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Paper 7
Entered: April 2, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HALLIBURTON ENERGY SERVICES, INC.,
Petitioner,

v.

ADELOS, INC., and THE UNITED STATES OF AMERICA,
AS REPRESENTED BY THE DEPARTMENT OF THE NAVY,
Exclusive Licensee and Patent Owner.

Case IPR2017-02114
Patent 7,268,863 B2

Before SALLY C. MEDLEY, MATTHEW R. CLEMENTS, and AMBER L. HAGY, *Administrative Patent Judges.*

CLEMENTS, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

I. INTRODUCTION

Halliburton Energy Services, Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 1–4, 9, 10, 13, and 15–32 of U.S. Patent No. 7,268,863 B2 (Ex. 1001, "the '863 patent"). Paper 1 ("Pet."). The United States of America, as Represented by the Department of the Navy and exclusive licensee Adelos, Inc. (herein collectively "Patent Owner"), filed a Preliminary Response. Paper 6 ("Prelim. Resp.").[1] Institution of an *inter partes* review is authorized by statute when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a); *see* 37 C.F.R. § 42.108. Upon consideration of the Petition and Preliminary Response, we conclude the information presented does not show there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of any of claims 1–4, 9, 10, 13, and 15–32 of the '863 patent..

A. Related Proceedings

The parties state that the '863 patent is the subject of a court proceeding styled *Adelos, Inc. v. Halliburton Company et al.*, Case No. 9:16-cv-119-DLC (D. Mon.). Pet. 1; Paper 3, 1–2. Also, Petitioner has challenged related patents in IPR2017-02107 and IPR2017-02109. Paper 3, 1–2.

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[1] Adelos, Inc. is identified as "the exclusive licensee of the Government." Paper 3, 1. The United States of America, as Represented by the Department of the Navy and exclusive licensee Adelos, Inc., jointly submit the Preliminary Response. Prelim. Resp. 1. Accordingly, we herein refer to the two collectively as Patent Owner.

B. The ’863 patent

The ’863 patent, titled “Natural fiber span reflectometer providing a spread spectrum virtual sensing array capability,” issued September 11, 2007, from U.S. Patent Application No. 11/056,632. Ex. 1001 at [54], [45], [21]. The ’863 patent generally relates to time-domain reflectometers. Ex. 1001, 1:39. Specifically, the ’863 patent “relates to such reflectometers which are a part of a photonic system application in which the object of the reflectometry is a span of fiber which has an interrogation signal launch end and a remote end.” *Id*. at 1:40–44. Figure 3 is reproduced below.

