



NEWSLETTER

... An Innovative Advanced Technology Company

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Come Fly with STC at NASA Ames Research Center

STC began a new exciting endeavor at its West Coast outposts. We won the Aeronautics and Mission Modeling and Simulation (AEMMS) 5-year contract at NASA Ames Research Center located at Moffett Field, CA on the San Francisco Bay area.

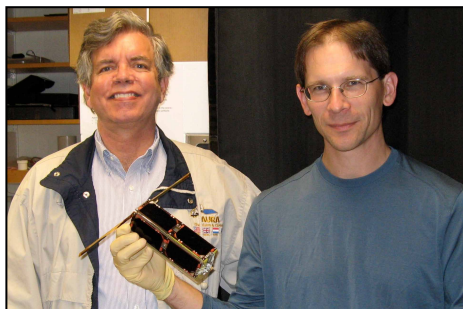
This new R&D work began on September 1, 2010. STC's new employees and Program Manager, **Stephen Lesh**, are located in NASA's Advanced Supercomputing (NAS) Building N-258. While based at the NAS, AEMMS work is spread out over the Ames campus and includes aeronautics as well as space vehicle missions. It even extends beyond NASA to the U.S. Army's High Performance Computing Advanced Rotorcraft Modeling and Simulation (HI-ARMS) Program.

In the Aeronautics Research Mission Directorate (ARMD) and especially the Systems Analysis Branch (Code AUS) of the Flight Vehicle Research and Technology Division, NASA's mighty computing horsepower, the Columbia Supercomputer, is used to construct detailed models of existing flight vehicles in strange new environments. For example, for Mars, as well as for complex simulations that fuse theoretical and experimental wind tunnel data in support of the design of entirely new

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STC and UMBC Build Nanosat for Launch in 2011

Science and Technology Corporation and University of Maryland, Baltimore County (UMBC) have built and shipped a nanosat for a February 2011 launch into low Earth orbit. The nanosat is called Qubscout-S1. It measures 2 in x 2 in x 4 in, about the size of a tall coffee mug and will space qualify a micro sun-sensor. This is STC's and UMBC's first satellite mission. Qubscout-S1 was built in record two months by STC staff and UMBC faculty and students. The Qubscout-S1 mission is an important step in the company's long-term vision for developing a satellite capability.



Dr. Mark Schoeberl (STC) and Steven Buczkowski (UMBC). Steven holds the completed satellite before shipment.

How did Qubscout-S1 happen? A few years ago, STC President, **Dr. Adarsh Deepak**, became interested in very small satellites called nanosats. These satellites, built primarily by educational institutions, provide inexpensive access to space. They allow Universities to develop innovative space designs, test new technologies, and train students in all aspects of the satellite industry. Dr. Deepak, as part of his interest, established the first on-line Journal of Small Satellites, JoSS (<http://www.jossonline.org/>), through A. Deepak Publishing.

In late August 2010, Dr. Deepak, while attending a Cubesat conference, learned of a launch opportunity for a few nanosats. The University of Rome had developed a secondary payload system called EduSat that would launch eight nanosats called Pocket Cubes, and EduSat still had space available for a couple nanosats. Morehead State University and Kentucky Space were coordinating the U.S. contribution. Pocket cubes are about the size of a Rubik's Cube.

After securing space on EduSat, Dr. Deepak, asked **Dr. Mark Schoeberl**, a former NASA employee now working for STC, to see what could be done with

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Honors and Awards

Mellor/STC Team Recognized for Safety Performance

The Mellor/STC team at CAMDS was recently recognized by the Utah Safety Council for their safety performance over the last year. Two awards were presented by Dr. Reza Karimi, Battelle Site Manager, to STC: an Award of Merit in recognition and appreciation for achievement in the field of safety as measured by their outstanding safety performance, and a Perfect Record Award in recognition of completing 36 consecutive months without incurring an OSHA Recordable Injury, Illness, Days Away from Work, or Death. **Steve Freudenberger** accepted the awards. The Perfect Record spans from January 1, 2007 to December 31, 2009. □



Steve Freudenberger (left) and Dr. Reza Karimi, Battelle Site Manager.

