

EXHIBIT A

In The Matter Of:
Skyhook Wireless v.
Google

David Kotz, Ph.D.
October 12, 2011

Jones Reporting Company
Two Oliver Street, 8th Floor
Boston, MA 02109

JonesReporting
COMPANY

Original File 1012Kotz.txt
Min-U-Script® with Word Index

Page 5

(08:35:27-08:36:51)

1 case?

2 **A SeaChange and nCUBE.**

3 Q SeaChange is S-E-A?

4 **A S-E-A Change. I think they were based in Boston.**

5 Q And you were retained by counsel for the parties

6 in that case?

7 **A Yes.**

8 Q For which party?

9 **A SeaChange.**

10 Q Okay. Do you remember the name of the firm?

11 **A Fish and Richardson.**

12 Q And I don't want you to reveal any confidential

13 information to the parties in that case, but at a high

14 level what was your testimony concerning?

15 **A Well, again, this was over ten years ago so I**

16 **don't remember very much in terms of the details of**

17 **the case, but if I recall correctly, the issue boiled**

18 **down to a patent invalidity question and so there was**

19 **a lot of testimony about prior art and how that**

20 **related to the details of the patent claims.**

21 Q And did you offer your opinions on the validity

22 of SeaChange's patents?

23 **A Yes.**

24 Q Let me just make sure I understood. Was

25 SeaChange the patent holder in that case or were they

Page 6

(08:36:54-08:38:09)

1 the defendant?

2 **A I think so. I'm sorry. It was a long time ago.**

3 Q Fair enough.

4 **A It was -- it was the -- there was the**

5 **infringement claim and then there was the counterclaim**

6 **of invalidity, and I believe it was SeaChange that was**

7 **the patent holder but, you know, I can't remember for**

8 **sure.**

9 Q And you mentioned that the issue was invalidity

10 and there was testimony about prior art. Are you

11 aware that there are other potential bases for

12 invalidating a patent claim besides the prior art?

13 **A Yes.**

14 Q And did you testify in that case to the best of

15 your recollection about issues of indefiniteness?

16 **A Not that I recall.**

17 Q Do you recall whether you had any testimony about

18 whether the patents in that case -- patent or patents

19 in that case met the written description requirement?

20 **A No, I don't recall that.**

21 Q You're -- you're -- you're frowning?

22 **A Yeah.**

23 Q Are you aware that there is a written description

24 requirement in patent law?

25 **A No.**

Page 7

(08:38:11-08:39:41)

1 Q Are you aware that there is what's called an

2 enablement requirement in patent law?

3 **A Somewhat. If I'm -- yeah. I think so.**

4 Q Okay. Realizing that you're not a lawyer --

5 **A Right.**

6 Q -- could you give us your basic understanding of

7 the enablement requirement?

8 **MR. LU:** Objection. Calls for a legal

9 conclusion.

10 **A Right. I'm not a lawyer so my familiarity with**

11 **these terms is somewhat limited. It's -- you know, to**

12 **the best of my understanding, it's -- the patent**

13 **should enable one who is of -- who is reasonably**

14 **skilled in the art to understand the bounds of the**

15 **patent claims.**

16 **MR. LU:** Also going to interpose an

17 objection. It calls for speculation.

18 **BY MS. MANNING:**

19 Q Sure. And -- and when I'm asking you questions

20 today, I'm sure you've gone over some of the -- some

21 of the basics of depositions with counsel, but when I

22 ask you a question today, I'm not asking for you to

23 speculate -- speculate. So to the extent that your

24 answer requires you to speculate, it's fine to flag

25 that for us. I may ask you to give me your best

Page 8

(08:39:44-08:40:49)

1 understanding. I'm entitled to ask for your best

2 understanding but so you -- but so you -- so you

3 understand my question that I'm asking, I'm not asking

4 you to speculate --

5 **A Okay.**

6 Q -- okay? Fair enough?

7 And Mr. Lu just interposed an objection, and I --

8 you went ahead and answered the question. That was

9 the right thing to do. Mr. Lu is entitled to make

10 objections for the record, and unless he instructs you

11 not to answer on the grounds of work product or some

12 other technical privilege or discovery immunity, I'll

13 ask you to go ahead and answer the question. Fair

14 enough?

15 **A Okay.**

16 Q Okay? And if there's ever a time when you don't

17 understand one of my questions, please let me know

18 that.

19 **A Will do.**

20 Q I'll try to refrain, rephrase. We can work

21 together to get to -- to something we both understand.

22 **A I appreciate that.**

23 Q Okay. And I guess if you don't ask me to

24 rephrase, I'll assume you understood. Fair enough?

25 **A Okay.**

Page 9

(08:40:50-08:42:12)

1 Q Okay. And we have somewhat more limited time --

2 time today and we will take breaks throughout the day.

3 If you need to take a break at any time, let us know.

4 **A Okay.**

5 Q I'll ask you not to do that when a question is

6 pending.

7 **A Okay.**

8 Q Do you -- we were talking about your

9 understanding of the enablement requirement of patent

10 law. I wanted to ask you, what is your understanding,

11 if any, about the definiteness requirements of patent

12 laws?

13 **MR. LU:** Objection. Calls for a legal

14 conclusion. Also object to the extent it calls

15 for speculation.

16 **A My understanding of the indefiniteness, the --**

17 **the -- the degree to which one can determine whether a**

18 **claim is indefinite is based on some instruction I**

19 **received from counsel.**

20 Q Okay. And gesturing toward Mr. Lu. Is that

21 counsel for Skyhook that's advised you?

22 **A Right. Yes.**

23 Q And one other thing I should mention. I will try

24 hard not to talk over you.

25 **A Okay.**

Page 10

(08:42:12-08:43:18)

1 Q I know the court reporter will appreciate it if

2 we don't talk over each other.

3 **A Right.**

4 Q So I'll try hard to let you finish, and I'm sure

5 she'll appreciate it if you do the same for me.

6 **A Okay.**

7 Q How have you been advised about the definiteness

8 requirement of patent laws?

9 **A Have I been?**

10 Q How have you been?

11 **A Through conversations with Mr. Lu and his**

12 **assistants.**

13 Q When you say his assistants, who are you

14 referring to?

15 **A The Somait. I don't know how you say her name.**

16 Q I do.

17 **MR. LU:** S-O-M-A-I-T.

18 **BY MS. MANNING:**

19 Q Thank you. Anyone else? Who's --

20 **A Not that I recall, no.**

21 Q And based on your conversations with Mr. Lu and

22 Ms. Somait --

23 **MR. LU:** Somait.

24 **BY MS. MANNING:**

25 Q Somait -- what is your understanding of the

Page 11

(08:43:21-08:45:20)

1 definiteness requirement of the patent laws?

2 **A My -- I understand that to be considered definite**

3 **a patent claim or to be considered indefinite a patent**

4 **claim would have to be insolubly ambiguous or**

5 **unamenable to construction.**

6 Q What does that mean in your mind?

7 **A Well, in order -- if you can find a reasonable**

8 **construction, then you've shown that it is**

9 **sufficiently definite or not indefinite.**

10 Q And can you put any -- any flesh on what you mean

11 by the ability to find a reasonable construction as

12 you put it?

13 **A Well, it would have to be consistent with the**

14 **specification, with the other claim language, with the**

15 **patent prosecution, with the ordinary meaning of terms**

16 **in the claim, etc.**

17 Q You said it has to be consistent with the

18 ordinary meaning, is that your understanding?

19 **A Well, that's part of it. That's part of what I**

20 **said. The -- the -- there are many words in the**

21 **claims and some of the words have ordinary meanings**

22 **and so you would want to use those where possible.**

23 Q Do you have a view as to whether some of the

24 words in the claims at issue in this case are

25 appropriately given meanings other than what you would

Page 12

(08:45:23-08:46:33)

1 term their ordinary meaning?

2 **MR. LU:** Objection. Vague.

3 **A Yeah, maybe you can restate that. I mean,**

4 **there's a lot of words in these claims so --**

5 Q So stipulated. It's a -- it's a high level

6 question.

7 **A Yes.**

8 Q In some cases you'll look at the claims and apply

9 the ordinary meanings, and those are the appropriate

10 constructions. Is this -- is this case in your view

11 one where we have to look at something other than the

12 ordinary meaning to properly understand the claims and

13 patents in suit?

14 **MR. LU:** Objection. Vague and ambiguous.

15 Also object to the extent it mischaracterizes

16 the state of common construction law. You can

17 answer.

18 **A Yes, there are terms in the claims that are not**

19 **ordinary terms.**

20 Q Like what?

21 **A They're technical terms in some of the cases.**

22 **Arterial bias is one that I know that's being**

23 **discussed for example.**

24 Q Any other terms that you think should be

25 construed as something other than their ordinary

Page 13

(08:46:39-08:47:50)

1 meaning?

2 **A Well, some of the others that I've opined about**

3 **include reference symmetry.**

4 **Q Any other terms in these claims?**

5 **MR. LU:** Just to clarify, Susan, you're

6 asking about claim terms that are discussed in

7 his opinion or --

8 **BY MS. MANNING:**

9 **Q I -- yes, I am asking about the -- the claim**

10 **terms that you discuss in your declaration. I'll ask**

11 **you a separate question about whether you've formed**

12 **opinions about other terms not discussed in your**

13 **report --**

14 **A Okay.**

15 **Q -- or declaration.**

16 **A Right. Well, so there are several parts to my**

17 **report and several different claim terms that are**

18 **discussed in there and, you know, I've given you two**

19 **examples and there are probably, if I recall correct,**

20 **several other examples -- several other terms in there**

21 **that are either technical terms or terms that need to**

22 **be construed in the context of the patent in order to**

23 **be understood.**

24 **Q Okay. My -- my -- my question was specific to --**

25 **to whether there are terms that you've discussed in**

Page 14

(08:47:54-08:49:11)

1 your declaration that you think should be construed so

2 that -- such that they have a meaning -- meaning other

3 than their, quote, ordinary definition.

4 **A Right. I think so, yes.**

5 **Q You mentioned arterial bias and you referenced**

6 **reference symmetry. Is there anything else that comes**

7 **to mind as having some meaning other than its ordinary**

8 **meaning?**

9 **A Yes. Well, nothing that comes to mind. I'd have**

10 **to go back and look --**

11 **Q Okay.**

12 **A -- to -- to remind myself --**

13 **Q Okay.**

14 **A -- in order to be precise.**

15 **Q Let me ask you a couple follow-up questions about**

16 **the -- your previous experience testifying. Did you**

17 **testify at trial?**

18 **A No.**

19 **Q Did you offer a report --**

20 **A Yes.**

21 **Q -- in that case? Do you know how that case was**

22 **resolved?**

23 **A In favor of SeaChange.**

24 **Q Okay. Do you know whether the case went to trial**

25 **and you just didn't testify?**

Page 15

(08:49:13-08:51:12)

1 **A Yes, it went to trial. I was there.**

2 **Q But you didn't testify?**

3 **A That's right.**

4 **Q Why not?**

5 **A There were two experts on our side, and the other**

6 **expert did the -- did most of the testimony and on a**

7 **day-by-day basis the counsel was deciding who would**

8 **testify as to what, and in the end I wasn't needed.**

9 **Q Okay. And you said this was about ten years ago?**

10 **A Yes.**

11 **Q Do you know -- do you know what court it was in?**

12 **A Delaware?**

13 **Q Have you ever been retained as a consultant to**

14 **aid attorneys in a patent case other than this case**

15 **and the SeaChange case?**

16 **A To -- you said to what attorneys?**

17 **Q To assist.**

18 **A Oh, to aid. I see. Yes, I have.**

19 **Q When have you -- when have you been so retained?**

20 **A Well, I think it's all in my vitae for**

21 **convenience. So there were, looks like, three or four**

22 **other cases.**

23 **Q Which page are you on?**

24 **A Page 2 of my vita.**

25 **MS. MANNING:** Should we go off the record

Page 16

(08:51:13-08:54:35)

1 for a minute? Let's go off the record.

2 **VIDEOGRAPHER:** The time is 8:55 and we're

3 going off the record.

4 (Discussion off the record)

5 **VIDEOGRAPHER:** The time is now 8:58 and

6 we're back on the record.

7 **BY MS. MANNING:**

8 **Q Dr. Kotz, I've hand you -- handed you a copy of**

9 **what the court reporter has marked Google Exhibit**

10 **1001. Could you tell us what that is?**

11 **A That is my curriculum vita.**

12 **Q Okay. And before we took our short break you**

13 **were referring to I think your own copy of it. On**

14 **page 2 you were going to tell me about your previous**

15 **consulting work in support of litigation.**

16 **A Right.**

17 **Q I see there are five things listed under**

18 **consulting. Is this a list of every case in which you**

19 **have been an expert witness?**

20 **A Yes.**

21 **Q Okay. And other than the SeaChange case, have**

22 **you given deposition testimony in any of these cases?**

23 **A No.**

24 **Q Have you -- did you prepare reports in any of**

25 **these cases?**

Page 17

(08:54:36-08:56:07)

1 **A I don't think so.**

2 Q And I take it you didn't have trial testimony in

3 any of these cases?

4 **A Right.**

5 Q Did -- did your work in any of these cases relate

6 to validity?

7 **A I don't remember.**

8 Q Okay. What was the technology in the -- what you

9 have listed as the EMC Corporation matter?

10 **A I'm sorry, I don't remember.**

11 Q Do you recall who the other party was in that

12 case?

13 **A No.**

14 Q Where it was pending by any chance?

15 **A No.**

16 Q Okay. The Kessel Electronics case, do you recall

17 what the technology that was?

18 **A Yes.**

19 Q What was it please?

20 **A Kessel was making a handheld PDA, personal**

21 **digital -- digital assistant that Palm claimed was**

22 **infringing on its copyrights.**

23 Q That's copyrights, not --

24 **A Software copyrights. That was a copyright suit.**

25 Q And what work did you do on that case at a high

Page 18

(08:56:12-08:57:33)

1 level?

2 **A I was asked to study the -- Palm and Kessel**

3 **software to decide whether they were perhaps the same**

4 **in part.**

5 Q Okay. So you analyzed the code itself?

6 **A Yes.**

7 Q And do you have an understanding of why you were

8 never asked to prepare a report in that case?

9 **A Kessel went bankrupt and the case was, as far as**

10 **I know, dropped.**

11 Q Okay. In the Connected Corporation matter, do

12 you recall who the other party to that matter was?

13 **A No.**

14 Q Do you recall what it was about?

15 **A No. This was a very short involvement. Again, I**

16 **think it was -- I assume it was settled or something**

17 **like that.**

18 Q Okay. The -- the other matter you have down

19 here, TMC Patents, do you recall what the technology

20 involved in that case was?

21 **A I think that one was about parallel computers.**

22 Q Do you know who the other party to the case was?

23 **A No.**

24 Q And you worked for TMC Patents, I take it?

25 **A I think so, yes.**

Page 19

(08:57:35-08:59:01)

1 Q Was TMC Patents a nonpracticing entity, do you

2 know?

3 **A I don't know. I don't recall anyway.**

4 Q So you thought it was a -- about parallel

5 computers. Do you recall what work you did on that

6 case?

7 **A No. Again, this was very short.**

8 Q And I -- I -- I note that this is all quite some

9 time ago.

10 **A Yes.**

11 Q Why nothing between fall of 2002 and your

12 retention in this case?

13 **A I've been very busy. I get lots of inquiries and**

14 **generally don't have the time, even if I have the**

15 **interest or the expertise.**

16 Q Okay. You say you're very busy so I have to ask,

17 very busy with what?

18 **A Well, I'm an active professor at Dartmouth with**

19 **lots of research projects and students, and I'm also**

20 **an administrator so I have -- and a father. Very**

21 **busy.**

22 Q So it isn't other consulting work that's taking

23 up your time?

24 **A No.**

25 Q Do you have specialized or technical knowledge

Page 20

(08:59:07-09:00:51)

1 that you think will aid the court in considering the

2 issues before it on claim construction?

3 **MR. LU: Objection. Vague. Ambiguous.**

4 **A Well, I have a lot of technical knowledge about**

5 **various aspects of wireless networking.**

6 Q What -- what specialized knowledge do you think

7 is relevant to the issues before -- relevant to

8 helping you aid the court here?

9 **A Well, I have been working with wireless networks,**

10 **specifically WiFi networks, for over ten years, and**

11 **some of that work involves location, location sensing,**

12 **location prediction, etc. And I understand the**

13 **patents in this case are also related to the use of**

14 **WiFi for localization.**

15 Q Is that different from location sensing or is it

16 the same thing as lo --

17 **A Essentially the same thing.**

18 Q And is location sensing different from location

19 prediction?

20 **A Yes.**

21 Q How -- what's location prediction?

22 **A Well, in the context of my personal research,**

23 **location prediction is meant for a moving WiFi device,**

24 **predicting the next access point to which it would**

25 **connect.**

Page 21

(09:00:53-09:02:48)

1 Q And you've written several papers on that,
2 correct?

3 A **Yes.**

4 Q How many papers have you written on location
5 sensing?

6 A **I -- in the con -- in terms of the papers
7 relevant to this patent, I think one.**

8 Q And which one is that?

9 A **It's actually cited in the patents. It's a Kim,
10 et al, in the patents. I'd have to look to find the
11 title. I don't remember the title per se so --**

12 Q Is it Risks of Using AP Locations Discovered
13 Through War Driving?

14 A **Yes.**

15 Q You might have just said this, but let me make
16 sure. Is that -- that's the only paper that you've
17 participated in that's -- that's specific to location
18 sensing?

19 A **Right.**

20 Q Okay. The location prediction work that you've
21 done, does the technology there rely solely on -- on
22 WiFi access points or are there other data inputs due
23 to this location prediction?

24 **MR. LU: Objection. Vague. Compound.**

25 A **So the technology in my papers was focused only**

Page 22

(09:02:55-09:04:51)

1 **on WiFi, although we always imagined that it would
2 have application to other types of wireless networks.**

3 Q And the location prediction technology, does that
4 involve determining the location of a device with a
5 WiFi radio?

6 A **No.**

7 Q But location sensing does, I take it?

8 A **Yes.**

9 Q You sort of shrug as if maybe not entirely. If
10 there's something more to it then, please explain.

11 A **Location sensing is -- is -- is a phrase that
12 could have many meanings -- meanings, but in the
13 context of our conversation, yes.**

14 Q To be clear, your paper was about determining
15 location of a device with a WiFi radio?

16 A **You're referring to the risks paper?**

17 Q Yes.

18 A **Yes, it was related to that. Our -- the paper is
19 about the risks that one has in determining location
20 if you use war driving data.**

21 Q Dr. Kotz, have you ever taught a class that -- in
22 which you discussed the technology behind determining
23 the location of a device with a WiFi radio through the
24 use of WiFi access point signals?

25 A **Well, I have taught several courses about**

Page 23

(09:04:53-09:06:20)

1 **wireless networks and mobile computing. I can't
2 recall whether we studied papers related to wireless
3 WiFi based location determination, but I -- we may
4 have.**

5 Q So you just don't recall one way or the other?

6 Okay.

7 A **Those courses were several years ago.**

8 Q Okay. Were all of your students undergraduates?

9 A **No.**

10 Q They were graduate students as well?

11 A **Yes.**

12 Q Do you have graduate students that you're
13 supervising now?

14 A **Yes.**

15 Q Typically how many do you have at a time?

16 A **Typically four or five.**

17 Q The -- the courses on wireless computing, have
18 those -- that you've taught, have those been at the
19 undergraduate level, graduate level, both?

20 A **Both.**

21 Q Could you describe the courses that you're
22 referring to?

23 A **Well, let's see. Like I said, they were several
24 years ago, and the -- probably in the early 2000s.
25 So -- so -- it doesn't have the years in here. Sorry.**

Page 24

(09:06:24-09:07:45)

1 Q You're referring to?

2 A **I'm referring to my CV again.**

3 Q Okay.

4 A **Yes.**

5 Q Exhibit 1001. What page of it please?

6 A **Page 40. So this is a list of courses I've
7 taught at Dartmouth College, and midway through the
8 page you'll see one, a seminar on wireless networks
9 and handheld computers but, unfortunately, I don't --
10 didn't list the date here. But that would have been
11 around 2000, 2001, somewhere around that time frame.
12 So it was a long time ago. And I'm -- I've forgotten
13 your question.**

14 Q I -- thank you for your candor. I had asked you
15 to -- to describe for me the -- the courses you were
16 referring to when you -- when you mentioned that you
17 taught courses in wireless computing.

18 A **Oh, right. So that was -- that course was a
19 seminar-style course, meaning that I selected several
20 dozen papers from the research literature and each
21 class meeting we would meet to discuss some of the
22 papers from the literature.**

23 Q Okay. Any of the other -- any other course that
24 you can recall either listed here or that would relate
25 to wireless computing?

Page 25

(09:07:49-09:09:29)

1 **A I taught the standard computer networks course**
2 **several time -- times, and that usually includes a few**
3 **days about wireless computing -- wireless networking.**
4 Q And in that course -- I'm sorry, you called it
5 the standard networking course?
6 **A Standard networking course, which is listed as CS**
7 **78 in the vita there.**
8 Q And did any of your -- your teaching in the
9 computer networks course relate to using WiFi access
10 points to locate a user device?
11 **A No, I don't think so.**
12 Q And the -- it's listed here as CS 88/188, the
13 seminar wireless networks and handheld computers?
14 **A Right. That's what we talked about before.**
15 Q Right. And you described several papers. Did
16 any of those papers relate to -- specifically to
17 WiFi -- using WiFi access points for location?
18 **MR. LU:** Objection. Vague. Ambiguous as
19 to what several papers.
20 **BY MS. MANNING:**
21 Q I'm asking you -- to be clear, because I wasn't,
22 I'm asking, you mentioned that what you would do in
23 that course is you would have several papers you would
24 collect from the literature and you would discuss them
25 with the students. I'm asking, did any of the papers

Page 26

(09:09:31-09:11:41)

1 that were discussed in -- in your course there relate
2 to using WiFi access points to locate user devices?
3 **A I can't recall for sure.**
4 Q Okay. So let me see if I've got -- if I can
5 accurately summarize here. You've written the -- the
6 risks paper --
7 **A Yes.**
8 Q -- that does talk about doing location using WiFi
9 access points. And if I understood you correctly, you
10 don't think you've ever taught that subject in a
11 course?
12 **MR. LU:** Objection to the extent it
13 mischaracterizes the witness's testimony.
14 **A I said I don't recall teaching that subject in a**
15 **course. I may have.**
16 Q And other than -- other than the work related to
17 the risks paper, which we'll talk about, do you recall
18 any other work that you've done specific to using
19 wireless access points to determine location of a --
20 of a mobile device?
21 **A Nothing that comes to mind, no.**
22 Q Okay. Okay. And I have not asked you about
23 every item in your 42 page CV that is Exhibit 1001.
24 Is your CV, to the best of your knowledge, an
25 accurate -- accurate?

Page 27

(09:11:42-09:14:01)

1 **A Yes.**
2 Q Is there anything you're aware of that is
3 material to your opinions in this case that's not
4 listed in your CV?
5 **MR. LU:** Objection. Vague. Ambiguous.
6 **BY MS. MANNING:**
7 Q I'm asking for your view, sir.
8 **A Nothing that I'm aware of.**
9 Q Okay. Dr. Kotz, I'm actually going to hand you
10 two documents. Google Exhibit 1002 is entitled --
11 it's entitled Notice of Subpoena to David Kotz, Ph.D.
12 It's several pages and -- and I'm going to hand you a
13 second document, Google 1003, entitled Objections to
14 Subpoena to David Kotz, Ph.D. Okay.
15 So on Exhibit 1002, I'm going to ask you to flip
16 past the notice, which is the first three pages. And
17 there you will find a Subpoena, and behind the
18 Subpoena itself you will find an attachment to the
19 Subpoena. Have you -- have you seen that part of
20 Exhibit 1002 before, the Subpoena and the attachment?
21 **A I've never seen this document before.**
22 Q To be clear, I'm not asking about the notice
23 part. I'm asking about the Subpoena and the
24 attachment. It starts on page -- the fourth page of
25 the document. One back. Starting there. Have you

Page 28

(09:14:10-09:15:23)

1 seen that before?
2 **A No.**
3 Q No?
4 **A No.**
5 Q Have you -- well, if you could flip to page 4 of
6 the attachment, the typewritten document. You'll see
7 a header there where it says document requests.
8 **A Yes.**
9 Q Have you seen these before?
10 **A These document requests?**
11 Q Yes.
12 **A No.**
13 Q No? Okay. Were you aware that Google had
14 requested the production of certain documents in
15 conjunction with your -- with the -- the Subpoena and
16 your testimony today?
17 **A No.**
18 Q I take it you did not do anything to look for or
19 obtain documents responsive to the Subpoena?
20 **A That's correct.**
21 Q Okay. Okay.
22 **MR. LU:** Susan, just so the record is
23 clear, we did -- the Subpoena was served on
24 Irell, and with Dr. Kotz's permission we did
25 have a conversation with him regarding the

Page 29

(09:15:24-09:16:35)

1 documents that were requested to find out if
 2 there were any documents that he relied upon
 3 that were not either publicly available or
 4 referenced in his expert report. Our
 5 objections were referenced in Exhibit 1003, and
 6 we made a production of additional documents
 7 that were requested in the Subpoena that
 8 Dr. Kotz did, in fact, identify; namely, the
 9 retention agreement.
 10 **MS. MANNING:** And I gather from the
 11 witness's testimony that nothing has been done
 12 about making any effort to obtain the other
 13 documents requested in response to the
 14 Subpoena?
 15 **MR. LU:** Well, publications are, as -- on
 16 the CV are publicly available. There are PDFs
 17 there. And I think you took the -- we took the
 18 same position that you folks took with respect
 19 to Dr. Acampora in terms of what was to be
 20 produced, what was not to be produced, though
 21 we did produce the Retention Agreement. I know
 22 the Retention Agreement of Dr. Acampora was
 23 produced.
 24 **MS. MANNING:** I don't believe it was
 25 requested.

Page 30

(09:16:35-09:18:12)

1 **MR. LU:** I believe there were requests
 2 broad enough to cover it, but we can agree to
 3 disagree.
 4 **BY MS. MANNING:**
 5 Q I'm going to ask the witness, Exhibit 1003, the
 6 objections, have you ever seen that document before?
 7 A **No.**
 8 Q Dr. Kotz, what documents, if any, did you review
 9 in the process of preparing your declaration?
 10 A **The four patents in suit; a motion or a**
 11 **declaration, I'm sorry, about the legal language from**
 12 **Google and from Skyhook, two separate documents; and**
 13 **declaration or whatever it's called from Dr. Acampora.**
 14 **I think that's it.**
 15 Q Did you --
 16 **MR. LU:** Did you want to reference your
 17 expert report to confirm that?
 18 **MS. MANNING:** I'll ask him about it, Sam.
 19 A **Yeah, I do list it, what I viewed, in the report.**
 20 **MR. LU:** Just wanted the record to be
 21 clear, Susan.
 22 **BY MS. MANNING:**
 23 Q You looked at --
 24 A **Four patents.**
 25 Q Hang on. Hang on.

Page 31

(09:18:15-09:20:09)

1 Dr. Kotz, I'm going to hand you what's been
 2 marked Google Exhibit 1004, the title of which is
 3 Declaration of David Kotz, Ph.D., in Support Of
 4 Plaintiff Skyhook Wireless, Inc.'s Opposition To
 5 Summary Judgment. Can you take a look at that and
 6 tell me what it is.
 7 A **Well, it appears to be my -- my declaration as**
 8 **titled plus my CV.**
 9 Q And if you'll look at page 26 of the document.
 10 Is that your signature, sir?
 11 A **Yes.**
 12 Q And did you in fact sign it on September 28th?
 13 A **Yes.**
 14 Q Sir, if you turn to paragraph 12, which comes
 15 under the header materials studied.
 16 A **Right.**
 17 Q My -- I believe my question -- I'll just re-ask
 18 it -- was other than the patents, briefs by Google and
 19 Skyhook, and Dr. Acampora's declaration, what, if
 20 anything, did you review in the process of preparing
 21 your declaration?
 22 A **The -- the one other thing is portions of the**
 23 **patent prosecution history of the 988 patent as stated**
 24 **here in paragraph 12.**
 25 Q Did you review the prosecution histories for the

Page 32

(09:20:11-09:21:36)

1 other patents in suit?
 2 A **Not that I recall.**
 3 Q You seem less than sure.
 4 A **Well, most of the portions that I reviewed were**
 5 **the parts that were quoted in the various other**
 6 **documents, so to the extent that they had been quoted**
 7 **in the -- in your or your client's declaration and**
 8 **your expert's declaration or Skyhook's declaration, I**
 9 **saw -- I may have seen some of those.**
 10 Q I see. When you say that you reviewed parts of
 11 the prosecution history of the 988, did you have the
 12 actual prosecution history documents or are you
 13 referring to snippets that were quoted in other
 14 documents and you just read what was quoted in those
 15 documents?
 16 A **Yes, primarily the latter. I don't know if I**
 17 **actually at the time had the full prosecution history.**
 18 Q How were the documents that you reviewed in the
 19 course of preparing your declaration, how were those
 20 made available to you?
 21 A **Download from counsel's server.**
 22 Q Okay. But counsel sent them to you?
 23 A **Yes.**
 24 Q Did -- who picked what documents you would look
 25 at?

Page 33

(09:21:38-09:23:14)

1 **A They recommended the four patents and these**
2 **three -- I guess three other documents.**

3 Q And what was the time frame for when you reviewed
4 these documents?

5 **A Let's see. This was signed on September 28th,**
6 **and so it would have been over the course of a week**
7 **or, at most, two prior to that.**

8 Q How much time did you spend reviewing the patents
9 prior to the time you signed your declaration?

10 **A A few hours. I don't remember exactly.**

11 Q Can you give me an estimate?

12 **A It would be difficult to -- to be more precise**
13 **than that.**

14 Q When you say a few hours, do you mean less than
15 ten?

16 **A Yes.**

17 Q Help me ballpark it here. More than five, less
18 than five?

19 **A Probably -- for all of the documents together,**
20 **between five and ten.**

21 Q And how much, if any, additional time did you
22 spend on your declaration besides the five or ten
23 hours spent reviewing documents?

24 **A Let's see. After reading the documents I had**
25 **conversation with counsel to discuss the legal**

Page 34

(09:23:20-09:25:15)

1 **background and to discuss the technical issues at --**
2 **relevant to this suit and then later on editing and**
3 **reviewing the declaration.**

4 Q Who wrote the declaration?

5 **A Well, it was a collaborative process. First**
6 **draft was prepared by counsel and the -- then I did**
7 **some editing to make corrections, revisions, etc.**

8 Q Do you recall what any of the changes you made
9 were?

10 **A I don't. There were, you know, many, small,**
11 **large, you know, here and there, so I don't remember**
12 **the specifics.**

13 Q I think I had asked how much time you had spent
14 on the other aspects of preparing your declaration.
15 Do you have an estimate of how much time you spent
16 besides the -- the document review time on these other
17 aspects that you mentioned?

18 **A It was probably another five or ten hours.**

19 Q Your -- your declaration notes that you're being
20 paid on an hourly basis?

21 **A That's right.**

22 Q Have you -- how have you recorded the time that
23 you've devoted to the case so far?

24 **A I use a software tool to help keep track of time.**

25 Q So you actually have some record of the amount of

Page 35

(09:25:17-09:27:39)

1 time that you have spent to date?

2 **A Yes.**

3 Q Okay. Have you billed either Skyhook or Irell
4 for your time yet?

5 **A Yes.**

6 **MS. MANNING:** And, Sam, we'll ask that a
7 copy of that be produced.

8 **BY MS. MANNING:**

9 Q I don't doubt that's an accurate recording of
10 your time devoted -- spent.

11 **A To the best of my knowledge it's accurate, yes.**

12 Q Sir, I'm going to hand you a two-page document
13 that's been marked Google Exhibit 1005. Would you
14 take a look at that, tell me what it is please.

15 **A This appears to be a copy of my retention letter.**

16 Q And is that your signature on the second page?

17 **A Yes.**

18 Q And you signed it on September 20th of this year?

19 **A Right.**

20 Q So that's the date on which you were retained?

21 **A Yes.**

22 Q When were you first contacted about this case?

23 **A Perhaps a week before that.**

24 Q And who contacted you?

25 **A Lina.**

Page 36

(09:27:46-09:29:33)

1 Q And do you have any understanding of how it is
2 they came to contact you?

3 **A My understanding is that I was recommended by**
4 **some of the Skyhook engineers.**

5 Q Do you know who at Skyhook?

6 **A No.**

7 Q Do you know anyone who works at Skyhook?

8 **A I met some of them several years ago. I don't**
9 **recall now who I met or whether they're still there.**

10 Q What context was it? You say -- you recall
11 meeting someone from Skyhook. What was the context?

12 **A At the time I was interested in wireless networks**
13 **and wireless-based location or localization, and I**
14 **don't remember whether I learned about them or they**
15 **learned about me, but we discovered this -- a mutual**
16 **interest and met for lunch in Boston. Had a nice**
17 **conversation.**

18 Q Can you give me a sense of time period?

19 **A I would have to -- it would have been in the**
20 **early 2000s to 2005, 6ish time frame. I don't**
21 **remember.**

22 Q Okay. Do you remember anything about the people
23 you met with other than they were from Skyhook?

24 **A Well, they were very nice people.**

25 Q I'm sure they'll be glad to hear that.

Page 37

(09:29:37-09:31:30)

1 **A Yes. I don't remember anything else about them**
2 **as people, I'm sorry.**
3 **Q Them. There was more than one person you met**
4 **with?**
5 **A Yes.**
6 **Q And you had just the one lunch meeting with**
7 **Skyhook?**
8 **A That's all I recall.**
9 **Q Do you recall anything about what was discussed?**
10 **A Well, we were interested in, for our research**
11 **purposes, having the ability for mobile devices to**
12 **sense their location, and Skyhook had a method for**
13 **doing that or that's what it seems, and so we were**
14 **hoping to be able to use their method in our research**
15 **or use their technology.**
16 **Q Were you able to?**
17 **A Well, I recall that some of my students tried**
18 **using their software. I don't recall how well it**
19 **worked out.**
20 **Q Do you know if this -- if this meeting and**
21 **discussion we had, do you have any recollection of --**
22 **of where that fell in time relative to the work that's**
23 **described in the risks article?**
24 **A No. I remember this meeting was before the**
25 **iPhone came out.**

Page 38

(09:31:32-09:33:05)

1 **Q 2007, I think?**
2 **A Yes.**
3 **Q Okay.**
4 **A Okay. Because it was not known at the time of**
5 **the meeting that they would be -- their technology**
6 **would be used in the iPhone.**
7 **Q Not known to you or --**
8 **A Not known to me. I don't know about them**
9 **obviously. So that gives you an upper bound on when**
10 **the meeting occurred, but I -- I don't -- don't**
11 **remember otherwise.**
12 **Q You said that you recall that some of your**
13 **students tried using Skyhook's software? Can you be**
14 **more specific as to -- as to what software you're**
15 **talking about?**
16 **A Well, I -- I -- I'm not very specific, I'm**
17 **afraid. My impression or recollection is that we were**
18 **given a trial copy of their software which was to be**
19 **used for mobile devices to locate themselves, and**
20 **students tried to install it and use it on some of our**
21 **devices, and I just don't remember what devices or**
22 **exactly what software, how well it worked or any of**
23 **that.**
24 **Q Okay. Do you remember who the students were who**
25 **were working on it?**

Page 39

(09:33:06-09:45:32)

1 **A No. Sorry.**
2 **Q Correct me if I'm wrong, but I'm gathering that**
3 **you guys didn't actually use Skyhook's software?**
4 **A Well, we tried it. We used it in the sense that**
5 **we obtained a copy and ran it on some computers, but**
6 **we didn't end up using it in any other sort of**
7 **productive way that I remember.**
8 **Q Okay. And I think I asked you this, but I'm**
9 **going to ask you again. Do you recall why?**
10 **A I don't, unfortunately. I don't remember if it**
11 **was because it didn't work well or because it didn't**
12 **suit our needs or it didn't run on the platforms we**
13 **cared about. I mean, there are many possible reasons**
14 **why we ended up not using it, but I don't remember.**
15 **Q Okay.**
16 **MS. MANNING:** Let's take a break.
17 **THE WITNESS:** Okay.
18 **VIDEOGRAPHER:** The time is now 9:38 and
19 **we're going off the record.**
20 **(Recess taken)**
21 **VIDEOGRAPHER:** The time is now 9:49 and
22 **we're back on the record.**
23 **BY MS. MANNING:**
24 **Q Hello, again.**
25 **A Hello.**

Page 40

(09:45:34-09:47:00)

1 **Q Before we took our break you mentioned that you**
2 **had been first contacted by counsel for Skyhook**
3 **roughly a week before the September 20th, 2011,**
4 **retainer letter.**
5 **A Right.**
6 **Q Do you know if that was before or after Skyhook**
7 **filed its opening claim construction paper?**
8 **A I don't know.**
9 **Q Did you have any role at all in the initial**
10 **formulation of Skyhook's claim construction positions?**
11 **A No.**
12 **Q When you -- you mentioned reading a paper by**
13 **Google and a paper by Skyhook as part of your -- your**
14 **work in this case. Were those respectively Skyhook's**
15 **opening claim construction brief and Google's Motion**
16 **for Summary Judgment?**
17 **A They were Google Inc.'s Memorandum of Law in**
18 **Support of its Motion for Summary Judgment of**
19 **Indefiniteness and, in the Alternative, Opening Claim**
20 **Construction Brief.**
21 **Q That's one.**
22 **A And the Declaration of Anthony S. Acampora and**
23 **Skyhook Wireless Opening Claim Construction Brief.**
24 **Q When you read Skyhook's brief, was there anything**
25 **in them that you disagreed with?**

Page 41

(09:47:07-09:48:30)

1 **A Not that I recall.**

2 Q I'm going to ask you a slightly different

3 question as to Google. When you read Google's Summary

4 Judgment of Indefiniteness paper and motion -- and

5 Claim Construction Brief, did you agree with any of

6 the claim construction positions Google took?

7 **MR. LU:** Objection to the extent it goes

8 beyond the witness's declaration.

9 **A Yeah. I was focused on the particular aspects**

10 **that I was asked to opine on which end up -- ended up**

11 **in this declar -- my declaration and so I wasn't**

12 **paying close attention to the other aspects of those**

13 **briefs.**

14 Q Did you -- most of your declaration focuses on

15 invalidity, fair to say?

16 **A It focuses on questions of indefiniteness**

17 **primarily.**

18 Q And you understand that if a term in a claim is

19 found to be indefinite, then that claim is deemed to

20 be invalid?

21 **A That's my understanding, although I'm not a**

22 **lawyer.**

23 Q It's not meant -- it's not meant to be a tricky

24 question.

25 **A Right.**

Page 42

(09:48:30-09:49:57)

1 Q But if I -- if I speak of the invalidity of the

2 claims in this context or the indefiniteness of the

3 claims in those contexts, those are -- I'll try to be

4 clear, but if I conflate them, understand that

5 indefiniteness is a -- is one reason why a claim might

6 be invalid.

7 **A One reason, right.**

8 Q Right. Okay. So when you were reviewing the --

9 the briefs, did you read the -- did you read all of

10 them?

11 **A Did I read all of the briefs?**

12 Q Yeah.

13 **A Yes. All of the ones that I've mentioned, yes.**

14 Q Yes. Let me be clear. When you were reading

15 Google's and Skyhook's briefs did you read each brief

16 front -- front to back including the sections that

17 dealt with claim terms on which each side proffers a

18 claim -- a claim construction?

19 **A Yes.**

20 Q Okay. So you didn't just read the invalidity

21 discussions in there?

22 **A Correct. I read them front to back.**

23 Q Okay. And did you read Dr. Acampora's entire

24 declaration?

25 **A Yes.**

Page 43

(09:50:09-09:51:59)

1 Q And I'm not sure I got an answer to my original

2 question so let me -- let me try asking it again.

3 When you were reading Google's brief on

4 indefiniteness and -- and the alternative for claim

5 construction, did you agree with any of the positions

6 that Google took on -- on how the claim should be

7 construed?

8 **MR. LU:** Objection to the extent it goes

9 beyond the scope of the witness's opinion.

10 **A So I don't recall the specific -- your question**

11 **is about the entire Google declaration, and there are**

12 **many components in that. Even of those subset that**

13 **applies to the topics covered in my opinion, I don't**

14 **recall the specifics of the Google opinion at this**

15 **time so I can't recall which ones I might have agreed**

16 **with or disagreed with in reading it.**

17 Q Other than perhaps the lunch in Boston with

18 Skyhook employees whose names we can't recall right

19 now, have you -- other than perhaps that lunch because

20 we don't know who was there, have you ever spoken with

21 any of the inventors of the patents in suit?

22 **A Not that I know of.**

23 Q You haven't done so in the context of your work

24 on this case, I take it?

25 **A No.**

Page 44

(09:52:02-09:53:28)

1 Q We were discussing earlier the -- the documents

2 you reviewed and you advised that you hadn't looked

3 at -- you didn't recall having looked at the

4 prosecution histories of the patents in suit though

5 you may have seen certain snippets quoted in the

6 papers?

7 **A Right.**

8 Q Do you have an understanding of how the

9 prosecution history of a patent relates to claim

10 construction?

11 **A Well, I understand that it is one of the sources**

12 **of information one should consider in determining a**

13 **claim construction. It is part of the -- part of the**

14 **intrinsic evidence.**

15 Q Why didn't you look at them in this case?

16 **A I'm sorry?**

17 Q Why did you not look at them in this case?

18 **MR. LU:** Objection to the extent it

19 mischaracterizes the witness's testimony.

20 **A Well, I did not look at the entire patent**

21 **history -- prosecution history. I'm not sure I had**

22 **them at the time I was preparing this report. I did**

23 **look at the -- as I said, the pieces that were quoted**

24 **in various other documents.**

25 Q Did you -- I believe you mentioned earlier that

Page 45

(09:53:37-09:55:13)

1 counsel for Skyhook had provided you with the
2 documents that you reviewed. Did you ask for any
3 other documents besides --
4 **A No.**
5 Q -- those you've identified as having been
6 reviewed?
7 **A No.**
8 Q Why didn't you ask for the prosecution histories?
9 **A I -- it didn't occur to me.**
10 Q Have you reviewed any other documents from this
11 case between the time you signed your declaration and
12 now?
13 **A No, I don't think so.**
14 Q So to date do you have copies of the prosecution
15 histories of the patents in suit?
16 **A I do.**
17 Q And you haven't read them yet?
18 **A I haven't had time.**
19 Q Okay.
20 **A Sorry.**
21 Q Are there any other documents that you have been
22 provided with?
23 **A Are there any other?**
24 Q Yes. That relate to this case I should say.
25 **A Yes. Yes, there are, many exhibits, dictionary**

Page 46

(09:55:18-09:56:29)

1 **definitions and the like.**
2 Q I did note that in your listing of the documents
3 you had reviewed in preparing your declaration, you
4 didn't note anything about having reviewed the
5 attorney declarations, I believe it's Sam's and mine,
6 that were filed in support of the opening briefs, and
7 those have attached to them a lot of exhibits,
8 including things like dictionary definitions and the
9 like.
10 **A Right.**
11 Q Did you -- did you, in fact, review any of the
12 declarations or any of the attachments that were
13 submitted to the court prior to the time you signed
14 your declaration on September 28th?
15 **A No.**
16 Q Did you have them?
17 **A September 28th. For the record, I signed it on**
18 **the 28th. You said --**
19 Q I hope that -- I hope that's what I said. If I
20 didn't say that, I apologize.
21 **A You said 20th, which is the retention letter.**
22 Q Okay.
23 **A 28th is the declaration. No, I did not review**
24 **all of those extensive, what did you call them,**
25 **motions.**

Page 47

(09:56:30-10:01:08)

1 Q They're declarations.
2 **A Declarations and exhibits before preparing this**
3 **September 28th declaration.**
4 Q Okay. Do you recall whether you had them
5 available to you?
6 **A I did not.**
7 **MR. LU:** Can I take a short break?
8 **MS. MANNING:** Sure.
9 **VIDEOGRAPHER:** The time is now 10:01 and
10 we're going off the record.
11 (Recess taken)
12 **VIDEOGRAPHER:** The time is now 10:05 and
13 we're back on the record.
14 **A So can I make a clarification?**
15 Q I have a question for you first --
16 **A Okay.**
17 Q -- and then I'll -- then I'll invite any
18 clarification you'd like.
19 **A All right.**
20 Q Did you just discuss the substance of your
21 testimony with counsel when you took a break?
22 **A Yes.**
23 **MR. LU:** You can answer that yes or no.
24 **A Yes.**
25 Q Okay. What did you discuss with counsel?

Page 48

(10:01:11-10:02:35)

1 **A What materials I had at what time.**
2 Q Okay. And can you elaborate?
3 **A Yes. So I had answered that I did not have**
4 **access to the full attorney's deposition declarations**
5 **and all the exhibits when at the time I prepared this**
6 **declaration, and it turns out that I did in one form.**
7 **So as I said earlier, I downloaded all the materials**
8 **via FTP, and there were many, many dozens of files and**
9 **so I asked for clarification at that time as to what I**
10 **should print and what I should read. And so I printed**
11 **the documents that I mentioned earlier that I relied**
12 **upon and not all of the others.**
13 Q Okay.
14 **A And so I had electronically, although I didn't**
15 **remember this, all of these other declarations and**
16 **exhibits, but I did not have on paper, I did not read,**
17 **all of those declarations and exhibits.**
18 Q Okay. And when you say you had them, you had
19 them in the sense that they were available to you on
20 an FTP site for download?
21 **A Yes, and then I did download them. They all came**
22 **as a big blob. When I --**
23 Q To use the technical term.
24 **A To use the technical term, yes, and then to --**
25 **once unpacked there were many, many files and I needed**

Page 49

(10:02:37-10:04:32)

1 **to ask which ones should be printed and read.**

2 Q Okay. And counsel reminded you of this during

3 your conversation?

4 A **Yes.**

5 Q Okay. Counsel -- did you discuss anything else

6 with counsel while --

7 A **No.**

8 Q -- you were out in the hall?

9 A **No.**

10 Q Okay. What else was in the blob?

11 A **I don't remember. I mean, there were many, many**

12 **files and so that's why I had to ask for clarification**

13 **as to which ones I should print and read.**

14 Q Okay. And -- and the ones that you did in fact

15 read and that you've listed in your declarations are

16 the ones that you were advised to actually look at?

17 A **Yes.**

18 Q Okay. And since -- since the time that you

19 signed your declaration on the 28th of September what,

20 if any, additional documents relevant to this case

21 have you reviewed?

22 A **I think you asked that, and I -- the answer is**

23 **none that I recall.**

24 Q Okay. What did you do to prepare for your

25 deposition today?

