

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Volume: I
Pages: 1-112
Exhibits: 1-10

COMMONWEALTH OF MASSACHUSETTS

MIDDLESEX, ss. SUPERIOR COURT DEPARTMENT
Civil Action No. 00-5159J

-----X

MICHAEL A. MINOVITCH,)
Plaintiff,)

v.)

RICHARD H. BATTIN,)
Defendant.)

-----X

DEPOSITION OF RICHARD H. BATTIN, Ph.D.

Wednesday, February 9, 2005

10:07 a.m.

Hermes, Netburn, O'Connor & Spearing, P.C.

111 Devonshire Street

Boston, Massachusetts 02109

Reporter: Justina M. deFaria, RDR/CRR

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

A P P E A R A N C E S:

HERMES, NETBURN, O'CONNOR & SPEARING, P.C.

By Peter G. Hermes, Esq.

John R. Felice, Esq.

111 Devonshire Street, Eighth Floor

Boston, Massachusetts 02109

(617) 728-0050

phermes@hnso.org

jfelice@hnso.org

On behalf of the Plaintiff

PALMER & DODGE LLP

By Jeffrey Swope, Esq.

111 Huntington Avenue at Prudential Center

Boston, Massachusetts 02199-7613

(617) 239-0100

jswope@palmerdodge.com

On behalf of the Defendant

Also Present: Michael A. Minovitch, Ph.D.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

I N D E X

EXAMINATION OF:	PAGE
RICHARD H. BATTIN, Ph.D.	
By Attorney Hermes	5

E X H I B I T S

NO.	PAGE
1 - Paper Entitled "On Algebraic Compilers and Planetary Fly-By Orbits" By Richard H. Battin	13
2 - Two-Page Printout	16
3 - One Page, Double Reconnaissance Trajectories Calculated on January 26, 1961	26
4 - Three-Page Letter Dated July 12, 2001 with One-Page Attachment	40
5 - Excerpt From <u>An Introduction to the Mathematics and Methods of Astrodynamics, Revised Edition</u>	59

E X H I B I T S (CONT.)

1	NO.	PAGE
2	6 - Lecture Notes on The Trajectory Problem As It Relates To The Mission For Interplanetary Flight	59
3	7 - Article Written For The AIAA By Dr. Battin	77
4	8 - 2000 American Astronautical Society Symposium, Article Entitled "A Scrapbook of Beautiful Equations and Great Ideas"	95
5	9 - Article Entitled "On Algebraic Compilers and Planetary Fly-By Orbits"	95
6	10 - Six-Page Letter Dated 10 September 1999	95

17

18 * Original exhibits retained by Attorney Hermes

19

20

21

22

23

24

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

RICHARD H. BATTIN, Ph.D., sworn

MR. HERMES: Mr. Swope, do you have any suggestion with respect to stipulations? I think the other day we stipulated with Dr. Hollister that he would read and sign the transcript under the pains and penalties of perjury, but we would otherwise proceed in accordance with the rules. Is that agreeable?

MR. SWOPE: That's fine.

MR. HERMES: All right.

EXAMINATION BY COUNSEL FOR THE PLAINTIFF

BY MR. HERMES:

Q. Sir, would you please state your name for the record.

A. Richard H. Battin, B-A-T-T-I-N.

Q. Dr. Battin, my name is Peter Hermes. With me this morning is John Felice. To my right is Dr. Michael Minovitch. Do you recognize that you are here to give testimony today in an action which has been brought by Dr. Minovitch against you?

A. Yes.

Q. Do you understand that, in general, the

1 subject matter of the action relates to the
2 development of ideas relating to gravity-assisted
3 trajectories?

4 A. The development of ideas? Could you --

5 Q. Do you understand that the case relates, at
6 least in part, to gravity-assisted trajectories?

7 A. Yes, it does.

8 Q. Do you have an understanding concerning what
9 the term "gravity-assisted trajectories" means?

10 A. No, I have no problem with that.

11 Q. You have no problem with it?

12 A. No. I mean, I understand.

13 Q. What is your understanding of the term, sir?

14 A. Well, that you are using -- if you pass by a
15 planet, you can accelerate or decelerate a
16 spacecraft.

17 Q. Based upon what, sir?

18 A. Based upon Newton's laws.

19 Q. So do I take it that when you -- your
20 understanding of gravity-assisted trajectories does
21 not include the use of an engine or other means of
22 propulsion --

23 A. That's correct.

24 Q. -- on a spacecraft; is that correct? That's

1 correct?

