

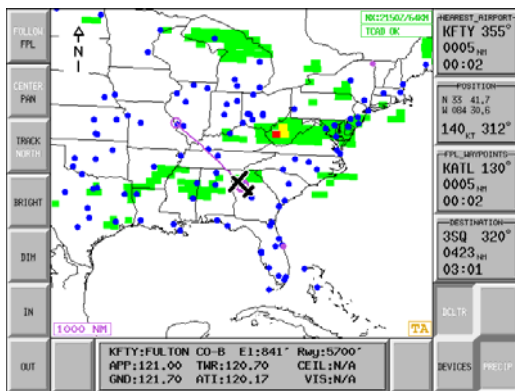
## History



Archangel Avionics, Inc. was founded by Dr. Michael E. Greene in October 1992. As both a Professor of Electrical & Computer Engineering and an instrument rated private pilot, Dr. Greene wanted to create instruments for his plane that were as sophisticated as the instruments he had created for NASA. One instrument of special interest was the mechanical gyro, which is found in almost every general aviation (GA) plane. This instrument is critical in that it provides attitude (pitch, roll & yaw) information. Any

pilot who has flown through the clouds can tell you that his/her life depends upon knowing whether the plane is flying upside down or right side up. Unfortunately, mechanical gyros are notoriously unreliable, as Dr. Greene found during several gyro failures in inclement conditions.

Archangel's first product was an Electronic Flight Instrument System (EFIS) for GA aircraft. This system included a large touchscreen-operated LCD display and various boxes which provided data to the embedded computer. The auxiliary boxes included an Attitude Heading Reference System (AHRS), an Engine Fuel Data System (EFDS), an Air Data System (ADS), a Power Control System (PCS) and a Fuel Probe Interface System (FPIS). These products were sold to the experimental aircraft market for a number of years and were flown in numerous high performance aircraft, including Lancair's, Questair's, Seawind's, & Glassair's.



PA-46).

In 1998, Archangel developed a Cockpit Display System (CDS) for GA aircraft. This large touchscreen-operated LCD displayed a moving map with both lightning and traffic overlays. In the process of certifying this product with the Federal Aviation Authority (FAA), Archangel received a Technical Standard Order (TSO) to manufacture the equipment, as well as Supplemental Type Certificates (STCs) for numerous planes (including PA-28, BE-33, BE-35, BE-36, &



In early 1999, Archangel Avionics, Inc. changed its name to Archangel Systems, Inc. to reflect its increasing emphasis on complete systems in lieu of avionics. This change also reflected the increasing expertise that Archangel had developed in a multitude of areas, including hardware, software, system integration, and design.

Later in 1999, Archangel was a member of one of the winning Synthetic Vision Industry Teams chosen by NASA to develop a revolutionary cockpit display for General Aviation. The goal of the program was to give airplane crews clear views of their surroundings in bad weather and darkness, which could help prevent deadly aviation accidents. Synthetic Vision, a virtual-reality display system for cockpits, would offer pilots an electronic picture of what's outside their windows, no matter the weather or time of day. Archangel provided both the hardware and software technology for this system.

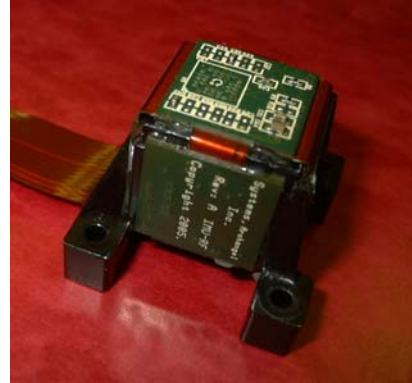


In 2002, Archangel expanded its market into the Defense arena. During this year, Archangel was awarded two competitive Phase 1 contracts. The first contract was to determine the feasibility of developing a Precision Inertial Measurement Unit (IMU), using Archangel's Air Data Attitude Heading Reference System (ADAHRS) as a basis. The contract was sponsored by the Missile Defense Agency's Small Business Innovation Research (SBIR) Program and managed by the U.S. Army Space and Missile Defense Command (Huntsville, AL). The new IMU was to provide an inexpensive and highly accurate alternative to conventional IMUs (without GPS aiding) and could be used to guide antimissile defense interceptors.

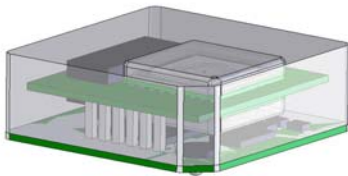
Archangel's second contract award in 2002 was to examine the feasibility of its proprietary Micro-Electro Mechanical System (MEMS) Annular Rotating Sensor (MARS™). The purpose of this new sensor was to provide a durable and highly accurate alternative to conventional MEMS sensors and to enable its user to construct extremely accurate and durable IMUs. The contract was funded by the Missile Defense Agency's Small Business Innovative Research (SBIR) Program and managed by the Naval Sea Systems Command's (NAVSEA) Naval Surface Fire Support Program Office, Code PMS-529.



