

Ex. PGS 1020

(EXCERPTED)

1 UNITED STATES DISTRICT COURT
2 SOUTHERN DISTRICT OF TEXAS
3 HOUSTON DIVISION

4 WESTERNGECO LLC * 09-CV-1827
5 VS. * Houston, Texas
6 ION GEOPHYSICAL * 7:39 a.m.
CORPORATION, FUGRO *
7 GEOTEAM, INC., ET AL * July 27, 2012

8 JURY TRIAL

9 Volume 5

10
11 BEFORE THE HONORABLE KEITH P. ELLISON
12 UNITED STATES DISTRICT JUDGE

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Direct-Triantafyllou

1 and where you're going with it. In every day language
2 usually we say, now is -- the beginning is now, and future
3 is ahead. But if you defined the beginning to be the
4 depression, the future was rise forward from the
5 depression. Okay?

09:00:27

6 **Q.** If we can go to the next slide. Can you give us an
7 example of some types of software that do this prediction
8 to determine based on information you know, what a system
9 will or what the mathematics at now or some point after
10 the measurement?

09:00:44

11 **A.** So there are a number of methodologies. Some of them
12 you're going to hear. That's why I put some of them down.
13 These are mathematical methods to do exactly what we spoke
14 before, take something from a time and move it forward.
15 So there's a system called an observer because it observes
16 the system and looks forward.

09:01:01

17 There's an ultimate observer, which is
18 called the Kalman filter because Professor Rudy Kalman
19 developed it.

09:01:14

20 **Q.** We've heard that term I think a little bit yesterday,
21 something called a Kalman filter?

22 **A.** Yes.

23 **Q.** And that's this optimal observer?

24 **A.** Yes. It's an optimal observer.

09:01:24

25 **Q.** And it's named after a scientist?

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1 We have no idea.

2 So if you have the Kalman filter on your
3 car, what would that Kalman filter do? Would get your
4 speedometer to see how fast you go, and which direction
09:04:34 5 you go, west, north and south, and will say, based on your
6 speed you have to be where this green place is. Makes a
7 very simple calculation, velocity 30 miles per hour, times
8 half an hour, so much in which direction.

9 So it finds -- it gives you an estimate.

09:04:52 10 It makes a prediction. Why is it a prediction? Why do
11 you call it prediction? You don't have any data to
12 corroborate. All you do is you take your own speed. You
13 say, hey, I must be there.

14 So what happens? The GPS comes in and the
09:05:06 15 GPS is the yellow dot. The GPS is very accurate and the
16 Kalman filter says hey, last week this guy changed the
17 tires, so the speedometer doesn't work very well. The GPS
18 is what I will believe. So, yes, I'm here. You got lucky
19 this time.

09:05:26 20 In the other example on the right, the GPS
21 comes and shows you you are there. There's no way you're
22 on the highway. You know that that's not the case.

23 What I predict this green spot is good
24 enough for me. So you feel confidence at least of where
09:05:43 25 you are. That's what a predictor does for you. Okay? It

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1 buy a television they give you the manual. They have such
2 detailed manuals, which are very well written, both by
3 Q-FIN and as we see from DigiFIN, they write very nice
4 manuals and explain how things work.

09:10:42

5 So in this case they say explicitly, "Due
6 to low sample rate of the position observations," meaning
7 the GPS is another example, doesn't come very often. "The
8 software runs also a position predictor. The Kalman
9 filter predicts where you are."

09:10:57

10 **Q.** So looking at the sentence that you've highlighted,
11 the low sample rate of the position observations, is that
12 explaining that you don't always get an actual measurement
13 of where the bird is?

09:11:12

14 **A.** Exactly. It takes several seconds before the new
15 observation comes. In the meanwhile, as we know those
16 waves don't wait for you. They keep traveling. So you do
17 this prediction to see where everything is to keep tab.

18 **Q.** And based on your analysis, was the WesternGeco
19 Q-Marine system covered by its own patent?

09:11:28

20 **A.** Yes. So it contains those elements.

21 **Q.** If we can now look at the next slide, did you take a
22 look at ION's Q systems?

23 **A.** Yes. I looked at the manuals of the DigiFIN and the
24 related technology to the DigiFIN. And also, I went to

09:11:51

25 the Websites of ION and looked at the product. And also I

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