

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AXON ENTERPRISE, INC., DEDRONE HOLDINGS, INC., AND
SKYDIO, INC.
Petitioners

v.

AIRSPACE DEFENSE, INC.
Patent Owner

Case No. IPR2025-00629
Patent 10,514,711

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 Petitioners Axon Enterprise, Inc., Dedrone Holdings, Inc., and Skydio, Inc.

2. I have written this declaration to provide my expert opinion and basis for my opinion regarding the authenticity and public availability of two publications. My opinions are based on my education, experience and review of the information relevant to this matter discussed herein.

3. I reserve the right to supplement or amend my opinions, and bases for them, in response 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, plus reimbursement for any additional reasonable expenses. My compensation is not in any way tied to the content of this report, the substance of my opinions, or the outcome of this proceeding. 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 and Information 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. Currently I serve as a Member of the CORE Margaret Mann Citation Committee and as a Member of the CORE Awards & Scholarship Coordination 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 1, and sets forth the dates for the professional positions I have held and additional information about my publications in the field of library sciences.

III. PRELIMINARIES

10. ***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 (“POSA”), exercising reasonable diligence, could have located the documents of their respective publications below.

11. 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 POSA in the relevant subject matter could locate it through the exercise of ordinary diligence.

12. 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 POSA 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.

13. 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.

14. ***Persons of ordinary skill in the art.*** I am told by counsel that the subject matter of this proceeding generally relates to flight control techniques for aircrafts.

15. I have been informed by counsel that a “person of ordinary skill in the art at the time of the [purported] invention” of the challenged patent 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.

16. I am told by counsel that persons of ordinary skill in this subject matter or art would have had either (1) at least a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Aerospace engineering, or an equivalent field, as well as at least 2 years of academic or industry experience in the aerospace or avionics fields, or (2) at least four years of experience in any of the above industries.

17. It is my opinion that such a person would have been engaged in research, learning thorough study and practice in the field and possibly through formal instruction with the bibliographic resources relevant to his or her research.

In the timeframe prior to October 9, 2016, as well as prior to October 1, 2017, such a person would have had access to a vast array of long-established print resources in the area of the aerospace or avionics fields.

IV. LIBRARY CATALOGING PRACTICES

A. INDEXING

18. A researcher may discover material relevant to their topic in a variety of ways. 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. One common means of discovery is to search for relevant information in an index of periodicals 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.

19. 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.

20. 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.

21. Before the widespread development of online databases to index articles in journals, magazines, conference papers, and technical reports, 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.

22. Librarians consulted information seekers to verify citations, check availability in union catalogs, printed books catalogs, the OCLC database (discussed below), 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.

23. Online indexing services such as Google Scholar¹ or ScienceDirect²

¹ <https://scholar.google.com/>

² <https://www.sciencedirect.com/>

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.

24. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The Library of Congress Subject Authorities includes standard forms of terms and cross references that are included in bibliographic records. Subject headings are terms that an individual seeking a document regardless of format can enter in the search bar of the online catalog. Subjects also connect an authenticated term (one included in the Library of Congress subject headings list) with related, broader, and narrower terms. The formats in which these access terms are presented vary from service to service.

B. MARC RECORDS AND THE ONLINE LIBRARY CATALOG

25. 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.³ MARC was first developed in the 1960s by

³ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/> (last visited March 4, 2026).

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.

26. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access to books, journals, and other resources in the collection. The bibliographic data provide points of access and can be searched by a POSA (as discussed below) to identify and obtain resources in the library collection. An information seeker (or POSA) 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.

27. 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.

28. 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.⁴ As explained by the Library of Congress:

Why Is a MARC Record Necessary? LIBRARY OF CONGRESS.⁵

29. Thus, almost every major library in the world is MARC-compatible. See, e.g., *MARC Frequently Asked Questions (FAQ)*, LIBRARY OF CONGRESS.⁶ (“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.⁷

⁴ 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 Congress, 1975) and available online from the Hathi Trust (<https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1>; last visited March 4, 2026).

⁵ <http://www.loc.gov/marc/umb/um01to06.html#part2>

⁶ <https://www.loc.gov/marc/faq.html>

⁷ <http://www.loc.gov/marc/bibliographic/>

30. 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 described in this declaration.

