

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ABB INC.,

Petitioner

v.

ROBOTIC VISION TECHNOLOGIES, LLC,

Patent Owner

Patent No. 8,095,237

Inter Partes Review No.
IPR2023-01426

DECLARATION OF SYLVIA HALL-ELLIS, PH.D.

I. INTRODUCTION

1. My name is Sylvia D. Hall-Ellis. I have been retained as an expert on behalf of ABB Inc. (“Petitioner”).

2. I have written this Declaration on behalf of Petitioner to provide my expert opinion regarding the authenticity and public availability of two publications. My Declaration sets forth my opinions in detail and provides the basis for my opinions regarding the public availability of these publications.

3. I reserve the right to supplement or amend my opinions, and basis for them, in response to any additional evidence, testimony, discovery, argument, and/or other additional information that may be provided to me after the date of this Declaration.

4. I am being compensated for my time spent working on this matter at my normal consulting rate of \$350 per hour, plus reimbursement for any additional reasonable expenses. My compensation is not in any way tied to the content of this Declaration, the substance of my opinions, or the outcome of this litigation. I have no other interests in this proceeding or with any of the parties.

5. All of the materials that I considered are discussed explicitly in this Declaration.

II. QUALIFICATIONS

6. I am currently an Adjunct Professor in the School of Information at San José State University. I obtained a Master of Library Science from the University of North Texas in 1972 and a Ph.D. in Library Science from the University of Pittsburgh in 1985. Over the last 50-plus years, I have held various positions in the field of library and information resources. I was first employed as a librarian in 1966 and have been involved in the field of library sciences since, holding numerous positions.

7. I am a member of the American Library Association (ALA) and its Association for Library Collections & Technical Services (ALCTS) Division, and I served on the Committee on Cataloging: Resource and Description (which wrote the new cataloging rules) and as the chair of the Committee for Education and Training of Catalogers and the Competencies and Education for a Career in Cataloging Interest Group. I also served as the Chair of the ALCTS Division's Task Force on Competencies and Education for a Career in Cataloging. Additionally, I have served as the Chair for the ALA Office of Diversity's Committee on Diversity, as a member of the REFORMA National Board of Directors, as a member of the Editorial Board for the ALCTS premier cataloging journal, *Library Resources and Technical Services*, as a Co-Chair of the Library Research Round Table (LRRT) for the

American Library Association, and as a member of the LRRT Nominating Committee.

8. I have also given over one hundred presentations in the field, including several on library cataloging systems and Machine-Readable Cataloging (“MARC”) standards. My current research interests include library cataloging systems, metadata, and organization of electronic resources.

9. My full curriculum vitae is attached hereto as Exhibit A.

III. LIBRARY CATALOGING PRACTICES

A. MARC RECORDS AND THE ONLINE LIBRARY CATALOG

10. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and organizing library catalog information.¹ MARC was first developed in the 1960s by the Library of Congress. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. Today, MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.

11. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access

¹ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/> (last visited July 5, 2023).

to books, journals, and other resources in the collection. The bibliographic data provide points of access and can be searched by a person of ordinary skill in the art at the time of the invention (“POSITA,” see paragraphs 35-37 below) to identify and obtain resources in the library collection. An information seeker (or POSITA) can search a local online library catalog or the holdings of a group of libraries in a state or region or in the global catalog WorldCat.

12. MARC records are not designed for public viewing. Although a significant number of libraries provide access to the MARC version of a bibliographic record, the public display is designed to show information in a succinct manner that is quickly understood and useful to the information seeker. Libraries determine the default search for the online catalog to make the entry of search terms efficient and result in a successful search. Information seekers can enter a keyword, title, author, or standard number for the item. Libraries may also provide a search capability called “Summon” that allows the information seeker to enter known information about the item to conduct a search.

13. Since at least the early 1970s and continuing to the present day, MARC has been the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.² As explained by the Library of Congress:

² A complete history of the development of MARC can be found in *MARC: Its History and Implications* by Henrietta D. Avram (Washington, DC: Library of

You could devise your own method of organizing the bibliographic information, but you would be isolating your library, limiting its options, and creating much more work for yourself. Using the MARC standard prevents duplication of work and allows libraries to better share bibliographic resources. Choosing to use MARC enables libraries to acquire cataloging data that is predictable and reliable. If a library were to develop a “home-grown” system that did not use MARC records, it would not be taking advantage of an industry-wide standard whose primary purpose is to foster communication of information.