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this launch opportunity. Unfortunately, EduSat was then scheduled for launch in December 2010 so any payload would have to be delivered in late October to Kentucky Space and it was already September 2.

Dr. Schoeberl had been previously working with Prof. J. Vanderlei Martins in the UMBC Physics Department on developing a Cubesat proposal for measuring the solar aureole. Cubesats are a type of microsat. Dr. Schoeberl approached Dr. Martin with the idea of using this Pocket Cube opportunity to space qualify the micro sun-sensor that UMBC had developed and would be needed for the future Cubesat mission. The goal would be to simultaneously reduce the technology risk for the later Cubesat mission and also provide the UMBC/STC team with valuable satellite development experience and qualifications. On the other hand, the satellite would have to be designed, constructed and tested in two months. There would be no time for mistakes. The satellite design is shown below.

Dr. Deepak asked his son, Ravi, to be the UMBC-STC liaison and Dr. Schoeberl became the STC Project Manager.

Over the next two months the satellite began to take shape. They had to order and overnight all the parts to UMBC.

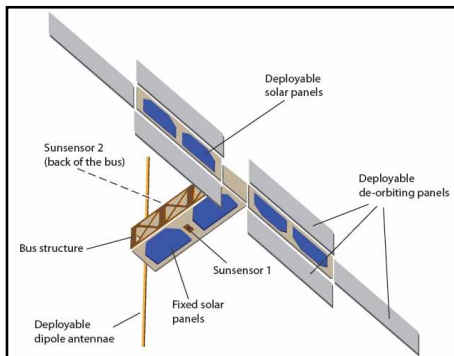


Diagram of satellite showing how the satellite will look after it is deployed. The "wings" or de-orbiting panels create extra drag so that the satellite will re-enter the atmosphere after 20 years in orbit. (Drawing by Barbara Schoeberl.)

Out-of-box solutions were found for a whole host of problems. For example, the radio antenna is a piece of metal measuring tape from Home Depot that was gold coated at a local jeweler. We needed quick, high quality construction of the spacecraft frame. STC's fabrication facility came to the rescue here. Ravi drove the plans to Hampton. The spacecraft structure was

built in Hampton in two days, and Ravi drove the frame back to Alexandria to be anodized.

One early problem was finding the right solar panels. It turned out that the solar panels that UMBC had on hand were



From left to right, George Wood, Rick Thomas, Jeff Manning and Ravi Deepak. Jeff and Rick are holding the satellite structure built by STC's fabrication facility.

not efficient enough to power the radio and the computer. Dr. Deepak through a contact made at a Cubesat conference, found high efficiency solar panels through an English company, Clyde Space. This solved the problem. Dr. Deepak visited the UMBC facility on October 28 to assess construction progress.

One week before delivery, the launch date slipped a week. Everyone said "whew." They really needed that extra week. The satellite was finally finished the first week in November. **Ravi Deepak** then drove it to Kentucky Space at Morehead State University, for integration of the Pocket Qubes into the launcher.

"It was an unbelievable effort by the STC staff and UMBC students and faculty. The team worked flat out to design and build the satellite in two months. At NASA, this would have taken years. This really shows how private industry working with a

University team, can be part of America's space future," said Dr. Schoeberl. "This has been more exciting than anything I ever did at NASA."

Qubscout-S1 will now be launched along with a cluster of other Pocket Qubes in February 2011. The primary payload is NigeriaSat-2, a Nigerian land resources



UMBC Lab. Left to right, Prof. Martins (UMBC), Dr. Schoeberl (STC) and Dr. Deepak (STC). Dr. Deepak is holding the Qubscout-S1 bus. Solar panels from Clyde Space are in the styrofoam case in front of Dr. Deepak. Photo October 28, 2010.

satellite. The launch will take place on a Depnr-1 rocket from the Orenburg Region of Russia. Qubscout-S1 will be ejected into a sun-synchronous orbit at about 700 km with a 10:15 A.M. equatorial crossing time. Data from the satellite will be downlinked to radio receivers at UMBC. Students will then analyze data from the two sun-sensors. The satellite has no altitude control so it will see various views of the sun as the satellite tumbles. This will be a good test for the sun sensors.