31. **MARC records.** A MARC record comprises several fields, each of which contains specific data about the cataloged resource. 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.⁸

32. 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, I consulted the Directory of OCLC Libraries to identify the institution that created the MARC record.⁹

33. 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.¹⁰ For example, 6XX fields are termed “Subject Access Fields.”¹¹ Among these, for example, is the 650 field; this is the “Subject Added Entry – Topical Term” field.¹² 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

⁸ <http://www.loc.gov/marc/bibliographic/bd3xx.html>

⁹ <https://www.oclc.org/en/contacts/libraries.html>

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

¹¹ <http://www.loc.gov/marc/bibliographic/bd6xx.html>

¹² <http://www.loc.gov/marc/bibliographic/bd650.html>

include a classification number. For example, the 050 field is the “Library of Congress Call Number.”¹³ A defined portion of the Library of Congress Call (LCC) 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.”¹⁴ 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.

¹³ <http://www.loc.gov/marc/bibliographic/bd050.html>

¹⁴ <http://www.loc.gov/marc/bibliographic/bd082.html>

C. OCLC

34. The OCLC was created “to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries 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.”¹⁵ 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.

35. 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

¹⁵ 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>).

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 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.

36. 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 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 automatically updates the date in Field 005 every time the library modifies the

MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library) and shows the most recent update and when the MARC record is printed to hardcopy—as is the case with the attachments to this declaration.

37. 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).

38. 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. Libraries receive a significant number of serials (e.g., journals and newspapers); deliveries come every day. The goal is to receive them in acceptable condition, note the receipt, property stamp them, and place them in public areas within a short time (customarily a day or two).

V. PUBLICATIONS

A. DOCUMENT 1: “Big/Little Deep Neural Network for Ultra Low Power Inference” by Eunhyeok Park, Dongyoung Kim, Soobeom Kim, Yong-Deok Kim, Gunhee Kim, Sungroh Yoon, and Sungjoo Yoo. Exhibit 1035 (“Park”)

39. Exhibit 1035 is a copy of a conference paper published in the digital volume titled *2015 International Conference on Hardware/Software Codesign and System Synthesis* found in the King Library at San José State University (San José, California). The conference paper titled “Big/Little Deep Neural Network for Ultra Low Power Inference” by Eunhyeok Park, Dongyoung Kim, Soobeom Kim, Yong-Deok Kim, Gunhee Kim, Sungroh Yoon, and Sungjoo Yoo (hereafter “Park”) appears beginning on page 124. The 2015 International Conference on Hardware/Software Codesign and System Synthesis (CODES + ISSS) was held on October 4-9, 2015, in Amsterdam, Netherlands. Exhibit 1035 is a true and correct copy of the Park conference paper (pages 124-132). I obtained this copy of the

conference paper from the King Library at San José State University. Specifically, the text of the Park conference paper 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 1035 was found within the custody of a library – a place where, if authentic, a copy of this digital conference proceedings volume would likely be. Exhibit 1035 is a true and correct copy in a condition that creates no suspicion about authenticity.

40. The Park conference paper is also available in the *IEEE Xplore* database¹⁶ and the digital repositories *ResearchGate*¹⁷ and *Semantic Scholar*.¹⁸ The *IEEE Xplore* database indicates that the Park conference paper was added on November 19, 2015. *ResearchGate* lists October 2015 as the date it was added to this repository, and the *Semantic Scholar* lists October 4, 2015, as the date it was added to this repository.

41. Attached hereto as Attachment 1A is a true and correct copy of the MARC record for the digital volume titled *2015 International Conference on*

¹⁶ <https://ieeexplore.ieee.org/document/7331375>

¹⁷

https://www.researchgate.net/publication/308704215_Biglittle_deep_neural_network_for_ultra_low_power_inference

¹⁸ <https://www.semanticscholar.org/paper/Big-little-deep-neural-network-for-ultra-low-power-Park-Kim/7e9469418f8cca348c766c801691931767f5e800>

Hardware/Software Codesign and System Synthesis obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 1A. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 1A, that library code is “STF,” which means that the MARC record for this digital conference proceedings volume was cataloged at the Stanford University Libraries (Palo Alto, California). As can be seen in field 008 (“Date entered on file”) in the MARC record for this exhibit, a cataloger at the Stanford University Libraries created OCLC record number 935373347 on January 20, 2016 (“160120”). The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to the MARC record occurred on September 29, 2025, as shown in field 005 (“20250929”).

