EXHIBIT # 1, A NARRATIVE STATEMENT

(ITEM # 10, FCC FORM 442)

a) COMPLETE PROGRAM OF RESEARCH AND EXPERIMENTATION PROPOSED:

A Research and Development (R&D) and experimentation program is proposed leading to the development and test of a **UNI**versal **C**ollision Obviation and Reduced **N**ear-miss (UNICORN™) system. (The Frontispiece of Patent No: US 6,211,808 B1 is attached at the end of this Narrative Statement.) Ultimately, UNICORN™ is intended for providing collision avoidance, terrain alert and ground-proximity warning when mounted upon general-aviation aircraft. Such a system is needed to provide the pilot with early warning of the presence of a nearby threat aircraft within the surrounding airspace or unanticipated terrain or the unexpected proximity of the ground along the intended flight path of the aircraft on which a UNICORN™ system is mounted. The U.S. Patent spells out the elements of such a system initially intended to operate at a frequency assigned around a portion of L-band (approximately 1 to 2 GHz) occupied by the variants of the **T**raffic **A**lert and **C**ollision **A**voidance (TCAS) system. In a sense, UNICORN™ is intended to be a "poor-man's" TCAS system; wherein, at a fraction of the price, when mounted on general-aviation aircraft, UNICORN™ would provide a similar capability to that afforded commercial aircraft by TCAS.

Unlike TCAS, UNICORN™ has no requirement for a transponder to be mounted on ***all*** potential threat aircraft. However, the rationale for selecting an operating frequency close to 1,090 MHz was based upon the UNICORN™ system having the provision for an upgrade to also act as a transponder for TCAS through the receiving and transmitting functions of its own antenna. In receiving a favorable reaction to a presentation of UNICORN™ to the FAA Office of Spectrum Policy and Management [ASR-1], their guidance was to not attempt TCAS synergism but, rather, preserve the autonomous capability of UNICORN™ by, possibly, operating in a less crowded frequency band. In this regard, the 2 to 4 GHz S-band and the 4 to 8 GHz C-band both were mentioned. It also was pointed out that a number of radars operated in S-band – such as Airport Surveillance Radar and Weather Radar – whereas, the systems supporting civil aviation (e.g., the Microwave Landing System and the Terminal Doppler Weather Radar), mainly, operated above the 5 GHz portion of C-band.

From the viewpoint of antenna size and, therefore, ray-dome drag profile, within limits, the higher the assigned frequency the better it becomes for a UNICORN™ system. In order to facilitate making a judgment regarding the selection of a requested operating frequency for UNICORN™, the FAA Office of Spectrum Policy and Management [ASR-1] provided a guide to Spectrum Engineering Services that contained a list of Radio Frequency Bands Supporting Civil Aviation. Nevertheless, we were reminded that the ultimate authority resided with the FCC because of the likelihood of band occupancy by other military and commercial systems emitting and receiving other Electro-Magnetic (EM) signals.

Presently, we are requesting a frequency assignment for experimental purposes. However, even in the light of the FAA Certification Process, for obvious reasons, we would prefer that frequency to well within the operating band capability of the antenna center frequency that ultimately will be assigned to us. Therefore, for the purpose of allowing a shift in our choice as we get further into the antenna subsystem design and test, it would be preferable if the FCC named an acceptable operating frequency in each of the L, S and C bands. Of course, if this is not acceptable to the FCC we will endeavor to work with the frequency assigned. Given a choice that has to be made at this point, the rank ordering of our preferences is C-band, S-band and, then, L-band; even though our U.S. Patent names L-band as the operating frequency for a UNICORN™ system.

Generally speaking, ***none*** of the subsystem elements or major components – apart from microprocessors, GUNN or IMPATT or TRAP-ATT diodes and other minor electronic components – is available as Commercial Off-The Shelf (COTS) items. Certainly this is so for the antenna subsystem which, in the UNICORN™ U.S. Patent, is described as an **octahedron** dielectric microwave lens – that might evolve to a **dodecahedron** or **icosahedron** or an irregular polyhedral design such as a "bucky-ball" or "soccer-ball", *etc*. – or, as an alternative, a "cluster" of "flared" rectangular-waveguide (sectoral-shaped) horns or rectangular waveguides with "excised" corners. This alternate approach was previously discarded because mutual-impedance coupling between "cluster" elements was thought to result in a departure from an omni-directional transmission pattern when all elements were driven simultaneously with microwave energy. In either case, the possibility for giving up transmitter gain and receiving sensitivity in the polar directions was considered as a means to achieve a lower-profile antenna.

