole tenor of that provision relates to physical inventions, i.e., apparatus or compositions, not methods. . . . A component of a process is a step in the process; it is not the physical material to be used in the process. What the panel opinion here holds is that supplying a component to be used in one of the process steps can create infringement. That is, in my view, an incorrect extension of the statutory language. . . . A material for use in practicing a process is not a component of that process.

Id. (Lourie, J., dissenting).

Court.[56] Subsequently, the *Union Carbide* parties settled their dispute after the Federal Circuit denied rehearing in that case and before Shell filed its widely expected petition for Supreme Court review. These events, however, did little to solidify *Eolas* and *Union Carbide* as reliable precedent, and several considerations call into question their long-term viability. These include the earlier case law holding Section 271(f) inapplicable to method claims, the recent criticism of the *Eolas* and *Union Carbide* decisions, the logical difficulties those decisions create, and the wording and legislative history of Section 271(f). Indeed, as noted below, the Supreme Court could effectively overrule *Eolas* and *Union Carbide* by its ruling in the now-pending *Microsoft Corp. v. AT&T Corp.* case .[57]

Note, however, that overruling these two decisions and holding Section 271(f) inapplicable to method claims could reduce, but would come nowhere near eliminating, the perverse incentives Section 271(f) creates for companies that produce, or consider producing, technologically advanced components in the United States for international markets. That is because, under modern patenting practices, most inventions that can be claimed as processes can be, and usually are, also claimed as "products" or "systems," which the patent laws treat as "machines" or "manufactures." Accordingly, even if Section 271(f) did not apply to method claims, the risks of Section 271(f) would largely persist for U.S. producers. Thus, corporate managers would still have to take that provision into account when deciding whether to direct capital investments, employee training, and technology-based manufacturing activities to U.S. locations or to foreign locales. To a large extent, its perverse incentives would remain.

C. Computer Software—Intangibles as "Components" and "Copies" Made Abroad as "Supplied" from the U.S.

Another recent extension of Section 271(f) concerns computer software and, apparently, other intangible but potentially functional types of information.[58] This field is economically and technologically important in its own right. It also illustrates a common pattern of geographically differentiated production that is important to any assessment of Section 271(f).

In contrast with the many types of computer hardware, software is a field where U.S. producers retain strong or dominant international posi-

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56. Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005), *cert. denied*, 126 S. Ct. 568 (2005).

57. See *infra* note 86 and accompanying text, regarding the possibility that the Supreme Court's decision in the pending *Microsoft Corp. v. AT&T Corp.* case might affect the applicability of Section 271(f) to method claims.

58. See *infra* text accompanying note 168 for some possible examples.

tions. In this and some other technological arenas, U.S. producers are competing successfully in certain advanced, high-value products even though they have been displaced by lower-cost foreign producers as to many companion components. This pattern of production promotes offshore assembly of combinations involving one or a few U.S.-produced high-value items with other components produced abroad. This, in turn, increases the likelihood that Section 271(f) will play a prominent role in any dispute involving a U.S. patent covering the overall product, system, or method, whether the patent is held by a U.S. or a foreign entity.

Several complex issues confront the application of Section 271(f) to software supplied from the United States. Two recent Federal Circuit decisions, both against Microsoft Corporation and both involving the same fact pattern, frame these issues: the March 2005 *Eolas* decision, discussed above, and the July 2005 decision in *AT&T Corp v. Microsoft Corp*.[59]

In each of these decisions, the Federal Circuit applied Section 271(f) broadly, holding it applicable where the U.S.-supplied "component" was intangible computer code that was sent abroad, slightly revised at the foreign location, and copied there onto foreign-made data storage devices for inclusion in foreign-made computer systems that would be sold and used only in foreign countries. Accordingly, while the Supreme Court recently granted review in the *AT&T* case,[60] Section 271(f) now seems fully applicable to all kinds of computer software. Moreover, it is unclear what, other than possible restrictions the Supreme Court may add, will limit its reach as to any other types of intangible information, data, patterns, or other possible U.S.-supplied items of value that play any role in foreign-made combinations—including instructions, data, or materials that facilitate foreign steps in methods patented in the United States.

As discussed below, the resulting risks and burdens on U.S. producers can be very large.[61] The district court judge in one of these recent decisions observed that "[the] novel issue[s] regarding the application of Section 271(f) presented [in these cases have] profound ramifications for Microsoft and other U.S. software manufacturers."[62]

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59. 414 F.3d 1366 (Fed. Cir. 2005), *reh'g and reh'g en banc denied*, No. 04-1285, 2005 U.S. App. LEXIS 24112 (Fed. Cir. Oct. 20, 2005); *cert. granted*, 127 S. Ct. 467 (2006).

60. Microsoft Corp. v. AT&T Corp., 127 S. Ct. 467 (2006).

61. *See infra* text accompanying note 122.

62. AT&T Corp. v. Microsoft Corp., 71 U.S.P.Q. 2d (BNA) 1118-19, 2004 U.S. Dist. LEXIS 3340, *2 (S.D.N.Y. 2004).

1. Typical Software Fact Pattern

The plaintiffs in the recent software cases[63] held U.S. patents claiming apparatus or methods that required software in combination with hardware or other items. Each of the plaintiffs sued Microsoft in U.S. courts alleging purely domestic infringement in the loading of certain Microsoft software products onto computer systems in the United States.[64] In the same lawsuits, they also sought additional damages under their U.S. patents and Section 271(f) based on Microsoft's transmission of its U.S.-produced software to foreign Microsoft licensees. The licensees would adjust the software for the particular installations and copy the result onto foreign-made hardware in those foreign countries. The plaintiffs did not assert that any of the resulting off-shore combinations were sent back into the United States. The foreign sales typically accounted for approximately 2/3 of the total damages sought from Microsoft in these cases.

In these cases, Microsoft's U.S.-developed software found its way into the foreign-made combinations through two alternative routes. In the first route, the software, in not-quite usable (i.e., not quite "executable") form, was recorded in the United States onto a few "golden master" disks—like CDs or DVDs. Those disks were shipped to foreign entities having license agreements with Microsoft. At the foreign locations, the licensees read the software off of the "golden masters." They then slightly re-arranged the code to make it directly executable, saved it, "replicated" it onto large numbers of storage devices—generally hard-disk drives—and included it inside the foreign-made computer systems. The resulting foreign-assembled combinations contained no tangible item supplied from the United States—such as the "golden masters" themselves.

The second alternative utilized electronic transmission, rather than physical transport of CD-like disks, to take the software abroad. In this method, the U.S.-developed code was encrypted here and then electronically transmitted, such as via the internet, from the United States to the

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63. See *supra* note 39, regarding two software cases in the district courts besides *Eolas* and *AT&T v. Microsoft*, which are the focus here.

64. Technically, most of the alleged domestic violations were "contributory infringement" or "active inducement" of infringement under 35 U.S.C. § 271(c) or (b), respectively. The AT&T patent covered technology for compressing and de-compressing coded speech signals, and the accused Microsoft product was its Windows operating system, which apparently includes such technology. The *Eolas* patent was directed at software allowing the opening of, and interaction with, separate applications through a web browser, and Microsoft's Internet Explorer was the accused product. *See also* Imagexpo, L.L.C. v. Microsoft Corp., 299 F. Supp. 2d 550 (E.D. Va. 2003) (involving Microsoft's NetMeeting software as the accused product).

foreign parties under license with Microsoft. There it was downloaded, decoded, decrypted, slightly re-arranged into executable code, saved, and then "replicated" (copied) onto the large numbers of foreign made storage devices in foreign made computer hardware as described above. In this alternative, no tangible or material item was supplied from the United States at all, let alone included in the accused combinations.

These facts raised two main, but overlapping, issues under Section 271(f): (i) did the software qualify as a "component" for purposes of that provision; and, if so, (ii) was the relevant "component" "supplied . . . from the U.S." where the licensees included only the foreign-made representations of the information (i.e., the copies made and recorded abroad onto the foreign-sourced data storage devices) in the foreign-assembled combinations? These questions are related to the applicability of Section 271(f) to method claims, discussed above; and the Federal Circuit has taken essentially the same approach here as it did there. Specifically, it has answered each of these questions in the affirmative, but it did so with differing amounts of attention and understanding. While the Federal Circuit judges initially overlooked some of the complexities in this area, they now recognize those complexities and disagree forcefully on at least two key points.

2. Did the Software Qualify as a Section 271(f) "Component"?

Microsoft advanced several arguments and analogies, and some arguably relevant case law, to show that its U.S.-supplied software did not qualify as a "component" under Section 271(f). Most fundamentally, it argued, the software was merely intangible information and instructions, which were not what Congress understood as "components" when it enacted Section 271(f).

Despite these arguments, the Federal Circuit's *Eolas* ruling, like the district court decisions in that case and two others,[65] held that computer code, whether supplied on a "golden master" or transmitted electronically, qualifies as a Section 271(f) "component."[66] Each such ruling relied mainly on the absence of statutory language expressly excluding intangibles from "component" status under that provision.

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65. Eolas Techs., Inc. v. Microsoft Corp., 2004 U.S. Dist. LEXIS 534, 70 U.S.P.Q. 2d (BNA) 1939 (N.D. Ill. Jan. 14, 2004); *AT&T Corp.*, 2004 U.S. Dist. LEXIS 3340; *Imagexpo*, 299 F. Supp. 2d 550.

66. Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005). In its *AT&T* ruling, the Federal Circuit said *Eolas* determined this issue and declined to revisit it. 414 F.3d 1366, 1369 (Fed. Cir. 2005).

Strictly as a matter of analysis and statutory interpretation, this reasoning was weak and the result is highly questionable. None of the cases discussed the Congressional enactment of Section 271(f) or its legislative history in any substantial and meaningful way; none of them recognized the implications of the terms used in the legislative history or the possibility of a narrower meaning in the word "component" itself; none of them acknowledged that software inventions were generally deemed unpatentable when Congress enacted Section 271(f) and that Congress never considered software, information, and other intangibles as possible "components" for purposes of Section 271(f).[67] Indeed, given the 1984 Congressional context and the heavy influence of the *Deepsouth* fact pattern, the absence of language expressly excluding disembodied software or other intangibles such as information or instructions from "component" status cannot be understood as suggesting that they should be included. Rather, it almost surely reflects how very far the possibility of such inclusion was from Congressional thinking at the time.

We should recognize that software can have "component-like" attributes from the standpoints of functionality, structural integration with hardware, and the manner in which consumers sometimes obtain and handle it.[68] Further, while the existing case law and legislative history sug-

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67. Further, as discussed above, the origins and background of that provision involved strictly physical objects as "components," and the legislative history referred to "products," "manufacturing," "machines," and "assembly" but never to "intangibles," "information," "instructions," "steps," "acts," etc. *See supra* notes 26, 32, 37. Moreover, the background of the 1984 Patent Law Amendments suggests that intangibles, at least those like process steps, would have been mentioned if their possible "component" status under Section 271(f) was within Congressional contemplation. See *supra* note 26, at (iii), regarding the companion provision in the same bill as enacted Section 271(f), which was the precursor of the Process Patents Amendments Act, now codified as Section 271(g).

With further regard to the wording of Section 271(f), none of the decisions recognized the view, expressed less than a year later by three other Federal Circuit judges, that "the whole tenor of [Section 271(f)] relates to physical inventions, i.e., to apparatus or compositions [of matter]…." *See supra* notes 37, 55. In addition, when Congress enacted Section 271(f), software was not generally deemed patentable. Parker v. Flook, 437 U.S. 584 (1978); Gottschalk v. Benson, 409 U.S. 63 (1972); *cf.* Diamond v. Diehr, 450 U.S. 175 (1981); Diamond v. Chakrabarty, 447 U.S. 303 (1980); *but see* AT&T Corp. v. Excel Commc'ns, Inc., 172 F.3d 1352 (Fed. Cir. 1999); State Street Bank & Trust Co. v. Signature Fin. Group, 149 F.3d 1369 (Fed. Cir. 1998). This makes it even less likely that anyone involved in the drafting, debate, or voting on the legislation contemplated information, software, or other intangibles as potential "components" for purposes of Section 271(f).

68. The following attributes make many types of software resemble "components," as that term is used in everyday speech: (a) software is created for the purpose of being combined with computer hardware to achieve an operable physical system; (b) it is some-

gested information or other intangibles supplied from the U.S. would not qualify as "components" for purposes of Section 271(f), none of the reported cases was exactly on point. In particular, none of them addressed the provision from the U.S. of directly functional information, like computer code, where that information itself was subsequently incorporated as an operating part of a patented combination. Thus, considering only the statutory language and giving each of the words a generous reading, an affirmative answer to the "component" question could not be ruled out.

At bottom, two things seem to have influenced the courts—particularly the Federal Circuit in *Eolas* and *AT&T*—away from a more careful and technical effort at statutory interpretation: (i) the courts' favorable regard for Section 271(f) and its presumed benefits and their resulting desire to apply it liberally; and (ii) the courts' appreciation of the importance of software and software innovations, both to particular patented inventions and, more generally, as an area of inventive activity and a subject of commerce.[69] The following Section discusses these two factors in detail, paying special attention to the *AT&T* decision.

A third factor was also at work in *Eolas*: a failure of the Federal Circuit panel to grasp some of the complexities the case presented. When the additional complexities appeared more clearly only five months later in the far simpler *AT&T* appeal, Judge Rader, the author of the *Eolas* opinion, reversed his position on a key issue that he, and presumably the other two members of the *Eolas* panel, had failed fully to grasp in that earlier case.[70] He could not have written the opinion he did in *Eolas* if he had understood that issue as he came to understand it only five months later in *AT&T*.

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times distinct and separable from the associated hardware and can be added to the computer hardware, deleted, revised, and replaced; (c) it is easily placed on tangible objects such as magnetic disks, CDs, magnetic tape, and/or silicon memory chips, and, in these forms, easily transported, delivered, etc.; (d) it can be purchased separately; (e) when installed, it is highly functional—overshadowing, in some respects, the computer hardware with which it is combined; (f) it exists as physical patterns—essentially hardware—at most or all times, not only in storage devices but also in operating computer systems, including during its use; and (g) it is often a large and complex package that must be highly exact in order to produce the desired performance of the overall physical system.

69. *See, e.g.*, *Eolas*, 399 F.3d at 1339 (emphasizing software as "the key part" of the overall combination).

70. That issue, addressed in the immediately following Section, concerns the foreign reproduction of the U.S.-supplied software followed by the recording of that reproduced code onto the foreign-made hard-disk drives at the foreign location.

3. *Did the Software Copies Made Abroad Qualify as Components Supplied from the United States?*

In its recent *AT&T* decision, a Federal Circuit panel, whose membership overlapped with the *Eolas* panel, addressed a question that was present and essential to the result in *Eolas* but was neither well-articulated nor clearly recognized in that case. This question was whether the foreign-made copies of the U.S.-sourced software should be deemed (i) items supplied from the U.S.—allowing application of Section 271(f)—or, alternatively, (ii) items made abroad—precluding application of that provision. This question is closely related to a dual reality of software: it is both intangible and tangible.

Considering only the intangible aspect of software, the question of foreign-made copies is essentially subsumed in the "component" question. If one deems software to be completely and fundamentally intangible yet fully within the definition of "component" for purposes of Section 271(f), the copy-vs.-original distinction loses much of its potential importance. In this view, and neglecting a few technicalities, the key *intangible* "component" was truly "supplied from" the United States and genuinely "included" or "combined" into the foreign-made computers.[71] The *Eolas* panel took this approach without focus or articulation. As explained below, two—but not all three—members of the *AT&T* panel followed this approach too, ignoring software's other reality—its tangible embodiment. This concentration solely on the intangible aspect of software is not reality, however, from an operational or technical point of view.

