Declaration of Marshall H. Kaplan, Ph.D. in Support of
Petition for *Inter Partes* Review of
U.S. Patent No. 8,678,321, Claims 1-13

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Space Exploration Technologies Corp.
Petitioner

v.

Blue Origin LLC
Patent Owner

Patent No. 8,678,321
Filing Date: June 14, 2010
Issue Date: March 25, 2014
Title: SEA LANDING OF SPACE LAUNCH VEHICLES AND ASSOCIATED SYSTEMS AND
METHODS

DECLARATION OF MARSHALL H. KAPLAN, PH.D.

Inter Partes Review No. _____

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I, Marshall H. Kaplan, declare as follows:

I.   INTRODUCTION AND QUALIFICATIONS

A.   Qualifications and Experience

1.   I have over 45 years of technical experience in the aerospace field, which includes extensive expertise in the area of rocketry and in launch vehicle engineering and systems. I am currently the Chief Executive Officer, Founder, and Principal Instructor of Launchspace, Inc., a leading aerospace training and consulting firm and a Visiting Professor of Aerospace Engineering at the University of Maryland.

2.   In my role at Launchspace, I have drawn on my industry experience to develop dozens of courses covering a wide range of aerospace topics, including courses titled "Launch Vehicle Systems Design and Engineering," "Introduction to Reusable Launch Vehicles," and "Advanced Launch Systems, Reusables." At the University of Maryland, I am developing a graduate course on launch vehicles. I was previously a tenured Professor of Aerospace Engineering at the Pennsylvania State University where I taught "Aerospace Vehicle Design" and "Dynamics and Control of Aerospace Vehicles." Through my academic work and my training programs, I have taught hundreds of classes and thousands of students and

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professionals. To be an effective teacher, I have kept my finger on the pulse of

the industry, remained cognizant of the knowledge base of other practitioners

and academics, and had the opportunity to observe the competency and

ingenuity of everyone from first year aerospace students to outstanding

professionals in the space industry, allowing me to accurately ascertain the skill

level necessary to practice in a complex field.

3.   Through Launchspace, I also serve as a consultant to industry,

academic, and government clients on a variety of aerospace projects. For

example, I am currently engaged as a Senior Advisor to the Defense Advanced

Research Projects Agency (DARPA) Experimental Spaceplane 1 (XS-1) project,

which involves the development of a reusable first stage of a space access vehicle.

4.   Prior to founding Launchspace, I was the Chief Engineer on both the

EER Systems' Conestoga 1620 expendable launch vehicle (ELV) (1992-1993) and

the fully reusable Kistler K-1 two-stage-to-orbit (TSTO) reusable launch vehicle

(RLV) (1993-1994). As launch vehicle Chief Engineer on the Kistler K-1 vehicle, I

was responsible for all technical design activities, launch operations, staging

events, and recovery of vehicle stages. I also consulted on numerous other

launch vehicle and other aerospace projects for the General Accounting Office

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(now Government Accountability Office), the National Research Council Study

Group on Single-Stage-to-Orbit Launch Vehicle Technologies, the Office of the

Secretary of Defense, and the Office of Science and Technology Policy.

5.   My consulting activities included evaluating expendable and reusable

launch vehicle designs and providing analysis and guidance on vehicle and

satellite control and reentry projects. For example, in conjunction with my work

for the National Research Council, I provided technical advice and performed

feasibility analyses related to the reusable, single-stage-to-orbit Advanced

Technology Demonstrator X-33 Program. I was also tasked by the Office of the

Secretary of Defense to evaluate various domestic launch vehicle companies,

including SpaceX, for their ability to deliver payloads to orbit. I have held

numerous other professional positions, which involved the design or analysis of

launch vehicles and/or vehicle control systems, and I have received a number of

professional awards and honors for my work in the aerospace field. Additional

details of my qualifications and experience are available in Exhibit A, my

curriculum vitae.

6.   I am the author of more than one hundred technical papers and

reports on various aspects of space technology and systems engineering,

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additional details of which can be found in Exhibit A. As one example, I was the lead author of "A Systems Approach to Developing an Inexpensive Fully-Reusable Two-Stage Launch Vehicle," which was presented in 1995 by the American Astronautical Society Conference and published as AAS-95-026. I am also the author of several books, including "Modern Spacecraft Dynamics and Control" and "Space Shuttle: America's Wings to the Future."

7.   I received a Ph.D. in Aeronautical and Astronautical Sciences from Stanford University in 1968, as well as a M.S. in Aeronautics and Astronautics from Massachusetts Institute of Technology in 1962. I completed my undergraduate degree in Aeronautical Engineering from Wayne State University in 1961 (cum laude).

8.   I am an expert in atmospheric flight, having received an Aeronautical Engineering degree, in addition to personal flight experience. I hold a private pilot multi-engine license with an instrument rating, and over the past 40 years, have accumulated over 4,000 hours of flight time. I have also taught courses in control theory and aircraft autopilot design.

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