Page 50

(10:04:35-10:06:03)

1 A **Let's see. I met with Sam Lu for several hours**

2 **to go over my declaration and to talk about each of**

3 **the points there and to discuss the logistics and**

4 **procedures of a deposition. Met again to review that**

5 **last night.**

6 Q I'm sorry, did you say you met again last night?

7 A **Met again last night briefly to just review.**

8 Q Am I correct to gather you had two meetings with

9 Sam?

10 A **Yes.**

11 Q One was last night. When was the other one?

12 A **Last Wednesday, I think? Last week.**

13 Q Other than meeting with Mr. Lu and discussing

14 issues with -- and the conversations in the course of

15 those meetings, did you do anything else to prepare

16 for your deposition?

17 A **I reread my declaration and some parts of the**

18 **patents and some of the other declarations mentioned**

19 **in here.**

20 Q When you say other declarations mentioned in

21 here, do you mean Dr. Acampora's declaration or did

22 you mean something else?

23 A **I don't think I reread his. Again, I had limited**

24 **time so I reread parts of Google's, parts of**

25 **Skyhook's, and all of mine, and some of the patents.**

Page 51

(10:06:10-10:09:00)

1 Q Did you focus in -- on particular parts of the

2 briefing?

3 A **During my reading?**

4 Q Yes.

5 A **Not in particular, no. I read through the whole**

6 **thing cover to cover.**

7 Q Okay. How about the patents, did you focus on

8 any parts in particular of those?

9 A **The claims.**

10 Q Did you read the specification?

11 A **Not again, no.**

12 Q Has Skyhook ever funded any of your research?

13 A **No.**

14 Q Do you know if Skyhook has ever funded any

15 research at Dartmouth?

16 A **Not that I know.**

17 Q Dr. Kotz, I'm going to hand you a document that

18 has been marked as Google Exhibit 1006. On its face

19 it is titled Risks of Using AP Locations Discovered

20 Through War Driving. If you could take a look at

21 that. Tell me what it is please.

22 A **This is a -- this is a technical paper with that**

23 **title that I wrote with some co-authors some years**

24 **ago.**

25 Q Who are the co-authors?

Page 52

(10:09:01-10:11:41)

1 A **Minkyong Kim and Jeffrey Fielding.**

2 Q And were they students?

3 A **Minkyong was a post doc and Jeff was an**

4 **undergraduate student.**

5 Q Do you know when this was published, Dr. Kotz?

6 A **I think it was 2006, I think.**

7 Q Sir, I'm going to hand you a copy of what's been

8 marked as Google Exhibit 1007. It is Bates numbered

9 GSHFED_0000021 through same prefix 40. And I hope you

10 agree with me that that is a copy of the 988 patent?

11 A **Appears to.**

12 Q Okay. And you have reviewed this document

13 before, sir?

14 A **Yes.**

15 Q If you would look on the second page of it. No,

16 second -- second actual page.

17 A **Oh, okay.**

18 Q You'll see -- in the left-hand column you'll see

19 it says U.S. patent documents and then other

20 publications and maybe two-thirds of the way down

21 there's a Kim M., et al?

22 A **Yes.**

23 Q Is this the -- is this the same article that

24 is -- has been marked as Exhibit 1006?

25 A **Yes.**

Page 53

(10:11:41-10:13:49)

1 Q Okay. And it says here that that's published in
2 Lecture Notes in Computer Science, Volume 3968 in
3 2006.
4 **A Right.**
5 Q Okay. And that comports with your recollection?
6 **A Yes.**
7 Q When did -- well, withdrawn.
8 What's the paper about?
9 **A Well, briefly it is about war driving, the**
10 **collection of WiFi access point locations through**
11 **driving -- literally driving around a neighborhood and**
12 **listening for access point traffic and then using that**
13 **for estimating the location of access points. And**
14 **then this paper says, if I -- it's been years since I**
15 **read it, but roughly it says the driving -- driving**
16 **and collecting location of access point data like that**
17 **leads one to misestimate the location of the access**
18 **point to be closer to the street than it actually is.**
19 Q The paper was published in 2006. Do you recall
20 when the actual study described in the paper was
21 conducted?
22 **A Not exactly, no. If we knew the month of the**
23 **publication, it might give me a clue, but that might**
24 **not -- it's not on the paper itself, so I'm looking to**
25 **see if I might have it here. It is. It was in May of**

Page 54

(10:13:59-10:15:37)

1 **2006, so the work certainly would have been done in**
2 **2005.**
3 Q The -- just to be clear. It was published in
4 May?
5 **A Published in May of 2006, so we would have done**
6 **the bulk of the research in 2005. We would have**
7 **submitted the paper late '05 or early '06 and then it**
8 **actually appeared in May.**
9 Q I think I -- I apologize. I think I missed part
10 of the testimony you just gave. You said you -- you
11 did -- for sure you did the bulk of the research in
12 2005 and you believe you submitted it when?
13 **A It would have been toward the end of 2005 or**
14 **early 2006. The -- these publications have a lead**
15 **time of, you know, several months. So I -- I don't**
16 **recall exactly.**
17 Q Okay. Does it -- I see you looking at your CV.
18 Does it -- is there any way we could more precisely
19 figure out the time at which -- at which the
20 underlying research was conducted?
21 **A Well, with some effort one could, through public**
22 **knowledge, look at when the submission deadline for**
23 **that conference was. I mean, that would be publicly**
24 **available information, either in the volume, literally**
25 **in the volume cover materials, or on the web. And,**

Page 55

(10:15:45-10:17:15)

1 **you know, otherwise I'd have to look through my -- my**
2 **records.**
3 Q Do you think you might have pertinent records?
4 **A Probably. E-mail, that sort of thing. Maybe**
5 **files from the -- the data files might have dates on**
6 **them. It's been five, six years so --**
7 Q I understand. I think you told me that -- is it
8 Ms. Kim or Mr. Kim?
9 **A Ms.**
10 Q Ms. Kim was a -- was a post doc?
11 **A Excuse me, Dr. Kim.**
12 Q Dr. Kim, yes. And Jeffrey Fielding, he was an
13 undergraduate?
14 **A He was.**
15 Q Okay. The -- the actual study, do you have any
16 way of determining whether that was done -- well, I
17 would assume it didn't happen over the summer, is that
18 a fair assumption?
19 **A You assume it didn't happen over the summer?**
20 Q Didn't -- didn't happen over the summer.
21 **A No, that's not a fair assumption, actually.**
22 Q Okay.
23 **A The summer would be the best time to do this**
24 **work.**
25 Q Okay.

Page 56

(10:17:16-10:18:46)

1 **A This is -- this is New England, and outdoor**
2 **experiments are better done in the summer than in the**
3 **winter.**
4 Q Yes. Okay. And do you have any -- as we sit
5 here today, do you have any way of figuring out
6 whether this was -- what time of year this was done
7 other than, you know, it must have been done by the
8 end of 2000 -- must have been completed by the end of
9 2005. Do you have any way of more precisely gauging
10 by quarter, season, month?
11 **MR. LU: Objection. Asked and answered.**
12 **A Not today. Not without a lot of effort.**
13 Q What was your role in this paper?
14 **A I am the -- listed as the last author, which in**
15 **my field tends to be a -- reflect the fact that I'm**
16 **the senior member of the team but not the one doing**
17 **the most of the -- most of the work. Minkyong led**
18 **this work with Jeff helping and I advised basically**
19 **and reviewed their progress and, you know, helped**
20 **review drafts of the document and so forth.**
21 Q Do you have any sense of when the study was
22 designed as opposed to when it was actually conducted?
23 **A No. It's the same issue really.**
24 Q Do you know who designed the -- the study?
25 **A It would have been a collaborative conversation**

Page 57

(10:18:49-10:20:55)

1 **between myself and Minkyong.**

2 Q Would it be -- would you say that her

3 contributions were greater than yours or yours greater

4 than hers?

5 **A These things are often challenging to determine,**

6 **but I would say hers were greater than mine,**

7 **especially on the detail level.**

8 Q In the second paragraph under introduction --

9 **A You're referring to the paper?**

10 Q Yes, I am. Exhibit --

11 **A 1006.**

12 Q 1006. Yes. Thank you. If you look at the

13 second paragraph down after the introduction, it says,

14 researchers have started using 801 -- 802.11 beacon

15 frames from access point APs to locate wireless

16 network users?

17 **A Right.**

18 Q And then it goes on and there's a reference to

19 Place Lab and there's a reference to Skyhook Wireless.

20 Do you -- do you know how it is you first became aware

21 of Place Lab's work?

22 **A Place Lab was a very visible project at the time.**

23 **I think I might have first heard about it directly**

24 **from the authors of the paper that I cite who I know**

25 **and see at conferences frequently. I don't --**

Page 58

(10:21:00-10:22:31)

1 Q Which -- which authors just to be clear?

2 **A So Anthony LaMarca is the first author on**

3 **reference 8 and the third author on reference 3, and**

4 **he's somebody that I see frequently. So I think I**

5 **probably heard about it directly from him in**

6 **conversation, excuse me, before -- you know, before we**

7 **wrote this paper certainly.**

8 Q You had said at conferences. What kind of

9 conferences?

10 **A Well so this paper and his paper we're**

11 **referencing are presented at a conference called**

12 **Pervasive for short, and that's an example of an**

13 **academic conference on -- where such papers are**

14 **presented, and many of us attend the same conferences**

15 **over and over again so --**

16 Q Do you know when Place Lab began its work? Do

17 you know?

18 **A I don't remember.**

19 Q Why is Skyhook referenced in this paper?

20 **A Why is Skyhook referenced?**

21 Q Uh-huh.

22 **A Well, as it's -- as it's written here, they**

23 **provide a similar commercial solution for locating**

24 **WiFi users so it was, we felt, important to reference**

25 **them as -- as an example. It's good academic practice**

Page 59

(10:22:37-10:23:45)

1 **to reference known work.**

2 Q And when it says Skyhook Wireless provides a

3 similar commercial solution for locating WiFi users,

4 you mean similar to Place Lab's --

5 **A Yes.**

6 Q -- solution?

7 **A Well, similar in its intent anyway.**

8 Q What do you mean by that?

9 **A Well, the technology may be different, but the --**

10 **the goal is to provide software that can track users**

11 **both indoors and outdoors is what I said about Place**

12 **Lab, and Skyhook was providing a solution that**

13 **attempted to do the same sort of thing.**

14 Q Is Skyhook's technology different from Place Lab?

15 **MR. LU: Objection to the extent it calls**

16 **for speculation.**

17 **A Yeah, I would have to look closely at their**

18 **technology -- Skyhook's technology and it's also a**

19 **question whether you're referring to the technology at**

20 **the time versus what their technology might be today.**

21 **I don't know what their technology is today. And I**

22 **would have to refresh myself about Place Lab's**

23 **technology, which was, you know, some time ago.**

24 Q My -- my question, which I'll just clarify,

25 was -- was directed to at the time you and your team

Page 60

(10:23:50-10:25:15)

1 wrote this, do you know whether Skyhook's technology

2 was at the time you wrote this different from Place

3 Lab's?

4 **MR. LU: Same objection.**

5 **A I don't -- I don't -- so there's two ways to**

6 **answer that question. One is do I know now whether**

7 **they were the same at the time and the other is did I**

8 **know then whether they were the same at the time, and**

9 **I think the answer to both of those is -- is no. I**

10 **don't know -- I didn't know enough about Skyhook's**

11 **technology because most of it wasn't publish to be**

12 **able to have a concrete opinion about whether they**

13 **were the same or similar.**

14 Q Does this reference to -- to Skyhook do anything

15 to help refresh your recollection about when it is you

16 might have met with the Skyhook folks and at least

17 loaded up -- one of your students loaded up their

18 software?

19 **A Yeah. Let's see. The challenge here is that**

20 **this citation indicates that we were aware of Skyhook**

21 **as a company and as a product at the time we wrote the**

22 **paper which would have been late '05, early '06, which**

23 **makes it likely that that meeting with them was around**

24 **that time of late '05 but not necessarily. It's**

25 **possible, and I don't remember, we may have been aware**

Page 61

(10:25:17-10:27:05)

1 of them as a -- as an existing company and solution
2 before I met them.
3 Q Okay. You just don't know one way or the other I
4 take it?
5 A Yeah. Sorry. It's a long way of saying I don't
6 know.
7 Q Going down on into the third paragraph also on
8 that first page of Exhibit 1006, second sentence says,
9 thus, researchers, it cites to 3 and 1, recently
10 started using the AP locations estimated through war
11 driving. And recently just stuck out at me. Do you
12 know when people started using WiFi access points for
13 location?
14 A No, I don't know. WiFi as a technology was
15 finalized in about 2000 or 2001 and it was -- there
16 was a period probably a year or two after that that
17 people started recording the locations, often
18 manually, off access point locations. When that term
19 war driving started into fashion or when that practice
20 became more common, I don't remember. The citation is
21 to papers from August 2005 and June 2005, but the
22 practice probably began, you know, before that.
23 Q Okay. You mentioned that people manually
24 recorded WiFi access locations. Sounds cumbersome,
25 but can you describe what it is you're talking about?

Page 62

(10:27:08-10:28:34)

1 A Well, in the most extreme example there was a
2 practice called war chalking to play on the word war
3 driving where they would write on the streets, this
4 was in Manhattan, most -- most commonly with chalk,
5 and they had a special code that they used different
6 shapes and symbols to describe what kind of access
7 point was available near there. So that people
8 walking down the street could know, ah, there's a WiFi
9 access point and it's open and it's secure and so
10 forth. So -- so that's what I meant by manual.
11 Q Okay. And -- and how -- how's -- what's the
12 technology for finding this?
13 A Well, the most basic tech -- if you have any WiFi
14 access point -- or, excuse me, WiFi laptop or device,
15 it will, by design, search for WiFi access points.
16 And the access points broadcast in their normal mode
17 of operation beacons, small packets of information
18 announcing their presence, and so any mobile device
19 can capture those because it's an open spectrum and
20 record the information in that beacon.
21 Q And what kind of information is typically in the
22 beacon?
23 A Typically it's the -- a number that identifies
24 the access point. It's called a MAC address, M-A-C,
25 and usually the name of the network and some other

Page 63

(10:28:48-10:31:13)

1 data about whether the network is secured and what
2 protocols it supports. I don't remember the details
3 beyond that but --
4 Q What's an SSID?
5 A SSID is an acronym whose full spelling I don't
6 remember, but it's the name, usually a human readable
7 name for the network.
8 Q Okay. And so the war chalking, do you know when
9 that began?
10 A Yeah, I don't remember exactly, but it was in
11 that time of the early 2000s. I don't think it's a
12 common practice anymore.
13 Q And how about war driving, when did that become a
14 common practice?
15 A I think you asked that already, and it's -- the
16 best I could estimate would be between 2001 and 2005,
17 but exactly -- you know, it's one of these emergent
18 behaviors. It's not clear.
19 Q War chalking, I'm -- this is a term that I wasn't
20 previously familiar -- familiar with.
21 A It's not commonly used.
22 Q Yeah, okay. But the -- the manually recording of
23 WiFi access points or -- or war chalking, as it may
24 sometimes be called, was that used to create databases
25 of -- of WiFi access point locations do you know?

Page 64

(10:31:16-10:32:50)

1 A War chalking was not used to create databases but
2 another form of manual recording would be after
3 collecting the locations of where beacons were
4 observed, you might record those manually, meaning
5 using great personal effort as opposed to automated
6 software to put them into a database to share them
7 with other people, for example.
8 Q Okay. And does war driving typically use some
9 sort of more automated system for creating a database
10 of access points?
11 A War driving initially did not, to my knowledge,
12 create databases, but it would -- the software that
13 first appeared was for the data collection part of it.
14 So you would have some software that would be designed
15 to, you know, rapidly poll for beacons and record
16 beacons and record your location as you drove along
17 the street, and then when you got home you would have
18 a list of what you saw and where you went. And what
19 you do with that is a different question.
20 Q Okay. Is that called stumbler software or is
21 that something else?
22 A That was one -- that was the name of one piece of
23 software designed to do that.
24 Q In -- one of the things that we -- you guys did
25 in the course of this study was create a database of

Page 65

(10:32:54-10:34:55)

1 WiFi access point locations that you had collected
2 through war driving, and I think you call it war
3 walking, is that right?
4 **A Yeah. We may have been the only ones to use that**
5 **term. Well, we created a database in a very loose**
6 **sense. I mean, we collected the data and we recorded**
7 **it in our computers in order to do the analysis and**
8 **this research.**
9 Q So you would agree that you did create a database
10 of the WiFi access points?
11 **A Yeah.**
12 Q Can you recall why it is that you decided to --
13 actually, your team decided to supplement the data
14 gathered through war driving with this it's called war
15 walking?
16 **A Well, we were studying the Dartmouth College**
17 **campus and the campus has some streets through it but**
18 **it has many buildings, and many of the buildings are**
19 **in large areas with no intervening streets and so in**
20 **order to better observe the access points inside some**
21 **of the big buildings, we had to walk around them on**
22 **the pedestrian sidewalks.**
23 Q Okay. Did you drive all the streets on the
24 Dartmouth campus?
25 **A I can't recall. I'm not sure if we did.**

Page 66

(10:35:14-10:36:37)

1 Q Just take a step back on -- on the equipment.
2 Who chose the equipment that you used for this study?
3 **A Well, it was a collaborative discussion, but it**
4 **was Minkyong who would have made the -- you know, the**
5 **detailed selection, you know, to examine what we had**
6 **or what we needed to buy and then we would discuss it.**
7 **I can't remember if -- you know, if we had -- of what**
8 **we used, whether it was stuff we had and so it was**
9 **convenient or whether we had to go buy some stuff.**
10 Q Do you remember any conversation about -- about
11 the strength of the antenna and how that would affect
12 the study?
13 **A I don't recall, no.**
14 Q Does -- does the strength of the antenna affect
15 the study?
16 **A Well, the -- the strength of an antenna does**
17 **affect how well you can hear beacons and how many you**
18 **might hear. Whether it would affect this study and**
19 **its conclusions would require a lot more thought.**
20 Q But I take it you'd agree with me that the
21 strength of the antenna affects the -- your ability to
22 see, or hear maybe is a better metaphor, WiFi access
23 points around you, stronger antenna you can hear ones
24 that are further away?
25 **A Sure.**

Page 67

(10:36:38-10:38:01)

1 Q Okay. And so the stronger your antenna, the
2 better -- well, is it true that the stronger the
3 antenna you have, the at least more data you're going
4 to get about access points?
5 **A Yes. You'll get more data, that's right.**
6 Q Will you get better data?
7 **A Better for what?**
8 Q That is a good question. The -- was one of the
9 goals here to -- in this study to find as many access
10 points on campus as -- as you could?
11 **A No, I don't think that was a specific goal.**
12 Q Okay. Did it matter to the study whether you
13 found some or all?
14 **A To some extent, yes.**
15 Q How?
16 **A Well, we were interested -- we -- we knew the**
17 **locations of the Dartmouth managed access points**
18 **because we had access to them through Dartmouth. And**
19 **we wanted to estimate their locations using war**
20 **driving methods and then compare how accurate those**
21 **estimates are -- well, compare those estimates with**
22 **the known location to determine accuracy. And**
23 **obviously the more of our own access points we could**
24 **discover, the more data points we would have for our**
25 **study, so it affected the study in that sense.**

Page 68

(10:38:07-10:39:44)

1 Q And more -- is it true that the more accurate --
2 access points you have, the better location you could
3 ultimately get?
4 **MR. LU: Objection. Incomplete**
5 **hypothetical. Foundation.**
6 **A I think it would help me if you restated that**
7 **question. It had a couple of different parts.**
8 Q Sure. Is it -- is it -- is it true that the more
9 WiFi access point locations you have that you've
10 determined through estimation, the better you're able
11 to later determine the location of the mobile device
12 in that same area?
13 **A Generally, yes. The more access points -- the**
14 **more data points you have that you can use for**
15 **localizing later on, the better the result.**
16 Q You said you didn't -- didn't know if you had
17 driven all of the -- all of the streets. I mean, is
18 there a reason you wouldn't drive all of the streets?
19 **A I don't think so. I mean, I'm looking at the**
20 **map, which is a little hard to read in this printout**
21 **but -- and it looks like we got most of them, at least**
22 **close to the campus area. Of course, there are other**
23 **streets in town. And I think it would make sense for**
24 **us to drive all of the streets that are drivable in**
25 **order to get more data points, but I can't say with**

Page 69

(10:39:46-10:41:01)

1 **certainty today that we did drive all the streets.**

2 Q Okay. Well, would you agree with me that it's

3 sort of -- I guess it's -- the obvious way to maximize

4 the number of -- of data points is to drive all the

5 streets you can?

6 **MR. LU:** Objection. Vague. Ambiguous.

7 Calls for legal conclusion. Foundation.

8 **A Well, is it obvious? Well, I think that -- let**

9 **me think about your question carefully. So it does**

10 **seem clear to me that if you want more data points,**

11 **then you would drive more streets.**

12 Q Was that clear at the time you wrote this paper,

13 designed the study?

14 **MR. LU:** Same objection.

15 **A That's -- that's -- that's hard to say. I mean,**

16 **that's six years ago. In retrospect it seems clear,**

17 **but then I can't say -- I don't recall whether we**

18 **thought it was obvious at the time that was -- that**

19 **requires me to either speculate about my condition at**

20 **the time or remember something I don't remember, so I**

21 **can't answer.**

22 Q Neither -- neither of which we are asking you to

23 do, sir.

24 **A Right.**

25 Q Did you walk all over campus?

Page 70

(10:41:01-10:42:12)

1 **A That would be a lot of walking.**

2 Q I take it the answer is no?

3 **A No. All over is a very broad term.**

4 Q Well, one of the things that is described here,

5 it's in the third paragraph under war driving --

6 **A On which page?**

7 Q On -- it's the third page of the document.

8 **A Unfortunately, not numbered.**

9 Q I have realized that I have inadvertently handed

10 you a copy of the document that is not Bates numbered.

11 **MR. LU:** And my copy is not Bates numbered

12 either.

13 **BY MS. MANNING:**

14 Q For everyone's ease of reference I'm going to ask

15 to trade.

16 **A Okay.**

17 **MS. MANNING:** If that's okay with you,

18 Sam?

19 **MR. LU:** Sure.

20 **MS. MANNING:** Any objection?

21 **MR. LU:** And just to make the record

22 clear, all we're doing is trading a copy of the

23 Kim article Risks of Using AP Locations

24 Discovered Through War Driving that does not

25 have Bates numbers to one that does have Bates

Page 71

(10:42:15-10:44:00)

1 numbered GSHFED_0011325 through 001139. And

2 that document will be Bates numbered -- I'm

3 sorry, marked with the Exhibit Number 1006.

4 **MS. MANNING:** Yes.

5 **MR. LU:** The previous 1006 has been

6 discarded?

7 **MS. MANNING:** Yes.

8 **BY MS. MANNING:**

9 Q Let's try that again.

10 **A Page 3 you say.**

11 Q Is the third page which is Bates numbered,

12 GSHFED_0011327. And under the header for Section 3.2

13 war driving, the third paragraph down you'll see I

14 guess it's the third sentence there. It says, to get

15 signals from as many APs as possible and also not bias

16 the AP location estimates towards one direction, we

17 walked around each building and tried to stay close to

18 it as long as we had GPS signal reception.

19 **A Okay.**

20 Q How is it that walking around each building

21 affected the number of access points you were able to

22 record?

23 **A Some of the Dartmouth buildings are very large**

24 **and have many, many access points and so the signal**

25 **from the access points is not visible in all**

Page 72

(10:44:06-10:45:28)

1 **directions, from all sides of the building.**

2 Q Okay. And how did walking around the building

3 affect whether the AP location estimates were biased

4 toward one direction?

5 **A Well, as -- as the paper eventually concludes, I**

6 **think, collecting data from one side of the building**

7 **tends to -- you end up with data points, observations**

8 **of an access point that are location stamped on that**

9 **side of the building and so your estimate of that**

10 **access point is biased toward that side of the**

11 **building where you've taken the observations. If you**

12 **take readings of an access point from all sides of a**

13 **building, then you have a -- a location for each**

14 **observation and those locations are on all sides of**

15 **the building or as many as you can get the access**

16 **point, and you're more likely to have a better**

17 **estimate of the access point's location.**

18 Q And your team knew that that was -- that was one

19 way to solve that problem as of the time you designed

20 that study, right?

21 **MR. LU:** Objection. Vague. Ambiguous.

22 **A Well, we -- I think to say we knew that was one**

23 **way to solve the problem is not quite correct. I**

24 **mean, we -- we felt that that was a -- a way that**

25 **would help us solve the problem. Whether we learned**

Page 73

(10:45:31-10:46:52)

1 **that from someone else or thought of it ourselves, I**
 2 **don't know.**
 3 Q Okay. Is that the same thing as arterial bias
 4 that's described in the 988 and 694 patents, the same
 5 problem you just described?
 6 A **Not exactly, no.**
 7 Q How is it different?
 8 A **This form of bias -- so assuming that, for**
 9 **example, you drove every street and you were able to**
 10 **hear some of the access points inside of a building on**
 11 **the street, then what we were showing I think, if I**
 12 **remember the results correctly, is that the access**
 13 **point location estimates are biased toward the street**
 14 **rather than in the center of the building or wherever**
 15 **they were. Arterial bias, as I understand it in the**
 16 **988 patent, reflects a bias toward arteries as opposed**
 17 **to other streets. So they're related concepts, but**
 18 **they're not the same.**
 19 Q Help me understand that. What -- what -- what's
 20 the distinction you're -- you're drawing?
 21 A **Well, so as I understood the -- the use of the**
 22 **phrase arterial bias in the 988 patent, they were**
 23 **concerned that data points would be collected only on**
 24 **so-called arteries, which are the heavily trafficked**
 25 **roads in the -- in a city and as opposed to other**

Page 74

(10:46:58-10:48:24)

1 **roads, and so you would -- the locations of APs would**
 2 **be -- more likely to be placed close to the artery**
 3 **rather than close to their actual location. And in**
 4 **this case we were concerned with them being placed**
 5 **closer to a street, not necessarily an artery. Might**
 6 **be an alley that you drove on. And so I was**
 7 **distinguishing based on the word artery as they used**
 8 **it.**
 9 Q Well, both issues, to the extent they're --
 10 they're different, are concerned with the biasing of
 11 the -- of the calculated location of the access point
 12 toward the place where the reading was taken --
 13 A **Yes.**
 14 Q -- correct?
 15 A **Yes.**
 16 Q And the actual results you got in the study --
 17 the number of -- very often you see that the access
 18 point is actually calculated as being on the path
 19 where the reading was taken?
 20 A **Correct.**
 21 Q Okay. And that is the same thing we see depicted
 22 in Figure 3 of the 988 patent that's Exhibit 1007?
 23 **MR. LU:** Objection. Mischaracterizes the
 24 witness's testimony.
 25 A **Well, that's a statement. Are you asking a**

Page 75

(10:48:26-11:05:11)

1 **question?**
 2 Q I -- I am asking, is it true that that is the
 3 same thing that we see depicted on Figure 3 of the 988
 4 patent?
 5 A **So help me remember what you mean by that. You**
 6 **said that is the same thing so --**
 7 Q Sure. Figure -- do you agree with me that Figure
 8 3 depicts calculated locations as being actually on
 9 the path that the scanning vehicle took?
 10 A **Yes.**
 11 Q And that's the same basic issue that you --
 12 you -- you found when you were driving Dartmouth
 13 campus, your access point locations would be
 14 calculated as being actually on the same path that the
 15 scanning vehicle or the walker actually took?
 16 A **In some cases, yes.**
 17 **MS. MANNING:** Let's change tape.
 18 **VIDEOGRAPHER:** The time is now 10:53 and
 19 we're going off the record.
 20 (Recess taken)
 21 **VIDEOGRAPHER:** The time is now 11:09 and
 22 we're on the record.
 23 **BY MS. MANNING:**
 24 Q Dr. Kotz, I want to ask you another question
 25 about that same paragraph on the third page of Exhibit

Page 76

(11:05:16-11:06:19)

1 1006 where it describes walking around each building
 2 to take readings. Were you trying to get multiple
 3 scans of each access point?
 4 A **Yes.**
 5 Q Why?
 6 A **In order to estimate the location as something**
 7 **other than the location where you were standing, you**
 8 **need multiple scans in order to triangulate.**
 9 Q And you need them from different locations around
 10 the access point, is that right?
 11 A **Right.**
 12 **MR. LU:** Objection. Vague. Ambiguous.
 13 A **You need them from different locations, and if**
 14 **you can get around the access point, then hopefully**
 15 **you can get a better -- more accurate position**
 16 **estimate.**
 17 Q You emphasized around, which isn't going to show
 18 up on the transcript, so could you just explain what
 19 you mean by -- you emphasized around. Why did you
 20 emphasize that?
 21 A **Because if you have -- you can't do triangulation**
 22 **without readings from multiple locations, that is,**
 23 **three, and if the three location -- or more locations**
 24 **are on one side of the access point, then your**
 25 **estimate is necessarily going to be closer to the**

Page 77

(11:06:21-11:07:56)

1 **readings than the actual location. If you can get**
2 **readings from -- that are on -- on points around the**
3 **access point at -- in other words, not all on one side**
4 **of the access point, then your estimate will be**
5 **better.**

6 Q And I have to ask you because you're testifying
7 here in 2011. That's something that your team
8 understood at the time you were designing the study
9 and doing this work?

10 A **Yeah.**

11 MR. LU: Objection. Vague. Ambiguous.

12 A **We understood that having readings from around**
13 **the access point would be -- lead to better -- more**
14 **accurate estimates at the time.**

15 Q Okay. And you understood that you needed
16 multiple scans in order to calculate the location?

17 A **Yes.**

18 Q Okay. How is it that -- that you knew that the
19 biasing of the access point locations was -- was a
20 potential problem? Do you recall?

21 MR. LU: Could you re -- could you read
22 back that question please?
23 (Pending question read back)

24 MR. LU: Objection. Foundation. Vague
25 and ambiguous.

Page 78

(11:08:01-11:09:15)

1 A **I don't recall how we knew that. I could**
2 **speculate about how, you know, but that -- I don't see**
3 **any point in that.**

4 Q I'll ask you for your best recollection if you
5 have one -- have one, but I won't ask you to
6 speculate.

7 A **Yeah, I can't -- I don't have a good**
8 **recollection. I'm sorry.**

9 Q Do you recall how it is that -- that your team
10 understood that -- the method by which the area was
11 traversed affected location calculation and accuracy?

12 MR. LU: Objection. Vague. Ambiguous.

13 A **So can you characterize method by which the**
14 **terrain was traversed?**

15 Q Well, what you've been describing for me is you
16 walked around the buildings --

17 A **Uh-huh.**

18 Q -- so as to get multiple readings from around the
19 building and, therefore, around the access points
20 inside of it.

21 A **Right.**

22 Q And that's -- that's a different method of -- of
23 walking through the area or driving through the area
24 as opposed to just straight line right on by it for
25 example.

Page 79

(11:09:15-11:10:39)

1 A **Uh-huh. Uh-huh.**

2 Q How is it that your team knew that how you
3 traversed the area will make a difference in the
4 accuracy of the location calculations --

5 MR. LU: Same --

6 BY MS. MANNING:

7 Q -- and the access points?

8 MR. LU: Same objection.

9 A **Well, quite literally, I don't know how we knew**
10 **this. The -- you know, looking -- thinking about the**
11 **mathematics of the calculations one -- and coming back**
12 **to my previous answer about how having readings from**
13 **around the access point will lead to a better accuracy**
14 **estimate, it seems likely that we were hypothesizing**
15 **and then going to do the study that one would get**
16 **better results if one traversed the terrain in that**
17 **way, but I don't remember how we came up with that at**
18 **the time. So, I mean -- because that's -- that's your**
19 **question, right?**

20 Q Yes.

21 A **How would we know? I don't know how we knew.**

22 Q But you did know that. You did know that, for
23 example, walking around the building --

24 A **Apparently, yeah. It's -- obviously, eventually**
25 **we figured it out one way or another.**

Page 80

(11:10:41-11:12:14)

1 Q And you -- and you just don't recall whether that
2 was something you knew at the time you were designing
3 the study or it's a conclusion drawn during the course
4 of the study?

5 A **Well -- right. Right.**

6 Q Do you -- well, withdrawn.

7 There are some figures in the -- in the paper
8 that show the actual path of walking, and I believe
9 there's one in here for the actual path of driving as
10 well. Did you guys plan out the routes in advance, do
11 you know?

12 A **I don't know.**

13 Q Do you have any recollection of how you decided
14 where to drive or where to walk?

15 A **See, the problem is that Minkyong was the lead on**
16 **the details of the study and so I -- I -- I know we**
17 **discussed it sometimes. I'm sure they did some test**
18 **walks and test drives to get some test data to see how**
19 **things were going, but I don't remember how we made**
20 **specific choices.**

21 Q There's some references to obstacles like trees
22 and vehicles and structures. I take it you were not
23 necessarily walking on paths?

24 A **Right.**

25 Q Is that --

Page 81

(11:12:14-11:13:52)

1 **A Right. I think that the goal was to walk as**
 2 **close to the building -- it says this, as close to the**
 3 **building as we could, but in some cases there were**
 4 **obstacles and in other cases you would lose GPS**
 5 **reception when you were close to a building, and so we**
 6 **didn't --**
 7 Q You --
 8 **A And so we didn't -- we weren't like, you know,**
 9 **right next to the wall and not necessarily out on the**
 10 **sidewalk. There isn't necessarily a pedestrian**
 11 **pathway between buildings in some cases and so we**
 12 **would walk across the grass.**
 13 Q Okay. The paper goes on to discuss the -- an
 14 analysis of the calculated locations for actually
 15 doing location estimation for mobile device.
 16 **A Uh-huh.**
 17 Q Did the -- how did the number of access points
 18 affect which location determination algorithm should
 19 be used?
 20 **MR. LU: Objection. Foundation.**
 21 **A I don't remember. I don't remember the**
 22 **algorithms that we used. I haven't read this paper in**
 23 **five years.**
 24 Q Okay.
 25 **A Sorry.**

Page 82

(11:13:59-11:15:51)

1 Q There are -- if you look, for example, at Section
 2 4.2, which is the sixth page of the document.
 3 **A All right.**
 4 Q I believe it's Bates number GSHFED_001330. Got
 5 it? There are references to simple centroid and
 6 weighted centroid algorithms and -- do you see those?
 7 **A Yes.**
 8 Q And there's reference in the next -- after the
 9 semicolon to particle filter?
 10 **A Right.**
 11 Q Is that also location determination algorithm?
 12 **A I think so.**
 13 Q I should ask. Are simple centroid and weighted
 14 centroid algorithms, are those location determination
 15 algorithms?
 16 **A Yes, I think so.**
 17 Q Other than what's written in the paper here, do
 18 you have any recollection of how the number of
 19 available access points affected the choice of which
 20 algorithm to use?
 21 **MR. LU: Objection. Foundation.**
 22 **A I don't think -- you know, in this context we**
 23 **were experimenting with all three algorithms, so we**
 24 **weren't choosing an algorithm. We were experi -- we**
 25 **would plug the data into all three algorithms and see**

Page 83

(11:15:54-11:18:24)

1 **how they did. At least that's -- from looking at**
 2 **Figure 3, that's what I'm seeing, we're -- we're**
 3 **presenting the accuracy, the error in each -- of each**
 4 **algorithm with each data set.**
 5 Q So is it fair to say that one of the purposes of
 6 the study is to determine which algorithms do a better
 7 job of -- of determining location of a mobile device?
 8 **A Yes. I mean, that's not a primary goal of the**
 9 **study, but that was part of it.**
 10 Q Okay. In other words, it's something you didn't
 11 know in advance?
 12 **A Correct.**
 13 Q You had to do the study?
 14 **A Correct.**
 15 Q Were there other location determination
 16 algorithms available to you that you could have used
 17 in the study?
 18 **A Probably. I mean, at the time there had been**
 19 **many, many published, but I can't remember which ones**
 20 **were available to us at the time. So probably there**
 21 **were others at the time.**
 22 Q Okay. The paper discusses at some length the
 23 errors in the estimated locations of the access point
 24 as compared to the known actual locations of -- of
 25 each individual access point. What -- what could have

Page 84

(11:18:31-11:19:43)

1 been done differently in the study to improve access
 2 point locations -- estimated access point locations, I
 3 should say?
 4 **MR. LU: Objection. Vague. Ambiguous.**
 5 Also to the extent it calls for speculation.
 6 **A Yeah, that's a broad question. What could have**
 7 **been done differently in the study. Lots of things.**
 8 Q Like what?
 9 **A Well, some of which we've partly discussed.**
 10 **There are other algorithms one might have used to**
 11 **better compute an estimate from the data we collected.**
 12 **We could have collected more data points. We could**
 13 **have used a stronger antenna or different antenna**
 14 **anyway. These are the things that come to mind, but**
 15 **given a few weeks, we could probably think of some**
 16 **other things too.**
 17 Q Okay. Anything else you can think of as you sit
 18 here?
 19 **A No.**
 20 Q Okay. You said you could have used other
 21 algorithms besides the three that are mentioned in
 22 the -- in the paper?
 23 **A Right.**
 24 Q I think you mentioned a moment ago that you
 25 thought there were others?

Page 85

(11:19:44-11:20:52)

1 **A Yeah. There were likely others available. The**
 2 **goal of this study wasn't to think up a new algorithm**
 3 **or to find the very best algorithm for locating access**
 4 **points.**
 5 Q Okay. And you said you could have used a
 6 stronger or different antenna?
 7 **A Yeah.**
 8 Q Which would just be a way of collecting more
 9 access points, correct?
 10 **A Yeah.**
 11 Q Would it -- would it have any other effect
 12 besides just more access points?
 13 **A Well, you might -- I mean, I suppose you might**
 14 **get more accurate signal strength estimates, and**
 15 **signal strength is a -- a weak proxy for distance,**
 16 **which is why one uses it as a weighting factor. And**
 17 **so it's possible that different antenna technology**
 18 **might have given better -- better signal strength**
 19 **estimates and therefore better distance estimates and,**
 20 **therefore, better weighting factors and, therefore,**
 21 **better estimation for example, but I don't know for**
 22 **sure what antenna we used and, you know, what**
 23 **alternatives were available at the time.**
 24 Q Right. You said it was a weak proxy for
 25 distance. Why -- why a weak proxy for distance?

Page 86

(11:20:54-11:22:10)

1 **A The -- the access points have an antenna and**
 2 **they're broadcasting the beacons, and the war drivers**
 3 **or war walkers are picking up these beacons using**
 4 **their own antenna and they're -- the antenna can tell**
 5 **you the strength of the signal it's receiving, but**
 6 **that signal is attenuated every time it goes through**
 7 **an object and with distance, so obviously it fades**
 8 **with distance, but if it goes through a wall or a tree**
 9 **or a person or a filing cabinet, the signal gets**
 10 **weaker and so it's not directly proportional to**
 11 **distance because obstructions can weaken the signal**
 12 **and make it appear, therefore, farther than it would**
 13 **be if distance was the only factor.**
 14 Q Is there any way to control for that?
 15 **MR. LU:** Objection. Vague. Ambiguous.
 16 **BY MS. MANNING:**
 17 Q I should say is there any way to control for that
 18 in your study?
 19 **A It would have been very difficult because the**
 20 **composition of the buildings are different. Some are**
 21 **brick, some are steel, some are wood, some have**
 22 **mountains of books like the library.**
 23 Q Sure.
 24 **A Some have a lot of people in them. Depends when**
 25 **you walk past. If it were snowing or raining, you**

Page 87

(11:22:13-11:23:26)

1 **would have water in between, which is a significant**
 2 **attenuating factor, so it would be very difficult to**
 3 **account for that.**
 4 Q And do these -- you know, the -- your paper talks
 5 about a number of -- of pre-existing location systems
 6 placed on it, for example I think you used Place Lab
 7 software. Do you know, do these pre-existing location
 8 determination systems, do they account for variations
 9 in signal strength or do they also treat it as a -- as
 10 a proxy for distance?
 11 **MR. LU:** Objection. Compound. Also
 12 object to the extent it calls for speculation.
 13 **A Well, I don't -- Place Lab is one example, one**
 14 **that we did cite. I don't recall that it used**
 15 **anything more complex than essentially a proxy for**
 16 **distance-type approach. I would be surprised if it**
 17 **did.**
 18 Q Why would you be surprised?
 19 **A Because it's very difficult, especially if you**
 20 **don't know anything about the environment.**
 21 Q Okay. The other thing that you mentioned when
 22 you were describing things you could have done to
 23 improve location, you could have collected more data
 24 points.
 25 **A Yeah.**

Page 88

(11:23:27-11:24:44)

1 Q How would -- how would one have done that? How
 2 could you have accomplished that?
 3 **A Well, I noticed in my quick review of the paper**
 4 **just now that we drove at ten miles per hour, for**
 5 **example, and we walked -- I don't know if it said how**
 6 **fast we walked, but that was in order to collect data**
 7 **points sufficiently frequently as you drove. If you**
 8 **drove through quickly, obviously there's less time.**
 9 **The beacons are sent typically ten times a second and**
 10 **so if you drive through quickly, you're not going to**
 11 **pick up very many beacons and so if you drive through**
 12 **slowly, you can pick up more beacons in the amount of**
 13 **time that you're nearby and that gives you more data**
 14 **points. So if we had tried different techniques to**
 15 **pick up more data points, we might have had -- we**
 16 **might have been able to compute more accurate**
 17 **locations, and one way we could have done that was to**
 18 **be to change the software or the driving patterns,**
 19 **walking patterns, etc.**
 20 Q When you say change the driving or walking
 21 patterns, do you mean literally the route?
 22 **A Yes. You could change the route. We could have**
 23 **changed -- we could have walked more slowly. We could**
 24 **have changed the software to collect more frequent**
 25 **data points. I'd have to think. Those are some**

Page 89

(11:24:50-11:26:18)

1 **examples of how we might have collected more data**
 2 **points.**

3 Q How would changing the route have affected the
 4 number of data points?

5 A **Well, if we hadn't driven every road, then we**
 6 **could have driven more roads. If we hadn't walked**
 7 **every path or every -- between every pair of**
 8 **buildings, we could have covered those spaces we**
 9 **missed. And so, obviously, if there are places we**
 10 **missed we would have collected more data points if we**
 11 **hadn't missed those. You might -- there might have**
 12 **been some benefit from driving or walking segments**
 13 **again, you know, repeating a segment. Although that**
 14 **seems wasteful, it could give you more data points.**

15 Q These -- these solutions for how to get more --
 16 more data points and, therefore, more accurate
 17 location, you know, for example driving more slowly or
 18 changing the route or just being more comprehensive in
 19 your route, those were all things known to your team
 20 at the time the study was being conducted?

21 MR. LU: Objection. Vague. Ambiguous.
 22 Calls for speculation.

23 A **I don't know if they were known. I mean, I --**
 24 **I'm -- I'm listing these examples today because they**
 25 **are apparent as things we could have done. Whether we**

Page 90

(11:26:21-11:28:49)

1 **thought of them at the time or could have thought of**
 2 **them at the time, I don't know.**

3 Q Has the technology changed in any way that would
 4 make something, you know, apparent today that --
 5 withdrawn.

6 Is there anything -- is there anything about the
 7 technology that's changed that would make the solution
 8 of driving more slowly or driving more
 9 comprehensively, you know, apparent to you today in
 10 ways that it wasn't when this study was actually
 11 designed and conducted?

12 MR. LU: Objection, vague, and foundation.

13 A **I don't think so. The technology has actually**
 14 **changed quite a bit in many ways, but whether it would**
 15 **have changed the apparentness of those things is**
 16 **really hard to know because sometimes ideas that seem**
 17 **obvious in retrospect are not obvious at the time.**
 18 **That's just the nature of things.**

19 Q If you could go over to Section 4.6 of your paper
 20 please. Begins on the page Bates numbered
 21 GSHFED_0011336. Got it?

22 A **Yeah.**

23 Q There is a discussion that begins here of access
 24 point interference. Just for the record, could you
 25 just briefly describe what -- what -- what the problem

Page 91

(11:28:51-11:30:13)

1 of interference is?

2 A **Well, WiFi technology uses unlicensed spectrum,**
 3 **and the set of frequencies available for WiFi is**
 4 **fairly narrow and so each access point has to pick a**
 5 **subrange of those frequencies for its use and there**
 6 **are only -- at least at the time there were only 11**
 7 **such ranges, and they overlapped. So you have access**
 8 **points that are next to each other, near each other,**
 9 **using the same frequency or overlapping frequencies,**
 10 **then they interfere with each other and the**
 11 **communication doesn't work well. So that's what I**
 12 **mean by wireless interference.**

13 Q And how does that affect -- affect the location
 14 technology, that interference?

15 A **Well, I think that that wasn't what we were**
 16 **trying to do in this section, but I -- it does -- it**
 17 **would affect it in the sense that if there are APs**
 18 **transmitting beacons on the same channel, they could**
 19 **collide with each other, and the beacons, meaning the**
 20 **transmissions, interfere and then no one receives the**
 21 **beacons successfully and so those beacons are lost.**
 22 **And, therefore, if you were trying to collect data for**
 23 **war driving or if you were trying to use beacons later**
 24 **for localization, you might miss some beacons because**
 25 **of the interference.**

Page 92

(11:30:15-11:31:34)

1 Q Is the -- the interference means that you
 2 literally don't receive the data from the access
 3 points that interfere with one another?

4 A **Yes, in -- in the most simplest sense, right. If**
 5 **they collide. If they transmit at the same time, then**
 6 **their signals interfere and the receiver can't decode**
 7 **either one of them.**

8 Q Okay. So is it that you have no information
 9 about those -- those access points or just that some
 10 of the -- some of the beacon packets get filtered out
 11 and your data is of less quality?

12 A **Some of those beacons -- the beacons that collide**
 13 **with another beacon or another data packet would be**
 14 **lost, but beacons are retransmitted usually about ten**
 15 **times a second, so if you are there long enough, you**
 16 **would hear the next beacon. If you're driving by**
 17 **pretty fast, you might miss it.**

18 Q Was there any reason to -- to filter out some of
 19 the observed access points when you were actually
 20 doing location calculations?

