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To: patent\_quality\_comments  
Subject: Elysium Digital's response to RFC on Patent Quality

Attached, please find Elysium Digital's response to the USPTO's RFC of December 9, 2009 on Enhancing Patent Quality.

We would be happy to answer any questions or provide additional information.

Thanks,

Geoff

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# Elysium Digital's Response to the U.S. Patent Office's Request for Comments on Enhancement in the Quality of Patents of Dec. 9, 2009

February 8, 2010

## I. Introduction: Litigation as a Test of Patent Quality

Elysium Digital provides computer science and electrical engineering advice to attorneys involved in litigation. Over the past decade, we have been involved in more than fifty patent cases, some lasting many years and involving multiple rounds of appeal. In those cases, we provided assistance to plaintiffs and defendants with analysis concerning validity, claim construction, and infringement, often in the form of expert testimony. We have reviewed thousands of patents and patent applications. In our experience, many patents in litigation suffer from a number of recurring issues that reduce their quality.

As an adversarial process, patent litigation reveals the strengths and weaknesses of individual patents. A high-quality patent will – by definition – withstand a complete and well-funded challenge to its validity. Equally important, a high-quality patent is unambiguous: even two adversarial parties should agree on the proper scope and interpretation of its claims. Compared to litigation involving low-quality patents, high-quality patent litigation is predictable, (relatively) cheap, amenable to settlement, and less likely to produce outcomes that are reversed on appeal.

In contrast, a low-quality patent is vulnerable to the introduction of new prior art and other charges of invalidity. It also presents a huge range of ambiguous interpretations. In such litigation, neither side is assured of the proper scope of the claims. Not only does this increase the uncertainty associated with the litigation, but it also increases the cost as both sides must present arguments supporting their construction of the claims. In the worst case, each side might need to present multiple invalidity and infringement theories, each responding to a different potential claim construction. Such claim construction issues are often the basis of appeals to the Federal Circuit. In nearly 31% of cases, the Federal Circuit reverses, vacates, or remands claim construction appeals from lower courts,<sup>1</sup> indicating that the task of properly interpreting claims is highly difficult and prone to dispute even among the judiciary. In such cases, the patent has arguably failed the public notice requirement: the public is not clear what activities or devices are covered by the patent claims.

In a world where all issued patents had been examined in the light of all relevant prior art and had been drafted to precisely claim only the proper scope, the claim construction and invalidity phases of litigation would be comparatively rare. Trials would focus on the factual questions of infringement and damages. This is not the case today: not only does nearly every patent trial involve a vigorous challenge to validity with material not considered by the examiner, but these invalidity arguments prevail in a significant proportion of cases.<sup>2</sup>

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1 David L. Schwartz, *Courting Specialization: An Empirical Study of Claim Construction Comparing Patent Litigation Before Federal District Courts and the International Trade Commission*, 50 WM. & MARY L. REV. 1699 (2009).

2 See, for example, <http://www.patstats.org/2006.htm>, which indicates that of 53 cases decided in 2006 in which obviousness was an issue, 30 (57%) rendered the patent invalid, including 7 (13%) at summary judgment.

Such patents have failed in all aspects of patent quality put forth in the RFC: there has not been a “thorough and complete examination” since new and relevant (and often invalidating) prior art is introduced in trial; often the patent is found to not claim the proper scope; and the public is unclear as to what is covered by the claims.

This response proposes a set of metrics for patents with the aim of reducing the uncertainty of patent litigation, as a particular aspect of the examination, scope, and notice measurements of patent quality. Additionally, it proposes a set of procedures and tools for the USPTO to employ to more effectively and efficiently evaluate patent applications in order to improve patent quality and generally enable litigation to resolve quickly, (relatively) inexpensively, and correctly.

## II. Proposed Metrics and Quality Indicators

### A. Outcome at Trial

The details of the outcomes of patent litigation should be recorded. Particular outcomes that should be recorded include findings of anticipation, obviousness, and problems with the disclosure, such as indefiniteness, inadequate description, or non-enablement. Any such finding indicates that the prosecution failed its “complete and thorough examination.” Additionally, the USPTO should record metrics related to disputed claim constructions, an indirect but still useful measure of the proper scope of the patent and the quality of the notice given to the public. Even many years after the examination process, such measures of patent quality could serve to provide incentives for the USPTO and prosecuting attorneys to change practices.

### B. Proportion of Claim Terms with Defined Scope

The USPTO should explicitly measure the proportion of claim terms that have a clear and unambiguous scope. This can be accomplished through explicit definition in the specification. For terms not explicitly defined, the patent should specify a reference work that should be consulted to obtain the proper definition. If no such reference work is provided by the applicant, the USPTO should use a reference work appropriate for the field of invention of the application. In all cases, reference works and definitions chosen used by the inventor and considered by examiner should be explicitly cited by the issued patent. Such information is a key piece of the record establishing the scope of the patent. This level of specificity is especially important for terms whose meanings are regularly subject to dispute during claim construction proceedings during litigation. Such terms should be recorded and collected, and receive additional scrutiny at the USPTO during prosecution.