The U.S. Patent describes a possible technique for fabricating the **octahedron** dielectric by dissecting a sphere of dielectric, dissecting it into octants and silver-plating or silver-sputtering three of the four vertex faces. In addition, the center would be scooped out so as a "microwave tuning cavity" to accommodate a microwave transmitter/oscillator diode, a microwave Transmitter/Receiver (T/R) microwave diode "cluster" and eight microwave video-rectifying diodes when reassembled into a sphere with an open dielectric surface. Unlike a Luneburg lens, a material having a uniform dielectric constant would be chosen to prevent a mismatch to free space that might otherwise arise because of the "corner-reflector" action of each of the metal plated octants; although a spherical Luneburg lens "squashed" into each octant has been considered for performing this function. Should a higher-order polyhedron than an **octahedron** – e.g., **dodecahedron** or higher-order regular or irregular polyhedron – be selected, the "corner-reflector" action becomes less critical. The alternative waveguide "cluster" approach does not encounter this problem to any degree.

Testing of the omni- or "flattened" omni-directional transmit beam pattern and the eight (or more) evenly distributed receiver beam patterns is crucial to the development of a UNICORN™ system. Consequently, the purpose of filing this FCC Form 442 is to secure permission to perform local (e.g., "parking lot") and antenna-range tests in a frequency band close to that in which an FAA Certified UNICORN™ airborne system would operate. The approved choice of this experimental UNICORN™-system frequency will determine the type of microwave power instrument that will be used in these transmitter and receiver tests; which may well start with VSWR bench tests and, then, progress to "parking lot" and also antenna-range tests. The alternative might be to fabricate the transmitter/receiver assembly – employing the low-power Gunn diode intended for the basic

2.5 NM "sphere-of-safety" option rather than the two optional longer range upgrades – to facilitate using the Gunn-diode source to perform a one-way test of the transmitter beam pattern and Effective Isotropic Radiated Power (EIRP) in dBw, as well as an external microwave calibrated source to perform a one-way test the receiver beam pattern and Gain/Temperature (G/T) sensitivity in dB/°K.

UNICORN™ utilizes a "sing-around system" as a means to jointly determine radial range and closure rate to an approaching (or receding) microwave-reflecting "target"; where, a tau criterion – given by radial range/closure rate – is subjected to a threshold so as to estimate if the time to reach the Closest-Point-of-Approach (CPA) or encounter is less than a predetermined "threat" interval. The 2.5 NM "sphere-of-safety" of the basic UNICORN™ system is the radial range at which the Radar Cross-Section (RCS) of a small or larger commercial aircraft "threat" will provide early warning of a potential collision to the pilot of a general-aviation aircraft on which UNICORN™ is installed. The RCS's of smaller "threat" will give rise to a smaller "sphere-of-safety" but (because of the correspondingly lower closure rate) will provide a roughly invariant early-warning time interval. As with TCAS, UNICORN™ will also be provided with a "whisper-and-shout" multi-pulse transmitter mode; but, after initially ramping up, unlike TCAS, UNICORN™ transmissions will ramp down based upon "first contact over-ride determination" logic. The UNICORN™ system will provide both range/bearing (with a color-coded tau criterion estimate on closure rate and altitude separation) flat-screen indications – on a standard aircraft instrument panel display or, as an alternative described in the U.S. Patent, a color-light indication of the azimuth/elevation "threat" octant on a "heads-up" transparent sphere that is analogous to the spherical antenna – as well as tone-coded audible alarms.

Consistent with bracketing all of the RCS "returns" from the largest anticipated nose-aspect commercial aircraft (e.g., a Boeing 777), a 500-nano-second, non-coded radar pulse will be emitted by the UNICORN™ transmitter every 31-micro-seconds or so (allowing for a receive/retransmit elapse time interval) in the quiescent mode. This corresponds to a 1.62 % duty cycle relative to the 2.5 NM "sphere-of-safety" associated with the basic UNICORN™ Gunn-diode configuration that emits a maximum average power of 1 watt; therefore corresponding to about 62 watts of pulse – mean-squared but often times called "peak" – power. (These are the maximum "average" and "peak" power/duty-cycle likely parameters – and, probably, very much less – to be used during antenna-range testing.) In a 4.5 NM "sphere-of-safety" upgrade employing an IMPATT diode, these maximum "average" and "peak" power/duty-cycle parameters, respectively, will be about 5 watts, 556 watts and 0.90 %. Likewise, when a TRAP-ATT diode upgrade is employed to achieve a 7.5 NM "sphere-of-safety", these parameters, respectively, become 10 watts, 1,853 watts and 0.54 %.

