BOSTON MCCLAIN & ASSOCIATES

December 2, 2015

Mr. Mike & Honorable Nikki Haley
Governor's Mansion
800 Richland Street
Columbia, SC 29201

Re: ALTACAS Crash Avoidance System

Hello Mike my name is Boston McClain Jr. and you and I served on the Bordering System together. I have also done appraisals for your wife's family. I'm hoping you remember me.

I and my partners have a patent all ready approved by the federal government for Aircrafts Crash Avoidance. I am requesting for your assistance by asking you to consult your with wife to get an audience for Boeing in Charleston on my behalf.

Please see the enclosed summary of the specs of the patent. Thank you in advance for you assistance in the matter.

Sincerely,

Boston McClain Jr.

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ALTACAS

(Aerial, Landing, & Takeoff Aircrafts Crash Avoidance System)

General Overview:

- Innovative and newly patented aircraft crash avoidance system employs GPS tracking and LIDAR laser radar technology
- Automated system reduces human errors caused by pilots and air traffic control
- Provides pilots and air traffic control additional reaction time to prevent collisions
- Enhances existing Next Generation Air Transportation Systems (NexGen)
- Enhances existing Traffic Crash Avoidance System (TCAS)
- Retrofit version easily installed

Technological Concept

- Employs laser radar gun technology used in traffic enforcement for motor vehicles.
- Actual LIDAR laser beams are safe, invisible, unidirectional, and expands up to nearly 15 square feet. Detects aircrafts up to 1.3 miles.

Special Features:

- Monitor runways and airways of aircrafts before takeoff
- Monitor runways and airways of aircrafts before landing
- Monitor airways of in-flight aircrafts
- Pinpoint accuracy detects, warns, and tracks aircrafts of possible collision
- Provides imagery, distance, speed, and direction of oncoming aircrafts
- Employs sensor activated runway lightings

Transfer Technology:

- Technology applicable for other transportation systems (e.g. trains, ships)

The advantages of having additional reaction time

- Every second is indispensible when aircrafts are on collision course with each other.
- Any safety system providing additional time may help avert a catastrophe.
- Runway incursions are subdivided into categories from A to D, depending on the level of severity.

1. Category D – Reaction time is not crucial because there is sufficient time to consider multiple alternatives to avoid a collision
2. Category C – There is sufficient time to smoothly execute an unplanned evasive action.

3. Category B – There is barely enough time to take an emergency evasive action
4. Category A – Instantaneous reaction and radical evasive action are required.

Automated system designed to:

- Prevent runway and airway collisions between landing and takeoff aircrafts
- Prevent collisions between in-flight aircrafts
- Opens three-way communication between pilots and air traffic controllers during crisis
- Identify and alert aircrafts regarding runways currently in use
- Alert aircrafts on intersecting runways
- Identify runways usage to aircrafts to prevent inadvertent incursions
- Prevent collisions of takeoff and landing aircrafts with non-aircraft vehicles

Products and Descriptions

1. Multidirectional Radar and Housing (MRAH) - This compact laser radar has a spherical aerodynamic design that houses the radar's laser beam emitters and laser beam sensors that detects aircrafts. Housing is capable of rotating 180 degrees horizontally while laser beam emitters can move vertically from 0 to 90 degrees. A factory-installed or retrofit versions attaches at various locations on wings and fuselage (See Figures 3 & 4).
2. Control and Processing Unit (CAPU) – This compact electronic apparatus houses a Central Processing Unit, Control Panel, Display and Radar Screens, GPS, Navigational Device, Wireless Telecommunication Device, and every necessary component for functionality of system (See Figure 11). A factory-installed or retrofit version is located within dashboard of cockpit and interconnects to Multidirectional Radar and Housing by means of wire or wireless transmission.
3. Sensor Activated Lighting Apparatus (SALA) – This dual LED light emitting apparatus aligns both side of runway. Dual LED colors of red and green activated by digital or RF signals using different frequencies (see Figures 7 & 8).
4. Remote Processing Unit (RPU) – This compact electronic apparatus houses a Central Processing Unit, Control Panel, Display Screen, Wireless Telecommunication Device, Warning Device and every necessary component for functionality of system (See Figure 12). A factory-installed or retrofit version is located within control panel of air traffic controller. Interacts with Wireless Telecommunication Device located within Control and Processing Unit (CAPU) of aircrafts.

Demonstration

- See accompanying animated video

How Crash Avoidance System Operates:

1. The airplane taxis onto the runway after pilot has entered specific data into **Control and Processing Unit (CAPU)** such as: Maximum Take-Off Weight (MTOW) or Regulated Maximum Take-Off Weight (RTOW); airspeeds such as V_{FTO} speed (final takeoff speed), V_{lof} speed (lift-off speed), and other V speeds factors; the headwind and tailwind, and Takeoff Run Available (TORA - the length of runway declared available and suitable for taking off. This information is available to pilots before takeoff. Entered data automatically adjusts and activate laser emitter beams on **Multidirectional Radar and Housing (MRAH)** to monitor the runway and projected airway of initial takeoff.
2. In this example, six (6) MRAHs are located on the aircraft: one above and one below each wing, one on nose, and one on the fuselage over the cockpit. The MRAHs over the cockpit and above each wing are monitoring the airway of projected lift-off, while the MRAHs on nose and below wings are monitoring the runway.
3. Before takeoff, laser beam emitters of MRAHs over cockpit and above each wing sweeps airway of projected liftoff in a continual upward and downward motion to confirm that no other airplanes are present in direct path. Laser beam emitters of MRAHs on nose and below wings continue to monitor runway (see Figures 5 & 6).
4. A remote control signal (digital or RF) from the CAPU automatically activates green LEDs of multiple **Sensor Activated Lighting Apparatus (SALA)** aligned on each side of takeoff runway. Another remote signal on a different frequency automatically activates flashing red LEDs of SALA on each side of runways intersecting takeoff aircraft's runway, while activating a blinking red light within cockpit of aircraft on intersecting runway. These flashing red lights momentarily warn aircrafts on intersecting runways not to proceed. Flashing red lights will cease once takeoff aircraft passes the intersection.
5. **If** inadvertent taxiing aircraft on an intersecting runway not equipped with SALA accidentally crosses runway of takeoff aircraft: the pilots of takeoff aircraft will be momentarily warned audibly and by blinking red light within cockpit. If threat does not persist, warnings within takeoff aircraft will cease with the words "No Aircraft Approaching" (see demo video).
6. As the takeoff aircraft proceeds down the runway, the green LEDs on SALA are turned off by the motion of passing aircraft, thereby visibly identifying current runway usage. In addition, all in-flight airplanes in the vicinity of airport receive audible or visible warnings that this runway is presently in use (see Figures 7 & 8).
7. As takeoff aircraft proceeds down the runway, GPS tracking technology and a computerized trajectory apparatus within Navigational Device automatically adjust laser beams emitters on MRAH to continue focusing and monitoring the airway of the projected lift and initial climb, while runway monitoring continues (see Figures 5 & 6).
8. As takeoff aircraft begins climb, all laser emitter beams on MRAHs automatically adjust to zero degrees to continue monitoring the takeoff plane throughout ascension.
9. During climb, Multidirectional Radar and Housings located on wings performs continual 90 degrees sweeps of airspace as it moves perpendicular toward the outside of airplane and back to original forward position (see video). This design helps ascending aircraft to detect takeoff and landing aircrafts dangerously approaching from multiple directions.
10. Once flight level altitude is reached, Multidirectional Radar and Housings are designed to either continuously rotate back and forth at 180 degrees, or rotate and lock in multiple directions to continue monitoring airspace (see demo video).

11. Multidirectional Radars and Housings (MRAHs) are not limited to the design or amount illustrated in this example. Additional laser beam emitters and sensors in same or separate housings (on various areas of wings and fuselage) can be added for enhanced safety.

<u>Prevents Collision during Landings and Takeoffs:</u>

An example of ALTACAS operation is as follows:

12. If an aircraft before takeoff detects a descending landing aircraft approaching the same runway, ALTACAS instantly activates within the cockpit a blinking red light and audible warning, such as "Aircraft Approaching." Control and Processing Unit (CAPU) allows Multidirectional Radar and Housings (MRAHs) of takeoff aircraft to lock on and track descending landing aircraft.
13. If inbound aircraft is equipped with ALTACAS, laser emitter beams on detected landing aircraft (located on nose and under the wings of Multidirectional Radar and Housing) will respond by moving vertically back and forth in the direction of oncoming runway to scan and locate takeoff aircraft's position on runway. Once located, the radar system locks on and track takeoff aircraft's position on runway (see Figure 9 and demo video).
14. If both aircrafts are equipped with ALTACAS, each pilot will receive audible warnings: "Aircraft Approaching," along with visible blinking red light within cockpit. If not, only the equipped aircraft will receive multiple warnings.
15. Automated systems of both aircrafts provide imagery, distance, speed, and direction of oncoming aircrafts.
16. If the inbound airplane is momentarily crossing the pathway of the takeoff aircraft, both pilots will receive an audible message such as "No Aircraft Approaching" to inform them that the threat no longer exists.
17. If threat of possible collision persists, air traffic control is alerted and a simultaneous three-way line of communication automatically opens between pilots of both aircrafts and air traffic controllers to defuse the crisis (see Figures 1, 2, & 10). This three-way discourse is possible because Wireless Three-way Telecommunication Device in Control and Processing Unit (CAPU) of both aircrafts interacts with the Wireless Three-way Telecommunication Device in **Remote Processing Unit (RPU),** which is located within control panel of air traffic controller.
18. After three-way communication, to avoid collision: aircrafts are instructed to either abort takeoff and move quickly off airstrip or descending aircraft to abort landing.
19. If air traffic control is not available, the Control and Processing Unit (CAPU) of both aircraft is designed to promptly analyze the situation and provide the pilots with a quick solution regarding the proper course of action to take to avoid possible collision.
20. Scene 14 – In this example, the aircraft on runway aborts take-off. Once the takeoff aircraft completely removes from the runway: flashing red light within cockpits of both aircrafts turns green to show that threat of possible collision no longer exist. Both pilots receive audible warnings: "No Aircraft Approaching." Inbound aircraft safely lands.
21. The above example demonstrated how ALTACAS prevented collisions between takeoff and descending landing aircrafts. The same system operation is applicable to incidents involving aircrafts on runways and during midflight (see demo video). Detects and warns from all directions.