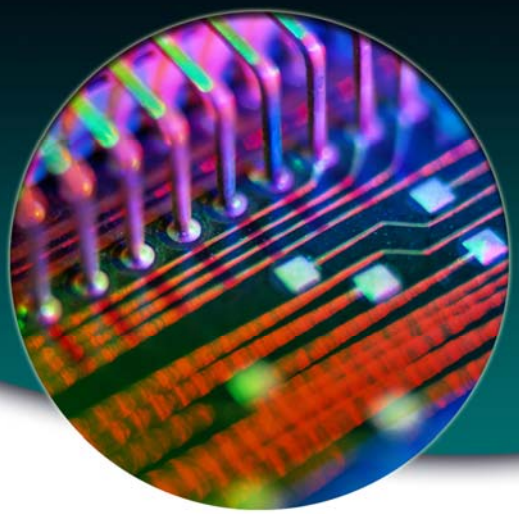
SQUIRE SANDERS | LEGAL COUNSEL WORLDWIDE



INTELLECTUAL PROPERTY UPDATE

Summer 2009

Squire, Sanders & Dempsey L.L.P.

Inside:

Editor's Corner

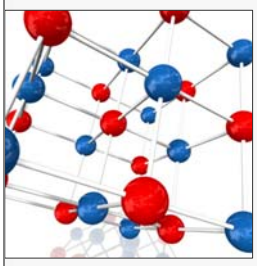
Don't miss the obvious. The Board of Patent Appeals and Interferences (BPAI) at the United States Patent and Trademark Office (USPTO) decides issues of patentability. In *Ex Parte Catlin et al.,* the BPAI reminds us of one of the most critical aspects of drafting a patent application: the specification must be thoroughly drafted, it must describe with particularity the structure and functions implementing the novel invention. In this issue, we explore various criteria for a patent applicant to consider when pursuing a software patent.

To patent or not to patent a business method patent, that is the question. The US Supreme Court is preparing to evaluate the patentability of software and business method patents. The Court announced on June 1, 2009 that it will soon hear *In re Bilski,* a dispute over the validity of a patent that covers commodity trading methods. In this issue we discuss two recent district court decisions that have interpreted and applied the holding of *In re Bilski.*

Manage your patent prosecution costs! In these difficult times, businesses small and large are constantly evaluating costs and trying to determine where to save. Nevertheless, patent protection is a critical aspect to advance strategic goals of a business. In this issue we discuss factors to consider before deciding to cap spending on patent application drafting and prosecution, and some strategies to contain patent prosecution costs.

Alicia M. Choi, editor

Claiming Algorithms After *Catlin*



Algorithms may be the most important disclosure in a software patent, but the definition of "algorithm" remains elusive. In a precedential opinion (*Ex Parte Catlin et al.*) on February 3, 2009, the BPAI applied the Federal Circuit's decision in *Aristocrat Techs. Austl. Pty Ltd. v. Inter. Game Tech.*[1] to find claims of *Catlin* invalid where the specification did not provide an algorithm.

The claims in *Catlin* were directed to a customer accessing an "earning activity" through a merchant's website. The relevant earning activity appears to have been frequent flyer programs and similar points-based programs. According to the BPAI, these incentive programs were simply "examples of the results of the operation of an unspecified algorithm."

In *Aristocrat,* the Federal Circuit took the position that "[f]or a patent to claim a means for performing a particular function and then to disclose only a general purpose computer as the structure designed to perform that function amounts to pure functional claiming."[2] The Federal Circuit went on to conclude that such disclosure does not meet the requirements of the sixth paragraph of 35 U.S.C. §112.

The decision in *Aristocrat* is part of a line of cases including *Biomediono, LLC v. Waters Technologies, Corp.*[3] In *Biomediono* the Federal Circuit stated: "If there is no structure in the specification corresponding to the means-plus-function limitation in the claims, the claim [sic] will be found invalid as indefinite."[4]

The BPAI applied *Aristocrat* to the claims in *Catlin* and concluded that the "[a]ppellant has failed to disclose any algorithm, and thus has failed to adequately describe sufficient structure, for performing the functions recited in the means elements contained in the first step of claims 1, 9, and 20 so as to render the claims definite."[5] The BPAI, therefore, held the claims invalid under 35 U.S.C. §112, second paragraph and, in a surprising aside, vacated the rejection under 35 U.S.C. §103 as "imprudent" because of the degree of speculation required to interpret the claim.