Using the MARC standard also enables libraries to make use of commercially available library automation systems to manage library operations. Many systems are available for libraries of all sizes and are designed to work with the MARC format. Systems are maintained and improved by the vendor so that libraries can benefit from the latest advances in computer technology. The MARC standard also allows libraries to replace one system with another with the assurance that their data will still be compatible.

Congress, 1975) and available online from the Hathi Trust (<https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1>; last visited July 5, 2023).

Why Is a MARC Record Necessary? LIBRARY OF CONGRESS.³

14. Thus, almost every major library in the world is MARC-compatible. See, e.g., *MARC Frequently Asked Questions (FAQ)*, LIBRARY OF CONGRESS.⁴ (“MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began fifty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today.”). MARC is the ANSI/NISO Z39.2-1994 standard (reaffirmed in 2016) for Information Interchange Format. The full text of the standard is available from the Library of Congress.⁵

15. Examining the MARC records for a specific item reveals the comprehensive data transcribed about a particular item at the time that cataloging and classification occurred. In addition to the creator, title, subjects, and standard numbers, additional information may provide additional and relevant data depending on the type of resource. Understanding the full extent of bibliographic data for an item and the points of access associated with it provides essential information that can be used to determine the indexing and public availability for documents

³ <http://www.loc.gov/marc/umb/um01to06.html#part2>

⁴ <https://www.loc.gov/marc/faq.html>

⁵ <http://www.loc.gov/marc/bibliographic/>

described in this Declaration.

B. MARC RECORDS

16. A MARC record comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follow. For example, a work's title is recorded in Field 245; the primary author of the work is transcribed in Field 100; an item's International Standard Book Number ("ISBN") consisting of ten or thirteen digits is transcribed in Field 020; an item's International Standard Serial Number ("ISSN") is transcribed in Field 022; the Library of Congress classification notation is recorded in Field 050; and the publication date is recorded in Field 260 under the subfield "c." If a work is a periodical, then its publication frequency is recorded in Field 310, and the publication dates (e.g., the first and last publication) are recorded in Field 362, which is also referred to as the enumeration/chronology field.⁶

17. The library that created the record is recorded in Field 040 in subfield "a" with a unique library code. When viewing the MARC record online via Online Computer Library Center's ("OCLC") bibliographic database, hovering over this code with the mouse reveals the full name of the library. I used this method of

⁶ <http://www.loc.gov/marc/bibliographic/bd3xx.html>

“mousing over” the library codes in the OCLC database to identify the originating library for the MARC records discussed in this Declaration. Where this “mouse over” option was not available, I consulted the Directory of OCLC Libraries to identify the institution that created the MARC record.⁷

18. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress.⁸ For example, 6XX fields are termed “Subject Access Fields.”⁹ Among these, for example, is the 650 field; this is the “Subject Added Entry – Topical Term” field.¹⁰ The 650 field is a “[s]ubject added entry in which the entry element is a topical term.” These entries “are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH)).” *Id.* Further, MARC records include call numbers, which themselves include a classification number. For example, the 050 field is the “Library of Congress Call Number.”¹¹ A defined portion of the Library of Congress Call (LCC)

⁷ <https://www.oclc.org/en/contacts/libraries.html>

⁸ <http://www.loc.gov/marc/bibliographic/>

⁹ <http://www.loc.gov/marc/bibliographic/bd6xx.html>

¹⁰ <http://www.loc.gov/marc/bibliographic/bd650.html>

¹¹ <http://www.loc.gov/marc/bibliographic/bd050.html>

Number is the classification number, and “source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*.” Thus, included in the 050 field is a subject matter classification. Further, the 082 field is the “Dewey Decimal Call Number.”¹² A defined portion of the Dewey Decimal Call (DDC) Number is the classification number, and “source of the classification number is the *Dewey Decimal Classification and Relative Index*.” Thus, included in the 082 field is a subject matter classification. Each item in a library has a single classification number. A library selects a classification scheme (e.g., the Library of Congress classification scheme just described or a similar scheme such as the Dewey Decimal classification scheme) and uses it consistently. When the Library of Congress assigns the LCC classification number, it appears as part of the 050 field. When the Library of Congress assigns the DDC classification number, it appears as part of the 082 field. If a local library assigns the classification number, it appears in a 090 field. In either scenario, the MARC record includes a classification number that represents a subject matter classification.