With Qubscout-S1, STC has now become an real space technology company.□

NOAA Awards BPA for Scientific, Technical and Administrative Support Services to STC

The National Oceanic and Atmospheric Administration (NOAA) announced in September that it has selected STC for recurring scientific, administrative and engineering support as part of a Federal Supply Schedule Blanket Purchase Agreement (BPA). Most of this work will take place at the NOAA's David Skaggs Research Center in Boulder, Colorado.

"Although STC was the incumbent on this activity, there was serious competition for this work, and I am extremely proud of our proposal team and the STC employees who helped us win a continuation of this BPA," said **Ashok Kaveeshwar**, STC Senior Vice President. "This BPA will allow us to expand our work with NOAA into new areas including climate research."

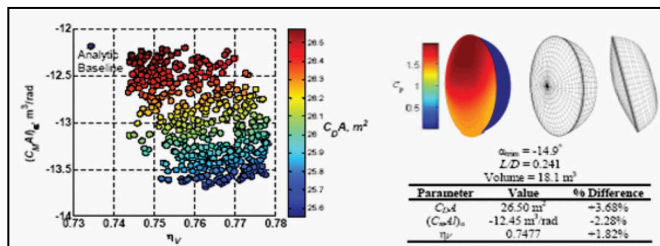
Under the NOAA BPA, the STC employees provide atmospheric monitoring work including updating pollutant and ozone trend models, weather research, software maintenance, administrative support, and travel planning. STC employees travel to remote locations to install and service gas monitoring equipment and sample flask analysis. STC also supports NOAA's student outreach program under the BPA. Students conduct a variety of research efforts that involve data collection and analysis, usually working with NOAA scientists.□

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vehicles and innovative future mission scenarios. The figure below is an example of a design study for a nosecone decelerator being considered for a softer entry into the Martian atmosphere for the next Mars Entry, Descent and Landing (EDL) System.



Example of a design study for a nosecone decelerator.

In the U.S. Army's Aeromechanics Division (Code YA) [Army Aviation & Missile Research, Development & Engineering Center's Aeroflightdynamics Directorate, Applied Modeling and Simulation Branch (YAH)] STC is helping design the newest rotorcraft in the HI-ARMS Program, combining wind tunnel experiments with supercomputer numerical analyses. The figure below shows how we analyze both

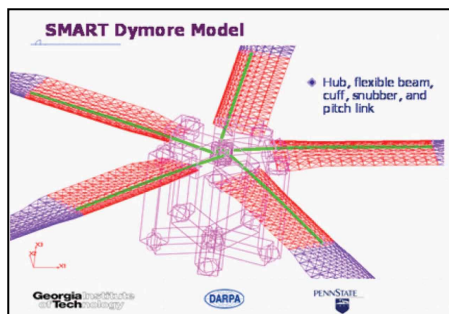
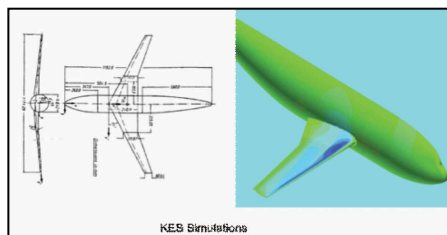


Diagram of a SMART rotor blade equipped with trailing edge flaps that shows how both the computational fluid dynamics, as well as the complex structural dynamics, is analyzed.

the computational fluid dynamics as well as the complex structural dynamics of a SMART rotor blade equipped with trailing edge flaps.

In fact, for the Exploration Systems Mission Directorate (ESMD) [Applied Modeling and Simulation Branch (TNA) and Fundamental Modeling and Simulation Branch (TNF) of the NASA Advanced Supercomputing (NAS) Division (TN)], STC uses a fluid mechanics program, OVERFLOW (developed originally at NASA Langley), to investigate new configurations for exploration and science applications. We develop new modeling, simulation, and



Wing-body configuration built from advanced turbulence models in OVERFLOW.

information technologies, and development of CFD codes for high fidelity inviscid and viscous scenarios using unstructured Cartesian and structured overset grid systems. Shown below is Wing-Body Configuration built from advanced turbulence models in OVERFLOW.

Whether it's in a new helicopter across town or across the surface of Mars, STC has got it covered in its Aero Modeling contract!□

New Contracts

STC was awarded our first contract at NASA Ames Research Center in August 2010. We were the successful bidder on the Aeronautics and Exploration Mission Modeling and Simulation (AEMMS) contract. This is a five year contract with two base years and three option years.