The underlying rationale for the BPAI's decision is two-fold:

1. a general purpose computer is not (without a particular algorithm) sufficient structure to serve as the basis for a means-plus-function claim recitation and
2. a particular algorithm must be identified with some degree of specificity.

The BPAI did not deem the general references to incentive programs and the like in the specification of the patent application to be sufficiently particular algorithms.

It is interesting to note that the BPAI rejected the appellants' own designation of the means as being "merchant's web site" in combination with "incentive program." The BPAI argued that because the claimed means were "at a merchant's web site" the claimed means could not correspond to the merchant's website. Whether or not this reasoning is valid, it highlights the value of providing more discussion regarding the embodiments of the invention in the application.

One negative aspect of this particular case is that no claims were deemed to be definite. Thus, it is not clear what level of particularity is required in order to meet the BPAI's new requirement that an algorithm be sufficiently particular. Even more concerning to patent practitioners is the complete absence of any definition of algorithm in the decision.

Based on a quotation provided from *Aristocrat,* we can infer that algorithm is not co-extensive with computer instructions. *Aristocrat* states that "[t]he instructions of the software program in effect 'create a special purpose

machine for carrying out the particular algorithm.'"[6] This demonstrates that, conceptually, software instructions and a "particular algorithm" are not the same thing, although they are related.

We may be able to obtain further light on what an algorithm is intended to be by comparison to another portion of the lengthy block quotation from *Aristocrat:* "A general purpose computer programmed to carry out a particular algorithm creates a 'new machine' because a general purpose computer 'in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software.'"[7]

Perhaps the best way to resolve this tension is by placing the concept of algorithm somewhere between the level of the "function" recited in the "means-plus-function" recitation and the level of computer instructions that actually implement the function.

There is a grammatical parallel between "particular functions" and "particular algorithm" in this discussion. Thus, one may reasonably conclude that specifying particular functions to be performed by the general purpose computer may amount to disclosing the particular algorithm, according to the implicit definition provided by the Federal Circuit and adopted by the BPAI.

However, other discussion in the BPAI decision suggests that merely specifying the particular functions may not be enough. The BPAI indicated that, in their view, the Federal Circuit had determined that the disclosure at issue was "merely a mathematical expression that describes the outcome of performing the function and not a means for achieving that outcome."[8]

The only other clue provided in *Catlin* regarding the meaning of algorithm is the following statement: "Accordingly, the Specification fails to disclose the algorithms that transform the general purpose processor to a special purpose computer programmed to perform the disclosed functions of the first elements of claims 1, 9, and 20."[9] This discussion seems to suggest that it is the algorithms themselves that change a general purpose processor into a programmed processor.

This final clue initially appears to undermine the first inference drawn from *Aristocrat* as quoted in *Catlin.* In this final clue, the most reasonable inference is that it is the instructions themselves that the BPAI thinks constitute the algorithm for performing the functions. After all, it is literally the programmer or software installer that transforms the general purpose processor by loading computer-readable instructions onto the processor. This would seem to contradict the distinction presented in *Aristocrat* between instructions and an algorithm.

Perhaps the best way to resolve this tension is by placing the concept of algorithm somewhere between the level of the "function" recited in the "means-plus-function" recitation and the level of computer instructions that actually implement the function. Thus, a flow chart *may* suffice to serve as the desired algorithm under *Catlin.* It should be noted, though, that prudence would suggest that the flow chart have somewhat greater detail than the most nuanced means-plus-function recitation. Thus, for example, if the function in the means-plus-function recitation is "calculating a product" then the flow chart would show the processes used in the calculation. If the function is one of those processes (perhaps in a dependent claim), then the *Catlin* methodology would seem to suggest that even more minute explanation of sub-processes to accomplish that process should be provided.

In short, *Catlin* has potentially opened the door to a heightened disclosure requirement for software applications. Although there is no explicit definition of algorithm in the case, *Catlin's* decision suggests a drafting strategy that minutely describes how each function to be recited in any means-plus-function claims can be performed. If *Catlin* is good law, it may not be enough simply to identify a function and indicate that it is to be

carried out on a general purpose processor. Instead, it may be necessary to explain how the function would be carried out at least in some example embodiments.