2 MR. SWOPE: Please let Mr. Hermes ask
3 the question before you interrupt and answer.

4 THE WITNESS: Okay.

5 BY MR. HERMES:

6 Q. As you may have heard from counsel, one of
7 the rules is that the stenographer can only have one
8 of us speaking at a time. I will try and avoid
9 stepping on the ends of your answers if you will try
10 and let me finish my questions.

11 A. All right.

12 Q. Thank you. What is your home address, sir?

13 A. 15 Paul Revere Road.

14 Q. And that's in Lexington?

15 A. Lexington.

16 Q. How long have you resided there, sir?

17 A. Since 1953, I think.

18 Q. With whom do you reside there currently?

19 A. With my wife.

20 Q. What is your date of birth, Dr. Battin?

21 A. March the 3rd, 1925.

22 Q. Is somebody planning an 80th birthday party
23 for you?

24 MR. SWOPE: They wouldn't tell you.

1 A. I hope not.

2 Q. Is it fair to say that except for a short
3 period of time in Arthur D. Little, you have spent
4 your entire professional career at MIT or the MIT
5 Instrumentation Laboratory, later Draper
6 Laboratories?

7 A. That is correct.

8 Q. Do I understand correctly that you spent
9 three, four years at Arthur D. Little?

10 A. Oh, no.

11 Q. How long were you at Arthur D. Little, sir?

12 A. I think it was less than two.

13 Q. And you first went to MIT when?

14 A. I started as a freshman in 1942.

15 Q. Did you serve in the armed services, sir?

16 A. I was a member of the armed services in
17 1943, and I was a Naval Reserve V12 program;
18 luckiest man in the world because I got my MIT
19 education as a Navy enlistee.

20 Q. Did you serve on active duty with the Naval
21 Reserve?

22 A. Just for a year afterwards. The war ended
23 when I was in midshipman school.

24 Q. What was the highest rank that you achieved

1 in the Naval Reserve?

2 A. I think just before I got out, I was a
3 lieutenant second grade. I have one and a half
4 stripes.

5 Q. And did you, except for your stint in the
6 Naval Reserve, continue at MIT in 1951 when you
7 received your doctorate?

8 A. Yes.

9 Q. And then do I understand that in or about
10 1951, you went to work for the MIT Instrumentation
11 Laboratory?

12 A. Yes.

13 Q. And the head of the MIT Instrumentation
14 Laboratory in or about 1951 was Hal Laning?

15 A. No.

16 Q. Who was the head?

17 A. Dr. Charles Stark Draper.

18 Q. Did at any --

19 A. Hal Laning was my boss, my first boss.

20 Q. What was his position at the Instrumentation
21 Lab?

22 A. Well, we were all just staff. They started
23 to give names like associate director, deputy
24 associate director, and so everybody had a title.

1 Q. Draper was the boss when you first went
2 there?

3 A. And he was the boss until he passed on in
4 the early '80s.

5 Q. And how long was Hal Laning at the MIT
6 Instrumentation Laboratory?

7 A. He was there all his life -- well, all the
8 time I knew him; and he hired me, and I think he was
9 at the lab probably two or three years before I was.
10 The lab was really very -- there were only about 200
11 employees at the time I joined.

12 Q. Well, how long was Laning there? When was
13 he last at the Instrumentation Lab? And I recognize
14 that at a certain point --

15 A. Until when he retired.

16 Q. When did he retire?

17 A. Well, he's five years older than I am, so my
18 guess is that he retired maybe -- I really don't
19 know.

20 Q. Was he working there into the 1980s, sir?

21 A. Oh, yes, yes.

22 Q. Was he working there into the --

23 A. Well, he was working there --

24 Q. -- 1990s?

1 A. -- but not necessarily as a full-time
2 employee.

3 Q. Did he work there, if you know, into the
4 1990s?

5 A. I think he worked there at least part time,
6 not necessarily being paid, but he was able to get
7 in and out until he really couldn't travel anymore
8 because he couldn't drive.

9 Q. You understand, sir, that sometime I believe
10 in the 1970s, the MIT Instrumentation Laboratory
11 separated from MIT?