42. Attachment 1A further includes an entry in field 050 (“TK7895.E42”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system). Attachment 1A also shows that Exhibit 1035 was catalogued with four descriptor terms reading “Embedded computer systems \$v Congresses” (Attachment 1B, Library of Congress subject heading sh2008102939), “Cooperating objects (Computer systems) \$v Congresses” (Attachment 1C, Library of Congress subject heading sh2012002854 and Attachment 1D, Library of

Congress subject heading sh85031115), “System design \$v Congresses” (see Attachment 1E, Library of Congress subject heading sh2008112431) and “Systems software \$v Congresses” (Attachment 1F, Library of Congress subject heading sh2010115268) in the 650 fields. Thus, as of its cataloging, 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 entries. Further, as of January 20, 2016, the MARC record attached hereto as Attachment 1A was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that acquired the digital conference proceedings volume, 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.

43. WorldCat indicates that the digital volume titled *2015 International Conference on Hardware/Software Codesign and System Synthesis* as cataloged at the Stanford University Libraries is currently available from 26 libraries.¹⁹ In view of the above, the digital conference proceedings volume titled *2015 International Conference on Hardware/Software Codesign and System Synthesis* was publicly available on or shortly after January 20, 2016, because by that date it had been

¹⁹ <https://search.worldcat.org/title/935373347>

received, cataloged, and indexed at the Stanford University Libraries and made part of the OCLC bibliographic database. For these reasons, it is my opinion that Exhibit 1035 was published and publicly accessible on or shortly after January 20, 2016.

B. DOCUMENT 2: “You Only Look Once: Unified, Real-Time Object Detection” by Joseph Redmon, Santosh Divvala, Ross Girshick, and Ali Farhadi. Exhibit 1036 (“Redmon”)

44. Exhibit 1036 is a copy of a conference paper published in the digital volume titled *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* found in the King Library at San José State University (San José, California). The conference paper titled “You Only Look Once: Unified, Real-Time Object Detection” by Joseph Redmon, Santosh Divvala, Ross Girshick, and Ali Farhadi (hereafter “Redmon”) appears beginning on page 779. The 2016 IEEE Conference on Computer Vision and Pattern Recognition was held on June 26 – July 1, 2016, in Las Vegas, Nevada. Exhibit 1036 is a true and correct copy of the Redmon conference paper (pages 779-788). I obtained this copy of the conference paper from the King Library at San José State University. Specifically, the text of the Redmon conference paper 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 1036 was found within the custody of a library – a place where, if authentic, a copy of this digital conference proceedings volume would likely be. Exhibit 1036 is a true and correct copy in a

condition that creates no suspicion about authenticity.

45. The Redmon conference paper is also available in the *IEEE Xplore* database²⁰ and the digital repositories *ResearchGate*²¹ and arXiv at Cornell University.²² The *IEEE Xplore* database indicates that the Redmon conference paper was added on December 12, 2016. *ResearchGate* lists June 2016 as the date it was added to this repository, the arXiv database lists May 9, 2016, as the date it was added to this repository.

46. Attached hereto as Attachment 2A is a true and correct copy of the MARC record for the digital volume titled *2016 IEEE Conference on Computer Vision and Pattern Recognition* obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 2A. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 2A, that library code is “STF,” which means that the MARC record for this digital conference proceedings volume was cataloged at the Stanford University Libraries (Palo Alto, California). As can be seen in field

²⁰ <https://ieeexplore.ieee.org/document/7780460>

²¹

https://www.researchgate.net/publication/311609522_You_Only_Look_Once_Unified_Real-Time_Object_Detection

²² <https://arxiv.org/abs/1506.02640>

008 (“Date entered on file”) in the MARC record for this exhibit, a cataloger at the Stanford University Libraries created OCLC record number 971499621 on February 6, 2017 (“170206”). The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to the MARC record occurred on September 25, 2025, as shown in field 005 (“20250925”).