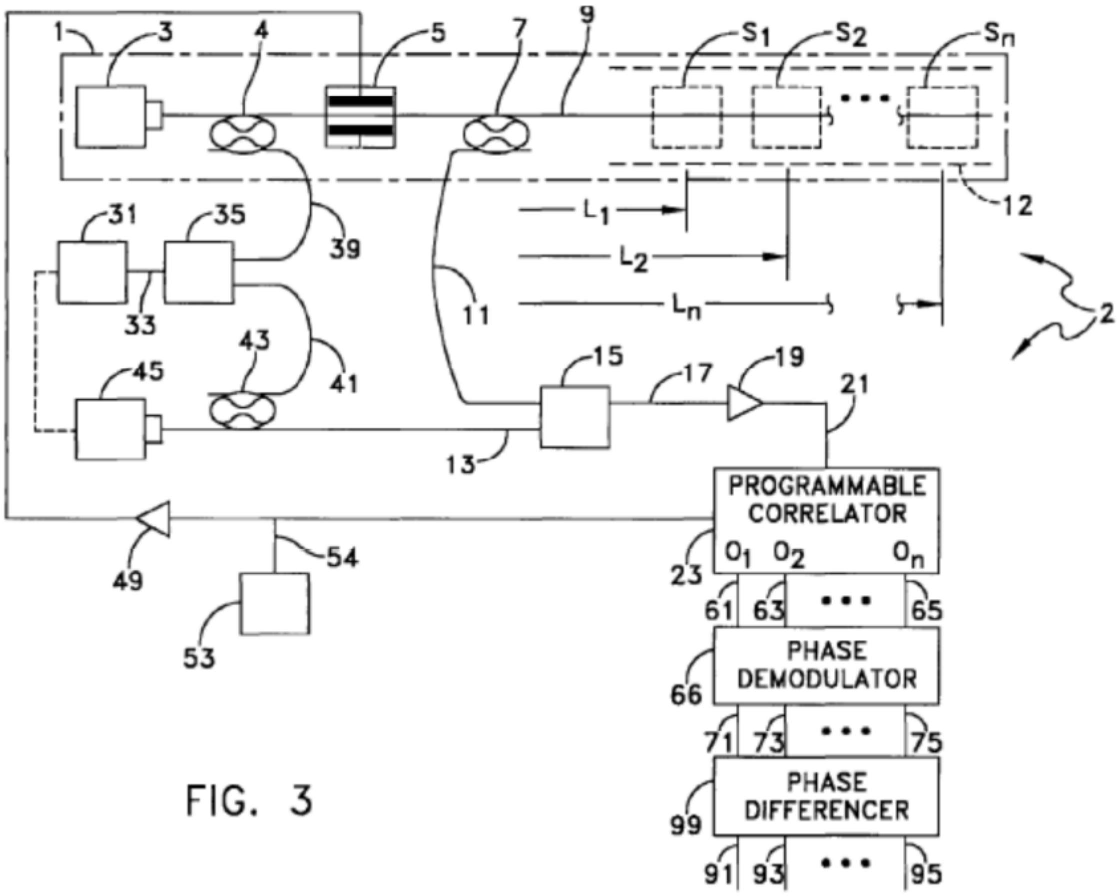

Figure 3 of the ’863 patent shows a block diagram of a time-domain reflectometer system.

Figure 3 shows a transmitter laser 3 connected to coupler or beamsplitter 4, which in turn is connected to optical modulator 5. *Id*. at 15:50–57. Optical modulator 5 is connected to optical coupler, beamsplitter or circulator 7, which in turn is connected to optical fiber 9. *Id*. at 14:65–15:2. Master correlation code generator 53 is connected to modulator 5 by amplifier 49. *Id*. at 15:57–60.

The propagation of the signal in optical fiber 9 "causes a back-propagating composite optical signal, which is the linear summation, or integration spatially, of all of the individual, continuous, or continuum of back-reflections along the span of the optical fiber." *Id*. at 15:15–21. Optical pathway 11 is connected to optical coupler, beamsplitter, or circulator 7 to receive backscattered light from optical fiber 9 and relay it to heterodyne optical receiver 15. *Id*. at 16:7–11, 20:24–28. Optical receiver 15 receives an input from local oscillator laser 45. *Id*. at 17:60–62. Transmitter laser 3 and local oscillator laser 45 are also connected to receiver 35 through optical couplers 4 and 43 and optical pathways 39 and 41. *Id*. at 14:48–55, 17:60–67. Optical receiver 35 is connected back to local oscillator laser 45 through phase locking circuity 31. *Id*. at 18:10–23. Correlator system 23 receives RF signal 21 and an input from correlation code generator 53. *Id*. at 19:55–57, 20:12–14. Correlator system 23 is connected to phase demodulation system 66 which in turn is connected to phase differencer 99. *Id*. at 21:28–35, 22:50–55. Phase demodulation system is comprised of a plurality of phase demodulators 81, 83, and 85. *Id*. at 25:1–4, Fig. 7.

C. Illustrative Claim

Of the challenged claims, claims 1, 31, and 32 are independent and claims 2–30 depend directly or indirectly from claim 1. Independent claim 1 is illustrative of the challenged claims and is reproduced below:

> 1. A time-domain reflectometer for sensing at a desired set of n spaced sensing positions along an optical fiber span, said sensing positions being for sensing a type of external physical signal having the property of inducing light path changes within the optical fiber span at regions there along where the signal is coupled to the span, comprising:
>
> an optical fiber span having a first end which concurrently serves as both the interrogation signal input end and the back propagating signal output end for purposes of reflectometry, and having a second remote end;
>
> a first light source for producing a coherent carrier lightwave signal of a first predetermined wavelength;
>
> a spectrum spreading signal modulator for temporally structuring said carrier lightwave signal into a spread spectrum modulated interrogation lightwave signal which continuously reiterates sequences of an autocorrelatable spectrum spreading signal, the reiterated sequences being executed in a fixed relationship to a predetermined timing base;
>
> a light wave heterodyner having first and second inputs for receiving a primary signal and a local oscillator signal, respectively, and operative to produce the beat frequencies of their respective frequencies;
>
> a lightwave directional coupler having a first port which receives said spread spectrum modulated interrogation lightwave signal, a second port coupled to said first end of said optical fiber span, and a third port coupled to said primary signal input of the hetrodyner;
>
> said directional coupler coupling said spread spectrum modulated interrogation lightwave signal to said second port where it is launched in a forwardly propagating direction along

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