

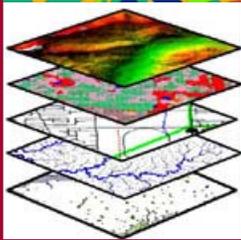
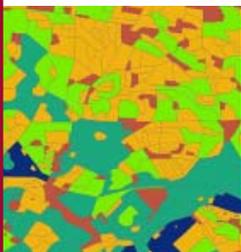
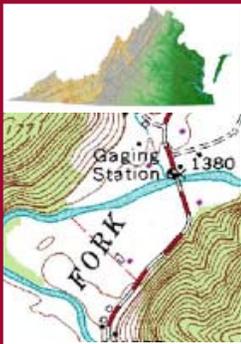
# The Virginia Geospatial Newsletter

Showcasing GIS, Remote Sensing and GPS Supported Products and Services in the Commonwealth

Volume 6, Number 3

Summer, 2008

The Virginia Geospatial Extension Program is a partnership between the Virginia Space Grant Consortium and Virginia Cooperative Extension



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## GIS Supports Bioenergy Feedstock Assessment In Southside Virginia

By: John Cundiff  
Department of Biological Science Engineering  
Virginia Tech

The Virginia Tobacco Commission provided support to help assess appropriate locations of bioenergy facilities in Southside, Virginia, based on potential and available feedstock. This article summarizes the processes challenges, and conclusions associated with this study.

### Executive Summary

The purpose of this study was to develop a database and methodology that can be used by economic development authorities to document the potential for growing a bioenergy feedstock in tobacco-producing

counties. Bioenergy is defined as any energy product produced from biomass. Feedstock is any biological raw material (woody or herbaceous) that is used by a bioenergy plant to produce the energy product. For the

purposes of this study, the model species is switchgrass, a warm season grass that is well adapted to marginal soils found in many of the South Central Virginia counties.

*Local leadership will determine if the potential to produce and utilize bioenergy is realized in Southern Virginia.*

The traditional tobacco-producing counties are experiencing a decline in tobacco production and require new income opportunities for agriculture. Simultaneously, there is interest in

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The Virginia Geospatial Newsletter is a quarterly publication developed through the Virginia Geospatial Extension Program, a partnership between the Virginia Space Grant Consortium (VSGC) and Virginia Cooperative Extension (VCE). The newsletter is published in conjunction with The Virginia Geographic Information Network (VGIN).

The purpose of the Virginia Geospatial Newsletter is to highlight innovative geospatial products and services throughout the Commonwealth and to widely disseminate geospatial knowledge and awareness throughout Virginia.

If you have suggestions or comments, or if you would like to contribute to the newsletter, please contact John McGee at the Virginia Geospatial Extension Program (jmcbg@vt.edu or [540] 231-2428).

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## State Agencies

By: David D. Morton, GISP  
GIS Coordinator

Virginia Department of Game and  
Inland Fisheries.

The Virginia Department of Game and Inland Fisheries (DGIF) is providing a new service for accessing the most current and complete threatened or endangered species and related environmental review spatial datasets. The Wildlife Environmental Review Map Service (WERMS) creates a means to distribute several individual feature classes through an Internet connection. By publishing WERMS, the DGIF can be sure partners have access to the latest and most comprehensive information for conservation planning and assessing potential impacts to wildlife and recreational resources.

The DGIF is responsible for managing and protecting state and federal threatened or endangered wildlife in Virginia. GIS data showing confirmed locations of these “listed” species and other important wildlife features are valuable tools for preventing impact to these treasured natural resources. One of the largest users of these data is the Virginia Department of Transportation (VDOT). To protect natural resources while providing safe and efficient transportation infrastructure, the VDOT conducts reviews for potential environmental impact for projects involving construction and maintenance activities. In order to streamline the review process, VDOT uses DGIF’s geospatial data to evaluate proposed VDOT projects, within the guidelines specified by Virginia’s State Environmental Review Process.

# WERMS -- Not Just for Fishin'!

Traditionally, this was done through DGIF’s Virginia Fish and Wildlife Information Service (VAFWIS, <http://www.vafwis.org>). Although VAFWIS continues to provide an excellent stand-alone query and reporting service, VDOT requires using the actual GIS datasets within an internal project tracking system. Because the data are being used to make initial project scoping decisions, the most comprehensive and current information must be readily available.