C. OCLC

19. The OCLC was created “to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries

¹² <http://www.loc.gov/marc/bibliographic/bd082.html>

themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information.”¹³ Among other services, OCLC and its members are responsible for maintaining the WorldCat database (<http://www.worldcat.org/>), used by independent and institutional libraries throughout the world.

20. OCLC also provides its members online access to MARC records through its OCLC bibliographic database. When an OCLC member institution acquires a work, it creates a MARC record for this work in its computer catalog system in the ordinary course of its business. MARC records created at the Library of Congress are tape-loaded into the OCLC database through a subscription to MARC Distribution Services daily or weekly. Once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress, the MARC record is then made available to any other OCLC members

¹³ Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Incorporated (available at <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf>).

online, and therefore made available to the public. Accordingly, once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress or another library anywhere in the world, any publication corresponding to the MARC record has been cataloged and indexed according to its subject matter such that a person interested in that subject matter could, with reasonable diligence, locate and access the publication through any library with access to the OCLC bibliographic database or through the Library of Congress.

21. When an OCLC member institution creates a new MARC record, OCLC automatically supplies the date of creation for that record. The date of creation for the MARC record appears in the fixed Field (008), characters 00 through 05. The MARC record creation date reflects the date on which, or shortly after which, the item was first acquired or cataloged. Initially, Field 005 of the MARC record is automatically populated with the date the MARC record was created in year, month, day format (YYYYMMDD) (some of the newer library catalog systems also include hour, minute, second (HHMMSS)). Thereafter, the library's computer system may automatically update the date in Field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library). Field 005 is visible when viewing a MARC record via an appropriate computerized interface, but when a MARC record is printed to

hardcopy, no “005” label appears. The initial Field 005 date (*i.e.*, the date the MARC record was created) does appear, however, next to the label “Entered.”¹⁴ The date upon which the most recent update to Field 005 occurred also appears, next to the label “Replaced.” Thus, when an item’s MARC record has been printed to hardcopy—as is the case with the MARC attachments to this Declaration—the date reflected next to the label “Entered” is necessarily on or after the date the library first cataloged and indexed the underlying item.

22. Once one library has cataloged and indexed a publication by creating a MARC record for that publication, other libraries that receive the publication do not create additional MARC records—the other libraries instead rely on the original MARC record. They may update or revise the MARC record to ensure accuracy, but they do not replace or duplicate it. This practice does more than save libraries from duplicating labor. It also enhances the accuracy of MARC records. Further, it allows librarians around the world to know that a particular MARC record is authoritative (in contrast, a hypothetical system wherein duplicative records were created would result in confusion as to which record is authoritative).

¹⁴ Field 005 is visible when viewing a MARC record via an appropriate computerized interface. But when a MARC record is printed directly to hardcopy from the OCLC database, the “005” label is not shown. The date in the 005 field instead appears next to the label “Replaced.”

23. Catalogers can create MARC records for all types of print, online, and digital resources. The date of creation of the MARC record by a cataloger at an OCLC member institution reflects when the underlying item is accessible to the public. Upwards of two-thirds to three-quarters of book sales and magazine subscriptions to libraries come from a jobber or wholesaler for online and print resources. These resellers make it their business to provide items to their customers as fast as possible, often providing turnaround times of only a single day after publication. Libraries purchase a significant portion of the balance of their books and journals directly from publishers themselves, which provide delivery on a similarly expedited schedule. In general, libraries make these purchases throughout the year and shelve the newly received items as soon thereafter as possible to make them available to their patrons.

24. In preparing this Declaration, I used authoritative databases, such as the OCLC bibliographic database and the Library of Congress Online Catalog, to confirm citation details of the various publications discussed.

25. *Indexing.* A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodical and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries, or purchase it from a publisher, a bookstore, a document delivery service, or other

provider. Sometimes, the date of a document's public accessibility will involve both indexing and library date information. However, date information for indexing entries is often unavailable. This is especially true for online indices.

26. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

27. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use by researchers no later than the publication date of the citing document.

28. Before the widespread development of online databases to index articles in journals, magazines, conference papers, and technical Declarations, libraries purchased printed volumes of indices. Graduate library school education mandated that students learn about the bibliographic control of disciplines, the prominent indexing volumes, and searching strategies required to use them effectively and efficiently. Half of the courses that I studied in library school were focused on the bibliography and resources in academic disciplines.