12 A. That's right.

13 Q. And at the time it separated, did it become
14 the Draper Laboratory?

15 A. Yes, it did.

16 Q. For the purposes of this deposition, unless
17 you believe it important as to any question, may we
18 refer to the MIT Instrumentation Laboratory and the
19 Draper Laboratory by the term "Draper Laboratory"?

20 A. Sure.

21 Q. Sir, let me show you a document bearing a
22 title "On Algebraic Compilers and Planetary Fly-by
23 Orbits."

24 A. Right.

1 Q. It has a date on it of 1994 and apparently
2 refers to a congress that took place in October of
3 1994. Do you see that on the first page, sir?

4 A. Yes.

5 Q. Do you recognize this as a paper which you
6 wrote in 1994?

7 A. Yes.

8 Q. On page 6 of this paper, in the left-hand
9 column --

10 A. Okay.

11 Q. -- approximately halfway down, there is a
12 quote which is preceded by the sentence "The story
13 is told in the Draper Anniversary volume."

14 A. Yes.

15 Q. Do you see that?

16 A. Yes.

17 Q. And the quote that follows is a quote from
18 an earlier work of yours, is it not?

19 A. What do you mean by that?

20 Q. Well, the paper reads, "The story is told in
21 the Draper Anniversary volume, colon," and then
22 there's a reference, a postscript of 17, and then
23 there is a quote; correct?

24 A. Yes.

1 Q. And the quote comes from an earlier work of
2 yours, does it not?

3 A. It comes from the Draper Anniversary volume.

4 Q. All right. Now, if you'll go back to the
5 first page of the paper, the abstract, did you write
6 the abstract, sir?

7 A. Yes.

8 Q. At the bottom of the left-hand column, the
9 final two sentences read, "The first orbit of this
10 type was obtained by the author on January 26, 1961.
11 To the author's knowledge, no one has even suggested
12 that practical three-dimensional multiple fly-by
13 orbits had been constructed at an earlier date." Do
14 you see that statement, sir?

15 A. Yes.

16 Q. You wrote that?

17 A. Yes.

18 MR. HERMES: May we have the October
19 1994 paper marked as Exhibit Number 1, please.

20 (Battin Exhibit No. 1 - Paper Entitled "On
21 Algebraic Compilers and Planetary Fly-By Orbits"
22 By Richard H. Battin - was marked for
23 identification.)

24 (Discussion off the record.)

1 BY MR. HERMES:

2 Q. Dr. Battin, have you had your deposition
3 taken previously?

4 A. No.

5 Q. Let me show you --

6 A. Not on this case or in any case.

7 Q. All right. Let me show you a two-page
8 document, sir.

9 Dr. Battin, are you familiar with the
10 two pages I've just handed you that are stapled
11 together?

12 A. Yes.

13 Q. Can you describe for me what those two pages
14 are?

15 A. The second page, which has all the data on
16 it, is information about the two mobile fly-by
17 orbits, Earth-Venus-Mars-Earth, that are the subject
18 of contention; and they give the launch velocities
19 of the spacecraft, the -- that is relative to the
20 Earth, the velocity relative to Venus approach,
21 relative to Venus after approach, relative to Mars
22 approach, after Mars approach, and then relative to
23 the Earth, return to Earth.

24 Q. Is this a document that you reviewed in

1 preparation for your deposition today this morning?

2 A. Well, yes.

3 Q. Okay.

4 A. Well, I mean, I didn't specifically -- if
5 you're going to ask me what all these numbers are,
6 I'll have to refer you to something else.

7 Q. Well, let's just wait until I ask you
8 questions --

9 A. Okay.

10 Q. -- and we'll go forward from there, sir.

11 A. All right.

12 Q. What is the first page of the two-page
13 document?

14 A. It's the date, January 26, 1961.

15 Q. What significance does that date have?

16 A. That is the date in which these calculations
17 were completed.

18 Q. On the second page, sir, there appears to be
19 the handwriting "double reconnaissance
20 trajectories." Do you see that?

21 A. Yes.

22 Q. Is that your handwriting?

23 A. Yes, it is.

24 Q. Do you have the original of these two pages

1 in your possession?