Starting in late 2006, VDOT and DGIF partnered to create an enterprise GIS infrastructure to house data and then publish it through an Internet map service. The main software components are ArcGIS Server to store and maintain the data and ArcIMS to publish the map service. A major component of this project included re-designing and streamlining DGIF’s various species observation location datasets into a single structure. This new database forms the backbone of WERMS.

Besides species observation locations for listed and declining species,

WERMS serves data displaying designated threatened and endangered species waters, trout streams, waterbird nesting colonies, and anadromous fish use areas. Recreational datasets are also provided. Data layers include: DGIF boat access sites, DGIF fish hatcheries, DGIF wildlife management areas, and DGIF managed lakes. WERMS is published as a feature map service, specifically for use in ESRI GIS clients (e.g., ArcMap). An advantage of the feature map service is the ability for end-users to alter map symbols, select and query features, and export the actual data into shapefiles or other feature classes. However, since the data are very dynamic, DGIF requires partners to use the Internet map service directly or extract updates at regular intervals.

The overall advantage of WERMS to VDOT is the ability to extract environmental review spatial data directly into an internal system. The advantage to DGIF is better data management and a new way to provide information to various partners. Besides VDOT, other state agencies, regional governments, consulting companies, and universities are beginning to hook into WERMS. If you would like more information about WERMS, including how to subscribe to this service, please contact Dave Morton at: [dave.morton@dgif.virginia.gov](mailto:dave.morton@dgif.virginia.gov) or 804-367-6772. DGIF would like to thank VDOT for their support in developing WERMS.



By: Dan Widner  
Coordinator, VGIN

# New Virginia Base Mapping Program Orthophotography RFP Soon to Be Released

As of this writing, VGIN will soon be releasing a new Request For Proposals (RFP) for the next round of statewide orthophotography acquisition and processing. VGIN manages a four year orthophotography update cycle through the Virginia Base Mapping Program (VBMP) and has previously provided statewide, high resolution orthophotography to state and local government in 2002 and 2006/07. Over the course of the last year, VGIN has solicited and received input from many stakeholders of the VBMP orthophotography to help us reassess the product and identify user needs. This process has helped us identify ways that we can improve the product we deliver.

There are three significant changes you will see reflected in the delivery of the product.

## 1. Make the program more manageable.

Collection and processing of the statewide product will be divided into halves, with the eastern portion of the state completed in 2009 and the western portion of the state in 2011 (Figure 1). The four year cycle will continue on this schedule for the foreseeable future. The primary reasons for this change were to make the product delivery more manageable – 2002 was a drought year that gave us better weather (and therefore more days to fly before leaf-out conditions), 2006 we were not so fortunate - and ensure faster delivery times.

(Continued on Page 9)

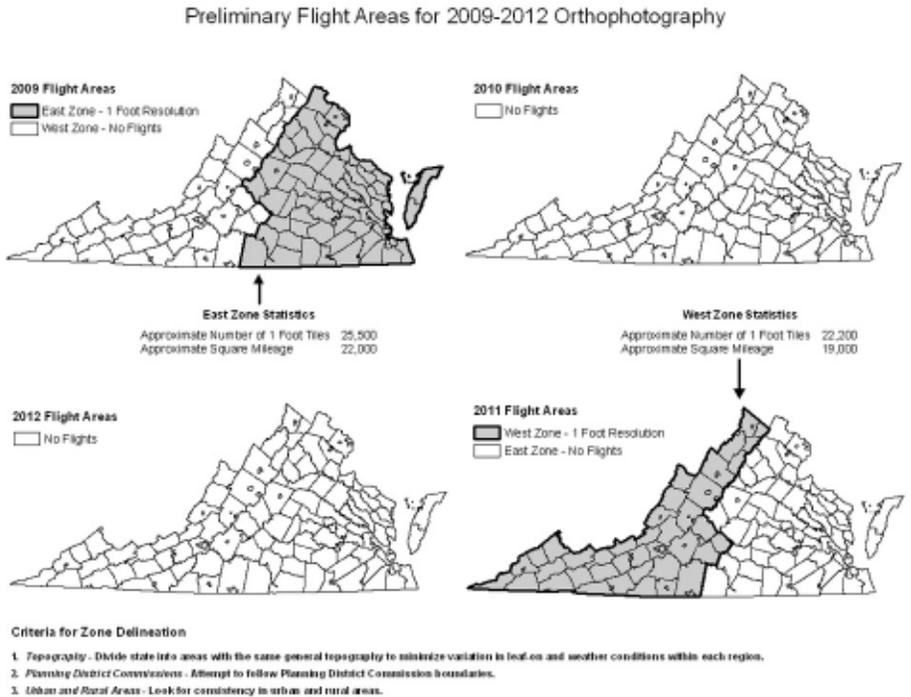


Figure 1: The the eastern portion of the state is scheduled for completion in 2009 and the western portion of the state in 2011