This procedural change could go as far as to modify the USPTO's long-standing practice of interpreting claim terms under their broadest reasonable interpretation, instead following the practice of the Federal courts, in which the proper claim interpretation is sought. Further discussion is beyond the scope of the present response, but the issue has received attention elsewhere.<sup>3</sup>

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3 See, e.g., Miller, Joel, “Claim Construction at the PTO—The “Broadest Reasonable Interpretation,” *Journal of the Patent and Trademark Office Society*, 88:3, pp. 279-296, March 2006; Bey, Dawn-Marie & Cotropia, Christopher A., “The Unreasonableness of the Patent Office's 'Broadest Reasonable Interpretation' Standard,” *AIPLA Quarterly Journal*,

### C. Proportion of Terms with Antecedents and with Appropriate Linking Language

Whenever claim elements refer to antecedents (e.g., “said element,” “first element,” etc.), that antecedent should have been introduced. While this is of course a bedrock principle of patent drafting, the fact is that many patents issue with missing or improper antecedents.

Similarly, claims in "means plus function" form should explicitly indicate the section of the specification that they are citing for the associated structure.

### D. Clear Marking of Inventive Step

Issued patents should identify which elements of the invention (including on a claim element-by-claim element basis) are in the prior art or if they are an inventive step being claimed. If all claim elements are in the prior art but the invention is an innovative combination, that should also be clearly indicated. Such clarity will be extraordinarily useful to juries, judges, and experts in determining infringement.

Requiring this identification of inventiveness in the patent application will assist examiners in focusing on the precise question of allowability and relation to the prior art. Similarly, applications that are continuations-in-part should identify which claim elements relate to the original specification as filed, and which relate to new material, again making the examination process simpler and clarifying the examination record.

### E. Clear Marking of Preamble and Field of Use Limitation

Much of the public criticism of the patent system as a whole arises when a patent that apparently reads on one area is applied to another. This is a failure of public notice, and in some cases a failure to claim the proper scope. Much of the ambiguity arises from the preambles of patents, which often describe an area of application or field of use. Under current case law, preambles restrict the scope of the claim if they give “life, meaning and vitality” to the claim. This test gives very little useful guidance to the public seeking certain knowledge of the scope.

The USPTO is in the position to minimize this public confusion by requiring patents to indicate whether a given preamble is limiting or not. If the examiner considered the preamble to be material to the proper interpretation of the scope of the patent, that fact should be reflected in the issued document. If not, then the inventor deserves the broader scope of the claims without the preamble and the patent should be clearly marked so.

One simple way to settle this question would be to make a single determination for all patents, e.g. establishing that preambles are always part of the claim and thus limit the scope of the claim.

## F. Clear Marking of Prosecution History

During prosecution, patent claims may be amended for various reasons, including to respond to examiner's objections and to narrow the scope of the claim to become patentable. Such amendments have significant impact on litigation strategy, as the doctrine of prosecution history estoppel governs the ability of the patent holder to employ the doctrine of equivalents to find infringement.

Currently there is no marking in the issued patent document indicating that the claim has been amended, meaning that an important piece of information required to properly understand the patent's scope is not easily available. While the written records of the prosecution history is available, it is often voluminous and not easily interpretable by non-lawyers.

Similarly, inventors often make statements to the examiner clearly disclaiming scope or distinguishing the invention from the prior art. However, without those statements in the patent document itself, this critical information is not easily available to someone attempting to determine the proper scope. If the specification does not clearly contain these statements, then the statements should be appended or otherwise inserted into the specification.

A high-quality patent that meets the requirement of public notice should clearly mark any such action that occurred during prosecution that could affect the scope of the patent.

## III. Tools and Procedures

### A. Formalized Algorithm Disclosure and Prior Art Search

As a matter of logic, reinforced by recent case decisions, software patents must recite some sort of algorithm. While the USPTO, including BPAI, and the court system have provided a number of guidelines and restrictions on the extent to which algorithms can be part of a valid patent, there is comparatively little guidance on how the algorithm should be claimed. Computer science and software engineering, in contrast, have built up an extensive set of vocabulary and tools to precisely describe an algorithm without having to resort to using source code. These techniques include modeling languages such as UML, pseudo-code, etc.<sup>4</sup> In contrast, English is generally agreed to be too ambiguous for formal description of algorithms.

A high-quality software patent enables the public to practice the invention without undue experimentation, and establishes clear limits of the invention being claimed. By requiring inventors to use a standard algorithm-description language, the USPTO would accomplish three important goals. First, the scope and notice requirements would be strengthened, as the disclosure would be less ambiguous than English. Second, the resulting disclosure would be more strongly enabled, as persons of ordinary skill in the art will be more readily able to implement an algorithm disclosed in a standard format.