2 A. Not in my possession.

3 Q. Do you know in whose possession they are?

4 A. Yes.

5 Q. Whose possession, sir?

6 A. (Indicates.)

7 Q. You'll have to --

8 A. Jeffrey Swope.

9 Q. When did you give them to Mr. Swope?

10 A. It was about a week ago when we first met --

11 MR. SWOPE: That's all you have to say.

12 MR. HERMES: Off the record for a
13 moment.

14 (Discussion off the record.)

15 MR. HERMES: May we have the two pages
16 marked as Exhibit Number 2.

17 (Battin Exhibit No. 2 - Two-Page Printout - was
18 marked for identification.)

19 BY MR. HERMES:

20 Q. Focusing on Exhibit Number 2, Dr. Battin, is
21 it your testimony that both of those pages were
22 printed on January 6, 1961?

23 A. Yes, January 26.

24 Q. I'm sorry, January 26, 1961.

1 A. Yes.

2 Q. Were they printed consecutively on that
3 date?

4 A. Yes.

5 Q. And at one time, were the two pages
6 attached?

7 A. Yes.

8 Q. Did you use a computer and a printer to
9 produce the two pages --

10 A. No.

11 Q. -- that form Exhibit Number 2?

12 A. No.

13 Q. Did you use a printer?

14 A. Yes.

15 Q. What type of printer did you use?

16 A. It was an IBM tabulator.

17 Q. Do you remember the model number?

18 A. No.

19 Q. In what method did you use that printer?

20 Did you type information into the printer?

21 A. Yes.

22 Q. So --

23 A. There were punch cards. Each line is a
24 card.

1 Q. Well, let's look at the first page of
2 Exhibit Number 2, sir. It appears that there is a
3 single line of information beginning with the number
4 92656. Do you see that?

5 A. Yes.

6 Q. Is it your testimony that you typed that
7 information into a punch card?

8 A. No.

9 Q. What information did you type -- was the
10 data on this page produced from a punch card?

11 A. Partly.

12 Q. Tell me how this information was produced,
13 starting with the first step, going through the
14 printing.

15 A. Let me say that whenever you printed things
16 with our tabulator, it was almost an annoyance,
17 because the first thing that would happen is it
18 would put out a page with a time conversion on it;
19 and I don't know what that meant, I don't know what
20 that number is, and I don't know whether -- I don't
21 know how that -- the date got on there either,
22 unless it either asked for a date or this was the
23 date in which it was being -- the tabulator was
24 being used. My guess is that it was the property of

1 the tabulator.

2 Q. Do I understand you, sir, that you did not
3 put a card into any machine or otherwise enter data
4 which produced the first page of Exhibit 2?

5 A. I don't remember.

6 Q. You simply don't know how the first page of
7 Exhibit 2 was produced; is that correct?

8 A. I do know how it was produced.

9 Q. How was it produced?

10 A. If you printed anything on that tabulator,
11 as I remember it -- I mean, this is a very long time
12 ago -- there were a number -- as I say, each of
13 these lines was a punch card.

14 Q. Well, I'm focusing on the first page, sir.

15 A. Okay. I say if you put a deck -- it was my
16 recall if you put a deck in there and asked it to,
17 say, start print or whatever, it would automatically
18 put out a time conversion card and then skip to the
19 next page.

20 Q. All right. You've spoken of a tabulator,
21 and I think you used the word "our." What's the
22 tabulator that you're speaking of? Is that the
23 printer?

24 A. Yes.

1 Q. And who made that tabulator?

2 A. IBM.

3 Q. What model was it?

4 A. No idea.

5 Q. Where was it located?

6 A. It was located right beside the computer.

7 Q. Well, and where was the computer located?

8 What was the address of the building?

9 A. It was in the -- in 1961, we were living in
10 the Whitmore Shoe Polish factory, which was adjacent
11 to the Hood's Milk factory, both of which had been
12 taken over by the MIT Instrumentation Laboratory.

13 Q. What was the street location? On what
14 street was it?

15 A. It's right along the railroad tracks across
16 Mass. Avenue at MIT. I don't know that I
17 remember --

18 Q. Is that Albany Street there, sir?

19 A. Yes, it's Albany Street. Both of those
20 buildings don't exist anymore, and the tabulator
21 doesn't either.

22 MR. SWOPE: Please just wait to have the
23 question asked.

24 THE WITNESS: Okay.

1 BY MR. HERMES:

2 Q. Now, with respect to the second page of
3 Exhibit 2 --

4 A. Yes.

5 Q. -- I believe you testified that each line of
6 data on the second page results from putting in a
7 single card?

8 A. Yes.

9 Q. Did you -- and the card was produced by
10 using a typewriter on a punch card machine of some
11 type to input data onto a card?