Figure 2: A “true ortho” product will be offered as an upgrade option

# GIS Supports Bioenergy in Virginia

(Continued from Page 1)

producing more of the nation's energy from renewable resources, and bioenergy, along with solar, wind, geothermal, and hydroelectric, is receiving a tremendous amount of attention. Increased production of energy from local resources will benefit not only the local economy, but also the entire Commonwealth of Virginia.

The study was funded by the Virginia Tobacco Indemnification and Community Revitalization Commission, hereafter referred to as the "Commission". The database that was developed describes current land use within a 20 mi and 30 mi radius of Gretna and a 20 mi radius of Keysville. These two sites were chosen as examples; no methodology was used to select "optimum" sites.

Any entrepreneur seeking a bioenergy plant location must be able to have confidently quantify two major considerations: : 1) how much feedstock is available, and 2) how much does the feedstock cost. Since hauling cost is a major consideration in the total cost of feedstock, the density of production is a key issue. A potential plant location that has a high percentage of the surrounding land potentially available for feedstock production will be more competitive than a location with a lower percentage of land available for feedstock production.

## *Hypothesized Organization of the Bioenergy Industry*

This study envisions that a bioenergy plant will: 1) operate year-round, and 2) will not have a central storage facility for feedstock, but will store feedstock in a distributed manner. . A plant that uses woody feedstock has different storage considerations than herbaceous feedstock. wood biomass is stored at the stump, and can therefore be harvested year-round in Virginia. However, herbaceous materials are harvested only part of the year, thus some storage is unavoidable.

This study envisions that the bioenergy industry organized in South Central Virginia (SCV) will have a division between agricultural operations and industrial operations. The cost of the agricultural operations will be covered in a "farmgate" contract offered to farmers. Farmers will be paid to grow switchgrass, harvest in round bales, and store these bales in single-layer ambient storage in satellite storage locations (SSLs), defined as a graveled area with access to a state-maintained road. Cost to build and maintain the SSL is included in the farmgate contract. Under this arrangement, the bioenergy plant then assumes the responsibility for loading, hauling, and delivery to the plant in accordance with their needs.

Each farmer should be given the same opportunity. If farmers are paid the same price to deliver feedstock, then a farmer located 20 miles from the plant will be disadvantaged relative to a farmer located 5 miles away, because of higher hauling cost. The business plan that is fair to every farmer/producer is to pay each the same farmgate price and have the bioenergy plant pay all the hauling cost. The plant can then contract with a hauling company that will invest in the

specialized equipment required and use it year-round.

## **Database Development**

The dataset is a vector polygon feature class. The polygons represent tracts of land that have contiguous land ownership and land use/ land cover (LULC) type. For example, a polygon can be grassland, a tract of woodland, or a hayfield.

Polygon boundaries of the dataset are a combination of other vector polygon datasets including Common Land Units (CLU) data provided by the USDA, parcel data provided by the respective localities, and National Wetlands Inventory (NWI) data published by the U.S. Fish and Wildlife Service. These data were assimilated within a Geographic Information System (GIS). The LULC classification of each polygon was checked by student verifiers using publicly available aerial photography. Polygons with an area equal to or greater than ( $\geq$ ) 5 acres were verified by research assistants in the GIS environment.

When verification of the polygons was complete, the attribute data was checked for consistency and completeness. The CLU and parcel polygon datasets were merged together for each county.

## **Analysis of Database to Identify Potential Production Fields**

The land use classifications with the most potential for conversion to switchgrass production are scrubland, grassland, cropland, and pastureland. Scrubland is defined as land that does not appear to be actively managed for agriculture or forestry. Scenario 1 is an estimate of the land that can most

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# Bioenergy

(Continued from Page 4)

probably be attracted into production. Scenario 2 gives the next highest estimate and so forth up to Scenario 6 (Table 1).