21 A **Yes, I think so. Again, this paper -- it's been**
 22 **a while, but we -- I believe we observed non-Dartmouth**
 23 **access points set up and run by private citizens in**
 24 **the neighborhood, and we didn't know the location of**
 25 **those access points and so for the purposes of our**

Page 93

(11:31:37-11:43:35)

1 **study, we weren't able to estimate or compute the**
2 **error of our estimates for those APs.**
3 Q Okay. Okay. So you -- you filtered those out
4 entirely for the location calculations, is that right?
5 **A Whether we filtered them out for the location**
6 **calculation, I don't know. I don't remember.**
7 **MS. MANNING:** Can we take just a very
8 short break?
9 **MR. LU:** Sure.
10 **VIDEOGRAPHER:** The time is now 11:37 and
11 we're going off the record.
12 (Recess taken)
13 **VIDEOGRAPHER:** The time is 11:47 and we're
14 back on the record.
15 **BY MS. MANNING:**
16 Q Dr. Kotz, could you please turn to Exhibit 1004,
17 which is your declaration.
18 **A Okay.**
19 Q And, in particular, if you could turn to page 6
20 of it please. And in the middle of the page there it
21 says level of ordinary skill in the art, and you in
22 paragraph 32 -- you offer an opinion about the
23 personal skill in the art?
24 **A Yes.**
25 Q And it says here, in my opinion, a person of

Page 94

(11:43:38-11:45:08)

1 ordinary skill in the art would have a bachelor's
2 degree in electrical engineering or computer science,
3 comma, three to five years of experience working in
4 wireless communications software design, comma, and
5 would be able to read and write computer source code.
6 Is that, in fact, your opinion of the skill and
7 education level of a person of ordinary skill in the
8 art relevant to these patents in suit?
9 **A Yes.**
10 Q What's the basis for your opinion?
11 **A Well, these patents are about computer**
12 **technology, WiFi networks, WiFi position estimation**
13 **and software to do so and so it seemed on reflection**
14 **that someone with this kind of experience would be**
15 **needed to -- would be appropriate to be considered**
16 **someone of ordinary skill in that art.**
17 Q Do you recall whether you reviewed Dr. Acampora's
18 declaration before formulating your opinion on this
19 point?
20 **A Yes.**
21 Q I asked you if you recall so now I'll ask you,
22 did you -- did you review it before formulating your
23 opinion?
24 **A Yes, I think so. I mean, I read his declaration**
25 **before we prepared this declaration and before we**

Page 95

(11:45:17-11:46:58)

1 **discussed this -- this aspect of it.**
2 Q I'm going to hand you what's been marked as
3 Google Exhibit 1008, document entitled on its face
4 Declaration of Anthony S. Acampora, Ph.D.
5 **A Okay.**
6 Q Is that the document you've previously reviewed,
7 sir?
8 **A Yes, it looks like it.**
9 Q It's not a small document. The good news is I
10 have a specific question for you. If you turn to
11 paragraph 60, which is on page 26.
12 **A All right.**
13 Q On page 26 you'll see a section also titled Level
14 of Ordinary Skill in the Art, and in paragraph 60
15 Dr. Acampora states in this case, it's my opinion that
16 one of ordinary skill in the art would be one with a
17 bachelor's degree in electrical engineering or
18 computer science and three to five years' experience
19 working in wireless communications hardware and
20 software design.
21 **A Yes, I see that.**
22 Q So they're pretty similar but not identical?
23 **A Yes.**
24 Q And I wanted to ask you some questions about the
25 reason for the -- the differences between them.

Page 96

(11:47:05-11:48:20)

1 Dr. Acampora includes in his description of person of
2 ordinary skill in the art three to five years of
3 experience working in wireless communications hardware
4 and software design, and I note that you omitted
5 hardware and -- hardware and. Is there a reason for
6 that? Is that a difference in text or is it a
7 difference in kind?
8 **A I hadn't noticed that difference before. I don't**
9 **know that it would be -- I'm not sure that it would be**
10 **necessary for someone to have hardware experience for**
11 **designing wireless communications hardware in order to**
12 **understand this patent. So I think it would be -- I**
13 **think it -- it's an unnecessary addition. So I'm**
14 **comfortable with my --**
15 Q Okay.
16 **A -- statement.**
17 Q Okay. If someone had three to five years of
18 experience in wireless communications hardware as
19 opposed to software, is it -- do you have a view on
20 whether that person would be appropriately viewed as
21 one of skill in the art?
22 **MR. LU:** And to clarify, you're asking
23 just hardware design?
24 **MS. MANNING:** Yes.
25 **A Well, I think that would be less ideal. I think**

Page 97

(11:48:26-11:50:03)

1 **it would be -- it would probably be okay because**
2 **anyone developing hardware would have to have some**
3 **understanding of the software, but it would be a less**
4 **ideal definition of the -- of the ordinary skill in**
5 **the art to have hardware-only background.**
6 Q But the hardware necessarily requires software,
7 is that your view?
8 **A Well, to be useful hardware requires software,**
9 **but someone who is doing hardware design typically has**
10 **to have some understanding of the software that will**
11 **run on it and so some -- I -- I could see as a stretch**
12 **that someone with only hardware experience could be --**
13 **might be able to -- to -- you know, would be able to**
14 **read these patents and make reasonable sense of them,**
15 **but I don't see why that's relevant. I mean, I think**
16 **computers -- communication software design is the**
17 **better definition.**
18 Q Okay. And one of the other differences I -- I
19 noted was that -- Dr. Acampora's definition is
20 formulated in the alternative, bachelor's degree in
21 electrical engineering or computer science or -- I'm
22 sorry, and three to five years of experience -- let me
23 strike the question. Reformulate.
24 You and Dr. Acampora agree that you have to have
25 both the educational background and the EE or the CS

Page 98

(11:50:07-11:51:29)

1 degree and three to five years of experience in the
2 relevant field?
3 **A Right.**
4 Q Okay. And then you add to your definition a
5 clause that's not in his, and would be able to read
6 and write computer source code. Why'd you add that?
7 **A Well, these patents are in many parts about the**
8 **application of algorithms to solve the problem, and**
9 **that requires someone to write code to implement those**
10 **algorithms and so reading and writing computer source**
11 **code would be a necessary condition.**
12 Q Do you think the ability to -- to read and write
13 computer source code is implicit in the definition --
14 in the description of someone as having a degree in
15 computer science, for example?
16 **A One would hope so, yes. Yeah, but I think it's**
17 **sometimes helpful to pull it out as -- to be clear**
18 **that that's something that's relevant in this case.**
19 Q Okay. Well, one of the things I'm trying to
20 understand is if we have an actual disagreement here
21 or if these are perhaps phrased differently but
22 essentially overlapping definitions.
23 **A Okay. I understand that's what you're trying --**
24 Q Do you have -- do you have -- do you have a view
25 on that?

Page 99

(11:51:30-11:52:51)

1 **A Well, unfortunately, I don't know what his --**
2 **what's behind his statement, whether he, for example,**
3 **thinks it isn't necessary to be able to read and write**
4 **computer source code and so I can't know whether this**
5 **is a difference in text or a difference in opinion.**
6 Q Okay. Well then I'll -- let's just ask about
7 your -- your views. I think we seem to -- seem to
8 agree that we firmly hope that a computer science
9 graduate can read and write source code and we would,
10 of course, expect that of computer science graduates.
11 Would you expect the person with the electrical
12 engineering degree would be likely to have some
13 ability to read and write code?
14 **MR. LU: Objection. Vague. Ambiguous as**
15 **to likely.**
16 **A I would expect someone with an electrical**
17 **engineering degree of these days certainly, I mean**
18 **recent years, to be able to read and write source**
19 **code.**
20 Q How about in 2005, would you have had similar
21 expectations?
22 **A Yes. Yes.**
23 Q Okay.
24 **A Can I clarify that?**
25 Q Sure.

Page 100

(11:52:52-11:54:17)

1 **A Meaning someone with a degree in 2005 as opposed**
2 **to someone who got their degree in 1965 in electrical**
3 **engineering not -- not referring to anyone in this**
4 **case, but in general there was no -- there was very**
5 **little computer source code then. It wouldn't be part**
6 **of an EE program then.**
7 Q Understood. As of 2005?
8 **A A fresh EE graduate would have that skill.**
9 Q Right. Right. Okay. Do you have experience
10 working with persons who would fit this description,
11 your description, of skill and education level of
12 person of ordinary skill?
13 **A Yes.**
14 Q Can you describe that experience for me please?
15 **A Well, so many of the colleagues that I work with**
16 **at Dartmouth and in my scientific community would fit**
17 **this description.**
18 Q By colleagues do you mean fellow faculty members?
19 **A Yes, or graduate students or post docs or faculty**
20 **and post docs at other universities.**
21 Q Okay. Do you have any experience outside the
22 academic setting working with persons who would fit
23 this description?
24 **A Yes, some. I've had some collaborations with**
25 **other industry colleagues. For example, the location**

Page 101

(11:54:24-11:56:05)

1 **prediction work we spoke about earlier was a**
 2 **collaboration with engineers at NTT DOCOMO Labs, and**
 3 **they were of this sort, not in academics.**
 4 Q Okay. You'll have to remind me, what -- what
 5 time frame was that work?
 6 A **That would have been overlapping this work, this**
 7 **paper we discussed earlier. Between about 2003 and**
 8 **2006 or 7, something like that.**
 9 Q Okay. And you suggested that some of the
 10 graduate students and maybe faculty would fit the
 11 description of a person of ordinary skill in the art.
 12 And I'm curious where such a person would have
 13 acquired three to five years' experience working in
 14 wireless communication software design.
 15 A **Well, so for example the -- my most recently**
 16 **graduated PH.D. student graduated in -- this summer,**
 17 **spent five or six years at Dartmouth as a graduate**
 18 **student, and he worked most of his time at Dartmouth**
 19 **on wireless software and coding software that would**
 20 **run inside the access points, for example. And so by**
 21 **the time he finished certainly he had more than met**
 22 **this standard.**
 23 Q Okay. Are you a person of skill in the art?
 24 A **Yes.**
 25 Q Are you a person of extraordinary skill in the

Page 102

(11:56:07-11:57:33)

1 art?
 2 A **Yes.**
 3 Q Okay. Do you -- how do you distinguish in your
 4 own mind between your own insights as a person of
 5 extraordinary skill in the art and those of a person
 6 of simply ordinary skill in the art? How do you make
 7 that distinction in your own head?
 8 A **Yeah, that's an interesting question. I have --**
 9 **for example, based on this definition, I have many**
 10 **more than three to five years of experience working**
 11 **with wireless networks, closer to 11 or 12. On the**
 12 **other hand, my experience, it tends to be at a higher**
 13 **level as a researcher and research leader; whereas, an**
 14 **engineer or maybe some of my graduate students would**
 15 **work at a much lower level and have much more detailed**
 16 **knowledge of the technology than I'm able to have. So**
 17 **I have a greater skill in the broader scope of**
 18 **wireless networking, but if you ask me to, you know,**
 19 **spend the afternoon writing device driver for some new**
 20 **wireless card, I would have some difficulty. So --**
 21 **so, you know, there's different degrees of skill in**
 22 **different aspects of the technology.**
 23 Q Why is it you would have trouble spending the
 24 afternoon writing the driver?
 25 A **Because I haven't had the luxury of the time to**

Page 103

(11:57:37-11:58:55)

1 **learn the details of the wireless technology at that**
 2 **level.**
 3 Q Okay.
 4 A **So, you know, extraordinary in certain aspects,**
 5 **more ordinary in other aspects.**
 6 Q Fair enough. We talked earlier about war
 7 driving. I think it was in the context of your risk
 8 paper. Is war driving the same thing as what the
 9 patents -- the specification of the patents in suit
 10 calls the random model?
 11 A **I'm trying to remember that model. Are you**
 12 **talking about 988 patent?**
 13 Q Yeah. Well, let me ask you a background
 14 question. Do you have any understanding of the
 15 similarities and differences between the
 16 specifications of the patents?
 17 A **So you're asking about the four patents in suit**
 18 **and that they have -- they differ somewhat in their**
 19 **specifications?**
 20 Q I'm asking do you have an understanding whether
 21 they differ in their specifications?
 22 A **Oh, I noticed that they do differ some in their**
 23 **specifications, but I don't understand exactly how**
 24 **each one differs from the other.**
 25 Q Okay. We'll leave aside the 897 patent, which

Page 104

(11:58:59-12:00:18)

1 I'll just represent to you my understanding is that it
 2 has some differences in the specification.
 3 A **Okay.**
 4 Q Would you agree with me that the 988, 694, and
 5 245 specifications, other than perhaps their summary
 6 and abstract, are essentially identical?
 7 A **I recall them being very similar. I didn't do a**
 8 **line-by-line analysis to make sure they were**
 9 **identical.**
 10 Q We can -- I think we'll probably end up talking
 11 at some length about the specification of the patents
 12 in suit. For convenience I think we tend to talk
 13 about the specification of the 988 and -- and I'll
 14 continue to do that if you are -- if you are
 15 comfortable with the idea that it is similar to the
 16 694 and 245. If you're not, we can go through all of
 17 them but --
 18 A **No, that's fine. It's a suitable representation.**
 19 Q Okay. And I'll also, you know, represent to you
 20 that the 245 references the disclosure of the other
 21 patents in suit and incorporates it by reference, so
 22 unless you're uncomfortable with -- with doing so,
 23 I'll also assume that our discussions of -- of the
 24 specification of the 988, to the extent that's
 25 referenced or incorporated into the others, that --

Page 105

(12:00:21-12:02:12)

1 that that testimony would be relevant to those
 2 patents. Is that fair?
 3 **A Seems fair.**
 4 **Q** Okay. So the question I had started to ask you
 5 was about war driving and whether it was the same
 6 thing as the random model discussed in the
 7 specification of the 988 patent?
 8 **A Yeah, I'm trying to remember what the random**
 9 **model specifically meant.**
 10 **Q** Well, if it assists you, take a look, column 7,
 11 line 52 -- or really 55. There's a reference to the
 12 random model.
 13 **A Okay.**
 14 **Q** Is that the same thing as war driving?
 15 **A No.**
 16 **Q** How is it different?
 17 **A Well, as described here, the random model is a**
 18 **use of war driving techniques by putting them into --**
 19 **putting a war driving device, they call it a scanning**
 20 **device, in vehicles as they are used for business or**
 21 **personal use going about their normal business. And**
 22 **many people who use the word war driving imagine**
 23 **someone going out purposefully to collect war driving**
 24 **data, meaning that they would drive around**
 25 **specifically trying to collect AP location data. And**

Page 106

(12:02:13-12:03:46)

1 **this is random, meaning -- in the sense that it's just**
 2 **happenstance. Wherever these cars go they collect**
 3 **data.**
 4 **Q** Okay. Could you look back on column 2, last
 5 paragraph in column 2. It starts with Microsoft.
 6 **A Okay.**
 7 **Q** Do you see that? And in the fourth line down,
 8 line 61 there's a reference to war drivers.
 9 **A Right.**
 10 **Q** Would you agree with me that the -- the inventors
 11 used the term random model to describe war driving?
 12 **A No. I don't think they equate them. They refer**
 13 **to war drivers here as amateur scanners who submit**
 14 **their WiFi scan data to public community web sites,**
 15 **and they don't talk here, at least not in a quick**
 16 **review of this, about how these amateurs collect the**
 17 **data, whether it's done in a random model or some**
 18 **other model. It's really in this definition about the**
 19 **collection and sharing with the community.**
 20 **Q** Okay. Did war driving include collecting data
 21 through nonrandom models?
 22 **MR. LU:** Objection to the extent it calls
 23 for speculation. Foundation.
 24 **A I think this description of war driving certainly**
 25 **leaves that open, and I think a lot of war drivers do**

Page 107

(12:03:50-12:05:00)

1 **use nonrandom models by this definition of random**
 2 **model.**
 3 **Q** So help me understand that. What's -- when you
 4 say this definition of random model, what exactly do
 5 you mean?
 6 **A The page -- you know, column whatever it was.**
 7 **Q** Column 7?
 8 **A Column 7.**
 9 **Q** Okay. And you think ran -- the war drivers used
 10 nonrandom models in contrast to the specific
 11 description of random model here. What model -- what
 12 models are they using?
 13 **MR. LU:** Objection. Calls for
 14 speculation.
 15 **A Well, you know, my main point was war drivers**
 16 **could use any number of models. Some use this**
 17 **so-called random model and some would go out and**
 18 **survey their neighborhood in some pattern. It could**
 19 **be anything.**
 20 **Q** You said war drivers would survey their
 21 neighborhoods using some --
 22 **A That would be an example.**
 23 **Q** -- pattern. By pattern you mean a driving route?
 24 They would follow a particular driving route?
 25 **A Yeah.**

Page 108

(12:05:01-12:06:42)

1 **Q** Do you mean something else?
 2 **A Yeah, that's what I meant.**
 3 **Q** Okay.
 4 **A And that was an example.**
 5 **Q** Uh-huh. And can you think of specific examples
 6 of war drivers doing that?
 7 **A No.**
 8 **Q** But it's your belief that the war drivers
 9 discussed in column 2, at least some of them, were
 10 doing that?
 11 **A Yes. I'm -- I'm confident that some of them did**
 12 **that. I don't know of any specific examples.**
 13 **Q** Okay. Would you agree with me that the inventors
 14 were trying to -- well, withdrawn.
 15 Would you agree with me that the inventors
 16 criticized the random model as a method of collection?
 17 **A Yes.**
 18 **Q** Okay. Was there a particular problem that the
 19 inventors described themselves as attempting to solve
 20 in the disclosure of the patent?
 21 **MR. LU:** Objection. Vague.
 22 **A Yeah. That's too broad. I'm sorry. What do you**
 23 **mean by in the disclosure of the patent --**
 24 **Q** Oh, well --
 25 **A -- problem to solve?**

Page 109

(12:06:45-12:07:42)

1 Q Problem to solve is not a term of art. When I
 2 say disclosure of the patent, I mean the
 3 specification --
 4 A Okay.
 5 Q -- not including the claims.
 6 A Okay.
 7 Q Patent lawyers can have a debate about whether
 8 the claims are part of the specification or separate.
 9 A Okay.
 10 Q But -- but when I'm -- when I'm talking about the
 11 specification I mean essentially everything before the
 12 claims --
 13 A Right. Right.
 14 Q -- and I'll use that as essentially synonymous
 15 with disclosure.
 16 A Right. Okay. Thank you.
 17 Q So with that clarification, I'll ask my question
 18 again.
 19 In the disclosure, in the specification are the
 20 inventors describing a particular problem or set of
 21 problems that they are trying to solve as described in
 22 the patent?
 23 MR. LU: Objection. Vague. Ambiguous.
 24 You're referring to the 988 only?
 25 MS. MANNING: Well, I'm referring to

Page 110

(12:07:43-12:08:53)

1 the -- I am referring to the specification of
 2 the 988 which is, as we've discussed, extremely
 3 similar to that of the 694 and 245 and
 4 incorporated by reference in the 897 so, yes.
 5 MR. LU: Just -- just -- I'm not trying to
 6 be difficult here. I want to figure out if
 7 there are different problems that are discussed
 8 in the 897, if you wanted him to answer that as
 9 well?
 10 MS. MANNING: I am asking the question
 11 with reference to the 988.
 12 THE WITNESS: I was wondering that too
 13 but --
 14 MS. MANNING: Thank you both.
 15 A So in general the problem they're trying to solve
 16 is building a system that allows one to determine the
 17 location of mobile devices using WiFi location
 18 positioning methods.
 19 Q And as they discuss, you know, systems for
 20 determining the location of -- of mobile devices,
 21 those were -- those were known in the art?
 22 A Right.
 23 Q Those aren't new, right?
 24 A Correct. So more specifically what they were
 25 trying to do was develop systems that could do that

Page 111

(12:08:58-12:11:50)

1 more accurately by, for example, driving all of the
 2 streets to collect more observations of the access
 3 points and avoid therein arterial bias and obtain
 4 better both reference symmetry and other features.
 5 Q Are those -- you just mentioned three things if I
 6 heard you correctly, that they were trying to drive
 7 all of the streets to collect more access points, that
 8 they were trying to avoid arterial bias, and they were
 9 trying to create reference symmetry. And we can have
 10 a discussion about what all those terms mean, but
 11 we'll get to that. The -- are those three different
 12 problems that they're trying to address?
 13 A Well, they're all related.
 14 Q They're all related problems?
 15 A Yeah.
 16 Q Okay. How are they related?
 17 A Well, one of the reasons to drive all the streets
 18 is to -- I think I put it this way in fact, is to
 19 reduce arterial bias, and one of the other benefits of
 20 doing that is you increase reference symmetry.
 21 Q The -- how did the inventors' criticisms of the
 22 random model in the specification inform the opinions
 23 you expressed in your declaration?
 24 A Let's see. So their criticism of the random
 25 model primarily is about the fact that the vehicles

Page 112

(12:11:56-12:13:24)

1 you've chosen to collect the data are not making any
 2 systematic attempt to collect the data and so they
 3 tend to travel on arteries and they tend to -- they
 4 will be unlikely to cover very many streets or
 5 certainly not all of the streets, and so that helped
 6 me to understand what they meant by arterial bias. In
 7 fact, that's where they seem to introduce the term
 8 arterial bias, at least they put it in quotes. And I
 9 don't know if it -- if -- if this is -- you know, has
 10 a strong relationship to some of the other parts of
 11 the opinion such as reference symmetry but, again,
 12 they're related concepts.
 13 Q Just so I'm clear, what exactly are the related
 14 concepts?
 15 A Arterial bias and reference symmetry. So, you
 16 know, we've just gone through how all these things are
 17 related, and then you asked me how the random model
 18 affected my formation of my opinion, and I explained
 19 how reading about their criticisms of the random model
 20 helped me to understand what they meant by arterial
 21 bias, and I'm not as clear about how well that helped
 22 me understand reference symmetry but, again, they're
 23 related concepts so understanding one helps one
 24 understand the other.
 25 Q The -- one of the things you said is that the --

Page 113

(12:13:30-12:14:50)

1 your view that the random model wasn't likely to cover
 2 all of the streets. Can you tell me what exactly
 3 that's based on?
 4 **A Well, the random model, as they've defined it, is**
 5 **to put -- put a scanning device in, you know, everyday**
 6 **vehicles, taxis or personal cars, delivery vans, etc.,**
 7 **and then let them collect data as they go around doing**
 8 **their normal business. And I think it's pretty clear**
 9 **that even though a taxi or delivery van might visit a**
 10 **lot of parts of the city, they're not going to visit**
 11 **every street, at least not in any finite period of**
 12 **time.**
 13 **Q** You agree with me, we're not talking about one
 14 vehicle, right? It's many vehicles?
 15 **A Correct.**
 16 **Q** Okay. Why wouldn't -- you know, if you outfitted
 17 every taxi in New York with a scanning -- with a
 18 scanner, why couldn't you get a comprehensive map of
 19 Manhattan in that way?
 20 **A You could get a lot, and people have done this,**
 21 **actually in San Francisco, but -- and I've seen the**
 22 **maps and they don't cover every street because there**
 23 **are some streets that just taxis don't happen to**
 24 **visit. They're -- they're small residential streets,**
 25 **and if they didn't have any customers there during the**

Page 114

(12:14:52-12:57:58)

1 **period of scanning, then you don't get any data.**
 2 **Q** Do you have any understanding what the scan
 3 period was for the examples you're talking about?
 4 **A I don't remember.**
 5 **MS. MANNING:** You have to change the tape.
 6 **VIDEOGRAPHER:** The time is now 12:19 and
 7 we're going off the record.
 8 (Recess taken)
 9 **VIDEOGRAPHER:** The time is now 1:01 and
 10 we're on the record.
 11 **BY MS. MANNING:**
 12 **Q** Dr. Kotz, we were discussing -- before the break
 13 we were talking a little bit about the random method
 14 of data collection as it's discussed in the patent.
 15 If -- and you gave an example of how you didn't think
 16 that in the examples you were familiar with random
 17 methods or war driving had resulted in a comprehensive
 18 scan of a -- of a city, I think San Francisco was the
 19 example you gave. Is there any reason why you
 20 couldn't achieve a complete scan of a target area?
 21 And by complete scan of a target area, I mean scan all
 22 of the access points in the target area using the
 23 random method if you had, you know, enough vehicles
 24 and enough time.
 25 **MR. LU:** Objection. Vague. Ambiguous.

Page 115

(12:58:00-12:59:25)

1 Also to the extent that it calls for a legal
 2 conclusion as to target areas a disputed claim
 3 term. Do you want to rephrase that?
 4 **MS. MANNING:** Yeah. Fair enough.
 5 **BY MS. MANNING:**
 6 **Q** Let me just clarify. In my question I'm not
 7 using target area in the sense of the claims. Let's
 8 just say a city. Make it a little easier. So is
 9 there any reason why using the random method you could
 10 scan every access point in the city if you had enough
 11 cars with scan -- set up with scanning equipment and
 12 enough time?
 13 **A Yes.**
 14 **Q** Why?
 15 **A I think there is a reason. There are -- there**
 16 **are a couple of components to that. First of all, you**
 17 **would want to cover every street, and so set aside for**
 18 **the minute scanning every access point. If your goal**
 19 **was to cover every street with one of the vehicles at**
 20 **some time, if you had a lot of vehicles and you had a**
 21 **lot of time, eventually one thinks every street would**
 22 **be driven by some one of your vehicles, but you might**
 23 **require a very large number of vehicles or a very long**
 24 **amount of time before every street was visited by one**
 25 **of your vehicles. Now if -- since your question was**

Page 116

(12:59:29-13:01:13)

1 **about scanning every access point, that implies that**
 2 **every access point is visible in the WiFi sense from**
 3 **some street, and I would think in some places, very**
 4 **dense -- densely constructed areas or very large**
 5 **blocks there would be some access points that simply**
 6 **can't be heard. And then finally there are some**
 7 **access points that don't transmit beacons because**
 8 **they've been configured that way so they can't be**
 9 **discovered, so I think that's why I answered initially**
 10 **yes there is a reason why one cannot scan all access**
 11 **points.**
 12 **Q** And let me make sure I understood your -- your --
 13 your reasons. Is it -- is it primarily because not
 14 every access point is visible?
 15 **A Primarily, yes.**
 16 **Q** If we leave aside the access points that don't
 17 broadcast, as you just mentioned, is there reason why
 18 given enough -- enough scanning vehicles and enough
 19 time you could record an access point location for
 20 every access point that does in fact broadcast?
 21 **A There are some access points you would**
 22 **nonetheless miss because as I -- the other reason I**
 23 **gave in prior -- previously was there would be some**
 24 **access points that can't be heard because their signal**
 25 **isn't strong enough to reach a street.**

Page 117

(13:01:24-13:02:43)

1 Q Isn't that a function of the strength of the
2 antenna of the scanning vehicle as well as the
3 strength of the -- of the signal as is actually
4 broadcast?

5 A Yes.

6 Q So if you had strong enough antenna on your
7 scanning vehicle, that presumably wouldn't be a
8 problem, correct?

9 A Well, I'm sure with a -- with a stronger antenna
10 you would get a better coverage, more access points
11 that you could hear, but I'm not sure it would not be
12 a problem. I can imagine some cities with
13 hundred-story buildings where some of the access
14 points might be very far away, high, or some areas
15 where there's a -- there aren't streets. I mean,
16 there's very low density of streets and there's large
17 areas in between the streets and so they might be far
18 away horizontally and so a strong antenna would help,
19 but it may not get everything.

20 Q Okay. Are we -- in your view, is there a reason
21 to think that that was a significant number of WiFi
22 access points?

23 MR. LU: Objection. Vague and ambiguous.

24 A So I agree. That -- what's that?

25 Q If -- if you had a strong directional antenna on

Page 118

(13:02:49-13:04:14)

1 your scanning vehicle, I realize strong is not
2 terribly specific, but let's assume --

3 A Right.

4 Q -- a strong antenna on the scanning vehicle, do
5 you have a sense of how many access points you would
6 expect would nevertheless not be scannable?

7 MR. LU: Objection. Foundation. Vague
8 and ambiguous.

9 A I don't have a strong sense of what fraction of
10 access points would not be scannable, and it would
11 depend a lot on the nature of the access points, their
12 antennas, and their placement and the environment and
13 the scanning antenna. So I don't know.

14 Q Okay. And it sounds like we've spotted an issue
15 here. There is a -- a scenario under which it is
16 possible to miss access points?

17 A Sure.

18 Q Even though they exist and they're broadcasting
19 in the clear. And do you have -- do you have any, you
20 know, factual information that would allow you to --
21 to make an assessment about a percentage of access
22 points in a given city that would fall into that
23 category? Any -- any facts to base it on other than
24 recognizing it's a potential issue, but any facts by
25 which to judge the severity of the issue?

Page 119

(13:04:17-13:06:40)

1 A Certainly not at hand. I mean, earlier we were
2 talking about my paper, Exhibit 1006, and in that
3 paper there were several of our own access points that
4 we knew existed and we knew were broadcasting that we
5 didn't discover through war driving in our -- using
6 our methods. And so that gives me confidence that --
7 that it is easy to miss some of the access points.

8 Q And was that a -- that failure to detect all
9 those access points, was that attributable in some
10 significant measure to the strength of the -- of the
11 antenna on your scanning device?

12 A I don't know. I mean, I'm sure that was a
13 factor.

14 Q My recollection -- according to the third page of
15 Exhibit 1006 it says, we used a Linux laptop and a
16 Cisco Aironet, A-I-R-O-N-E-T, Aironet 350 wireless
17 card which supports 802.11B. So you're using a card
18 in -- a wireless card in a laptop?

19 A Uh-huh.

20 Q Not a -- not a strong antenna?

21 A No, nothing special.

22 Q Right. And Figure 2 of the 988 patent shows
23 directional antennas on the scanning vehicle, right?

24 A That's what it shows.

25 Q Okay. And directional antenna being a much, much

Page 120

(13:06:44-13:07:51)

1 stronger antenna than what's in a laptop?

2 MR. LU: Objection. Foundation. Vague
3 and ambiguous.

4 BY MS. MANNING:

5 Q Is that your understanding, sir, or do you have a
6 different understanding?

7 A It's different. That term normally means
8 something different than stronger. Directional means
9 that it is aimed in a particular direction and it
10 receives signals coming from that direction.

11 Q Right. And it -- and it is able to receive
12 signals from much further away in the -- in the
13 direction that it's pointed than something like a card
14 on the laptop you were using in your study?

15 MR. LU: Objection. Foundation. Vague
16 and ambiguous.

17 A Generally speaking, directional antennas are
18 designed for that purpose but not necessarily, but
19 that -- they're generally designed for that. The word
20 directional is more about the fact that they're --
21 they're focused in a direction as opposed to omni
22 directional which is what you would see in a laptop.

23 Q Right. And that affects the ability to -- to
24 receive weaker signals from -- from further --
25 withdrawn.

Page 121

(13:07:52-13:09:32)

1 And that affects the ability to receive weaker
2 signals, correct?

3 **MR. LU:** Objection. Foundation. Vague
4 and ambiguous.

5 **A One would use a directional antenna in order --**
6 **one would use a specialized antenna for scanning**
7 **purposes so that you can receive weaker signals or**
8 **signals from farther away, and one approach would be**
9 **to use a directional antenna. And you would usually**
10 **choose a directional antenna that is designed with**
11 **that extra gain, meaning the ability to receive weak**
12 **signals. The other reason to use directional antennas**
13 **is so you can have multiple antennas listening in**
14 **different directions. The other reason is that**
15 **because they are directional, you know that this**
16 **signal came from that side of the street versus that**
17 **side of the street. So there are a lot of reasons why**
18 **one might use directional antennas, that's why it's**
19 **difficult to answer your question concisely.**

20 Q Okay. Well, I appreciate your clarifying.
21 Sir, can you take a look at Figure 11 in the 988
22 patent please. Are you familiar with this figure?
23 **A Yes. I've seen it before.**
24 Q Just generally, what's your understanding of what
25 it shows?

Page 122

(13:09:33-13:11:11)

1 **A Well, it's comparing the random scanning model**
2 **with the Chinese postman scanning model.**

3 Q And the -- it's divided in half and the X's we
4 see are locations where the readings were taken around
5 the access point, is that your understanding?
6 **A That's my understanding.**

7 Q In the random scanning model does it show taking
8 multiple readings of the WiFi access point at
9 different locations around the access point?
10 **A No.**

11 Q What does it show?
12 **A It shows -- it shows the locations of multiple**
13 **lo -- multiple readings of that access point location**
14 **and the calculation -- calculated estimated location**
15 **of that access point, but all of the readings are on**
16 **one side of the access point.**

17 Q Well, there -- I -- I -- I will certainly agree
18 with you that they are all on -- perspective here is
19 on the left side of the access point, but it's
20 certainly taking readings from multiple locations?
21 **A Yes.**

22 Q Okay. And those locations, I don't have a
23 protractor with me but, you know, probably something
24 on the order of, you know, 140 or so degrees? I don't
25 mean to be precise with that but --

Page 123

(13:11:13-13:12:40)

1 **A Right.**

2 Q -- a big arc --

3 **A Yes.**

4 Q -- around it? Why isn't that taking readings
5 from multiple readings from locations around the
6 access point?
7 **A Well, I guess an intuitive understanding of**
8 **around, at least in my mind, would include readings**
9 **that were from not just the left side but the right**
10 **side. What we have here is from -- some from the top**
11 **side and some from the bottom side, again, using this**
12 **perspective but only from the left side and not from**
13 **the right side, and so it doesn't -- by contrast to**
14 **the right side of the figure, the Chinese postman**
15 **scanning model where you see X's all around the access**
16 **point and many locations above and below, left and**
17 **right. So I think it's more in contrast that one sees**
18 **the lack of the -- the lack of the locations being**
19 **around the access point.**

20 Q Okay. So it sounds like you think the Chinese
21 postman scanning model clearly shows taking multiple
22 readings from around the access point?
23 **A That figure does, yes.**

24 Q Yes. Okay. And if you had even one reading from
25 the right side of the access point in the random

Page 124

(13:12:42-13:14:33)

1 scanning model, would that be taking multiple readings
2 from around the access point in your view?
3 **A That's -- that's hard. It's -- I think it would**
4 **be difficult to clearly define what would be**
5 **sufficient to -- to say that it is collected around**
6 **the access point. I'm not sure how precise one needs**
7 **to be given the nature of the material in this packet,**
8 **but one is not -- I mean, it would be nice to see a**
9 **few more than one on the other side.**

10 Q Well --

11 **A So -- so -- but I see what you're doing. You're**
12 **trying to look for a line. At what point does it**
13 **become around?**

14 Q Yeah.

15 **A I don't know.**

16 Q Okay. Let me ask you a question about Figure 3.
17 And I trust you're familiar with this figure?
18 **A Yes.**

19 Q And, generally speaking, what's your
20 understanding of what it shows?
21 **A This is a scenario showing arterial bias.**

22 Q And it is so -- so entitled. The path of the
23 scan -- scan vehicle is what we show in the heavy
24 black line with arrows, right?
25 **A Right.**

Page 125

(13:14:34-13:15:58)

1 Q Okay. And the figure shows calculated locations
2 of access points, and in most cases those are actually
3 on top of the path of the scan vehicle, right?
4 **A Right.**
5 Q I am interested in one of the access points in
6 the middle box, and there is an access point that is
7 sort of nearer the bottom left-hand corner there, and
8 there is a calculated access point that is right on
9 the bottom left-hand corner. Do you see that?
10 **A Yes.**
11 Q Would you agree that -- that those correspond,
12 the -- the calculated access point is the calculated
13 access point for that nearest access point?
14 **A Not necessarily. It's likely, but there's**
15 **nothing in the figure that helps us know that for**
16 **sure.**
17 Q Okay. But you'd agree that's the most likely
18 reading of this?
19 **A Yes.**
20 Q Okay. The access point itself, not the
21 location -- calculated location, but the access point
22 itself, has that been scanned from multiple sides
23 around the WiFi access point?
24 **A This figure doesn't show the locations of the**
25 **scans, but it shows the path where the scans were**

Page 126

(13:16:03-13:17:35)

1 **taken, and if one assumes that a lot of the scans were**
2 **taken along that path, then -- well, it's somewhat**
3 **around. I mean, aroundness, if you will, is maybe a**
4 **matter of degree but, you know, if -- all the scans**
5 **are going to be on the left or lower side of that**
6 **access point, not on the right or upper side of that**
7 **access point.**
8 Q It's -- again, perhaps we would benefit from a
9 protractor that we don't have here.
10 **A Yeah.**
11 Q But it's, you know, going to be significantly
12 more than 180 degrees --
13 **A True.**
14 Q -- around it, wouldn't you agree?
15 **A True.**
16 Q And the calculated location for that access
17 point, the one that we think is most likely for that
18 access point, that's the only calculated location
19 shown in this figure that isn't actually on the scan
20 path, right?
21 **A Right.**
22 Q And would a person of ordinary skill in the art
23 understand that the reason it's not on the -- on the
24 scan path be because it has been scanned -- because
25 the access point has been scanned from multiple

Page 127

(13:17:38-13:19:06)

1 locations around the access point?
2 **A I think so. I mean, I think they -- if you**
3 **studied this carefully, you would recognize that**
4 **the -- the scans occurred in multiple locations that**
5 **were up this north-south Street 304 and this east-west**
6 **Street 305 and that they were on -- sufficiently on --**
7 **on sides -- on two sides of the access point so that**
8 **you could get that estimate.**
9 Q Okay.
10 **A But to say -- to go to say that -- you know, you**
11 **used precise language about multiple locations around**
12 **the access point and whether one understood it to be**
13 **around in this case, I'm not sure. I think there --**
14 **one could -- some might say that but most probably**
15 **would not, especially when you compare it with Figure**
16 **4 which more clearly shows scans that are around the**
17 **access points. And I think that's the kind of**
18 **contrast that the patent's about, and they're trying**
19 **to make that point.**
20 Q Well, I -- what I'm trying to understand is -- is
21 your opinion about what a -- a person of ordinary
22 skill in the art would understand from the teachings
23 of the -- of the specification. And if I'm -- if I'm
24 understanding you correctly, it might be a person of
25 ordinary skill in the art might be of two minds.

Page 128

(13:19:08-13:20:41)

1 **A Well, there are two people of ordinary skill**
2 **would be each of different minds, but I think -- I**
3 **mean, I think the -- the -- the figure has to be**
4 **examined in the context of the other figures, and the**
5 **patent specification is trying to teach by showing**
6 **this contrast, this is what it looks like when you**
7 **have arterial bias, meaning that because you're only**
8 **driving arteries, your estimated locations are skewed**
9 **towards the arteries because there aren't enough**
10 **observations around the access points; whereas, if you**
11 **have this other model derived, for example, from using**
12 **the Chinese postman routing algorithm, then you'll get**
13 **many more observations that are more around the access**
14 **point and you'll get better estimations.**
15 Q Figure 3, the access points that's in the bottom
16 left-hand corner of the middle -- middle box, would
17 you describe that as having more or less arterial bias
18 than the other access points that are right on the
19 scan path?
20 **A Less. It would have -- it has less arterial bias**
21 **than the ones that are on the scanning path.**
22 Q Okay. And so -- so the amount of -- the amount
23 of arterial bias can vary even in the -- the random
24 model, is that a --
25 **A True.**

Page 129

(13:20:41-13:22:39)

1 Q Okay. And in Figure 4, which is the next figure,
2 that's the one you were contrasting Figure 3 with,
3 this figure shows the calculated locations of the
4 access point and the actual access points. So like --
5 so like your study I suppose it has ground truth shown
6 in it, but the -- the access points and the calculated
7 locations of the access points are never exactly the
8 same, right?
9 **A Not in this figure, no.**
10 Q Okay. Does -- does Figure 4 show a situation
11 with arterial bias in the calculated locations?
12 **A Not -- I don't see any significant arterial bias,**
13 **no. It's not -- doesn't label the arteries by the**
14 **way.**
15 Q Oh, if I understand you correctly, you're
16 distinguishing main arteries from just any street?
17 **A Right.**
18 Q I think you used the word significant. You said
19 it didn't show any significant arterial bias. Does it
20 show any arterial bias I guess is my question?
21 **A No, I don't see any question.**
22 Q And that's true even though none of the access
23 points are exactly --
24 **A Correct.**
25 Q -- the same as the calculated location. Okay.

Page 130

(13:22:50-13:24:16)

1 What's your understanding, sir, of what the Chinese
2 postman model is?
3 **A I actually was not familiar with that algorithm**
4 **before reading this patent. I understand it's a**
5 **variation of the Eulerian tour problem and it's an**
6 **algorithm that -- that maps out a route that covers**
7 **every segment in a graph, in this case the graph being**
8 **a city map, with the goal of visiting every -- every**
9 **street segment.**
10 Q And have you ever read the article actually
11 referenced, I believe it's Kwan article, actually
12 referenced in the patent at column 8, line 40 -- I'm
13 sorry, 39? Graphic programming using odd or even
14 points in Chinese map?
15 **A No.**
16 Q You've never -- never read it?
17 **A No. That was before I was born.**
18 Q Before most of us were born.
19 **A Yes.**
20 Q The -- withdrawn.
21 Do you have any understanding of what Chinese
22 postman is other than just what the patents themselves
23 say on this?
24 **A No.**
25 Q Would you agree with me that the goal of the

Page 131

(13:24:19-13:26:41)

1 Chinese postman routing model is to cover every street
2 and minimize the number of streets that are visited
3 twice?
4 **A That's my understanding, yes.**
5 Q Do the patents teach any way of achieving
6 reference symmetry other than by using Chinese postman
7 routing model?
8 **A Well, my recollection is that they -- they use**
9 **the Chinese postman routing algorithm as one example**
10 **of a -- or maybe the word is preferred embodiment, as**
11 **one way of achieving -- of achieving reference**
12 **symmetry by driving all the roads, but I think**
13 **there -- I think they leave open the possibility, it**
14 **certainly is a reasonable possibility, that one could**
15 **use other algorithms that cover all the roads.**
16 Q Do they give any examples of other approaches to
17 achieving reference symmetry?
18 **A I don't recall them giving other specific**
19 **examples, but I do recall them using -- I'm looking**
20 **for it, but I do recall them using language to the**
21 **effect that this would be one approach, the Chinese**
22 **postman algorithm.**
23 Q Are you relying on column 8, line 28 or so?
24 **A That's where I'm looking. So at line 41, for**
25 **example, it says preferred embodiment -- embodiments**

Page 132

(13:26:44-13:27:40)

1 **of the invention include a methodology for identifying**
2 **a target region for coverage and then using the**
3 **Chinese postman routing algorithm for planning the**
4 **vehicle route. So I take that to mean that they after**
5 **having introduced the Chinese postman algorithm say**
6 **this is one way you could do it, but you could also do**
7 **it other ways.**
8 Q Okay. But if I understood your testimony a
9 moment ago, you don't -- you would agree, they don't
10 actually reference any other ways of doing it?
11 **A Not that I recall, but I also understand they**
12 **don't need to.**
13 Q Well, that's a -- is that -- that's a legal --
14 **A That would be a legal thing.**
15 Q -- understanding?
16 **A And I'm -- you know, but then I'm -- you know,**
17 **I'm not a lawyer, I don't know for sure, but that's my**
18 **understanding.**
19 Q Leaving Mr. Lu and I to debate the legal
20 requirement --
21 **A Yes.**
22 Q -- you agree, there is no -- there's nothing else
23 besides Chinese postman taught in terms of a way to
24 traverse every street in the target area, correct?
25 **MR. LU: Objection. In terms of -- oh, of**

Page 133

(13:27:44-13:29:56)

1 a way. Objection, vague and ambiguous.
2 Mischaracterizes the witness's testimony.
3 **A As I said, I don't recall there being another**
4 **example. There may be one I'm not recalling.**
5 Q In order to meet the requirements of Claim 1 of
6 the 988 patent -- just take that as an example so you
7 have a concrete example to work with. In order to
8 meet the requirements of the claim about recording
9 multiple readings of the WiFi access point at
10 different locations around the WiFi access point so
11 that the multiple readings have reference symmetry
12 relative to other WiFi access points in the target
13 area and so that the calculation of the position of
14 the WiFi access point avoids arterial bias in the
15 calculated position information.
16 **A Right.**
17 Q Got it?
18 **A That's lines 23 or so down to 30.**
19 Q Right. Is there any way to -- to meet those
20 requirements other than driving a route through the
21 target area that covers every street in the target
22 area?
23 **A I don't think one has to cover every street to**
24 **meet those requirements. You have to record multiple**
25 **readings. You have to record them at different**

Page 134

(13:29:58-13:31:26)

1 **locations. Those readings have to have reference**
2 **symmetry relative to other access points in the area,**
3 **which would mean you'd want to have a large number of**
4 **the streets driven so that you'd have a lot of, you**
5 **know, distrib -- good distribution of readings, and**
6 **you want to avoid arterial bias in the calculations,**
7 **which would mean that you would want to avoid**
8 **collecting all your data on a few arteries. So you**
9 **would want to collect data from many streets, but I**
10 **don't think you would have to -- according to this**
11 **claim language and my opinion, you wouldn't have to**
12 **collect it on every street.**
13 Q Okay. How could you achieve reference symmetry
14 if you didn't collect data from every street?
15 **A Well, we haven't talked about what reference**
16 **symmetry is yet.**
17 Q There is a debate about what that is, I realize
18 that.
19 **A And I have, you know, expressed some opinions**
20 **about that. In order to get reference symmetry you**
21 **need to have a good distribution of readings around**
22 **the -- the access -- around the relevant access points**
23 **or at places where you're trying to localize the**
24 **users, and I think one could do that if you didn't**
25 **cover every street, but if you were missing any**

Page 135

(13:31:28-13:33:17)

1 **significant streets or, you know, if there were some**
2 **regions that weren't well covered because you were**
3 **skipping a street or two, then you probably wouldn't**
4 **have sufficient reference symmetry in that region.**
5 Q Okay. Do the patents teach that you have to plan
6 the route by which you drive the target area?
7 **A Any of the four patents or are you thinking --**
8 **asking about a specific one?**
9 Q Well, let's start with the 988.
10 **MR. LU:** Just to clarify, you're simply
11 talking about the disclosure or what the claims
12 require?
13 **MS. MANNING:** I asked about the teachings
14 and so I meant to ask about the disclosure.
15 **A Oh, okay. Well, I was focusing on the claims at**
16 **the moment.**
17 Q We can come back to that.
18 **A Yeah. Right. I don't see any requirement in the**
19 **claims that cover that you plan your routes. The**
20 **disclosure, that is the specification, you know, uses**
21 **the Chinese postman algorithm as an example of how one**
22 **would plan a route that would cover all the streets**
23 **and that would not -- and it would do so efficiently**
24 **and criticizes the random model, which means -- which**
25 **is sort of the opposite of planning, completely**

Page 136

(13:33:19-13:34:32)

1 **unplanned data collection, but I can't recall if**
2 **they -- if the specifications specifically requires a**
3 **plan.**
4 Q Well, the -- the same line that we were looking
5 at earlier, column 8, line 28?
6 **A Yeah.**
7 Q Another approach is devel -- is develop a --
8 routing algorithms that include every single street in
9 the target area so as to avoid arterial bias in the
10 resulting collection of data, thus, producing a more
11 reliable positioning system for end users?
12 **A Sure.**
13 Q You'd agree with me that is talking -- that is
14 teaching that one is to plan the route through the
15 target area, correct?
16 **A Right.**
17 Q Okay. And then immediately thereafter it -- it
18 discusses the Chinese postman as an optimized routing
19 algorithm?
20 **A Right.**
21 Q And, again, Chinese postman is described as
22 covering every single street in the target area?
23 **A That's the goal of that classic problem, yes.**
24 Q It's not just the goal of Chinese postman, it is
25 the goal the inventors describe as -- it is the goal

Page 137

(13:34:38-13:46:29)

1 of -- you were to achieve through planning your route?

2 **A Yes.**

3 **Q** The line before that. The goal is to drive every

4 street?

5 **A Yes.**

6 **MR. LU:** Now would be a good time for a

7 short break?

8 **MS. MANNING:** I was just going to say,

9 sure.

10 **VIDEOGRAPHER:** The time is now 1:39 and

11 we're going off the record.

