DECLARATION OF DR. A. BRUCE BUCKMAN

I, Dr. A. Bruce Buckman, declare as follows:

1. I am a retired Professor of Electrical and Computer Engineering at the University of Texas at Austin. I was first appointed in 1974, and I retired in 2009. I obtained a B.S. in electrical engineering from the Massachusetts Institute of Technology in 1964, and M.S. and Ph.D. degrees in electrical engineering from the University of Nebraska at Lincoln in 1966 and 1968, respectively. I held academic positions at the University of Nebraska at Lincoln from 1968 to 1974, and at the University of Texas at Austin from 1974 to August 2009. My *curriculum vitae*, which is attached as Exhibit A, discusses my qualifications and experience in the fields of electrical engineering and computer science in more detail.

2. I have been retained by Volkswagen Group of America, Inc. in connection with a petition for *inter partes* review of U.S. Patent No. 6,012,007 ("the '007 patent"). I have reviewed the '007 patent, as well as its prosecution history. I have also reviewed U.S. Patent No. 5,732,375 ("Cashler") and U.S. Patent No. 5,474,327 ("Schousek").

The '007 Patent

3. The '007 patent relates to occupant restraints for vehicles and particularly to a method using seat sensors to determine seat occupancy for control of the deployment of supplemental inflatable restraints (SIRs) or vehicle airbags.

Col. 1, ll. 10-12, col. 1, ll. 52-55. According to the '007 patent, because airbags are designed for adult passengers, "it is preferred to disable the passenger side airbag when a small person occupies the seat or when the seat is empty." Col. 1, ll. 22-30. In purporting to discriminate between large and small seat occupants, the '007 patent describes that a number of sensors, located in the passenger seat of the vehicle, are coupled with a microprocessor that interprets the data and determines whether to allow or inhibit deployment of an airbag based on the detected occupant size. Col. 1, l. 66-col. 2, l. 10.

4. In discussing then-existing systems relating to using seat sensors to determine seat occupancy for control of the deployment of vehicle airbags the '007 states that Cashler and Schousek "form a foundation for the present invention," but that the '007 patent is also intended to have the ability to discriminate between heavy and light occupants and to operate under dynamic conditions such as occupant shifting or bouncing due to rough roads. Specifically, the '007 states:

> It has been proposed in U.S. Pat. No. 5,474,327 to Schousek, entitled "VEHICLE OCCUPANT RESTRAINT WITH SEAT PRESSURE SENSOR", and in U.S. Pat. No. 5,732,375, issued Mar. 24, 1998 and assigned to the assignee of this invention, to incorporate pressure sensors in the passenger seat and monitor the response of the sensors by a microprocessor to evaluate the weight and weight distribution, and for inhibiting deployment in certain cases. These disclosures teach the use of sensors on

> the top surface of the seat, just under the seat cover, and algorithms especially for detecting the presence and orientation of infant seats. Both of these disclosures form a foundation for the present invention and are incorporated herein by reference. It is desirable, however to provide a system which is particularly suited for discriminating between heavy and light occupants and for robust operation under dynamic conditions such as occupant shifting or bouncing due to rough roads.

Col. 1, ll. 31-49.

5. The '007 patent describes that it is desirable to operate "under dynamic conditions such as occupant shifting or bouncing due to rough roads." Col. 1, ll. 44-48. Specifically, the '007 patent describes the use of an "Adult Lock Flag." The '007 patent describes that "When the Adult Lock Flag is set, the output decision will always be to allow deployment." Col. 4, ll. 40-41. In the setting of the Adult Lock Flag, a lock threshold is used which is above a "total force" threshold range (*i.e.*, exceeding which also allows airbag deployment). Col. 4, ll. 41-44. An unlock threshold "represents an empty seat." If a decision filter is at its maximum (indicating a decision to allow deployment), the total force is greater than the lock threshold, and the lock timer (which measures the time since the vehicle ignition is turned on) is larger than the lock delay, a flag value is increased toward a maximum value and the Adult Lock Flag is set. Col. 4, ll. 46-50. Otherwise, the system determines whether the total force is above the unlock threshold, and if not,

whether the total force is below the unlock threshold and the flag value is greater than zero. Col. 4, ll. 50-54. If so, the flag value is decremented toward zero, and in either case, the flag value is tested; if the value is above zero, the Adult Lock Flag is set, and if the value is zero, the Adult Lock Flag is cleared. Col. 4, ll. 50-57.

6. During the prosecution of the '007 patent, the applicants argued in an amendment dated July 6, 1999, in distinguishing Cashler from the '007 patent:

> While the Cashler patent admittedly is foundational to the present invention, the rejected claims recite non-obvious enhancements in the form of apparatus and method steps which are particularly useful for discriminating between heavy and light occupants under dynamic conditions due, for example, to occupant shifting or bouncing. Such enhancements are neither shown nor suggested in Cashler. Independent method Claims 1 and 16 both recite the steps of (1) establishing a lock threshold above the normal allow threshold, (2) setting a lock flag when the total force or relative weight parameter is above the lock threshold AND deployment has been allowed for a given time, (3) clearing the lock flag when the total force or relative weight parameter is below an empty seat threshold for a time, and (4) allowing deployment while the lock flag is set. Independent apparatus Claim 17 includes nearly identical recitations, but in the context of functions performed by a programmed microprocessor. These steps/functions are not found in Cashler, rather, they enhance Cashler by addressing dynamic operating conditions not even recognized in the Cashler patent.
>
> **Cashler**

7. Cashler describes a method of inhibiting or allowing vehicle airbag deployment using an array of pressure sensors arranged on a vehicle passenger seat and coupled to a microprocessor. The microprocessor analyzes the sensor load forces and then determines whether to allow or inhibit airbag deployment. Abstract.

8. Cashler describes that it may not be beneficial to deploy a vehicle airbag in certain instances, such as when a forward facing infant seat is on the passenger seat. Col. 1, ll. 12-29, col. 1, ll. 51-58. Cashler describes that "a dozen sensors, judicially located in the seat, can garner sufficient pressure and distribution information to allow determination of the occupant type and infant seat position," and that "this information, in turn, can be used as desired to inhibit SIR deployment." Col. 1, ll. 59-63.

9. Cashler describes that sensors are mounted on a bottom bucket seat cushion. Figure 2; col. 3, ll. 21-23. At the time Cashler was filed in 1995, it was well-known to include, in a vehicle seat cushion, a resilient pad with a top surface for bearing an occupant, a bottom surface supported by a panel, and sensors mounted between the bottom surface and the panel. For example, U.S. Patent No. 5,232,243, which issued in 1993, describes a seat with a "top cover plate" and a "bottom cover plate," in which the bottom plate supports an array of seat weight

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