UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

HUGHES NETWORK SYSTEMS, LLC and
HUGHES COMMUNICATIONS, INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.
_____

Case IPR2015-00059
Patent 7,916,781

_____

**DECLARATION OF SOLOMON W. GOLOMB, PH.D. IN SUPPORT OF
PATENT OWNER'S RESPONSE TO *INTER PARTES* REVIEW OF
U.S. PATENT NO. 7,916,781**

TABLE OF CONTENTS

I, Solomon W. Golomb, declare as follows:

I. QUALIFICATIONS

1. My name is Solomon Golomb. I am a Distinguished and University Professor of Electrical Engineering and Mathematics at the University of Southern California ("USC"). I received my B.A. in Mathematics from Johns Hopkins University in 1951 and my M.S. in Mathematics from Harvard University in 1953. I received my Ph.D. in Mathematics from Harvard University in 1957.

2. For over sixty years I have conducted research in the field of communication systems and signals. Following completion of my Ph.D. thesis, I worked at NASA's Jet Propulsion Laboratory ("JPL") in Pasadena, California from 1956 to 1963, initially as a Senior Research Engineer and eventually as a Deputy Section Chief of the Telecommunications Research Section.[1] At JPL, I was one of the leaders of their space communications efforts and I played a key role in formulating the design of deep-space communications for subsequent lunar and planetary explorations.

3. In 1963 I joined USC as a professor. Throughout the past five decades I have taught courses and conducted research in Electrical Engineering and Mathematics. My areas of research have included communication systems and signals, including space-communications technology and radar and sonar signals,

---

[1] NASA's Jet Propulsion Laboratory (JPL) is a division of the California Institute of Technology.

as well as coding for reliability, security, data compression, and synchronization. I am recognized for my work with shift register sequences, or pseudorandom sequences, which have extensive applications in radar, space communications, cryptography, and now cell phone communications. I also developed what came to be known as Golomb Coding, a lossless data compression method using codes I developed in the 1960s. My efforts in these fields have helped make USC a center for communications research.

4.   From 1995 to 1998 I was the Director of Technology for the Annenberg Center of Communication at USC. I received the USC Presidential Medallion in 1985 and was awarded the title of University Professor in 1993. In 1999 I was appointed as the first holder of the Andrew and Erna Viterbi Chair in Communications for the USC Viterbi School of Engineering. In 2008 I was named a USC Distinguished University Professor.

5.   I am the author or co-author of a number of books on communications and coding theory, including *Digital Communications with Space Applications* (originally published in 1964, revised edition published in 1982), *Shift Register Sequences* (originally published in 1967, revised edition published in 1982), *Basic Concepts in Information Theory and Coding* (1994), and *Signal Design for Good Correlation: For Wireless Communication, Cryptography, and Radar* (2005). In 1987 I contributed a chapter on error correcting codes to the TIME-LIFE book *Understanding Computers: Memory and Storage*.

6.   In addition to these books, I have authored or co-authored hundreds of other publications on communications systems and signals, coding theory, and

mathematics, including works specifically directed to error correcting codes. I have presented lectures regarding error correcting codes at academic conferences and symposiums, including the National Computer Conference and the Symposium on Applications of Algebra to Error-Correcting Codes.

7. In addition to my posts at USC, I have received numerous awards and recognition for my contributions to the field of communication systems and signals. In 2013, I received the National Medal of Science, the highest honor bestowed by the United States for scientific innovation, from President Obama for my advances in mathematics and communications. I was elected to the National Academy of Engineering in 1976 and to the National Academy of Sciences in 2003. I was named a Fellow of the Institute of Electrical and Electronics Engineers ("IEEE") in 1982 and subsequently received the IEEE Shannon Award of the Information Theory Society. In 2000 I received the Richard W. Hamming Medal of the IEEE. The Hamming Medal is named after a pioneer in the development of computer science and error correcting codes in particular, and is awarded for exceptional contributions to information sciences, systems, and technology. I have been a Foreign Member of the Russian Academy of Natural Science since 1994. I was appointed a Fellow of the American Mathematical Society in 2012 and a Fellow of the Society for Industrial and Applied Mathematics in 2013.

8. A copy of my curriculum vitae is attached as Exhibit 2029.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.

fastcase®
Smarter legal research.