29. Librarians consulted with information seekers to verify citations, check

availability in union catalogs, printed books catalogs, the OCLC database, and make formal requests for materials (e.g., books, conference proceedings, journal articles). Requests were transmitted using Telex machines, rudimentary email systems, and the United States Postal Service. During my career, I have performed and supervised staff who handled these resource sharing tasks.

30. A citation of a document by another is evidence that the document was publicly available and in use no later than the publication date of the citing document.

IV. PRELIMINARIES

31. *Scope of this Declaration.* I am not an attorney and will not offer opinions on the law. I am, however, rendering my expert opinion on the authenticity of the documents referenced herein and on when and how each of these documents was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the documents before on or around the listed dates of their respective publications below.

32. I am informed by counsel that a printed publication qualifies as publicly accessible as of the date it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

33. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered “publicly accessible” if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as publicly accessible). One manner of sufficient indexing is indexing according to subject matter category. I understand that the cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient, even if the single library is in a foreign country. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

34. I understand that routine business practices, such as general library cataloging and indexing practices, can be used to establish an approximate date on which a printed publication became publicly accessible.

35. *Persons of ordinary skill in the art.* I am told by counsel that the subject matter of this proceeding generally relates to 3D robotic vision and more specifically to techniques and systems for three-dimensional object location using robotic vision.

36. I have been informed by counsel that a “person of ordinary skill in the art at the time of the inventions” is a hypothetical person who is presumed to be familiar with the relevant field and its literature at the time of the inventions. This hypothetical person is also a person of ordinary creativity, capable of understanding the scientific principles applicable to the pertinent field.

37. I am told by counsel that persons of ordinary skill in this subject matter or art would have had a Bachelor’s degree in robotics, mechanical engineering, computer science, electrical engineering, or an equivalent, and at least three years of professional experience working in the field of computer vision or three years of graduate level education, including a focus on computer vision applications. The POSITA would have knowledge about machine vision and camera calibration techniques.

38. It is my opinion that such a person would have been engaged in research, learning through study and practice in the field and possibly through formal

instruction the bibliographic resources relevant to his or her research. In the 2011 timeframe, such a person would have had access to a vast array of long-established print resources in the area of payment systems.

V. DOCUMENT 1: EXHIBIT 1004 (“CORKE”)

39. Exhibit 1004 is a true and correct copy of the book titled *Visual Control of Robots: High-Performance Visual Servoing* by Peter I. Corke (hereafter “Corke”) and issued by John Wiley and Sons with a 1996 copyright date. The text of Exhibit 1004 is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. Exhibit 1004 was found within the custody of a library (the Morgan Library at Colorado State University (Fort Collins, Colorado) – a place where, if authentic, a copy of this book would likely be. Exhibit 1004 is a true and correct copy in a condition that creates no suspicion about its authenticity.

40. Attached hereto as Attachment 1A is a true and correct copy of the MARC record for this book from the Morgan Library at Colorado State University (Fort Collins, Colorado). Library ownership is indicated by the presence of the library’s code (“COF”) in field 049. I personally identified and retrieved the library catalog record which is Attachment 1A.

41. Based on finding a print copy of Exhibit 1004 in the Morgan Library at Colorado State University (Fort Collins, Colorado) and MARC record in its online

library catalog attached as Attachment 1A, it is my opinion that the book titled *Visual Control of Robots: High-Performance Visual Servoing* (Exhibit 1004) was created using a Library of Congress MARC record that was created on August 29, part of the Cataloging in Publication (CIP) Program (see paragraph 43). Attachment 1A indicates that the Corke book was added to the Morgan Library collection on July 9, 1997, as shown in field 945 (“07-09-97”). Therefore, the book titled *Visual Control of Robots: High-Performance Visual Servoing* (Exhibit 1004) was present and cataloged in the Morgan Library at Colorado State University (Fort Collins, Colorado) on July 9, 1997. It would have been able to be located by a person of ordinary skill in the art using the library catalog system and was accessible as of this date.