Total production fields identified in the 20-mi radius around Gretna ranged from 42,800 ac (Scenario 1) to 78,600 ac (Scenario 6). This result means that 5.3% of the total land area is potentially available using Scenario 1 and 9.8% using Scenario 2. To put this is prospective, about 65% of the total land area is forested. For the 30-mi radius, the totals were 116,100 ac (Scenario 1) and 189,400 ac (Scenario 6). The range in total land percentage was 6.4 to 10.5%. If the average yield for switchgrass is assumed to be 5 ton/ac, then the production potential within a 30-mi radius will range from 580,500 to 947,000 tons.

To help put the production potential in prospective, suppose a plant operates 24 h/d, 7 d/wk for 47 wk/y. The 580,500 tons will supply a plant that averages 73.5 ton/h, and the 947,000 tons will supply a plant averaging 120 ton/h. The largest wood-fired electric generating plant east of the Mississippi consumes about 119 ton/h of wood chips and mill waste, thus, in terms of bioenergy, we can classify the 120 ton/h plant as a large plant.

Total production fields identified in the 20-mi radius around Keysville ranged from 39,700 ac (Scenario 1) to 69,100 ac (Scenario 6). This result means that 4.9% of the total land area is potentially available using Scenario 1 and 8.6% using Scenario 6. When comparing with the 20-mi radius

around Gretna, the Keysville location has about 12% less production acreage potentially available.

## Analysis of Database to Locate Potential SSLs

Potential locations for SSLs that met all criteria (located on a state-maintained road, had at least 100 ac of production fields within a 2-mi radius, and the site was classified as scrubland) were manually selected for the 30-mi radius around Gretna. There were a total of 199 SSLs selected; of these, 109, or 55%, met all criteria.

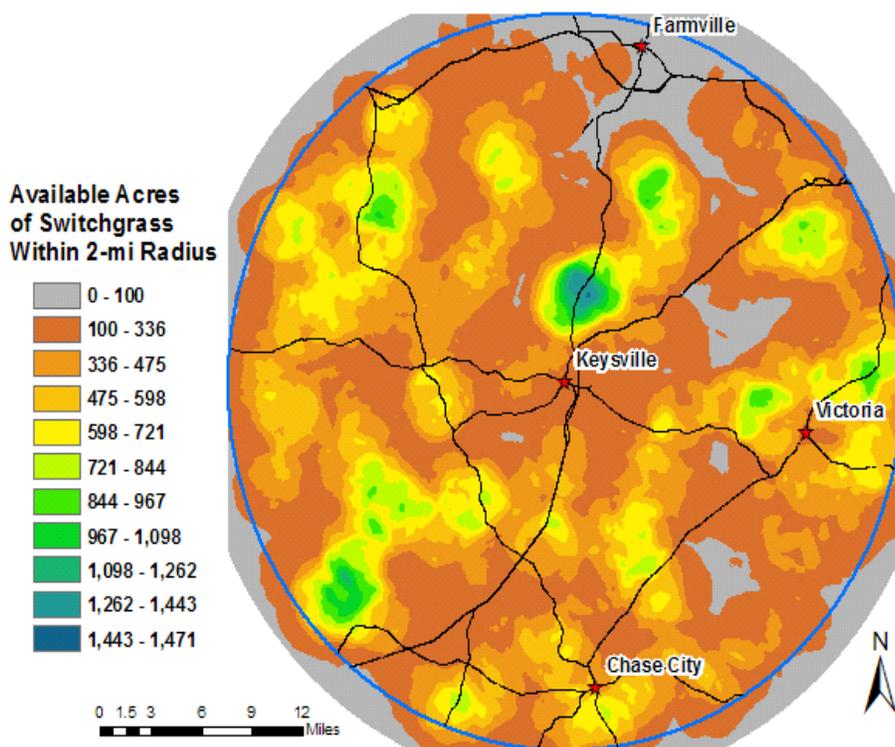
The mean size of the SSLs ranged from 531 acres of production field storage (Scenario 1) to 855 acres (Scenario 6). The size range for Scenario 6 across all 199 SSLs was 134 ac (min) to 2390 ac (max). To put this in perspective, it is estimated that 2000 ac of production fields will require a graveled storage of 11.1 ac. This

Scenario	Percentage of Land in the Dataset to be Converted to Switchgrass
1	80% Scrubland and Granssland
2	80% Scrubland and Granssland and 20 % Cropland
3	80% Scrubland and Granssland and 40 % Cropland
4	80% Scrubland and Granssland and 40% Cropland and 5% Pastureland
5	80% Scrubland and Granssland and 40% Cropland and 10% Pastureland
6	80% Scrubland and Granssland and 80% Cropland and 10% Pastureland