The physical representation of software is fundamental and essential from a technical and operational standpoint. Software must take physical form in order to operate within a computer system, as well as to be saved,

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71. Even neglecting the foreign replication/copying of the software as sent from the United States, technical changes to that software—such as decryption, decompression, and then final compilation and linking—generally occur at the foreign locations to ensure that the software will operate properly with the hardware with which it will be combined. This means that the item supplied from the U.S. is slightly different from the item included in the foreign combination. No mention of these small technical changes appeared in the Federal Circuit's *Eolas* or *AT&T v. Microsoft* decisions. This may be appropriate, to the extent that Section 271(f) remains on the books and courts continue to follow the main holdings of these cases. Presumably a party intent on evading Section 271(f) could arrange matters so that some re-adjustment or re-assembly of the component(s) sent from the U.S. would be required after their delivery at the foreign location. To deem that stratagem effective in rendering the provision inapplicable seems arguably inconsistent with what Congress apparently intended to accomplish in enacting that provision, namely establishing infringement despite the need for some amount of foreign assembly work before the claimed combination comes into existence at the foreign location.

transferred, or transmitted.[72] Copying and installing software is a wholly physical process of altering tangible objects. In *AT&T*, the "replication" amounted to a fine-scale, late-stage manufacturing process that added a digital pattern, representing information and instructions, to physical objects by rearranging the physical substance of those objects.[73] The fine-scale re-arranging of the material of the foreign-sourced disk at a foreign location to reflect U.S.-supplied information is easier to characterize, from a physical point of view, as "foreign manufacturing" based on U.S.-supplied information than as inclusion of a "component" supplied from the United States.

For the two-judge majority of the *AT&T* panel, these technical and operational considerations, and indeed the process of statutory interpretation based on Congressional intent, were relatively unimportant. Far more significant, in their view, were two "bigger picture" considerations—essentially the same two that influenced the *Eolas* panel on the "component" question. First, the majority had a high regard for Section 271(f) and its presumed benefits. They characterized Section 271(f) as a "remedial" statute, and expressly gave it a broad and expansive interpretation—ironically relying on a U.S. Supreme Court approach to interpretation of

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72. The *Eolas* panel referred to this dual reality and used it as one basis for declining to view the intangible aspects of software as incompatible with its treatment as a Section 271(f) "component." Referring to software's intangible aspects as "software" and its physical aspects as "hardware," the *Eolas* panel stated:

> [A]s the district court pointed out, process and product—software and hardware—are practically interchangeable in the field of computer technology. On a functioning computer, software morphs into hardware at the touch of a button. In other words, software converts its functioning code into hardware and *vice versa.* Thus . . . the computer transforms the code on the [golden master] into a machine component in operation. Thus, sound policy again counsels against varying the definition of "component of a patented invention" according to the particular form of the part under consideration, particularly when those parts change form during operation as occurs with software code.

399 F. 3d at 1339-40 (citation omitted). In actuality, of course, software within a computer system takes physical form at all times, although that physical form is readily changeable.

73. In the recent cases, those objects were hard disks, and the added patterns were in their fine-scale magnetization. The replicated pattern was provided, subject to the technicalities discussed *supra* note 71, as prescribed by, and representing, U.S.-supplied information—via the "golden master" or via electronic transmission—but the ordinary usage of the word "component" fits the resulting patterned disk better than it fits the information that was used as a model for the pattern.

the Federal Securities Laws that the Court has long since abandoned.[74] On little more basis than this, the majority rejected possible interpretations of Section 271(f) that might "subvert[] [its] remedial nature . . . [and permit] a technical avoidance of the statute by ignoring the advances in . . . industry practices that developed after the enactment of [Section] 271(f)."[75]

Second, like the *Eolas* panel, the *AT&T* majority had a high regard for the importance of software innovations and tried not to exclude them, as a practical matter, from the presumed benefits of Section 271(f). Recognizing that copying of the U.S. components abroad could easily constitute foreign manufacturing rather than "supply[ing the copies] from the U.S.," the panel majority sought a broader definition of "supply." In doing so, the panel majority looked *not* to Congress's understanding or intent when it enacted Section 271(f) and *not* to the usage of that term in other statutory provisions, cases, or in standard references. Instead, it looked to "the way software is typically 'supplied.'"[76] Based on that consideration, it concluded that "copying . . . is part and parcel of software distribution" so that "the act of copying is subsumed in the act of 'supplying.'" Accordingly,

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74. Quoting a statement in the legislative history that described Section 271(f) as a significant "housekeeping" provision, the majority in *Eolas* re-characterized it as a "remedial" provision that "should be construed broadly to effectuate its purposes." 414 F.3d at 1371 (emphasis added). The majority stated that, at its enactment, Section 271(f) was "touted as a 'housekeeping-oriented' measure, without which 'the patent system would not be responsive to the challenges of a changing world and the public would not benefit from the release of creative genius," and then quoted from *Tcherepnin v. Knight*, 389 U.S. 332, 336 (1967), one of several Supreme Court decisions from the 1960s under the Federal Securities Laws that called for a broad and flexible application of the securities laws. *Id.* By the mid-1970s, the Supreme Court's approach to interpretation of the securities laws had narrowed tremendously. *See, e.g.*, Chiarella v. United States, 445 U.S. 222 (1980) (rejecting Court of Appeals' extension of prohibition against insider trading under Section 10(b) of Securities Exchange Act of 1934 and SEC Rule 10b-5 thereunder beyond the traditional context of persons in relations of trust and confidence with purchasing or selling party and persons having an affirmative duty to speak); Santa Fe Indus., Inc. v. Green, 430 U.S. 462 (1977) (rejecting the Court of Appeals' broad reading of Section 10(b) of Securities Exchange Act of 1934 and SEC Rule 10b-5 thereunder as reaching certain breaches of fiduciary duty in connection with securities transactions; holding deception or manipulation necessary for any violation); Ernst & Ernst v. Hochfelder, 425 U.S. 185 (1976) (rejecting Court of Appeals' broad application of Section 10(b) of Securities Exchange Act of 1934 and SEC Rule 10b-5 thereunder as reaching certain negligent acts in connection with purchases or sales of securities; scienter held necessary for any violation).

75. 414 F.3d at 1371 (emphasis added). The two-judge majority continued: Section 271(f), "if it is to remain effective, must…be interpreted in a manner that is appropriate to the nature of the technology at issue." *Id.*

76. *Id.* at 1369.

the panel majority deemed "all the resulting copies," for purposes of Section 271(f), "essentially [to have] been supplied from the United States."[77] The panel also rejected any different treatment for the software supplied on the "golden masters" as opposed to that transmitted electronically.[78]

This two-judge majority decision of the *AT&T* panel provoked a strong dissent, based on the foreign copying issue, from Judge Rader, the author of the recent *Eolas* decision. That is ironic because Judge Rader's own opinion in *Eolas* had fully endorsed the application of Section 271(f) to the same essential facts as were presented in *AT&T*. In particular, the same foreign copying issue was present—though the parties apparently did not emphasize it—in *Eolas*, but neither Judge Rader nor any other member of the *Eolas* panel made any mention of it there. In effect, Judge Rader had reached the same conclusion in *Eolas* as the one he strenuously rejected in *AT&T*.[79]

Judge Rader's dissent is notable for its traditional, rather than expansive, approach. For one thing, he refused to ignore the physical processes involved in software replication and installation. Effectively, he declined to treat the tangible embodiment of the software as completely unimportant compared to its intangible aspects. Accordingly, he viewed copying or "replicating" the software abroad as foreign manufacturing and therefore incapable of being "subsumed" in the act of "supplying" it from the U.S.[80]

He also emphasized the traditional view that patent protection in foreign markets requires inventors to secure patents in the respective foreign countries. The panel majority's ruling, he said "disregards the existing international scheme of patent law" with potentially serious consequences extending well beyond the software industry.[81] Pursuant to a stipulation in the case, he noted, Microsoft paid damages for every copy of its accused software loaded onto computers in the United States. The matter before the court, he said, concerned instances where the software was installed

77. *Id.* at 1369-71.

78. *Id.* Liability under Section 271(f), the majority said, "does not depend on the medium used for exportation." To treat these methods of supply differently, it said, would exalt "form over substance." *Id.* at 1370.

79. The complexity of the *Eolas* appeal and the parties' apparent failure to emphasize the foreign copying issue help explain the oddity of Judge Rader's opposite conclusions. In *Eolas*, the court devoted most of its attention to difficult issues of claim construction, anticipation, obviousness, and inequitable conduct. The court's rulings on Section 271(f) in *Eolas* came as a relatively short segment at the end of a long opinion and will affect the ultimate result in the case only if the anticipation, obviousness, and inequitable conduct questions are all decided against Microsoft.

80. *Id.* at 1373-74.

81. *Id.* at 1372.

"in Düsseldorf or Tokyo" for foreign sale and use. In those cases, he said, foreign installation may constitute infringement of AT&T's rights, but only if AT&T held a German or a Japanese patent.[82]

Finally, Judge Rader objected to the potentially massive liability Microsoft faced, compared with the very small number of "golden masters" or electronic transmissions it had sent abroad. "One act of supplying," he said "cannot give rise to liability for multiple acts of [foreign] copying." He therefore decried the "endless liability in the U.S." that the majority's decision imposed "for products manufactured entirely abroad."[83]

Microsoft sought Supreme Court review in the *AT&T* case, as it had done, unsuccessfully, in *Eolas*. After first inviting the Solicitor General to present the views of the United States, the Supreme Court recently granted Microsoft's petition for review.[84] The two questions before the Court are: (i) whether computer software qualifies as a "component" for purposes of Section 271(f); and, if so, (ii) whether "supplied . . . from the U.S." includes foreign-produced copies of the U.S.-sourced software that are loaded onto computer hardware at foreign locations.[85]

As this article went to press, only Microsoft and the various amici supporting it had filed their briefs on the merits of the case. Presenting the views of the United States, the Solicitor General's ("SG's") brief carries special weight. As in his September, 2006 amicus brief recommending that the Court grant certiorari in the case, the SG argues for essentially the same positions that Judge Rader took in his *AT&T* dissent, namely: (i) that software qualifies as a Section 271(f) "component" but (ii) that foreign-made copies of software supplied from the United States do *not* qualify as "supplied" from the United States for purposes of that provision. The case does not directly present, and it appears unlikely that the Court will directly address, the separate question, discussed above, of whether Section 271(f) applies to method (process) claims. Nevertheless, a narrow interpretation of Section 271(f) "components" as including only tangible objects would tend to discourage application of that provision to method claims.[86] Unfortunately, any of the results the Supreme Court is likely to

82. *Id.*; *see also id.* at 1373.

83. *Id.* at 1372-73.

84. Microsoft Corp. v. AT&T Corp., 127 S. Ct. 467 (2006)

85. *See* Petition for a Writ of Certiorari, Microsoft Corp. v. AT&T Corp., 2006 WL 403897 (Feb. 17, 2006) (No. 05-1056).

86. Under Judge Rader's *Eolas* reasoning, the "components" of a method invention are "steps" or "acts." Since those are intangible, a requirement that Section 271(f) components be tangible would seem to rule out application of that provision to method inventions. Judge Rader's reasoning in *Union Carbide*, however, might lead to the opposite result. There the Federal Circuit panel applied Section 271(f) to a method claim where

reach in this case will have at least some ironic and undesirable aspects and will fail to solve the fundamental defects of Section 271(f).[87]

D. Components Designed but Not "Produced" in the United States—U.S. Companies Moving Production Off-Shore

Another recent Federal Circuit case, *Pellegrini v. Analog Devices, Inc.*,[88] rounds-out our review of Section 271(f) in operation. While *Pellegrini* and a few similar decisions[89] recognized limitations on the application of Section 271(f), the nature of those limitations underscores—indeed strengthens—the perverse incentives Section 271(f) creates against invest-

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the "component" supplied from the U.S. was a tangible substance that operated as a catalyst in the claimed chemical process. See *supra* notes 53-54 and accompanying text regarding the logical inconsistencies in the *Eolas* and *Union Carbide* reasoning.

87. The worst result, in terms of economic consequences, would be to uphold the ruling by the Federal Circuit panel majority. This would maximize the perverse incentives Section 271(f) creates for current and prospective U.S. producers and the discrimination in favor of off-shore production.

A ruling in accordance with the views stated by the SG and Judge Rader would lead to a less harmful result but one still ironically inconsistent with a stated objective of Section 271(f) and far less favorable to the U.S. economy than the fact pattern and result in *Deepsouth*. Specifically, one stated objective of Section 271(f) was to "avoid encouraging manufacturing abroad." *See supra* note 26. Finding no infringement because foreign-made copies are not "supplied from the U.S." would protect U.S. software producers from Section 271(f) liability in many cases, but would encourage (a) copying of U.S. made software abroad onto (b) foreign made hardware there and (c) final assembly there of the overall computer systems or software combination products. In *Deepsouth*, by contrast, all of the "manufacturing" except for the trivial final assembly of the U.S.-made parts was done in the U.S. with the associated employment, tax-generation, and other benefits to the U.S. economy.

The other possibility, a ruling that software cannot qualify as a "component" for Section 271(f) purposes, would likewise reduce the adverse consequences for the U.S. economy, but would re-subject Section 271(f) to one of several criticisms that a leading patent law scholar has leveled at it. Such a ruling would probably involve a determination that only tangible, physical items can qualify as Section 271(f) "components." Thus, software and all types of data would be excluded, as would steps and acts, the elements of method (process) claims. While good for U.S. software and data providers, such a conclusion would re-create what Professor Chisum has identified as an essentially irrational feature formerly thought to characterize the coverage of Section 271(f), namely its applicability to claims to apparatus and compositions of matter but not to process (method) claims. *See supra* note 40. In short, only repeal of Section 271(f) will eliminate the inconsistencies and adverse consequences of Section 271(f).

88. 375 F.3d 1113 (Fed. Cir. 2004).

89. *Id.* at 1115-17; *see e.g.*, Rotec Indus. Inc. v. Mitsubishi Corp., 215 F.3d 1246, 1257-58 (Fed. Cir. 2000) (reaching a result similar to that in *Pellegrini* on slightly less dramatic facts).

ing in productive facilities in the United States and in favor of moving U.S. jobs and technology to other countries.

Pellegrini held a U.S. patent on brushless drive circuits for electric motors. The defendant, Analog Devices, was organized and headquartered in the United States. Analog conceived and developed integrated circuit chips for use with other components in combinations that allegedly fell within Pellegrini's patent. Analog controlled and arranged all aspects of the allegedly infringing activity from the United States, but it did not manufacture the chips in the United States, let alone combine them into infringing combinations here. Rather, after designing and perfecting the chips in the United States, Analog both manufactured them at its own factory in Ireland and contracted for their production under proprietary arrangements at two different facilities in Taiwan. It then assembled and tested the combinations in several non-U.S. locations. Analog provided financing and management from the United States, set production levels in the United States, and sent instructions to the off-shore locations for the production and disposition of the chips. It received purchase orders from, and invoiced, customers worldwide and received payments for all of the products sold worldwide. Analog sold and shipped most or all of its chips, however, from Analog's foreign facilities to foreign purchasers for use in foreign countries.[90]

Relying on Section 271(f), Pellegrini charged Analog with infringement and sought damages for world-wide sales of the resulting combinations that included the chips. Analog moved for summary judgment of non-liability for all chips sold to foreign locations on the ground that Section 271(f) applies only where some significant part or parts are physically produced in, and shipped from, the United States. The Federal Circuit panel unanimously agreed with Analog despite the seemingly broad phrasing of the key clause in Section 271(f).[91] The court held that the location of production was key to whether Section 271(f) could apply.[92] Further,

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90. 375 F.3d at 1115, 1117.

91. *Id.* at 1117-18. The statutory language states an infringer includes anyone who "without authority supplies or causes to be supplied in or from the United States [the key components] . . . ." § 271(f)(1)-(2). In effect, the court ruled that "in or from the United States" modifies only "supplies or . . . supplied" and not "causes."