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<sup>4</sup> See, e.g., David C. Bohrer and Michael I. Frankel, "The Question Left Unanswered In WMS Gaming: What Is the Algorithm?" *Intellectual Property & Technology Law Journal*, 16:4, pp. 8-20, April 2004

The final advantage is that prior art searches will be more effective and targeted. By employing a searchable library of algorithms (covering existing patents, academic literature, the public domain, etc.) the USPTO could quickly identify relevant prior art for an algorithmic claim element. As such a library grows in size, effectiveness, and usability, it would aid inventors and researchers in their research and in drafting new patent applications, as they could more easily and precisely include the appropriate detail of prior art by reference.

## B. Patent Office use of Revision Control Systems

Software projects usually employ a “revision control system” to track changes made over time. Among other benefits, these tools allow a visualization of the evolution of a particular body of source code, marking the time that changes are made and some explanation of why.

The application of this tool to patents is obvious. By recording the specification and claims in a revision control system, it will be possible to inspect which parts were introduced, deleted, or changed, at what points in the prosecution process, and why. Using such a system as a front-end interface to the file history would make the process of understanding the history of prosecution considerably easier. For example, inspection of the history of a claim would show where and when each amendment occurred, the original and modified text of the claim at that point in time, and the explanation provided by the application or examiner for that change. Such information is critical to determining the proper scope of the claim.

## C. Automated Analysis

Textual analysis software can automate many checks on patent quality, including many of the metrics described above. These include detecting missing antecedents or linking language, identifying claim terms unused or undefined in the specification, and identifying inconsistencies in diagram labeling. While of course not a replacement for inspection by a trained patent examiner, such an automated procedure allows many problems to be identified and addressed by the applicants even before the first inspection by the examiner. Not only does this speed the process by improving the quality of patents before the examiner sees them, it means that the initial examination can focus on more essential issues.

For software patents that rely on 112(6) “means plus function” claiming, software could attempt to link the function recited in the claim with structure recited in the specification. Merely identifying such linkage could assist the examiner; a failure to do so might indicate that stronger linking language is needed, or that in fact there is a missing structure. Given the number of high-profile cases at the BPAI and Federal Circuit that have found patents invalid based on the lack of a recited algorithm under WMS Gaming or Aristocrat, it seems there remains a need to more carefully scrutinize software patents for the presence of algorithms matching “means for” claim elements.

More sophisticated automated analysis could assist in prior art searches. By applying linguistic and statistical approaches, language of the specification can be compared to other patents or other databases of prior art, and identify documents with similar subjects and structure. Through various algorithmic approaches such as latent semantic indexing and identification of unique or unusual terms, this can discover similar material even when some of the vocabulary used to describe the invention is different.

It can also narrow the focus of the differences between the invention and the prior art, allowing the examiner to explicitly identify the alleged inventive step and focus the analysis on that material.

A parallel approach to solving this problem would be to enhance the machine-readable XML form in which patents are recorded to encode additional information, such as interrelationships between different sections, antecedents, associated structure, etc. As a machine-readable representation, it could be used for automated tools (both within the USPTO and by third parties) to analyze patents individually and in groups. The human-readable version would not have to change, or could incorporate just some of the features. Recent changes in patent representation have made it much easier for such tools to operate, but there is more opportunity to enhance the functionality and expressiveness of such a representation.

#### D. Indexing Open Source as Prior Art

Many innovative software inventions become disclosed to the public when they are included in open source software (OSS). These innovations can be made public before patent filings using similar ideas. It can be time-intensive and inconvenient for examiners to inspect all of the many potential open source software projects that might include that particular feature.

It is an obvious advantage of using OSS as prior art that the source code is available to the public. An additional feature that makes it especially attractive as a source of potential prior art is that most OSS projects are stored in source code revision control systems (e.g., Subversion<sup>5</sup>), making it possible to examine the state of a given project on a certain date.

It is less straightforward to search a large set of repositories for a set of features and attempt to identify which projects had those features in a given date range. We suggest indexing and archiving of public OSS project web sites, such as sourceforge.net, in a form that efficiently stores indexes to source code and documentation for specific dates. In such a form, examiners could specify the priority date of the patent application in question and be able to identify open source software projects that matched an architectural description or keywords at a specific date. The USPTO, the patent community, and the open source community could collaborate to identify useful standards for describing and publishing descriptions and features of software projects.

#### IV. Conclusion

The material presented in this response is based on our experience as computer science and electrical engineering professionals with extensive experience observing and assisting with patent litigation. Our experience has taught us to recognize many features of issued patents that make litigation more expensive, more unpredictable, and more complicated. By providing these comments to the USPTO, we hope that we can assist in the larger effort in reducing pendency, improving the quality of those patents that do issue, and in improving the process of patent litigation, when it occurs.

We are happy to assist in further inquiries and would be pleased to discuss these ideas further. Please

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<sup>5</sup> See, e.g., <http://subversion.apache.org/>

send comments or requests for further information to Geoff A. Cohen at Elysium Digital (geoff@elys.com).

*This response was written by Geoff A. Cohen, Ph.D., of Elysium Digital, with substantial input from other employees of Elysium Digital and from Prof. Edward W. Felten and Joe Calandrino of Princeton University. It represents the position of Elysium Digital only.*