Table 1: Scenarios of Potential Land Use Percentages for Bioenergy Utilization

estimate is based on twor conditions: 1.) the satellite storage area will be filled and emptied only once each year, and

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Potential Bioenergy Feedstock Density (Switchgrass) near Keysville

# Hanover County Integrates Economic Development & GIS

By: Kevin Nelson  
GIS Manager, Hanover County

Hanover County has implemented a new interactive GIS web-based product named Site LoGISTics, which will enhance economic development business attraction and retention programs. Site LoGISTics provides critical site

site in September 2007, and County staff made a series of presentations to the commercial real estate community, economic developers, and local business owners to introduce



web site provides a wealth of information, but the County wanted to expand on what was being provided to include more information, including demographic data, and more functionality and data layers.



Hanover's Site LoGISTics Web Page

In recent years businesses have become more technically sophisticated and, as such, a trend has developed where much of the initial evaluation of a locality as a potential business location occurs through individual companies doing research on the internet. It is critically important for localities to have as much information as possible available to prospective businesses through the internet. In addition, the County recognized that the existing business community needed access to detailed demographic data, which could be incorporated into their decision-making processes and business plans.

information, demographics, and extensive mapping features, which are the key factors in the site selection process. This new interactive site selection service web page, which was developed in partnership with Timmons Group, can be viewed at [www.hanoversites.com](http://www.hanoversites.com) (or [www.hanovercounty.biz](http://www.hanovercounty.biz)).

The Site LoGISTics application is also linked to the main County economic development web site, which experienced a 35% increase in traffic once the new web site was introduced. Site Logistcs was launched on the Hanover Economic Development web

them to the services and functions that are available in the application.

### Background

For many years Hanover County has coordinated with the Virginia Economic Development Partnership (VEDP) to provide information on available office, industrial, and flex building space and for unimproved properties planned for commercial and industrial uses. VEDP was in the forefront in the design and development of a web site that incorporates GIS technology and economic development site data in an easy to use internet web page ([www.yesvirginia.org](http://www.yesvirginia.org)). The VEDP

### Web Site Design

Once the decision was made to develop an economic development GIS web site, the County researched and reviewed several options, including selecting existing off-the-shelf products. The County was concerned about investing in an application that is a package solution designed for a national audience. In addition, the existing VEDP web site provides a valuable service, but the County wanted to implement a design that provided more flexibility and expanded

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# VAMLIS Update

By: Qiana C. Foote,  
VAMLIS President.

It is the beginning of a new year for VAMLIS with a newly elected Executive Board and many exciting things are up and coming. It is my privilege to be a part of the Executive Board and help lead VAMLIS into this next year.

To begin; a brief recap our Spring 2008 Conference “Mainstreaming GIS in Virginia” held at the Omni in Charlottesville, Virginia, May 5<sup>th</sup>-7<sup>th</sup>. The conference was a success with 3 different pre-conference workshops attended by 40 people focusing on ArcPad, ArcGIS Server and ArcGIS Desktop Tips and Tricks. A poster session provided great examples of the uses of GIS in all disciplines with awards going to k-12, college and professional entrants. There were 168 people in attendance and 14 vendor booths. The conference break-out sessions included such topics as GIS in utilities, enterprise GIS, education, LiDAR, public safety, web-based GIS, imagery applications and a separate tract of ESRI lead training sessions. Our Keynote Speaker N. Jerry Simonoff, Director IT investment & Enterprise Solutions at VITA provided great insight as to the role and future of geospatial technology at the state level. VAMLIS would like to specifically thank the Conference CO-Sponsors, VITA, ESRI, Virginia Space Grant Consortium, and Timmons Group.

Looking ahead there is a number of activities that VAMLIS will be working on to support our membership. The

biggest and most well known is our partnership with the VAPDC to create a single statewide conference for 2009. VAMLIS and the VAPDC have already met and selected their Co-Chairs and committee members who are beginning to lay the foundation for next year’s event. Details about the event will be forthcoming in the next few months. In addition to the statewide conference; VAMLIS will also have a spring meeting of its membership. This will be a one day event, to provide updates about VAMLIS, GIS technology, and engage the membership for ideas and comments about what VAMLIS can do for them.