92. The court stated:

> [Section] 271(f) is clear on its face. It applies only where components of a patent[ed] invention are physically present in the United States and then either sold or exported. . . . The plain language of § 271(f)(1) focuses on the location of the accused components, not the accused infringer. . . . [T]here can be no liability under § 271(f)(1) unless components are shipped from the United States for assembly.

the court said, it made no difference whether Analog produced the chips at its own factory in Ireland or contracted with other offshore companies for their production. The court stated that Analog's successful defense was "not based on the use of a contractor, but rather on [foreign] manufacture."[93] In other words, Section 271(f) attacks only U.S. production followed by shipment abroad. Companies—foreign or U.S.-based and regardless of their activities in the United States—can avoid all risks and exposure under Section 271(f) if they produce their components anywhere but in the United States. At least one other recent Federal Circuit decision supports this conclusion.[94]

E. Effects of Section 271(f) Extensions

In summary, despite some dissenting voices, the Federal Circuit is applying Section 271(f) expansively. Under recent rulings, that provision reaches all types of products and all types of patents, and the triggering "components" can be anything in a broad range of tangibles and intangibles, including a broad but ill-defined range of acts, substances, and other items that comprise or facilitate steps in claimed processes. Moreover, while *Pellegrini* limited Section 271(f) in one respect, that limitation benefits only those entities that carry out their productive activities *outside* the United States. It provides no comfort whatsoever for entities producing in the United States. Indeed, by emphasizing that a company—whether based in the United States or abroad—can achieve complete safety under Section 271(f) by locating its production facilities abroad or contracting-out production of key components to foreign producers, *Pellegrini* increased the incentives for companies *not* to invest in, and not to conduct, production in the United States.

The effects of Section 271(f) in recent cases have been dramatic. The $565 million damages award (including some interest) in *Eolas*, for example, was the second largest in U.S. patent law history at the time. On remand, the court will presumably increase this award, adding additional interest, if it finds the patent valid and enforceable. Of particular importance here, *two-thirds* of that total dollar amount is potentially recoverable under the U.S. patent and in a single U.S. lawsuit solely because of Section 271(f). Similarly, inclusion of Section 271(f) claims in *Union Carbide* doubled the damages exposure there as well as increasing the reach of the resulting injunction.

Pelligrini, 375 F.3d at 1117 (emphasis added).

93. *Id.* at 1118.

94. *Rotec*, 215 F.3d at 1257-58.

As important as the dollar amounts involved is the wide publicity that has attended the *Eolas* ruling and other recent decisions under Section 271(f). Awareness of substantial patent awards on the part of corporate managers and legal advisers can substantially influence corporate attitudes regarding the risks of patent infringement suits. For example, the *Kodak-Polaroid* patent litigation of the late 1980s and early 1990s resulted in heavy monetary and injunctive consequences adverse to Kodak and in extensive related publicity. Many people credit corporate America's awareness of those consequences with a fundamental shift in the thinking of U.S. corporate executives and their advisors regarding the strength of U.S. patents and the dangers of infringement litigation.[95] The wide publicity of *Eolas* and other recent Section 271(f) decisions, together with the heavy damages awards and broad injunctive remedies that courts may impose in those cases may have similar effects. The result could be enhanced corporate concerns regarding the dangers of infringement under Section 271(f), with a consequent chilling effect on investments in U.S. productive facilities and a further shift of technology sector jobs to foreign countries.

As noted above, judicial review in this area is incomplete. The far-reaching *Eolas* and *AT&T* decisions reflect the views of only a few of the Federal Circuit's twelve judges. Recently, other Federal Circuit judges have disagreed with the *Eolas* holding that Section 271(f) applies to method patents.[96] Moreover, the Supreme Court recently granted Microsoft's petition for review of the Federal Circuit's decision in *AT&T*. Unfortunately, the greatest plausible cut-backs to Section 271(f) that Federal Circuit en banc review or Supreme Court review could effect would reduce but not eliminate the perverse effects of Section 271(f).[97]

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95. FTC REPORT, *supra* note 19; ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW THE BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS AND WHAT TO DO ABOUT IT 112-115 (2004) [hereinafter INNOVATION AND ITS DISCONTENTS].

96. See the discussion of the Federal Circuit's revised opinion in the BlackBerry case *supra* note 51, and the discussion of the dissent by several Federal Circuit judges from the denial of rehearing and rehearing en banc in *Union Carbide Chemicals & Plastics Technology Corp. v. Shell Oil Co.*, 434 F.3d 1357, 1358-59 (Fed. Cir. 2006), *supra* note 55 and accompanying text.

97. In view of the Federal Circuit judges' recent statements, it seems plausible that en banc review by the Federal Circuit in some future case under Section 271(f) might reverse the rulings that the provision can apply to method claims. See, for example, the statements quoted *supra* notes 51 and 55. Supreme Court review in some future case, of course, could go beyond that, but the questions presented to the Court in the pending *AT&T v. Microsoft* case are narrower, namely: (i) whether software object code can be a "component" for purposes of Section 271(f) and (ii) if so, whether copies of that object

IV. ASSESSING SECTION 271(F)

This Part examines the merits and demerits of Section 271(f). The criteria used are: (i) the objectives of the patent laws—namely the promotion of the "progress of science and useful arts";[98] (ii) considerations of fairness and efficiency in patent enforcement; and (iii) related, widely recognized goals of U.S. trade and economic policy such as promoting U.S. competitiveness in international markets and enhancing employment and investment in the United States.[99] A preliminary question confronting any such evaluation is whether we have enough information on which to base such an assessment. Accordingly, this Part addresses the following matters:

- Whether the information available to us with regard to the operation of Section 271(f) is sufficient to support an evaluation in which we can have any confidence;
- The extent to which Section 271(f) generates beneficial incentives for invention and/or commercialization of new technology;
- The risks and burdens U.S. producers face as a result of Section 271(f);
- Other possible arguments in favor of Section 271(f), including considerations of fairness and efficiency in patent enforcement; and
- A "bottom line" assessment.

Thereafter, a short final Part of this Article addresses some new areas where we may expect Section 271(f) to be applied in the future and some special aspects of that provision in contemporary patent enforcement.

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code are "supplied" from the United States when those copies are created overseas by replicating a separate master version supplied from the United States.

For reasons mentioned above, even the broadest cut-backs of Section 271(f) that the Federal Circuit or the Supreme Court might plausibly make would reduce, but not eliminate, the perverse incentives that Section 271(f) creates. *See supra* text accompanying note 57.

98. U.S. CONST. art. I, § 8, cl. 8.

99. The legislative history identifies promotion of U.S. manufacturing and reduction of U.S. unemployment as objectives of Section 271(f). *See supra* note 28 and accompanying text.

A. Do We Have Sufficient Information on Which to Base an Evaluation of Section 271(f)?

Ideally, an assessment of Section 271(f) would have the benefit not only of a legal and historical review but also of economic analyses of that provision in operation. If possible, this would include, among other things: (i) data and case studies on how Section 271(f) has operated in different circumstances and technological areas, including the nature of the U.S.-supplied components in relation to the patented inventions and of why those components were not themselves covered by a U.S. patent (which would have made Section 271(f) superfluous); (ii) a comparative economic analysis of the U.S. patent system (with and without Section 271(f)) and at least a few important foreign patent systems (which lack any provision similar to Section 271(f)); (iii) an assessment of the costs and effectiveness of the patent enforcement mechanisms in other countries (which is the traditional method of obtaining patent protection in foreign markets); and (iv) analyses of whether and why alternative foreign sources of the U.S.-supplied components have not been readily available and how long this condition has lasted in particular product and geographic markets. This and similar information might provide a definitive picture of how Section 271(f) affects U.S. interests in such areas as innovation, trade, technology investment, facility siting, jobs creation, and international competitiveness. As far as the author knows, such analyses are not currently available.

For several reasons, however, the absence of such analyses need not prevent us from making important judgments as to Section 271(f) or from having confidence in those judgments. First, a wealth of information on the operation of the U.S. patent system has recently become available as a result of several recent, wide-ranging studies. The associated reports illuminate the U.S. patent system and its operation, including its shortcomings and changes that might improve its performance. The U.S. Federal Trade Commission sponsored and prepared one of these, releasing the associated report in 2003 ("FTC Report").[100] The National Research Council, an arm of the National Academies (formerly the National Academy of Sciences), sponsored another and published the resulting report in 2004 ("NAS Report").[101] A number of other studies and reports on the U.S. patent system,

100. FTC REPORT, *supra* note 19.

101. NAS REPORT, *supra* note 19. This report was the result of initiatives of the Governing Board of the National Academies and its Board on Science, Technology, and Economic Policy. They commissioned a Committee on Intellectual Property Rights in the Knowledge-Based Economy, and, under their auspices, multiple meetings, public fora, and workshops were held; nine policy-related empirical studies (selected from more than

generally less extensive than these two but nevertheless substantial, have likewise appeared in the last two years.[102]

These studies included the commissioning of a number of scholarly inquiries and reports on aspects of the patent system as well as the receipt of numerous presentations from academics, corporate managers, intellectual property directors, legal and technical experts, and others. Additional information on the patent system has been published in connection with these two studies and in connection with the extensive hearings on patent reform in the two most recent sessions of Congress. Commentators have published various other reports, articles, and at least one book in the last two years on the U.S. patent system and its operation and problems.[103] None of these studies, reports, or articles seems to have focused substantially on Section 271(f). Nevertheless, they provide extensive, detailed, and apparently reliable information regarding the operation, enforcement, and effects of the patent laws, much of which is relevant to an assessment of Section 271(f).

A second aid in assessing Section 271(f) is the incentives-based rationale of the patent laws: the patent laws are all about incentives. Moreover, courts have fleshed out the legal application of Section 271(f) to a significant degree now, and its basic operation is relatively clear in most

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eighty proposals) were sponsored; testimony was received from invited speakers including economists, legal scholars and practitioners, judges, former PTO officials, and business managers; and information was gathered in other ways.

102. In addition to the two reports noted above and the commentary and hearings mentioned *infra* note 103, each of the following organizations, among others, sponsored a substantial study and report on the U.S. patent system that has been first published within the last two years: the Brookings Institution, the Council on Foreign Relations, the Congressional Research Service/Library of Congress, and the Intellectual Property Law Section of the American Bar Association. Copies of these reports are generally available on the respective sponsoring organization's website.

103. Apart from the FTC and NAS Reports and the separate studies/reports referred to *supra* notes 19 and 102, responses to the FTC and NAS reports have been published by organizations such as the American Intellectual Property Law Association and the Intellectual Property Law Section of the American Bar Association. In connection with the NAS and FTC Studies and their recommendations for reform, the House Subcommittee on the Courts, the Internet, and Intellectual Property and the Senate Subcommittee on Intellectual Property held a number of hearings throughout 2005 and 2006 on patent reform and problems with the U.S. patent system. The House Subcommittee staff and others have published and/or introduced several proposed bills. This activity, including the main points of the testimony and presentations made in these hearings, has been widely reported by the Bureau of National Affairs (BNA), Commerce Clearinghouse (CCH), and others. A considerable range of additional commentary has also been published recently on the same subject including numerous articles and at least one widely discussed book by two economists, INNOVATION AND ITS DISCONTENTS, *supra* note 95, at 112-15.

respects. Accordingly, one can understand the risks, rewards, and incentives Section 271(f) is likely to produce for inventors, investors, and producers in at least a general way and on average. In addition, large degrees of uncertainty are inherent in the application and enforcement of patents and, to an even greater extent, in the early stages of invention and commercialization of technological advances. As far as the resulting incentives are concerned, these uncertainties swamp much or all of the details that one might analyze in careful empirical studies of how Section 271(f) has operated in specific cases. This is especially true because the incentivizing effects of the patent laws must operate at the early inventive and investment stages of innovation, whereas patent enforcement can occur, and Section 271(f) might actually operate in court, only later and after these large uncertainties have had their effects. Accordingly, inventors, backers, and corporate managers can only take into account the general and average effects of Section 271(f) at the early inventive and investment stages when the incentivizing effects of the patent laws must operate, if they are to operate at all.

Third, the real effects of Section 271(f)—whether in stimulating inventive activity and commercialization of technological advances or, on the other hand, inducing companies to invest and produce off-shore—depend on how persons in the inventive, industrial, and investment sectors and their legal advisors *perceive* that section and its role in the overall patent system. Like us, these persons lack the empirical data and economic analyses that would be desirable for a full, rigorous analysis. Accordingly, such sophisticated analyses are, in an important sense, irrelevant to how Section 271(f) is actually influencing incentives, production planning, and choices of locations for investment, facilities construction, and jobs creation. The more relevant factors, in this regard, are the publicized results of Section 271(f) in operation and the advice that executives receive from their legal and other advisors.

Fourth and finally, detailed analyses—indeed any analyses at all—of economic effects or impacts on innovation have been starkly absent from both enactments and amendments of the patent statutes and major judicial interpretations of the patent laws. No meaningful analysis accompanied the enactment of Section 271(f).[104] A generally similar situation has characterized many legislative actions revising the U.S. patent laws. Congress generally acts, in this and many other areas, on the basis of very limited

104. The majority and dissenting opinions in *Deepsouth* each provided more substantial discussions of the relevant issues and policy considerations than appeared in the legislative history of Section 271(f). *See supra* notes 13-18, 24, 26, 29 and accompanying text.

analysis. Usually, their data comprise no more than general testimony and/or reviews of prior court decisions, and the accompanying committee reports sometimes fail to make clear whether important lines of existing case law are being approved or disapproved. Further, political pressures tend to play larger roles than economic or other analyses. Likewise, as some of the judges on the Federal Circuit have noted, that court usually decides major issues of patent law without the benefit of economic analyses and without any data on the likely effects on innovation or economic activity, even though the purpose of the patent laws is to affect those very matters.[105]

Thus, despite our lack of empirical data and economic analyses, we have the same information that inventors, managers, investors, and their legal advisors use when they include Section 271(f) in their decisions af-

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105. *See, e.g.*, Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1529-32 (Fed. Cir. 1995) (en banc) (Newman, J., concurring) (noting (i) the importance of the doctrine of equivalents to the "national interest in technologic innovation" and to the effectiveness of the patent system in incentivizing innovation but (ii) the lack of available "policy exploration, economic analysis, [etc.]" in these areas and (iii) the failure of the Federal Circuit, the parties, or the amici curiae to discuss these subjects in that important case. That and other cases similarly note the lack of express clarifications in major codifications of the patent laws as to whether major lines of prior case law are being reaffirmed or rejected); *see also* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17 (1997) (rejecting arguments that the re-codification of the Patent Act in 1952 and the various earlier changes in claiming requirements had undercut or overturned a long line of mainly older cases affirming the viability of the doctrine of equivalents where the legislation and its legislative history were silent on that question). Compare the disagreements among the Federal Circuit's decisions and among its judges on the proper approach to the fundamental process of patent claim construction, which is described and largely resolved in the recent en banc ruling in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) but without any economic or other real-world analysis being provided to aid in that decision. Finally, note the recorded statement by Chief Judge Michel of the Federal Circuit at a 2002 conference on patent reform, regarding recent litigation on the issue of the doctrine of equivalents in the leading case of *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558 (Fed. Cir. 2000) (en banc):

> Now you might have thought . . . where there was a concern about the relative needs to promote adequate incentives—or you could say fairness to inventors—on the one hand with the need for competitors to have adequate predictive value and certainty on the other hand, that somebody, at least *amici* and, one would hope, also the parties, would have given us some . . . meaningful data about that. Now I read all the briefs . . . and I can't remember anything that I would consider empirical data. . . . If you trace back the pedigree, I suspect that you will find that in a great many cases there never was any meaningful economic or qualified data.