47. Attachment 2A further includes an entry in field 050 (“TA1634”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system). Attachment 2A shows that Exhibit 1036 was catalogued with three descriptor terms reading “Computer vision \$v Congresses” (see Attachment 2B, Library of Congress subject heading sh2008101162), “Optical pattern recognition \$v Congresses” (see Attachment 2C, Library of Congress subject heading sh2008108668), and “Pattern recognition systems \$v Congresses” (see Attachment 2D, Library of Congress subject heading sh2008108988) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 2A was indexed according to its subject matter by virtue of at least two independently sufficient classifications: the field 050 entry and the field 650 entries. Further, as of February 6, 2017, the MARC record attached hereto as Attachment 2A was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that acquired the digital

conference proceedings volume, 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.

48. WorldCat indicates that the digital volume titled *2016 IEEE Conference on Computer Vision and Pattern Recognition* as cataloged at the OCLC Corporate Library is currently available from 115 libraries.²³ In view of the above, the digital conference proceedings volume titled *2016 IEEE Conference on Computer Vision and Pattern Recognition* was publicly available on or shortly after February 6, 2017, because by that date it had been received, cataloged, and indexed at the Stanford University Libraries and made part of the OCLC bibliographic database. For these reasons, it is my opinion that Exhibit 1036 was published and publicly accessible on or shortly after February 6, 2017.

VI. SUMMARY OF OPINIONS

49. In view of the foregoing, it is my opinion that the publications described above were publicly available to a POSA by the corresponding date listed in the table below:

²³ <https://search.worldcat.org/title/971499621>

Exhibit	Description	Publication Date
1035	Park, Eunhyeok, Dongyoung Kim, Soobeom Kim, Yong-Deok Kim, Gunhee Kim, Sungroh Yoon, and Sungjoo Yoo. "Big/Little Deep Neural Network for Ultra Low Power Inference." <i>2015 International Conference on Hardware/Software Codesign and System Synthesis Proceedings</i> (pp. 124-132). CODES + ISSS. Piscataway, NJ: IEEE, 2015.	January 20, 2016
1036	Redmon, Joseph, Santosh Divvala, Ross Girshick, and Ali Farhadi. "You Only Look Once: Unified, Real-Time Object Detection." <i>2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Proceedings</i> (pp. 779-788). Los Alamitos, CA: IEEE Computer Society, 2016.	February 6, 2017

50. 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. If cross-examination is required of me, I will appear within the United States during the time allotted for cross-examination.

51. 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: March 6, 2026

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

ATTACHMENT 1A

Bibliographic Record - OCLC Number: 935373347

LDR	Record Status	'c' - Corrected or revised
	Type of Record	'a' - Language material
	Bibliographic Level	'm' - Monograph/Item
	Type of Control	' ' - No specified type of control
	Encoding Level	' ' - Full level
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005	20250929024649.0	
008	Date Entered on File	'160120'
	Type of Date/Publication Status	't' - Publication and copyright date
	Date1/Beginning Date of Publication	'2015'
	Date2/Ending Date of Publication	'2015'
	Place of Publication, Production, or Execution Code	'nju' - New Jersey
	Illustrations	'a '
	Target Audience	' ' - Unknown or unspecified
	Form of Item	'o' - Online
	Nature of Contents Code	'b '
	Government Publication	' ' - Not a government publication
	Conference Publication	'1' - Conference publication
	Festschrift	'0' - Not a festschrift
	Index	'0' - No index
	Literary Form	'0' - Not fiction
	Biography	' ' - No biographical material
	Language Code	'eng' - English
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006	Form of Material	'm' - Computer file
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	Form of Item	'o' - Online
	Type of Computer File	'd' - Document
	Government Publication	' ' - Not a government publication
007	Category of Resource	'c' - Electronic Resource
	Specific Material Designation (c)	'r' - Remote
	Color (c)	'm' - Mixed
	Dimensions (c)	'n' - Not applicable
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	File Formats (c)	' ' - No attempt to code
	Quality Assurance Target(s) (c)	' ' - No attempt to code
	Antecedent/Source (c)	' ' - No attempt to code
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040 STF **\$b** eng **\$e** rda **\$e** pn **\$c** STF **\$d** CUS **\$d** OCLCA **\$d** COO **\$d** REB **\$d** OCLCQ **\$d** STF **\$d** OCLCF **\$d** STF **\$d** OCL **\$d** OCLCO **\$d** OCLCQ **\$d** OCLCO **\$d** OCLCQ **\$d** OCLCL **\$d** OCLC O