12 (Recess taken)

13 **VIDEOGRAPHER:** The time is now 1:49 and

14 we're on the record.

15 **BY MS. MANNING:**

16 **Q** Okay. Let's take a look at the prosecution

17 history of the 988 patent. And we will mark this as

18 Google Exhibit 1009. The Bates numbers are

19 GSHFED_0000154 through 273.

20 Dr. Kotz, I think you've told me that you have

21 not seen -- you may have in your possession somewhere

22 on a hard drive, but you have not actually looked at

23 the prosecution history, right?

24 **A Right. I have not looked at all of it.**

25 **Q** Okay. If you turn to the page Bates numbered

Page 138

(13:46:35-13:48:47)

1 183. That page is page 3 of an amendment to the

2 claims that was made during prosecution, and on the

3 page that I've directed you to, GSHFED_183, you'll see

4 a listing of the claims, and it shows how they have

5 been modified through amendment?

6 **A Uh-huh. Yes.**

7 **Q** I believe this is quoted in our claim

8 construction brief. So is this familiar to you? Have

9 you seen this before?

10 **A Yeah, it does look familiar. I've seen it.**

11 **Q** Okay. So this is the part you've seen?

12 **A Yes.**

13 **Q** Good. I wanted to discuss with you the

14 modifications we see here in the claim language, and

15 I'm hoping we can catalog together the differences

16 between the claims as they were filed and as they

17 actually issued. And would you agree with me that

18 after the underlying language is inserted, it is

19 the -- there is a new requirement that the multiple

20 readings are recorded at different locations around

21 the WiFi access point that wasn't there prior to the

22 amendment?

23 **A Well, the new language at the very least makes it**

24 **more explicit. Before it was that the multiple**

25 **readings are there to provide reference symmetry, and**

Page 139

(13:48:52-13:50:13)

1 **now they're saying that they are collected at**

2 **different locations so that you get reference**

3 **symmetry. I think that makes it more explicit that**

4 **you need different locations. So, yes, it is -- the**

5 **short answer was yes.**

6 **Q** Okay. And I think you just paraphrased the

7 language a moment ago. As a -- as amended, not as

8 filed, but as amended Claim 1 requires that the

9 multiple readings have reference symmetry relative to

10 other WiFi access points in the target area, right?

11 **A Right.**

12 **Q** Okay. So it's -- it's the -- it's the multiple

13 readings that have reference symmetry, whatever that

14 is, and we can talk about what that is, but whatever

15 it is, it is something that the multiple readings

16 have, would you agree with that?

17 **A Right.**

18 **Q** And this requirement that the multiple readings

19 have reference symmetry relative to other WiFi access

20 points in the target area, that's new too, right?

21 **A Right. And, again, it's clarifying. It's making**

22 **it more explicit what the reference symmetry means in**

23 **this context.**

24 **Q** When you say that it's clarifying, that -- am I

25 to understand that -- that you think that the -- that

Page 140

(13:50:18-13:51:29)

1 the change is actually just a clarification of

2 something that was already required before?

3 **A I think so, yes, because before in the earlier**

4 **version it said readings of the WiFi access point to**

5 **provide reference symmetry and now it's saying**

6 **reference symmetry relative to other WiFi access**

7 **points, so I think it's -- that helps to -- to me**

8 **anyway, that helps me understand what reference**

9 **symmetry is about in this context.**

10 **Q** Okay. But is it -- is it a substantive change in

11 the scope of the claim or is it clarification of

12 something that was already there?

13 **MR. LU:** Objection to the extent it calls

14 for a legal conclusion.

15 **A Yeah. I mean, I can't comment in the legal**

16 **context, but from my reading as an expert, I think**

17 **it's a clarification because the reference symmetry is**

18 **a word that is defined in the context of this patent**

19 **and it helps one who's reading this to understand what**

20 **reference symmetry means in the context of this claim.**

21 **Because reference symmetry in these patents has two**

22 **meanings. It -- it occurs in two different contexts,**

23 **right. One is reference symmetry in the context of**

24 **location determination of a mobile client and the**

25 **other one is, in this case, reference symmetry**

Page 141

(13:51:33-13:53:25)

1 **relative to other WiFi access points. So this helps**
 2 **disambiguate that.**
 3 Q You said that of the two -- in your view there
 4 are two contexts, one of which is reference symmetry
 5 in the context of a mobile client?
 6 A **Well, yeah.**
 7 Q What do you mean by that?
 8 A **If you look back at my declaration, we talk about**
 9 **these two different cases.**
 10 Q And is it your view that claim -- Claim 1 of the
 11 988 sort of specifies one of those two cases? You
 12 think there are two kinds of reference symmetry
 13 discussed in the -- in the patents?
 14 A **There are two.**
 15 Q And is it your testimony that -- that Claim 1
 16 pertains only to one of those two kinds, specifically
 17 to reference symmetry relative to other access points
 18 in the target area?
 19 A **Yeah, I think so. I mean, the -- the other -- I**
 20 **mean, the other use of the -- of that term shows up in**
 21 **a different -- different part of the claim language**
 22 **and perhaps in one of the other patents and this is**
 23 **one that's about reference symmetry relative to WiFi**
 24 **access points and that one was reference symmetry**
 25 **relative -- I forget the exact wording.**

Page 142

(13:53:35-13:55:31)

1 Q Here's the 694 patent. Let's mark it. Let's
 2 mark the 694 patent.
 3 A **Is it in there?**
 4 Q I trust that's what you're referring to in the --
 5 in the 694 patent.
 6 A **I think so.**
 7 Q Is the other patent that has an express reference
 8 symmetry limitation?
 9 A **Yeah. I'm just looking in here for where we had**
 10 **the two different -- anyway. It's not in there.**
 11 Q Here. I'll hand you the marked copy so that we
 12 can use that. You're welcome to look at your own, but
 13 let's mark as Exhibit 1010 copy of U.S. Patent Number
 14 7433694, which is Bates number GSHFED_0000041 through
 15 60.
 16 Now you looked up something. Is it -- do you
 17 want to clarify your previous answer based on what
 18 you've been reviewing or continue your answer I should
 19 ask?
 20 A **I admit I'm a little lost in my own answer but --**
 21 Q If you want, I can ask a new question.
 22 A **Well, you know, I was recalling that, you know,**
 23 **in my opinion, we had been discussing the terms**
 24 **reference symmetry and there were two different -- two**
 25 **constructions that Skyhook is proposing relative to**

Page 143

(13:55:35-13:57:25)

1 **that term. One of them is with respect to certain**
 2 **language in the 694 patent and one of them is with**
 3 **respect to language in the 988 patent, this particular**
 4 **section that we were just discussing. And that's what**
 5 **I was thinking of when I said there are two different**
 6 **contexts in which that term is used, reference**
 7 **symmetry. And so in this -- when I was coming back to**
 8 **this particular language, I felt that this addition of**
 9 **this phrase relative to other WiFi access points, you**
 10 **know, to me was -- was helping to clarify which of**
 11 **those contexts we were talking about.**
 12 Q Okay.
 13 A **Sorry that was a bit muddled. I'll try to be**
 14 **clear.**
 15 Q Looking at the prosecution history we received,
 16 the -- the as filed and as amended versions of Claim
 17 1, do you have a view on whether the claims as amended
 18 are narrower or broader than the claims as they were
 19 filed?
 20 **MR. LU:** Objection to the extent it calls
 21 for a legal conclusion.
 22 **BY MS. MANNING:**
 23 Q I should say or are they the same?
 24 A **Yeah, I don't -- I mean, again, from a nonlegal**
 25 **perspective, just from reading this as a person of**

Page 144

(13:57:29-13:59:48)

1 **ordinary skill in the art, my impression is that**
 2 **they're the same and that they are clarifying rather**
 3 **than narrowing.**
 4 Q If we look at the prosecution history of the 694.
 5 You can put that large document away for now. We may
 6 come back to it, but let's look at a different one for
 7 a moment. I'm going to mark as Google Exhibit 1011
 8 the prosecution history of the 694 patent, which is
 9 Bates numbered GSHFED_0000274 through 372. And,
 10 again, I understand from your earlier testimony that
 11 you have not reviewed this document.
 12 A **Not in whole, no.**
 13 Q But if you would turn to the page Bates number
 14 ending 297. You will see something similar to what we
 15 were just looking at. You will see an amendment to
 16 the claims of the 694 patent. And I believe this was
 17 also quoted in our opening papers which you have read.
 18 A **Right.**
 19 Q Is this familiar to you?
 20 A **Yes, it looks familiar.**
 21 Q And in 694 we again see certain amendments to the
 22 same limitations that discuss the taking -- taking of
 23 readings, arterial bias and reference symmetry. I'm
 24 obviously paraphrasing. And in the 694 we see that
 25 the applicants inserted the language at different

Page 145

(13:59:53-14:01:20)

1 locations around the WiFi access point and that refers
 2 to recording multiple readings?
 3 **A Right.**
 4 Q And then they go on in new language, so that the
 5 multiple readings, then there's special deleted
 6 language, avoid arterial bias?
 7 **A Right.**
 8 Q So -- so you'd agree with me that at least one of
 9 the things that's new in this is that -- that the
 10 multiple readings have to be taken from different
 11 locations around the WiFi access point, that's a new
 12 requirement, right, or is that a clarification of
 13 something that was already there?
 14 **A Well, again, you know, they -- they took out the**
 15 **part -- the phrase about to provide reference symmetry**
 16 **and, you know, I think the language at different**
 17 **locations around the WiFi access point is a**
 18 **clarification of that. I mean, that would be the**
 19 **impact of reference symmetry or, I mean, that would be**
 20 **one way you get reference symmetry, so this is more**
 21 **clear than that previous language.**
 22 Q The other addition you've -- you've noted they
 23 eliminated some -- some language about to provide
 24 reference symmetry when calculating the position of
 25 the WiFi access point and to -- and instead they have

Page 146

(14:01:26-14:03:21)

1 inserted new language down to the bottom where it
 2 talks about the database records for substantially all
 3 WiFi access points in the target area provide
 4 reference symmetry within the target area?
 5 **A Right.**
 6 Q Same question, is that a substantive change in
 7 the scope of the claim as you understand it or is it
 8 clarification of requirements that were already there?
 9 **A I think it's a clarification. I mean, they've**
 10 **got the -- they're essentially rewording the reference**
 11 **symmetry aspect of the claim in this bottom phrase.**
 12 Q So is it -- is it your understanding that the --
 13 the scope of the -- of Claim 1 of the 694 patent as
 14 filed is substantively the same as the scope of it as
 15 it actually issued?
 16 **A Yeah.**
 17 Q You can also put away that large document.
 18 **A You guys use a lot of paper.**
 19 Q Again, so stipulated.
 20 **A Excuse me.**
 21 **MR. LU:** Is that noise being picked up?
 22 **THE WITNESS:** I wondered.
 23 **BY MS. MANNING:**
 24 Q Let's look at figure --
 25 **MR. LU:** Let me go -- let's take a quick

Page 147

(14:03:23-14:09:24)

1 break. I'm going to check to see if the door
 2 is open in the laundry room. It was earlier
 3 and I asked --
 4 **MS. MANNING:** Sure.
 5 **VIDEOGRAPHER:** The time is now 2:07 and
 6 we're going off the record.
 7 (Recess taken)
 8 **VIDEOGRAPHER:** The time is now 2:12 and
 9 we're on the record.
 10 **BY MS. MANNING:**
 11 Q Dr. Kotz, would you take a look at the 988
 12 patent, Figure 5 please. Okay. What does this figure
 13 show us in your understanding?
 14 **A This figure is an example of the lack of**
 15 **reference symmetry with respect to user -- labeled**
 16 **user 501.**
 17 Q And the figure shows radio range of the user
 18 device. Does it matter that most of the calculated
 19 locations -- does it matter in terms of judging
 20 whether there's reference symmetry or lack of
 21 reference symmetry that most of the access points are
 22 out of range of the user device?
 23 **A No, not to that user.**
 24 Q If we had -- withdrawn.
 25 This figure -- unlike Figures 3 and 4 that talked

Page 148

(14:09:29-14:11:30)

1 about arterial bias, this figure doesn't show us where
 2 the actual location of any of the access points are,
 3 right?
 4 **A Right.**
 5 Q Does this figure still show us a lack of
 6 reference symmetry even if the calculated locations
 7 are dead on over the top of where the access points
 8 actually are?
 9 **MR. LU:** Objection. Vague and ambiguous.
 10 Foundation.
 11 **A Well, so if these estimated locations as drawn in**
 12 **the figure were the actual locations of access points**
 13 **and these are the set that are available for use in**
 14 **localizing the user, it would still show lack of**
 15 **reference symmetry.**
 16 Q We were talking a little bit before we changed
 17 the tape about different kinds of reference symmetry
 18 that you see in the -- the two different database
 19 claims, the 988 and the 694, and is this the -- the
 20 reference symmetry that we see here and also in Figure
 21 6, which also has the user, is that the kind of
 22 reference symmetry in the 694 patent -- the claims of
 23 the 694 patent I should say?
 24 **A Well, I need to go look at that. So in the 694**
 25 **it says, and wherein the database records for**

Page 149

(14:11:35-14:13:16)

1 **substantially all WiFi access points in the target**
 2 **area provide reference symmetry within the target**
 3 **area. And this one -- this -- these examples are more**
 4 **about the use of reference -- the -- the -- the**
 5 **reference symmetry in the context of positioning a**
 6 **user, and Claim 1 of 694 is more about the -- the**
 7 **nature of the set of -- of access point estimated**
 8 **locations.**
 9 **MR. LU:** You should refer to your expert
 10 report for -- to refresh your recollection.
 11 **MS. MANNING:** Why don't we let him finish
 12 his answer.
 13 **A Okay. Well, I was -- I mean, I think I was more**
 14 **or less done, but the -- in the expert report we**
 15 **had -- or I had opined about the word -- the**
 16 **construction of that phrasing in the 694.**
 17 **Q** You're -- you're looking at your copy of your
 18 report?
 19 **A Yeah.**
 20 **Q** Can you tell me what paragraphs it is you're
 21 referring to?
 22 **A I'm sorry. It was 97. I see, right. Right. So**
 23 **I -- I -- I must have misspoken here so let me read**
 24 **this again. Right. Okay. So in this context it is**
 25 **about the -- it is about the user's calculating the**

Page 150

(14:13:20-14:15:09)

1 **position of the user using the prerecorded locations**
 2 **and so it is close to this figure. I apologize.**
 3 **Q** Okay. Just -- just so I'm -- just so I'm
 4 understanding your testimony --
 5 **A Right.**
 6 **Q** -- we've got a number of documents in front of us
 7 and you're kind of gesturing. If I'm understanding
 8 you correctly, you're telling me this: That the
 9 reference symmetry in the 694 is calculated with
 10 reference to a user, and that's the same thing as what
 11 we see in Figures 5 and 6 --
 12 **A Right.**
 13 **Q** -- is that right?
 14 **A Right. Sorry I got lost there.**
 15 **Q** In Figure 5, if we assume that the calculated
 16 locations of the user locations -- I'm sorry,
 17 calculated locations of the access points -- let me
 18 start over.
 19 In Figure 5, if we assume that the calculated
 20 location of the access points are exactly right and
 21 they show precisely where the actual access points
 22 are, and if we also assume that this is -- this shows
 23 all of the access points that are actually in this
 24 area, does that make any difference, the fact that it
 25 shows all of them inaccurately? Does that make any

Page 151

(14:15:15-14:16:57)

1 difference for the reference symmetry issue in
 2 determining whether there's reference symmetry or not?
 3 **A Well, it would be the best you can do, but I**
 4 **can't -- yeah. I -- would it make any difference? I**
 5 **think -- I think not. I mean, you would still have --**
 6 **you would still not have reference symmetry and --**
 7 **and -- you wouldn't have the desired degree of**
 8 **distribution of access points to get an accurate**
 9 **localization.**
 10 **Q** Okay. And that would just be a function of how
 11 the -- how the access points are actually distributed
 12 in the area?
 13 **A Right. Right.**
 14 **Q** I think of this as -- Figure 5 as the easy case?
 15 **A Yeah.**
 16 **Q** It obviously doesn't have reference symmetry.
 17 Would you -- would you agree that it's obvious this
 18 doesn't have reference symmetry?
 19 **A Right. Yes.**
 20 **Q** Okay. And I think of Figure 6 as another kind of
 21 easy one. It obviously does have reference symmetry
 22 if you think reference symmetry is the distribution of
 23 the calculated locations around the access -- around
 24 the user rather?
 25 **A Yes.**

Page 152

(14:17:06-14:18:58)

1 **MR. LU:** Can we stipulate to both of those
 2 statements?
 3 **BY MS. MANNING:**
 4 **Q** What's the -- what would happen if in Figure 6 we
 5 took away all three of the calculated locations in the
 6 top right-hand box? Would you still have reference
 7 symmetry?
 8 **A Well, it's -- it's much like the case we were**
 9 **discussing earlier, that L-shaped driving route. And**
 10 **I think it would be -- it would be less reference**
 11 **symmetry, if you can say that, if you allow me that,**
 12 **and it would be less desirable, but if that was the**
 13 **situation, that is to say there were no access points**
 14 **in that block, the best you can do, if you missed**
 15 **access points in that block because you didn't collect**
 16 **data well in that region, then you haven't collected**
 17 **data with full reference symmetry that's available or**
 18 **potentially available and so you haven't achieved the**
 19 **kind of symmetry that they're seeking in this method.**
 20 **Q** Okay. So if I understand you, it depends on
 21 whether the access points are actually there or not.
 22 If we -- if we --
 23 **A I think so.**
 24 **Q** If we -- if there are in fact three access points
 25 in that top right-hand box but we don't have

Page 153

(14:19:03-14:20:04)

1 calculated locations for them --

2 **A Right.**

3 Q -- then that would be a situation where you would

4 not have reference symmetry, correct?

5 **A Right.**

6 Q Okay. All other things on the Figure 6 being

7 equal?

8 **A Yes.**

9 Q But if you -- but if the top right-hand box on

10 Figure 6 simply didn't have any access points in it

11 and that's why you didn't have calculated locations,

12 it's your view that in that case you would have

13 reference symmetry or you wouldn't or you'd have less?

14 I guess I didn't understand that point.

15 **A Yeah, that's fine. I think you would, but it**

16 **would be less -- it would be less reference symmetry.**

17 Q Okay.

18 **A But I would still call that reference symmetry in**

19 **this context in the way that we're -- the way I read**

20 **the term claims and the way that we're trying to**

21 **construe the claim terms because it is -- the -- the**

22 **set of access points that you have observed are well**

23 **distributed around the user and the ones that you**

24 **haven't observed because they don't exist are just not**

25 **there. Sorry. Like if this was a park or something**

Page 154

(14:20:07-14:22:05)

1 **like that.**

2 Q On Figure 6, if we took away all of the

3 calculated access points that are outside of the

4 circle that shows radio range of the user device,

5 let's assume that those access points exist but we

6 don't have any information for them, would Figure 6 in

7 that -- as modified still show reference symmetry or

8 would it not show reference symmetry?

9 **A Well, with respect to this user it would still**

10 **show reference symmetry.**

11 Q Okay. And once the user moves from the

12 intersection that we see shown in Figure 6 to, say,

13 the intersection across -- if you move from the --

14 **A West one block and south one block, is that where**

15 **you're going?**

16 Q Sure. Better way to put it. Thank you. And

17 your user is now located west a block and south a

18 block but you -- but you have the same access points

19 present --

20 **A And, again, the ones we agreed were not present.**

21 Q The ones we agreed are not present are still not

22 present.

23 **A Yeah.**

24 Q Then do you have reference symmetry with respect

25 to that user?

Page 155

(14:22:07-14:23:11)

1 **MR. LU:** Objection. Foundation. What are

2 the assumptions for why they're not present?

3 **MS. MANNING:** The assumption for why

4 they're not present is that they exist but you

5 haven't scanned them.

6 **A Right. Okay. So --**

7 Q I should say you don't have any data for their

8 calculated location. Whether or not you've scanned

9 them, you don't have any data for calculated location.

10 **A Okay. And assuming the same radio range?**

11 Q Yes.

12 **A Okay. So in that case I think you would not have**

13 **reference symmetry because you would only be -- you'd**

14 **only have data for access points northeast of the user**

15 **and you wouldn't have any data for the access points,**

16 **although they are present, to the south and west and**

17 **southwest of the user and so you wouldn't have**

18 **reference symmetry.**

19 Q Okay. Now let's change the assumption. If the

20 assumption for the reason that we no longer have any

21 information about those access points, it's not that

22 we have failed to -- to scan them or put the

23 information in the database, it's that they don't

24 exist and your user still has moved south a block and

25 west a block from where the user's actually shown in

Page 156

(14:23:13-14:25:50)

1 Figure 6, in that situation is there reference

2 symmetry with regard to the user?

3 **A Well, it's difficult to say. I mean, it's --**

4 **it's -- it's more like this case we discussed earlier,**

5 **Figure 5, and so because the -- there is no way to get**

6 **reference symmetry in that case, it's very difficult**

7 **to say whether there is or isn't reference symmetry.**

8 **I think we decided earlier that there wasn't, but**

9 **that's because it wasn't possible.**

10 Q Okay. So let me give you a different

11 hypothetical. It's not with regard to the figures.

12 Say I'm a competitor and I know Skyhook has their

13 patents and I want to design around Skyhook's patents,

14 specifically just for sake of a discussion I want to

15 design around Claim 1 of the 694 patent and I want to

16 have my database of WiFi access points, I want to have

17 a computer readable medium, I want to have records

18 about calculated location information, I want to meet

19 all of the limitations of Claim 1 of the 694 patent

20 except I would like to not be sued for patent

21 infringement. So in order to not be sued for patent

22 infringement I have decided that it is my goal to

23 design around this claim and do everything that the

24 claim requires except I want to make sure that the

25 database records for substantially all WiFi access

Page 157

(14:25:51-14:30:18)

1 points in the target area do not provide reference
 2 symmetry within the target area. So it would
 3 necessarily mean that I have substantially all WiFi
 4 access points in the target area because that's a
 5 different part of the claim. I just want to avoid
 6 having reference symmetry. How do I do that?
 7 **MR. LU:** Actually, can you read that
 8 question back?
 9 (Pending question read back)
 10 **MR. LU:** Objection, vague, ambiguous, and
 11 it's not clear what you're carving out. Are
 12 you carving out reference symmetry or are you
 13 carving out substantially --
 14 **MS. MANNING:** I'm carving out reference
 15 symmetry.
 16 **MR. LU:** Simply. So you want to collect
 17 substantially all WiFi access points but not
 18 have reference symmetry?
 19 **MS. MANNING:** Uh-huh.
 20 **A Well, to be frank, I'm finding it difficult to**
 21 **think of a way to do that given the other aspects of**
 22 **the claim.**
 23 **Q** Okay. Let me ask you a different question. Is
 24 there any way to gather substantially all -- I'm
 25 sorry. Is there any way to have database records for

Page 158

(14:30:23-14:32:09)

1 substantially all WiFi access points in the target
 2 area and also obtain the calculated position
 3 information from recording multiple readings of the
 4 WiFi access point in different locations around the
 5 WiFi access point other than to drive every street?
 6 **A Please repeat the question.**
 7 **Q** Sure. Sure. I'm looking at two different
 8 aspects of Claim 1 of the 694 patent. I'm looking at
 9 the requirement the database records -- the database
 10 have records for substantially all WiFi access points
 11 in the target area and also at the requirement that
 12 the said calculated position information is obtained
 13 from recording multiple readings of the WiFi access
 14 point at different locations around the WiFi access
 15 point. So there's two aspects of -- of Claim 1 of 694
 16 patent. Is there any way to meet both of those
 17 limitations other than driving every street in the
 18 target area?
 19 **MR. LU:** Objection. Vague and ambiguous.
 20 **A Well, I mean, there's -- the claims -- the claim**
 21 **goes on to avoid arterial bias, but you left that out**
 22 **in this example --**
 23 **Q** Uh-huh.
 24 **A -- and so one could get substantially all but**
 25 **probably not all WiFi access points as we've discussed**

Page 159

(14:32:13-14:34:05)

1 **by not driving all of the streets and you would get**
 2 **multiple readings of the WiFi access points at**
 3 **different locations around the access point, but the**
 4 **fewer streets you drive, the less close you are to**
 5 **substantially all WiFi access points. I mean, you**
 6 **wouldn't -- you wouldn't get -- you would need to**
 7 **drive most streets if not -- in order to get**
 8 **substantially all WiFi access points is my feeling.**
 9 **Q** Okay. In your answer you -- you noted that my
 10 original question hadn't included the avoid arterial
 11 bias in the calculated position information
 12 requirement. Is there any way to avoid arterial bias
 13 other than by driving every street and also meet the
 14 recording multiple readings and the requirement that
 15 the database have records for substantially all WiFi
 16 access points? Can you do all three of those things
 17 except by driving every street?
 18 **A All three getting substantially all points,**
 19 **obtaining multiple readings of each point and avoid**
 20 **arterial bias?**
 21 **Q** Right.
 22 **A I think so. And -- and by the way, this claim**
 23 **doesn't require that you do drive every street, but**
 24 **you would want to choose your streets very carefully**
 25 **so that you would not miss -- so you not end up**

Page 160

(14:34:09-14:35:51)

1 **biasing towards arteries because that was one of the**
 2 **three things and so that you would have a strong**
 3 **likelihood of covering substantially all WiFi access**
 4 **points even though you skipped some streets.**
 5 **Q** Uh-huh. Okay. What -- what's your understanding
 6 of the relationship between the teachings of the
 7 specification and the meaning of the claim language?
 8 **A On the 694 patent?**
 9 **Q** As a general matter.
 10 **A Oh. Well, the claim language tells you what the**
 11 **patent is covering, if you will, and the specification**
 12 **helps you to understand the context of the claims, but**
 13 **the claims coverage isn't limited exclusively to**
 14 **what's described in the specification. In particular,**
 15 **when there are preferred embodiments or other**
 16 **expressions of -- of, you know, for example.**
 17 **Q** Do you have an understanding of whether the
 18 specification can implicitly redefine claim language?
 19 **MR. LU:** Objection. Vague.
 20 **A You know, I -- I see that primarily as a legal**
 21 **question and not as a technical question so I would**
 22 **want to be very careful.**
 23 **Q** Well, and -- and -- and -- I'm -- I'm not trying
 24 to ask you a legal question, but I am -- I'm trying to
 25 understand your opinions and I'm trying to understand

Page 161

(14:35:55-14:37:38)

1 how it is in your opinion the person of ordinary skill
 2 in the art would view these claim terms. So in
 3 forming your opinions did you consider whether the
 4 specification might have implicitly redefined or
 5 further limited some of the claim language?
 6 **A No. I mean, I -- I think that the specification**
 7 **helps provide the context in which you can understand**
 8 **the claims, but the specification, as I understand it,**
 9 **in general does not limit the claims. The claims are**
 10 **what they are and of course sometimes particular terms**
 11 **in the claims need definition and that's when you go**
 12 **back to the specification to try to understand the**
 13 **context of the definition.**
 14 Q Okay. Do you have an understanding of whether
 15 claim terms can be redefined during the prosecution
 16 history in --
 17 **MR. LU: Objection.**
 18 **BY MS. MANNING:**
 19 Q -- in the correspondence back and forth with the
 20 PTO?
 21 **MR. LU: Objection. Vague.**
 22 **A Sorry. Yes. My understanding is that that**
 23 **correspondence back and forth is -- between the**
 24 **inventors and the PTO is one way that the claim**
 25 **language itself does get adjusted and redefined such**

Page 162

(14:37:43-14:38:51)

1 **that the patent examiner believes that it is suitable**
 2 **for issuing.**
 3 Q Now when you say adjusted and redefined, are
 4 you -- are you talking about express amendments of the
 5 claims like --
 6 **A Like the ones we looked at.**
 7 Q Like we saw before?
 8 **A Yes.**
 9 Q That's assuredly true that you can have express
 10 amendments of the claim language. My question, I was
 11 going to get at something -- something a little
 12 different.
 13 **A Okay.**
 14 Q Do you have an understanding of whether you can
 15 implicitly limit your claims not through an express
 16 amendment of the actual language but through your
 17 explanation of what that language means, either by
 18 saying so in plain words or through implication?
 19 **MR. LU: Objection. Vague.**
 20 **A Well, my understanding, and this is, you know,**
 21 **about the legal process, and my understanding is that**
 22 **that -- the patent specification and the patent**
 23 **prosecution history is part of the evidence one**
 24 **considers in deciding what the claim terms mean but**
 25 **that the patent prosecution history is less relevant**

Page 163

(14:38:55-14:40:59)

1 **or less reliable than the specification itself for**
 2 **example.**
 3 Q Did that inform your views in any way?
 4 **A Not directly.**
 5 Q When you say not directly?
 6 **A Well, I -- remember that I didn't read all the --**
 7 **the prosecution history and I only read those pieces**
 8 **that were pulled out by one side or the other and that**
 9 **was -- they were part of the mix, but I think the**
 10 **specification and the claims themselves were where --**
 11 **where -- where most of the information that was useful**
 12 **came from.**
 13 Q Why is it that you judge the specification to be,
 14 in your sort of -- have information that was more
 15 useful than -- than the prosecution history?
 16 **A Well, there's -- there was a lot more detail, a**
 17 **lot more information there that I saw, and it**
 18 **explained the technology and the related technologies**
 19 **and related terms in ways that I thought was helpful.**
 20 Q Okay.
 21 **MR. LU: Should we take a short break?**
 22 **THE WITNESS: Sure.**
 23 **MS. MANNING: Do you want to?**
 24 **MR. LU: Sure.**
 25 **VIDEOGRAPHER: The time is now 2:45 and**

Page 164

(14:41:01-14:49:43)

1 we're going off the record.
 2 (Recess taken)
 3 **VIDEOGRAPHER: The time is now 2:52 and**
 4 **we're back on the record.**
 5 **BY MS. MANNING:**
 6 Q Sorry about that. I have my exhibit we're going
 7 to mark as exhibit -- Google Exhibit 1012, a document
 8 that we created. And you will note that it bears some
 9 resemblance to the figures of the patent that we've
 10 been discussing. And it is -- you will see that
 11 there's a legend on it that we have, some red markings
 12 that show calculated position of access points, and we
 13 have a user identified here on the page and we have a
 14 radio range similar to what we've seen before, and my
 15 question for you is does this show reference symmetry
 16 within the meaning of the claims?
 17 **MR. LU: Objection. Vague. Ambiguous.**
 18 **Foundation as to the assumptions.**
 19 **A So you're talking about the reference symmetry in**
 20 **the context of the 694 patent as we were before?**
 21 Q I'll limit -- I'll ask you a different question
 22 for the 988. Let's just focus on the 694.
 23 **A Right.**
 24 Q Does Exhibit 1012 show reference symmetry within
 25 the meaning of the 694 patent in your view?

Page 165

(14:49:50-14:51:30)

1 **MR. LU:** Same objections.

2 **A** **So it's difficult. I mean, considering the way**

3 **that we've been discussing reference symmetry and the**

4 **way that reference symmetry has been defined in my**

5 **opinion, one of the characteristics is that the**

6 **calculated positions of the observed WiFi access**

7 **points in range of user, so I'm looking at the set**

8 **that are in range of this user, tend to be distributed**

9 **around the user with reduced levels of arterial bias,**

10 **which is an aspect we weren't discussing very strongly**

11 **before. And it's impossible to tell from the way --**

12 **from this figure how these -- these points were**

13 **collected and whether there are reduced levels of**

14 **arterial bias, but I'm guessing that there is some**

15 **arterial bias here only because some of these access**

16 **points appear to be in the middle of the street. And**

17 **so by that definition then there is not reference**

18 **symmetry here.**

19 **Q** Okay. So is that the only reason why in your

20 view this would not have reference symmetry?

21 **A** **So the other characteristic was this tended to be**

22 **distributed around the user part, and as we discussed**

23 **before, it's a little difficult to define, you know,**

24 **strictly what is around the user and what is not**

25 **around the user. There are some easy cases, as you**

Page 166

(14:51:34-14:53:09)

1 **said. This is one that's a little harder, right,**

2 **because there are many access points to the, if you**

3 **will, southwest, west, south areas but not so much up**

4 **in block -- there are none in Block 3 and Block 6 to**

5 **the east of the user and so they're not well**

6 **distributed all around the user. We also talked about**

7 **earlier whether there existed access points in those**

8 **areas, and we don't know from this figure whether they**

9 **do or don't exist or whether one would expect them to**

10 **exist even.**

11 **Q** Okay. So we can -- we can address in a moment --

12 a moment the issue of whether the access points --

13 whether there are access points that exist that are

14 not represented by calculated location information in

15 this figure, but before we get there, just based on

16 what you know now, is it possible to give a yes/no

17 answer to whether or not this has reference symmetry

18 within the meaning of the 694 patent?

19 **MR. LU:** Same objections.

20 **A** **Is it possible?**

21 **MR. LU:** Actually, also asked and

22 answered.

23 **A** **I mean, in effect what I said before was no, it's**

24 **not.**

25 **Q** It's not possible?

Page 167

(14:53:11-14:54:53)

1 **A** **Not possible because I don't have enough**

2 **information.**

3 **Q** What -- what additional information would you

4 need?

5 **A** **Well, were these calculated positions collected**

6 **in a way that reduced arterial bias, that's one thing.**

7 **And I think it would be helpful to know, although**

8 **we've set aside, as you said, the question of whether**

9 **there are access points or -- or expected to be access**

10 **points in Blocks 3 and 6.**

11 **Q** Is it essential? I mean, understanding just that

12 it would be helpful. Is that -- is that critical to

13 the analysis?

14 **A** **No, I guess not.**

15 **Q** So the -- the -- the main thing you need to know

16 is -- is the method by which the area was traversed to

17 scan for the access points?

18 **A** **Well, I guess, you know, I'm trying to -- I'm**

19 **trying to -- to apply the definitions that are worked**

20 **out in this opinion to this new example and -- which**

21 **is a great technique for testing a definition, and one**

22 **of the characteristics of that definition is that the**

23 **observed access points tend to be distributed around**

24 **the user with reduced levels of arterial bias, and**

25 **that begs the question how does one know whether there**

Page 168

(14:54:55-14:56:36)

1 **are reduced levels of arterial bias. And one way to**

2 **do that would be to know whether the method used would**

3 **reduce or tend to reduce arterial bias, and another**

4 **would be to find some way of judging whether there is**

5 **arterial bias just from looking at the positions. And**

6 **it appears in this figure, since that's all I have to**

7 **work with, that there is some -- possibly some**

8 **arterial bias. And so your question was do I need to**

9 **know the method, and I'm -- I'm not sure to be honest.**

10 **I think it would be -- I'm trying to think if there's**

11 **a way one could do this without knowing the method of**

12 **data collection and I -- and I think one could devise**

13 **a method, but I'm trying to do that on the fly and**

14 **that's a little tricky.**

15 **Q** Okay. Well, and I appreciate your -- your effort

16 to give a thorough answer -- answer to the question.

17 As you are thinking about it you've identified that

18 you might need to know the method by which the -- the

19 scan data was collected that underlies the calculated

20 positions, and I think we decided you didn't need --

21 didn't necessarily need to know whether or not there

22 were more access points that existed in the target

23 area --

24 **A** **Uh-huh.**

25 **Q** -- than what are represented by the calculated

Page 169

(14:56:38-14:58:34)

1 locations. So if I'm right, the only thing on the
 2 table is do we need to know the method or not?
 3 **A Yeah. I'm not sure.**
 4 **MR. LU:** Objection to the extent it
 5 mischaracterizes the witness's testimony.
 6 **BY MS. MANNING:**
 7 **Q** Let me mark another figure. This one is Google
 8 Exhibit 1013. It's a figure similar in some ways to
 9 the last one that we were looking at, and my question
 10 for you is can you tell from this figure whether --
 11 whether this shows reference symmetry within the
 12 meaning of the 694 patent?
 13 **MR. LU:** Objection. Vague. Ambiguous.
 14 Foundation.
 15 **A So in this one the -- some of the access**
 16 **points --**
 17 **MR. LU:** Just for clarification, you have
 18 this labeled as first, second, third, fourth,
 19 and I think Street A, B, C, and D. Is this the
 20 same sort of snapshot of a hypothetical grid of
 21 streets as shown in Exhibit 1012?
 22 **THE WITNESS:** The previous diagram.
 23 **MS. MANNING:** Yes, it is.
 24 **MR. LU:** So we're talking about the same
 25 streets with different scanning techniques

Page 170

(14:58:36-15:00:01)

1 or -- or -- I'm trying to figure out what the
 2 hypothetical is here.
 3 **MS. MANNING:** We are talking about --
 4 the -- the area is the same. The streets and
 5 the blocks are the same. We have different
 6 calculated positions of access points.
 7 **MR. LU:** Okay.
 8 **A Yeah. I mean, the major difference between these**
 9 **two, assuming all other things being equal, are the**
 10 **calculated positions of the access points. Looks like**
 11 **there may be a few more access points. The access**
 12 **points are all within the blocks. None of them are on**
 13 **the streets as they were in the previous diagram,**
 14 **which might tell us that there's less arterial bias**
 15 **than in this version than in that version. Not**
 16 **necessarily, but it might be. And --**
 17 **Q** And when you say this version and that version
 18 you're referring to?
 19 **A I'm sorry. In the new version, 1013, seems to**
 20 **have -- it may have less arterial bias than the**
 21 **previous version, 1012, because the access points**
 22 **don't appear to be on the streets. Those are the**
 23 **differences I notice. And the question is whether**
 24 **there is -- this exhibits reference symmetry.**
 25 **Q** So it shows that there's reference symmetry

Page 171

(15:00:02-15:01:43)

1 within the meaning of the 694 patent?
 2 **A Right. Yeah, it seems to. I mean, there are --**
 3 **the access points are distributed around the user more**
 4 **or less and they are perhaps having reduced level of**
 5 **arterial bias, you know, with the caveat of the**
 6 **previous conversation that it's not immediately clear**
 7 **how one determines that for sure.**
 8 **Q** And my question again about Exhibit 1013 was
 9 specific to the 694 patent. If the -- if we change
 10 the question as about the 988 patent, what then? Does
 11 this Exhibit 1013 show reference symmetry within the
 12 meaning of the 988 patent?
 13 **A Well, the 988 patent has a different -- let's**
 14 **see. So in the 988 patent there's no user involved.**
 15 **It's about the multiple readings have reference**
 16 **symmetry relative to other WiFi access points in the**
 17 **target area. And so if we -- so in this 1013 we**
 18 **ignore the user and the user's radio range and look at**
 19 **the rest of the picture. Is that what you're asking**
 20 **me to do?**
 21 **Q** I am -- I am asking you to give me the answer to
 22 my -- my question.
 23 **A Okay.**
 24 **Q** Which is just simply does this have reference
 25 symmetry within the meaning of the 988 patent. If you

Page 172

(15:01:49-15:03:26)

1 think that we disregard the -- the user in order to
 2 come up with the answer to that question, you know,
 3 please -- please explain.
 4 **MR. LU:** Objection. Foundation. Vague
 5 and ambiguous.
 6 **A So I think the answer would be yes, it does.**
 7 **Q** Okay. Why?
 8 **A Well, the 988 patent requires that one record**
 9 **multiple readings of the WiFi access point at**
 10 **different locations around the WiFi access point so**
 11 **that multiple readings have reference symmetry**
 12 **relative to other WiFi access points in the target**
 13 **area, and so that calculation of the position of WiFi**
 14 **access point avoids arterial bias in the calculated**
 15 **position information, and Skyhook has construed that**
 16 **to mean, and I believe this is a much more clear**
 17 **definition, multiple scans are recorded. That's**
 18 **something that's not part of staring at a map, of**
 19 **course. The scans are taken at different locations.**
 20 **We -- that's not something we can see from the map.**
 21 **But this results in the following, that multiple**
 22 **readings produce a calculated position of the WiFi**
 23 **access point having reference symmetry relative to**
 24 **other WiFi access points in the target area, and the**
 25 **calculated position of the access point reduces the**

Page 173

(15:03:29-15:05:11)

1 **effects of arterial bias. So I'm looking at the**
 2 **calculated positions of the access points you've**
 3 **plotted, the red dots, and to me they appear to have**
 4 **reference symmetry in the sense that there are many**
 5 **access points around each one, and they seem to have**
 6 **reduced levels of arterial bias because they aren't**
 7 **close to the streets generally. They're certainly not**
 8 **on the streets.**
 9 Q Okay. And I think you were referencing Skyhook's
 10 definition -- proposed definition of the reference
 11 symmetry limitation in the 988 as -- as recited in I
 12 guess it's paragraph 100 of your --
 13 **A Yes.**
 14 Q -- report? Okay. So the claim language of the
 15 988 says so that the multiple readings have reference
 16 symmetry relative to other WiFi access points in the
 17 target area. So it's the -- it's -- according to the
 18 claim language, it's the multiple readings have
 19 reference symmetry. And Skyhook would define that, as
 20 you noted when you were reading from the definition,
 21 that the multiple readings produce a calculated
 22 position of the WiFi access point having reference
 23 symmetry, but let's assume the court doesn't agree
 24 with that. If the court takes the view that it is the
 25 multiple readings that is the scan data, the multiple

Page 174

(15:05:17-15:06:31)

1 readings are the thing that have to have reference
 2 symmetry, and they have to have it relative to other
 3 WiFi access points in the target area, first off, what
 4 would that look like?
 5 **MR. LU:** Objection. Foundation. Vague
 6 and ambiguous.
 7 **A What would that look like?**
 8 **MR. LU:** It goes beyond the scope of the
 9 witness's opinion.
 10 **A Well, so you're talking about the multiple**
 11 **readings having reference symmetry with respect to**
 12 **other WiFi access points --**
 13 Q Uh-huh.
 14 **A -- and the -- I'm thinking of the figures in the**
 15 **patent that dem -- that plot the access points' actual**
 16 **locations and the readings around them or the**
 17 **calculated -- actually --**
 18 Q Figure 11 you mean?
 19 **A Yeah. Showing the multiple readings around the**
 20 **calculated positions. I think 11 is about arterial**
 21 **bias, I think.**
 22 Q You tell me. If you weren't thinking of 11, I
 23 just want to --
 24 **A I'm checking. I think -- I think I recall that.**
 25 **This is one of the few diagrams that I recall that has**

Page 175

(15:06:34-15:07:52)

1 **the raw readings and the access point location and**
 2 **that's what you're asking about.**
 3 Q Right. I'm -- I'm -- yeah. I'm -- I'm asking
 4 you if -- if the court takes the view that it is the
 5 multiple readings themselves that have reference
 6 symmetry and they have to have it relative to other
 7 WiFi access points in the target area --
 8 **A Right.**
 9 Q -- I'm asking you, do you know what that would
 10 look like?
 11 **MR. LU:** Same objections.
 12 **A I think it would -- in some ways it would be**
 13 **similar to the kinds of things we've been discussing**
 14 **except you'd be plotting the raw readings of the**
 15 **access points instead of the calculated positions of**
 16 **the access points and you'd be looking at the**
 17 **distribution of those readings around the actual**
 18 **access points instead of the distribution of the**
 19 **calculated positions among themselves. So you'd be**
 20 **looking to see -- much like we have with these 1013**
 21 **example where we're looking at the symmetry around a**
 22 **user, you'd be looking at the symmetry of readings**
 23 **around an actual access point, and if they're well**
 24 **distributed around that, that's what -- that's what**
 25 **that could mean if the court were to look at it that**

Page 176

(15:07:55-15:09:28)

1 **way.**
 2 Q Well, the claim -- the claim language is that --
 3 talks about taking -- recording multiple readings of
 4 the WiFi access point at different locations around
 5 the access point so that the multiple readings have
 6 reference symmetry relative to other WiFi access
 7 points in the target area.
 8 **A Right.**
 9 Q If I understood you to be -- if I understood you
 10 correctly, I understood you to be describing the
 11 readings having reference symmetry with respect to the
 12 access point that they're actually reading?
 13 **A Yes.**
 14 Q Okay. So -- okay. So my question was -- was
 15 different.
 16 **A Yes.**
 17 Q Assume the court believes that the multiple
 18 readings have to have reference symmetry relative to
 19 other WiFi access points in the target area, the claim
 20 language, what would that look like?
 21 **MR. LU:** Same objections.
 22 **BY MS. MANNING:**
 23 Q Do you know?
 24 **A No, that's -- yeah, that's -- that's a little**
 25 **harder to see. You know, I can imagine a couple of**

Page 177

(15:09:33-15:12:40)

1 **different ways one could interpret that. Multiple**
 2 **readings have reference symmetry relative to other**
 3 **WiFi access points. I mean, what that would mean is,**
 4 **I guess, the set of readings for Access Point A would**
 5 **be -- have reference symmetry with respect to another**
 6 **Access Point B in the target area which would mean --**
 7 **at least if we follow our other use of that term, well**
 8 **distributed around Access Point B, but that doesn't**
 9 **seem to be very useful if it has that property.**

10 Q Okay.

11 **A Hence, the need to construe this language more**
 12 **clearly.**

13 Q I'm going to ask you to -- to move back to
 14 Exhibit 1012 for a moment. And I -- I had asked you
 15 whether it had -- it showed reference symmetry within
 16 the meaning of the 694 patent. Now I want to ask you,
 17 does this -- does Exhibit 1012 show reference symmetry
 18 within the meaning of the 988 patent?

19 **A Well, as -- as -- as Skyhook would like to**
 20 **construe it, the calculated position of the WiFi**
 21 **access points have reduced effects of arterial bias,**
 22 **and it would appear from this figure that there is**
 23 **some arterial bias because the access points are in**
 24 **the streets and so it would not.**

25 Q Okay. And similar to what we were discussing

Page 178

(15:12:44-15:14:21)

1 with Exhibit 1013, if -- if the court does not view
 2 Skyhook's construction favorably and instead takes the
 3 view that the -- it is the multiple readings
 4 themselves that must have reference symmetry and they
 5 must have it relative to other WiFi access points in
 6 the target area, in that situation do we have
 7 reference symmetry -- symmetry demonstrated on Exhibit
 8 1012?

9 **MR. LU: Objection. Incomplete**
 10 **hypothetical. Foundation.**

11 **A We don't have any readings on this figure so**
 12 **can't answer that.**

13 Q Okay. So you would need to -- you would need to
 14 see the readings themselves? Okay. Assuming that you
 15 had -- would it -- would it implicate the same issue
 16 we were just discussing, you would have to have --
 17 multiple readings would have to be taken from around a
 18 given access point and those readings would also have
 19 to be distributed around other WiFi access points in
 20 the target area, is that right?

21 **A Right. That's the way we were discussing it**
 22 **before. In that respect this figure's no different**
 23 **than the previous one because we're both imagining a**
 24 **different figure. One with readings, right?**

25 Q Well, I think my question was, you know, what --

Page 179

(15:14:23-15:24:32)

1 what would it look like for --

2 **A Yes.**

3 Q -- for the multiple readings to have reference
 4 symmetry relative to other WiFi access points. And
 5 for purposes of that analysis, is there any difference
 6 between Exhibit 1013 and 1012?