Peter Flanagan, associate, Tysons Corner

1. 521 F.3d 1328 (Fed. Cir. 2008).
2. *Aristocrat* at 1333.
3. 490 F.3d 946 (Fed. Cir. 2007).
4. *Biomediono* at 950.
5. Page 12 of opinion.
6. *Catlin* at 6, *Aristocrat* at 1333.
7. *Id.*
8. *Catlin* at 8.
9. *Catlin* at 11-12.

R.I.P. Business Method Patents?

Many commentators contend that the formation of the Court of Appeals for the Federal Circuit in 1982 ushered in a period of change that strengthened the rights of patent owners at the expense of innovation and consumers. That tide appears to have ebbed over the past several years with increased Supreme Court scrutiny over patent issues in cases such as *Festo Corp. v Shoketsu Kinzoku Kogyo Kabushiki Co.* (limiting application of the doctrine of equivalents); *eBay, Inc. v. MercExchange, L.L.C.* (halting the practice of near-automatic grants of permanent injunctions following findings of infringement); *Quanta Computer Inc. v. LG Electronics, Inc*. (limiting a patent owner's right to restrict the extent of patent exhaustion*); MedImmune, Inc. v. Genentech, Inc.* (loosening restrictions on declaratory judgment standing); and *KSR Intl Co. v. Teleflex, Inc*. (raising the obviousness bar to patentability). The unmistakable message most recently appeared to take hold in the Federal Circuit with that court's *en banc* decision in *In re Bilski*[1] for which the Supreme Court has now granted *certiorari*. At a minimum, that decision deals a significant body blow to the patentability of business method patents, which the Federal Circuit seemingly endorsed in *State Street Bank & Trust Co. v. Signature Fin. Group, Inc*.[2] Here we assesses whether, in the absence of the Supreme Court's decision (or in the event the high court essentially adopts the Federal Circuit's reasoning), the body blow is really a knockout punch. We make the assessment by briefly reviewing *Bilski* and then by examining two recent district court decisions interpreting the resulting landscape.

In re Bilski

Bilski was an appeal from a decision of the BPAI. The BPAI decision had affirmed the USPTO examiner's rejection of all claims in a patent application that sought to claim a method for hedging commodity trading risks. The BPAI rejected the claims as ineligible subject matter under 35 U.S.C. §101.

The Federal Circuit admittedly intended to "clarify the standards applicable in determining whether a claimed method constitutes a statutory 'process' under §101" in light of the threshold nature of the inquiry. In other words, if a patent claim does not embrace patentable subject matter, the claim fails even if it meets all other legal requirements for patentability. The Federal Circuit framed the issue as follows:

> [S]ection 101 "recites four categories of patent-eligible subject matter: processes, machines, manufactures, and compositions of matter. It is undisputed that Applicants' claims are not directed to a machine, manufacture, or composition of matter. Thus, the issue before us involves what the term 'process' in §101 means, and how to determine whether a given claim . . . is a 'new and useful process.'"

Reviewing Supreme Court decisions on the issue, the Federal Circuit noted that "the [Supreme] Court has held that a claim is not a patent-eligible 'process' if it claims 'laws of nature, natural phenomena, [or] abstract ideas.'" Interpreting the higher court's major decisions on the issue, the Federal Circuit articulated the "machine-or-

transformation test" as the proper standard for determining patentable subject matter under §101: "A claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."

The issue left after *Bilski* for would-be patent owners and those seeking to enforce or defend business method patents is the extent to which such claims remain enforceable. Two district court decisions have each shed different light on the issue.

CyberSource Corp. v. Retail Decisions, Inc.

On March 26, 2009 the Northern District of California rendered its decision in *CyberSource Corp. v. Retail Decisions, Inc.*[3] granting defendant's motion for summary judgment of invalidity. The patents-in-suit claimed a method for detecting fraud in a credit card transaction between a consumer and a merchant over the Internet. Defendant contended that the asserted claims were invalid because they "could literally be performed on a piece of paper or in one's mind." Applying *Bilski*, the district court agreed, holding that the claimed business method was not directed to patentable subject matter.

A claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.

Addressing the first part of *Bilski*'s disjunctive "machine-or-transformation" test, the district court held that the claimed method was not transformative. "According to plaintiff, the [claimed] fraud verification process manipulates credit card numbers by using them to construct and utilize a 'map of credit card numbers.'" The court dismissed plaintiff's argument that the method met the first test, concluding that "[s]imply collecting data into a vague sort of 'map' does not amount to a 'transformation.'"

Turning to the alternative prong of the *Bilski* test, the district court held that the claims were not tied to a particular machine or apparatus. Plaintiff contended otherwise, pointing out that the claims recited processes that could be performed over the Internet. The district court wryly noted that "[f]ormer Vice-President Al Gore did not actually take credit for inventing the Internet, and neither does plaintiff; however, plaintiff does contend that the entire Internet is the machine implementation of its method." The court rejected plaintiff's contention that the Internet is a "particular machine or apparatus," finding that (i) the Internet is not composed of particular machines, (ii) the use of the Internet in the claims-in-suit constituted "insignificant extra-solution activity" that did not qualify as a machine implementation and (iii) "the use of the Internet does not impose meaningful limits on the scope of the claims."

In closing, the district court provided its own perspective of *Bilski*'s impact: "In analyzing *Bilski*, one is led to ponder whether the end has arrived for business method patents, whose numbers swelled following the decision in *State Street Bank*...The closing bell may be ringing for business method patents, and their patentees may find they have become bagholders."

Versata Software, Inc. v. Sun Microsystems, Inc.

Less than a week after the *CyberSource* decision, the Eastern District of Texas considered defendant's motion for judgment on the pleadings in *Versata Software, Inc. v. Sun Microsystems, Inc.*[4] Defendant Sun moved to dismiss the action on the ground that plaintiff Versata's software method claims ran afoul of §101 as interpreted in *Bilski.* The court's decision denying the motion is sufficiently concise that its substance can be excerpted here:

> Sun argues that the claimed methods do not satisfy the "machine" portion of the test because they can be performed entirely within the human mind, or using pencil and paper. Further, Sun argues the claimed methods do not satisfy the "transformation" portion of the test because they do not transform any article into a different state or thing. The court's interpretation of *Bilski* is not so broad as Sun's. In fact, the [Federal]

> Circuit decline[d] to adopt a broad exclusion over software or any other such category of subject matter beyond the exclusion of claims drawn to fundamental principles . . . [and noted] the process claim at issue in this appeal is not, in any event, a software claim. Thus, the facts here would be largely unhelpful in illuminating the distinctions between those software claims that are patent-eligible and those that are not.

The court concluded that "Sun has not met its burden to prove there are 'no disputed issues of material fact and [that] only questions of law remain,'" and thus denied the motion.

Where Now?

The "closing bell" ringing in *CyberSource* does not appear to have reverberated in the Eastern District of Texas. While the brevity of the *Versata* decision begs some caution in reading too much into it, the court's refusal to read *Bilski* literally to invalidate the software method claims there – which presumably could be used to invalidate software method claims as a class – contrasts with the *CyberSource* court's premonition that business method patents will soon be extinct. While some patents will clearly run afoul of the machine-or-transformation test, the different district court perspectives revealed in *CyberSource* and *Versata* suggest a certain amount of uncertainty will prevail in other cases in the absence of the Supreme Court's final say.

David S. Elkins, partner, Palo Alto
Thomas Kua, associate, Palo Alto

1. 545 F.3d 943 (Fed. Cir. 2008).
2. 149 F.3d 1368 (Fed. Cir. 1998).
3. No. C 04-03268 (MHP).
4. No. 2-06-cv-358 (TJW).

The Real Cost Cutting Strategies for Patent Prosecution in Today's Market

Businesses with the intent to manage the bottom line are scouring the patent prosecution process for ways to cut costs. Some companies are capping the amount of money lawyers can spend to prosecute their patent applications, while others have abandoned patent applications all together.