019 956664058

020 **\$z** 9781467383219

020 **\$z** 146738321X

020 **\$z** 9781467380775 **\$q** (print-on-demand)

020 **\$z** 1467380776 **\$q** (print-on-demand)

050 4 TK7895.E42

111 2 IEEE/ACM/IFIP International Conference on Hardware/Software Codesign & System Synthesis **\$d** (2015 : **\$c** Amsterdam, Netherlands)

245 1 0 2015 International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS) : **\$b** October 4-9, 2015, Mövenpick Hotel, Amsterdam City Center, Amsterdam, the Netherlands / **\$c** sponsoring societies ACM, IEEE.

246 1 **\$i** Also known as: **\$a** CODES+ISSS 2015

246 1 **\$i** Available from some providers with title: **\$a** Hardware/Software Codesign and System Synthesis (CODES+ISSS), 2015 International Conference on

264 1 Piscataway, NJ : **\$b** IEEE, **\$c** [2015]

264 4 **\$c** ©2015

300 1 online resource : **\$b** illustrations (some color)

336 text **\$b** txt **\$2** rdacontent

337 computer **\$b** c **\$2** rdamedia

338 online resource **\$b** cr **\$2** rdacarrier

347 text file **\$2** rda

500 "IEEE Catalog Number: CFP15COD-ART"--PDF copyright page.

500 "Digest of technical papers"--PDF copyright page.

500 "Embedded Systems Week (ESWeek) is the premier event covering all aspects of embedded systems and software. By bringing together three leading conferences (CASES, CODES+ISSS, and EMSOFT), 2 symposia (ESTIMedia and RSP) and several workshops and tutorials, ESWeek allows attendees to benefit from a wide range of topics covering the state of the art in embedded systems research and development."--Http://www.esweek.org

504 Includes bibliographical references.

588 0 Online resource; title from PDF title page (IEEE, viewed on January 20, 2016).

650 0 Embedded computer systems **\$v** Congresses.

650 0 Cooperating objects (Computer systems) **\$v** Congresses.

650 0 System design **\$v** Congresses.

650 0 Systems software **\$v** Congresses.

650 6 Systèmes enfouis (Informatique) **\$v** Congrès.

650 6 Objets coopérants (Systèmes informatiques) **\$v** Congrès.

650 6 Conception de systèmes **\$v** Congrès.

650 6 Logiciels de base **\$v** Congrès.

650 7 Systems software **\$2** fast

650 7 System design **\$2** fast

650 7 Embedded computer systems **\$2** fast

650 7 Cooperating objects (Computer systems) **\$2** fast

655 ings (reports) **\$2** aat

655 7 Conference papers and proceedings **\$2** fast
655 7 Conference papers and proceedings. **\$2** lcgft
655 7 Actes de congrès. **\$2** rvmgf
710 2 Association for Computing Machinery, **\$e** sponsoring body. **\$1** <https://id.oclc.org/worldcat/entity/E39QH7JmpTQRkKmb7vw3QtqQY6>
710 2 Institute of Electrical and Electronics Engineers, **\$e** sponsoring body. **\$1** <https://id.oclc.org/worldcat/entity/E39QH7JmppbjgFY6j8mDDMWwRg>
856 4 0 **\$3** ACM Digital Library **\$u** <http://dl.acm.org/citation.cfm?id=2830840&CFID=746609010&CFTOKEN=72549619> **\$z** Access restricted to subscribers.
856 4 0 **\$3** IEEE Xplore **\$u** <http://ieeexplore.ieee.org/servlet/opac?punumber=7318233>
029 1 AU@ **\$b** 000061151067
029 1 AU@ **\$b** 000061396605

ATTACHMENT 1B

MARC record

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LCCN

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150	\$a Embedded computer systems \$v Congresses
667	\$a Record generated for validation purposes.
670	\$a Work cat.: Architecture and design of distributed embedded systems, c2001
999 f f	\$i 8be087e3-5d6c-4da7-a3f4-fffc5437fee7 \$s 3947f5cf-15b4-4efd-9dc9-6803297a0c51