7 **A No.**

8 **MS. MANNING: We can change the tape.**
 9 **VIDEOGRAPHER: The time is now 3:19 and**
 10 **we're going off the record.**
 11 **(Recess taken)**

12 **VIDEOGRAPHER: The time is now 3:28 and**
 13 **we're on the record.**

14 **BY MS. MANNING:**

15 Q So we've been discussing what it might look like
 16 for multiple readings to have reference symmetry
 17 relative to other WiFi access points, and my question
 18 for you is does the specification actually disclose
 19 any information about the scan data, the multiple
 20 readings themselves having reference symmetry relative
 21 to other WiFi access points?

22 **A We're talking about 988?**

23 Q Yes, that is the 988.

24 **A I recall that it has a section defining reference**
 25 **symmetry, at least with that title. I don't recall**

Page 180

(15:24:43-15:26:33)

1 **whether it addresses that point exactly so let's see.**
 2 **Well, so in this -- in this section, column 9, line**
 3 **50, and following where they introduce reference**
 4 **symmetry, they're talking about the distribution of**
 5 **reference points around the end user in terms of**
 6 **calculating the user's position.**

7 Q Right.

8 **A And the reference points are calculated AP**
 9 **locations, I think.**

10 Q Right. And I understand -- understood that to be
 11 different from what we were talking about?

12 **A Right. I agree.**

13 Q Okay.

14 **A And so I'm -- you were asking whether it teaches**
 15 **anything about that, and it's not in this section**
 16 **anyway.**

17 Q Okay. And if you look at your report, the first
 18 sentence in paragraph 102.

19 **A Okay.**

20 Q It says, the specification refers to multiple
 21 readings, quote, providing reference symmetry among
 22 the reference points. And then it cites to the 988
 23 patent at columns 2, lines 55 and 56?

24 **A Right. The ones we were just looking at, I**
 25 **think.**

Page 181

(15:26:33-15:27:48)

1 Q I think -- I think we were -- I think we were a
2 little further in the patent. I think they were
3 columns 9 and 10.
4 **A Sorry.**
5 Q But if you look at -- and I'll actually do this.
6 If you look at that citation, column 2, lines 55 and
7 56, I just want to double check this one because I
8 don't see that as referring to multiple readings
9 providing reference symmetry among reference points.
10 **A Well, this sentence is in a bit of a different**
11 **context, but it says there's no way to provide**
12 **reference symmetry among the reference points. You're**
13 **right, it doesn't refer to the readings because there**
14 **are no readings in this context. It's about TV**
15 **towers.**
16 Q Okay. So -- okay. So -- so upon further look
17 you would agree with me that at least this particular
18 citation doesn't support the idea that the multiple
19 readings themselves provide reference symmetry?
20 **A True.**
21 Q Okay. And further on down in that same
22 paragraph, 102 of your declaration, it says, the
23 specification also explains that in one aspect of the
24 disclosed invention, quote, more access points,
25 bracket, are gathered closed, bracket, uniformly

Page 182

(15:27:52-15:30:00)

1 across a target area confirming that the multiple
2 readings produce reference symmetry relative to other
3 WiFi access points. And looking at -- if you look at
4 column 8, lines 56 and 59, my question for you again,
5 is there anything in 56 through 59 that actually talks
6 about the scan data, the multiple readings having
7 reference symmetry relative to other WiFi access
8 points?
9 **A No.**
10 Q And it's a little bit longer citation, but column
11 9, lines 4 through 21 is the other citation there, and
12 if you could take a look at that and tell me whether
13 that talks about -- upon further review whether you
14 think that talks about multiple readings themselves
15 having reference symmetry.
16 **A Well, this citation doesn't, unless I missed it,**
17 **use the phrase reference symmetry, but it does refer**
18 **to the scanning vehicles detect a particular access**
19 **point from as many sides as possible of the building**
20 **housing the access point. And so that's referring to**
21 **the readings. And this additional data greatly**
22 **improves the results of the reverse triangulation**
23 **formula. So though it doesn't use the phrase, in a**
24 **way it has the spirit of that phrase.**
25 Q Well --

Page 183

(15:30:00-15:31:56)

1 **A It's talking about the distribution of the access**
2 **point readings.**
3 Q Right. And is it -- is it indicating that those
4 readings have reference symmetry relative to some
5 other access point?
6 **A No, that's true, it does not.**
7 Q In your -- in your declaration at paragraph 106
8 you have a reference to what you believe to be the
9 purpose of the database, and my question is just
10 what -- what role does the purpose of the database, as
11 you put it, have in the claim construction analysis?
12 **MR. LU: Objection. Vague. Also object**
13 **as to it calls for a legal conclusion.**
14 **A Okay. I'm sorry, your question was what role**
15 **does the purpose of the database play?**
16 Q Uh-huh.
17 **A In?**
18 Q In the -- in the analysis of the actual claim
19 language.
20 **A Well, let's see. Go back to the claim language.**
21 **This is about Claim 1, and Claim 1 is about a database**
22 **of WiFi access points. So I think that the purpose of**
23 **the database is relevant. The purpose, as I opined,**
24 **is to calculate the location of mobile devices. And**
25 **so the claim is a long claim, and we are talking about**

Page 184

(15:32:03-15:33:27)

1 **the reference symmetry aspect of it. And this point,**
2 **paragraph 106 -- in this point I say the database**
3 **should contain AP locations distributed throughout the**
4 **target area so there will tend to be access points**
5 **distributed around the user. And so it seems -- I**
6 **don't know, it seems reasonable to talk about the**
7 **purpose of the database being for calculating the**
8 **location. I don't -- sorry, I don't see the point of**
9 **why there is an issue.**
10 Q Well, I'm trying -- I'm trying -- I'm trying to
11 understand your -- your views as to what's sort of
12 appropriate -- appropriate questions to ask in order
13 to figure out how to issue the claims, and I take it
14 you think what your perceived purpose of the database
15 is is a relevant -- is relevant to how the words
16 themselves should actually be construed in they should
17 be construed consistent with their perceived purpose,
18 right?
19 **MR. LU: Objection. Vague. Ambiguous.**
20 **Also to the extent it calls for a legal**
21 **conclusion.**
22 **A Right. Well, from -- from the point of view --**
23 **from the point of view of my expert opinion as opposed**
24 **to a legal opinion, I think that the purpose is --**
25 **is -- is relevant because it -- it's another piece of**

Page 185

(15:33:30-15:36:14)

1 **context in which one reads the terms.**

2 Q I'm going to mark as Google Exhibit 1014 a copy

3 of U.S. Patent Number 7305245. This is Bates number

4 GSHFED_0000001 through 20. And you've reviewed this

5 before, sir?

6 A **Yeah.**

7 Q And I've given this to you so you can reference

8 the claim language if you want or any other part of it

9 you feel appropriate, but in the -- Claim 1, one of

10 the limitations is based on the number of WiFi access

11 points identified by -- via receive messages choosing

12 a corresponding location determination algorithm from

13 a plurality of location determination algorithms said

14 chosen algorithm being suited for the number of

15 identified WiFi access points?

16 A **Yeah.**

17 Q As you know, the meaning of that limitation shows

18 an algorithm being suited for the number of identified

19 WiFi access points is one of the terms in dispute

20 here. My question for you, sir, is going back to my

21 earlier hypothetical about a competitor. I'm a

22 competitor. I would like to design around the 245

23 patent and not get sued by Skyhook for infringing, and

24 in designing around, I have determined that I wanted

25 to do everything in the claim -- Claim 1 of the 245

Page 186

(15:36:20-15:37:44)

1 patent except I want to avoid infringement because I

2 want to avoid this limitation, said chosen algorithm

3 being suited for the number of identified WiFi access

4 points. And my question is how do I do that?

5 A **Let's see. So -- I've just got to look back at**

6 **what I was saying earlier about that language and --**

7 **so one easy way, I think, to do -- to avoid that would**

8 **be to use a single algorithm and not to choose an**

9 **algorithm at all.**

10 Q Agree that would do it, but that's different from

11 my hypothetical.

12 A **Oh, I'm sorry.**

13 Q What I'm -- what I'm -- what I want to do is I

14 want to do everything in Claim 1, including based on

15 the number of WiFi access points identified via

16 receive messages, choosing a corresponding location

17 determination algorithm from a plurality of location

18 determination algorithms.

19 A **Oh, okay.**

20 Q So I've got -- I've got --

21 A **I see.**

22 Q -- multiple algorithms.

23 A **Okay.**

24 Q I want to choose between them. I just don't want

25 to -- I just want to not infringe by not meeting that

Page 187

(15:37:47-15:40:06)

1 said chosen algorithm being suited for the number of

2 identified WiFi access points requirement.

3 **MR. LU:** Objection. Vague, foundation,

4 and I think un -- objection, vague, foundation,

5 incomplete hypothetical in terms of the claim

6 language you've recited.

7 A **So, let's see. So if you choose -- if you chose**

8 **an algorithm -- if you chose an algorithm without**

9 **paying attention to the number of WiFi access points**

10 **identified among the set of choices that you have, I**

11 **think that would suffice. Suppose, for example, that**

12 **all the algorithms that you have in your arsenal are**

13 **suited for all numbers of WiFi access points and you**

14 **made your choice based on some other factor than the**

15 **number of identified access points, I think that would**

16 **get you out of this one.**

17 Q Okay.

18 A **But, you know, then it becomes a legal question**

19 **perhaps.**

20 Q How so?

21 A **Well, I mean, if all the algorithms you had were**

22 **suited for all numbers of WiFi access points -- and**

23 **would that fall under this language or not? I suppose**

24 **it would.**

25 Q When you say -- when you use the word suited,

Page 188

(15:40:13-15:41:53)

1 what's the -- what's the criteria for suitability the

2 patent teaches, if any?

3 A **Well, let's see. I'm trying to remember.**

4 **MR. LU:** Could you read back that last

5 question and answer? I just wanted to -- the

6 last portion.

7 A **It was a long answer.**

8 **(Previous question and answer read back)**

9 **MR. LU:** And could you read back the

10 previous question and answer? Just previous

11 question.

12 **(The following question was read back:**

13 **Q: I want to choose between them. I just**

14 **don't want to -- I just want to not infringe by**

15 **not meeting that said chosen algorithm being**

16 **suited for the number of identified WiFi access**

17 **points requirement.)**

18 **MR. LU:** Was that the question?

19 **THE REPORTER:** And you objected.

20 A **So the question on the table is whether the**

21 **patent teaches --**

22 Q What it means to be suited.

23 A **-- what it means to be suited. And I, in my**

24 **opinion, didn't reference any section of the patent in**

25 **regards to that language, and I'm not quickly finding**

Page 189

(15:41:59-15:43:54)

1 **a place where it does. I'm trying to find that.**

2 Q Can I ask you to look at column 7, line 9.

3 **A The decision of which algorithm to use is driven**

4 **by the number of access points observed and the user**

5 **case application using it.**

6 Q Would you agree with me that that doesn't teach

7 you -- that doesn't give you any criteria for what it

8 would mean to be suited or not suited to the number of

9 WiFi access points?

10 **MR. LU:** Objection. Foundation. Vague

11 and ambiguous.

12 **A Not directly, no.**

13 Q How about column 5, lines 45 through 48, for

14 example, the location determination algorithm?

15 **A That's saying something very similar to the**

16 **sentence we just read.**

17 Q Right. Would you agree with me that that, too,

18 doesn't actually give you any criteria for what

19 constitutes suitability or lack of suitability?

20 **A Well, it says that it -- no, I guess you're**

21 **right. I agree.**

22 Q To my knowledge those are the only two passages

23 of the specification in play, and my question for you

24 is are you aware of anyplace else in the patents that

25 there's any criteria for what constitutes suitability

Page 190

(15:43:57-15:45:48)

1 or lack of suitability of algorithm vis-a-vis the

2 number of access points?

3 **A No, not that I recall.**

4 Q In your declaration, I'm looking at paragraph

5 87 --

6 **A Okay.**

7 Q -- you state in the middle of that paragraph 87,

8 certain algorithms are, comma, and are known to be,

9 comma, more appropriate to use in certain instances

10 than other algorithms. I have a couple questions

11 about that. First, is this something within the

12 knowledge of a person of ordinary skill in the art in

13 your view?

14 **A Yeah.**

15 Q And would it be something a person of ordinary

16 skill in the art knew as of October 2005 when the

17 application for patents -- several of the patents in

18 suit was filed?

19 **A Yeah.**

20 Q Okay. And the language is not a hundred percent

21 clear so let me see if I understand you. When you say

22 that the certain algorithms are and are known to be

23 more appropriate to use in certain instances than

24 other algorithms, is the certain instances there

25 differing number of WiFi access points?

Page 191

(15:45:51-15:47:15)

1 **A Yes.**

2 Q Can you give me some examples of algorithms that

3 were known to be appropriate to use for varying

4 numbers of access points as of October 2005?

5 **A Well, so this is choosing -- this is in the**

6 **context of the language that says choosing a**

7 **corresponding location determination algorithm so --**

8 Q Yes.

9 **A -- we're talking about location determination**

10 **algorithms.**

11 Q Yes.

12 **A I have to think about that. I mean, the -- I**

13 **don't recall all the algorithms that were known at**

14 **that time. I don't -- and I certainly don't know all**

15 **the algorithms by -- by heart anyway. There were**

16 **three that we discussed earlier, the centroid -- the**

17 **simple centroid, the weighted centroid, and the**

18 **particle filter in my paper for example --**

19 Q Yes.

20 **A -- and I think the centroid ones are -- require a**

21 **minimum number of access point -- data points to be**

22 **useful, say three or more, if I recall correctly, and**

23 **the particle filter I can't recall whether it had any**

24 **constraints. There are probably other algorithms, but**

25 **I can't think of them at the moment.**

Page 192

(15:47:18-15:48:24)

1 Q Okay. But, nevertheless, it's your -- it's your

2 view that as of 2005, late 2005, a person of ordinary

3 skill in the art would -- would have -- would have

4 known what algorithms would be appropriate to use with

5 any given number of access points?

6 **A Right. Well, you wouldn't -- I mean, the chosen**

7 **algorithm has to be suited for the number of access**

8 **points so you might base your choice on other factors**

9 **as well but you might eliminate certain ones because**

10 **they're not suitable for that number of access points.**

11 Q Understood, but --

12 **A Yeah.**

13 Q -- to the extent we're talking about just this

14 requirement of the claim --

15 **A Right. Right.**

16 Q -- people would know that you could choose access

17 points based on their suitability for a number -- I'm

18 sorry. People would know that -- that you could

19 choose an algorithm based on its suitability to the

20 number of observed access points --

21 **A Right.**

22 Q -- correct? I said people but I meant persons of

23 skill in the art.

24 **A Understood.**

25 Q All right. And would they know that there was

Page 193

(15:48:27-15:49:45)

1 value in -- in making that determination, actually

2 choosing between the algorithms on that basis?

3 **MR. LU:** Objection. Vague.

4 **A Yes. I mean, there are certain algorithms that**

5 **wouldn't be suitable and so you wouldn't -- you**

6 **couldn't choose them because they wouldn't work or**

7 **they wouldn't work well.**

8 **Q** Okay. So one reason that something wouldn't be

9 suited would be that it just wouldn't work to

10 calculate location based on the number of access

11 points?

12 **A Right.**

13 **Q** And then you said wouldn't work well. How do

14 I -- how do I judge the bounds of that?

15 **A Well, it's difficult without coming up with a**

16 **specific example. Wouldn't work well could mean that**

17 **it -- it gave poor accuracy, poor -- not inaccurate**

18 **results. Another would be my example here that with a**

19 **large number of access points it might run very slowly**

20 **and -- and depending on your context of your**

21 **application that may be -- not meet your needs. It**

22 **would be too slow and so you would choose a different**

23 **algorithm that was faster when you had a larger number**

24 **of access points. It might be less accurate. You**

25 **might be willing to trade lower accuracy for higher**

Page 194

(15:49:48-15:51:44)

1 **speed, for example.**

2 **Q** But you'd agree with me that -- that if accuracy

3 is the -- is the criteria, certainly the patent

4 doesn't teach that? We -- we looked at a couple

5 different passages. That's not what the patent

6 teaches?

7 **A True.**

8 **Q** I think earlier we were talking about some

9 situations where if you had two persons of ordinary

10 skill in the art, they might have differing views on

11 an issue before them, and in this context my question

12 is could persons of skill in the art ever be uncertain

13 about what constitutes an algorithm that's suitable to

14 the number of WiFi access points?

15 **A So I -- I don't think so. I mean, given an**

16 **algorithm and if you -- if you were asked -- one of**

17 **ordinary skill in the art were asked is this suitable**

18 **for, say, ten access points or a hundred access**

19 **points, I think you could decide either by examination**

20 **or with some experimentation whether that algorithm**

21 **was suitable for that number of access points.**

22 **Q** Just so I understand, when you're talking about

23 examination experimentation, what are you -- what are

24 you thinking of?

25 **A By examination I mean by studying the algorithm**

Page 195

(15:51:46-15:53:26)

1 **on paper, reading it and thinking about it. By**

2 **experimentation, it might not be sufficiently obvious**

3 **from just examining it so you might code it up, give**

4 **it some test data, run some experiments and determine,**

5 **you know what, this one is just too slow when we get**

6 **up to a hundred access points so I'm not going to use**

7 **it for my application. It's not suitable.**

8 **Q** So is -- is -- is suitability, you know, is it

9 sort of a digital on/off concept or is it an issue of

10 degree?

11 **MR. LU:** Objection. Vague. Compound.

12 **A Well, I think the -- as we discussed earlier, the**

13 **patent specification doesn't give a lot of guidance**

14 **about what suitability means, but it was discussed in**

15 **the context of choosing an algorithm with the needs of**

16 **the application and the number of access points in**

17 **mind and so I think -- I think that in -- in -- in --**

18 **it would have some degree -- in some contexts it would**

19 **be a matter of degree. So this one would be more**

20 **suitable, less suitable in this context, but in other**

21 **contexts it might just be binary. This algorithm is**

22 **not suitable for an odd number of access points**

23 **because it requires an even number of access points.**

24 **So my answer, unfortunately, is it's both.**

25 **Q** Okay.

Page 196

(15:53:26-15:57:42)

1 **A In some algorithms, in some contexts it's binary,**

2 **digital. In other contexts it's a matter of degree.**

3 **MS. MANNING:** Why don't we go off the

4 record.

5 **MR. LU:** Pardon?

6 **MS. MANNING:** Why don't we go off the

7 record.

8 **MR. LU:** Okay.

9 **VIDEOGRAPHER:** The time is 3:58 and we're

10 going off the record.

11 (Discussion off the record)

12 (Off the video record at 3:58 p.m.)

13 **MS. MANNING:** I would like a rough copy

14 please, and do you need an e-mail address for

15 that?

16 **THE REPORTER:** I'll get it after.

17 **MS. MANNING:** And the original can be

18 mailed to me at my office, I believe you have

19 my business card, 2020 K Street, Washington,

20 DC, 20006, I believe.

21 **MR. LU:** Same order, and you have I think

22 both my contact information for the e-mail

23 address.

24 (WHEREUPON, the deposition was closed at

25 approximately 3:57 p.m.)

1 I have carefully read the foregoing
2 deposition and the answers made by me are true.

3

4

5 _____
6 David Kotz, Ph.D.

7

8

9 STATE OF _____

10 COUNTY OF _____

11

12 At _____ in said
13 County, this _____ day of _____,
14 2011, personally appeared the above named
15 _____ and made oath that the
16 foregoing answers, subscribed by him, are true.
17 Before me,

18

19

20

21 _____
22 Notary Public

23

24

25

My commission expires: _____

26

1 CERTIFICATE

2 I, Lisa M. Hallstrom, Registered Professional
3 Reporter, certify:

4 That the foregoing proceedings were
5 reported stenographically by me at the time and
6 place herein set forth;

7 That the foregoing is a true and correct
8 transcript of my shorthand notes so taken;

9 That the witness was sworn by me as a
10 Notary Public for the State of Vermont;

11 That I am not a relative or employee of
12 any attorney of the parties nor financially
13 interested in the action.

14 The certification of this transcript does not apply
15 to any reproduction of the same by any means unless
16 under the direct control and/or direction of the
17 certifying reporter.

18

19

20

21 _____
22 Lisa M. Hallstrom, RPR, CRR, CCP

23

24

25 My commission expires February 10, 2015.

	185:2	40:3;77:7;197:13	4.6 (1) 90:19
0	102 (2) 180:18;181:22	2020 (1) 196:19	40 (3) 24:6;52:9;130:12
001139 (1) 71:1	106 (2) 183:7;184:2	20th (3) 35:18;40:3;46:21	41 (1) 131:24
05 (3) 54:7;60:22,24	11 (6) 91:6;102:11;121:21;174:18, 20,22	21 (1) 182:11	42 (1) 26:23
06 (2) 54:7;60:22	11:09 (1) 75:21	23 (1) 133:18	45 (1) 189:13
1	11:37 (1) 93:10	245 (6) 104:5,16,20;110:3;185:22,25	48 (1) 189:13
1 (17) 61:9;133:5;139:8;141:10,15; 143:17;146:13;149:6;156:15, 19;158:8,15;183:21,21;185:9, 25;186:14	11:47 (1) 93:13	26 (3) 31:9;95:11,13	5
1:01 (1) 114:9	12 (3) 31:14,24;102:11	273 (1) 137:19	5 (7) 147:12;150:11,15,19;151:14; 156:5;189:13
1:39 (1) 137:10	12:19 (1) 114:6	28 (2) 131:23;136:5	50 (1) 180:3
1:49 (1) 137:13	140 (1) 122:24	28th (8) 31:12;33:5;46:14,17,18,23; 47:3;49:19	501 (1) 147:16
10 (1) 181:3	180 (1) 126:12	297 (1) 144:14	52 (1) 105:11
10:01 (1) 47:9	183 (1) 138:1	3	55 (3) 105:11;180:23;181:6
10:05 (1) 47:12	1965 (1) 100:2	3 (14) 58:3;61:9;71:10;74:22;75:3, 8;83:2;124:16;128:15;129:2; 138:1;147:25;166:4;167:10	56 (4) 180:23;181:7;182:4,5
10:53 (1) 75:18	2	3.2 (1) 71:12	59 (2) 182:4,5
100 (1) 173:12	2 (8) 15:24;16:14;106:4,5;108:9; 119:22;180:23;181:6	3:19 (1) 179:9	6
1001 (3) 16:10;24:5;26:23	2:07 (1) 147:5	3:28 (1) 179:12	6 (13) 93:19;148:21;150:11;151:20; 152:4;153:6,10;154:2,6,12; 156:1;166:4;167:10
1002 (3) 27:10,15,20	2:12 (1) 147:8	3:57 (1) 196:25	60 (3) 95:11,14;142:15
1003 (3) 27:13;29:5;30:5	2:45 (1) 163:25	3:58 (2) 196:9,12	61 (1) 106:8
1004 (2) 31:2;93:16	2:52 (1) 164:3	30 (1) 133:18	694 (34) 73:4;104:4,16;110:3;142:1,2, 5;143:2;144:4,8,16,21,24; 146:13;148:19,22,23,24;149:6, 16;150:9;156:15,19;158:8,15; 160:8;164:20,22,25;166:18; 169:12;171:1,9;177:16
1005 (1) 35:13	20 (1) 185:4	304 (1) 127:5	6ish (1) 36:20
1006 (10) 51:18;52:24;57:11,12;61:8; 71:3,5;76:1;119:2,15	2000 (3) 24:11;56:8;61:15	305 (1) 127:6	7
1007 (2) 52:8;74:22	20006 (1) 196:20	32 (1) 93:22	7 (5) 101:8;105:10;107:7,8;189:2
1008 (1) 95:3	2000s (3) 23:24;36:20;63:11	350 (1) 119:16	7305245 (1) 185:3
1009 (1) 137:18	2001 (3) 24:11;61:15;63:16	372 (1) 144:9	7433694 (1) 142:14
1010 (1) 142:13	2002 (1) 19:11	39 (1) 130:13	78 (1) 25:7
1011 (1) 144:7	2003 (1) 101:7	3968 (1) 53:2	
1012 (8) 164:7,24;169:21;170:21; 177:14,17;178:8;179:6	2005 (16) 36:20;54:2,6,12,13;56:9; 61:21,21;63:16;99:20;100:1,7; 190:16;191:4;192:2,2	4	
1013 (8) 169:8;170:19;171:8,11,17; 175:20;178:1;179:6	2006 (7) 52:6;53:3,19;54:1,5,14;101:8	4 (6) 28:5;127:16;129:1,10; 147:25;182:11	
1014 (1)	2007 (1) 38:1	4.2 (1) 82:2	
	2011 (3)		

8	<p>Acampora's (5) 31:19;42:23;50:21;94:17; 97:19</p> <p>access (313) 20:24;21:22;22:24;25:9,17; 26:2,9,19;48:4;53:10,12,13,16, 17;57:15;61:12,18,24;62:6,9,14, 15,16,24;63:23,25;64:10;65:1, 10,20;66:22;67:4,9,17,18,23; 68:2,9,13;71:21,24,25;72:8,10, 12,15,17;73:10,12;74:11,17; 75:13;76:3,10,14,24;77:3,4,13, 19;78:19;79:7,13;81:17;82:19; 83:23,25;84:1,2;85:3,9,12;86:1; 90:23;91:4,7;92:2,9,19,23,25; 101:20;111:2,7;114:22;115:10, 18;116:1,2,5,7,10,14,16,19,20, 21,24;117:10,13,22;118:5,10, 11,16,21;119:3,7,9;122:5,8,9, 13,15,16,19;123:6,15,19,22,25; 124:2,6;125:2,5,6,8,12,13,13,20, 21,23;126:6,7,16,18,25;127:1,7, 12,17;128:10,13,15,18;129:4,4, 6,7,22;133:9,10,12,14;134:2,22, 22;138:21;139:10,19;140:4,6; 141:1,17,24;143:9;145:1,11,17, 25;146:3;147:21;148:2,7,12; 149:1,7;150:17,20,21,23;151:8, 11,23;152:13,15,21,24;153:10, 22;154:3,5,18;155:14,15,21; 156:16,25;157:4,17;158:1,4,5, 10,13,14,25;159:2,3,5,8,16; 160:3;164:12;165:6,15;166:2,7, 12,13;167:9,9,17,23;168:22; 169:15;170:6,10,11,11,21; 171:3,16;172:9,10,12,14,23,24, 25;173:2,5,16,22;174:3,12,15; 175:1,7,15,16,18,23;176:4,5,6, 12,19;177:3,4,6,8,21,23;178:5, 18,19;179:4,17,21;181:24; 182:3,7,18,20;183:1,5,22;184:4; 185:10,15,19;186:3,15;187:2,9, 13,15,22;188:16;189:4,9;190:2, 25;191:4,21;192:5,7,10,16,20; 193:10,19,24;194:14,18,18,21; 195:6,16,22,23</p> <p>achieved (1) 152:18</p> <p>achieving (4) 131:5,11,11,17</p> <p>acquired (1) 101:13</p> <p>acronym (1) 63:5</p> <p>across (3) 81:12;154:13;182:1</p> <p>action (1) 4:6</p> <p>active (1) 19:18</p> <p>actual (20) 32:12;52:16;53:20;55:15; 74:3,16;77:1;80:8,9;83:24; 98:20;129:4;148:2,12;150:21; 162:16;174:15;175:17,23; 183:18</p> <p>actually (46) 21:9;27:9;32:17;34:25;39:3; 49:16;53:18;54:8;55:21;56:22; 65:13;74:18;75:8,14,15;81:14; 90:10,13;92:19;113:21;117:3; 125:2;126:19;130:3,10,11; 132:10;137:22;138:17;140:1; 146:15;148:8;150:23;151:11; 152:21;155:25;157:7;166:21; 174:17;176:12;179:18;181:5; 182:5;184:16;189:18;193:1</p> <p>add (2) 98:4,6</p> <p>addition (3) 96:13;143:8;145:22</p> <p>additional (5) 29:6;33:21;49:20;167:3; 182:21</p> <p>address (5) 62:24;111:12;166:11;196:14, 23</p> <p>addresses (1) 180:1</p> <p>adjusted (2) 161:25;162:3</p> <p>administrator (1) 19:20</p> <p>admit (1) 142:20</p> <p>advance (2) 80:10;83:11</p> <p>advised (5) 9:21;10:7;44:2;49:16;56:18</p> <p>affect (9) 66:11,14,17,18;72:3;81:18; 91:13,13,17</p> <p>affected (6) 67:25;71:21;78:11;82:19; 89:3;112:18</p> <p>affects (3) 66:21;120:23;121:1</p> <p>afraid (1) 38:17</p>	<p>afternoon (2) 102:19,24</p> <p>again (32) 5:15;18:15;19:7;24:2;39:9, 24;43:2;50:4,6,7,23;51:11; 58:15;71:9;89:13;92:21; 109:18;112:11,22;123:11; 126:8;136:21;139:21;143:24; 144:10,21;145:14;146:19; 149:24;154:20;171:8;182:4</p> <p>ago (15) 4:18;5:15;6:2;15:9;19:9;23:7, 24;24:12;36:8;51:24;59:23; 69:16;84:24;132:9;139:7</p> <p>agree (36) 30:2;41:5;43:5;52:10;65:9; 66:20;69:2;75:7;97:24;99:8; 104:4;106:10;108:13,15; 113:13;117:24;122:17;125:11, 17;126:14;130:25;132:9,22; 136:13;138:17;139:16;145:8; 151:17;173:23;180:12;181:17; 186:10;189:6,17,21;194:2</p> <p>agreed (3) 43:15;154:20,21</p> <p>agreement (3) 29:9,21,22</p> <p>ah (1) 62:8</p> <p>ahead (2) 8:8,13</p> <p>aid (4) 15:14,18;20:1,8</p> <p>aimed (1) 120:9</p> <p>Aironet (2) 119:16,16</p> <p>A-I-R-O-N-E-T (1) 119:16</p> <p>al (2) 21:10;52:21</p> <p>algorithm (40) 81:18;82:11,20,24;83:4;85:2, 3;128:12;130:3,6;131:9,22; 132:3,5;135:21;136:19;185:12, 14,18;186:2,8,9,17;187:1,8,8, 188:15;189:3,14;190:1;191:7; 192:7,19;193:23;194:13,16,20, 25;195:15,21</p> <p>algorithms (32) 81:22;82:6,14,15,23,25;83:6, 16;84:10,21;98:8,10;131:15; 136:8;185:13;186:18,22; 187:12,21;190:8,10,22,24; 191:2,10,13,15,24;192:4;193:2, 4;196:1</p> <p>alley (1) 74:6</p> <p>allow (2) 118:20;152:11</p> <p>allows (1) 110:16</p> <p>along (2)</p>
9	<p>9 (4) 180:2;181:3;182:11;189:2</p> <p>9:38 (1) 39:18</p> <p>9:49 (1) 39:21</p> <p>97 (1) 149:22</p> <p>988 (38) 31:23;32:11;52:10;73:4,16, 22;74:22;75:3;103:12;104:4,13, 24;105:7;109:24;110:2,11; 119:22;121:21;133:6;135:9; 137:17;141:11;143:3;147:11; 148:19;164:22;171:10,12,13,14, 25;172:8;173:11,15;177:18; 179:22,23;180:22</p>	<p>ability (8) 11:11;37:11;66:21;98:12; 99:13;120:23;121:1,11</p> <p>able (16) 37:14,16;60:12;68:10;71:21; 73:9;88:16;93:1;94:5;97:13,13; 98:5;99:3,18;102:16;120:11</p> <p>above (2) 123:16;197:13</p> <p>abstract (1) 104:6</p> <p>academic (3) 58:13,25;100:22</p> <p>academics (1) 101:3</p> <p>Acampora (8) 29:19,22;30:13;40:22;95:4, 15;96:1;97:24</p>
A	<p>accomplished (1) 88:2</p> <p>according (3) 119:14;134:10;173:17</p> <p>account (2) 87:3,8</p> <p>accuracy (8) 67:22;78:11;79:4,13;83:3; 193:17,25;194:2</p> <p>accurate (13) 26:25,25;35:9,11;67:20;68:1; 76:15;77:14;85:14;88:16; 89:16;151:8;193:24</p> <p>accurately (2) 26:5;111:1</p> <p>achieve (3) 114:20;134:13;137:1</p>	

<p>64:16;126:2 Alternative (3) 40:19;43:4;97:20 alternatives (1) 85:23 although (6) 22:1;41:21;48:14;89:13; 155:16;167:7 always (1) 22:1 amateur (1) 106:13 amateurs (1) 106:16 ambiguous (32) 11:4;12:14;20:3;25:18;27:5; 69:6;72:21;76:12;77:11,25; 78:12;84:4;86:15;89:21;99:14; 109:23;114:25;117:23;118:8; 120:3,16;121:4;133:1;148:9; 157:10;158:19;164:17;169:13; 172:5;174:6;184:19;189:11 amended (4) 139:7,8;143:16,17 amendment (5) 138:1,5,22;144:15;162:16 amendments (3) 144:21;162:4,10 among (5) 175:19;180:21;181:9,12; 187:10 amount (5) 34:25;88:12;115:24;128:22, 22 analysis (7) 65:7;81:14;104:8;167:13; 179:5;183:11,18 analyzed (1) 18:5 announcing (1) 62:18 answered (5) 8:8;48:3;56:11;116:9;166:22 antenna (30) 66:11,14,16,21,23;67:1,3; 84:13,13;85:6,17,22;86:1,4,4; 117:2,6,9,18,25;118:4,13; 119:11,20,25;120:1;121:5,6,9, 10 antennas (6) 118:12;119:23;120:17; 121:12,13,18 Anthony (3) 40:22;58:2;95:4 anymore (1) 63:12 anyplace (1) 189:24 AP (9) 21:12;51:19;61:10;70:23; 71:16;72:3;105:25;180:8;184:3 apologize (3) 46:20;54:9;150:2</p>	<p>apparent (3) 89:25;90:4,9 Apparently (1) 79:24 apparentness (1) 90:15 appear (5) 86:12;165:16;170:22;173:3; 177:22 appeared (3) 54:8;64:13;197:13 appears (4) 31:7;35:15;52:11;168:6 applicants (1) 144:25 application (7) 22:2;98:8;189:5;190:17; 193:21;195:7,16 applies (1) 43:13 apply (2) 12:8;167:19 appreciate (5) 8:22;10:1,5;121:20;168:15 approach (4) 87:16;121:8;131:21;136:7 approaches (1) 131:16 appropriate (9) 12:9;94:15;184:12,12;185:9; 190:9,23;191:3;192:4 appropriately (2) 11:25;96:20 approximately (1) 196:25 APs (5) 57:15;71:15;74:1;91:17;93:2 arc (1) 123:2 area (50) 68:12,22;78:10,23,23;79:3; 114:20,21,22;115:7;132:24; 133:13,21,22;134:2;135:6; 136:9,15,22;139:10,20;141:18; 146:3,4;149:2,3;150:24;151:12; 157:1,2,4;158:2,11,18;167:16; 168:23;170:4;171:17;172:13, 24;173:17;174:3;175:7;176:7, 19;177:6;178:6,20;182:1;184:4 areas (7) 65:19;115:2;116:4;117:14, 17;166:3,8 around (82) 24:11,11;53:11;60:23;65:21; 66:23;71:17,20;72:2;76:1,9,14, 17,19;77:2,12;78:16,18,19; 79:13,23;105:24;113:7;122:4,9; 123:4,5,8,15,19,22;124:2,5,13; 125:23;126:3,14;127:1,11,13, 16;128:10,13;133:10;134:21, 22;138:20;145:1,11,17;151:23, 23;153:23;156:13,15,23;158:4, 14;159:3;165:9,22,24,25;166:6;</p>	<p>167:23;171:3;172:10;173:5; 174:16,19;175:17,21,23,24; 176:4;177:8;178:17,19;180:5; 184:5;185:22,24 aroundness (1) 126:3 arrows (1) 124:24 arsenal (1) 187:12 art (33) 5:19;6:10,12;7:14;93:21,23; 94:1,8,16;95:14,16;96:2,21; 97:5;101:11,23;102:1,5,6; 109:1;110:21;126:22;127:22, 25;144:1;161:2;190:12,16; 192:3,23;194:10,12,17 Arterial (49) 12:22;14:5;73:3,15,22;111:3, 8,19;112:6,8,15,20;124:21; 128:7,17,20,23;129:11,12,19, 20;133:14;134:6;136:9;144:23; 145:6;148:1;158:21;159:10,12, 20;165:9,14,15;167:6,24;168:1, 3,5,8;170:14,20;171:5;172:14; 173:1,6;174:20;177:21,23 arteries (9) 73:16,24;112:3;128:8,9; 129:13,16;134:8;160:1 artery (3) 74:2,5,7 article (5) 37:23;52:23;70:23;130:10,11 aside (4) 103:25;115:17;116:16;167:8 aspect (5) 95:1;146:11;165:10;181:23; 184:1 aspects (11) 20:5;34:14,17;41:9,12; 102:22;103:4,5;157:21;158:8, 15 assessment (1) 118:21 assist (1) 15:17 assistant (1) 17:21 assistants (2) 10:12,13 assists (1) 105:10 assume (12) 8:24;18:16;55:17,19;104:23; 118:2;150:15,19,22;154:5; 173:23;176:17 assumes (1) 126:1 assuming (4) 73:8;155:10;170:9;178:14 assumption (5) 55:18,21;155:3,19,20 assumptions (2)</p>	<p>155:2;164:18 assuredly (1) 162:9 attached (1) 46:7 attachment (4) 27:18,20,24;28:6 attachments (1) 46:12 attempt (1) 112:2 attempted (1) 59:13 attempting (1) 108:19 attend (1) 58:14 attention (2) 41:12;187:9 attenuated (1) 86:6 attenuating (1) 87:2 attorney (1) 46:5 attorneys (2) 15:14,16 attorney's (1) 48:4 attributable (1) 119:9 August (1) 61:21 author (3) 56:14;58:2,3 authors (2) 57:24;58:1 automated (2) 64:5,9 available (16) 29:3,16;32:20;47:5;48:19; 54:24;62:7;82:19;83:16,20; 85:1,23;91:3;148:13;152:17,18 avoid (14) 111:3,8;134:6,7;136:9;145:6; 157:5;158:21;159:10,12,19; 186:1,2,7 avoids (2) 133:14;172:14 aware (10) 6:11,23;7:1;27:2,8;28:13; 57:20;60:20,25;189:24 away (9) 66:24;117:14,18;120:12; 121:8;144:5;146:17;152:5; 154:2</p>
B			
<p>bachelor's (3) 94:1;95:17;97:20 back (32) 4:20;14:10;16:6;27:25;39:22;</p>			

42:16,22;47:13;66:1;77:22,23; 79:11;93:14;106:4;135:17; 141:8;143:7;144:6;157:8,9; 161:12,19,23;164:4;177:13; 183:20;185:20;186:5;188:4,8,9, 12	below (1) 123:16	74:9;97:25;110:14;111:4; 152:1;158:16;178:23;195:24; 196:22	122:14;125:1,8,12,12,21; 126:16,18;129:3,6,11,25; 133:15;147:18;148:6;150:9,15, 17,19;151:23;152:5;153:1,11; 154:3;155:8,9;156:18;158:2,12; 159:11;164:12;165:6;166:14; 167:5;168:19,25;170:6,10; 172:14,22,25;173:2,21;174:17, 20;175:15,19;177:20;180:8
background (4) 34:1;97:5,25;103:13	benefit (2) 89:12;126:8	bottom (6) 123:11;125:7,9;128:15;146:1, 11	calculating (4) 145:24;149:25;180:6;184:7
Baker (1) 4:5	benefits (1) 111:19	bound (1) 38:9	calculation (5) 78:11;93:6;122:14;133:13; 172:13
ballpark (1) 33:17	besides (7) 6:12;33:22;34:16;45:3;84:21; 85:12;132:23	bounds (2) 7:14;193:14	calculations (5) 79:4,11;92:20;93:4;134:6
bankrupt (1) 18:9	best (12) 6:14;7:12,25;8:1;26:24; 35:11;55:23;63:16;78:4;85:3; 151:3;152:14	box (5) 125:6;128:16;152:6,25;153:9	call (4) 46:24;65:2;105:19;153:18
base (2) 118:23;192:8	better (27) 56:2;65:20;66:22;67:2,6,7; 68:2,10,15;72:16;76:15;77:5, 13;79:13,16;83:6;84:11;85:18, 18,19,20,21;97:17;111:4; 117:10;128:14;154:16	bracket (2) 181:25,25	called (9) 7:1;25:4;30:13;58:11;62:2, 24;63:24;64:20;65:14
based (15) 5:4;9:18;10:21;23:3;74:7; 102:9;113:3;142:17;166:15; 185:10;186:14;187:14;192:17, 19;193:10	beyond (4) 41:8;43:9;63:3;174:8	break (11) 9:3;16:12;39:16;40:1;47:7, 21;93:8;114:12;137:7;147:1; 163:21	calls (17) 7:8,17;9:13,14;59:15;69:7; 84:5;87:12;89:22;103:10; 106:22;107:13;115:1;140:13; 143:20;183:13;184:20
bases (1) 6:11	bias (52) 12:22;14:5;71:15;73:3,8,15, 16,22;111:3,8,19;112:6,8,15,21; 124:21;128:7,17,20,23;129:11, 12,19,20;133:14;134:6;136:9; 144:23;145:6;148:1;158:21; 159:11,12,20;165:9,14,15; 167:6,24;168:1,3,5,8;170:14,20; 171:5;172:14;173:1,6;174:21; 177:21,23	breaks (1) 9:2	came (6) 36:2;37:25;48:21;79:17; 121:16;163:12
basic (3) 7:6;62:13;75:11	biased (3) 72:3,10;73:13	brick (1) 86:21	campus (7) 65:17,17,24;67:10;68:22; 69:25;75:13
basically (1) 56:18	biasing (3) 74:10;77:19;160:1	brief (8) 40:15,20,23,24;41:5;42:15; 43:3;138:8	Can (79) 4:16;8:20;9:17;11:7,10;12:3, 16;24:24;26:4;30:2;31:5;33:11; 36:18;38:13;47:7,14,23;48:2; 59:10;61:25;62:19;65:12;66:17, 23;68:14;69:5;72:15;76:14,15; 77:1;78:13;84:17;86:4,11; 88:12;93:7;99:9,24;100:14; 104:10,16;108:5;109:7;111:9; 113:2;117:12;121:7,13,21; 128:23;135:17;138:15;139:14; 142:12,21;144:5;146:17; 149:20;151:3;152:1,11,14; 157:7;159:16;160:18;161:7,15; 162:9,14;166:11,11;169:10; 172:20;176:25;179:8;185:7; 189:2;191:2;196:17
basics (1) 7:21	big (3) 48:22;65:21;123:2	briefing (1) 51:2	card (6) 102:20;119:17,17,18;120:13; 196:19
basis (4) 15:7;34:20;94:10;193:2	billed (1) 35:3	briefly (3) 50:7;53:9;90:25	cared (1) 39:13
Bates (15) 52:8;70:10,11,25,25;71:2,11; 82:4;90:20;137:18,25;142:14; 144:9,13;185:3	binary (2) 195:21;196:1	briefs (6) 31:18;41:13;42:9,11,15;46:6	careful (1) 160:22
beacon (6) 57:14;62:20,22;92:10,13,16	bit (6) 90:14;114:13;143:13;148:16; 181:10;182:10	broad (4) 30:2;70:3;84:6;108:22	carefully (4) 69:9;127:3;159:24;197:1
beacons (20) 62:17;64:3,15,16;66:17;86:2, 3;88:9,11,12;91:18,19,21,21,23, 24;92:12,12,14;116:7	black (1) 124:24	broadcast (4) 62:16;116:17,20;117:4	cars (3)
bears (1) 164:8	black (1) 124:24	broadcasting (3) 86:2;118:18;119:4	
became (2) 57:20;61:20	blob (2) 48:22;49:10	broader (2) 102:17;143:18	
become (2) 63:13;124:13	block (11) 152:14,15;154:14,14,17,18; 155:24,25;166:4,4,4	building (19) 71:17,20;72:1,2,6,9,11,13,15; 73:10,14;76:1;78:19;79:23; 81:2,3,5;110:16;182:19	
becomes (1) 187:18	blocks (4) 116:5;167:10;170:5,12	buildings (9) 65:18,18,21;71:23;78:16; 81:11;86:20;89:8;117:13	
began (3) 58:16;61:22;63:9	boiled (1) 5:17	bulk (2) 54:6,11	
Begins (2) 90:20,23	books (1) 86:22	business (4) 105:20,21;113:8;196:19	
begs (1) 167:25	born (2) 130:17,18	busy (4) 19:13,16,17,21	
behaviors (1) 63:18	Boston (3) 5:4;36:16;43:17	buy (2) 66:6,9	
behind (3) 22:22;27:17;99:2	both (14) 8:21;23:19,20;59:11;60:9;		
belief (1) 108:8		C	
believes (2) 162:1;176:17		cabinet (1) 86:9	
		calculate (3) 77:16;183:24;193:10	
		calculated (54) 74:11,18;75:8,14;81:14;	