NAS REPORT, *supra* note 19, at 86 n.14.

fecting innovative efforts, investments, and the locations of productive facilities and activity. Moreover, this amounts to far more information than Congress had in 1984 in enacting Section 271(f). Twenty years of experience and "hindsight" give us a reasonable basis for assessing that provision, particularly when compared with the lack of analysis that underlay its enactment.

B. Benefits—Does Section 271(f) Help Incentivize Innovation?

The basic aim of the U.S. patent laws is to "promote the progress of science and useful arts," both by incentivizing invention and commercialization of technological advances—including the investments needed for those purposes—and by encouraging full public disclosure of discoveries that would otherwise remain secret.[106] Section 271(f), however, can provide no significant incentives or encouragement along these lines.

Initially, of course, Section 271(f) contributes nothing to protection of U.S. patent holders with respect to exploitation of their inventions in U.S. markets. It was never intended to provide additional protection in domestic markets, and its terms add nothing to the other provisions of the Patent Act in that regard.[107] Two other points then prove the absence of any incentivizing benefits from Section 271(f). First, at the relevant times, that provision provides no plausible promise of useful protection against competition—or even of the right to exploit the invention—in foreign markets. Second, in the relatively unusual cases where one or more foreign markets might actually be material in incentivizing the inventor or his/her financial backers, those persons will have obtained alternative—and substantially better—protection in the form of patents in the relevant jurisdiction, thereby making Section 271(f) superfluous. Even easier, if one or more key component(s) of an invention is itself new and patentable, the inventors likely will have rendered Section 271(f) superfluous simply by claiming that or those key components, as well as the larger invention, in their U.S. patents.

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106. The U.S. patent laws are based on Article I, Section 8, Clause 8 of the U.S. Constitution, which provides that Congress shall have the power "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." To promote the progress of science and the useful arts, the patent laws primarily incentivize invention and the commercialization of technological advances and secondarily encourage the disclosure of information about inventions and how they work. Such disclosure assists persons other than the inventor to understand and learn from the patented invention and thereby further advance the art. NAS REPORT, *supra* note 19, at 35-36, 39, 63-64.

107. *See supra* notes 5, 6 and accompanying text.

The first of these points—that Section 271(f) can provide no meaningful prospect, at the relevant times, of protection against competition in foreign markets—may not have been completely clear when that provision was enacted in 1984. Developments in international competitiveness and legal developments such as the *Pellegrini* case, however, have now made that clear.

The basic problem, as *Pellegrini* shows, is that Section 271(f) offers holders of U.S. patents protection in foreign markets only against competition from products containing components produced within the United States. Thus, as to any foreign market, Section 271(f) provides no protection whatsoever against any components or resulting combinations made in that country, or any other country, as long as the key component(s) were not made in the United States. In fact, as *Pellegrini* illustrates, Section 271(f) provides no protection against competition in any foreign market, even by a U.S. company that designs the key component(s) and the full combination in the United States, provides financing and management from the United States, directs production and sales from the United States, combines the components into "infringing" combinations abroad, and sells those combinations in foreign markets, as long as that company *either* produces the relevant component(s) in its own non-U.S. facilities *or* obtains them from foreign producers. The same lack of protection, of course, applies to companies headquartered outside the United States. They can compete with the U.S. patent holder in all foreign markets free of any restraint from the U.S. patent laws as long as their production occurs in some country other than the United States.

In 1972, the *Deepsouth* dissenters postulated that U.S. manufacturers generally had competitive advantages over producers in other countries.[108] If this were true, restraining competition only from U.S. producers might provide the holder of a U.S. patent with a meaningful degree of protection in foreign markets. For some years following World War II, of course, U.S. manufacturers did have advantages over their foreign counterparts in many types of production. Now, however, a trip to Wal-Mart or to a car dealership, camera shop, hardware store, TV or computer store, etc., or a perusal of the *Wall Street Journal* shows that any such general manufacturing advantages disappeared long ago in most if not all fields.

Pellegrini illustrates this disappearance: the components at issue were semiconductor integrated circuit chips, a type of product and a technology that were developed mainly in the United States. Yet the U.S. company accused of infringement sourced them in two ways, neither of which in-

108. *See supra* note 16 and accompanying text.

volved U.S. production. There may still be a few areas where U.S. producers have strong positions world-wide, such as software and, perhaps, aircraft manufacturing and certain pharmaceuticals. But the strengths of programmers in Bangalore, Eastern Europe, and other foreign locations are well known, as are the competitive strength of Airbus and other foreign aircraft manufacturers, the difficulties of McDonnell-Douglas, Lockheed-Martin, and other former U.S. aircraft manufacturers, and the strengths of European pharmaceutical manufacturers. Further, the continuing viability of some U.S. producers may be partly the result of historical circumstances (including distribution arrangements, installed base, network effects, etc.), not of advantages in the manufacturing of components. In short, foreign producers in most fields are now strong and often enjoy substantial cost advantages over U.S. producers—and Section 271(f) gives U.S. patent holders no protection whatsoever against any of them.

A timing consideration further undercuts any protection Section 271(f) might seem to offer in foreign markets. The incentivizing effects of the patent laws must operate at the early inventive and investment stages of innovation if they are to bear any fruit. Possible monetary returns, and the need for effective patent protection, in contrast, come years later. Thus, the patent laws can incentivize innovation only if meaningful protection appears likely to be available *some years after* the initial inventive efforts and associated investments. Traditional territorial patent protection fits very well with this timing requirement, but any "protection" under Section 271(f) fails this test miserably.

To be specific, a foreign patent, if obtained, lasts for a fixed term of reasonable duration, typically twenty years from the date of the original patent application. Likewise, a U.S. patent claiming key patentable components provides a similar term of protection. Any protection available under Section 271(f), however, is very different. If no foreign producers could offer competition in foreign markets for a given product today, that has no bearing on whether one or more foreign producers could do so five or more years in the future, when inventive efforts and investment might pay off and protection from competition would be needed. In other words, while traditional patent protection is known to last long enough to promote returns on innovation, one would not expect protection under Section 271(f) today still to be effective when it will be needed. Thus at the relevant times, any possibility of protection from Section 271(f) will appear not only weak and speculative in the short term but also wholly speculative or unlikely as to the period when it might be helpful.

The second point mentioned above is equally important: in the cases where prospects of returns from one or a few foreign markets actually

would operate to incentivize an inventor who has applied or will apply for a U.S. patent, that inventor very probably will obtain a foreign patent or patents. Note, initially, that Section 271(f) can apply only where a U.S. patent exists, so we must assume the inventor is applying or will apply for a U.S. patent and that it will be granted. This situation then poses two questions: (i) whether foreign markets would actually help incentivize that inventor or investor; and (ii) if so, what those persons can and will do as to getting patents in such countries.

In order to play a role in incentivizing innovative efforts, a specific foreign market must be a focus of actual interest on the part of the inventor or investor at the time of invention or investment. This is often the case with regard to the U.S. market because it is the most important economically for most inventions. Focus on the U.S. market is particularly strong on the part of the persons that, in furtherance of U.S. interests, we most want to incentivize, namely U.S. inventors and investors.[109] After the United States, and particularly after Japan and the countries participating in the European Patent Office agreement, market sizes—and interest in the corresponding patents—drop off rapidly.[110] Thus, while inventors may

109. The patent laws are intended to promote progress in science and the useful arts, and this, in concept, can be achieved not only by incentivizing U.S. individuals and companies but also by incentivizing foreign inventors and investors by offering them, if successful, patent-based monopolies in the U.S. markets. The U.S. patent laws do that because they do not favor U.S. inventors or patent owners over non-U.S. inventors or owners as to the availability of U.S. patents or as to the remedies available for infringement. But, where the inventor/owner is a non-U.S. person or company, the financial rewards of the invention provided from the U.S. markets are more likely to go outside the U.S., and potential U.S. producers are barred from competing here. Accordingly, the cost/benefit relationship is not as favorable for U.S. interests as where the incentive works successfully on U.S. entities. The even-handedness of the U.S. patent laws is more a matter of international agreement and reciprocity than a matter of maximizing progress in innovation: the U.S. grants patent rights to foreign inventors in return for foreign countries giving U.S. inventors and patent owners equal rights to obtain and enforce patents granted by those foreign countries. See *supra* note 10 summarizing certain provisions of the Paris Convention.

110. One indication of this is the relative numbers of applications made for patents to be issued by various countries. Statistical comparisons are difficult for several reasons, including: (i) the existence of international and regional patent cooperation arrangements producing multiple avenues for patent applications and, in some cases, single patent grants effectively covering numerous countries; (ii) variations in the allowable subject matter coverage of individual patents causing multiple patents to be used in some countries where a single patent might cover the same subject matter in others; and (iii) differing pendency periods for applications filed in different countries. Generally, however, the European participants in the European Patent Office together with the United States and Japan account for between 70% and 88% of the world-wide patent applications submitted annually, patents granted annually, and patents in force, with all other countries account-

have special interests in particular markets, it is unlikely that more than a very few markets other than the U.S. market will assume actual significance for incentivizing purposes.[111]

Applying for patents in many countries can increase the costs the inventor or his/her backers must bear, but several things mitigate this as to the inventor who applies for a U.S. patent. First, as noted just above, it is unlikely that more than a very few markets, other than the United States, will assume actual significance for incentivizing purposes. Therefore, we need not consider the costs of obtaining patents in large numbers of jurisdictions other than the United States but only in a few.

Second, by far the biggest cost in securing a patent is for legal costs for the preparation of the written description, claims, and other portions of the application.[112] Once that is done for one country, assumed here to be the United States, the identical or nearly identical document, perhaps with translation, is generally used in any other countries where patents are sought, substantially reducing the incremental cost of applying in a second

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ing for the remainder. *See, e.g.*, EUROPEAN PATENT OFFICE, U.S. PATENT & TRADEMARK OFFICE & JAPAN PATENT OFFICE, TRILATERAL STATISTICAL REPORT (2005), *available at* http://www.trilateral.net/tsr/tsr_2005/ [hereinafter TRILATERAL STATISTICAL REPORT]; ORGANISATION FOR ECONOMIC CO-OPERATION & DEVELOPMENT, COMPENDIUM OF PATENT STATISTICS (2005), *available at* http://www.oecd.org/dataoecd/60/24/8208325.pdf [hereinafter COMPENDIUM OF PATENT STATISTICS].

111. *See supra* notes 109, 110. Further, U.S. inventors and patent owners generally have greater familiarity with U.S. markets and U.S. sources of financing than with those in foreign countries. This familiarity further contributes to their concentration on U.S. markets in evaluating their chances of monetary success in their inventive and investing activities. Indeed, based on some experience with inventors and considerable experience in venture capital financing, development joint ventures, and early stage acquisitions, it is the author's view that a majority of U.S. inventors and smaller U.S. companies consider U.S. patents but not foreign patents in considering the likelihood of returns from their inventive or IP-related investing activities. Further, if foreign patents are considered at all, interest is limited to a very few foreign countries. It is rare indeed for the markets in numerous foreign countries each to play a meaningful part in incentivizing these persons with respect to inventive efforts, early stage financing, or early-stage venture or acquisition planning. A similar attitude is evident even in the patenting practices of some major U.S. companies such as IBM, which has recently described its tendency to patent a high percentage of its inventions in the U.S. but to patent its inventions much more selectively in foreign countries. *See* Thomson, Rankings of the Most Innovative Companies by Patent Filings, http://scientific.thomson.com/free/ipmatters/bti/8199727 (last visited Nov. 5, 2006) (quoting Takako Yamakura, Public Relations Manager, Technology & Research Communications at IBM).

112. "Legal counsel [fees] represent[] the vast majority of [the cost of obtaining a patent]." NAS REPORT, *supra* note 19, at 38.

or third country.[113] In addition, a prospective patentee must respond to objections that the U.S. Patent and Trademark Office ("PTO") raises due to pieces of prior art. The prospective patentee can usually reuse that response to similar objections that a foreign patent examiner makes, further lessening the incremental costs of obtaining foreign patents. Moreover, even without these savings, the total costs of obtaining a patent in the United States is, for a variety of reasons, simply "well above the range of those [costs] in other industrial countries."[114]

In addition, the Patent Cooperation Treaty ("PCT"), sponsored by the World Intellectual Property Organization ("WIPO"), further eases the burdens of obtaining patent protection for such foreign markets as an inventor may select. As of October 2006, the United States and 132 other countries were parties to the PCT.[115] Under its provisions, inventors filing a patent application in the United States can make a single, cheap, international filing and thereby: (i) obtain an effective filing date, in all participating countries, for purposes of priority and avoidance of statutory bars; and (ii) postpone the decision as to whether to incur most of the relatively modest incremental costs of preparing and filing foreign applications for a substantial period, typically thirty (30) months. This international filing will preserve inventors' priority rights as to as many countries as they desire for a single modest fee, and will produce an international search report for the inventors and their backers to review.[116] They can then use the thirty months and the search report to determine whether the invention seems commercially viable and protectible before committing, on a country-by-country basis, to incur the relatively modest incremental costs of prosecuting an actual application in one or more countries in addition to the United States. If the invention shows promise in that period, it should be easier for inventors and/or backers to secure any additional financial support they might need to cover the incremental costs of the additional applications.

Accepting these modest incremental burdens gives the inventor and his/her backers considerably more protection in the significant foreign

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113. See *id*. at 121, for the criticism of the "best mode" disclosure requirement in U.S. patent law that, because it has no counterpart in the laws of other countries, the common practice of simply translating a first-filed foreign patent application for use in the U.S. cannot be used for the best mode disclosure, which increases U.S. filing costs. This problem is absent where, as we assume here, the original application is prepared for filing in the U.S.

114. *Id.* at 68.

115. 1 WORLD INTELLECTUAL PROPERTY ORGANIZATION, PCT APPLICANT'S GUIDE (Annex A 2006), *available at* http://www.wipo.int/pct/guide/ en/gdvol1/annexes/annexa/ax_a.pdf.

116. *See, e.g.*, COMPENDIUM OF PATENT STATISTICS, *supra* note 110, at 57.

markets than Section 271(f) can possibly provide. While there are some gaps in effective foreign patent protection, these are primarily in countries having small domestic markets. Moreover, patents issued in foreign countries will protect the inventor against non-U.S. competition as well as against components manufactured in the United States. Such protection will last for the full patent term, not just until non-U.S. producers decide to compete. Thus, assuming the particular foreign market or markets actually figured into the inventor's or financial backer's thinking sufficiently to affect their incentives and conduct, rationality certainly calls for them to seek genuine patent protection for those markets.

Yet another consideration supports this assessment: Section 271(f) does not prevent a separate inventor from applying for and obtaining a patent on the same invention in the relevant foreign countries. The inventor's U.S. application will afford him/her certain priority advantages in obtaining a foreign patent if he/she seeks one. The publication or issuance of the U.S. patent (or other events) might bar a patent application in the foreign country filed after that date by a separate inventor. Before filing the U.S. application and for at least eighteen months thereafter, however, the inventor must assume that he/she may relinquish foreign patent protection unless he/she blocks other patents in those countries by pursuing protection there. Thus, if particular foreign countries are so significant as to figure in the inventors' or backers' actual thinking, they will take at least the first steps to obtain foreign patents.

