UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DIGITAL CHECK CORP. d/b/a ST IMAGING,
Petitioner,

v.

E-IMAGEDATA CORP.
Patent Owner.

Case IPR2017-00178
Patent 9,179,019 B2

DECLARATION OF JONATHAN D. ELLIS

Patent Trial and Appeal Board
United States Patent and Trademark Office
P. O. Box 1450
Alexandria, VA 22313-1450

e-IMAGEDATA CORP. EXHIBIT 2005

I. INTRODUCTION

1. My name is Jonathan D. Ellis. I have been retained by counsel as an expert for Patent Owner e-ImageData Corp. in *inter partes* review proceeding IPR2017-00178 before the Patent Trial and Appeal Board.

2. I understand that the patent at issue in this proceeding is U.S. Patent No. 9,179,019.

3. My Curriculum Vitae has been filed as Exhibit 2006, which includes a description of my employment and educational background. I have summarized below some aspects of my experience that have specific importance to the opinions that I am providing in this case.

4. All three degrees I have obtained have been in mechanical engineering, and while I am trained as any normal mechanical engineer is trained through accredited programs in mechanical engineering, my specializations are precision engineering, metrology, and optomechanics. Precision engineering is a multidisciplinary approach to building state of the art systems and instrumentation with an emphasis on error budgeting and achieving tight performance specifications. Often, precision engineering combines mechanics, electronics, optics, controls, and/or software. Metrology is the study of measurements, with an emphasis on traceability and error tolerancing. In essence, I am trained to design, build, and qualify precise instruments, often for metrology purposes.

5. I currently have an appointment as a tenured associate professor in the Department of Mechanical Engineering with a secondary appointment in The Institute of Optics at the University of Rochester. Much of my work is focused on training students, either through coursework or through research. In my research, I routinely tackle problems associated with mechanical systems interfacing with optical imaging systems that need real-time signal processing and controls. This is the essence of the systems described in the '019 Patent: a mechanical system for precisely and repeatably positioning an imaging system and sensor to image an object on to the sensor with real-time readout and control.

6. Below are examples of projects that I have worked on or that I am currently working on that utilize similar technology to that needed in this case:

a. Developing an imaging system for measuring attributes of <20 nm linewidth structures employing precise control and synchronization between microscope components, laser sources, positioning stages, and cameras.

b. Developing a high-speed, high numerical aperture scanning system for ophthalmic applications. This involved building a high numerical aperture microscope that can scan over large fields (>7 mm diameter) with <50 nm accuracy and scan speeds >800 mm/s. Having a large scanning field and a high numerical aperture are two attributes that are

odds with one another, requiring a complex design and optimization to maximize the performance of both the optical components and the mechanical components. One patent has been filed on the scanning system and a several provisional patents are in preparation. This IP is currently licensed to Clerio Vision, Inc.

c. Developing an optical probe for freeform optics metrology with real-time signal processing of optical interference signals. Here, we are interested in ways to measure rotationally non-symmetric surfaces, which are current a challenge for the field with no clear solution. One patent has been filed.

d. Developed high-speed signal processing algorithms that have been implemented on a field programmable gate array for real time phasemeter signal processing. This allows complex algorithms to be computed at high speeds, enabling high speed measurement and control with no post-processing operations required.

e. Have devised methods for building fiber optic delivered interferometry systems. One patent has been granted (from when I was studying in the Netherlands) and one patent has been filed with the technology currently licensed to a company.

f. Have devised and developed a novel method for stabilizing Helium Neon gas lasers, with one patent granted (also from the Netherlands).

g. Have devised and developed a novel method for nanoindentation with removing the frame stiffness dependency (US Patent #7568381 B2).

7. At the University of Rochester, I run a research group that works on research projects relating to the same fundamental principles used to design and build microfilm readers and scanners. As on example, we designed systems that scanned for defects in semiconductor chips. Our systems delivered light to a sample in a specific pattern and scanned the sample to determine whether any defects existed. These systems were able to scan and detect defects in very small features.

8. In addition to these projects, I have worked on many others related to precision positioning systems, probing and metrology systems, signal processing circuit design, and optical metrology.

9. I have experience with the operation and mechanical configuration of microfilm scanners. I have repeatedly assembled and disassembled several microfilm scanners, analyzed the images produced by microfilm scanners, and have researched the microfilm scanning industry.

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