<p>106:2;113:6;115:11 carving (4) 157:11,12,13,14 case (55) 4:16,21,23;5:1,6,13,17,25; 6:14,18,19;11:24;12:10;14:21, 21,24;15:14,14,15;16:18,21; 17:12,16,25;18:8,9,20,22;19:6, 12;20:13;27:3;34:23;35:22; 40:14;43:24;44:15,17;45:11,24; 49:20;74:4;95:15;98:18;100:4; 127:13;130:7;140:25;151:14; 152:8;153:12;155:12;156:4,6; 189:5 cases (15) 12:8,21;15:22;16:22,25;17:3, 5;75:16;81:3,4,11;125:2;141:9, 11;165:25 catalog (1) 138:15 category (1) 118:23 caveat (1) 171:5 center (1) 73:14 centroid (8) 82:5,6,13,14;191:16,17,17,20 certain (12) 28:14;44:5;103:4;143:1; 144:21;190:8,9,22,23,24;192:9; 193:4 certainly (13) 54:1;58:7;99:17;101:21; 106:24;112:5;119:1;122:17,20; 131:14;173:7;191:14;194:3 certainty (1) 69:1 chalk (1) 62:4 chalking (5) 62:2;63:8,19,23;64:1 challenge (1) 60:19 challenging (1) 57:5 chance (1) 17:14 Change (12) 5:4;75:17;88:18,20,22;114:5; 140:1,10;146:6;155:19;171:9; 179:8 changed (7) 88:23,24;90:3,7,14,15;148:16 changes (1) 34:8 changing (2) 89:3,18 channel (1) 91:18 characteristic (1) 165:21 characteristics (2)</p>	<p>165:5;167:22 characterize (1) 78:13 check (2) 147:1;181:7 checking (1) 174:24 Chinese (18) 122:2;123:14,20;128:12; 130:1,14,21;131:1,6,9,21;132:3, 5,23;135:21;136:18,21,24 choice (3) 82:19;187:14;192:8 choices (2) 80:20;187:10 choose (10) 121:10;159:24;186:8,24; 187:7;188:13;192:16,19;193:6, 22 choosing (7) 82:24;185:11;186:16;191:5, 6;193:2;195:15 chose (3) 66:2;187:7,8 chosen (6) 112:1;185:14;186:2;187:1; 188:15;192:6 circle (1) 154:4 Cisco (1) 119:16 citation (7) 60:20;61:20;181:6,18;182:10, 11,16 cite (2) 57:24;87:14 cited (1) 21:9 cites (2) 61:9;180:22 cities (1) 117:12 citizens (1) 92:23 city (7) 73:25;113:10;114:18;115:8, 10;118:22;130:8 claim (85) 6:5,12;9:18;11:3,4,14,16; 13:6,9,17;20:2,40;7,10,15,19, 23;41:5,6,18,19;42:5,17,18,18; 43:4,6;44:9,13;115:2;133:5,8; 134:11;138:7,14;139:8;140:11, 20;141:10,10,15,21;143:16; 146:7,11,13;149:6;153:21; 156:15,19,23,24;157:5,22; 158:8,15,20;159:22;160:7,10, 18;161:2,5,15,24;162:10,24; 173:14,18;176:2,2,19;183:11, 18,20,21,21,25,25;185:8,9,25, 25;186:14;187:5;192:14 claimed (1) 17:21</p>	<p>claims (40) 5:20;7:15;11:21,24;12:4,8,12, 18;13:4;42:2,3;51:9;109:5,8,12; 115:7;135:11,15,19;138:2,4,16; 143:17,18;144:16;148:19,22; 153:20;158:20;160:12,13; 161:8,9,9,11;162:5,15;163:10; 164:16;184:13 clarification (13) 47:14,18;48:9;49:12;109:17; 140:1,11,17;145:12,18;146:8,9; 169:17 clarify (8) 13:5;59:24;96:22;99:24; 115:6;135:10;142:17;143:10 clarifying (4) 121:20;139:21,24;144:2 class (2) 22:21;24:21 classic (1) 136:23 clause (1) 98:5 clear (25) 22:14;25:21;27:22;28:23; 30:21;42:4,14;54:3;58:1;63:18; 69:10,12,16;70:22;98:17; 112:13,21;113:8;118:19; 143:14;145:21;157:11;171:6; 172:16;190:21 clearly (4) 123:21;124:4;127:16;177:12 client (2) 140:24;141:5 client's (1) 32:7 close (11) 41:12;68:22;71:17;74:2,3; 81:2,2,5;150:2;159:4;173:7 closed (2) 181:25;196:24 closely (1) 59:17 closer (4) 53:18;74:5;76:25;102:11 clue (1) 53:23 co-authors (2) 51:23,25 code (13) 18:5;62:5;94:5;98:6,9,11,13; 99:4,9,13,19;100:5;195:3 coding (1) 101:19 collaboration (1) 101:2 collaborations (1) 100:24 collaborative (3) 34:5;56:25;66:3 colleagues (3) 100:15,18,25 collect (18)</p>	<p>25:24;88:6,24;91:22;105:23, 25;106:2,16;111:2,7;112:1,2; 113:7;134:9,12,14;152:15; 157:16 collected (14) 65:1,6;73:23;84:11,12;87:23; 89:1,10;124:5;139:1;152:16; 165:13;167:5;168:19 collecting (6) 53:16;64:3;72:6;85:8;106:20; 134:8 collection (8) 53:10;64:13;106:19;108:16; 114:14;136:1,10;168:12 College (2) 24:7;65:16 collide (3) 91:19;92:5,12 column (17) 52:18;105:10;106:4,5;107:6, 7,8;108:9;130:12;131:23;136:5; 180:2;181:6;182:4,10;189:2,13 columns (2) 180:23;181:3 comfortable (2) 96:14;104:15 coming (4) 79:11;120:10;143:7;193:15 comma (4) 94:3,4;190:8,9 comment (1) 140:15 commercial (2) 58:23;59:3 commission (1) 197:24 common (4) 12:16;61:20;63:12,14 commonly (2) 62:4;63:21 communication (3) 91:11;97:16;101:14 communications (5) 94:4;95:19;96:3,11,18 community (3) 100:16;106:14,19 company (2) 60:21;61:1 compare (3) 67:20,21;127:15 compared (1) 83:24 comparing (1) 122:1 competitor (3) 156:12;185:21,22 complete (2) 114:20,21 completed (1) 56:8 completely (1) 135:25 complex (1)</p>
---	--	--	--

87:15 components (2) 43:12;115:16 comports (1) 53:5 composition (1) 86:20 Compound (3) 21:24;87:11;195:11 comprehensive (3) 89:18;113:18;114:17 comprehensively (1) 90:9 compute (3) 84:11;88:16;93:1 computer (17) 25:1,9;53:2;94:2,5,11;95:18; 97:21;98:6,10,13,15;99:4,8,10; 100:5;156:17 computers (8) 4:19;18:21;19:5;24:9;25:13; 39:5;65:7;97:16 computing (5) 23:1,17;24:17,25;25:3 con (1) 21:6 concept (1) 195:9 concepts (4) 73:17;112:12,14,23 concerned (3) 73:23;74:4,10 concerning (1) 5:14 concisely (1) 121:19 concludes (1) 72:5 conclusion (9) 7:9;9:14;69:7;80:3;115:2; 140:14;143:21;183:13;184:21 conclusions (1) 66:19 concrete (2) 60:12;133:7 condition (2) 69:19;98:11 conducted (5) 53:21;54:20;56:22;89:20; 90:11 conference (3) 54:23;58:11,13 conferences (4) 57:25;58:8,9,14 confidence (1) 119:6 confident (1) 108:11 confidential (1) 5:12 configured (1) 116:8 confirm (1)	30:17 confirming (1) 182:1 conflate (1) 42:4 conjunction (1) 28:15 connect (1) 20:25 Connected (1) 18:11 consider (2) 44:12;161:3 considered (3) 11:2,3;94:15 considering (2) 20:1;165:2 considers (1) 162:24 consistent (3) 11:13,17;184:17 constitutes (3) 189:19,25;194:13 constraints (1) 191:24 constructed (1) 116:4 construction (20) 11:5,8,11;12:16;20:2;40:7,10, 15,20,23;41:5,6;42:18;43:5; 44:10,13;138:8;149:16;178:2; 183:11 constructions (2) 12:10;142:25 construe (3) 153:21;177:11,20 construed (7) 12:25;13:22;14:1;43:7; 172:15;184:16,17 consultant (1) 15:13 consulting (3) 16:15,18;19:22 contact (2) 36:2;196:22 contacted (3) 35:22,24;40:2 contain (1) 184:3 context (32) 13:22;20:22;22:13;36:10,11; 42:2;43:23;82:22;103:7;128:4; 139:23;140:9,16,18,20,23; 141:5;149:5,24;153:19;160:12; 161:7,13;164:20;181:11,14; 185:1;191:6;193:20;194:11; 195:15,20 contexts (9) 42:3;140:22;141:4;143:6,11; 195:18,21;196:1,2 continue (2) 104:14;142:18 contrast (5)	107:10;123:13,17;127:18; 128:6 contrasting (1) 129:2 contributions (1) 57:3 control (2) 86:14,17 convenience (2) 15:21;104:12 convenient (1) 66:9 conversation (9) 22:13;28:25;33:25;36:17; 49:3;56:25;58:6;66:10;171:6 conversations (3) 10:11,21;50:14 copies (1) 45:14 copy (16) 16:8,13;35:7,15;38:18;39:5; 52:7,10;70:10,11,22;142:11,13; 149:17;185:2;196:13 copyright (1) 17:24 copyrights (3) 17:22,23,24 corner (3) 125:7,9;128:16 Corporation (2) 17:9;18:11 corrections (1) 34:7 correctly (9) 5:17;26:9;73:12;111:6; 127:24;129:15;150:8;176:10; 191:22 correspond (1) 125:11 correspondence (2) 161:19,23 corresponding (3) 185:12;186:16;191:7 counsel (15) 5:5;7:21;9:19,21;15:7;32:22; 33:25;34:6;40:2;45:1;47:21,25; 49:2,5,6 counsel's (1) 32:21 counterclaim (1) 6:5 COUNTY (2) 197:9,12 couple (6) 14:15;68:7;115:16;176:25; 190:10;194:4 course (21) 24:18,19,23;25:1,4,5,6,9,23; 26:1,11,15;32:19;33:6;50:14; 64:25;68:22;80:3;99:10; 161:10;172:19 courses (7) 22:25;23:7,17,21;24:6,15,17	court (12) 10:1;15:11;16:9;20:1,8; 46:13;173:23,24;175:4,25; 176:17;178:1 cover (15) 30:2;51:6,6;54:25;112:4; 113:1,22;115:17,19;131:1,15; 133:23;134:25;135:19,22 coverage (3) 117:10;132:2;160:13 covered (3) 43:13;89:8;135:2 covering (3) 136:22;160:3,11 covers (2) 130:6;133:21 create (6) 63:24;64:1,12,25;65:9;111:9 created (2) 65:5;164:8 creating (1) 64:9 criteria (5) 188:1;189:7,18,25;194:3 critical (1) 167:12 criticism (1) 111:24 criticisms (2) 111:21;112:19 criticized (1) 108:16 criticizes (1) 135:24 CS (3) 25:6,12;97:25 cumbersome (1) 61:24 curious (1) 101:12 curriculum (1) 16:11 customers (1) 113:25 CV (7) 24:2;26:23,24;27:4;29:16; 31:8;54:17
D			
Dartmouth (12) 19:18;24:7;51:15;65:16,24; 67:17,18;71:23;75:12;100:16; 101:17,18 data (68) 21:22;22:20;53:16;55:5;63:1; 64:13;65:6,13;67:3,5,6,24; 68:14,25;69:4,10;72:6,7;73:23; 80:18;82:25;83:4;84:11,12; 87:23;88:6,13,15,25;89:1,4,10, 14,16;91:22;92:2,11,13;105:24, 25;106:3,14,17,20;112:1,2; 113:7;114:1,14;134:8,9,14;			

<p>136:1,10;152:16,17;155:7,9,14, 15;168:12,19;173:25;179:19; 182:6,21;191:21;195:4</p> <p>database (23) 64:6,9,25;65:5,9;146:2; 148:18,25;155:23;156:16,25; 157:25;158:9,9;159:15;183:9, 10,15,21,23;184:2,7,14</p> <p>databases (3) 63:24;64:1,12</p> <p>date (4) 24:10;35:1,20;45:14</p> <p>dates (1) 55:5</p> <p>David (5) 4:9;27:11,14;31:3;197:5</p> <p>D-A-V-I-D (1) 4:9</p> <p>day (2) 9:2;197:12</p> <p>day-by-day (1) 15:7</p> <p>days (2) 25:3;99:17</p> <p>DC (1) 196:20</p> <p>dead (1) 148:7</p> <p>deadline (1) 54:22</p> <p>dealt (1) 42:17</p> <p>debate (3) 109:7;132:19;134:17</p> <p>decide (2) 18:3;194:19</p> <p>decided (6) 65:12,13;80:13;156:8,22; 168:20</p> <p>deciding (2) 15:7;162:24</p> <p>decision (1) 189:3</p> <p>declar (1) 41:11</p> <p>declaration (46) 13:10,15;14:1,30;9,11,13; 31:3,7,19,21;32:7,8,8,19;33:9, 22;34:3,4,14,19;40:22;41:8,11, 14;42:24;43:11;45:11;46:3,14, 23;47:3;48:6;49:19;50:2,17,21; 93:17;94:18,24,25;95:4;111:23; 141:8;181:22;183:7;190:4</p> <p>declarations (10) 46:5,12;47:1,2;48:4,15,17; 49:15;50:18,20</p> <p>decode (1) 92:6</p> <p>deemed (1) 41:19</p> <p>defendant (1) 6:1</p> <p>define (3)</p>	<p>124:4;165:23;173:19</p> <p>defined (3) 113:4;140:18;165:4</p> <p>defining (1) 179:24</p> <p>definite (2) 11:2,9</p> <p>definiteness (3) 9:11;10:7;11:1</p> <p>definition (19) 14:3;97:4,17,19;98:4,13; 102:9;106:18;107:1,4;161:11, 13;165:17;167:21,22;172:17; 173:10,10,20</p> <p>definitions (4) 46:1,8;98:22;167:19</p> <p>degree (16) 9:17;94:2;95:17;97:20;98:1, 14;99:12,17;100:1,2;126:4; 151:7;195:10,18,19;196:2</p> <p>degrees (3) 102:21;122:24;126:12</p> <p>Delaware (1) 15:12</p> <p>deleted (1) 145:5</p> <p>delivery (2) 113:6,9</p> <p>dem (1) 174:15</p> <p>demonstrated (1) 178:7</p> <p>dense (1) 116:4</p> <p>densely (1) 116:4</p> <p>density (1) 117:16</p> <p>depend (1) 118:11</p> <p>depending (1) 193:20</p> <p>Depends (2) 86:24;152:20</p> <p>depicted (2) 74:21;75:3</p> <p>depicts (1) 75:8</p> <p>deposed (1) 4:11</p> <p>deposition (7) 16:22;48:4;49:25;50:4,16; 196:24;197:2</p> <p>depositions (1) 7:21</p> <p>derived (1) 128:11</p> <p>describe (10) 4:16;23:21;24:15;61:25;62:6; 90:25;100:14;106:11;128:17; 136:25</p> <p>described (11) 25:15;37:23;53:20;70:4;73:4,</p>	<p>5;105:17;108:19;109:21; 136:21;160:14</p> <p>describes (1) 76:1</p> <p>describing (4) 78:15;87:22;109:20;176:10</p> <p>description (11) 6:19,23;96:1;98:14;100:10, 11,17,23;101:11;106:24;107:11</p> <p>design (12) 62:15;94:4;95:20;96:4,23; 97:9,16;101:14;156:13,15,23; 185:22</p> <p>designed (10) 56:22,24;64:14,23;69:13; 72:19;90:11;120:18,19;121:10</p> <p>designing (4) 77:8;80:2;96:11;185:24</p> <p>desirable (1) 152:12</p> <p>desired (1) 151:7</p> <p>detail (2) 57:7;163:16</p> <p>detailed (2) 66:5;102:15</p> <p>details (5) 5:16,20;63:2;80:16;103:1</p> <p>detect (2) 119:8;182:18</p> <p>determination (15) 23:3;81:18;82:11,14;83:15; 87:8;140:24;185:12,13;186:17, 18;189:14;191:7,9;193:1</p> <p>determine (8) 9:17;26:19;57:5;67:22;68:11; 83:6;110:16;195:4</p> <p>determined (2) 68:10;185:24</p> <p>determines (1) 171:7</p> <p>determining (9) 22:4,14,19,22;44:12;55:16; 83:7;110:20;151:2</p> <p>devel (1) 136:7</p> <p>develop (2) 110:25;136:7</p> <p>developing (1) 97:2</p> <p>device (19) 20:23;22:4,15,23;25:10; 26:20;62:14,18;68:11;81:15; 83:7;102:19;105:19,20;113:5; 119:11;147:18,22;154:4</p> <p>devices (8) 26:2;37:11;38:19,21,21; 110:17,20;183:24</p> <p>devise (1) 168:12</p> <p>devoted (2) 34:23;35:10</p> <p>diagram (2)</p>	<p>169:22;170:13</p> <p>diagrams (1) 174:25</p> <p>dictionary (2) 45:25;46:8</p> <p>differ (3) 103:18,21,22</p> <p>difference (11) 79:3;96:6,7,8;99:5,5;150:24; 151:1,4;170:8;179:5</p> <p>differences (6) 95:25;97:18;103:15;104:2; 138:15;170:23</p> <p>different (73) 13:17;20:15,18;41:2;59:9,14; 60:2;62:5;64:19;68:7;73:7; 74:10;76:9,13;78:22;84:13; 85:6,17;86:20;88:14;102:21,22; 105:16;110:7;111:11;120:6,7,8; 121:14;122:9;128:2;133:10,25; 138:20;139:2,4;140:22;141:9, 21,21;142:10,24;143:5;144:6, 25;145:10,16;148:17,18; 156:10;157:5,23;158:4,7,14; 159:3;162:12;164:21;169:25; 170:5;171:13;172:10,19;176:4, 15;177:1;178:22,24;180:11; 181:10;186:10;193:22;194:5</p> <p>differently (3) 84:1,7;98:21</p> <p>differing (2) 190:25;194:10</p> <p>differs (1) 103:24</p> <p>difficult (13) 33:12;86:19;87:2,19;110:6; 121:19;124:4;156:3,6;157:20; 165:2,23;193:15</p> <p>difficulty (1) 102:20</p> <p>digital (4) 17:21,21;195:9;196:2</p> <p>directed (2) 59:25;138:3</p> <p>direction (6) 71:16;72:4;120:9,10,13,21</p> <p>directional (13) 117:25;119:23,25;120:8,17, 20,22;121:5,9,10,12,15,18</p> <p>directions (2) 72:1;121:14</p> <p>directly (6) 57:23;58:5;86:10;163:4,5; 189:12</p> <p>disagree (1) 30:3</p> <p>disagreed (2) 40:25;43:16</p> <p>disagreement (1) 98:20</p> <p>disambiguate (1) 141:2</p> <p>discarded (1)</p>
---	--	--	---

71:6 disclose (1) 179:18 disclosed (1) 181:24 disclosure (9) 104:20;108:20,23;109:2,15, 19;135:11,14,20 discover (2) 67:24;119:5 Discovered (5) 21:12;36:15;51:19;70:24; 116:9 discovery (1) 8:12 discuss (14) 13:10;24:21;25:24;33:25; 34:1;47:20,25;49:5;50:3;66:6; 81:13;110:19;138:13;144:22 discussed (24) 12:23;13:6,12,18,25;22:22; 26:1;37:9;80:17;84:9;95:1; 101:7;105:6;108:9;110:2,7; 114:14;141:13;156:4;158:25; 165:22;191:16;195:12,14 discusses (2) 83:22;136:18 discussing (14) 44:1;50:13;114:12;142:23; 143:4;152:9;164:10;165:3,10; 175:13;177:25;178:16,21; 179:15 Discussion (7) 16:4;37:21;66:3;90:23; 111:10;156:14;196:11 discussions (2) 42:21;104:23 dispute (1) 185:19 disputed (1) 115:2 disregard (1) 172:1 distance (9) 85:15,19,25,25;86:7,8,11,13; 87:10 distance-type (1) 87:16 distinction (2) 73:20;102:7 distinguish (1) 102:3 distinguishing (2) 74:7;129:16 distrib (1) 134:5 distributed (12) 151:11;153:23;165:8,22; 166:6;167:23;171:3;175:24; 177:8;178:19;184:3,5 distribution (8) 134:5,21;151:8,22;175:17,18; 180:4;183:1	divided (1) 122:3 doc (2) 52:3;55:10 DOCOMO (1) 101:2 docs (2) 100:19,20 document (24) 27:13,21,25;28:6,7,10;30:6; 31:9;34:16;35:12;51:17;52:12; 56:20;70:7,10;71:2;82:2;95:3,6, 9;144:5,11;146:17;164:7 documents (31) 27:10;28:14,19;29:1,2,6,13; 30:8,12;32:6,12,14,15,18,24; 33:2,4,19,23,24;44:1,24;45:2,3, 10,21;46:2,48;11;49:20;52:19; 150:6 done (19) 21:21;26:18;29:11;43:23; 54:1,5;55:16;56:2,6,7;84:1,7; 87:22;88:1,17;89:25;106:17; 113:20;149:14 door (1) 147:1 dots (1) 173:3 double (1) 181:7 doubt (1) 35:9 down (11) 5:18;18:18;52:20;57:13;61:7; 62:8;71:13;106:7;133:18; 146:1;181:21 Download (3) 32:21;48:20,21 downloaded (1) 48:7 dozen (1) 24:20 dozens (1) 48:8 Dr (29) 4:3,12;16:8;22:21;27:9; 28:24;29:8,19,22;30:8,13,31:1, 19;42:23;50:21;51:17;52:5; 55:11,12;75:24;93:16;94:17; 95:15;96:1;97:19,24;114:12; 137:20;147:11 draft (1) 34:6 drafts (1) 56:20 drawing (1) 73:20 drawn (2) 80:3;148:11 drivable (1) 68:24 drive (19) 65:23;68:18,24;69:1,4,11;	80:14;88:10,11;105:24;111:6, 17;135:6;137:3,22;158:5;159:4, 7,23 driven (6) 68:17;89:5,6;115:22;134:4; 189:3 driver (2) 102:19,24 drivers (9) 86:2;106:8,13,25;107:9,15, 20;108:6,8 drives (1) 80:18 Driving (55) 21:13;22:20;51:20;53:9,11, 11,15,15;61:11,19;62:3;63:13; 64:8,11;65:2,14;67:20;70:5,24; 71:13;75:12;78:23;80:9;88:18, 20;89:12,17;90:8,8,91:23; 92:16;103:7,8;105:5,14,18,19, 22,23;106:11,20,24;107:23,24; 111:1;114:17;119:5;128:8; 131:12;133:20;152:9;158:17; 159:1,13,17 dropped (1) 18:10 drove (6) 64:16;73:9;74:6;88:4,7,8 due (1) 21:22 during (6) 49:2;51:3;80:3;113:25;138:2; 161:15	97:25;100:6,8 effect (3) 85:11;131:21;166:23 effects (2) 173:1;177:21 efficiently (1) 135:23 effort (5) 29:12;54:21;56:12;64:5; 168:15 either (10) 13:21;24:24;29:3;35:3;54:24; 69:19;70:12;92:7;162:17; 194:19 elaborate (1) 48:2 electrical (6) 94:2;95:17;97:21;99:11,16; 100:2 electronically (1) 48:14 Electronics (1) 17:16 eliminate (1) 192:9 eliminated (1) 145:23 else (13) 10:19;14:6;37:1;49:5,10; 50:15,22;64:21;73:1;84:17; 108:1;132:22;189:24 E-mail (3) 55:4;196:14,22 embodiment (1) 131:10 embodiments (2) 131:25;160:15 embodyence (1) 131:25 EMC (1) 17:9 emergent (1) 63:17 emphasize (1) 76:20 emphasized (2) 76:17,19 employees (1) 43:18 enable (1) 7:13 enablement (3) 7:2,7;9:9 end (11) 15:8;39:6;41:10;54:13;56:8, 8;72:7;104:10;136:11;159:25; 180:5 ended (2) 39:14;41:10 ending (1) 144:14 engineer (1) 102:14
E			
	earlier (21) 44:1,25;48:7,11;101:1,7; 103:6;119:1;136:5;140:3; 144:10;147:2;152:9;156:4,8; 166:7;185:21;186:6;191:16; 194:8;195:12 early (6) 23:24;36:20;54:7,14;60:22; 63:11 ease (1) 70:14 easier (1) 115:8 east (1) 166:5 east-west (1) 127:5 easy (5) 119:7;151:14,21;165:25; 186:7 editing (2) 34:2,7 education (2) 94:7;100:11 educational (1) 97:25 EE (3)		

<p>engineering (6) 94:2;95:17;97:21;99:12,17; 100:3</p> <p>engineers (2) 36:4;101:2</p> <p>England (1) 56:1</p> <p>enough (20) 6:3;8:6,14,24;30:2;60:10; 92:15;103:6;114:23,24;115:4, 10,12;116:18,18,18,25;117:6; 128:9;167:1</p> <p>entire (3) 42:23;43:11;44:20</p> <p>entirely (2) 22:9;93:4</p> <p>entitled (7) 8:1,9;27:10,11,13;95:3; 124:22</p> <p>entity (1) 19:1</p> <p>environment (2) 87:20;118:12</p> <p>equal (2) 153:7;170:9</p> <p>equate (1) 106:12</p> <p>equipment (3) 66:1,2;115:11</p> <p>error (2) 83:3;93:2</p> <p>errors (1) 83:23</p> <p>especially (3) 57:7;87:19;127:15</p> <p>essential (1) 167:11</p> <p>Essentially (7) 20:17;87:15;98:22;104:6; 109:11,14;146:10</p> <p>estimate (14) 33:11;34:15;63:16;67:19; 72:9,17;76:6,16,25;77:4;79:14; 84:11;93:1;127:8</p> <p>estimated (7) 61:10;83:23;84:2;122:14; 128:8;148:11;149:7</p> <p>estimates (10) 67:21,21;71:16;72:3;73:13; 77:14;85:14,19,19;93:2</p> <p>estimating (1) 53:13</p> <p>estimation (4) 68:10;81:15;85:21;94:12</p> <p>estimations (1) 128:14</p> <p>et (2) 21:10;52:21</p> <p>etc (5) 11:16;20:12;34:7;88:19; 113:6</p> <p>Eulerian (1) 130:5</p>	<p>even (12) 19:14;43:12;113:9;118:18; 123:24;128:23;129:22;130:13; 148:6;160:4;166:10;195:23</p> <p>eventually (3) 72:5;79:24;115:21</p> <p>everyday (1) 113:5</p> <p>everyone's (1) 70:14</p> <p>evidence (2) 44:14;162:23</p> <p>exact (1) 141:25</p> <p>exactly (15) 33:10;38:22;53:22;54:16; 63:10,17;73:6;103:23;107:4; 112:13;113:2;129:7,23;150:20; 180:1</p> <p>examination (3) 194:19,23,25</p> <p>examine (1) 66:5</p> <p>examined (1) 128:4</p> <p>examiner (1) 162:1</p> <p>examining (1) 195:3</p> <p>example (44) 12:23;58:12,25;62:1;64:7; 73:9;78:25;79:23;82:1;85:21; 87:6,13;88:5;89:17;98:15;99:2; 100:25;101:15,20;102:9; 107:22;108:4;111:1;114:15,19; 128:11;131:9,25;133:4,6,7; 135:21;147:14;158:22;160:16; 163:2;167:20;175:21;187:11; 189:14;191:18;193:16,18;194:1</p> <p>examples (12) 13:19,20;89:1,24;108:5,12; 114:3,16;131:16,19;149:3; 191:2</p> <p>except (5) 156:20,24;159:17;175:14; 186:1</p> <p>exclusively (1) 160:13</p> <p>Excuse (4) 55:11;58:6;62:14;146:20</p> <p>Exhibit (39) 16:9;24:5;26:23;27:10,15,20; 29:5;30:5;31:2;35:13;51:18; 52:8,24;57:10;61:8;71:3;74:22; 75:25;93:16;95:3;119:2,15; 137:18;142:13;144:7;164:6,7,7, 24;169:8,21;171:8,11;177:14, 17;178:1,7;179:6;185:2</p> <p>exhibits (7) 45:25;46:7;47:2;48:5,16,17; 170:24</p> <p>exist (8) 118:18;153:24;154:5;155:4,</p>	<p>24;166:9,10,13</p> <p>existed (3) 119:4;166:7;168:22</p> <p>existing (1) 61:1</p> <p>expect (5) 99:10,11,16;118:6;166:9</p> <p>expectations (1) 99:21</p> <p>expected (1) 167:9</p> <p>experi (1) 82:24</p> <p>experience (16) 14:16;94:3,14;95:18;96:3,10, 18;97:12,22;98:1;100:9,14,21; 101:13;102:10,12</p> <p>experimentation (3) 194:20,23;195:2</p> <p>experimenting (1) 82:23</p> <p>experiments (2) 56:2;195:4</p> <p>expert (9) 4:21;15:6;16:19;29:4;30:17; 140:16;149:9,14;184:23</p> <p>expertise (1) 19:15</p> <p>experts (1) 15:5</p> <p>expert's (1) 32:8</p> <p>expires (1) 197:24</p> <p>explain (3) 22:10;76:18;172:3</p> <p>explained (2) 112:18;163:18</p> <p>explains (1) 181:23</p> <p>explanation (1) 162:17</p> <p>explicit (3) 138:24;139:3,22</p> <p>express (4) 142:7;162:4,9,15</p> <p>expressed (2) 111:23;134:19</p> <p>expressions (1) 160:16</p> <p>extensive (1) 46:24</p> <p>extent (21) 7:23;9:14;12:15;26:12;32:6; 41:7;43:8;44:18;59:15;67:14; 74:9;84:5;87:12;104:24; 106:22;115:1;140:13;143:20; 169:4;184:20;192:13</p> <p>extra (1) 121:11</p> <p>extraordinary (3) 101:25;102:5;103:4</p> <p>extreme (1)</p>	<p>62:1</p> <p>extremely (1) 110:2</p> <hr/> <p style="text-align: center;">F</p> <hr/> <p>face (2) 51:18;95:3</p> <p>fact (13) 29:8;31:12;46:11;49:14; 56:15;94:6;111:18,25;112:7; 116:20;120:20;150:24;152:24</p> <p>factor (5) 85:16;86:13;87:2;119:13; 187:14</p> <p>factors (2) 85:20;192:8</p> <p>facts (2) 118:23,24</p> <p>factual (1) 118:20</p> <p>faculty (3) 100:18,19;101:10</p> <p>fades (1) 86:7</p> <p>failed (1) 155:22</p> <p>failure (1) 119:8</p> <p>Fair (12) 6:3;8:6,13,24;41:15;55:18,21; 83:5;103:6;105:2,3;115:4</p> <p>fairly (1) 91:4</p> <p>fall (3) 19:11;118:22;187:23</p> <p>familiar (10) 63:20,20;114:16;121:22; 124:17;130:3;138:8,10;144:19, 20</p> <p>familiarity (1) 7:10</p> <p>far (4) 18:9;34:23;117:14,17</p> <p>farther (2) 86:12;121:8</p> <p>fashion (1) 61:19</p> <p>fast (2) 88:6;92:17</p> <p>faster (1) 193:23</p> <p>father (1) 19:20</p> <p>favor (1) 14:23</p> <p>favorably (1) 178:2</p> <p>features (1) 111:4</p> <p>feel (1) 185:9</p> <p>feeling (1)</p>
---	--	--	---

159:8 fell (1) 37:22 fellow (1) 100:18 felt (3) 58:24;72:24;143:8 few (8) 25:2;33:10,14;84:15;124:9; 134:8;170:11;174:25 fewer (1) 159:4 field (2) 56:15;98:2 Fielding (2) 52:1;55:12 figure (63) 54:19;74:22;75:3,7,7;83:2; 110:6;119:22;121:21,22; 123:14,23;124:16,17;125:1,15, 24;126:19;127:15;128:3,15; 129:1.1,2,3,9,10;146:24;147:12, 12,14,17,25;148:1,5,12,20; 150:2,15,19;151:14,20;152:4; 153:6,10;154:2,6,12;156:1,5; 165:12;166:8,15;168:6;169:7,8, 10;170:1;174:18;177:22; 178:11,24;184:13 figured (1) 79:25 figures (7) 80:7;128:4;147:25;150:11; 156:11;164:9;174:14 figure's (1) 178:22 figuring (1) 56:5 filed (8) 40:7;46:6;138:16;139:8; 143:16,19;146:14;190:18 files (5) 48:8,25;49:12;55:5,5 filing (1) 86:9 filter (4) 82:9;92:18;191:18,23 filtered (3) 92:10;93:3,5 finalized (1) 61:15 finally (1) 116:6 find (10) 11:7,11;21:10;27:17,18;29:1; 67:9;85:3;168:4;189:1 finding (3) 62:12;157:20;188:25 fine (3) 7:24;104:18;153:15 finish (2) 10:4;149:11 finished (1) 101:21	finite (1) 113:11 firm (1) 5:10 firmly (1) 99:8 first (15) 27:16;34:5;35:22;40:2;47:15; 57:20,23;58:2;61:8;64:13; 115:16;169:18;174:3;180:17; 190:11 Fish (1) 5:11 fit (4) 100:10,16,22;101:10 five (18) 16:17;23:16;33:17,18,20,22; 34:18;55:6;81:23;94:3;95:18; 96:2,17;97:22;98:1;101:13,17; 102:10 flag (1) 7:24 flesh (1) 11:10 flip (2) 27:15;28:5 fly (1) 168:13 focus (3) 51:1,7;164:22 focused (3) 21:25;41:9;120:21 focuses (2) 41:14,16 focusing (1) 135:15 folks (2) 29:18;60:16 follow (2) 107:24;177:7 following (3) 172:21;180:3;188:12 follow-up (1) 14:15 foregoing (2) 197:1,15 forget (1) 141:25 forgotten (1) 24:12 form (3) 48:6;64:2;73:8 formation (1) 112:18 formed (1) 13:11 forming (1) 161:3 formula (1) 182:23 formulated (1) 97:20 formulating (2)	94:18,22 formulation (1) 40:10 forth (4) 56:20;62:10;161:19,23 found (3) 41:19;67:13;75:12 Foundation (21) 68:5;69:7;77:24;81:20;82:21; 90:12;106:23;118:7;120:2,15; 121:3;148:10;155:1;164:18; 169:14;172:4;174:5;178:10; 187:3,4;189:10 four (7) 15:21;23:16;30:10,24;33:1; 103:17;135:7 fourth (3) 27:24;106:7;169:18 fraction (1) 118:9 frame (4) 24:11;33:3;36:20;101:5 frames (1) 57:15 Francisco (2) 113:21;114:18 frank (1) 157:20 Frederick (1) 4:9 F-R-E-D-E-R-I-C-K (1) 4:10 frequencies (3) 91:3,5,9 frequency (1) 91:9 frequent (1) 88:24 frequently (3) 57:25;58:4;88:7 fresh (1) 100:8 front (4) 42:16,16,22;150:6 frowning (1) 6:21 FTP (2) 48:8,20 full (5) 4:7;32:17;48:4;63:5;152:17 function (2) 117:1;151:10 funded (2) 51:12,14 further (8) 66:24;120:12,24;161:5;181:2, 16,21;182:13	29:10;50:8;157:24 gathered (2) 65:14;181:25 gathering (1) 39:2 gauging (1) 56:9 gave (5) 54:10;114:15,19;116:23; 193:17 general (4) 100:4;110:15;160:9;161:9 generally (7) 19:14;68:13;120:17,19; 121:24;124:19;173:7 gesturing (2) 9:20;150:7 gets (1) 86:9 given (14) 11:25;13:18;16:22;38:18; 84:15;85:18;116:18;118:22; 124:7;157:21;178:18;185:7; 192:5;194:15 gives (3) 38:9;88:13;119:6 giving (1) 131:18 glad (1) 36:25 goal (14) 59:10;67:11;81:1;83:8;85:2; 115:18;130:8,25;136:23,24,25, 25;137:3;156:22 goals (1) 67:9 goes (8) 41:7;43:8;57:18;81:13;86:6, 8;158:21;174:8 Good (10) 4:3,4;58:25;67:8;78:7;95:9; 134:5,21;137:6;138:13 Google (24) 4:6;16:9;27:10,13;28:13; 30:12;31:2,18;35:13;40:13,17; 41:3,6;43:6,11,14;51:18;52:8; 95:3;137:18;144:7;164:7; 169:7;185:2 Google's (5) 40:15;41:3;42:15;43:3;50:24 GPS (2) 71:18;81:4 graduate (9) 23:10,12,19;99:9;100:8,19; 101:10,17;102:14 graduated (2) 101:16,16 graduates (1) 99:10 graph (2) 130:7,7 Graphic (1) 130:13
		G	
		gain (1) 121:11 gather (3)	

<p>grass (1) 81:12</p> <p>great (2) 64:5;167:21</p> <p>greater (4) 57:3,3,6;102:17</p> <p>greatly (1) 182:21</p> <p>grid (1) 169:20</p> <p>ground (1) 129:5</p> <p>grounds (1) 8:11</p> <p>GSHFED_0000001 (1) 185:4</p> <p>GSHFED_0000021 (1) 52:9</p> <p>GSHFED_0000041 (1) 142:14</p> <p>GSHFED_0000154 (1) 137:19</p> <p>GSHFED_0000274 (1) 144:9</p> <p>GSHFED_0011325 (1) 71:1</p> <p>GSHFED_0011327 (1) 71:12</p> <p>GSHFED_0011336 (1) 90:21</p> <p>GSHFED_001330 (1) 82:4</p> <p>GSHFED_183 (1) 138:3</p> <p>guess (12) 8:23;33:2;69:3;71:14;123:7; 129:20;153:14;167:14,18; 173:12;177:4;189:20</p> <p>guessing (1) 165:14</p> <p>guidance (1) 195:13</p> <p>guys (4) 39:3;64:24;80:10;146:18</p>	<p>happenstance (1) 106:2</p> <p>hard (7) 9:24;10:4;68:20;69:15;90:16; 124:3;137:22</p> <p>harder (2) 166:1;176:25</p> <p>hardware (13) 95:19;96:3,5,5,10,11,18,23; 97:2,6,8,9,12</p> <p>hardware-only (1) 97:5</p> <p>head (1) 102:7</p> <p>header (3) 28:7;31:15;71:12</p> <p>hear (8) 36:25;66:17,18,22,23;73:10; 92:16;117:11</p> <p>heard (5) 57:23;58:5;111:6;116:6,24</p> <p>heart (1) 191:15</p> <p>heavily (1) 73:24</p> <p>heavy (1) 124:23</p> <p>Hello (2) 39:24,25</p> <p>Help (9) 33:17;34:24;60:15;68:6; 72:25;73:19;75:5;107:3;117:18</p> <p>helped (4) 56:19;112:5,20,21</p> <p>helpful (4) 98:17;163:19;167:7,12</p> <p>helping (3) 20:8;56:18;143:10</p> <p>helps (8) 112:23;125:15;140:7,8,19; 141:1;160:12;161:7</p> <p>Hence (1) 177:11</p> <p>Here's (1) 142:1</p> <p>high (5) 4:16;5:13;12:5;17:25;117:14</p> <p>higher (2) 102:12;193:25</p> <p>histories (4) 31:25;44:4;45:8,15</p> <p>history (17) 31:23;32:11,12,17;44:9,21, 21;137:17,23;143:15;144:4,8; 161:16;162:23,25;163:7,15</p> <p>holder (2) 5:25;6:7</p> <p>home (1) 64:17</p> <p>honest (1) 168:9</p> <p>hope (5) 46:19,19;52:9;98:16;99:8</p>	<p>hopefully (1) 76:14</p> <p>hoping (2) 37:14;138:15</p> <p>horizontally (1) 117:18</p> <p>hour (1) 88:4</p> <p>hourly (1) 34:20</p> <p>hours (5) 33:10,14,23;34:18;50:1</p> <p>housing (1) 182:20</p> <p>how's (1) 62:11</p> <p>human (1) 63:6</p> <p>hundred (3) 190:20;194:18;195:6</p> <p>hundred-story (1) 117:13</p> <p>hypothesizing (1) 79:14</p> <p>hypothetical (8) 68:5;156:11;169:20;170:2; 178:10;185:21;186:11;187:5</p>	<p>98:9</p> <p>implicate (1) 178:15</p> <p>implication (1) 162:18</p> <p>implicit (1) 98:13</p> <p>implicitly (3) 160:18;161:4;162:15</p> <p>implies (1) 116:1</p> <p>important (1) 58:24</p> <p>impossible (1) 165:11</p> <p>impression (2) 38:17;144:1</p> <p>improve (2) 84:1;87:23</p> <p>improves (1) 182:22</p> <p>inaccurate (1) 193:17</p> <p>inaccurately (1) 150:25</p> <p>inadvertently (1) 70:9</p> <p>include (5) 13:3;106:20;123:8;132:1; 136:8</p> <p>included (1) 159:10</p> <p>includes (2) 25:2;96:1</p> <p>including (4) 42:16;46:8;109:5;186:14</p> <p>Incomplete (3) 68:4;178:9;187:5</p> <p>incorporated (2) 104:25;110:4</p> <p>incorporates (1) 104:21</p> <p>increase (1) 111:20</p> <p>Inc's (2) 31:4;40:17</p> <p>indefinite (4) 9:18;11:3,9;41:19</p> <p>indefiniteness (8) 6:15;9:16;40:19;41:4,16; 42:2,5;43:4</p> <p>indicates (1) 60:20</p> <p>indicating (1) 183:3</p> <p>individual (1) 83:25</p> <p>indoors (1) 59:11</p> <p>industry (1) 100:25</p> <p>inform (2) 111:22;163:3</p>
H		I	
<p>half (1) 122:3</p> <p>hall (1) 49:8</p> <p>hand (11) 16:8;27:9,12;31:1;35:12; 51:17;52:7;95:2;102:12;119:1; 142:11</p> <p>handed (2) 16:8;70:9</p> <p>handheld (3) 17:20;24:9;25:13</p> <p>Hang (2) 30:25,25</p> <p>happen (5) 55:17,19,20;113:23;152:4</p>	<p>idea (2) 104:15;181:18</p> <p>ideal (2) 96:25;97:4</p> <p>ideas (1) 90:16</p> <p>identical (3) 95:22;104:6,9</p> <p>identified (12) 45:5;164:13;168:17;185:11, 15,18;186:3,15;187:2,10,15; 188:16</p> <p>identifies (1) 62:23</p> <p>identify (1) 29:8</p> <p>identifying (1) 132:1</p> <p>ignore (1) 171:18</p> <p>imagine (3) 105:22;117:12;176:25</p> <p>imagined (1) 22:1</p> <p>imagining (1) 178:23</p> <p>immediately (2) 136:17;171:6</p> <p>immunity (1) 8:12</p> <p>impact (1) 145:19</p> <p>implement (1)</p>		

information (25) 5:13;44:12;54:24;62:17,20, 21;92:8;118:20;133:15;154:6; 155:21,23;156:18;158:3,12; 159:11;163:11,14,17;166:14; 167:2,3;172:15;179:19;196:22	intrinsic (1) 44:14	31:5;40:16,18;41:4	language (42) 11:14;30:11;127:11;131:20; 134:11;138:14,18,23;139:7; 141:21;143:2,3,8;144:25;145:4, 6,16,21,23;146:1;160:7,10,18; 161:5,25;162:10,16,17;173:14, 18;176:2,20;177:11;183:19,20; 185:8;186:6;187:6,23;188:25; 190:20;191:6
infringe (2) 186:25;188:14	introduce (2) 112:7;180:3	June (1) 61:21	
infringement (4) 6:5;156:21,22;186:1	introduced (1) 132:5	K	
infringing (2) 17:22;185:23	introduction (2) 57:8,13	keep (1) 34:24	laptop (6) 62:14;119:15,18;120:1,14,22
initial (1) 40:9	intuitive (1) 123:7	Kessel (4) 17:16,20;18:2,9	large (10) 34:11;65:19;71:23;115:23; 116:4;117:16;134:3;144:5; 146:17;193:19
initially (2) 64:11;116:9	invalid (2) 41:20;42:6	Kim (9) 21:9;52:1,21;55:8,8,10,11,12; 70:23	larger (1) 193:23
inputs (1) 21:22	invalidating (1) 6:12	kind (10) 58:8;62:6,21;94:14;96:7; 127:17;148:21;150:7;151:20; 152:19	last (11) 50:5,6,7,11,12,12;56:14; 106:4;169:9;188:4,6
inquiries (1) 19:13	invalidity (6) 5:18;6:6,9;41:15;42:1,20	kinds (4) 141:12,16;148:17;175:13	late (4) 54:7;60:22,24;192:2
inserted (3) 138:18;144:25;146:1	invention (2) 132:1;181:24	knew (13) 53:22;67:16;72:18,22;77:18; 78:1;79:2,9,21;80:2;119:4,4; 190:16	later (4) 34:2;68:11,15;91:23
inside (4) 65:20;73:10;78:20;101:20	inventors (8) 43:21;106:10;108:13,15,19; 109:20;136:25;161:24	knowing (1) 168:11	latter (1) 32:16
insights (1) 102:4	inventors' (1) 111:21	knowledge (10) 19:25;20:4,6;26:24;35:11; 54:22;64:11;102:16;189:22; 190:12	laundry (1) 147:2
insolubly (1) 11:4	invite (1) 47:17	known (14) 38:4,7,8;59:1;67:22;83:24; 89:19,23;110:21;190:8,22; 191:3,13;192:4	law (5) 6:24;7:2;9:10;12:16;40:17
install (1) 38:20	involve (1) 22:4	Kotz (20) 4:3,9,12;16:8;22:21;27:9,11, 14;29:8;30:8;31:1,3;51:17; 52:5;75:24;93:16;114:12; 137:20;147:11;197:5	laws (3) 9:12;10:8;11:1
instances (3) 190:9,23,24	involved (2) 18:20;171:14	K-O-T-Z (1) 4:10	lawyer (4) 7:4,10;41:22;132:17
instead (4) 145:25;175:15,18;178:2	involvement (1) 18:15	Kotz's (1) 28:24	lawyers (1) 109:7
instruction (1) 9:18	involves (1) 20:11	Kwan (1) 130:11	lead (4) 54:14;77:13;79:13;80:15
instructs (1) 8:10	iPhone (2) 37:25;38:6	L	leader (1) 102:13
intent (1) 59:7	Irell (2) 28:24;35:3	Lab (7) 57:19,22;58:16;59:12,14; 87:6,13	leads (1) 53:17
interest (2) 19:15;36:16	issue (15) 5:17;6:9;11:24;56:23;75:11; 118:14,24,25;151:1;166:12; 178:15;184:9,13;194:11;195:9	label (1) 129:13	learn (1) 103:1
interested (4) 36:12;37:10;67:16;125:5	issued (2) 138:17;146:15	labeled (2) 147:15;169:18	learned (3) 36:14,15;72:25
interesting (1) 102:8	issues (6) 6:15;20:2,7;34:1;50:14;74:9	Labs (1) 101:2	least (15) 60:16;67:3;68:21;83:1;91:6; 106:15;108:9;112:8;113:11; 123:8;138:23;145:8;177:7; 179:25;181:17
interfere (4) 91:10,20;92:3,6	issuing (1) 162:2	Lab's (4) 57:21;59:4,22;60:3	leave (3) 103:25;116:16;131:13
interference (6) 90:24;91:1,12,14,25;92:1	item (1) 26:23	lack (8) 123:18,18;147:14,20;148:5, 14;189:19;190:1	leaves (1) 106:25
interpose (1) 7:16	J	LaMarca (1) 58:2	Leaving (1) 132:19
interposed (1) 8:7	Jeff (2) 52:3;56:18		Lecture (1) 53:2
interpret (1) 177:1	Jeffrey (2) 52:1;55:12		led (1) 56:17
intersection (2) 154:12,13	job (1) 83:7		left (6) 122:19;123:9,12,16;126:5;
intervening (1) 65:19	judge (3) 118:25;163:13;193:14		
into (7) 61:7,19;64:6;82:25;104:25; 105:18;118:22	judging (2) 147:19;168:4		
	Judgment (4)		