Additional initiatives being pursued are;

- Updating the VAMLIS Home page -, The VAMLIS home page is clearly the main point of contact to for those both in our membership and those looking to learn more about VAMLIS. The revamping of the web page will be to give it new life and make it a useful resource to the Virginia GIS Community.
- Instituting regular email updates to VAMLIS members - The email updates to our membership are to keep VAMLIS members connected. VAMLIS is a volunteer organization so the more people we have involved the more effective the organization can be.

- Revival of the VAMILS committees - There are a number of committees that have gone unmanned for a few years and it is our hopes to revive these committees for they all serve important roles. (The committees are Membership, Activities, Legislative, Communications,

Nominating, and Education.)

- GIS Coordinator development program - The program development for new GIS coordinators would be a means to impart knowledge. Through the vision the Virginia Geographic Information Network and the VBMP program, digital orthophotography has introduced a number of localities that would not otherwise afford this technology to some of the power and usefulness of GIS. This has created a new generation of GIS Coordinators. Virginia has a wealth of seasoned and knowledgeable GIS professionals who have navigated the world of GIS in Virginia and could be a significant resource to those who are just getting started. In addition to sharing knowledge with our colleagues we are also looking to support GIS in the classroom. Great strides have been made by our Education committee to get GIS into the classrooms (k-12,



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# GPS Outdoor Augmented Reality Games at NRCC and RU

*Collaboration project between New River Community College and Radford University*

By: Carlotta Eaton, Director,  
Game Technology Programs,  
Professor, Information Technology,  
New River Community College

Sixteen girls are running around the



Figure 1: Girls at the game starting point

parking lot at the NRCC Mall Site while peering intently at small handheld devices. You notice ear buds plugged in their ears. Is this a new iPod craze? Not at all. The girls are playing and beta testing a new GPS Outdoor Augmented Reality game designed and developed by NRCC students. They are campers at the Girls Get IT Camp for local high school girls.

In this game, Jamie has been captured by aliens and needs to be rescued (see Figure 1). Each girl needs to find and visit the five airports (GPS points) to earn the clues. At each GPS point,

the game is programmed to trigger a video clip. The video clip is displayed in full color on the small screen of the handheld device. Each video clip gives information and displays a quiz. If the girl answers the quiz correctly then a

new video clip plays with instructions on how to earn the next clue. Each clue is a different letter of the alphabet. Next the map displays on the small screen with her current location and shows the “airport” locations. After the girl earns all the clue letters, then she taps the small screen to drag the letters into words. The game is programmed to compare the word against a dictionary. If the word compares correctly, then she earns a point. Harder words earn more points in the game. After the girl figures out the minimum number of words then she

will see a rescue video clip and outtakes from the game programmers.

An Augmented Reality (AR) game is similar to a virtual reality game. In this case, AR combines GPS point locations in the NRV Mall parking lot and augments it with video, text, and sound. The multimedia information displays on the small HP iPAQ Travel Companion handheld device shown in Figure 3. Augmented Reality (AR) is a field of computer research which deals with the combination of real-world and computer



Figure 2: Girls following map on screen to next airport

generated information. AR builds upon the emerging informal and collaborative learning styles that students use as they communicate and share resources with their cell phones, portable gaming platforms, and handheld computers.

This game is a simplistic example of an outdoor learning activity that can be created with AR technology. NRCC students Daniel Burgess, Emily Gabrysch, Jamie St. Clair and Lauren Robertson created this Alien Rescue game for the Girls Get IT Camp. The NRCC students learned how to create Outdoor GPS games as a project in

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# VGIN Ortho Update

(Continued from Page 3)

## 2. Faster delivery times.

One of the largest issues raised by localities was that it took too long to receive the product once it was captured. In this RFP we are requesting a six months delivery time from acquisition, as compared to one year in previous flights. By reducing the size of the area captured, we anticipate vendors will be responsive to this request, but we will not know for certain until we receive bids.

## 3. More upgrade options.

VGIN is requesting a digital, one foot resolution product (versus a film based product of the past), which will enable us to easily provide a color infrared product upgrade option. In addition, we will be requesting the previous upgrade options of six inch resolution, contours and structures, as well as a priority processing upgrade, a “true ortho” upgrade product (see Figure 2), a planimetric upgrade option, and off year collection options. All of these will provide a “cafeteria style” list of options that localities (and others) can choose from and/or to use this contract vehicle.