ATTACHMENT 1C

MARC record

LC control
no.: sh2012002854

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Permalink: <https://lccn.loc.gov/sh2012002854> (link opens in a new tab)

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001 sh2012002854

005 20250804135434.7

008 120716i| anannbabn |a ana c

010 \$a sh2012002854

035 \$a sh2012002854

040 \$a WaU \$b eng \$c DLC \$d DLC

150 \$a Cooperating objects (Computer systems)

450 \$a COs (Cooperating objects)

450 \$a Cyber-physical systems

450 \$a Objects, Cooperating (Computer systems)

550 \$w g \$a Embedded computer systems

550 \$w g \$a Ubiquitous computing

550 \$w g \$a Wireless sensor networks

670 \$a Work cat.: Marron, P.J. The emerging domain of cooperating objects, c2012: \$b p. 9 (Cooperating objects are modular systems of autonomous, heterogeneous devices pursuing a common goal by cooperation in computations and in sensing and/or actuating with the environment ... the domain of Cooperating objects is a cross-section between (networked) embedded systems, ubiquitous computing, and (wireless) sensor networks)

670 \$a Cooperating Objects Network of Excellence web site, July 16, 2012: \$b about, background (There is a number of different system concepts that have gained a lot of relevance in the area of embedded systems ... [They are] embedded systems ... pervasive computing (also called ubiquitous computing) ... [and] wireless sensor networks ... A future system concept needs to combine the strong points of all three system concepts ... It has to provide support for the control of physical processes like today's embedded systems do, have as good support for device heterogeneity and spontaneity of usage as required by pervasive and ubiquitous computing approaches, and has to be as cost efficient and wirelessly agile as wireless sensor networks are. These new systems consist, therefore, of individual entities or objects that jointly strive to reach a common goal, which will typically be a goal in sensing or control, and are dynamically and loosely federating themselves for cooperation, taking care not to overtax their available resources. Definition ... Cooperating Objects consist of embedded computing devices equipped with communication as well as sensing or actuation capabilities that are able to cooperate and organize themselves autonomously into networks to achieve a common task. The vision of Cooperating Objects is to tackle the emerging complexity by cooperation and modularity. Towards this vision, the ability to communicate and interact with other objects and/or the

environment is a major prerequisite. While in many cases cooperation is application specific, cooperation among heterogeneous devices can be supported by shared abstractions)

670 \$a Third International Workshop on Networks of Cooperating Objects home page, July 16, 2012 \$b (Cooperating Objects (COs) collectively refers to embedded computing devices equipped with communication as well as sensing or actuation capabilities, able to cooperate and organize themselves autonomously into networks to achieve a common task. As such, COs envision a single, coherent system formed by a wide range of devices)

670 \$a Ollero, A. An introduction to the concept of cooperating objects and sensor networks, via WWW, July 16, 2012: \$b p. 14 (Cooperating Object (CO); a CO can be defined as a collection of sensors, actuators, controllers or other COs that communicate with each other and are able to achieve, more or less autonomously, a common goal)

670 \$a Wikipedia, viewed May 14, 2015 \$b (cyber-physical system (CPS) is a system of collaborating computational elements controlling physical entities. Today, a precursor generation of cyber-physical systems can be found in areas as diverse as aerospace, automotive, chemical processes, civil infrastructure, energy, healthcare, manufacturing, transportation, entertainment, and consumer appliances. This generation is often referred to as embedded systems. In embedded systems the emphasis tends to be more on the computational elements, and less on an intense link between the computational and physical elements)

670 \$a Applied science full text, viewed May 14, 2015 \$b (separate headings: Cooperating objects (Computer systems); Cyber-physical systems)

675 \$a Inspec

999 f f \$i a718a35e-f580-4451-bedf-bf97729bea16 \$s 0b71812a-f5a7-45e9-b4c8-203037408b88

ATTACHMENT 1D

MARC record

LC control
no.: sh 85031115

LCCN
Permalink: <https://lccn.loc.gov/sh85031115> (link opens in a new tab)