Capping spending is one cost-cutting strategy that is penny wise and pound foolish. For example, when corporations cap the amount of money – and therefore time – spent on the prosecution of patent applications, the quality of the patent application could be potentially reduced. When significant budget restrictions affect the patent application's quality, the patent application pendency could potentially be much longer than expected. And as pendency of the patent application continues to increase, the cost of prosecuting the patent application will increase. In other words, the short term savings increase the long term cost of prosecuting a patent application.

Businesses would be better served returning to patent prosecution basics. Taking time (and spending money) to draft the patent application is a smart move businesses can make. Yes, it costs less to speed through the drafting of the patent application, but any savings are outweighed by issues that can crop up later. For example, a hastily drafted patent application might leave an examiner confused when it comes to examining the application. The examiner may not clearly understand and appreciate the scope of the invention. When the scope of the invention is unclear to the examiner, many objections or rejections could be raised that will frustrate the applicant and delay the allowance of the application. In addition, because of the significant number of objections or rejections, the

applicant will be required to spend more time and money to have an attorney prepare arguments to overcome these issues.

The bottom line is that a more complete patent application will reduce the pendency (and cost) for the prosecution of the patent application.

However, these issues can be easily avoided if businesses spend their money wisely, i.e., spend the time needed to properly draft the patent application. If businesses are willing to allow their attorney to invest more time on the preparation of the patent application, the attorney will be able to draft a better and more coherent patent application, which will clearly convey to the examiner what the invention is directed to. As a result, there will be a reduction in the amount of objections and rejections during the prosecution of the patent application. This will also please the examiner because the examiner has to work less on nonsubstantive issues rather than substantive issues. And, as always, a pleased examiner is more likely to grant an allowance of the patent application.

The bottom line is that a more complete patent application will reduce the pendency (and cost) for the prosecution of the patent application, which ultimately makes businesses successful.

Another move for businesses is to take advantage of the *Manual of Patent Examining Procedure* (MPEP). The MPEP includes a set of guidelines for examiners to use when examining patent applications. For example, the MPEP requires that an examiner issue Office Actions that are complete as to all matters. If this requirement is not met, businesses should request that the examiner issue another Office Action that is complete. A complete Office Action provides a clear record and gives the attorney prosecuting the case a better opportunity to rebut the rejections made in the Office Action. However, the only way to determine whether the Office Action is complete is for businesses to provide their attorneys with ample time to examine the completeness of the Office Action.

This leads to another technique that businesses can use to reduce prosecution costs in the long term. Businesses should spend more time to prepare a thorough response that addresses each and every rejection in the Office Action. Businesses currently appear to be under the misconception that there is no difference between a response that was prepared in two hours or six hours. But the time to prepare a response depends upon the issues (i.e., objections and rejections) raised in the Office Action. If the issues are simple, the response can be prepared rather quickly. However, more complex issues will require more time to prepare the response because a thorough analysis is required to properly address the issues. This will inevitably reduce the length of prosecution, which automatically cuts the cost in prosecuting the application over the long term. However, when prepared hastily the response will not overcome the rejection and the length of prosecution will increase, thereby creating more expense for the business in the long run. Thus, a more complete response will likely overcome objections and rejections, and reduce the cost of prosecution over the pendency of the application.

In some instances, when a case is not progressing, applicants typically take steps as varied as further amending the claims, abandoning the patent application or appealing the case to the BPAI. But these measures usually mean more expense in the long run through the filing of unnecessary responses or appeals without benefit of a better understanding of the examiner's position. Therefore, another smart move businesses can make is to conduct patent examiner interviews. In a patent examiner interview, the applicant (and/or the applicant's attorney) has an opportunity to discuss the patent application with the examiner. In such an interview, the applicant will be able to explain the invention and scope of the claims, and provide arguments supporting the patentability of the claims in view of the prior art. The applicant will be able to have a dynamic discussion with the examiner and better understand the examiner's interpretation of the scope of the claims in view of the prior art. Furthermore, the

applicant will be able to strategize more effectively on how to obtain allowance of the patent application more promptly.

The examiner interview provides a means to effectively advance prosecution and better formulate a strategy to follow during the prosecution of the application. For instance, the examiner interview can be helpful even in instances when, based on the examiner's position, the applicant concludes that it is no longer feasible to advance the prosecution of the pending patent application in front of the examiner. When this happens, the applicant can then file an appeal to the BPAI. This step means the applicant avoids spending time and money filing an unnecessary response to the Office Action that more than likely will not advance prosecution, given the examiners' previously stated positions. In those instances, the applicant has now spent less time and money in prosecuting the patent application than they otherwise would have had they continued to unsuccessfully argue with the examiner.