Statistics bear out these conclusions. Pursuant to U.S. procedural changes mandated by the 1994 TRIPS Agreement, the U.S. PTO publishes most U.S. patent applications eighteen months after they are filed, destroying the secrecy that would otherwise last unless and until the patent issues. An exception to such automatic publication applies if the applicant disclaims the filing of any foreign counterpart patent application(s).[117] Because it preserves secrecy, the applicant has a substantial incentive to file such a disclaimer if he/she will not file any such foreign applications. Yet, tabulations of these disclaimers show that, on average across technologies and years, applicants preserve secrecy as to only about 10-11% of U.S. applications by filing such disclaimers.[118] Moreover, knowledgeable observers estimate that a substantial portion of this 10-11% of applications for which the prospective patentee files no foreign counterparts pertain to marginal inventions not deemed worth patenting abroad.[119] This suggests

117. 35 U.S.C. § 122(b).
118. *Id.* at 64; *see* FTC REPORT, *supra* note 19, ch. 4 at 27.
119. NAS REPORT, *supra* note 19, at 64.

that at least one foreign counterpart application is filed in connection with a very high percentage of all U.S. patent applications and that the percentage is even higher among applications representing inventions thought to have substantial value.[120]

To summarize our two main points, Section 271(f) provides patent holders no protection in U.S. markets and does not offer meaningful prospects of patent protection in foreign markets, particularly at the inventive and investment stages of innovation when patent-based incentives must operate. In contrast, foreign patenting of inventions being patented in the United States promises real patent protection for those instances where prospects of protection in foreign markets might produce incremental incentives for innovation; it is now user-friendly, entails modest incremental costs that need not be incurred or committed to at an early stage, and is actually carried out in a large majority of cases, particularly where the inventions are thought to have significant value. In short, Section 271(f) contributes nothing toward the incentivizing benefits the U.S. patent laws are intended to provide.

C. Risks and Burdens for U.S. Producers

The failure of Section 271(f) to protect U.S. patent holders in foreign markets does not translate into low risks for U.S. producers who sell components abroad. Indeed, Section 271(f) has become a substantial burden and disincentive for U.S. producers of technologically advanced products for international markets.

The seeming paradox of significant added risks without any significant protection results from Section 271(f)'s applicability only against U.S. producers. This leaves all actual and potential foreign producers free to compete with the patent holder in foreign markets and makes Section 271(f) ineffective as a protective measure for U.S. patent holders. It does not, however, reduce the monetary or injunctive burdens Section 271(f) can impose on companies that do produce components in the U.S. and export their products to other countries.

The impact of Section 271(f) on U.S. producers can be severe. In *Eolas*, for example, 2/3 of the huge $565 million (including some interest)

120. The 89-90% figure for the fraction of U.S. patent applications for which foreign filings are not disclaimed would include both (i) cases where the foreign filing is made first and (ii) cases where the applicant makes the initial PCT filing but then, based on the international search report and any commercial developments during the subsequent thirty months, decides not to complete any filings in foreign countries, in addition to (iii) cases where the U.S. filing is made first with plans to file abroad which are subsequently carried out.

district court judgment represented damages based on foreign sales that were recoverable under the U.S. patent laws only because of Section 271(f).[121] In other words, the award under Section 271(f) dwarfed the traditional U.S.-based damages. In the recent *Union Carbide* case, the claims for foreign sales advanced under Section 271(f) did not have quite as dramatic a role. There, Section 271(f) damages merely doubled *Shell's* damages exposure (increasing it by about $110 million) as well as extending the scope of the injunctive relief in the case. In cases of willful infringement, of course, treble damages can be awarded, as well as the typically large attorney fees and costs incurred in patent litigation.[122]

Several other aspects of patent enforcement—many of them not unique to the Section 271(f) context—further increase the risks that Section 271(f) poses for U.S. producers. These include:

1) The strengthening and proliferation of U.S. patents in the last twenty-five years;

2) The frequently uncertain scope and validity of patents;

3) Technological and industrial trends of increasing product complexity and international sourcing of "components"; and

4) The likely availability of onerous permanent injunctions against unsuccessful infringement defendants.

As explained below, these factors compound Section 271(f)'s heavy monetary consequences and create a truly substantial set of risks for U.S. producers of technologically advanced "components" for world markets. Because these risks are easy to avoid by moving production offshore, they create strong incentives that operate directly contrary to U.S. interests. The following paragraphs briefly review these factors.

1. Strengthening and Proliferation of U.S. Patents

Completely apart from Section 271(f), U.S. patent rights have become dramatically stronger in the last twenty-five years. For decades prior to the 1980s, their legal and economic weakness was widely recognized,[123] causing Justice Jackson to disparage the trend he feared could soon mean "the

121. *See supra* text accompanying note 95.

122. *See* 35 U.S.C §§ 284-85; *infra* note 137 regarding the magnitude of attorney fees in patent infringement cases.

123. *See* sources cited *supra* note 19 and accompanying text; INNOVATION AND ITS DISCONTENTS, *supra* note 95, at 97, 99-110.

only patent that is valid is one which this Court has not been able to get its hands on."[124]

Beginning around 1980, however, a combination of factors has vastly strengthened U.S. patents and patent rights.[125] The results have included much increased strength for patents as legal and economic instruments, much greater respect for patents on the part of business executives as well as legal advisors and academics, and a broad new recognition among corporate managers that large monetary liabilities and potentially disastrous injunctions are likely possibilities in cases of patent infringement. This across-the-board strengthening of patent rights has made patents a much greater, and much more widely recognized, source of business risks for companies producing technologically advanced products.[126]

At the same time as U.S. patents have gained strength legally, they have proliferated greatly in numbers, thereby further increasing the patent-

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124. Jungerson v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson, J., dissenting); *see, e.g.*, Ling-Temco-Vought, Inc. v. Kollsman Instrument Corp., 372 F.2d. 263, 271 (2d Cir. 1967) (Kauffman, J., concurring in part and dissenting in part); Reiner v. I. Leon Co., 285 F.2d 501, 503 (2d Cir. 1960).

125. Among other things, the U.S. Court of Appeals for the Federal Circuit, created in 1982 with exclusive appellate jurisdiction over essentially all U.S. patent cases, ended the inconsistency of patent rights among the circuits and the hostility many courts had shown to patents and patent enforcement. In numerous decisions since its creation, the Federal Circuit has established more supportive standards of validity and enforceability for patents, narrowed the defenses to claims of patent infringement, and generally increased the availability of effective remedies for holders of U.S. patents. *See supra* note 20; FTC REPORT, *supra* note 19, ch. 1 at 18-22, 30; NAS REPORT, *supra* note 19, at 31-37, 50. This broad and multi-faceted strengthening of U.S. patents by the Federal Circuit's rulings is one of the principal subjects of the recent and widely discussed book INNOVATION AND ITS DISCONTENTS, *supra* note 95, at 104-26. Separate federal legislation has further strengthened U.S. patents and the rights of their holders in other ways. *See, e.g.*, Patent Misuse Reform Act of 1988, 35 U.S.C. § 271 (amending Section 271(d) to cut back the misuse defense); Process Patent Amendments Act, Pub. L. No. 100-418, 102 Stat. 1563 (adding Section 271(g), thereby extending to holders of process patents the right to preclude importation of products made abroad by means of their U.S. patented process); Patent Law Amendments of 1984, Pub. L. No. 98-622, 98 Stat. 3383 (enacting not only Section 271(f) but also provisions to protect against certain types of obviousness-based invalidation of patents because of work of other members of the same research team); Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585 (extending the terms of certain patents on inventions subject to regulatory review); Cooperative Research & Technology Enhancement ("CREATE") Act of 2004, Pub. L. No. 108-453, 118 Stat. 3596 (removing additional types of cooperatively-developed prior art as an obstacle to the issuance of new patents).

126. FTC REPORT, *supra* note 19, ch. 1 at 14-22, 30, ch. 3 at 16, 36; INNOVATION AND ITS DISCONTENTS, *supra* note 95, at 104-26; NAS REPORT, *supra* note 19, at 31-37, 50.

based risks and uncertainties facing technology companies. Between 1981 and 2000, for example, the number of U.S. patents granted annually more than tripled.[127] There are now nearly two million unexpired U.S. patents.[128] This proliferation reflects several causes, in addition to rapid technological advances, including: (i) the widespread corporate adoption of patent accumulation and licensing as a method of revenue generation; (ii) a virtual "patent arms race" of "defensive patenting," particularly in the electronics, software, computer, and telecommunications industries;[129] and (iii) the basic ease of obtaining U.S. patents.[130] In any event, many com-

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127. *See, e.g.*, FTC REPORT, *supra* note 19, ch. 5 at 24-25; *see also* NAS REPORT, *supra* note 19, at 16, 42-51. Indeed, according to the U.S. PTO's *Annual Performance and Accountability Reports* published on its website, the number of utility patent applications filed annually is up by nearly a factor of four from 1978 to 2005.

128. Based on annual issuance statistics presented on the PTO's website and the patent term of seventeen years from issuance, which applied until a few years ago, there should be more than two million issued and unexpired U.S. patents outstanding. This, however, is something of an overestimate for three reasons: (i) a relatively small number of the patents issued in the last seventeen years were, no doubt, issued subject to terminal disclaimers pursuant to 37 C.F.R. § 1.321(a) and (b) and therefore had shorter lives; (ii) some of these patents have expired for failure of the holders to pay the applicable maintenance fees (maintenance fees were first imposed pursuant to the Act of Dec. 12, 1980, Pub. L. 96-517, 94 Stat. 3015, and were applicable to applications filed on or after that date); and (iii) a relatively small number of those patents have been held invalid in infringement or declaratory judgment suits or in re-examination proceedings. The second of these factors is no doubt the most important in numerical terms, but such failures to pay maintenance fees are presumably rare as to economically significant patents, and a procedure exists whereby many such prematurely expired patents can be revived. *See* 37 C.F.R. § 1.378(c). Taking into account failures to pay maintenance fees and other factors, a recent report indicated that a few years ago something in excess of 1.63 million issued U.S. patents then remained in force. TRILATERAL STATISTICAL REPORT, *supra* note 110.

129. FTC REPORT, *supra* note 19, ch. 2 at 26-28, 30-31, 34-36, ch. 3 at 33-40, 52-54; NAS REPORT, *supra* note 19, at 31. "Defensive patenting" is the deliberate accumulation of as many patents as possible out of fear that, without a substantial patent portfolio with which to bargain and potentially retaliate, a company can easily be barred from participation in important product areas by competitors exercising their patent rights. *See* FTC REPORT, *supra* note 19, ch. 2 at 34, 36 (referring to "defensive patenting" which was spurred by the practices of Japanese companies in: (i) filing large numbers of patent applications on small innovations; and (ii) "agglomerating huge [patent] portfolios which they swapped [i.e., cross licensed] with [other large Japanese companies] but which they were unwilling to trade with [i.e., license to] outside players").

130. *See, e.g.*, FTC REPORT, *supra* note 19, ch. 3 at 34-36 (referring to the ease of obtaining U.S. patents); *id.* ch. 1 at 8-9 (referring to the "plethora of presumptions and procedures [that] tip the scales in favor of the ultimate issuance of a patent, once an application is filed" and to the PTO's obligation to issue a patent unless the PTO can demonstrate that the claimed invention is not patentable—which effectively creates a presumption that each requested patent should be issued); *see also* NAS REPORT, *supra* note 19, at 54 n.34, quoting two patent scholars:

panies that formerly applied for few if any patents now are making concerted efforts to apply for, and obtain, as many patents as possible.[131]

2. Uncertainty as to Patent Coverage and Validity

Uncertainty as to patent scope, validity, and enforceability is an inherent—and frequently deplored—aspect of patent rights.[132] This uncertainty is significant, for present purposes, because it often prevents technology companies from determining whether patents cover products they are producing or want to produce and, if the patents do, whether they are valid and enforceable. Accordingly, even as to known patents, the exercise of care cannot insulate U.S. producers from substantial risks of infringement, including the potentially large increases in damages exposure and more burdensome injunctions under Section 271(f). The consequences of uncertainty, of course, extend far beyond Section 271(f). However, the burdens in relation to potential benefits and the effects of recent technological and

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> One of the oddest things about the U.S. patent system is that it is impossible for the [PTO] to ever finally reject a patent application. While patent examiners can refuse to allow [a requested patent], and can even issue what are misleadingly called "Final Rejections," the patent applicant always gets another chance to persuade the patent examiner to change her mind.

131. *See* sources cited *supra* notes 129-130.

132. See, for example, the comments of various participants in the February 18, 2005 "town meeting" hearing in San Jose, California, the first of four such hearings on patent reform co-sponsored by the National Academies' Board on Science, Technology, and Economic Policy, the American Intellectual Property Law Association, and the Federal Trade Commission. Among the comments were the following:

> We have a patent system that is fundamentally is [sic] not predictable enough. You can't just pick up a patent, see what's claimed, and predict what's going to happen when you get into court. We know—painfully—patent law isn't simple enough," Armitage said.
>
> Armitage also criticized that it takes years to determine something is patentable, "long after the technology is obsolete. It just isn't relevant if the patent system takes longer than the life cycle of the product."
>
> Joseph J. Rolla, deputy commissioner for patent examination policy at the PTO, said the agency has more than 100 pending reexamination proceedings that are over four years old. More than 400 pending proceedings are two years or older, and almost 600 proceedings have been pending for a year.

Joyce. E. Cutler, *Patents/Reform: Patent Reform Is Hot Topic for Innovators, Litigators*, Pat. Trademark & Copyright J. (BNA) (Feb. 25, 2005). Substantial segments of the recent FTC Report address the uncertainty of U.S. patent rights and its negative consequences for innovation and economic activity. *See, e.g.*, FTC REPORT, *supra* note 19, ch. 3 at 37-41, 53-54.

trade developments have particular relevance in this context. Accordingly, a brief review of some of the contributors to the uncertainty is useful here.

a) Complexity of Patent Claims and Defenses

Patent claims and defenses, and patent litigation generally, are notoriously complex and unpredictable. Statistics show that the reversal rate for district court claim construction rulings—and on trial court judgments in patent cases generally—is in the range of 40%.[133] In one recent case,[134] two successive panels of the Federal Circuit announced opposite constructions of the same relevant claim terms in the same patent in successive appeals even though claim interpretation is purely a matter of law.[135] The history of the *Eolas* and *Blackberry* cases, discussed above, provides good examples of—and sad commentaries on—this complexity and unpredictability.[136] The very large average legal fees in patent lawsuits further testify to the high levels of complexity in such proceedings.[137]

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133. *See, e.g.*, Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 233 (2005) (discussing a survey that found a 34.5% reversal rate in the Federal Circuit on appealed rulings on claim construction alone, which is three times greater than the typical reversal rates in other circuits). Other surveys have found somewhat higher rates of reversal in the Federal Circuit, and it is not unusual for the Federal Circuit to uphold a district court's claim construction rulings but to reverse on, say, validity or enforceability. In fact, this was the result in the *Eolas* appeal. 399 F.3d 1325 (Fed. Cir. 2005).

134. *Compare* CVI/BETA Ventures, Inc. v. Tura LP, 112 F.3d 1146, 1157-58, 1160 n.7 (Fed. Cir. 1997) (construing the same claim terms in the appeal in a manner opposite to that used in the determination of liability that had been affirmed in an earlier appeal), *with* CVI/BETA Ventures, Inc. v. Tura LP, 120 F.3d 1260 (Fed. Cir. 1997). A similar result happened again in *Nystrom v. Trex Co.*, 424 F.3d 1136 (Fed. Cir. 2005), although here it resulted in part from the intervening en banc ruling by the Federal Circuit in *Phillips v. AWH* Corp., 415 F.3d 1303 (Fed. Cir. 2005), which modestly revised the rules governing patent claim construction.

135. Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd* 517 U.S. 370 (1996); Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448 (Fed. Cir. 1998) (en banc).