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003 DLC
008 860211i| anannbabn |b ana
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035 \$a (DLC)sh 85031115
035 \$a (DLC)30040
040 \$a DLC \$c DLC \$d DLC \$d WaU \$d DLC
053 0 \$a AS
150 \$a Congresses and conventions
360 \$i subdivision \$a Congresses \$i under subjects; and names of individual congresses
450 \$a Colloquia
450 \$a Colloquiums
450 \$a Conferences
450 \$a Conventions (Congresses)
450 \$a International conferences, congresses and conventions
450 \$a Symposia
450 \$a Symposiums
550 \$w g \$a Intellectual cooperation
550 \$a Convention facilities
670 \$a Random House Kernerman Webster's college dictionary, ©2010, via TheFreeDictionary.com, Aug. 29, 2013 \$b (colloquium n., pl. -quiums, -quia a conference at which scholars or other experts present papers on and discuss a specific topic)
670 \$a The American heritage dictionary of the English language, ©2000, via TheFreeDictionary.com, Aug. 29, 2013 \$b (colloquium n. pl. colloquiums or colloquia 1. An informal meeting for the exchange of views. 2. An academic seminar on a broad field of study, usually led by a different lecturer at each meeting.)
670 \$a Merriam-Webster online, Aug. 29, 2013 \$b (colloquium plural colloquiums or -quia: a usually academic meeting at which specialists deliver addresses on a topic or on related topics and then answer questions relating to them)
999 f f \$i 59247730-0e23-4b44-8771-1d5e86e8c778 \$s ee9d7940-8c86-4b58-9f82-c292b4097248

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Permalink: <https://lccn.loc.gov/sh2008112431> (link opens in a new tab)

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035	\$a (DLC)sh2008112431
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150	\$a System design \$v Congresses
667	\$a Record generated for validation purposes.
670	\$a Work cat.: Tools and algorithms for the construction and analysis of systems, c2001
999 f f	\$i 63d2e664-8ff3-400c-bac8-fd1f5dd04b04 \$s 7424d4f5-42fc-4dba-85c5-ddeb35a16417

ATTACHMENT 1F

MARC record

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LCCN

Permalink: <https://lccn.loc.gov/sh2010115268> (link opens in a new tab)

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670	\$a Work cat.: Proceedings, 9th International Symposium on System Synthesis, c1996
999 f f	\$i ac7d1f9b-8b52-4e1d-baab-91f2f05321d0 \$s d05848c2-82ac-4d14-9c9f- 936251e68db0

ATTACHMENT 2A

Bibliographic Record - OCLC Number: 971499621

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	Type of Record	'a' - Language material
	Bibliographic Level	'm' - Monograph/Item
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005	20250925184237.4	
008	Date Entered on File	'170206'
	Type of Date/Publication Status	't' - Publication and copyright date
	Date1/Beginning Date of Publication	'2016'
	Date2/Ending Date of Publication	'2016'
	Place of Publication, Production, or Execution Code	'cau' - California
	Illustrations	'a '
	Target Audience	' ' - Unknown or unspecified
	Form of Item	'o' - Online
	Nature of Contents Code	'b '
	Government Publication	' ' - Not a government publication
	Conference Publication	'1' - Conference publication
	Festschrift	'0' - Not a festschrift
	Index	'1' - Index present
	Literary Form	'0' - Not fiction
	Biography	' ' - No biographical material
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	Government Publication	' ' - Not a government publication
007	Category of Resource	'c' - Electronic Resource
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	Color (c)	'm' - Mixed
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040 STF **\$b** eng **\$e** rda **\$e** pn **\$c** STF **\$d** OCLCO **\$d** CUS **\$d** OCLCF **\$d** MYG **\$d** OCLCA **\$d** UMC **\$d** OCLCQ **\$d** OCLCO **\$d** COO **\$d** VT2 **\$d** REB **\$d** IAS **\$d** CEF **\$d** WYU **\$d** LVT **\$d** AU @ **\$d** UMC **\$d** OCLCQ **\$d** OCLCO **\$d** OCLCQ **\$d** OCLCL **\$d** OCLCO

019 972606108 **\$a** 974365422 **\$a** 1096905089 **\$a** 1243130739 **\$a** 1287881041

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020 **\$z** 9781509014378

020 **\$z** 1509014373

020 **\$z** 9781509014385 **\$q** (print)

020 **\$z** 1509014381 **\$q** (print)

024 7 10.1109/CVPRW39219.2016 **\$2** doi

037 **\$b** 00066573

050 4 TA1634

111 2 IEEE Computer Society Conference on Computer Vision and Pattern Recognition **\$n** (29th : **\$d** 2016 : **\$c** Las Vegas, Nev.). **\$e** Workshops.