Simple measures, such as more complete patent application, determining whether Office Action is complete, filing thorough Responses or even conducting examiner interviews, can have profound impact on a company's bottom line by reducing the time spent obtaining a patent.

Sheetal S. Patel, associate, Tysons Corner

Contributor Profiles

Editor

Alicia M. Choi focuses her practice on the areas of patent law. Her work includes preparing and prosecuting utility patent applications in the areas of electrical and computer engineering including information technology, software systems, wireless communication, medical diagnostic devices, semiconductors, analog and digital circuitry, and consumer electronics such as optical storage media and audio devices for US and international clients. Her experience also includes conducting novelty, patentability, invalidity and infringement analyses for various electrical devices and systems. Before entering the practice of law, Ms. Choi was a lead engineer for Rockwell Automation where she was involved in the integration of various programmable controllers and electronic operators.

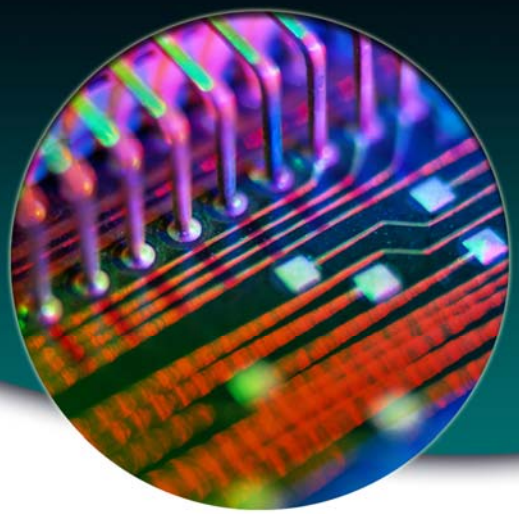
David S. Elkins leads the firm's Intellectual Property Litigation Practice. He practices patent, trademark, copyright and trade secret litigation and complex technology litigation, principally in the areas of semiconductors, information technology and telecommunications. He represents clients in jurisdictions across the United States and in federal and state courts of appeals. Mr. Elkins also has substantial international dispute resolution experience, having represented clients in proceedings before the ICC International Court of Arbitration (San Francisco and Geneva), the American Arbitration Association (US) and the Japan Commercial Arbitration Association (Tokyo).

Peter Flanagan focuses his practice on intellectual property matters. He has assisted clients in patent prosecution as well as in intellectual property litigation, including patent and copyright litigation. Mr. Flanagan has counseled clients regarding intellectual property portfolios and has helped clients analyze infringement and validity of US patents. He has prosecuted hundreds of patent applications in a broad spectrum of technologies, including computer hardware and software, control systems, communications systems, power electronics, electrochemical devices, semiconductors, mechanical systems, industrial systems and medical devices.

Thomas Kua focuses his practice on intellectual property litigation. As a summer associate at Squire Sanders, Mr. Kua assisted with trademark and class arbitration matters. He also gained experience researching and drafting memoranda to clients on a range of legal topics including constitutional, labor and employment, and securities law issues. Mr. Kua is a member of the Asian American Bar Association of the Greater Bay Area.

Sheetal S. Patel focuses his practice on intellectual property matters including patent prosecution in the fields of software and electronics. He has prosecuted patents for large corporations based in the United States, Japan, Germany and Finland, procuring patents in various fields involving software applications, electrical devices, business methods, wireless communications and robotics. Mr. Patel is the co-author of "Practicing Law in India," published for the 2009 AIPLA Mid-Winter meeting. He is a member of the American Bar Association and the American Intellectual Property Law Association.