42. Attachment 1A further includes an entry in field 050 (“TJ211.35 \$b C68 1996”), a subject matter classification number consistent with the Library of Congress classification system. Attachment 1A further includes a descriptor term reading “Robots \$x Control systems” (see Attachment 1B, Library of Congress subject heading sh89001406) in the 650 field. Thus, as of its cataloging, the Corke book (Exhibit 1004), which is the publication corresponding to the MARC record attached hereto as Attachment 1A, was indexed according to its subject matter by virtue of at least two independently sufficient classifications: the field 050 entry and the field 650 entry.

43. Attached hereto as Attachment 1C is a true and correct copy of the MARC record for the book titled *Visual Control of Robots: High-Performance Visual Servoing* by Corke (Exhibit 1004) obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 1C. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 1C, that library code is “DLC,” which means that the MARC record for this book was created at the Library of Congress. The presence of CIP data on the copyright page of Exhibit 1004 indicates that the Corke book was cataloged as part of the CIP Program.¹⁵ A cataloger prepares basic information about the forthcoming book which is included on the verso of the title page (also called the copyright page). The information is provided to save time needed for the cataloging process at the library after the book is purchased. The CIP data includes the author (field 100), title and subtitle (field 245), ISBN (field 022), suggested subject headings (field 650), classification numbers for the Library of Congress classification number (field 050), and the Dewey Decimal classification number (field 082). These data elements are included in the MARC record that the Library of Congress contributes to the OCLC bibliographic database. As can be seen in the “Entered” field in the MARC record for this exhibit, a cataloger at the Library

¹⁵ <https://www.loc.gov/publish/cip/>

of Congress created OCLC record number 35364719 on August 29, 1996, as shown in the “Entered” field (“19960829”). The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to Attachment 1C occurred on May 30, 2022, as shown in the “Replaced” field (“20220530”). I personally identified and retrieved the MARC record that is Attachment 1C.

44. Attachment 1C further includes an entry in field 050 (“TJ211.35 \$b C68 1996”)—as described above, this includes a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 082 (“629.8/92”), a subject matter consistent with the Dewey Decimal classification system. Attachment 1C further includes a descriptor reading “Robots \$x Control systems” (see Attachment 1B, Library of Congress subject heading sh89001406) in the 650 field. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 1C was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 082 entry, and the field 650 entry. Further, as of August 29, 1996, the MARC record attached hereto as Attachment 1C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library, which means that the corresponding publication was publicly available on or before

that same date through any library with access to the OCLC bibliographic database or through an individual library.

45. Attachment 1C indicates that the book titled *Visual Control of Robots: High-Performance Visual Servoing* by Corke (Exhibit 1004) as cataloged at the Library of Congress is currently available from 145 libraries. The MARC record for the Corke book in the British Library was created on November 11, 1996 (see Attachment 1D). Therefore, in view of above, it is my opinion that this book was publicly available on November 11, 1996, because by that date it had been published in England by Research Studies Press, cataloged and indexed at the British Library, made part of the OCLC bibliographic database, and received in the British Library (in addition to the Morgan Library at Colorado State University (Fort Collins, Colorado), as explained above). For these reasons, it is my opinion that Exhibit 1004 was published and accessible to the public on or shortly after November 11, 1996 because it was cataloged in the British Library and locatable as of this date.

VI. DOCUMENT 2: EXHIBIT 1005 (“WEI”)

46. Attached hereto as Exhibit 1005 is a copy of the journal article titled “Active Self-calibration of Robotic Eyes and Hand-eye Relationships with Model Identification” by Guo-Qing Wei, K. Arbter, and G. Herzinger (hereafter “Wei”). The Wei article was published in Volume 14, Number 1 of the journal titled *IEEE Transactions on Robotics and Automation* and was found in the Linda Hall Library

of Science, Engineering & Technology (Kansas City, Missouri). The Wei article appears beginning on page 158 of this issue dated February 1998. Exhibit 1005 is a true and correct copy of the Wei article (pages 158-166) that I understand is being submitted as an exhibit in this proceeding. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. The Wei article is also available in the *IEEE Xplore* database¹⁶ and the digital repository *Semantic Scholar*.¹⁷ Exhibit 1005 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Exhibit 1005 is a true and correct copy in a condition that creates no suspicion authenticity.

