Continental Business Machines, Inc.
1629 Silver Lake Blvd.
Los Angeles, CA 90026
(323) 661-3300
(323) 661-3232 fax

TO WHOM IT MAY CONCERN

My name is Fred Schiess, former owner of Continental Business Machines, Inc., 1629 Silver Lake Blvd. Los Angeles, CA 90026 . Tel. # 323-661-3300.

My background is as follows:
Four-year apprentice ship as typewriter mechanic in Switzerland from 1945 to 1949.
Three years with Underwood Elliott Fisher Office Machines, technical service, Switzerland
One year special training as service representative with Hermes Precisa, manufacturer of typewriters, calculators and adding machines in preparation of assignment as service manager in the United States of America.
Two years military service in the US Army, 1955 to 1957.
After discharge, service technician for Henley Typewriters in Hollywood, Calif.
1961 started Continental Business Machines, Los Angeles. Retired from full time work in 2004, but still active in the same business when special needs arise relating to special products.
Customer base included Union Oil Company of California, all US Post offices in Los Angeles County, major insurance firms and commercial banks in Los Angeles County, US Marshall's Office, US Airforce Base in Los Angeles, Los Angeles County and Los Angeles City offices, US District Courts in Los Angeles County and assortment of commercial accounts.
Teaching night classes in office machine repairs for the Los Angeles Unified School system for office machine technicians employed by members of SCOMDA (Southern California Office Machine Dealers Association). Close association with IBM typewriter division, including technical training on complete line of electric typewriters.

ASSIGNMENT;

I have been presented with six sets of documents for the purpose of examining the type fonts used in each document. All of the six sets of documents comprise manuscripts with titles describing various subjects and attached cover pages also bearing these subject titles as well as dates. The following is a list of the titles of these manuscripts and the attached cover pages indicating the corresponding dates:

1. **"INTRODUCTION TO CELESTIAL MECHANICS."** The attached cover page reads : Lecture Notes on Astronautical Guidance by Richard H. Battin February 1961 for class 16.46.

2. **'SPECIAL PROPERTIES OF CONIC TRAJECTORIES."** The attached cover page reads: Lecture notes on Special Properties of Conic Trajectories by Richard H. Battin February 1961 for class 16.46.

3. **"POSITION IN CONIC TRAJECTORIES."** The attached cover page reads: Lecture Notes on Position in Conic Trajectories by Richard H. Battin March 1961 for class 16.46

4. **"APPENDIX D APPROXIMATE POSITION AND VELOCITY OF THE MOON"** The attached cover page reads : Lecture Notes on Approximate Position and Velocity of the Moon by Richard H. Battin April 1961 for class 16.46.

5. **"VARIATIONS OF THE ORBITAL ELEMENTS."** The attached cover page reads: Lecture Notes on Variations of the Orbital Elements by Richard H. Battin May 1961 For class 16.46.

6. **"THE TRAJECTORY PROBLEM AS IT RELATES TO THE MISSION FOR INTERPLANETARY FLIGHT."** The attached cover page reads: Lecture Notes On The Trajectory Problem As It Relates To The Mission For Interplanetary Flight by Richard H. Battin August 1961 for class 16.46.

RESULTS OF MY EXAMINATION:

The **cover pages** for all six sets of documents listed above were typed on an IBM Executive typewriter equipped with an IBM proportional typeface called **Proportional Modern** (PM). This IBM Executive type style spaces individual characters according to their widths, such as two space units for a lower case letter l (L) or small l, but 4 space units for the upper case or capital letter L. Likewise with the letter F; in lower case the letter f takes up 2 space units and in upper case – capital – letter F takes up 4 space units. Letter M takes up 5 space units, both in lower and upper case. All punctuations as well as all numbers take up 3 space units.

The **typed manuscript** in document sets 1,2,3,4 and 5 were also typed with an IBM Executive with Proportional Modern type face, identical to the cover pages.

The **typed manuscript** in document set 6 (**six**) however, was typed on a typewriter with conventional 12-pitch typeface called Letter Gothic 12. This typeface spaces all characters $1/12^{th}$ of an inch. This typeface, unlike the IBM EXECUTIVE Proportional Modern, is not exclusive to the IBM brand and was available on almost all brands of typewriters.

It is evident that the typed manuscript of document set six titled **"THE TRAJECTORY PROBLEM AS IT RELATES TO THE MISSION FOR INTERPLANETARY FLIGHT"** on the pages listed above, was not produced on the same typewriter as the typed manuscript on document sets numbers 1 to 5, except for the cover page of document set six.

The consistency of type fonts used between the cover pages and manuscripts of the first five documents indicates that the manuscript in document 6 is not the original manuscript.

Examination of the above documents performed on December 21, 2004 by the undersigned:

Fred Schiess

FRED SCHIESS

Lecture Notes

on

The Trajectory Problem As It Relates To The Mission For Interplanetary Flight

by

Richard H. Battin

J. Halcombe Laning, Jr.

August, 1961

for class 16.46

Massachusetts Institute of Technology

Cambridge 39, Massachusetts

THE TRAJECTORY PROBLEM AS IT RELATES TO THE MISSION FOR INTERPLANETARY FLIGHT

by

Richard H. Battin and J. Halcombe Laning, Jr.

The first generation of interplanetary spacecraft has been designed primarily for the purpose of exploring the space environment. From the guidance standpoint, the missions have been relatively elementary so that ground based tracking and control should be adequate. However, as the scope of interplanetary ventures broadens, the need for self-sufficiency in spacecraft operations will become apparent. Self-contained navigation systems requiring little or no radiation contact with Earth will then provide the solution to the guidance problem for the more sophisticated missions.

It is the purpose of this paper to discuss some of the more advanced interplanetary missions from the standpoint of the limitations imposed by the geometry of the Solar System on the trajectory problem. Consideration is given to a variety of mission objectives which include orbiting a target planet, atmospheric probes and non-stop round trip reconnaissance.

1. Interplanetary Trajectories

An initial step in planning for most interplanetary missions is the selection of a suitable trajectory for the spacecraft. Although the advent of practical continuous propulsion devices may significantly change the situation, interplanetary probes now under development must travel essentially from launch to destination in free fall under the influence of solar and planetary gravity fields. A predetermined reference trajectory is thus an integral part of the operation. If launched precisely in such a course, the vehicle could, in theory, proceed to its destination without the need of further propulsion. However, deviations from this reference path require correction, and a source of propulsion energy would have to be provided. To insure successful completion of the mission, the vehicle must not be permitted to deviate substantially from the planned course because of the limited reserve of energy which can be transported. Unfortunately, until we have at our disposal more powerful sources of energy than are now available in the form of chemical fuels, space travel must be confined to these admittedly restrictive free-fall routes.

The determination of an appropriate course to be followed is complicated by the fact that both the starting and destination points describe orbits about the Sun. The angular velocities of the departure and destination planets are not only different but are continually changing with time. Furthermore, although the motions of the planets are essentially planar, the planes of their orbits do not coincide. True, the inclination angles are small, but the effect can be significant.

Complicated though the circumstances may be, nevertheless the path of the vehicle in free-fall is completely determined by the initial conditions, i.e., the velocity vector of the spacecraft at the time of departure from Earth. Prior to injection into orbit, the spacecraft has a velocity with respect to the Sun of just under 100,000 ft/sec, which is the same as the orbital velocity of the Earth. The problem then is to determine the impulse in velocity needed to attain a suitable interplanetary orbit so that the spacecraft will intersect the orbit of the destination