12 A. Key-punch.

13 Q. Key-punch?

14 A. Yes.

15 Q. And did you actually key-punch each of these
16 cards on January 26, 1961?

17 A. Yes.

18 Q. You did that personally?

19 A. Yes.

20 Q. Now, where did those cards come from? It
21 appears to have been approximately 15 or 16 cards
22 that were used. I haven't counted the number, but
23 somewhere over 15, perhaps fewer than 20 lines of
24 data. Those are cards that you produced on that

1 day, sir?

2 A. Yes.

3 Q. And did you produce those cards from some
4 other data or information?

5 A. Yes.

6 Q. From what other data or information, sir?

7 A. From the output of the computer.

8 Q. What output was that?

9 A. Well, the computer was used for generating
10 various orbits; and when I was finished, when I had
11 actually been able to produce the multiple fly-by
12 trajectories, then I copied that data from the
13 computer into an orderly pattern like this just so I
14 could have it put amongst my memorabilia.

15 Q. Do I understand, sir, that page 2, in
16 effect, contains the results of calculations that
17 were done with respect to two different fly-by
18 orbits?

19 A. That's right.

20 Q. And do I understand that at one point in
21 time, there were sheets of computer paper containing
22 the calculations of those orbits?

23 A. That's right.

24 Q. And did you keep the calculations of those

1 orbits?

2 A. No.

3 Q. When did you discard them?

4 A. I don't know.

5 Q. Did you discard them in 1961 in January?

6 A. Probably.

7 Q. As you sit here today, you have no memory of
8 when you discarded the printouts with respect to the
9 calculations that resulted in the information
10 regarding the two orbits shown on the second page of
11 Exhibit 2; is that correct?

12 A. That's right.

13 Q. Now, on what computer did you do those
14 calculations? Was it an IBM 650?

15 A. That's right.

16 Q. And when did you do the calculations with
17 respect to the first of the two orbits, that is, as
18 to which data is given on the second page of Exhibit
19 2?

20 A. I don't know.

21 Q. Was it in 1961, sir?

22 A. It -- the work was probably done over about
23 a month trial and error until a satisfactory
24 solution came up; and then I was really just, you

1 know, working off and on. This was not really
2 something that we were -- that anybody beside myself
3 was concerned with. So when I had spare time, I
4 would go work on it.

5 Q. The two orbits identified on the second page
6 of Exhibit 2 show successful multiple-planet fly-by
7 trajectories; correct?

8 A. Yes.

9 Q. One of the requirements for a fly-by
10 trajectory was that if your spacecraft went around a
11 planet, the distance from the center of the planet
12 had to exceed the radius of the planet; correct?

13 A. Yes.

14 Q. Otherwise the spacecraft would hit the
15 planet?

16 A. Yes.

17 Q. All right. Did you do other calculations
18 prior to January 26, 1961 where you did not arrive
19 at a solution where the spacecraft flew sufficiently
20 away from the planet such that it was a successful
21 orbit?

22 A. Many.

23 Q. How many?

24 A. I have no idea.

1 Q. When was the first time you did one of those
2 calculations in an attempt to determine an orbit?

3 A. You mean of a multiple fly-by?

4 Q. Yes.

5 A. You mean involving two planets?

6 Q. Yes, sir.

7 A. I don't know.

8 Q. Well, was it in 1961?

9 A. It was earlier than that.

10 Q. How much earlier?

11 A. Oh, as I say, about a month or so, I would
12 guess.

13 Q. Is it your best judgment that the first time
14 you attempted to calculate a multiple-planet fly-by
15 orbit was within a month or two of January 26, 1961?

16 MR. SWOPE: Object to the form of the
17 question. You may answer.

18 A. I don't know.

19 Q. Do you have any documents, sir, which
20 indicate when it was that you first attempted to
21 calculate a multi-planetary fly-by orbit?

22 A. No.

23 Q. Do I understand, sir, that the information
24 on the second page of Exhibit Number 2 needs --

1 strike that. Do I understand, sir, that the
2 information on the second page of Exhibit 2 is not
3 understandable to you without reference to an
4 additional document?