47. Attached hereto as Attachment 2A is a true and correct copy of the MARC record for the journal titled *IEEE Transactions on Robotics and Automation* at the Linda Hall Library of Science, Engineering & Technology. Library ownership is indicated by the presence of the library's code ("LHL") in field 049. The library continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 2A occurred on September 6, 2023, as shown in field 005 ("20230906"). I personally identified

¹⁶ <https://ieeexplore.ieee.org/document/660864>

¹⁷ <https://www.semanticscholar.org/paper/Active-self-calibration-of-robotic-eyes-and-with-Wei-Arbter/2355c4e2021cf12d01d858771c70dc33471c23a4>

and retrieved the MARC record that is Attachment 2A.

48. Based on finding a print copy of Exhibit 1005 in the Linda Hall Library of Science, Engineering & Technology and MARC record in its online library catalog attached as Attachment 2A, it is my opinion that the Wei article published in the journal titled *IEEE Transactions on Robotics and Automation* was publicly available on or shortly after February 18, 1998, as shown by the library's stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 2A also shows that Exhibit 1005 was catalogued with three descriptor terms reading "Robotics \$v Periodicals" (see Attachment 2B, Library of Congress subject heading sh2010111346), "Automatic control \$v Periodicals" (see Attachment 2C, Library of Congress subject heading sh2007101730), and "Automation \$v Library of Congress subject heading sh2007101731) in the 650 fields.

49. As noted in the holdings information (362 field), the Linda Hall Library of Science, Engineering & Technology has received the journal titled *IEEE Transactions on Robotics and Automation* since February 1989 and continues to receive the publication.¹⁸ In view of the MARC record for Exhibit 1005, the Wei

¹⁸ The publication was originally titled the *IEEE Journal of Robotics and Automation* (March 1985-December 1988) and adopted a new title, *IEEE*

article was publicly on or shortly after February 18, 1998, because the serial title had been received, cataloged, and indexed at the Linda Hall Library of Science, Engineering & Technology and made part of its online catalog database.

50. Attached hereto as Attachment 2E is a true and correct copy of the MARC record for the journal titled *IEEE Transactions on Robotics and Automation* obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 2E, that library code is “NSD,” which means that the MARC record for this serial was cataloged as part of the National Serials Data Program at the Library of Congress. As can be seen in the “Entered” field in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 19003543 on January 11, 1989, as shown in the “Entered” field (“19890111”). The library continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 2E occurred on January 31, 2023, as shown in the “Replaced” field (“20230131”). I personally identified and retrieved the MARC record that is Attachment 2E. The “BLvl” entry in Attachment 2E is “s,” which indicates that the journal titled *IEEE Transactions on Robotics and Automation* is a serial publication. Field 310 of

Transactions on Robotics and Automation (February 1989-June 2004). In August 2004, the publication adopted the current title, *IEEE Transactions on Robotics*.

Attachment 2E reads “Bimonthly.” Accordingly, the MARC record for Exhibit 1005 corresponds to the journal titled *IEEE Transactions on Robotics and Automation* from the time the serial title adopted the title and includes the date of the Wei article.

51. Attachment 2E includes an entry in field 050 (“TJ210.2 \$b .I33”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 082 (“629.8/92/05”), a subject matter consistent with the Dewey Decimal classification system. Attachment 2E further includes three descriptor terms reading “Robotics \$v Periodicals” (see Attachment 2B, Library of Congress subject heading sh2010111346), “Automatic control \$v Periodicals” (see Attachment 2C, Library of Congress subject heading sh2007101730), and “Automation \$v Periodicals” (see Attachment 2D, Library of Congress subject heading sh2007101731) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 2E was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 082 entry, and the field 650 entries. As of January 11, 1989, the MARC record attached hereto as Attachment 2E was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the

corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library.

52. Attachment 2E indicates that the journal titled *IEEE Transactions on Robotics and Automation* as cataloged at the Library of Congress is currently available from 327 libraries. In view of the above, this issue of the journal titled *IEEE Transactions on Robotics and Automation* was publicly available on or shortly after February 18, 1998, because by that date it had been cataloged and indexed at the Library of Congress, made part of the OCLC bibliographic database, and received at the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that Exhibit 1005 was published and accessible to the public on or shortly after February 18, 1998.

VII. SUMMARY OF OPINIONS

53. In view of the foregoing, it is my opinion that the publication described above were publicly available no later than the corresponding date listed in the table below:

Exhibit	Publication	Publicly Available Date
1004	Corke, Peter I. <i>Visual Control of Robots: High-Performance Visual Servoing</i> . Taunton, Somerset, England: Research Studies Press; New York: Wiley, ©1996.	Approximately November 11, 1996
1005	Wei, Guo-Qing, K. Arbter, and G. Herzinger. "Active Self-calibration of Robotic Eyes and	Approximately February 18, 1998

Exhibit	Publication	Publicly Available Date
	Hand-eye Relationships with Model Identification.” <i>IEEE Transactions on Robotics and Automation</i> , vol. 14, no. 1 (Feb. 1998): 158-166.	