<p>158:21 left-hand (4) 52:18;125:7,9;128:16 legal (19) 7:8,9;13:30;11;33:25;69:7; 115:1;132:13,14,19;140:14,15; 143:21;160:20,24;162:21; 183:13;184:20,24;187:18 legend (1) 164:11 length (2) 83:22;104:11 less (24) 32:3;33:14,17;88:8;92:11; 96:25;97:3;128:17,20,20; 149:14;152:10,12;153:13,16, 16;159:4;162:25;163:1;170:14, 20;171:4;193:24;195:20 letter (3) 35:15;40:4;46:21 level (15) 4:16;5:14;12:5;18:1;23:19, 19;57:7;93:21;94:7;95:13; 100:11;102:13,15;103:2;171:4 levels (5) 165:9,13;167:24;168:1;173:6 library (1) 86:22 likelihood (1) 160:3 likely (11) 60:23;72:16;74:2;79:14;85:1; 99:12,15;113:1;125:14,17; 126:17 limit (3) 161:9;162:15;164:21 limitation (4) 142:8;173:11;185:17;186:2 limitations (4) 144:22;156:19;158:17; 185:10 limited (5) 7:11;9:1;50:23;160:13;161:5 Lina (1) 35:25 line (14) 78:24;105:11;106:7,8;124:12, 24;130:12;131:23,24;136:4,5; 137:3;180:2;189:2 line-by-line (1) 104:8 lines (6) 133:18;180:23;181:6;182:4, 11;189:13 Linux (1) 119:15 list (5) 16:18;24:6,10;30:19;64:18 listed (8) 16:17;17:9;24:24;25:6,12; 27:4;49:15;56:14 listening (2) 53:12;121:13</p>	<p>listing (3) 46:2;89:24;138:4 literally (5) 53:11;54:24;79:9;88:21;92:2 literature (3) 24:20,22;25:24 litigation (1) 16:15 little (13) 68:20;100:5;114:13;115:8; 142:20;148:16;162:11;165:23; 166:1;168:14;176:24;181:2; 182:10 lo (2) 20:16;122:13 loaded (2) 60:17,17 localization (4) 20:14;36:13;91:24;151:9 localize (1) 134:23 localizing (2) 68:15;148:14 locate (4) 25:10;26:2;38:19;57:15 located (1) 154:17 locating (3) 58:23;59:3;85:3 location (94) 20:11,11,12,15,18,18,21,23; 21:4,17,20,23;22:3,4,7,11,15,19, 23;23:3;25:17;26:8,19;36:13; 37:12;53:13,16,17;61:13;64:16; 67:22;68:2,11;71:16;72:3,8,13, 17;73:13;74:3,11;76:6,7,23; 77:1,16;78:11;79:4;81:15,18; 82:11,14;83:7,15;87:5,7,23; 89:17;91:13;92:20,24;93:4,5; 100:25;105:25;110:17,17,20; 116:19;122:13,14;125:21,21; 126:16,18;129:25;140:24; 148:2;150:20;155:8,9;156:18; 166:14;175:1;183:24;184:8; 185:12,13;186:16,17;189:14; 191:7,9;193:10 Locations (77) 21:12;51:19;53:10;61:10,17, 18,24;63:25;64:3;65:1;67:17, 19;68:9;70:23;72:14;74:1;75:8, 13;76:9,13,22,23;77:19;81:14; 83:23,24;84:2,2;88:17;122:4,9, 12,20,22;123:5,16,18;125:1,24; 127:1,4,11;128:8;129:3,7,11; 133:10;134:1;138:20;139:2,4; 145:1,11,17;147:19;148:6,11, 12;149:8;150:1,16,16,17; 151:23;152:5;153:1,11;158:4, 14;159:3;169:1;172:10,19; 174:16;176:4;180:9;184:3 logistics (1) 50:3 long (8)</p>	<p>6:2;24:12;61:5;71:18;92:15; 115:23;183:25;188:7 longer (2) 155:20;182:10 look (50) 12:8,11;14:10;21:10;28:18; 31:5,9;32:24;35:14;44:15,17, 20,23;49:16;51:20;52:15;54:22; 55:1;57:12;59:17;82:1;105:10; 106:4;121:21;124:12;137:16; 138:10;141:8;142:12;144:4,6; 146:24;147:11;148:24;171:18; 174:4,7;175:10,25;176:20; 179:1,15;180:17;181:5,6,16; 182:3,12;186:5;189:2 looked (8) 30:23;44:2,3;137:22,24; 142:16;162:6;194:4 looking (25) 53:24;54:17;68:19;79:10; 83:1;131:19,24;136:4;142:9; 143:15;144:15;149:17;158:7,8; 165:7;168:5;169:9;173:1; 175:16,20,21,22;180:24;182:3; 190:4 looks (6) 15:21;68:21;95:8;128:6; 144:20;170:10 loose (1) 65:5 lose (1) 81:4 lost (4) 91:21;92:14;142:20;150:14 lot (21) 5:19;12:4;20:4;46:7;56:12; 66:19;70:1;86:24;106:25; 113:10,20;115:20,21;118:11; 121:17;126:1;134:4;146:18; 163:16,17;195:13 lots (3) 19:13,19;84:7 low (1) 117:16 lower (3) 102:15;126:5;193:25 L-shaped (1) 152:9 LU (119) 7:8,16;8:7,9;9:13,20;10:11, 17,21,23;12:2,14;13:5;20:3; 21:24;25:18;26:12;27:5;28:22; 29:15;30:1,16,20;41:7,43;8; 44:18;47:7,23;50:1,13;56:11; 59:15;60:4;68:4;69:6,14;70:11, 19,21;71:5;72:21;74:23;76:12; 77:11,21,24;78:12;79:5,8; 81:20;82:21;84:4;86:15;87:11; 89:21;90:12;93:9;96:22;99:14; 106:22;107:13;108:21;109:23; 110:5;114:25;117:23;118:7; 120:2,15;121:3;132:19,25; 135:10;137:6;140:13;143:20;</p>	<p>146:21,25;148:9;149:9;152:1; 155:1;157:7,10,16;158:19; 160:19;161:17,21;162:19; 163:21,24;164:17;165:1; 166:19,21;169:4,13,17,24; 170:7;172:4;174:5,8;175:11; 176:21;178:9;183:12;184:19; 187:3;188:4,9,18;189:10;193:3; 195:11;196:5,8,21 lunch (4) 36:16;37:6;43:17,19 luxury (1) 102:25</p>
M			
			<p>MAC (1) 62:24 M-A-C (1) 62:24 mailed (1) 196:18 main (3) 107:15;129:16;167:15 major (1) 170:8 makes (3) 60:23;138:23;139:3 making (5) 17:20;29:12;112:1;139:21; 193:1 managed (1) 67:17 Manhattan (2) 62:4;113:19 MANNING (66) 4:2,5;7:18;10:18,24;13:8; 15:25;16:7;25:20;27:6;29:10, 24;30:4,18,22;35:6,8;39:16,23; 47:8;70:13,17,20;71:4,7,8; 75:17,23;79:6;86:16;93:7,15; 96:24;109:25;110:10,14;114:5, 11;115:4,5;120:4;135:13;137:8, 15;143:22;146:23;147:4,10; 149:11;152:3;155:3;157:14,19; 161:18;163:23;164:5;169:6,23; 170:3;176:22;179:8,14;196:3,6, 13,17 manual (2) 62:10;64:2 manually (4) 61:18,23;63:22;64:4 many (41) 4:14;11:20;21:4;22:12;23:15; 34:10;39:13;43:12;45:25;48:8, 8,25,25;49:11,11;58:14;65:18, 18;66:17;67:9;71:15,24,24; 72:15;83:19,19;88:11;90:14; 98:7;100:15;102:9;105:22; 112:4;113:14;118:5;123:16; 128:13;134:9;166:2;173:4; 182:19 map (6)</p>

68:20;113:18;130:8,14; 172:18,20 maps (2) 113:22;130:6 mark (8) 137:17;142:1,2,13;144:7; 164:7;169:7;185:2 marked (9) 16:9;31:2;35:13;51:18;52:8, 24;71:3;95:2;142:11 markings (1) 164:11 material (2) 27:3;124:7 materials (4) 31:15;48:1,7;54:25 mathematics (1) 79:11 matter (11) 17:9;18:11,12,18;67:12; 126:4;147:18,19;160:9;195:19; 196:2 maximize (1) 69:3 may (20) 7:25;23:3;26:15;32:9;44:5; 53:25;54:4,5,8;59:9;60:25; 63:23;65:4;117:19;133:4; 137:21;144:5;170:11,20;193:21 maybe (9) 12:3;22:9;52:20;55:4;66:22; 101:10;102:14;126:3;131:10 mean (83) 11:6,10;12:3;33:14;39:13; 49:11;50:21,22;54:23;59:4,8; 65:6;68:17,19;69:15;72:24; 75:5;76:19;79:18;83:8,18; 85:13;88:21;89:23;91:12; 94:24;97:15;99:17;100:18; 107:5,23;108:1,23;109:2,11; 111:10;114:21;117:15;119:1, 12;122:25;124:8;126:3;127:2; 128:3;132:4;134:3,7;140:15; 141:7,19,20;143:24;145:18,19; 146:9;149:13;151:5;156:3; 157:3;158:20;159:5;161:6; 162:24;165:2;166:23;167:11; 170:8;171:2;172:16;174:18; 175:25;177:3,3,6;187:21;189:8; 191:12;192:6;193:4,16;194:15, 25 meaning (28) 11:15,18;12:1,12;13:1;14:2,2, 7,8;24:19;64:4;91:19;100:1; 105:24;106:1;121:11;128:7; 160:7;164:16,25;166:18; 169:12;171:1,12,25;177:16,18; 185:17 meanings (6) 11:21,25;12:9;22:12,12; 140:22 means (10) 92:1;120:7,8;135:24;139:22;	140:20;162:17;188:22,23; 195:14 meant (10) 20:23;41:23,23;62:10;105:9; 108:2;112:6,20;135:14;192:22 measure (1) 119:10 media (1) 4:20 medium (1) 156:17 meet (9) 24:21;133:5,8,19,24;156:18; 158:16;159:13;193:21 meeting (11) 24:21;36:11;37:6,20,24;38:5, 10;50:13;60:23;186:25;188:15 meetings (2) 50:8,15 member (1) 56:16 members (1) 100:18 Memorandum (1) 40:17 mention (1) 9:23 mentioned (19) 4:5;6:9;14:5;24:16;25:22; 34:17;40:1,12;42:13;44:25; 48:11;50:18,20;61:23;84:21,24; 87:21;111:5;116:17 messages (2) 185:11;186:16 met (13) 6:19;36:8,9,16,23;37:3;50:1, 4,6,7;60:16;61:2;101:21 metaphor (1) 66:22 method (17) 37:12,14;78:10,13,22;108:16; 114:13,23;115:9;152:19; 167:16;168:2,9,11,13,18;169:2 methodology (1) 132:1 methods (4) 67:20;110:18;114:17;119:6 Microsoft (1) 106:5 middle (6) 93:20;125:6;128:16,16; 165:16;190:7 midway (1) 24:7 might (48) 21:15;42:5;43:15;53:23,23, 25;55:3,5;57:23;59:20;60:16; 64:4;66:18;74:5;84:10;85:13, 13,18;88:15,16;89:1,11,11; 91:24;92:17;97:13;113:9; 115:22;117:14,17;121:18; 127:14,24,25;161:4;168:18; 170:14,16;179:15;192:8,9;	193:19,24,25;194:10;195:2,3,21 miles (1) 88:4 mind (8) 11:6;14:7,9;26:21;84:14; 102:4;123:8;195:17 minds (2) 127:25;128:2 mine (3) 46:5;50:25;57:6 minimize (1) 131:2 minimum (1) 191:21 Minkyong (6) 52:1,3;56:17;57:1;66:4;80:15 minute (2) 16:1;115:18 mischaracterizes (6) 12:15;26:13;44:19;74:23; 133:2;169:5 misestimate (1) 53:17 miss (6) 91:24;92:17;116:22;118:16; 119:7;159:25 missed (6) 54:9;89:9,10,11;152:14; 182:16 missing (1) 134:25 misspoken (1) 149:23 mix (1) 163:9 mobile (13) 23:1;26:20;37:11;38:19; 62:18;68:11;81:15;83:7;110:17, 20;140:24;141:5;183:24 mode (1) 62:16 model (33) 103:10,11;105:6,9,12,17; 106:11,17,18;107:2,4,11,11,17; 108:16;111:22,25;112:17,19; 113:1,4;122:1,2,7;123:15,21; 124:1;128:11,24;130:2;131:1,7; 135:24 models (5) 106:21;107:1,10,12,16 modifications (1) 138:14 modified (2) 138:5;154:7 moment (9) 84:24;132:9;135:16;139:7; 144:7;166:11,12;177:14;191:25 month (2) 53:22;56:10 months (1) 54:15 more (90) 9:1;22:10;33:12,17;37:3;	38:14;54:18;56:9;61:20;64:9; 66:19;67:3,5,23,24;68:1,1,8,13, 14,25;69:10,11;72:16;74:2; 76:15,23;77:13;84:12;85:8,12, 14;87:15,23;88:12,13,15,16,23, 24;89:1,6,10,14,15,16,16,17,18; 90:8,8;101:21;102:10,15;103:5; 110:24;111:1,2,7;117:10; 120:20;123:17;124:9;126:12; 127:16;128:13,13,17;136:10; 138:24;139:3,22;145:20;149:3, 6,13;156:4;163:14,16,17; 168:22;170:11;171:3;172:16; 177:11;181:24;190:9,23; 191:22;195:19 morning (2) 4:3,4 most (24) 15:6;32:4;33:7;41:14;56:17, 17;60:11;62:1,4,4,13;68:21; 92:4;101:15,18;125:2,17; 126:17;127:14;130:18;147:18, 21;159:7;163:11 motion (4) 30:10;40:15,18;41:4 motions (1) 46:25 mountains (1) 86:22 move (2) 154:13;177:13 moved (1) 155:24 moves (1) 154:11 moving (1) 20:23 much (14) 5:16;33:8,21;34:13,15; 102:15,15;119:25,25;120:12; 152:8;166:3;172:16;175:20 muddled (1) 143:13 multiple (63) 76:2,8,22;77:16;78:18; 121:13;122:8,12,13,20;123:5, 21;124:1;125:22;126:25;127:4, 11;133:9,11,24;138:19,24; 139:9,12,15,18;145:2,5,10; 158:3,13;159:2,14,19;171:15; 172:9,11,17,21;173:15,18,21, 25,25;174:10,19;175:5;176:3,5, 17;177:1;178:3,17;179:3,16,19; 180:20;181:8,18;182:1,6,14; 186:22 must (5) 56:7,8;149:23;178:4,5 mutual (1) 36:15 myself (3) 14:12;57:1;59:22
---	---	--	---

N	New (15) 56:1;85:2;102:19;110:23; 113:17;138:19,23;139:20; 142:21;145:4,9,11;146:1; 167:20;170:19	numbers (5) 70:25;137:18;187:13,22; 191:4	October (2) 190:16;191:4
<p>name (7) 4:7;5:10;10:15;62:25;63:6,7; 64:22</p> <p>named (1) 197:13</p> <p>namely (1) 29:8</p> <p>names (1) 43:18</p> <p>name's (1) 4:5</p> <p>narrow (1) 91:4</p> <p>narrower (1) 143:18</p> <p>narrowing (1) 144:3</p> <p>nature (4) 90:18;118:11;124:7;149:7</p> <p>nCUBE (1) 5:2</p> <p>near (2) 62:7;91:8</p> <p>nearby (1) 88:13</p> <p>nearer (1) 125:7</p> <p>nearest (1) 125:13</p> <p>necessarily (12) 60:24;74:5;76:25;80:23;81:9; 10:97;6:120;18;125:14;157:3; 168:21;170:16</p> <p>necessary (3) 96:10;98:11;99:3</p> <p>need (22) 9:3;13:21;76:8,9,13;132:12; 134:21;139:4;148:24;159:6; 161:11;167:4,15;168:8,18,20, 21;169:2;177:11;178:13,13; 196:14</p> <p>needed (5) 15:8;48:25;66:6;77:15;94:15</p> <p>needs (4) 39:12;124:6;193:21;195:15</p> <p>neighborhood (3) 53:11;92:24;107:18</p> <p>neighborhoods (1) 107:21</p> <p>neither (2) 69:22,22</p> <p>network (4) 57:16;62:25;63:1,7</p> <p>networking (5) 20:5;25:3,5,6;102:18</p> <p>networks (11) 20:9,10;22:2;23:1;24:8;25:1, 9,13;36:12;94:12;102:11</p> <p>nevertheless (2) 118:6;192:1</p>	<p>news (1) 95:9</p> <p>next (6) 20:24;81:9;82:8;91:8;92:16; 129:1</p> <p>nice (3) 36:16,24;124:8</p> <p>night (4) 50:5,6,7,11</p> <p>noise (1) 146:21</p> <p>non-Dartmouth (1) 92:22</p> <p>none (4) 49:23;129:22;166:4;170:12</p> <p>nonetheless (1) 116:22</p> <p>nonlegal (1) 143:24</p> <p>nonpracticing (1) 19:1</p> <p>nonrandom (3) 106:21;107:1,10</p> <p>normal (3) 62:16;105:21;113:8</p> <p>normally (1) 120:7</p> <p>northeast (1) 155:14</p> <p>north-south (1) 127:5</p> <p>Notary (1) 197:20</p> <p>note (5) 19:8;46:2,4;96:4;164:8</p> <p>noted (4) 97:19;145:22;159:9;173:20</p> <p>notes (2) 34:19;53:2</p> <p>Notice (4) 27:11,16,22;170:23</p> <p>noticed (3) 88:3;96:8;103:22</p> <p>NTT (1) 101:2</p> <p>number (48) 62:23;69:4;71:3,21;74:17; 81:17;82:4,18;87:5;89:4; 107:16;115:23;117:21;131:2; 134:3;142:13,14;144:13;150:6; 185:3,3,10,14,18;186:3,15; 187:1,9,15;188:16;189:4,8; 190:2,25;191:21;192:5,7,10,17, 20;193:10,19,23;194:14,21; 195:16,22,23</p> <p>numbered (10) 52:8;70:8,10,11;71:1,2,11; 90:20;137:25;144:9</p>	<p>O</p> <p>oath (1) 197:14</p> <p>object (5) 9:14;12:15;86:7;87:12; 183:12</p> <p>objected (1) 188:19</p> <p>Objection (71) 7:8,17;8:7;9:13;12:2,14;20:3; 21:24;25:18;26:12;27:5,41:7; 43:8;44:18;56:11;59:15;60:4; 68:4;69:6,14;70:20;72:21; 74:23;76:12;77:11,24;78:12; 79:8;81:20;82:21;84:4;86:15; 87:11;89:21;90:12;99:14; 106:22;107:13;108:21;109:23; 114:25;117:23;118:7;120:2,15; 121:3;132:25;133:1;140:13; 143:20;148:9;155:1;157:10; 158:19;160:19;161:17,21; 162:19;164:17;169:4,13;172:4; 174:5;178:9;183:12;184:19; 187:3,4;189:10;193:3;195:11</p> <p>objections (8) 8:10;27:13;29:5;30:6;165:1; 166:19;175:11;176:21</p> <p>observation (1) 72:14</p> <p>observations (5) 72:7,11;111:2;128:10,13</p> <p>observe (1) 65:20</p> <p>observed (9) 64:4;92:19,22;153:22,24; 165:6;167:23;189:4;192:20</p> <p>obstacles (2) 80:21;81:4</p> <p>obstructions (1) 86:11</p> <p>obtain (4) 28:19;29:12;111:3;158:2</p> <p>obtained (2) 39:5;158:12</p> <p>obtaining (1) 159:19</p> <p>obvious (7) 69:3,8,18;90:17,17;151:17; 195:2</p> <p>obviously (9) 38:9;67:23;79:24;86:7;88:8; 89:9;144:24;151:16,21</p> <p>occur (1) 45:9</p> <p>occurred (2) 38:10;127:4</p> <p>occurs (1) 140:22</p>	<p>odd (2) 130:13;195:22</p> <p>off (20) 15:25;16:1,3,4;39:19;47:10; 61:18;75:19;93:11;114:7; 137:11;147:6;164:1;174:3; 179:10;196:3,6,10,11,12</p> <p>offer (3) 5:21;14:19;93:22</p> <p>office (1) 196:18</p> <p>often (4) 4:18;57:5;61:17;74:17</p> <p>omitted (1) 96:4</p> <p>omni (1) 120:21</p> <p>on/off (1) 195:9</p> <p>Once (3) 4:15;48:25;154:11</p> <p>one (160) 7:13;8:17;9:17,23;12:11,22; 18:21;21:7,8;22:19;23:5;24:8; 27:25;31:22;37:3,6,40;21;42:5, 7;44:11,12;48:6;50:11,11; 53:17;54:21;56:16;60:6,17; 61:3;63:17;64:22,22,24;67:8; 70:4,25;71:16;72:4,6,18,22; 76:24;77:3;78:5,5;79:11,15,16, 25;80:9;83:5;84:10;85:16; 87:13,13;88:1,17;91:20;92:3,7; 95:16,16;96:21;97:18;98:16,19; 103:24;110:16;111:17,19; 112:23,23,25;113:13;115:19,21, 22,24;116:10;121:5,6,8,18; 122:16;123:17,24;124:6,8,9; 125:5;126:1,17;127:12,14; 129:2;131:9,11,14,21;132:6; 133:4,23;134:24;135:8,21; 136:14;140:19,23,25;141:4,11, 16,22,23,24;143:1,2;144:6; 145:8,20;149:3;151:21;154:14, 14;158:24;160:1;161:24; 162:23;163:8;165:5;166:1,9; 167:6,21,25;168:1,11,12;169:7, 9,15;171:7;172:8;173:5;174:25; 177:1;178:23,24;181:7,23; 185:1,9,19;186:7;187:16;193:8; 194:16;195:5,19</p> <p>ones (17) 42:13;43:15;49:1,13,14,16; 65:4;66:23;83:19;128:21; 153:23;154:20,21;162:6; 180:24;191:20;192:9</p> <p>only (20) 21:16,25;65:4;73:23;86:13; 91:6,6;97:12;109:24;123:12; 126:18;128:7;141:16;155:13, 14;163:7;165:15,19;169:1; 189:22</p>

<p>open (5) 62:9,19;106:25;131:13;147:2</p> <p>opening (6) 40:7,15,19,23;46:6;144:17</p> <p>operation (1) 62:17</p> <p>opine (1) 41:10</p> <p>opined (3) 13:2;149:15;183:23</p> <p>opinion (25) 13:7;43:9,13,14;60:12;93:22,25;94:6,10,18,23;95:15;99:5;112:11,18;127:21;134:11;142:23;161:1;165:5;167:20;174:9;184:23,24;188:24</p> <p>opinions (7) 5:21;13:12;27:3;111:22;134:19;160:25;161:3</p> <p>opposed (9) 56:22;64:5;73:16,25;78:24;96:19;100:1;120:21;184:23</p> <p>opposite (1) 135:25</p> <p>Opposition (1) 31:4</p> <p>optimized (1) 136:18</p> <p>order (21) 11:7;13:22;14:14;65:7,20;68:25;76:6,8;77:16;88:6;96:11;121:5;122:24;133:5,7;134:20;156:21;159:7;172:1;184:12;196:21</p> <p>ordinary (33) 11:15,18,21;12:1,9,12,19,25;14:3,7;93:21;94:1,7,16;95:14,16;96:2;97:4;100:12;101:11;102:6;103:5;126:22;127:21,25;128:1;144:1;161:1;190:12,15;192:2;194:9,17</p> <p>original (3) 43:1;159:10;196:17</p> <p>others (6) 13:2;48:12;83:21;84:25;85:1;104:25</p> <p>otherwise (2) 38:11;55:1</p> <p>ourselves (1) 73:1</p> <p>out (32) 29:1;37:19,25;48:6;49:8;54:19;56:5;61:11;79:25;80:10;81:9;92:10,18;93:3,5;98:17;105:23;107:17;110:6;130:6;145:14;147:22;157:11,12,13,14;158:21;163:8;167:20;170:1;184:13;187:16</p> <p>outdoor (1) 56:1</p> <p>outdoors (1) 59:11</p> <p>outfitted (1)</p>	<p>113:16</p> <p>outside (2) 100:21;154:3</p> <p>over (17) 5:15;7:20;9:24;10:2;20:10;33:6;50:2;55:17,19,20;58:15,15;69:25;70:3;90:19;148:7;150:18</p> <p>overlapped (1) 91:7</p> <p>overlapping (3) 91:9;98:22;101:6</p> <p>own (9) 16:13;67:23;86:4;102:4,4,7;119:3;142:12,20</p>	<p>144:24</p> <p>Pardon (1) 196:5</p> <p>park (1) 153:25</p> <p>part (22) 11:19,19;18:4;27:19,23;40:13;44:13,13;54:9;64:13;83:9;100:5;109:8;138:11;141:21;145:15;157:5;162:23;163:9;165:22;172:18;185:8</p> <p>participated (1) 21:17</p> <p>particle (3) 82:9;191:18,23</p> <p>particular (15) 41:9;51:1,5,8;93:19;107:24;108:18;109:20;120:9;143:3,8;160:14;161:10;181:17;182:18</p> <p>parties (3) 4:25;5:5,13</p> <p>party (1) 84:9</p> <p>parts (12) 13:16;32:5,10;50:17,24,24;51:1,8;68:7;98:7;112:10;113:10</p> <p>party (4) 5:8;17:11;18:12,22</p> <p>passages (2) 189:22;194:5</p> <p>past (2) 27:16;86:25</p> <p>patent (101) 4:23;5:18,20,25;6:7,12,18,24;7:2,12,15;9:9,11;10:8;11:1,3,3,15;13:22;15:14;21:7;31:23,23;44:9,20;52:10,19;73:16,22;74:22;75:4;96:12;103:12,25;105:7;108:20,23;109:2,7,22;114:14;119:22;121:22;128:5;130:4,12;133:6;137:17;140:18;142:1,2,5,7,13;143:2,3;144:8;16:146:13;147:12;148:22,23;156:15,19,20,21;158:8,16;160:8,11;162:1,22,22,25;164:9,20,25;166:18;169:12;171:1,9,10,12,13,14,25;172:8;174:15;177:16,18;180:23;181:2;185:3,23;186:1;188:2,21,24;194:3,5;195:13</p> <p>patents (46) 5:22;6:18,18;12:13;18:19,24;19:1;20:13;21:9,10;30:10,24;31:18;32:1;33:1,8;43:21;44:4;45:15;50:18,25;51:7;73:4;94:8,11;97:14;98:7;103:9,9,16,17;104:11,21;105:2;130:22;131:5;135:5,7;140:21;141:13,22;156:13,13;189:24;190:17,17</p> <p>patent's (1) 127:18</p> <p>path (14) 74:18;75:9,14;80:8,9;89:7;</p>	<p>124:22;125:3,25;126:2,20,24;128:19,21</p> <p>paths (1) 80:23</p> <p>pathway (1) 81:11</p> <p>pattern (3) 107:18,23,23</p> <p>patterns (3) 88:18,19,21</p> <p>paying (2) 41:12;187:9</p> <p>PDA (1) 17:20</p> <p>PDFs (1) 29:16</p> <p>pedestrian (2) 65:22;81:10</p> <p>pending (4) 9:6;17:14;77:23;157:9</p> <p>people (15) 36:22,24;37:2;61:12,17,23;62:7;64:7;86:24;105:22;113:20;128:1;192:16,18,22</p> <p>per (2) 21:11;88:4</p> <p>perceived (2) 184:14,17</p> <p>percent (1) 190:20</p> <p>percentage (1) 118:21</p> <p>perhaps (10) 18:3;35:23;43:17,19;98:21;104:5;126:8;141:22;171:4;187:19</p> <p>period (5) 36:18;61:16;113:11;114:1,3</p> <p>permission (1) 28:24</p> <p>person (22) 37:3;86:9;93:25;94:7;96:1,20;99:11;100:12;101:11,12,23,25;102:4,5;126:22;127:21,24;143:25;161:1;190:12,15;192:2</p> <p>personal (6) 17:20;20:22;64:5;93:23;105:21;113:6</p> <p>personally (1) 197:13</p> <p>persons (5) 100:10,22;192:22;194:9,12</p> <p>perspective (3) 122:18;123:12;143:25</p> <p>pertains (1) 141:16</p> <p>pertinent (1) 55:3</p> <p>Pervasive (1) 58:12</p> <p>PhD (6) 27:11,14;31:3;95:4;101:16;197:5</p>
P			
<p>packet (2) 92:13;124:7</p> <p>packets (2) 62:17;92:10</p> <p>page (34) 15:23,24;16:14;24:5,6,8;26:23;27:24,24;28:5;31:9;35:16;52:15,16;61:8;70:6,7;71:10,11;75:25;82:2;90:20;93:19,20;95:11,13;107:6;119:14;137:25;138:1,1,3;144:13;164:13</p> <p>pages (2) 27:12,16</p> <p>paid (1) 34:20</p> <p>pair (1) 89:7</p> <p>Palm (2) 17:21;18:2</p> <p>paper (45) 21:16;22:14,16,18;26:6,17;40:7,12,13;41:4;48:16;51:22;53:8,14,19,20,24;54:7;56:13;57:9,24;58:7,10,10,19;60:22;69:12;72:5;80:7;81:13,22;82:17;83:22;84:22;87:4;88:3;90:19;92:21;101:7;103:8;119:2,3;146:18;191:18;195:1</p> <p>papers (16) 21:1,4,6,25;23:2;24:20,22;25:15,16,19,23,25;44:6;58:13;61:21;144:17</p> <p>paragraph (19) 31:14,24;57:8,13;61:7;70:5;71:13;75:25;93:22;95:11,14;106:5;173:12;180:18;181:22;183:7;184:2;190:4,7</p> <p>paragraphs (1) 149:20</p> <p>parallel (3) 4:19;18:21;19:4</p> <p>paraphrased (1) 139:6</p> <p>paraphrasing (1)</p>			

<p>phrase (8) 22:11;73:22;143:9;145:15; 146:11;182:17,23,24</p> <p>phrased (1) 98:21</p> <p>phrasing (1) 149:16</p> <p>pick (4) 88:11,12,15;91:4</p> <p>picked (2) 32:24;146:21</p> <p>picking (1) 86:3</p> <p>picture (1) 171:19</p> <p>piece (2) 64:22;184:25</p> <p>pieces (2) 44:23;163:7</p> <p>Place (13) 57:19,21,22;58:16;59:4,11, 14,22;60:2,74:12;87:6,13;189:1</p> <p>placed (3) 74:2,4;87:6</p> <p>placement (1) 118:12</p> <p>places (3) 89:9;116:3;134:23</p> <p>plain (1) 162:18</p> <p>Plaintiff (1) 31:4</p> <p>plan (6) 80:10;135:5,19,22;136:3,14</p> <p>planning (3) 132:3;135:25;137:1</p> <p>platforms (1) 39:12</p> <p>play (4) 4:20;62:2;183:15;189:23</p> <p>please (18) 4:6,8;17;17:19;22:10;24:5; 35:14;51:21;77:22;90:20;93:16, 20;100:14;121:22;147:12; 158:6;172:3,3;196:14</p> <p>plot (1) 174:15</p> <p>plotted (1) 173:3</p> <p>plotting (1) 175:14</p> <p>plug (1) 82:25</p> <p>plurality (2) 185:13;186:17</p> <p>plus (1) 31:8</p> <p>pm (2) 196:12,25</p> <p>point (125) 20:24;22:24;53:10,12,16,18; 57:15;61:18;62:7,9,14,24; 63:25;65:1;68:9;72:8,10,12,16;</p>	<p>73:13;74:11,18;75:13;76:3,10, 14,24;77:3,4,13,19;78:3;79:13; 83:23,25;84:2,2;90:24;91:4; 94:19;107:15;115:10,18;116:1, 2,14,19,20;122:5,8,9,13,15,16, 19;123:6,16,19,22,25;124:2,6, 12;125:6,8,12,13,13,20,21,23; 126:6,7,17,18,25;127:1,7,12,19; 128:14;129:4;133:9,10,14; 138:21;140:4;145:1,11,17,25; 149:7;153:14;158:4,5,14,15; 159:3,19;172:9,10,14,23,25; 173:22;175:1,2,3;176:4,5,12; 177:4,6,8;178:18;180:1;182:19, 20;183:2,5;184:1,2,8,22,23; 191:21</p> <p>pointed (1) 120:13</p> <p>points (223) 21:22;25:10,17;26:2,9,19; 50:3;53:13;61:12;62:15,16; 63:23;64:10;65:10,20;66:23; 67:4,10,17,23,24;68:2,13,14,25; 69:4,10;71:21,24,25;72:7; 73:10,23;77:2;78:19;79:7; 81:17;82:19;84:12;85:4,9,12; 86:1;87:24;88:7,14,15,25;89:2, 4,10,14,16;91:8;92:3,9,19,23, 25;101:20;111:3,7;114:22; 116:5,7,11,16,21,24;117:10,14, 22;118:5,10,11,16,22;119:3,7,9; 125:2,5;127:17;128:10,15,18; 129:4,6,7,23;130:14;133:12; 134:2,22;139:10,20;140:7; 141:1,17,24;143:9;146:3; 147:21;148:2,7,12;149:1; 150:17,20,21,23;151:8,11; 152:13,15,21,24;153:10,22; 154:3,5,18;155:14,15,21; 156:16;157:1,4,17;158:1,10,25; 159:2,5,8,16,18;160:4;164:12; 165:7,12,16;166:2,7,12,13; 167:9,10,17,23;168:22;169:16; 170:6,10,11,12,21;171:3,16; 172:12,24;173:2,5,16;174:3,12; 175:7,15,16,18;176:7,19;177:3, 21,23;178:5,19;179:4,17,21; 180:5,8,22;181:9,12,24;182:3,8; 183:22;184:4;185:11,15,19; 186:4,15;187:2,9,13,15,22; 188:17;189:4,9;190:2,25;191:4, 21;192:5,8,10,17,20;193:11,19, 24;194:14,18,19,21;195:6,16, 22,23</p> <p>points' (1) 174:15</p> <p>point's (1) 72:17</p> <p>poll (1) 64:15</p> <p>poor (2) 193:17,17</p> <p>portion (1)</p>	<p>188:6</p> <p>portions (2) 31:22;32:4</p> <p>position (18) 29:18;76:15;94:12;133:13, 15;145:24;150:1;158:2,12; 159:11;164:12;172:13,15,22, 25;173:22;177:20;180:6</p> <p>positioning (3) 110:18;136:11;149:5</p> <p>positions (13) 40:10;41:6;43:5;165:6;167:5; 168:5,20;170:6,10;173:2; 174:20;175:15,19</p> <p>possession (1) 137:21</p> <p>possibility (2) 131:13,14</p> <p>possible (12) 11:22;39:13;60:25;71:15; 85:17;118:16;156:9;166:16,20, 25;167:1;182:19</p> <p>possibly (1) 168:7</p> <p>post (4) 52:3;55:10;100:19,20</p> <p>postman (17) 122:2;123:14,21;128:12; 130:2,22;131:1,6,9,22;132:3,5, 23;135:21;136:18,21,24</p> <p>potential (3) 6:11;77:20;118:24</p> <p>potentially (1) 152:18</p> <p>practice (6) 58:25;61:19,22;62:2;63:12,14</p> <p>precise (5) 14:14;33:12;122:25;124:6; 127:11</p> <p>precisely (3) 54:18;56:9;150:21</p> <p>predicting (1) 20:24</p> <p>prediction (8) 20:12,19,21,23;21:20,23; 22:3;101:1</p> <p>pre-existing (2) 87:5,7</p> <p>preferred (3) 131:10,25;160:15</p> <p>prefix (1) 52:9</p> <p>prepare (4) 16:24;18:8;49:24;50:15</p> <p>prepared (3) 34:6;48:5;94:25</p> <p>preparing (7) 30:9;31:20;32:19;34:14; 44:22;46:3;47:2</p> <p>prerecorded (1) 150:1</p> <p>presence (1) 62:18</p>	<p>present (7) 154:19,20,21,22;155:2,4,16</p> <p>presented (2) 58:11,14</p> <p>presenting (1) 83:3</p> <p>presumably (1) 117:7</p> <p>pretty (3) 92:17;95:22;113:8</p> <p>previous (14) 14:16;16:14;71:5;79:12; 142:17;145:21;169:22;170:13, 21;171:6;178:23;188:8,10,10</p> <p>previously (3) 63:20;95:6;116:23</p> <p>primarily (6) 32:16;41:17;111:25;116:13, 15;160:20</p> <p>primary (1) 83:8</p> <p>print (2) 48:10;49:13</p> <p>printed (2) 48:10;49:1</p> <p>printout (1) 68:20</p> <p>prior (8) 5:19;6:10,12;33:7,9;46:13; 116:23;138:21</p> <p>private (1) 92:23</p> <p>privilege (1) 8:12</p> <p>probably (18) 13:19;23:24;33:19;34:18; 55:4;58:5;61:16,22;83:18,20; 84:15;97:1;104:10;122:23; 127:14;135:3;158:25;191:24</p> <p>problem (17) 72:19,23,25;73:5;77:20; 80:15;90:25;98:8;108:18,25; 109:1,20;110:15;117:8,12; 130:5;136:23</p> <p>problems (4) 109:21;110:7;111:12,14</p> <p>procedures (1) 50:4</p> <p>process (4) 30:9;31:20;34:5;162:21</p> <p>produce (4) 29:21;172:22;173:21;182:2</p> <p>produced (4) 29:20,20,23;35:7</p> <p>producing (1) 136:10</p> <p>product (2) 8:11;60:21</p> <p>production (2) 28:14;29:6</p> <p>productive (1) 39:7</p> <p>professor (1)</p>
--	---	--	---

<p>19:18 proffers (1) 42:17 program (1) 100:6 programming (1) 130:13 progress (1) 56:19 project (1) 57:22 projects (1) 19:19 properly (1) 12:12 property (1) 177:9 proportional (1) 86:10 proposed (1) 173:10 proposing (1) 142:25 prosecution (22) 11:15;31:23,25;32:11,12,17; 44:4,9,21;45:8,14;137:16,23; 138:2;143:15;144:4,8;161:15; 162:23,25;163:7,15 protocols (1) 63:2 protractor (2) 122:23;126:9 provide (12) 58:23;59:10;138:25;140:5; 145:15,23;146:3;149:2;157:1; 161:7;181:11,19 provided (2) 45:1,22 provides (1) 59:2 providing (3) 59:12;180:21;181:9 proxy (5) 85:15,24,25;87:10,15 PTO (2) 161:20,24 public (3) 54:21;106:14;197:20 publication (1) 53:23 publications (3) 29:15;52:20;54:14 publicly (3) 29:3,16;54:23 publish (1) 60:11 published (6) 52:5;53:1,19;54:3,5;83:19 pull (1) 98:17 pulled (1) 163:8 purpose (10)</p>	<p>120:18;183:9,10,15,22,23; 184:7,14,17,24 purposefully (1) 105:23 purposes (5) 37:11;83:5;92:25;121:7; 179:5 put (12) 11:10,12;64:6;111:18;112:8; 113:5,5;144:5;146:17;154:16; 155:22;183:11 putting (2) 105:18,19</p>	<p>116:25 read (47) 32:14;40:24;41:3;42:9,9,11, 15,20,22,23;45:17;48:10,16; 49:1,13,15;51:5,10;53:15; 68:20;77:21,23;81:22;94:5,24; 97:14;98:5,12;99:3,9,13,18; 130:10,16;144:17;149:23; 153:19;157:7,9;163:6,7;188:4, 8,9,12;189:16;197:1 readable (2) 63:6;156:17 reading (19) 33:24;40:12;42:14;43:3,16; 51:3;74:12,19;98:10;112:19; 123:24;125:18;130:4;140:16, 19;143:25;173:20;176:12;195:1 readings (83) 72:12;76:2,22;77:1,2,12; 78:18;79:12;122:4,8,13,15,20; 123:4,5,8,22;124:1;133:9,11,25; 134:1,5,21;138:20,25;139:9,13, 15,18;140:4;144:23;145:2,5,10; 158:3,13;159:2,14,19;171:15; 172:9,11,22;173:15,18,21,25; 174:1,11,16,19;175:1,5,14,17, 22;176:3,5,11,18;177:2,4;178:3, 11,14,17,18,24;179:3,16,20; 180:21;181:8,13,14,19;182:2,6, 14,21;183:2,4 reads (1) 185:1 realize (2) 118:1;134:17 realized (1) 70:9 Realizing (1) 7:4 really (4) 56:23;90:16;105:11;106:18 re-ask (1) 31:17 reason (19) 42:5,7;68:18;92:18;95:25; 96:5;114:19;115:9,15;116:10, 17,22;117:20;121:12,14; 126:23;155:20;165:19;193:8 reasonable (5) 11:7,11;97:14;131:14;184:6 reasonably (1) 7:13 reasons (4) 39:13;111:17;116:13;121:17 recall (66) 4:25;5:17;6:16,17,20;10:20; 13:19;17:11,16;18:12,14,19; 19:3,5;23:2,5;24:24;26:3,14,17; 32:2;34:8;36:9,10;37:8,9,17,18; 38:12;39:9;41:1;43:10,14,15, 18;44:3;47:4;49:23;53:19; 54:16;65:12,25;66:13;69:17; 77:20;78:1,9;80:1;87:14;94:17, 21;104:7;131:18,19,20;132:11;</p>	<p>133:3;136:1;174:24,25;179:24, 25;190:3;191:13,22,23 recalling (2) 133:4;142:22 receive (8) 92:2;120:11,24;121:1,7,11; 185:11;186:16 received (2) 9:19;143:15 receiver (1) 92:6 receives (2) 91:20;120:10 receiving (1) 86:5 recent (1) 99:18 recently (3) 61:9,11;101:15 reception (2) 71:18;81:5 Recess (9) 39:20;47:11;75:20;93:12; 114:8;137:12;147:7;164:2; 179:11 recited (2) 173:11;187:6 recognize (1) 127:3 recognizing (1) 118:24 recollection (12) 6:15;37:21;38:17;53:5;60:15; 78:4,8;80:13;82:18;119:14; 131:8;149:10 recommended (2) 33:1;36:3 record (45) 4:7;8:10;15:25;16:1,3,4,6; 28:22;30:20;34:25;39:19,22; 46:17;47:10,13;62:20;64:4,15, 16;70:21;71:22;75:19,22;90:24; 93:11,14;114:7,10;116:19; 133:24,25;137:11,14;147:6,9; 164:1,4;172:8;179:10,13;196:4, 7,10,11,12 recorded (5) 34:22;61:24;65:6;138:20; 172:17 recording (10) 35:9;61:17;63:22;64:2;133:8; 145:2;158:3,13;159:14;176:3 records (10) 55:2,3;146:2;148:25;156:17, 25;157:25;158:9,10;159:15 red (2) 164:11;173:3 redefine (1) 160:18 redefined (4) 161:4,15,25;162:3 reduce (3) 111:19;168:3,3</p>
	Q		
	<p>quality (1) 92:11 quarter (1) 56:10 quick (3) 88:3;106:15;146:25 quickly (3) 88:8,10;188:25 quite (4) 19:8;72:23;79:9;90:14 quote (3) 14:3;180:21;181:24 quoted (8) 32:5,6,13,14;44:5,23;138:7; 144:17 quotes (1) 112:8</p>		
	R		
	<p>radio (8) 22:5,15,23;147:17;154:4; 155:10;164:14;171:18 raining (1) 86:25 ran (2) 39:5;107:9 random (28) 103:10;105:6,8,12,17;106:1, 11,17;107:1,4,11,17;108:16; 111:22,24;112:17,19;113:1,4; 114:13,16,23;115:9;122:1,7; 123:25;128:23;135:24 range (8) 147:17,22;154:4;155:10; 164:14;165:7,8;171:18 ranges (1) 91:7 rapidly (1) 64:15 rather (4) 73:14;74:3;144:2;151:24 raw (2) 175:1,14 re (1) 77:21 reach (1)</p>		