After the expiration of our previous NOAA-wide BPA, STC was awarded both the Ancillary Support Services and the Engineering and Professional Support Services BPAs for continued contract service to the NOAA Boulder labs.

Our Hanover office won two CRREL BAAs in September 2010. STC was also one of three awardees of the SciTech NG contract from NOAA NESDIS. An unsuccessful bidder has protested the awards and we expect a decision by GAO by the end of February 2011.

STC was on the winning team with Think Tank for the NOAALink contract. We were also awarded a subcontract from Unisys for the LSATS effort, which extends our 10 years of continuous service another five years.

Recently, STC has been awarded new contracts and subcontracts valued at over \$46M from our Government and Commercial/prime customers, with aggregate orders totaling over \$3.1M under GSA IT and PES contracts.

AMS/STC SCHOLARSHIP AWARD

The American Meteorological Society (AMS) has named Daniel A. Rothenberg as the recipient of the AMS/STC Freshman Undergraduate Scholarship for 2007/2008. He was presented the scholarship at the 2010 AMS Annual Meeting in Atlanta.

Daniel is completing his senior year at Cornell University pursuing a major in atmospheric science. He has invested a great deal of time in research on his honors thesis using a carbon-coupled climate model to investigate the effects of large volcanic eruptions on biogeochemistry in the climate system. In addition, he also had a summer internship at the Center for Multiscale Modeling of Atmospheric Processes at the National Science Foundation Science and Technology Center at Colorado State University working on an atmosphere dynamical core. Daniel plans to continue on to graduate school to study atmosphere/climate modeling.

The AMS Freshman Undergraduate Scholarship is awarded on merit and is designed to encourage outstanding undergraduates to pursue careers in the fields covered by the award. STC has sponsored the scholarship since 1992.□



Daniel Rothenberg (left) receives his award at the AMS Annual Meeting.

Service Awards



Dick Gilligan presents Diana Hejduk with an award for 5 years of service with STC.



STC Edgewood recognized Norm Green for his 22 years of service.



Dick Gilligan presents Rich Waller with an award for 5 years of service with STC.

Honey Bees

Honey bees in past few years are disappearing and dying at an alarming rate. The dying of Honey bees has a major impact on the food chain supply. Dr. Jerry Bromenshenk and colleagues from ECBC Point Detection Branch recently published a paper in PLoSOne entitled "Iridovirus and Microsporidian Linked to Honey Bee Colony Decline." The paper presents a correlation between a DNA virus Iridovirus and a Microsporidian as infectious cofactors. These were discovered using bioinformatics algorithms developed by STC's **Samir Deshpande** using mass spectrometer based proteomics technique. This paper has received media attention from: Bloomberg BusinessWeek, WJZ, NPR, New York Times, CBS, New Scientist, Time Magazine, and the New Yorker. This paper has been viewed by over 38,000 readers since it was published on October 6, 2010. The CB Point Detection Branch was interviewed by a reporter from Voice of America (VOA) that was arranged by the ECBC Public Liaison office.

Bromenshenk, J. J., C. B. Henderson, C. H. Wick, M. F. Stanford, A. W. Zulich, et al. (2010) Iridovirus and Microsporidian Linked to Honey Bee Colony Decline. PLoS ONE 5(10): e13181. doi:10.1371/journal.pone.0013181. □

Security Corner

The widespread distribution of documents posted on WikiLeaks has caused damage to our national security by the unauthorized disclosure of U.S. Government documents. If you have inadvertently accessed or downloaded classified information from a public website, please notify Carol Lightner, FSO. The information should be deleted from your computer, but no further sanitization of IT systems is required.

Quality Corner

Material items are expended during the performance of a contract, component parts of a higher assembly, or items that lose their individual identity through incorporation into an end item. Supplemented items are standard (catalog) items that require some modification or documentation (certification). Special items are designed or manufactured to our specifications. Exempt items are low cost, off-the-shelf items not affecting quality. All of these item types are treated differently under QSP 7400-01, Procurement so please familiarize yourself with the policy if you are involved in procurement at any level.