For more information contact:

Stuart Blankenship

[stuart.blankenship@vita.virginia.gov](mailto:stuart.blankenship@vita.virginia.gov)

or

Dan Widner

[dan.widner@vita.virginia.gov](mailto:dan.widner@vita.virginia.gov)



# NRCC-GPS Outdoor Augmented Reality Games

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the ITD 212 Interactive Web Design class taught by Carlotta Eaton. Eaton



Photography: Matt Dunleavy

Figure 3: HP iPAQ Travel Companion

is a professor of Information Technology and the Director of Game Technology Programs at NRCC. NRCC was the first community college in the state to offer degree specializations in Game Technology. NRCC’s three game programs started in Fall 2006 with 1) AAS Information Technology Game Design specialization, 2) AAS CAD Animation and Game Technology, and a 3) career studies certificate in Game Design, Web Design and Animation. NRCC also offers three other Information Technology degree specializations in Programming, Computer Graphics and Web Design, and Network and Technical Support. See [www.nr.edu/it](http://www.nr.edu/it) for more information on the game programs.

The class project was a team effort in collaboration with Dr. Matthew Dunleavy at Radford University. Dr. Dunleavy began research in the AR area last year at the Harvard Graduate School of Education. He is currently an Assistant Professor in Instructional Technology at Radford University, and is continuing his AR research with the ROAR project (Radford Outdoor Augmented Reality) ([www.radford.edu/mdunleavy/620/ROAR.html](http://www.radford.edu/mdunleavy/620/ROAR.html)). The four above



Photography: April Tolley

Lauren Robertson and girls with HP devices

mentioned NRCC students have continued to work with Dr. Dunleavy this summer.

The NRCC ITD 212 class project objective was to create a different game called RU ROAR Tour. The game provided a tour of the Radford University campus that could be used by new visiting students. Dr. Dunleavy’s education graduate students developed the overall educational content for the RU ROAR Tour game. NRCC students created an initial version of the ROAR game using Adobe Flash, Flash ActionScript and Mscape software ([www.mscape.com](http://www.mscape.com)) developed by

(Continued on Page 15, Col. 2)

# Hanover County's GIS Supports Economic Development

(Continued from Page 6)

functionality for potential users of the site.

The County did not have the resources to develop or host the web page internally, so a unique arrangement was initiated between the County and Timmons Group. Timmons Group developed and hosts the Site LoGISTics web site using Hanover as a pilot community with the full intent of marketing the technology that was developed for the site to other localities. The County played a major role in the design of the web site with Economic Development staff focusing on components and design elements that would be meaningful to their client base while Timmons Group addressed the technical elements of how and what depth of data would be used. The ultimate design of the web site incorporates a combination of the best design elements of numerous other web sites and comments that were compiled from focus and pilot testing user groups that the County used to review the progress and development of the web site.

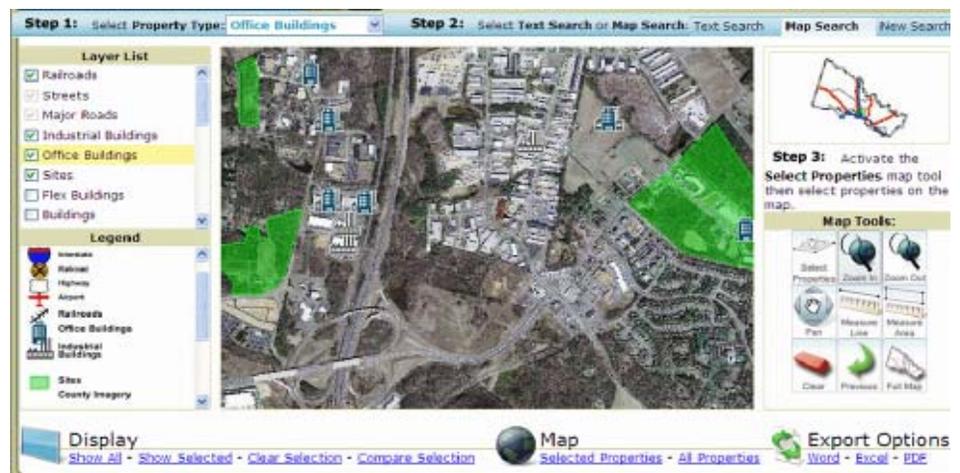
## Web Site Functionality

Before the development of this web site business professionals had to search through numerous sources to find building, site, and demographic data for Hanover County. Now these

professionals and business leaders have 24-7 access to important data from one convenient, web-based source.