54. In signing this Declaration, I recognize that the Declaration will be filed as evidence in a case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

55. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1034 of Title 18 of the United States Code.

DATED: September 19, 2023

By: Sylvia D. Hall-Ellis
Sylvia D. Hall-Ellis, Ph.D.

Decl. of Sylvia Hall-Ellis

Attachment 1A

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245 10$aVisual control of robots : $bhigh-performance visual
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300 ##$axxviii, 353 p. : $bill. ; $c24 cm.
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504 ##$aIncludes bibliographical references (p. 303-319) and
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650 #0$aRobots $xControl systems.
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Decl. of Sylvia Hall-Ellis

Attachment 1B

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670 __ |a Dict. of robotics |b Control; controller)

670 __ |a EI |b (Robotics--Control systems)

670 __ |a LC data base, 3/1/89.

906 __ |t 8914 |u fk04 |v 1

952 __ |a 6 bib. record(s) to be changed

952 __ |a LC pattern: Airplanes--Control systems

953 __ |a fg09

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Attachment 1C

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082 00 629.8/92 \$2 20
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090 \$b
100 1 Corke, Peter I., \$d 1959-
245 10 Visual control of robots : \$b high-performance visual servoing / \$c Peter I. Corke.
260 Taunton, Somerset, England : \$b Research Studies Press ; \$a New York : \$b Wiley, \$c ©1996.
300 xxviii, 353 pages : \$b illustrations ; \$c 24 cm.
336 text \$b txt \$2 rdacontent
337 unmediated \$b n \$2 rdamedia
338 volume \$b nc \$2 rdacarrier
490 1 Robotics and mechatronics series ; \$v 2
504 Includes bibliographical references (pages 303-319) and index.
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P2

Decl. of Sylvia Hall-Ellis

Attachment 2A

MARC Bibliographic Record

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245 00 \$aIEEE transactions on robotics and automation :\$ba publication of the IEEE Robotics and Automation Society.

246 3_ \$aInstitute of Electrical and Electronics Engineers transactions on robotics and automation

246 30 \$aRobotics and automation

246 33 \$aIEEE transactions on robotics & automation

260 \$aNew York :\$bInstitute of Electrical and Electronics Engineers,\$c1989-c2004.

300 \$a16 volumes :\$billustrations ;\$c28 cm

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362 0_ \$aVol. 5, no. 1 (Feb. 1989)-v. 20, no. 3 (June 2004).

530 \$aAlso issued online.

580 \$aSplit into: IEEE transactions on automation science and engineering, and: IEEE transactions on robotics, t

650 _0 \$aRobotics\$vPeriodicals.

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650 _0 \$aAutomation\$vPeriodicals.

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260 \$aNew York, NY :\$bInstitute of Electrical and Electronics Engineers,\$cc1989-2004.

310 \$aBimonthly

362 1_ \$aBegan with: Vol. 5, no. 1 (Feb. 1989); ceased with v. 20, no. 3 (June 2004).

500 \$aTitle from IEEEExplore homepage (viewed Jul. 18, 2000).

588 \$aDescription based on print version record.

588 \$aLatest issue consulted: Vol. 20, issue 2 (Apr. 2004) (ieeexplore.ieee.org, viewed Sept. 23, 2014).

500 \$aRefereed/Peer-reviewed

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245 00 IEEE transactions on robotics and automation : \$b a publication of the IEEE Robotics and Automation Society.
246 3 Institute of Electrical and Electronics Engineers transactions on robotics and automation
246 30 Robotics and automation
260 New York : \$b Institute of Electrical and Electronics Engineers, \$c 1989-c2004.
300 16 v. : \$b ill. ; \$c 28 cm.
310 Bimonthly
362 0 Vol. 5, no. 1 (Feb. 1989)-v. 20, no. 3 (June 2004).
580 Split into: IEEE transactions on automation science and engineering, and: IEEE transactions on robotics, the latter continuing the numbering of this journal.
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710 2 IEEE Robotics and Automation Society.

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