SQUIRE SANDERS | LEGAL COUNSEL WORLDWIDE



Squire Sanders Intellectual Property Practice

Nathan Lane III
Intellectual Property Practice Group Leader
San Francisco
+1.415.954.0249
nlane@ssd.com

Alicia M. Choi
Intellectual Property Update Editor
Tysons Corner
+1.703.720.7896
amchoi@ssd.com

Majid AlBassam
Tysons Corner
malbassam@ssd.com

Robert P. Auerbach
San Francisco
rauerbach@ssd.com

Olga M. Bezrukova
Moscow
obezrukova@ssd.com

Xavier M. Brandwajn
Palo Alto
xbrandwajn@ssd.com

Barry D. Brown
Palo Alto
bbrown@ssd.com

Nicholas Chan
Hong Kong
nchan@ssd.com

Brad Y. Chin
Tysons Corner
bchin@ssd.com

Francesca E. Crisera
San Francisco
fcrisera@ssd.com

David S. Elkins
Palo Alto
delkins@ssd.com

Kamran Emdadi
Tysons Corner
kemdadi@ssd.com

Peter C. Flanagan
Tysons Corner
pflanagan@ssd.com

Adam R. Fox
Los Angeles
afox@ssd.com

Victor Genecin
New York
vgenecin@ssd.com

Douglas H. Goldhush
Tysons Corner
dgoldhush@ssd.com

Barry S. Goldsmith
Tysons Corner
bgoldsmith@ssd.com

Joseph P. Grasser
Palo Alto
jgrasser@ssd.com

Gloria M. Gusler
Palo Alto
San Francisco
ggusler@ssd.com

Wayne A. Jones
Palo Alto
wjones@ssd.com

Cameron K. Kerrigan
San Francisco
ckerrigan@ssd.com

Alisa C. Key
Tysons Corner
akey@ssd.com

Donnie L. Kidd, Jr.
Washington DC
dkidd@ssd.com

Todd P. Komaromy
Phoenix
tkomaromy@ssd.com

Eligiusz J. Krzesniak
Warsaw
ekrzesniak@ssd.com

Thomas Kua
Palo Alto
tkua@ssd.com

Michael A. Leonard II
Tysons Corner
mleonard@ssd.com

Zhaoyang Li (Paul)
Los Angeles
San Francisco
zli@ssd.com

Qun (Helen) Liu
San Francisco
qliu@ssd.com

Lucius L. Lockwood
Phoenix
llockwood@ssd.com

Mark Lupkowski
Houston
San Francisco
mlupkowski@ssd.com

José Luis Martín
Palo Alto
jlmartin@ssd.com

Caroline H. Mead
San Francisco
cmead@ssd.com

Joseph A. Meckes
San Francisco
jmeckes@ssd.com

Norman L. Morales
San Francisco
nmorales@ssd.com

A.J. Moss
Phoenix
amoss@ssd.com

Keith Mullervy
Tysons Corner
kmullervy@ssd.com

Jared T. Olson
Tysons Corner
jolson@ssd.com

Sheetal S. Patel
Tysons Corner
spatel@ssd.com

Colter Paulson
Cincinnati
cpaulson@ssd.com

James L. Reed
San Francisco
jreed@ssd.com

Troy R. Rice
San Francisco
trice@ssd.com

David E. Rogers
Phoenix
drogers@ssd.com

Bernard F. Rose
San Francisco
brose@ssd.com

Beth Seals
San Francisco
bseals@ssd.com

Elena Shleptsova
Moscow
eshleptsova@ssd.com

Alex D. Starkovich
Phoenix
astarkovich@ssd.com

Loren H. Tung
Tysons Corner
ltung@ssd.com

Philip Zender
San Francisco
pzender@ssd.com

Song Zhu
Palo Alto
San Francisco
szhu@ssd.com

NORTH AMERICA
Cincinnati
Cleveland
Columbus
Houston
Los Angeles
Miami
New York
Palo Alto
Phoenix
San Francisco
Tallahassee
Tampa
Tysons Corner
Washington DC
West Palm Beach

LATIN AMERICA
Bogotá+
Buenos Aires+
Caracas
La Paz+
Lima+
Panamá+
Rio de Janeiro
Santiago+
Santo Domingo
São Paulo

EUROPE & MIDDLE EAST
Bratislava
Brussels
Bucharest+
Budapest
Dublin+
Frankfurt
Kyiv
London
Moscow
Prague
Riyadh+
Warsaw

ASIA
Beijing
Hong Kong
Shanghai
Tokyo

+Independent network firm

www.ssd.com