In 2003, Archangel received two SBIR Phase II contract awards, allowing it to expand its efforts for both the IMU and the MARS™ projects. During this period, Archangel completed development of its IM<sup>3</sup>™. This low cost IMU is an essential component of Archangel's Air Data Attitude Heading Reference System (AHR150) and can be used in other applications, including bore hole drilling, flight control systems for missiles & automotive applications.



Phase II development work also continued on Archangel's MARS™ sensor. Efforts here were so successful that Archangel was awarded a \$10,000,000 ceiling, cost-plus-fixed-fee contract in July 2004 to gun harden their MARS™ sensor. Gun-hardening will enable the sensor to survive and operate after it has been fired from a gun. This would enable conversion from Global Positioning System (GPS) aided navigation systems to systems which can accurately function, even when GPS is unavailable or jammed -- technology needed for emerging projects in precision long-range hypersonic projectiles. This Phase III SBIR contract will enable enhancements and improvements to Archangel's MARS™ sensor, developed under previous Phase I and II contracts, thus allowing the technology to become an integral part of ongoing Naval development efforts. The Naval Surface Warfare Center, Dahlgren Division, Dahlgren, VA. is the contracting agency (N00178-04-D-1036).



March 2004 was an exciting time for Archangel Systems as the company purchased and moved to a new building. The 14,000 sq. ft. facility on 2.5 acres contains 3515 square feet of feet of production. Facility equipment includes thermal chambers, a three-axis Scorsby table, a precision thermally controlled single axis rate and positioning table, a single axis engineering rate table, numerous oscilloscopes, data acquisition systems, logic analyzers, microscopes, prototyping stations, testing stations and RVSM compliant air-data calibration equipment. Specialized MEMS hardware include a multi-wafer alignment fixture, two co-axially illuminated microscopes, specialty wafer bonding and alignment fixtures and ceramic board test fixtures. Software packages used for development include



Matlab®, LabView®, ANSYS, Intellisuite and a variety of programming and debugging packages, board layout software, schematic capture software, 3D drawing and design packages as well as office related accounting and service packages. Archangel additionally has a cooperative research agreement space with the Alabama Microelectronics Science and Technology Center (AMSTC) for MEMS development and is a member of the Center for Advanced Vehicle Electronics (CAVE), both at Auburn University.



In March of 2005, Archangel announced that Bell Helicopter Textron of Fort Worth, TX had entered into a long term agreement with Archangel, under which Archangel will supply its Air Data Attitude Heading Reference System (AHR150A) for the Bell/Agusta Model 609 Tilt Rotor Aircraft. Three AHR150A Systems will be used in each 609 as part of the aircraft's fly by wire system. Archangel's AHR150A, selected by Bell, provides ARINC 706-4 Air Data on 4 ARINC 429 Lo-Speed busses and ARINC 705-5 Attitude Data on 4

ARINC 429 Hi-Speed busses. Each AHR150A system is comprised of two boxes, an Inertial Sensing Unit (ISU) and a remotely mounted three axis Magnetic Sensing Unit (MSU). The ISU contains multiple dissimilar software and processors to achieve true DO178b Level A performance with MEMS sensors. The MSU also contains DO178b Level A software and outputs 3 axis magnetic data on an RS422 buss. Certification of the unit is expected in April of 2007, with deliveries starting shortly thereafter. The heart of the AHR150A inertial sensing is a commercial version of the IM<sup>3</sup><sup>TM</sup> (Inertial Measurement Cube) and is based on Archangel's proprietary FLASP<sup>TM</sup> software. The IM<sup>3</sup><sup>TM</sup> is being provided in varying configurations for a variety of guidance and control systems, image stabilization systems, and other applications.



The Bell/Agusta 609 is the world's first civilian Tiltrotor aircraft. The BA609 Tiltrotor combines the speed, altitude, and comfort of a turboprop with the vertical takeoff and landing capabilities of a helicopter. Having cruising capabilities of 25,000 ft., this versatile aircraft will fly in icing conditions and extreme climates, from Arctic to desert. Seating up to nine passengers and at twice the speed of typical helicopters of comparable capacity, the BA609 is designed to be the best multi-mission aircraft for the

task.

Jack Gallagher, Program Director for Bell/Agusta 609, expressed the importance of the long-term agreement, "Key to the success of the 609 is cost, performance, weight and

schedule; Archangel Systems meets these critical elements and we welcome them to our Team.”

In April of 2006, Archangel was chosen to lead one of four teams under the DARPA Navigation Grade Integrate Micro-Gyroscope (NGIMG) program based on its MARS™ technology. The new technology has been named NGMARS™. Other members of the Archangel NGMARS™ team include AMSTC (Auburn University), MEMS Optical (Huntsville) and SAIC (Huntsville). The output of this project will be a complete six axis IMU contained in a one cubic centimeter package. Under separate funding from the Navy, Archangel is also investigating the gun hardening of these devices.