<p>reduced (8) 165:9,13;167:6,24;168:1; 171:4;173:6;177:21</p> <p>reduces (1) 172:25</p> <p>refer (4) 106:12;149:9;181:13;182:17</p> <p>reference (159) 13:3;14:6;30:16;57:18,19; 58:3,3,24;59:1;60:14;70:14; 82:8;104:21;105:11;106:8; 110:4,11;111:4,9,20;112:11,15, 22;131:6,11,17;132:10;133:11; 134:1,13,15,20;135:4;138:25; 139:2,9,13,19,22;140:5,6,8,17, 20,21,23,25;141:4,12,17,23,24; 142:7,24;143:6;144:23;145:15, 19,20,24;146:4,10;147:15,20, 21;148:6,15,17,20,22;149:2,4,5; 150:9,10;151:1,2,6,16,18,21,22; 152:6,10,17;153:4,13,16,18; 154:7,8,10,24;155:13,18;156:1, 6,7;157:1,6,12,14,18;164:15,19, 24;165:3,4,17,20;166:17; 169:11;170:24,25;171:11,15, 24;172:11,23;173:4,10,15,19, 22;174:1,11;175:5;176:6,11,18; 177:2,5,15,17;178:4,7;179:3,16, 20,24;180:3,5,8,21,22;181:9,9, 12,12,19;182:2,7,15,17;183:4,8; 184:1;185:7;188:24</p> <p>referenced (8) 14:5;29:4,5;58:19,20;104:25; 130:11,12</p> <p>references (3) 80:21;82:5;104:20</p> <p>referencing (2) 58:11;173:9</p> <p>referring (19) 10:14;16:13;22:16;23:22; 24:1,2,16;32:13;57:9;59:19; 100:3;109:24,25;110:1;142:4; 149:21;170:18;181:8;182:20</p> <p>refers (2) 145:1;180:20</p> <p>reflect (1) 56:15</p> <p>reflection (1) 94:13</p> <p>reflects (1) 73:16</p> <p>Reformulate (1) 97:23</p> <p>refrain (1) 8:20</p> <p>refresh (3) 59:22;60:15;149:10</p> <p>regard (2) 156:2,11</p> <p>regarding (1) 28:25</p> <p>regards (1) 188:25</p>	<p>region (3) 132:2;135:4;152:16</p> <p>regions (1) 135:2</p> <p>relate (6) 17:5;24:24;25:9,16;26:1; 45:24</p> <p>related (15) 5:20;20:13;22:18;23:2;26:16; 73:17;111:13,14,16;112:12,13, 17,23;163:18,19</p> <p>relates (1) 44:9</p> <p>relationship (2) 112:10;160:6</p> <p>relative (28) 37:22;133:12;134:2;139:9, 19;140:6;141:1,17,23,25; 142:25;143:9;171:16;172:12, 23;173:16;174:2;175:6;176:6, 18;177:2;178:5;179:4,17,20; 182:2,7;183:4</p> <p>relevant (16) 20:7,7;21:7;34:2;49:20;94:8; 97:15;98:2,18;105:1;134:22; 162:25;183:23;184:15,15,25</p> <p>reliable (2) 136:11;163:1</p> <p>relied (2) 29:2;48:11</p> <p>rely (1) 21:21</p> <p>relying (1) 131:23</p> <p>remember (44) 5:10,16;6:7;17:7,10;21:11; 33:10;34:11;36:14,21,22;37:1, 24;38:11,21,24;39:7,10,14; 48:15;49:11;58:18;60:25; 61:20;63:2,6,10;66:7,10;69:20, 20;73:12;75:5;79:17;80:19; 81:21,21;83:19;93:6;103:11; 105:8;114:4;163:6;188:3</p> <p>remind (2) 14:12;101:4</p> <p>reminded (1) 49:2</p> <p>repeat (1) 158:6</p> <p>repeating (1) 89:13</p> <p>rephrase (3) 8:20,24;115:3</p> <p>report (13) 13:13,17;14:19;18:8;29:4; 30:17,19;44:22;149:10,14,18; 173:14;180:17</p> <p>reporter (4) 10:1;16:9;188:19;196:16</p> <p>reports (1) 16:24</p> <p>represent (3) 4:6;104:1,19</p>	<p>representation (1) 104:18</p> <p>represented (2) 166:14;168:25</p> <p>requested (5) 28:14;29:1,7,13,25</p> <p>requests (3) 28:7,10;30:1</p> <p>require (5) 66:19;115:23;135:12;159:23; 191:20</p> <p>required (1) 140:2</p> <p>requirement (19) 6:19,24;7:2,7,9;9:10;8;11:1; 132:20;135:18;138:19;139:18; 145:12;158:9,11;159:12,14; 187:2;188:17;192:14</p> <p>requirements (6) 9:11;133:5,8,20,24;146:8</p> <p>requires (10) 7:24;69:19;97:6,8;98:9; 136:2;139:8;156:24;172:8; 195:23</p> <p>reread (3) 50:17,23,24</p> <p>research (12) 19:19;20:22;24:20;37:10,14; 51:12,15;54:6,11,20;65:8; 102:13</p> <p>researcher (1) 102:13</p> <p>researchers (2) 57:14;61:9</p> <p>resemblance (1) 164:9</p> <p>residential (1) 113:24</p> <p>resolved (1) 14:22</p> <p>respect (10) 29:18;143:1,3;147:15;154:9, 24;174:11;176:11;177:5;178:22</p> <p>respectively (1) 40:14</p> <p>response (1) 29:13</p> <p>responsive (1) 28:19</p> <p>rest (1) 171:19</p> <p>restate (1) 12:3</p> <p>restated (1) 68:6</p> <p>result (1) 68:15</p> <p>resulted (1) 114:17</p> <p>resulting (1) 136:10</p> <p>results (6) 73:12;74:16;79:16;172:21; 182:22;193:18</p>	<p>retained (4) 5:5;15:13,19;35:20</p> <p>retainer (1) 40:4</p> <p>retention (6) 19:12;29:9,21,22;35:15;46:21</p> <p>retransmitted (1) 92:14</p> <p>retrospect (2) 69:16;90:17</p> <p>reveal (1) 5:12</p> <p>reverse (1) 182:22</p> <p>review (13) 30:8;31:20,25;34:16;46:11, 23;50:4,7;56:20;88:3;94:22; 106:16;182:13</p> <p>reviewed (17) 32:4,10,18;33:3;44:2,4;45:2,6, 10;46:3,4;49:21;52:12;56:19; 94:17;95:6;144:11;185:4</p> <p>reviewing (5) 33:8,23;34:3;42:8;142:18</p> <p>revisions (1) 34:7</p> <p>rewording (1) 146:10</p> <p>Richardson (1) 5:11</p> <p>Right (141) 7:5,10;8:9;9:22;10:3;13:16; 14:4;15:3;16:16;17:4;21:19; 24:18;25:14,15;31:16;34:21; 35:19;40:5;41:25;42:7,8;43:18; 44:7;46:10;47:19;53:4;57:17; 65:3;67:5;69:24;72:20;76:10, 11;78:21,24;79:19;80:5,5,24; 81:1,9;82:3,10;84:23;85:24; 92:4;93:4;95:12;98:3;100:9,9; 106:9;109:13,13,16;110:22,23; 113:14;118:3;119:22,23; 120:11,23;123:1,9,13,14,17,25; 124:24,25;125:3,4,8;126:6,20, 21;128:18;129:8,17;133:16,19; 135:18;136:16,20;137:23,24; 139:10,11,17,20,21;140:23; 144:18;145:3,7,12;146:5;148:3, 4;149:22,22,24;150:5,12,13,14, 20;151:13,13,19;153:2,5;155:6; 159:21;164:23;166:1;169:1; 171:2;175:3,8;176:8;178:20,21, 24;180:7,10,12,24;181:13; 183:3;184:18,22;189:17,21; 192:6,15,15,21,25;193:12</p> <p>right-hand (3) 152:6,25;153:9</p> <p>risk (1) 103:7</p> <p>Risks (8) 21:12;22:16,19;26:6,17; 37:23;51:19;70:23</p>
--	---	---	--

<p>road (1) 89:5</p> <p>roads (5) 73:25;74:1;89:6;131:12,15</p> <p>role (4) 40:9;56:13;183:10,14</p> <p>room (1) 147:2</p> <p>rough (1) 196:13</p> <p>roughly (2) 40:3;53:15</p> <p>route (15) 88:21,22;89:3,18,19;107:23,24;130:6;132:4;133:20;135:6,22;136:14;137:1;152:9</p> <p>routes (2) 80:10;135:19</p> <p>routing (7) 128:12;131:1,7,9;132:3;136:8,18</p> <p>run (6) 39:12;92:23;97:11;101:20;193:19;195:4</p>	<p>scanners (1) 106:13</p> <p>scanning (27) 75:9,15;105:19;113:5,17;114:1;115:11,18;116:1,18;117:2,7;118:1,4,13;119:11,23;121:6;122:1,2,7;123:15,21;124:1;128:21;169:25;182:18</p> <p>scans (11) 76:3,8;77:16;125:25,25;126:1,4;127:4,16;172:17,19</p> <p>scenario (2) 118:15;124:21</p> <p>Science (7) 53:2;94:2;95:18;97:21;98:15;99:8,10</p> <p>scientific (1) 100:16</p> <p>scope (7) 43:9;102:17;140:11;146:7,13,14;174:8</p> <p>se (1) 21:11</p> <p>S-E-A (2) 5:3,4</p> <p>SeaChange (8) 5:2,3,9,25;6:6;14:23;15:15;16:21</p> <p>SeaChange's (1) 5:22</p> <p>search (1) 62:15</p> <p>season (1) 56:10</p> <p>second (11) 27:13;35:16;52:15,16,16;57:8,13;61:8;88:9;92:15;169:18</p> <p>Section (10) 71:12;82:1;90:19;91:16;95:13;143:4;179:24;180:2,15;188:24</p> <p>sections (1) 42:16</p> <p>secure (1) 62:9</p> <p>secured (1) 63:1</p> <p>seeing (1) 83:2</p> <p>seeking (1) 152:19</p> <p>seem (8) 32:3;69:10;90:16;99:7,7;112:7;173:5;177:9</p> <p>seemed (1) 94:13</p> <p>seems (9) 37:13;69:16;79:14;89:14;105:3;170:19;171:2;184:5,6</p> <p>sees (1) 123:17</p> <p>segment (3) 89:13;130:7,9</p>	<p>segments (1) 89:12</p> <p>selected (1) 24:19</p> <p>selection (1) 66:5</p> <p>semicolon (1) 82:9</p> <p>seminar (2) 24:8;25:13</p> <p>seminar-style (1) 24:19</p> <p>senior (1) 56:16</p> <p>sense (17) 36:18;37:12;39:4;48:19;56:21;65:6;67:25;68:23;91:17;92:4;97:14;106:1;115:7;116:2;118:5,9;173:4</p> <p>sensing (7) 20:11,15,18;21:5,18;22:7,11</p> <p>sent (2) 32:22;88:9</p> <p>sentence (5) 61:8;71:14;180:18;181:10;189:16</p> <p>separate (3) 13:11;30:12;109:8</p> <p>September (8) 31:12;33:5;35:18;40:3;46:14,17;47:3;49:19</p> <p>served (1) 28:23</p> <p>server (1) 32:21</p> <p>set (13) 83:4;91:3;92:23;109:20;115:11,17;148:13;149:7;153:22;165:7;167:8;177:4;187:10</p> <p>setting (1) 100:22</p> <p>settled (1) 18:16</p> <p>several (19) 13:16,17,20,20;21:1;22:25;23:7,23;24:19;25:2,15,19,23;27:12;36:8;50:1;54:15;119:3;190:17</p> <p>severity (1) 118:25</p> <p>shapes (1) 62:6</p> <p>share (1) 64:6</p> <p>sharing (1) 106:19</p> <p>short (9) 16:12;18:15;19:7;47:7;58:12;93:8;137:7;139:5;163:21</p> <p>show (22) 76:17;80:8;122:7,11;124:23;125:24;129:10,19,20;147:13;</p>	<p>148:1,5,14;150:21;154:7,8,10;164:12,15,24;171:11;177:17</p> <p>showed (1) 177:15</p> <p>showing (4) 73:11;124:21;128:5;174:19</p> <p>shown (6) 11:8;126:19;129:5;154:12;155:25;169:21</p> <p>shows (20) 119:22,24;121:25;122:12,12;123:21;124:20;125:1,25;127:16;129:3;138:4;141:20;147:17;150:22,25;154:4;169:11;170:25;185:17</p> <p>shrug (1) 22:9</p> <p>side (23) 15:5;42:17;72:6,9,10;76:24;77:3;121:16,17;122:16,19;123:9,10,11,11,12,13,14,25;124:9;126:5,6;163:8</p> <p>sides (7) 72:1,12,14;125:22;127:7,7;182:19</p> <p>sidewalk (1) 81:10</p> <p>sidewalks (1) 65:22</p> <p>sign (1) 31:12</p> <p>signal (13) 71:18,24;85:14,15,18;86:5,6,9,11;87:9;116:24;117:3;121:16</p> <p>signals (10) 22:24;71:15;92:6;120:10,12,24;121:2,7,8,12</p> <p>signature (2) 31:10;35:16</p> <p>signed (7) 33:5,9;35:18;45:11;46:13,17;49:19</p> <p>significant (7) 87:1;117:21;119:10;129:12,18,19;135:1</p> <p>significantly (1) 126:11</p> <p>similar (16) 58:23;59:3,4,7;60:13;95:22;99:20;104:7,15;110:3;144:14;164:14;169:8;175:13;177:25;189:15</p> <p>similarities (1) 103:15</p> <p>simple (3) 82:5,13;191:17</p> <p>simplest (1) 92:4</p> <p>simply (6) 102:6;116:5;135:10;153:10;157:16;171:24</p> <p>single (3) 136:8,22;186:8</p>
S			
<p>sake (1) 156:14</p> <p>Sam (5) 30:18;35:6;50:1,9;70:18</p> <p>same (55) 10:5;18:3;20:16,17;29:18;52:9,23;56:23;58:14;59:13;60:4,7,8,13;68:12;69:14;73:3,4,18;74:21;75:3,6,11,14,25;79:5,8;91:9,18;92:5;103:8;105:5,14;129:8,25;136:4;143:23;144:2,22;146:6,14;150:10;154:18;155:10;165:1;166:19;169:20,24;170:4,5;175:11;176:21;178:15;181:21;196:21</p> <p>Sam's (1) 46:5</p> <p>San (2) 113:21;114:18</p> <p>saw (4) 32:9;64:18;162:7;163:17</p> <p>saying (6) 61:5;139:1;140:5;162:18;186:6;189:15</p> <p>scan (21) 106:14;114:2,18,20,21,21;115:10,11;116:10;124:23,23;125:3;126:19,24;128:19;155:22;167:17;168:19;173:25;179:19;182:6</p> <p>scannable (2) 118:6,10</p> <p>scanned (5) 125:22;126:24,25;155:5,8</p> <p>scanner (1) 113:18</p>	<p>scanners (1) 106:13</p> <p>scanning (27) 75:9,15;105:19;113:5,17;114:1;115:11,18;116:1,18;117:2,7;118:1,4,13;119:11,23;121:6;122:1,2,7;123:15,21;124:1;128:21;169:25;182:18</p> <p>scans (11) 76:3,8;77:16;125:25,25;126:1,4;127:4,16;172:17,19</p> <p>scenario (2) 118:15;124:21</p> <p>Science (7) 53:2;94:2;95:18;97:21;98:15;99:8,10</p> <p>scientific (1) 100:16</p> <p>scope (7) 43:9;102:17;140:11;146:7,13,14;174:8</p> <p>se (1) 21:11</p> <p>S-E-A (2) 5:3,4</p> <p>SeaChange (8) 5:2,3,9,25;6:6;14:23;15:15;16:21</p> <p>SeaChange's (1) 5:22</p> <p>search (1) 62:15</p> <p>season (1) 56:10</p> <p>second (11) 27:13;35:16;52:15,16,16;57:8,13;61:8;88:9;92:15;169:18</p> <p>Section (10) 71:12;82:1;90:19;91:16;95:13;143:4;179:24;180:2,15;188:24</p> <p>sections (1) 42:16</p> <p>secure (1) 62:9</p> <p>secured (1) 63:1</p> <p>seeing (1) 83:2</p> <p>seeking (1) 152:19</p> <p>seem (8) 32:3;69:10;90:16;99:7,7;112:7;173:5;177:9</p> <p>seemed (1) 94:13</p> <p>seems (9) 37:13;69:16;79:14;89:14;105:3;170:19;171:2;184:5,6</p> <p>sees (1) 123:17</p> <p>segment (3) 89:13;130:7,9</p>	<p>segments (1) 89:12</p> <p>selected (1) 24:19</p> <p>selection (1) 66:5</p> <p>semicolon (1) 82:9</p> <p>seminar (2) 24:8;25:13</p> <p>seminar-style (1) 24:19</p> <p>senior (1) 56:16</p> <p>sense (17) 36:18;37:12;39:4;48:19;56:21;65:6;67:25;68:23;91:17;92:4;97:14;106:1;115:7;116:2;118:5,9;173:4</p> <p>sensing (7) 20:11,15,18;21:5,18;22:7,11</p> <p>sent (2) 32:22;88:9</p> <p>sentence (5) 61:8;71:14;180:18;181:10;189:16</p> <p>separate (3) 13:11;30:12;109:8</p> <p>September (8) 31:12;33:5;35:18;40:3;46:14,17;47:3;49:19</p> <p>served (1) 28:23</p> <p>server (1) 32:21</p> <p>set (13) 83:4;91:3;92:23;109:20;115:11,17;148:13;149:7;153:22;165:7;167:8;177:4;187:10</p> <p>setting (1) 100:22</p> <p>settled (1) 18:16</p> <p>several (19) 13:16,17,20,20;21:1;22:25;23:7,23;24:19;25:2,15,19,23;27:12;36:8;50:1;54:15;119:3;190:17</p> <p>severity (1) 118:25</p> <p>shapes (1) 62:6</p> <p>share (1) 64:6</p> <p>sharing (1) 106:19</p> <p>short (9) 16:12;18:15;19:7;47:7;58:12;93:8;137:7;139:5;163:21</p> <p>show (22) 76:17;80:8;122:7,11;124:23;125:24;129:10,19,20;147:13;</p>	<p>148:1,5,14;150:21;154:7,8,10;164:12,15,24;171:11;177:17</p> <p>showed (1) 177:15</p> <p>showing (4) 73:11;124:21;128:5;174:19</p> <p>shown (6) 11:8;126:19;129:5;154:12;155:25;169:21</p> <p>shows (20) 119:22,24;121:25;122:12,12;123:21;124:20;125:1,25;127:16;129:3;138:4;141:20;147:17;150:22,25;154:4;169:11;170:25;185:17</p> <p>shrug (1) 22:9</p> <p>side (23) 15:5;42:17;72:6,9,10;76:24;77:3;121:16,17;122:16,19;123:9,10,11,11,12,13,14,25;124:9;126:5,6;163:8</p> <p>sides (7) 72:1,12,14;125:22;127:7,7;182:19</p> <p>sidewalk (1) 81:10</p> <p>sidewalks (1) 65:22</p> <p>sign (1) 31:12</p> <p>signal (13) 71:18,24;85:14,15,18;86:5,6,9,11;87:9;116:24;117:3;121:16</p> <p>signals (10) 22:24;71:15;92:6;120:10,12,24;121:2,7,8,12</p> <p>signature (2) 31:10;35:16</p> <p>signed (7) 33:5,9;35:18;45:11;46:13,17;49:19</p> <p>significant (7) 87:1;117:21;119:10;129:12,18,19;135:1</p> <p>significantly (1) 126:11</p> <p>similar (16) 58:23;59:3,4,7;60:13;95:22;99:20;104:7,15;110:3;144:14;164:14;169:8;175:13;177:25;189:15</p> <p>similarities (1) 103:15</p> <p>simple (3) 82:5,13;191:17</p> <p>simplest (1) 92:4</p> <p>simply (6) 102:6;116:5;135:10;153:10;157:16;171:24</p> <p>single (3) 136:8,22;186:8</p>

<p>sit (2) 56:4;84:17</p> <p>site (1) 48:20</p> <p>sites (1) 106:14</p> <p>situation (5) 129:10;152:13;153:3;156:1; 178:6</p> <p>situations (1) 194:9</p> <p>six (3) 55:6;69:16;101:17</p> <p>sixth (1) 82:2</p> <p>skewed (1) 128:8</p> <p>skill (34) 93:21,23;94:1,6,7,16;95:14, 16;96:2,21;97:4;100:8,11,12; 101:11,23,25;102:5,6,17,21; 126:22;127:22,25;128:1;144:1; 161:1;190:12,16;192:3,23; 194:10,12,17</p> <p>skilled (1) 7:14</p> <p>skipped (1) 160:4</p> <p>skipping (1) 135:3</p> <p>Skyhook (34) 9:21;30:12,31;4,19;35:3; 36:4,5,7,11,23;37:7,12;40:2,6, 13,23;43:18;45:1;51:12,14; 57:19;58:19,20;59:2,12;60:14, 16,20;142:25;156:12;172:15; 173:19;177:19;185:23</p> <p>Skyhook's (15) 32:8;38:13;39:3;40:10,14,24; 42:15;50:25;59:14,18;60:1,10; 156:13;173:9;178:2</p> <p>slightly (1) 41:2</p> <p>slow (2) 193:22;195:5</p> <p>slowly (5) 88:12,23;89:17;90:8;193:19</p> <p>small (4) 34:10;62:17;95:9;113:24</p> <p>snapshot (1) 169:20</p> <p>snippets (2) 32:13;44:5</p> <p>snowing (1) 86:25</p> <p>so-called (2) 73:24;107:17</p> <p>Software (32) 17:24;18:3;34:24;37:18; 38:13,14,18,22;39:3;59:10; 60:18;64:6,12,14,20,23;87:7; 88:18,24;94:4,13;95:20;96:4, 19;97:3,6,8,10,16;101:14,19,19</p>	<p>solely (1) 21:21</p> <p>solution (6) 58:23;59:3,6,12;61:1;90:7</p> <p>solutions (1) 89:15</p> <p>solve (9) 72:19,23,25;98:8;108:19,25; 109:1,21;110:15</p> <p>Somait (4) 10:15,22,23,25</p> <p>S-O-M-A-I-T (1) 10:17</p> <p>somebody (1) 58:4</p> <p>someone (14) 36:11;73:1;94:14,16;96:10, 17;97:9,12;98:9,14;99:16; 100:1,2;105:23</p> <p>sometimes (5) 63:24;80:17;90:16;98:17; 161:10</p> <p>Somewhat (5) 7:3,11;9:1;103:18;126:2</p> <p>somewhere (2) 24:11;137:21</p> <p>sorry (31) 6:2;17:10;23:25;25:4;30:11; 37:2;39:1;44:16;45:20;50:6; 61:5;71:3;78:8;81:25;97:22; 108:22;130:13;143:13;149:22; 150:14,16;153:25;157:25; 161:22;164:6;170:19;181:4; 183:14;184:8;186:12;192:18</p> <p>sort (14) 22:9;39:6;55:4;59:13;64:9; 69:3;101:3;125:7;135:25; 141:11;163:14;169:20;184:11; 195:9</p> <p>Sounds (3) 61:24;118:14;123:20</p> <p>source (8) 94:5;98:6,10,13;99:4,9,18; 100:5</p> <p>sources (1) 44:11</p> <p>south (5) 154:14,17;155:16,24;166:3</p> <p>southwest (2) 155:17;166:3</p> <p>spaces (1) 89:8</p> <p>speak (1) 42:1</p> <p>speaking (2) 120:17;124:19</p> <p>special (3) 62:5;119:21;145:5</p> <p>specialized (3) 19:25;20:6;121:6</p> <p>specific (17) 13:24;21:17;26:18;38:14,16; 43:10;67:11;80:20;95:10;</p>	<p>107:10;108:5,12;118:2;131:18; 135:8;171:9;193:16</p> <p>specifically (8) 20:10;25:16;105:9,25; 110:24;136:2;141:16;156:14</p> <p>specification (34) 11:14;51:10;103:9;104:2,11, 13,24;105:7;109:3,8,11,19; 110:1;111:22;127:23;128:5; 135:20;160:7,11,14,18;161:4,6, 8,12;162:22;163:1,10,13; 179:18;180:20;181:23;189:23; 195:13</p> <p>specifications (6) 103:16,19,21,23;104:5;136:2</p> <p>specifics (2) 34:12;43:14</p> <p>specifies (1) 141:11</p> <p>spectrum (2) 62:19;91:2</p> <p>speculate (7) 7:23,23,24;8:4;69:19;78:2,6</p> <p>speculation (8) 7:17;9:15;59:16;84:5;87:12; 89:22;106:23;107:14</p> <p>speed (1) 194:1</p> <p>spell (1) 4:7</p> <p>spelling (1) 63:5</p> <p>spend (3) 33:8,22;102:19</p> <p>spending (1) 102:23</p> <p>spent (6) 33:23;34:13,15;35:1,10; 101:17</p> <p>spirit (1) 182:24</p> <p>spoke (1) 101:1</p> <p>spoken (1) 43:20</p> <p>spotted (1) 118:14</p> <p>SSID (2) 63:4,5</p> <p>stamped (1) 72:8</p> <p>standard (4) 25:1,5,6;101:22</p> <p>standing (1) 76:7</p> <p>staring (1) 172:18</p> <p>start (2) 135:9;150:18</p> <p>started (6) 57:14;61:10,12,17,19;105:4</p> <p>Starting (1) 27:25</p>	<p>starts (2) 27:24;106:5</p> <p>state (4) 4:7;12:16;190:7;197:8</p> <p>stated (1) 31:23</p> <p>statement (3) 74:25;96:16;99:2</p> <p>statements (1) 152:2</p> <p>states (1) 95:15</p> <p>stay (1) 71:17</p> <p>steel (1) 86:21</p> <p>step (1) 66:1</p> <p>still (11) 36:9;148:5,14;151:5,6;152:6; 153:18;154:7,9,21;155:24</p> <p>stipulate (1) 152:1</p> <p>stipulated (2) 12:5;146:19</p> <p>storage (1) 4:20</p> <p>straight (1) 78:24</p> <p>street (40) 53:18;62:8;64:17;73:9,11,13; 74:5;113:11,22;115:17,19,21, 24;116:3,25;121:16,17;127:5,6; 129:16;130:9;131:1;132:24; 133:21,23;134:12,14,25;135:3; 136:8,22;137:4;158:5,17; 159:13,17,23;165:16;169:19; 196:19</p> <p>streets (41) 62:3;65:17,19,23;68:17,18, 23,24;69:1,5,11;73:17;111:2,7, 17;112:4,5;113:2,23,24;117:15, 16,17;131:2;134:4,9;135:1,22; 159:1,4,7,24;160:4;169:21,25; 170:4,13,22;173:7,8;177:24</p> <p>strength (12) 66:11,14,16,21;85:14,15,18; 86:5;87:9;117:1,3;119:10</p> <p>stretch (1) 97:11</p> <p>strictly (1) 165:24</p> <p>strike (1) 97:23</p> <p>strong (10) 112:10;116:25;117:6,18,25; 118:1,4,9;119:20;160:2</p> <p>stronger (8) 66:23;67:1,2;84:13;85:6; 117:9;120:1,8</p> <p>strongly (1) 165:10</p> <p>structures (1)</p>
--	--	--	---

<p>80:22 stuck (1) 61:11 student (3) 52:4;101:16,18 students (14) 19:19;23:8,10,12;25:25; 37:17;38:13,20,24;52:2;60:17; 100:19;101:10;102:14 studied (3) 23:2;31:15;127:3 study (35) 18:2;53:20;55:15;56:21,24; 64:25;66:2,12,15,18;67:9,12,25, 25;69:13;72:20;74:16;77:8; 79:15;80:3,4,16;83:6,9,13,17; 84:1,7;85:2;86:18;89:20;90:10; 93:1;120:14;129:5 studying (2) 65:16;194:25 stuff (2) 66:8,9 stumbler (1) 64:20 subject (2) 26:10,14 submission (1) 54:22 submit (1) 106:13 submitted (3) 46:13;54:7,12 Subpoena (12) 27:11,14,17,18,19,20,23; 28:15,19,23;29:7,14 subrange (1) 91:5 subscribed (1) 197:15 subset (1) 43:12 substance (1) 47:20 substantially (15) 146:2;149:1;156:25;157:3,13, 17,24;158:1,10,24;159:5,8,15, 18;160:3 substantive (2) 140:10;146:6 substantively (1) 146:14 successfully (1) 91:21 sued (3) 156:20,21;185:23 suffice (1) 187:11 sufficient (2) 124:5;135:4 sufficiently (4) 11:9;88:7;127:6;195:2 suggested (1) 101:9</p>	<p>suit (15) 12:13;17:24;30:10;32:1;34:2; 39:12;43:21;44:4;45:15;94:8; 103:9,17;104:12,21;190:18 suitability (9) 188:1;189:19,19,25;190:1; 192:17,19;195:8,14 suitable (11) 104:18;162:1;192:10;193:5; 194:13,17,21;195:7,20,20,22 suited (14) 185:14,18;186:3;187:1,13,22, 25;188:16,22,23;189:8,8;192:7; 193:9 summarize (1) 26:5 Summary (5) 31:5;40:16,18;41:3;104:5 summer (6) 55:17,19,20,23;56:2;101:16 supervising (1) 23:13 supplement (1) 65:13 support (5) 16:15;31:3;40:18;46:6; 181:18 supports (2) 63:2;119:17 suppose (4) 85:13;129:5;187:11,23 sure (46) 5:24;6:8;7:19,20;10:4;21:16; 26:3;32:3;36:25;43:1;44:21; 47:8;54:11;65:25;66:25;68:8; 70:19;75:7;80:17;85:22;86:23; 93:9;96:9;99:25;104:8;116:12; 117:9,11;118:17;119:12;124:6; 125:16;127:13;132:17;136:12; 137:9;147:4;154:16;156:24; 158:7,7;163:22,24;168:9;169:3; 171:7 surprised (2) 87:16,18 survey (2) 107:18,20 Susan (4) 4:5;13:5;28:22;30:21 symbols (1) 62:6 symmetry (137) 13:3;14:6;111:4,9,20;112:11, 15,22;131:6,12,17;133:11; 134:2,13,16,20;135:4;138:25; 139:3,9,13,19,22;140:5,6,9,17, 20,21,23,25;141:4,12,17,23,24; 142:8,24;143:7;144:23;145:15, 19,20,24;146:4,11;147:15,20, 21;148:6,15,17,20,22;149:2,5; 150:9;151:1,2,6,16,18,21,22; 152:7,11,17,19;153:4,13,16,18; 154:7,8,10,24;155:13,18;156:2, 6,7;157:2,6,12,15,18;164:15,19,</p>	<p>24;165:3,4,18,20;166:17; 169:11;170:24,25;171:11,16, 25;172:11,23;173:4,11,16,19, 23;174:2,11;175:6,21,22;176:6, 11,18;177:2,5,15,17;178:4,7,7; 179:4,16,20,25;180:4,21;181:9, 12,19;182:2,7,15,17;183:4; 184:1 synonomous (1) 109:14 system (3) 64:9;110:16;136:11 systematic (1) 112:2 systems (4) 87:5,8;110:19,25</p>	<p>127:22;135:13;160:6 team (8) 56:16;59:25;65:13;72:18; 77:7;78:9;79:2;89:19 tech (1) 62:13 technical (10) 8:12;12:21;13:21;19:25;20:4; 34:1;48:23,24;51:22;160:21 technique (1) 167:21 techniques (3) 88:14;105:18;169:25 technologies (1) 163:18 technology (32) 17:8,17;18:19;21:21,25;22:3, 22;37:15;38:5;59:9,14,18,18,19, 20,21,23;60:1,11;61:14;62:12; 85:17;90:3,7,13;91:2,14;94:12; 102:16,22;103:1;163:18 telling (1) 150:8 tells (1) 160:10 ten (12) 4:18;5:15;15:9;20:10;33:15, 20,22;34:18;88:4,9;92:14; 194:18 tend (7) 104:12;112:3,3;165:8; 167:23;168:3;184:4 tended (1) 165:21 tends (3) 56:15;72:7;102:12 term (18) 12:1;41:18;48:23,24;61:18; 63:19;65:5;70:3;106:11;109:1; 112:7;115:3;120:7;141:20; 143:1,6;153:20;177:7 terms (34) 5:16;7:11;11:15;12:18,19,21, 24;13:4,6,10,12,17,20,21,21,25; 21:6;29:19;42:17;111:10; 132:23,25;142:23;147:19; 153:21;161:2,10,15;162:24; 163:19;180:5;185:1,19;187:5 terrain (2) 78:14;79:16 terribly (1) 118:2 test (4) 80:17,18,18;195:4 testify (5) 6:14;14:17,25;15:2,8 testifying (2) 14:16;77:6 testimony (21) 5:14,19;6:10,17;15:6;16:22; 17:2;26:13;28:16;29:11;44:19; 47:21;54:10;74:24;105:1; 132:8;133:2;141:15;144:10;</p>
T			
<p>table (2) 169:2;188:20 talk (10) 9:24;10:2;26:8,17;50:2; 104:12;106:15;139:14;141:8; 184:6 talked (5) 25:14;103:6;134:15;147:25; 166:6 talking (28) 9:8;38:15;61:25;103:12; 104:10;109:10;113:13;114:3, 13;119:2;135:11;136:13; 143:11;148:16;162:4;164:19; 169:24;170:3;174:10;179:22; 180:4,11;183:1,25;191:9; 192:13;194:8,22 talks (6) 87:4;146:2;176:3;182:5,13,14 tape (4) 75:17;114:5;148:17;179:8 target (41) 114:20,21,22;115:2,7;132:2, 24;133:12,21,21;135:6;136:9, 15,22;139:10,20;141:18;146:3, 4;149:1,2;157:1,2,4;158:1,11, 18;168:22;171:17;172:12,24; 173:17;174:3;175:7;176:7,19; 177:6;178:6,20;182:1;184:4 taught (8) 22:21,25;23:18;24:7,17,25:1; 26:10;132:23 taxi (2) 113:9,17 taxis (2) 113:6,23 teach (5) 128:5;131:5;135:5;189:6; 194:4 teaches (4) 180:14;188:2,21;194:6 teaching (3) 25:8;26:14;136:14 teachings (3)</p>	<p>ten (12) 4:18;5:15;15:9;20:10;33:15, 20,22;34:18;88:4,9;92:14; 194:18 tend (7) 104:12;112:3,3;165:8; 167:23;168:3;184:4 tended (1) 165:21 tends (3) 56:15;72:7;102:12 term (18) 12:1;41:18;48:23,24;61:18; 63:19;65:5;70:3;106:11;109:1; 112:7;115:3;120:7;141:20; 143:1,6;153:20;177:7 terms (34) 5:16;7:11;11:15;12:18,19,21, 24;13:4,6,10,12,17,20,21,21,25; 21:6;29:19;42:17;111:10; 132:23,25;142:23;147:19; 153:21;161:2,10,15;162:24; 163:19;180:5;185:1,19;187:5 terrain (2) 78:14;79:16 terribly (1) 118:2 test (4) 80:17,18,18;195:4 testify (5) 6:14;14:17,25;15:2,8 testifying (2) 14:16;77:6 testimony (21) 5:14,19;6:10,17;15:6;16:22; 17:2;26:13;28:16;29:11;44:19; 47:21;54:10;74:24;105:1; 132:8;133:2;141:15;144:10;</p>		

150:4;169:5 testing (1) 167:21 thereafter (1) 136:17 therefore (7) 78:19;85:19,20,20;86:12; 89:16;91:22 therein (1) 111:3 thinking (8) 79:10;135:7;143:5;168:17; 174:14,22;194:24;195:1 third (10) 58:3;61:7;70:5,7;71:11,13,14; 75:25;119:14;169:18 thorough (1) 168:16 though (7) 29:20;44:4;113:9;118:18; 129:22;160:4;182:23 thought (8) 19:4;66:19;69:18;73:1;84:25; 90:1,1;163:19 three (26) 15:21;27:16;33:2,2;76:23,23; 82:23,25;84:21;94:3;95:18; 96:2,17;97:22;98:1;101:13; 102:10;111:5,11;152:5,24; 159:16,18;160:2;191:16,22 throughout (2) 9:2;184:3 thus (2) 61:9;136:10 times (4) 4:14;25:2;88:9;92:15 title (5) 21:11,11;31:2;51:23;179:25 titled (3) 31:8;51:19;95:13 TMC (3) 18:19,24;19:1 today (13) 7:20,22;9:2;28:16;49:25; 56:5,12;59:20,21;69:1;89:24; 90:4,9 together (3) 8:21;33:19;138:15 told (2) 55:7;137:20 took (13) 16:12;29:17,17,18;40:1;41:6; 43:6;47:21;75:9,15;145:14; 152:5;154:2 tool (1) 34:24 top (6) 123:10;125:3;148:7;152:6, 25;153:9 topics (1) 43:13 tour (1) 130:5	toward (7) 9:20;54:13;72:4,10;73:13,16; 74:12 towards (3) 71:16;128:9;160:1 towers (1) 181:15 town (1) 68:23 track (2) 34:24;59:10 trade (2) 70:15;193:25 trading (1) 70:22 traffic (1) 53:12 trafficked (1) 73:24 transcript (1) 76:18 transmissions (1) 91:20 transmit (2) 92:5;116:7 transmitting (1) 91:18 travel (1) 112:3 traverse (1) 132:24 traversed (5) 78:11,14;79:3,16;167:16 treat (1) 87:9 tree (1) 86:8 trees (1) 80:21 trial (5) 14:17,24;15:1;17:2;38:18 triangulate (1) 76:8 triangulation (2) 76:21;182:22 tricky (2) 41:23;168:14 tried (6) 37:17;38:13,20;39:4;71:17; 88:14 trouble (1) 102:23 true (14) 67:2;68:1,8;75:2;126:13,15; 128:25;129:22;162:9;181:20; 183:6;194:7;197:2,15 trust (2) 124:17;142:4 truth (1) 129:5 try (8) 8:20;9:23;10:4;42:3;43:2; 71:9;143:13;161:12	trying (37) 76:2;91:16,22,23;98:19,23; 103:11;105:8,25;108:14; 109:21;110:5,15,25;111:6,8,9, 12;124:12;127:18,20;128:5; 134:23;153:20;160:23,24,25; 167:18,19;168:10,13;170:1; 184:10,10,10;188:3;189:1 turn (6) 31:14;93:16,19;95:10; 137:25;144:13 turns (1) 48:6 TV (1) 181:14 twice (1) 131:3 two (31) 13:18;15:5;27:10;30:12;33:7; 50:8;60:5;61:16;127:7,25; 128:1;135:3;140:21,22;141:3,4, 9,11,12,14,16;142:10,24,24; 143:5;148:18;158:7,15;170:9; 189:22;194:9 two-page (1) 35:12 two-thirds (1) 52:20 types (1) 22:2 typewritten (1) 28:6 Typically (7) 23:15,16;62:21,23;64:8;88:9; 97:9	180:10;192:11,24 unfortunately (5) 24:9;39:10;70:8;99:1;195:24 uniformly (1) 181:25 universities (1) 100:20 unless (3) 8:10;104:22;182:16 unlicensed (1) 91:2 unlike (1) 147:25 unlikely (1) 112:4 unnecessary (1) 96:13 unpacked (1) 48:25 unplanned (1) 136:1 up (28) 19:23;39:6,14;41:10,10; 60:17,17;72:7;76:18;79:17; 85:2;86:3;88:11,12,15;92:23; 104:10;115:11;127:5;141:20; 142:16;146:21;159:25;166:3; 172:2;193:15;195:3,6 upon (4) 29:2;48:12;181:16;182:13 upper (2) 38:9;126:6 use (48) 11:22;20:13;22:20,24;34:24; 37:14,15;38:20;39:3;48:23,24; 64:8;65:4;68:14;73:21;82:20; 91:5,23;105:18,21,22;107:1,16, 16;109:14;121:5,6,9,12,18; 131:8,15;141:20;142:12; 146:18;148:13;149:4;177:7; 182:17,23;186:8;187:25;189:3; 190:9,23;191:3;192:4;195:6 used (29) 4:19;38:6,19;39:4;62:5; 63:21,24;64:1;66:2,8;74:7; 81:19,22;83:16;84:10,13,20; 85:5,22;87:6,14;105:20;106:11; 107:9;119:15;127:11;129:18; 143:6;168:2 useful (5) 97:8;163:11,15;177:9;191:22 user (42) 25:10;26:2;147:15,16,17,22, 23;148:14,21;149:6;150:1,10, 16;151:24;153:23;154:4,9,11, 17,25;155:14,17,24;156:2; 164:13;165:7,8,9,22,24,25; 166:5,6;167:24;171:3,14,18; 172:1;175:22;180:5;184:5; 189:4 users (6) 57:16;58:24;59:3,10;134:24; 136:11
U			
		ultimately (1) 68:3 un (1) 187:4 unamenable (1) 11:5 uncertain (1) 194:12 uncomfortable (1) 104:22 under (7) 16:17;31:15;57:8;70:5;71:12; 118:15;187:23 undergraduate (3) 23:19;52:4;55:13 undergraduates (1) 23:8 underlies (1) 168:19 underlying (2) 54:20;138:18 understood (19) 5:24;8:24;13:23;26:9;73:21; 77:8,12,15;78:10;100:7;116:12; 127:12;132:8;176:9,9,10;	

<p>user's (4) 149:25;155:25;171:18;180:6</p> <p>uses (3) 85:16;91:2;135:20</p> <p>Using (38) 21:12;25:9,17;26:2,8,18; 37:18;38:13;39:6,14;51:19; 53:12;57:14;61:10,12;64:5; 67:19;70:23;86:3;91:9;107:12; 21;110:17;114:22;115:7,9; 119:5,17;120:14;123:11; 128:11;130:13;131:6,19,20; 132:2;150:1;189:5</p> <p>usually (5) 25:2;62:25;63:6;92:14;121:9</p>	<p>video (1) 196:12</p> <p>VIDEOGRAPHER (21) 16:2,5;39:18,21;47:9,12; 75:18,21;93:10,13;114:6,9; 137:10,13;147:5,8;163:25; 164:3;179:9,12;196:9</p> <p>view (24) 11:23;12:10;27:7;96:19;97:7; 98:24;113:1;117:20;124:2; 141:3,10;143:17;153:12;161:2; 164:25;165:20;173:24;175:4; 178:1,3;184:22,23;190:13; 192:2</p> <p>viewed (2) 30:19;96:20</p> <p>views (4) 99:7;163:3;184:11;194:10</p> <p>vis-a-vis (1) 190:1</p> <p>visible (4) 57:22;71:25;116:2,14</p> <p>visit (3) 113:9,10,24</p> <p>visited (2) 115:24;131:2</p> <p>visiting (1) 130:8</p> <p>vita (3) 15:24;16:11;25:7</p> <p>vitae (1) 15:20</p> <p>Volume (3) 53:2;54:24,25</p>	<p>196:19</p> <p>wasteful (1) 89:14</p> <p>water (1) 87:1</p> <p>way (56) 23:5;39:7;52:20;54:18;55:16; 56:5,9;61:3,5;69:3;72:19,23,24; 79:17,25;85:8;86:14,17;88:17; 90:3;111:18;113:19;116:8; 129:14;131:5,11;132:6,23; 133:1,19;145:20;153:19,19,20; 154:16;156:5;157:21,24,25; 158:16;159:12,22;161:24; 163:3;165:2,4,11;167:6;168:1, 4,11;176:1;178:21;181:11; 182:24;186:7</p> <p>ways (9) 60:5;90:10,14;132:7,10; 163:19;169:8;175:12;177:1</p> <p>weak (4) 85:15,24,25;121:11</p> <p>weaken (1) 86:11</p> <p>weaker (4) 86:10;120:24;121:1,7</p> <p>web (2) 54:25;106:14</p> <p>Wednesday (1) 50:12</p> <p>week (4) 33:6;35:23;40:3;50:12</p> <p>weeks (1) 84:15</p> <p>weighted (3) 82:6,13;191:17</p> <p>weighting (2) 85:16,20</p> <p>welcome (1) 142:12</p> <p>weren't (6) 81:8;82:24;93:1;135:2; 165:10;174:22</p> <p>West (5) 154:14,17;155:16,25;166:3</p> <p>what's (24) 7:1;20:21;31:1;52:7;53:8; 62:11;63:4;73:19;82:17;94:10; 95:2;99:2;107:3;117:24;120:1; 121:24;124:19;130:1;152:4; 160:5,14;184:11;188:1,1</p> <p>whereas (2) 102:13;128:10</p> <p>wherein (1) 148:25</p> <p>WHEREUPON (1) 196:24</p> <p>wherever (2) 73:14;106:2</p> <p>whole (2) 51:5;144:12</p> <p>Who's (2) 10:19;140:19</p>	<p>whose (2) 43:18;63:5</p> <p>Why'd (1) 98:6</p> <p>WiFi (114) 20:10,14,23;21:22;22:1,5,15, 23,24;23:3;25:9,17,17;26:2,8; 53:10;58:24;59:3;61:12,14,24; 62:8,13,14,15;63:23,25;65:1,10; 66:22;68:9;91:2,3;94:12,12; 106:14;110:17;116:2;117:21; 122:8;125:23;133:9,10,12,14; 138:21;139:10,19;140:4,6; 141:1,23;143:9;145:1,11,17,25; 146:3;149:1;156:16,25;157:3, 17;158:1,4,5,10,13,14,25;159:2, 5,8,15;160:3;165:6;171:16; 172:9,10,12,13,22,24;173:16, 22;174:3,12;175:7;176:4,6,19; 177:3,20;178:5,19;179:4,17,21; 182:3,7;183:22;185:10,15,19; 186:3,15;187:2,9,13,22;188:16; 189:9;190:25;194:14</p> <p>willing (1) 193:25</p> <p>winter (1) 56:3</p> <p>wireless (33) 20:5,9;22:2;23:1,2,17;24:8, 17,25;25:3,3,13;26:19;31:4; 36:12;40:23;57:15,19;59:2; 91:12;94:4;95:19;96:3,11,18; 101:14,19;102:11,18,20;103:1; 119:16,18</p> <p>wireless-based (1) 36:13</p> <p>withdrawn (7) 53:7;80:6;90:5;108:14; 120:25;130:20;147:24</p> <p>within (14) 146:4;149:2;157:2;164:16, 24;166:18;169:11;170:12; 171:1,11,25;177:15,18;190:11</p> <p>without (5) 56:12;76:22;168:11;187:8; 193:15</p> <p>witness (8) 4:21;16:19;30:5;39:17; 110:12;146:22;163:22;169:22</p> <p>witness's (9) 26:13;29:11;41:8;43:9;44:19; 74:24;133:2;169:5;174:9</p> <p>wondered (1) 146:22</p> <p>wondering (1) 110:12</p> <p>wood (1) 86:21</p> <p>word (9) 62:2;74:7;105:22;120:19; 129:18;131:10;140:18;149:15; 187:25</p> <p>wording (1)</p>
<p style="text-align: center;">V</p> <p>Vague (43) 12:2,14;20:3;21:24;25:18; 27:5;69:6;72:21;76:12;77:11, 24;78:12;84:4;86:15;89:21; 90:12;99:14;108:21;109:23; 114:25;117:23;118:7;120:2,15; 121:3;133:1;148:9;157:10; 158:19;160:19;161:21;162:19; 164:17;169:13;172:4;174:5; 183:12;184:19;187:3,4;189:10; 193:3;195:11</p> <p>validity (2) 5:21;17:6</p> <p>value (1) 193:1</p> <p>van (1) 113:9</p> <p>vans (1) 113:6</p> <p>variation (1) 130:5</p> <p>variations (1) 87:8</p> <p>various (3) 20:5;32:5;44:24</p> <p>vary (1) 128:23</p> <p>varying (1) 191:3</p> <p>vehicle (11) 75:9,15;113:14;117:2,7; 118:1,4;119:23;124:23;125:3; 132:4</p> <p>vehicles (13) 80:22;105:20;111:25;113:6, 14;114:23;115:19,20,22,23,25; 116:18;182:18</p> <p>version (7) 140:4;170:15,15,17,17,19,21</p> <p>versions (1) 143:16</p> <p>versus (2) 59:20;121:16</p> <p>via (3) 48:8;185:11;186:15</p>	<p style="text-align: center;">W</p> <p>walk (6) 65:21;69:25;80:14;81:1,12; 86:25</p> <p>walked (6) 71:17;78:16;88:5,6,23;89:6</p> <p>walker (1) 75:15</p> <p>walkers (1) 86:3</p> <p>walking (14) 62:8;65:3,15;70:1;71:20; 72:2;76:1;78:23;79:23;80:8,23; 88:19,20;89:12</p> <p>walks (1) 80:18</p> <p>wall (2) 81:9;86:8</p> <p>War (47) 21:13;22:20;51:20;53:9; 61:10,19;62:2,2,6,8,13,19,23; 64:1,8,11;65:2,2,14,14;67:19; 70:5,24;71:13;86:2,3;91:23; 103:6,8;105:5,14,18,19,22,23; 106:8,11,13,20,24,25;107:9,15, 20;108:6,8;114:17;119:5</p> <p>Washington (1)</p>		

141:25
words (8)
11:20,21,24;12:4;77:3;83:10;
162:18;184:15
work (36)
8:11,20;16:15;17:5,25;19:5,
22;20:11;21:20;26:16,18;37:22;
39:11;40:14;43:23;54:1;55:24;
56:17,18;57:21;58:16;59:1;
77:9;91:11;100:15;101:1,5,6;
102:15;133:7;168:7;193:6,7,9,
13,16
worked (5)
18:24;37:19;38:22;101:18;
167:19
working (9)
20:9;38:25;94:3;95:19;96:3;
100:10,22;101:13;102:10
works (1)
36:7
write (9)
62:3;94:5;98:6,9,12;99:3,9,
13,18
writing (3)
98:10;102:19,24
written (7)
6:19,23;21:1,4;26:5;58:22;
82:17
wrong (1)
39:2
wrote (7)
34:4;51:23;58:7;60:1,2,21;
69:12

X

X's (2)
122:3;123:15

Y

year (3)
35:18;56:6;61:16
years (21)
4:18;5:15;15:9;20:10;23:7,
24,25;36:8;51:23;53:14;55:6;
69:16;81:23;94:3;96:2,17;
97:22;98:1;99:18;101:17;
102:10
years' (2)
95:18;101:13
yes/no (1)
166:16
York (1)
113:17