136. After years of disputes and litigation, the district court in *Eolas* rejected Microsoft's defenses of anticipation, obviousness, and inequitable conduct, made rulings on claim interpretation, and, based on a jury verdict, entered a very large judgment for Eolas. On appeal, the Federal Circuit reversed the district court's rulings on the anticipation, obviousness, and inequitable conduct defenses, remanded the case for trial of these issues, and held that Microsoft had failed to preserve a possible error in claim construction for appeal. *See* Michael Warnecke, *Web Browser Patent Challenged by Microsoft Is Reaffirmed as Valid by Patent Office*, Pat. Trademark & Copyright J. (BNA) (Sept. 30, 2005). Moreover, in October 2003, the PTO instituted a reexamination of the Eolas patent and then issued two successive office actions in February and August 2004, each rejecting all ten of the challenged claims as having been obvious in view of the prior art at the

b) Unknown Patents

The uncertainties as to known patents, of course, pale in comparison with those in two other categories of patents: (i) those issued patents and published-but-unissued patent applications that may have been missed by any recent search; and (ii) those additional pending patent applications that

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time of the application. *Id.* Some observers considered these actions indicative of likely eventual invalidation of the patent. In September 2005, however, after further filings by the parties, the PTO issued a "Notice of Intent to Issue a Reexamination Certificate" for the patent, reaffirming the view that the patent is valid. *Id.*

A similar story of uncertainty can be seen in the closely watched BlackBerry litigation. After substantial litigation in that case, the district court entered summary judgment of infringement and a jury found the infringement willful in November 2002. In August 2003, after further proceedings, the district court entered a final judgment awarding damages and an injunction against further manufacture, use, importation, or sale of all BlackBerry systems, software, and handled devices. In December 2004, however, the Federal Circuit vacated the injunction, reversed some of the district court's claim construction rulings, and set aside the jury verdict. In August 2005, after additional motions, the Federal Circuit withdrew this fifty-nine page decision and issued a new seventy-four page decision, reversing the district court's rulings of infringement of the method claims but affirming the infringement rulings as to the apparatus claims. Meanwhile, in January 2003, the PTO had ordered reexamination of the patent claims. According to published reports, the PTO subsequently issued initial rulings rejecting all of the claims in the subject patents, including the sixteen claims at issue in the litigation, and entered a final action finding one of the patents invalid. In October 2005, both the Federal Circuit and the U.S. Supreme Court denied further stays of injunctive relief pending final resolution of the case. With a broad new injunction against operation of the BlackBerry system expected, its owner-operator settled the infringement claims with a payment of more than $600 million, although the PTO reexamination proceedings continued and could well ultimately invalidate all the claims in suit.

These examples of continuing uncertainty as to patent coverage and validity are unfortunate, but not unusual, given the complexity of many issues affecting the existence, extent, and enforcement of patent rights.

137. Surveys of attorney fees in patent cases that go to trial have reported that the average legal fees in such cases vary greatly depending on the amount "at risk." One survey found that the legal fees on each side of small patent infringement cases (< $1 million "at risk") average about $500,000, that the average per side in medium-sized cases ($1 million - $25 million "at risk") is about $2.0 million, that the average per side in larger cases (> $25 million "at risk") is $4.0 million, and that the costs on each side can exceed $20 million in the largest cases. NAS REPORT, *supra* note 19, at 68-70. Similar ranges, with substantial variations by region of the country, have been reported in other surveys. *See, e.g.*, KIMBERLY MOORE ET AL., PATENT LITIGATION & STRATEGY 1 (Thompson-West, 2d Ed. 2003). David Simon, the Chief Patent Counsel at Intel, has been quoted as saying that, for Intel, "legal fees are a huge hit. 'Any one patent lawsuit will cost us in the area of $20 million-plus, given the complexity of our technology.'" Victoria Slind-Flor, *Simon Says - Intel's Chief Patent Counsel, David Simon, Has Some Tough Rules for Outside Counsel*, IP LAW & BUS., December 10, 2004, *available at* http://www.law.com/jsp/article.jsp?id=1102543080110.

the PTO has not yet issued nor published. Patent searches are never certain to identify all the patents that may cover a given product or invention. The discovery, well after one or more searches, of highly relevant patents is not unusual. Likewise, the second category—pending but unissued and unpublished patents—still creates substantial risks despite changes to the U.S. patent system that have resulted in most pending U.S. patent applications being published eighteen months after their effective filing dates.[138]

c) Poor Patent "Quality"

Accompanying the proliferation of U.S. patents described above and explaining some of the uncertainty as to patent-based rights and obligations is the widespread perception that many patents being issued by the PTO should never have been issued because they claim unpatentable "inventions." Clear, quantitative data on patent quality are hard to obtain, but anecdotal information and the testimony of most of the patent experts that address this question indicate U.S. patents are issued too readily and that patent quality has become a very serious problem affecting substantial percentages of issued patents.[139] As reasons for this quality problem, they cite: (i) the ballooning numbers and complexity of applications being filed; (ii) the PTO's and courts' generally weak application of the obviousness grounds for denying patents; (iii) the PTO's inadequate prior art database in some areas where many patent applications are being filed; and (iv) the distressingly short time the PTO examiners have to review

138. Pursuant to the American Inventors Protection Act of 1999, Pub. L. No. 106-113, 113 Stat. 1501 (codified at 35 U.S.C. § 122), the PTO recently began publishing U.S. patent applications eighteen months after filing *unless* the applicants disclaimed any intention to file any counterpart applications in any foreign country. Despite this practice, pending, unpublished U.S. patent applications remain a substantial source of uncertainty and risk for several reasons: (i) the U.S. patent system, pursuant to 35 U.S.C. § 102(b), allows a "grace period" of one year for filing the application after placing a product "on sale" or "in public use" or after describing it in a written publication, thereby allowing later applications than most non-U.S. patent systems; (ii) PTO processing times for patent applications have ballooned to well over three years in most art fields and much more than that in some; and (iii) publication can be avoided for the entire period of pendency (i.e., until issuance of the patent) by submitting a disclaimer of intent to file corresponding applications in foreign countries—which is the main situation where Section 271(f) might claim any justification in any event. *See* 35 U.S.C. § 122.

139. FTC REPORT, *supra* note 19, Exec. Summary at 5-10, ch. 1 at 34-35, ch. 3 at 20-21, 37-40, 53, etc.; INNOVATION AND ITS DISCONTENTS, *supra* note 95 at 142-50.

each application, find the relevant prior art, and determine patentability as well as adequacy of disclosure, etc.[140]

3. Technological and Industrial Trends—International Sourcing of "Components" and Product Complexity

Apart from legal matters, trends in technology and production practices have contributed greatly to the risks posed by Section 271(f). These include: (i) increased world-wide sourcing of product components; and (ii) the increasing complexity of many new products, which causes them to include large numbers of relatively newly developed "components."

Business literature for decades has discussed the ever increasing levels of international procurement of components for all sorts of products. The case law suggests the same thing, although one cannot deem Section 271(f) cases as representative because some international aspects of the products in question are essential for the section to have any relevance at all. Nevertheless, cases like *Pellegrini* illustrate what are now common patterns of international component design, sourcing, and assembly.[141] There is simply no doubt that procurement of components from a variety of international sources is now commonplace, particularly for more complex and technologically advanced products. These patterns of international sourcing of components multiply the possibilities for application of Section 271(f).

Increasing product complexity has further increased the impact and burdens of Section 271(f). Particularly in the fields of electronics, semiconductors, computers, telecommunications, software, and the like, single new products often incorporate very large numbers of what one can reasonably term "components." Indeed, evidence developed in the NAS Report[142] showed that, in semiconductors, computers, telecommunications, and related fields, "it is common for there to be *hundreds* of patentable elements in one [new] product."[143] The Federal Circuit's reasoning in *Eolas* and other recent cases implies that an even larger number of individual "elements" of each of those patentable inventions would qualify as Section

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140. *See generally* NAS REPORT, *supra* note 19, at 47-54, 61-62, 80, 87-90, 104; FTC REPORT, *supra* note 19, Exec. Summary at 5-10, ch. 1 at 34-35, ch. 3 at 20-21, 36-37, 53-54, ch. 4 at 8-15; INNOVATION AND ITS DISCONTENTS, *supra* note 95, at 145-50.

141. See *supra* text accompanying note 90 regarding the international sourcing and assembly of the products involved in that case.

142. See *supra* note 101 regarding the origins of the NAS Report and the information developed there.

143. NAS REPORT, *supra* note 19, at 37 (emphasis added) (citing studies done in 2000 and 2001).

271(f) "components."[144] In any event, clearly there are very large numbers of such "components" in many new products. This too makes the application of Section 271(f) to such products much more likely than it would otherwise be and also more complex and difficult to assess.

4. Likely Injunctions

In many contexts, the possibility of a permanent injunction against further making, using, selling, etc. a product or "component" because of patent infringement is considered more threatening than even a substantial damages award.[145] The potential for entry of injunctions, in addition to awards of damages, is present under Section 271(f) as it is under the other types of infringement of U.S. patents.[146] Moreover, despite the Supreme Court's recent *eBay, Inc. v. MercExchange* decision, entry of a broad permanent injunction against the defendant's continued production and sale activities is quite likely in Section 271(f) cases where infringement is found and the defendant fails to prove, by clear and convincing evidence, that the patent is invalid or unenforceable; this is particularly true if the patent holder or an exclusive licensee is competing in the market for the claimed product.[147] The potential harshness of this result, together with the

144. The recent Federal Circuit cases indicate that each patentable invention involves multiple "components," for purposes of Section 271(f). Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325, 1339-40 (Fed. Cir. 2005) (holding that each structural element of a patented "machine," "manufacture," or "composition of matter" would qualify as a "component," as would each "step" or "act" of a patented method); AT&T Corp. v. Microsoft Corp., 414 F.3d 1366, 1368-69 (Fed. Cir. 2005) (agreeing). *See also supra* notes 46-51 and accompanying text.

145. Injunctive awards can, among other things, shut-down the defendant's production of the relevant product(s) or components, decimate the defendant's market participation, block performance of its supply commitments, render useless investments made and/or facilities built for production of the relevant item(s), and/or injure its participation in markets for products not covered by the patent(s) in question but related to the claimed product(s) or processes for sales or distribution purposes.

146. 35 U.S.C. § 283; *see, e.g.*, Lubrizol Corp. v. Exxon Corp., 696 F. Supp. 302 (N.D. Ohio 1988) (enjoining further shipments of the key chemical ingredient abroad for use in the claimed chemical combinations).

147. eBay, Inc. v. MercExchange, LLC, 126 S. Ct. 1837 (2006). In this case, the district court found MercExchange's patent infringed and not proved invalid but nevertheless declined to issue a permanent injunction against eBay, finding that MercExchange's: (i) willingness to license; (ii) failure to practice the patents itself; and (iii) comments to the media regarding its intent to enforce and license its patent rights all weighed against any presumption that it would suffer irreparable harm without an injunction. MercExchange, L.L.C. v. eBay, Inc., 271 F. Supp. 2d 789 (E.D. Va. 2002). The Federal Circuit reversed this denial of a permanent injunction stating, inter alia: "Because the 'right to exclude recognized in a patent is the essence of the concept of property,' the general rule is that a permanent injunction will issue once infringement and validity have been ad-

strong bargaining position it can give patent holders claiming infringement, have been widely criticized.

Obviously, the burdens of an injunctive order depend heavily on the facts of the particular case, with some injunctions presumably imposing only modest burdens as a practical matter. Likewise, *eBay* makes it less certain that a broad permanent injunction will be imposed whenever Section 271(f) infringement is found in the U.S. production of unpatented components for use in foreign-assembled products. The likelihood of onerous injunctive relief nevertheless remains important. When considering the risks of Section 271(f) claims, companies that can locate their productive activities either in the United States or abroad must consider not only (i) the increased possibility and larger size of infringement damages awards that producing domestically would entail but also (ii) the possibility that investments in productive facilities and people here might be wasted, even for foreign sales, and the company's ability to supply foreign markets jeopardized, because of an injunction under Section 271(f), whereas little or no such risk would exist if the investments were made in productive facilities located abroad.[148] Indeed, injunctions entered under

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judged." 401 F.3d 1323, 1338 (Fed. Cir. 2005). The Supreme Court reversed, stating that both courts had erred: the district court by concluding that the factors it mentioned were sufficient to deny a permanent injunction and the Federal Circuit by applying a nearly absolute presumption in favor of such broad, permanent injunctive relief. *eBay*, 126 S. Ct. at 1840-41. The Court mandated detailed facts-and-circumstances application of the traditional four-factor test for entry of an injunction but declined to spell out how the factors should be applied either on the facts of that case or in patent cases more generally. *Id.* The two concurring opinions, representing a total of seven of the justices, indicated that permanent injunctions can still be expected in a large proportion of cases where the patent is found valid and infringed and the patent holder competes in supplying the claimed product. *Id.* at 1841-43.

148. In order for Section 271(f) to add anything to the otherwise applicable rights and obligations: (a) the components in question must not be the subject of U.S. or the relevant foreign patents and (b) no effective foreign patent enforcement can be available as to the "infringing" combinations in the locations where they are assembled, sold, or used. If these points are true, production of the components in question in the country where the combinations are assembled or in any other country will necessarily face little or no meaningful exposure to patent liability. For example, assume as alleged that Pellegrini's patent would be found valid and enforceable and that the combinations in question, when made abroad, fell within its claims. Further assume that Pellegrini had sued not only Analog Devices, which produced the subject circuit chip components in Ireland and had them produced in Taiwan, but also a separate company that produced similar chips in the U.S. for shipment, combination, and sale solely abroad. The result would have been that Analog Devices would be free to continue supplying the chips for foreign markets, but that the company that produced the same chips in the U.S. for combination and use abroad would have been enjoined from continuing that activity.

Section 271(f) are uniquely far-reaching in one sense: they prohibit production in the United States of unpatented components for inclusion in "infringing" combinations anywhere in the world, including in countries that have no patent laws, countries where the combination product in question is not patentable subject matter, countries where a patent on that product exists but is invalid or unenforceable, and countries where no relevant patent application was ever filed.

In summary, Section 271(f) is anything but benign for U.S. producers. When it comes into play, it can multiply the monetary and injunctive exposure of U.S. producers to claims of patent infringement. Its terms necessarily put U.S. producers at a disadvantage relative to their foreign competitors. The recent judicial extensions of Section 271(f) have greatly expanded its reach. At the same time, commercial and technological developments have increased the likelihood that it can be invoked as to newly developed products. In addition, the increased number and enhanced strength of U.S. patents have increased the risks inherent in infringement litigation across the board, both in cases where the risk multiplier of Section 271(f) applies and in cases where it does not. Overall, the incremental risks and burdens created by Section 271(f) are substantial for producers of technologically oriented components for world markets.

Particularly serious are the resulting incentives. As *Pellegrini* makes clear, current and prospective U.S. producers can avoid the risks and burdens of Section 271(f) by the simple stratagem of locating their productive activities outside the United States. In the case of intangible "components" such as software and information, this might require the relocation of activities not normally referred to as "manufacturing" or "production."[149] Off-shoring of productive activities, of course, is sometimes attractive simply because of the reduction in production costs it often allows. Given the recent legal, technological, and commercial developments extending the reach of Section 271(f), however, the avoidance of its risks must in-

149. Part V of this Article suggests some types of information other than software might soon be deemed Section 271(f) "components" under the Federal Circuit's expansionist approach to that provision. Software and information may be made in final or near final form by writers, designers, and researchers in activities not normally termed "manufacturing." Conceivably a patent plaintiff trying to apply Section 271(f) to an information "component" might argue that U.S.-developed information is "supplied" from the U.S. even if it finds its way from a U.S. researcher to an off-shore facility where its tangible form of expression is altered and is subsequently distributed in that new form to other foreign locations and combined there with other components such as, say, medical diagnostic machines. If such an argument should prevail, it might be necessary to move the writing or research facility out of the U.S. in order to avoid the operation of Section 271(f) as to the use of the information with other components in world markets.

creasingly influence advice given to corporate managers as to where new production facilities should be located. In fields where patent worries are particularly strong, such as electronics, telecommunications, computer systems, etc., relocation of activities currently conducted in the United States may be part of such advice.