5 A. Not so.

6 Q. Well, as you sit here this morning, can you
7 tell me which figure on that page shows an inbound
8 Mars velocity?

9 A. No, I can't.

10 Q. All right. So you need reference to another
11 document in order to interpret the figures on the
12 second page of Exhibit 2?

13 A. That's right, that's right. I didn't need
14 another document. Okay.

15 Q. As you sit here today, you need another
16 document in order to do that, do you not?

17 A. That's right.

18 MR. HERMES: Let's mark as Exhibit
19 Number 3 --

20 (Battin Exhibit No. 3 - One Page, Double
21 Reconnaissance Trajectories Calculated on
22 January 26, 1961 - was marked for
23 identification.)

24 BY MR. HERMES:

1 Q. Dr. Battin, if you'll refer to the copy
2 that's been marked, Exhibit Number 3 is a document
3 bearing a caption running from left to right "Double
4 Reconnaissance Trajectories Calculated on January
5 26, 1961," and then a date, June 6, 2000. Do you
6 see that, sir?

7 A. Yes.

8 Q. To what does the date June 6, 2000 refer?

9 A. It probably referred to when I was first
10 served a subpoena that I was going -- that legal
11 action was going to be taken against me.

12 Q. And do the figures on Exhibit 3 relate in
13 some fashion to the figures on the second page of
14 Exhibit 2?

15 A. Certainly.

16 Q. And it appears there was a figure on Exhibit
17 3 for an outbound Earth relative velocity vector?

18 A. Yes.

19 Q. And then a number, minus 6326. Do you see
20 that, sir?

21 A. Yes, yes.

22 Q. In reference to the second page of Exhibit
23 2, am I to understand that the reference on Exhibit
24 3 to minus 6326 refers to the entry on the second

1 page of Exhibit Number 2 which reads minus 6326
2 followed by 0000?

3 A. Yes.

4 Q. And, similarly, do each of the entries
5 running down the columns on Exhibit 3 refer to
6 relative velocity vectors shown on each succeeding
7 line of the second page of Exhibit 2?

8 A. Yes.

9 Q. And the information contained on each
10 succeeding column going to the right on the second
11 page of Exhibit 2 contains the information
12 identified in the next column to the right on
13 Exhibit 3?

14 A. Yes.

15 Q. And do I understand that the second page of
16 Exhibit 2 provides certain information with respect
17 to two multi-planetary fly-bys of Earth, Venus,
18 Mars, Earth, one beginning on 6 June 1972 and one
19 beginning -- I'm sorry -- 9 June 1972 and one
20 beginning on 6 February 1966?

21 A. Yes.

22 Q. In the second column on Exhibit 3, there is
23 a date on the third line down that says 1 Jan '58.
24 To what does that refer? Do you see that, sir?

1 A. Where?

2 MR. HERMES: May I?

3 MR. SWOPE: (Indicates.)

4 A. Oh, yes.

5 Q. Do you see the reference to 1 Jan '58?

6 A. Yes.

7 Q. To what does that refer?

8 A. That is an epic at which -- from which
9 all -- you have to understand what Julian dates are.
10 You probably don't want me to go into that; but on
11 January the 1st, 1958, the Julian day number for
12 that date is the first number.

13 Q. Please read the number, sir.

14 A. Okay.

15 Q. Just slowly.

16 A. 2436204.5.

17 Q. So the 1 Jan '58 reference does not refer to
18 some action which you took on or about the 1st of
19 January, 1958; is that --

20 A. That's correct.

21 Q. -- correct, sir?

22 MR. SWOPE: Please wait until he's
23 answered -- asked the question before you answer.

24 THE WITNESS: I have to slow down.

1 BY MR. HERMES:

2 Q. Now, do you recall how long it took to print
3 out the trajectory -- either one of the trajectories
4 shown on Exhibit Number 2?

5 A. How long?

6 Q. Let me try another question.

7 A. Okay.

8 Q. It's a fair statement, is it not, that the
9 calculation of the trajectory, the results of which
10 are shown on the second page of Exhibit 2 --

11 A. Right.

12 Q. -- took some period of time to print and was
13 printed on multiple pages; is that correct?

14 A. Yes.

15 Q. Yes. Do you recall, either in terms of the
16 number of pages or the thickness of the paper, how
17 long or how great was the printout with respect to
18 the trajectory?