245 1 0 Proceedings, 29th IEEE Conference on Computer Vision and Pattern Recognition Workshops : **\$b** 26 June-1 July 2016, Las Vegas, Nevada.

246 3 0 29th IEEE Conference on Computer Vision and Pattern Recognition Workshop

246 3 CVPRW 2016

246 1 **\$i** Available from some providers with title: **\$a** 2016 IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)

246 1 **\$i** Available from some providers with title: **\$a** Computer Vision and Pattern Recognition Workshops (CVPRW), 2016 IEEE Conference on

264 1 Los Alamitos, California : **\$b** Conference Publishing Services, IEEE Computer Society, **\$c** [2016]

264 4 **\$c** ©2016

300 1 online resource (xxii, 1624 pages) : **\$b** illustrations (some color)

336 text **\$b** txt **\$2** rdacontent

337 computer **\$b** c **\$2** rdamedia

338 online resource **\$b** cr **\$2** rdacarrier

347 text file **\$b** PDF **\$2** rda

500 "IEEE Computer Society Order Number E5869"--PDF copyright page.

504 Includes bibliographical references and author index.

520 8 Annotation **\$b** CVPR is the premiere annual Computer Vision event comprising the main CVPR conference and many co located workshops and short courses With its high quality and low cost, it provides an exceptional value for students, academics and industry CVPRW consists of the published papers from the 30 co located workshops spanning many different sub fields of computer vision.

588 0 Online resource; title from PDF title page (IEEE Xplore, viewed on February 6, 2017).

650 0 Computer vision **\$v** Congresses.

650 0 Optical pattern recognition **\$v** Congresses.

650 0 Pattern recognition systems **\$v** Congresses.

650 6 Vision par ordinateur **\$v** Congrès.

650 6 Reconnaissance optique des formes (Informatique) **\$v** Congrès.

650 6 Reconnaissance des formes (Informatique) **\$v** Congrès.

650 7 Computer vision **\$2** fast

650 7 Optical pattern recognition **\$2** fast

650 recognition systems **\$2** fast

655 7 proceedings (reports) **\$2** aat
655 7 Conference papers and proceedings **\$2** fast
655 7 Conference papers and proceedings. **\$2** lcgft
655 7 Actes de congrès. **\$2** rvmgf
710 2 IEEE Computer Society, **\$e** issuing body. **\$1** <https://id.oclc.org/worldcat/entity/E39QQPVp7YRxjbcrXVPYHxVD3F>
710 2 Institute of Electrical and Electronics Engineers.
776 0 **\$z** 1509014381
856 4 0 **\$3** IEEE Xplore **\$u** <https://ieeexplore.ieee.org/servlet/opac?punumber=7784518>

ATTACHMENT 2B

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150	\$a Computer vision \$v Congresses
667	\$a Record generated for validation purposes.
670	\$a Work cat.: Cognitive vision systems, c2006
999 f f	\$i 5de2e4fb-445d-4851-b737-7c31530d2f1c \$s d69f0853-0990-4ca6-b9a4-bfc084bab61a

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667	\$a Record generated for validation purposes.
670	\$a Work cat.: 2005 7th International Conference on Information Fusion (FUSION), c2005
999 f f	\$i acc1f22d-cf1c-4d0e-ae2a-12ae5ccfe511 \$s d6793f3b-97c1-4676-9cd0-f37a901f0c5a

ATTACHMENT 2D

MARC record

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035	\$a (DLC)sh2008108988
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150	\$a Pattern recognition systems \$v Congresses
667	\$a Record generated for validation purposes.
670	\$a Work cat.: Advances in pattern recognition, 2001
999 f f	\$i 4407fb64-438f-479c-b318-d065ad5ca824 \$s 3bd21ce2-b7ca-4393-9002-da9174f8e273