Within the above-mentioned changes, the UNICORN™ system schematic will bear resemblance to that shown on the attached Frontispiece of the basic UNICORN™ Patent No. US 6,211,808 B1, dated April 3, 2001. Of course, there are other nuances to be found in the descriptive material contained in this U.S. Patent and other technical material. However, unless otherwise requested, the above synopsis is thought to be adequate to satisfy Item 10 a).

b) THE SPECIFIC OBJECTIVES SOUGHT TO BE ACCOMPLISHED:

The specific objectives sought to be accomplished with an experimental version of a FAA Certified airborne UNICORN™ system is a complete ground-based testing of the antenna subsystem that is crucial to the success of this endeavor. The associated R&D and antenna testing will be supported out of funding raised for this purpose through a Private Placement Memorandum (PPM) on which Flight Safety Technologies, Incorporated (FSTI) recently closed with private investors. However, during a recent briefing made on UNICORN™ to the senior personnel in the FAA Office of Spectrum Policy and Management [ASR-1], FSTI received sufficient encouragement to warrant the submission of a future proposal for funding to perform Phase-I R&D under a Small Business Innovative Research (SBIR) Program. Notwithstanding the success in securing Phase-I SBIR funding, it is FSTI's desire to proceed forthwith on the R&D and experimentation spelled out under Item 10 a). Therefore, frequency assignment by the FCC is needed as soon as possible to achieve the first-phase objectives associated with having a fully evolved and tested/demonstrated UNICORN™ antenna subsystem.

These specific objectives need to be accomplished as a prelude to completing the development and testing of the less critical electronics and display subsystems and components required to proceed towards an FAA Certified airborne UNICORN™ system. As previously stated under Item 10 a), there is a "chicken and egg" situation in requesting a UNICORN™ antenna subsystem experimentation frequency assignment from the FCC. This is due to the flexibility that UNICORN™ offers in accommodating operation in either of the L-, S- or C-bands, with a preference being in reversed rank order because C-band allows the smallest antenna ray-dome drag profile. The ideal situation would be for the FCC to sanction R&D and experimentation at anyone or more of three frequencies with a total of 2 MHz of bandwidth (or slightly more to allow for adequate "guard bands" on either side of the center frequency) respectively assigned in L-, S- and C-band. If so, FSTI would be motivated to perform detailed designs and prototype fabrication to determine the optimum choice between those three assigned frequencies. Failing that, FSTI will proceed with a detailed design, fabrication and testing at whatever frequency the FCC chooses to assign.

c) HOW THE PROGRAM OF EXPERIMENTATION HAS A REASONABLE PROMISE OF CONTRIBUTION TO THE DEVELOPMENT, EXTENSION, EXPANSION OR UTILIZATION OF THE RADIO ART OR IS ALONG LINES NOT ALREADY INVESTIGATED:

The reasonable promise that UNICORN™ will contribute to the development, extension, expansion and utilization of the radio art and is along lines not already investigated is officially attested to by fact that Patent No. US 6,211,808 B1 was accepted by the U.S. Patents and Trademarks Office (see attached) as an invention by Frank L. Rees of Baltimore, MD (US) and assigned to Flight Safety Technologies, Inc., of New London, CT. The proposed program of experimentation is the first step in reducing this invention to practice. As already stated under both

Items 10 a) and 10 b), this first step involves experimentation with and measurement of the transmit/receive characteristics of the UNICORN™ antenna subsystem. In the conception of this antenna subsystem, sufficiently diverse alternative approaches have been identified to promise fulfillment of specific objectives that will contribute to the radio art of aircraft collision avoidance along lines not already investigated. To whit, the use of a "sing-around system" to estimate parameters useful in providing aircraft, terrain and ground proximity warning using "skin reflections" from nearby radar reflectors (that could cause potentially catastrophic encounters) – as opposed to TCAS radar returns ***only*** from "threat" aircraft transponders – that also are localized in radial range, closure rate, azimuth and elevation octants with sufficient early-warning expediency. Once the antenna subsystem invention has been successfully reduced to practice, the implementation of the electronic logic and display equipments is well within the existing state-of-the-art.