19 A. If you're talking about the tabulator, it
20 printed 100 cards a minute.

21 Q. How many cards went into the original
22 trajectory?

23 A. Lots. I have no --

24 Q. Can you give me an order of magnitude?

1 A. A thousand.

2 Q. And how were those cards produced?

3 A. Partly -- well, the input data would be
4 key-punched in, and the other data would be output
5 from the computer on punch cards. Then you would
6 have to take those punch cards, go to a tabulator
7 and list -- it was a very tedious process.

8 Q. To produce one trajectory, how long did it
9 take? Was it a matter of hours or a matter of days?

10 A. What do you mean?

11 Q. Well --

12 A. You mean to get a successful trajectory?

13 Q. No, sir. If I understand it, you calculated
14 a large number of trajectories before you arrived at
15 the trajectories reflected on Exhibit 2; is that
16 correct?

17 A. That's correct.

18 Q. All right. How long did it take to produce
19 a single trajectory, whether or not it was one of
20 those reflected on Exhibit Number 2?

21 A. I really don't remember.

22 Q. How long did it take the computer to
23 calculate the trajectories?

24 A. I don't remember.

1 Q. Did you do all of your calculations on an
2 IBM 650 computer?

3 A. Yes.

4 Q. Was there an IBM 704 computer at the
5 Instrumentation Laboratory in 1961?

6 A. No.

7 Q. Did you have access at MIT to an IBM 704
8 computer?

9 A. If I had access to it, I never used it, no.

10 Q. All right. So it is your testimony that
11 each and every trajectory that you calculated was
12 done on the IBM 650 computer at the MIT
13 Instrumentation Laboratory; is that correct?

14 A. Yes.

15 Q. And can you tell me when you first made an
16 attempt to calculate an Earth-Venus-Mars-Earth
17 fly-by?

18 A. All I can say for sure is prior to those
19 dates.

20 Q. But you cannot tell me in terms of months,
21 days or years how much prior?

22 A. The --

23 THE WITNESS: May I refer to the
24 estimate -- not the estimate, but the prediction of

1 multiple fly-by that was recorded in Walt
2 Hollister's notes?

3 MR. SWOPE: You're asking if it's
4 present here in the room?

5 THE WITNESS: No. I said can I refer to
6 that?

7 MR. SWOPE: You're testifying. You make
8 the decision about how to answer the question
9 truthfully.

10 BY MR. HERMES:

11 Q. My question to you, sir, is: Can you, as
12 you sit here this morning, without reference to any
13 other document for the moment, determine when it is
14 you first attempted to do a calculation of a
15 trajectory for an Earth-Venus-Mars-Earth fly-by?

16 A. No.

17 Q. Okay. Is there some --

18 MR. SWOPE: Excuse me. Just for
19 clarity, I think two questions ago you asked him
20 when he first calculated prior to those dates, or
21 perhaps he answered the question that way, "those
22 dates" being the ones shown on Exhibit 3 --

23 THE WITNESS: Yes.

24 MR. SWOPE: -- which is a single date.

1 THE WITNESS: Yes.

2 MR. SWOPE: January 28 (sic), 1961.

3 BY MR. HERMES:

4 Q. Prior to January 26, 1961 --

5 MR. SWOPE: 20 --

6 BY MR. HERMES:

7 Q. -- Dr. Battin, can you tell me, as you sit
8 here this morning, without reference to any other
9 document, when you first attempted to calculate the
10 Earth-Venus-Mars-Earth trajectory?

11 A. It would have been sometime during the
12 previous year, 1960.

13 Q. Is there some document to which you can
14 refer which might refresh your recollection or
15 provide information in that regard?

16 A. No.

17 Q. Were there some notes of Dr. Laning that
18 contain information in that regard?

19 A. No, not Dr. Laning, no.

20 Q. Do I take it that you have no documents to
21 which you can refer to assist you in determining
22 when you first made a calculation of an
23 Earth-Venus-Mars-Earth fly-by?

24 A. That's right, I don't have any ev -- records

1 of that.

2 Q. Dr. Battin, going back to the first page of
3 Exhibit Number 2, there is a number, "92656," and
4 then a time -- then the words "time conversion." Do
5 you know to what those refer, sir?