D. Other Possible Arguments in Favor of Section 271(f)

While Section 271(f) creates substantial problems and cannot incentivize innovation, its defenders might cite two separate considerations as possible reasons for its retention: (i) the knowledge/intent elements of infringement under Section 271(f) and the possible "unfairness" of such infringement in view of those elements; and (ii) efficiency considerations in the enforcement of U.S. patent rights. On examination, neither consideration meaningfully supports retention of Section 271(f).

1. Knowledge Elements and Unfairness

Defenders of Section 271(f) might say that the knowledge or intent required on the part of a U.S. producer in order to infringe under that section mitigates the burdens it imposes on U.S. producers. Similarly, given the knowledge/intent elements, they might argue that infringement under Section 271(f) requires "unfair" conduct, which is properly subject to sanctions.

Both clauses of Section 271(f) (together with the case law on inducement of infringement and contributory infringement) limit that section's application to circumstances where the U.S. producer of components: (i) knows or has reason to know that the components it produces and sells are likely to be combined abroad into a combination product; and (ii) has notice of the relevant U.S. patent and the ability to surmise that the foreign-made combination may fall within one or more of the patent's claims.[150] The extreme case of such knowledge, of course, was *Deepsouth*, where the U.S. producer made all the arrangements, knew of the patent, its coverage and validity, and had already been enjoined from the its proposed acts.[151] The Supreme Court dissenters in that case characterized the U.S. pro-

150. The wording of those clauses is set forth *supra* note 23. A number of cases discuss the elements of inducing infringement and contributory infringement and the "lack of clarity" as to the type or degree of intent needed for inducement. *See* Insituform Techs., Inc. v. Cat Contracting, Inc., 385 F.3d 1360, 1378 (Fed. Cir. 2004); Hewlett-Packard Co. v. Bausch & Lomb, Inc., 909 F.2d 1464, 1469 (Fed. Cir. 1990); *cf.* Golden Blount, Inc. v. Peterson Co., 438 F.3d 1354, 1364 (Fed. Cir. 2006). In any event, intent is often inferred from circumstantial evidence. Water Techs. Corp. v. Calco, Ltd., 850 F.2d 660, 668-69 (Fed. Cir. 1988).

151. *See supra* text accompanying notes 12-13.

ducer's conduct as unfair and, indeed, "iniquitous"; this perception contributed greatly to their view that it should be condemned.[152] Most Section 271(f) cases involve nothing like those levels of knowledge, intent, and overall direction on the part of the U.S. producer. In any event, as several considerations show, the knowledge/intent elements in Section 271(f) do not substantially mitigate its burdens and risks, do not justify it on fairness grounds, and do not render its perverse incentives insubstantial.

For one thing, as we have seen,[153] considerable uncertainty clouds the scope and validity of issued patents. This is significant here because a belief that a particular patent would not cover the foreign combination or that the patent was invalid or unenforceable might well not protect a U.S. producer against a finding of infringement of that patent under Section 271(f).[154] Making matters worse for the U.S. producer is the large number of patents that may cover new innovative products, often dozens of existing patents for each individual new product in fields such as semiconductors, software and computer systems, telecommunications, etc.[155] With significant uncertainties as to such large numbers of patents, it is unrealistic to think that a U.S. producer of technologically advanced components

152. *See supra* note 14 and accompanying text.

153. *See supra* text accompanying notes 138-140.

154. *See, e.g.*, Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005) (remanding the case to try the issues of anticipation, obviousness, and inequitable conduct). In the pending reexamination proceeding, the PTO examiner has indicated his preliminary belief that the *Eolas* patent is invalid. The court opinions do not suggest that Microsoft would have any defense to the huge incremental liability under Section 271(f) if those defenses are ultimately rejected even though it could prove that it had a good faith belief that one or more of the defenses was applicable—as the Federal Circuit has said may be the case—or that the patent would not be read as covering the foreign-made combinations. *See Eolas*, 399 F.3d 1325. Such matters presumably would prevent findings of willful infringement and awards of enhanced damages under 35 U.S.C. § 284, but the district court's third-of-a-billion-dollar incremental award under Section 271(f) did not include any such enhancement. *See also Golden Blount*, 438 F. 3d at 1364 (affirming finding of actionable inducement of infringement where accused party had received notification from patentee alleging infringement of the asserted patent, claimed a good faith belief of non-infringement of any valid claims, but had not insisted on competent written opinions of counsel affirming non-infringement or invalidity). The *Golden Blount* court held that "the only intent required [on the part of the defendant] is the intent to cause the acts that constitute infringement." *Id.* (quoting *Hewlett-Packard*, 909 F.2d at 1469).

155. *See* NAS REPORT, *supra* note 19, at 37 (noting that, in semiconductors and other complex product technologies, "it is common for there to be hundreds of patentable elements in one product," and consequently, absent cross license arrangements and other mitigating efforts, it would usually be impossible to develop or commercialize new products without infringing multiple patents of others).

can generally avoid infringement under Section 271(f) by exercising reasonable care.[156]

Yet another difficulty is a matter of timing. When a company must make investment decisions for the location of productive facilities, it or its advisors cannot possibly know what pending U.S. patents will be published or will issue during construction and start-up of those facilities or their operation. Thus, even if a U.S. producer could assess all issued and pending patents and form reliable judgments that none of them validly cover the combinations in which the company's components would be used, exposure under Section 271(f) would still be quite possible by the time the facilities enter operation and for some time thereafter.

Further, any fairness-based argument in favor of Section 271(f) is substantially undercut by the double failure (or inability) of the U.S. patent holder to obtain direct patent protection either: (i) in the form of U.S. patents on the U.S.-supplied components in question; or (ii) in the form of relevant foreign patents for the combination product. If the U.S. patent holder could have obtained either one of those patents but did not do so, his/her claim of unfairness would ring hollow in view of the relative ease of obtaining such protection. On the other hand, if the components and combination were unpatentable here and in the relevant foreign country, respectively, barring U.S. component producers from competing in the foreign market is difficult to justify as "fair."

Indeed, the most apparent unfairness relevant to Section 271(f) seems to be in the operation of that section itself—particularly given current patterns of U.S. patent awards and international competition. The operation of that provision only against U.S. producers, in itself, seems unfair. It is worse now that the granting of patents to non-U.S. inventors and owners differs fundamentally from what was assumed by the Supreme Court in *Deepsouth* and by Congress when it enacted Section 271(f).[157] Until the

156. Further, an effort by the U.S. producer to reduce its Section 271(f) exposure would require substantial conservatism on its part in assessing the scope and enforceability of the possibly applicable issued patents and published applications. This would expand the areas where U.S. producers are barred from innovating and competing, thereby chilling production and competition by U.S. producers.

157. Both the majority and the dissent in *Deepsouth Packing Co. v. Laitram Corp.* assumed, consistent with the facts there, that the question addressed concerned U.S. patents held by U.S. individuals or entities. The majority, for example, asserted what they considered a traditional and desirable ability of U.S. producers: "[W]e note that what is at stake here is the right of American companies to compete with an American patent holder in foreign markets. Our patent system makes no claim to extraterritorial effect . . . ." 406 U.S. 518, 531 (1972). The dissenters assumed the same thing: "[The majority's result allows] an infringer to set up shop [in the U.S.] next door to a patent-protected inventor

1980s, the large majority of U.S. patents were issued to U.S. inventors and owned by them or by other U.S. entities. Currently, however, half of U.S. patents are being issued to foreign inventors and owned by foreign entities,[158] with Japanese companies comprising a majority of the ten top grantees of U.S. patents.[159] Accordingly, Section 271(f) may soon be invoked by, for example, a Japanese entity as the owner of the U.S. patent for a combination product or for a method/process. The target of the Section 271(f) claim, of course, would have to be one or more U.S. producers of components or of items that facilitate use of the method. Damages could be claimed under the U.S. patent laws for sales of the relevant combination products or use of the method in any country in the world.[160] Given the absence of a provision like Section 271(f) in Japanese patent law, the U.S. patent laws ironically would protect a Japanese company from competition by U.S. producers in markets around the world even though other Japanese producers, indeed all non-U.S. producers, would be under no such restrictions. There can be no justification for such a result.

2. Efficiency in Patent Enforcement

Another possible argument in favor of Section 271(f) is that it can promote efficiency in the collection of damages in infringement suits involving product sales in multiple countries. The holder of a U.S. patent can sometimes combine claims for domestic infringement with claims under Section 271(f) based on sales in foreign countries. A little consideration, however, shows that this provides no justification for Section 271(f).

Patent enforcement is notoriously expensive and problematic. For a holder of patents in multiple countries, enforcement against infringers in each of those countries has sometimes required separate actions in the respective jurisdictions.[161] In actuality, of course, one or a few infringers

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whose product enjoys a substantial foreign market and deprive him of this valuable business." *Id.* at 534 (Blackmun, J., dissenting) (quoting Laitram Corp. v. Deepsouth Packing Co., 443 F.2d 936, 939 (5th Cir. 1971)). The limited legislative history of Section 271(f) shows the same assumption. *See supra* notes 24-32 and accompanying text.

158. *See supra* note 17.

159. *See, e.g.*, U.S. Patent & Trademark Office, Calendar Year 2005 - Preliminary List of Top Patenting Organizations, http://www.uspto.gov/go/taf/top05cos.htm

160. For Section 271(f) to be relevant, the U.S. patent would have to cover only the combination and not the component(s) or the item that facilitates use of the method. That being the case, any Japanese patent would presumably not cover the component(s) or item either.

161. *See* Briefs of Appellant, Intellectual Property Owners Ass'n as Amicus Curiae Supporting Appellant, United States as Amicus Curiae Supporting Appellant, Federal Circuit Bar Ass'n as Amicus Curiae Supporting Appellant, American Intellectual Property Law Ass'n as Amicus Curiae Supporting Appellant, *Voda v. Cordis Corp.*, Misc. Dkt

may be by far the most significant. Particularly in such a case, one or two suits may either: (i) reap the bulk of potential recoveries; or (ii) shape the resolution and settlement of claims for sales activity in many or all of the relevant jurisdictions. That will not necessarily be the case, though, and the possible need for infringement suits in more than one jurisdiction—with correspondingly increased costs—cannot be dismissed.

As the *Eolas* case demonstrates, Section 271(f) might seem, on the surface, to substitute for suits in multiple jurisdictions, allowing enforcement of patent rights in multiple countries in a single, more efficient proceeding.[162] The basic problems, however, are that: (i) Section 271(f) does not apply the respective patent laws of foreign jurisdictions as to sales in those respective countries but applies an abbreviated form of the U.S. patent laws as to those foreign sales; and (ii) Section 271(f) is available only against U.S. producers. Thus, the standards applied are not those that are applicable as against non-U.S. infringers—who, in fact, would be under no restrictions at all unless an enforceable patent exists in the relevant jurisdiction, in which case Section 271(f) would be largely superfluous—and discrimination against U.S. producers is inherent in such proceedings. The only way to avoid discrimination and accurately reflect the actual underlying patent rights would be to apply the respective national patent laws as to acts in the respective countries.

A few patent holders have tried to sue infringers in a single U.S. court action under: (i) their U.S. patents and the U.S. patent laws for infringing acts committed here; and (ii) their foreign patents and foreign patent laws for acts in the respective foreign countries. The U.S. federal district courts probably have jurisdiction to adjudicate the foreign patent law claims against U.S. producers, in addition to any claims against them under U.S. law, either under the supplemental jurisdiction statute, 28 U.S.C. § 1367(a), or under the general diversity statute, 28 U.S.C. § 1332. In the relatively few cases where such combined claims have been asserted, however, the U.S. courts have generally used one of several rationales to decline to hear the foreign law claims, even though they involved the same

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No. 785, 122 F.App. 515, 2005 U.S. App. LEXIS 4394 (Fed. Cir. Feb. 22, 2005) (granting petition for permission to appeal), *appeal dismissed*, 125 F.App. 287, 2005 U.S. App. LEXIS 5594 (Fed. Cir. Mar. 2, 2005), *available at* http://patentlaw.typepad.com/patent/2005/06.

162. In *Eolas Techs., Inc. v. Microsoft Corp.*, for example, Eolas obtained a judgment from the district court against Microsoft awarding damages for both: (i) domestic infringement; and (ii) creation of the allegedly infringing combination products abroad, effectively covering sales in many different countries as well as sales in the United States. 399 F.3d 1325 (Fed. Cir. 2005).

or similar products and the same or very similar patent claims to those being adjudicated under the U.S. patent laws.[163]

Practical problems may make it infeasible to adjudicate patent infringement in multiple countries under multiple laws in a single proceeding. These include: (i) the complexity of the patent laws; (ii) the differences among the patent laws of different countries; (iii) the need to apply instruments, documents, and laws in different languages; and (iv) the procedural complications and difficulty of gathering information from multiple countries, etc.[164] Such complications may be an argument for the harmonization of international patent laws, which is a common topic of discussion in patent law circles. Judging by negotiations to date, however, internationalizing the U.S. patent laws is not an acceptable answer to this problem as far as foreign countries are concerned. Use of Section 271(f) to accomplish a limited internationalization of U.S. law—but only against U.S. producers and only as to circumstances where U.S.-produced "components" are assembled abroad—seems logically unsupportable and, in any event, would injure U.S. interests and complicate patent rights substantially.

E. Bottom Line Assessment

The matters addressed above seal our assessment of Section 271(f). That provision fails to stimulate innovation and therefore fails to advance the objectives of the U.S. patent laws. It constitutes a threat and burden for U.S. producers of technologically advanced products that non-U.S. producers do not face. Since companies—U.S. and foreign alike—can avoid the burdens and risks of Section 271(f) simply by locating their productive facilities outside the United States or contracting with foreign producers, that provision creates substantial perverse incentives *against* investment, job creation, employee training, and production of innovative products in the United States. The patent laws are all about creating desirable incentives. In that respect, Section 271(f) is seriously counterproductive.

As we have seen, recent Federal Circuit decisions have greatly extended Section 271(f), but uncertainty remains as to whether the exten-

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163. These rationales have included (i) determinations that the claims did not involve a "common nucleus of operative fact," (ii) the discretion to decline to exercise supplemental jurisdiction pursuant to 28 U.S.C. § 1367(c), and (iii) the *forum non conveniens* doctrine. *See* Briefs of Appellant and for the United States, the American Intellectual Property Law Ass'n., & the Federal Circuit Bar Ass'n. as Amici Curiae Supporting Appellant, *supra* note 161; Ideal Instruments, Inc. v. Rivard Instruments, Inc., 434 F. Supp. 2d 598, 630-31 (N.D. Iowa 2006); *cf.* SRAM Corp. v. Sunrace Roots Enter. Co., 390 F. Supp. 2d 781, 784-85 (N.D. Ill. 2005).

164. *See generally* briefs discussed *supra* note 161.

sions will last. Supreme Court review in *Microsoft v. AT&T* might broadly confirm—or reverse—the application of Section 271(f) to: (i) intangible "components" such as information, patterns, and software; and (ii) foreign-made combination products that include only foreign-made copies or representations of the U.S.-originated items such as information, patterns, software, designs, etc. It might also influence the applicability of Section 271(f) to method claims, although that issue is not directly presented.[165] Broad clarification, however, may be slow in coming. Recent statements by Chief Justice Roberts, like the Court's recent decision in *eBay*, indicate a preference for narrow, rather than broad, rulings.[166] Accordingly, we may not have real clarity on these questions in the near future.

Even if the Court rolls back the recent extensions, the discrimination against U.S. producers inherent in Section 271(f) will remain as to many types of components and combination products, and that provision will still lack any incentivizing benefits for innovation. Further, the perverse incentives against investment and production in the United States would be reduced only modestly by, for example, a broad determination that Section 271(f) does not apply to method claims.[167] Complete repeal of Section 271(f) is the preferred alternative.

V. FUTURE APPLICATIONS OF SECTION 271(F) AND SPECIAL ASPECTS OF THAT PROVISION IN CONTEMPORARY PATENT ENFORCEMENT

Although it is an undesirable provision of law, Section 271(f) may remain on the books for a considerable period in the future and may have important applications that are not yet evident. Accordingly it is interesting, in technical as well as economic and policy terms, to consider some new ways in which Section 271(f) may be applied in the near future, if it is not repealed or drastically curtailed.