6 A. No.

7 Q. Is it your testimony that that information
8 came out of the printer independently of any input
9 of yours?

10 A. That's correct.

11 Q. Such that when you put the cards in that
12 contained the information on the second page of
13 Exhibit 2, the first thing which was printed was
14 page number 1 with the information contained on it;
15 is that correct?

16 A. That's correct.

17 MR. SWOPE: All of the information
18 contained on it?

19 MR. HERMES: Yes.

20 MR. SWOPE: I'm sorry, you were asking
21 him first about the --

22 MR. HERMES: No.

23 MR. SWOPE: -- numbers and the words
24 "time conversion."

1 BY MR. HERMES:

2 Q. Do you know where the four zeroes and then
3 the 01-26-61 came from?

4 A. For sure, I don't. My guess is that the
5 tabulator had a clock so that -- not a clock, but a
6 date so it could keep a record of what you were
7 printing; and it did it by just automatically
8 producing that first page, and then would skip to
9 the next page for your data.

10 Q. Do you know what the reference 24 is on the
11 first page of Exhibit 2?

12 A. No.

13 Q. You do not know for a fact, sir, that the
14 tabulator in question had a clock in it capable of
15 printing dates?

16 A. No.

17 Q. Do you recall whether there was any practice
18 or procedure at the MIT Instrumentation Lab where
19 someone would put a card into the tabulator each
20 time something was printed in order to print a date?

21 A. I don't know.

22 Q. It is your testimony, sir, that you did not
23 put anything into the tabulator in order to produce
24 the information on the first page -- the printed

1 information on the first page of Exhibit Number 2;
2 is that correct?

3 A. I couldn't be absolutely positive.

4 Q. As you sit here this morning, you have no
5 memory of putting any input data into the tabulator
6 to produce the first page of Exhibit 2; correct?

7 A. That's right.

8 Q. Dr. Battin, I've placed in front of you a
9 document containing four pages. Have you seen that
10 document? It bears -- it's on the letterhead
11 Federal Forensic Associates, Inc., and the first
12 page is dated July 12, 2001. Have you seen that
13 document before?

14 A. I think so, but I'm not sure.

15 Q. All right. Would you look at the fourth
16 page, sir.

17 A. Yes.

18 Q. The fourth page appears to be a color copy
19 of two photographs; is that correct?

20 A. Yes, yes.

21 Q. Do you recognize what is depicted on the two
22 color copies of the photographs?

23 A. These are the two pages, that line, the two
24 pages of your Exhibit --

1 Q. 2, sir?

2 A. 2, yes; and this is some kind of a serial
3 number put on by the producer of the stacks of
4 papers.

5 Q. It is your best memory, sir, that on the
6 date that you printed Exhibit Number 2, as it came
7 out on the reverse side of the pages, there was a
8 number across the perforations of the pages?

9 A. That's right.

10 Q. And that number appears to have been
11 56276 --

12 A. Yes.

13 Q. -- as depicted in the photographs?

14 A. Yes.

15 Q. Do you know when it was that the pages
16 became separated?

17 A. No.

18 Q. Do you know the circumstances under which
19 the pages became separated?

20 A. Yes.

21 Q. What were the circumstances?

22 A. Old age. They were not hermetically sealed.
23 They were in a folder in my attic unprotected from
24 the elements.

1 Q. Is it your testimony, sir, that sometime
2 within, say, since 1990, you went looking for the
3 original of Exhibit 2 and discovered that it had
4 become separated?

5 A. Yes.

6 Q. What was the occasion on which you went
7 looking for Exhibit Number 2, the original of
8 Exhibit Number 2?

9 A. When the -- when I was first served legally.

10 Q. Are you talking about sometime in 1999 or
11 2000, sir?

12 A. That's right.

13 Q. Had you not gone back to look for that
14 document at any time previously?

15 A. No.

16 Q. You apparently wrote certain papers or had
17 papers published in 1994 and 1996 that made
18 reference to the work that you identify on Exhibit
19 Number 2. When you wrote those papers, did you go
20 back and look at Exhibit -- the original of Exhibit
21 Number 2?

22 A. No.

23 MR. HERMES: May we have this marked
24 as -- I'm sorry. Dr. Battin, may I have that? May