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165. See *supra* notes 84-85 and accompanying text regarding the Supreme Court's recent grant of review in *AT&T v. Microsoft* and the matters the Court may decide in that case.

166. In his remarks at the May, 2006 Georgetown Law School Commencement, Chief Justice Roberts' main theme was that the Court should never rule more broadly than necessary to resolve the case before it. *See, e.g.*, E.J. Dionne Jr., *The Chief Justice Sets a Standard*, WASH. POST, June 20, 2006, at A-17. Whether based on this precept or not, the Court issued a very narrow and uninformative ruling in *eBay, Inc. v. MercExchange, LLC*, 126 S. Ct. 1837 (May 15, 2006), its most recent patent law decision.

167. See *supra* text accompanying note 57 regarding the reduction of the provision's perverse incentives that would result from such a ruling.

A. High-Value Components and Information Components

Factors influencing the application of Section 271(f) include: (i) the modern globalized patterns of production and assembly of components; (ii) the product areas where U.S. producers remain ahead of, or competitive with, their foreign counterparts in supplying components; and (iii) the large numbers of patents being issued on inventions that, themselves, involve large numbers of distinct components.

One pattern we have seen involves foreign assembly of relatively low-value components made in various countries with one or a few high-value components produced in the United States.[168] This pattern makes it likely that liability under Section 271(f) will be asserted in any dispute involving a U.S. patent claiming the foreign-assembled combination or a portion thereof.

Sophisticated semiconductor microchips used as components of larger foreign-assembled devices fit this pattern in those areas where U.S. producers are prominent in producing such chips. U.S. produced software is another likely example, given the strengths of U.S. software producers and the ease with which such intangible components can be supplied from the United States to any location in the world for inclusion in larger systems and devices. Other U.S. supplied components to which Section 271(f) might be applied could include computer virus signatures, software updates or patches, and data compilations that enable patented inventions to operate or to update their operation.

B. Genomics and Stem Cells

Moving to the edge of the computer arena, genomic analysis systems and methods might easily lead to infringement charges under Section 271(f) against U.S. producers of several divergent types of "components." For one thing, silicon microchips having thousands of specialized receptors to detect specific DNA base sequences will apparently be one key component of automated systems for providing economical genomic analysis and typing of individuals. Specialized software for processing the raw data and analyzing it against genotypes in the population, disease correlations, and/or therapeutic sensitivity correlations would likely be another important component. A database of population genetics, drug sensitivity correlations, disease correlations, etc.—some or all of which might be subject to periodic updating—might also be an important component of such systems and methods. Given U.S. strengths in advanced microchips, analytical software, and genetic research, all three of these types of "com-

168. *See supra* text accompanying note 59.

ponents" might well be produced in the United States. At the same time, a variety of hardware items, from fluid-handling equipment to computer hardware, electrical systems, display/communications devices, etc, will also be required. Many of these may be produced, and the entire machines may be assembled, abroad.

The patents on such systems and/or methods might cover implementations with any of a range of analytic microchips, any of a variety of analytical software products, and any of a range of genetic databases or updates thereof. Variations of these key components might or might not be patented. The owner of a U.S. patent on all or a part of the system or method might use Section 271(f) to bar U.S. producers from supplying any of a range of microchips, software products, and/or genetic databases for use in such systems or methods anywhere in the world. To the extent they recognize this possibility, technically capable companies, wherever based, would think twice before investing in U.S. facilities and training of U.S. workers to produce such microchips, software, or databases. Indeed, since the data "components" might come directly from research activities, such companies might decide to locate their research and development activities, in addition to production facilities, outside of the United States.

As a final point of speculation, it is widely hoped that stem cells may become important bases for treatment of a range of human ills. If so, such cells or cell lines may become "components" of therapeutic methods that will be practiced abroad or of therapeutic systems that will be assembled and used abroad. Depending on the circumstances, the holder of a U.S. patent on part or all of such a method or system might use Section 271(f) to assert infringement on the part of the U.S. developer/supplier of the cells or cell lines and/or information used in connection with them even though the patent holder had not, and perhaps could not have, patented the cells or information.

C. Patent Trolls

In the last decade, numerous entities have been formed to identify and acquire unused or "quiescent" patents[169] and assert them, via demand letters, threats of suit, or actual litigation, against companies whose products or processes may fall within the patent claims. The organizers of such entities have usually been patent attorneys and have often arranged financial

169. Such "quiescent" patents may be obscure and/or owned by companies in bankruptcy or by estates of the deceased inventors. They may have expired for failure to pay maintenance fees—so long as they are still subject to revival by appropriate application to the PTO. See 37 C.F.R. § 1.378(c), which makes it possible in many cases to revive a patent that has expired for failure to pay maintenance fees.

backing by venture capitalists or similar investors.[170] Critics have labeled these entities "patent trolls," a term that has gained wide currency.[171]

Technology companies and other critics emphasize that trolls play no part in either creating the underlying inventions or commercializing or producing the products covered by the patents they assert. Overall, the critics say, trolls unfairly exploit the weaknesses of the U.S. patent system against entities that are performing the hard work of innovation.[172] In this

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170. *See* FTC REPORT, *supra* note 19, ch. 2 at 31, ch. 3 at 37-41; NAS REPORT, *supra* note 19, at 31. Both reports describe the emergence of patent enforcement entities backed by venture capital, private equity, or hedge fund investors hoping to profit by acquiring and enforcing theretofore unasserted patents.

171. *See, e.g.*, Cutler, *supra* note 132 (describing the presentations and discussion at the four "town meetings" on patent reform sponsored by the National Academies' Board on Science, Technology, and Economic Policy, the Federal Trade Commission, and the American Intellectual Property Law Association in connection with the recommendations for reform of the U.S. patent laws made in the NAS Report and FTC Report). For example, the Patent, Trademark & Copyright Journal reported regarding one of those "town meetings":

> Much debate centered on patent "trolls," a term of derision for attorneys and individuals who send letters to and sue companies alleging patent infringement and seeking royalties. "Right now injunctions are being used to effectively deprive [companies in the industry of] the ability . . . to deliver value to customers, to deliver innovation," [Microsoft's William] Poole said. Patent trolls, he said, "don't ever actually commercialize an invention, [but] they . . . hold up someone that is trying to commercialize that invention, that is trying to deliver the value to consumers. And they hold them up via threat of injuncti[ons]. And we think this is wrong."

Id. T. Andrew Culbert of Microsoft said:

> The troll concept refers to the person on the bridge who doesn't contribute to innovation but . . . manages to abuse the system, use the system in a way it was not intended to be used, but then tax[es] the people who do actually . . . innovate and who want to deliver those innovations to the end users.

Id.; *see also* Joe Beyers, *Rise of the Patent Trolls*, CNET NEWS.COM, Oct. 12, 2005, http://news.com.com/ riseofthepatenttrolls/2010-1071_3-5892996.html. Beyers observed:

> The shakedown is on. In the aftermath of the dot-com bust, a new kind of business with a simple, yet potentially lethal, model has emerged. Call them "patent trolls." These operators have no products or customers. Yet they wield the power to bring the companies that actually make and sell products to their knees. . . . In recent years, trolls have raised massive amounts of money. . . . Trolls have an inherently unfair advantage in extracting value from operating companies due to the nature and uncertainty of the patent judicial system.

Beyers, *supra*.

172. *See supra* note 171. According to media interviews, trolls often search through large numbers of outstanding patents seeking those that: (i) have broad claims that cover,

view, trolls harm innovation and the U.S. economy and amount to a misuse of the patent system.[173]

The typical troll business plan probably does not rely substantially on Section 271(f). Trolls can apparently find many useful quiescent patents and many possible infringers arguably subject to large infringement damages and/or license fees by relying solely on domestic production, sales, and use.

Nevertheless, Section 271(f) does have a vastly disproportionate value and usefulness for patent trolls compared to other patent holders. This special value reflects a timing-related difference between: (i) what is required—early-on—to incentivize inventive efforts and investment; and (ii) what makes a patent valuable, years later, in the hands of a potential en-

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or might be read as covering, products that have come into substantial use by others; but (ii) lack any history of licensing or assertion, i.e., are quiescent and ignored. According to critics, the acquired patents, though broad, are often invalid, but the activities of trolls are nevertheless a significant burden on many U.S. producers because of the costs and risks of unpredictable patent litigation. For the target of a troll, the economics of litigating validity is generally unattractive because: (i) the troll has little at risk and can rely on the statutory presumption of validity, 35 U.S.C. § 282; whereas (ii) the accused infringer must bear the burden of proof and must demonstrate invalidity by "clear and convincing" evidence; and (iii) as an operating company, the accused infringer is likely to suffer severe disruption and injury if the patent should be found valid and infringed. Where the trolls are particularly concerned about weaknesses of the patents they are asserting and negotiations do not lead to the license fees they seek, trolls may sue a few target companies at a time but, depending on the circumstances, and demand relatively modest royalties of each one. Their apparent aim in such cases is to demand low enough royalties that the target companies will settle and pay rather than going to the expense of litigating the validity of the subject patents. *See, e.g.*, FTC REPORT, *supra* note 19, ch. 2 at 31, ch. 3 at 37-41.

173. Numerous published accounts refer to the particular problems such trolls present for companies that produce technologically advanced products. In many technologies, such as semiconductors, computer hardware and software, and electronics generally, routine cross-licensing of patents is essential to allow the introduction of new products. Absent such routine licensing, the large numbers of existing patents (sometimes termed "patent thickets") may totally block new product introductions or, in other instances make innovation very difficult. Fortunately, ready cross-licensing, with or without cash payments to balance the perceived worth of the rights licensed by each side, has long been routine. That is largely because no enterprise actually producing and introducing products could succeed without regularly obtaining licenses to patents held by others in return for licensing its own. In contrast, trolls have no commercial operations that could be threatened by the patent portfolios of other companies and no interest in obtaining licenses of such patents. Accordingly, they are not constrained in threatening to shut down the operations of producing companies via injunctive orders under their acquired patents—assuming they would be upheld. *See generally* sources cited *supra* note 172. The more aggressive stance and different incentives of the trolls have been troubling to a number of U.S. technology companies. *Id.*

forcer. Years after outstanding patents have issued, a patent troll can review large numbers of them to see which: (i) have claims that may cover products or processes that have, by then, come into substantial use; and (ii) are available cheaply. Importantly, the troll can evaluate the potential recovery from asserting those patents based not only on the size of the U.S. market for the claimed product or process but also taking into account whether one or more U.S. producer supplies one or more component for inclusion in the claimed product or process as assembled or practiced abroad. If so, Section 271(f) is ideal for capturing, in a single U.S. lawsuit, large incremental damages from worldwide sales—and for threatening injunctions against worldwide sales of components made in the United States.

Whether Section 271(f) claims have played a material role, to date, in negotiations between trolls and U.S. producers of technologically advanced components is unclear, because the negotiations and settlements entered into by trolls are generally kept confidential. Recent testimony by the founder-principal of a large alleged troll, however, showed his awareness of the particular usefulness of Section 271(f). Apparently for that reason, he strongly opposed limitations on, or repeal of, Section 271(f).[174] It seems likely that the increased bargaining power and enhanced recoveries Section 271(f) often provides can make the difference between a marginal patent troll and one that is profitable and attractive to private equity and other investors.[175]

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174. *See* Neil Graham, *Legislation/Patents: House Continues Debate on Patent Reform; Momentum Builds As Differences Sharpen*, PAT. TRADEMARK & COPYRIGHT J. (BNA) (May 6, 2005) (describing the April 28, 2006 testimony of Nathan Myhrvold before the House Subcommittee on Courts, the Internet and Intellectual Property). Myhrvold, formerly Chief Technology Officer at Microsoft, founded Intellectual Ventures, which is often identified as a mysterious entity resembling a large and wealthy patent troll. *See, e.g.*, Nicholas Varchaver, *Who's Afraid of Nathan Myhrvold?*, FORTUNE, June 26, 2006, *available at* http://money.cnn.com/magazines/fortune/fortune_archive/ 2006/07/10/ 8380798/index.htm. In that testimony, Myhrvold opposed limitations on Section 271(f) as well as limitations on the pre-*eBay* rule of automatic injunctions in patent cases where infringement has been found. Automatic injunctions, like Section 271(f) in appropriate cases, greatly enhance the leverage of trolls *vis-à-vis* putative infringers.

175. The *Eolas* example shows how advantageous Section 271(f) can be in increasing the pay-off from a single U.S. lawsuit. *See* 399 F.3d 1325 (Fed. Cir. 2005). In *Eolas*, two-thirds of the huge damages award entered by the district court was based on foreign sales made relevant and admissible solely because of Section 271(f). *Id.* Presumably Section 271(f) would be particularly important to the economics of a troll that concentrates on industries such as electronics, telecommunications, computer hardware and software, biotechnology, etc., where many technologically advanced components are often combined into larger patentable products or processes.

Most commentators consider the activities of patent trolls and their impact on the U.S. economy to be undesirable overall. Accordingly, any adverse effects on the economics of their operations as a consequence of narrowing or repealing Section 271(f) would seem to be, overall, positive for innovation and for the U.S. economy as a whole.

VI. CONCLUSION

Although intended to promote innovation, the patent laws can also impede innovation and competition and threaten social welfare. As both the NAS Report and the FTC Report emphasize, it is important to limit the adverse effects of patents if they are to produce net benefits to society.[176]

Section 271(f) provides no significant incentives for innovation, investment, or disclosure while creating perverse incentives for existing and prospective U.S. producers and investors. Even the good news about that provision is bad: actual or prospective U.S. producers can avoid its discriminatory burdens and achieve relative safety by moving their productive facilities to other countries or contracting-out production to foreign suppliers. But whenever a company chooses one of these options, the U.S. loses technology, sector jobs, tax revenues, and portions of our technological and industrial base.

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176. *See, e.g.*, Lab. Corp. of Am. v. Metabolite Labs., Inc., 126 S. Ct. 2921, 2922 (2006) (Breyer, J., dissenting from dismissal of writ of certiorari) ("[S]ometimes too much patent protection can impede rather than 'promote the Progress of Science and useful Arts'"); *id.* at 2929 (discussing the "important debate" as to whether our current patent system reflects the proper balance it should embody); FTC Report, *supra* note 19, Executive Summary at 2-12, 14-16, ch. 1, passim. In *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, the Supreme Court explained:

> Every patent is the grant of a privilege of exacting tolls from the public. The Framers plainly did not want those monopolies freely granted. The invention, to justify a patent, had to serve the ends of science—to push back the frontiers of chemistry, physics, and the like; to make a distinctive contribution to scientific knowledge . . . . "[Recognition of excessive patent rights] tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith."

340 U.S. 147, 154-55 (1950) (quoting Atl. Works v. Brady, 107 U.S. 192, 200 (1882)).

Section 271(f) was presumably well intentioned and might not have done much harm in the economic, technological, and legal environment of the 1970s and early 1980s. Even then, however, it amounted to a misguided overreaction to the unusual circumstances presented in *Deepsouth*. Present day patterns of international production and competition, revolutions in technology, and the proliferating numbers of patents have multiplied the circumstances where litigants can invoke that provision. These same factors together with judicial decisions expanding the reach of Section 271(f) and the increased strength and availability of patent remedies have likewise increased the impact of Section 271(f) when it is invoked. U.S. producers have also become more vulnerable to the discrimination Section 271(f) brings to patent enforcement. At the same time, advances in international patent cooperation have reduced the always flimsy justifications for Section 271(f).

Section 271(f) threatens U.S. interests and lacks any redeeming benefits. Congress should repeal that provision without further delay. Failing that, its application should be cut back as drastically as possible.