Hanover County continues to participate in VEDP's site selection program. Indeed, rather than duplicating data efforts and trying to establish competing processes, the County has integrated the data presently provided on the VEDP web site into the County's web site. County Economic Development staff use the VEDP web site to enter pertinent data about a building or site in the pre-designed and easy to use form sheets. If a new building or site is being established then that data is also added to the County's GIS as a point (building) or polygon (site). The County downloads the VEDP data on a monthly basis and links that data to the appropriate GIS feature. That data

parameters, including building types, buildings or properties of a certain size or range of sizes, and selecting properties directly from a map. The web site also allows users to create demographic reports, including workforce statistics, household income, population, census data, income data, and education level attained. The demographic data is provided by Applied Geographics. These reports can be customized by distance from a point or for site comparisons when multiple sites are being considered. The reports can be downloaded in Excel, Word, or PDF file formats. All pertinent GIS data layers are also included on the site, including streets, tax parcels, zoning, topography, special interest sites, and digital aerial photos. Business point data is also shown, which is provided by Info-USA.



Office, Industrial, Flex, & Available Sites are Shown

and any other updated GIS data layers are sent to Timmons Group to be updated on the web site.

In addition to being able to select specific properties that are familiar, the web site provides other query

## The Future

Site LoGISTics is a valuable web-based information tool for businesses and real estate professionals and site location specialists. The web site provides building, site, and

(Continued on Page 11, Col 1)

# Hanover County

(Continued from Page 10)

demographic data that are important in identifying profitable locations for new businesses and expansion opportunities for existing businesses. Hanover County considers this new web site as a valuable asset to our economic development program. Hanover is pleased to be one of the first of what will no doubt be a growing number of communities across Virginia to implement an economic development solution that integrates GIS technology. However, our work is not finished as the County is working with Timmons Group to implement more design and functionality elements into the site. The County has also discussed other alternatives for better data integration with VEDP, including the potential use of GIS replication technology.

# VAMLIS Update

(Continued from Page 7)

SOLs) but there is more work to do.

The webpage update, emails, new program for Coordinators and support of GIS in education are all exciting initiatives. However, remember that none of this is possible without membership support but more importantly membership participation. So please look review the initiatives described above, consider helping. You can contact [vamlis\\_org@yahoo.com](mailto:vamlis_org@yahoo.com) for more information on these initiatives.

Again, I'm excited to be a part of this new year and look forward to seeing and hearing from you all.

Qiana Foote can be reached at [qfoote@co.goochland.va.us](mailto:qfoote@co.goochland.va.us) or 804-556-5834.

## Save the Date!

Mention or failure to mention any event or workshop does not constitute an endorsement by the Virginia Geospatial Extension

### Beginning Metadata

Wednesday, August 13, 2008:  
9:00 am - 4:30 pm, Richmond, VA

Registration: [http://www.surveymonkey.com/s.aspx?sm=slukCx\\_2bjLkA1ImvjhM2LHA\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=slukCx_2bjLkA1ImvjhM2LHA_3d_3d)

### Intermediate Metadata

Thursday, August 14, 2008:  
9:00 am - 4:30 pm, Richmond, VA

Registration: [http://www.surveymonkey.com/s.aspx?sm=slukCx\\_2bjLkA1ImvjhM2LHA\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=slukCx_2bjLkA1ImvjhM2LHA_3d_3d)

### Beginning Metadata

Wednesday, November 5, 2008:  
9:00 am - 4:30 pm, Richmond, VA

Registration: [http://www.surveymonkey.com/s.aspx?sm=slukCx\\_2bjLkA1ImvjhM2LHA\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=slukCx_2bjLkA1ImvjhM2LHA_3d_3d)

### Intermediate Metadata, Thursday, November 6, 2008:

9:00 am - 4:30 pm, Richmond, VA

Registration: [http://www.surveymonkey.com/s.aspx?sm=slukCx\\_2bjLkA1ImvjhM2LHA\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=slukCx_2bjLkA1ImvjhM2LHA_3d_3d).

Note: registration is required to attend each of the Metadata Workshops.

Contact Lyle Hornbaker ([lyle.hornbaker@vita.virginia.gov](mailto:lyle.hornbaker@vita.virginia.gov) / 804-416-6202) for additional information.

### Rocky Knob Public Forums / Floyd and Patrick County Community Asset Mapping Workshop

Sponsored by Blue Ridge Heritage, Inc. in association with Virginia Tech, Clemson University, Virginia Cooperative Extension, and the Virginia Geospatial Extension Program.

September 4th, 2008 from 4:00 pm - 7:00 pm. | Floyd, VA

September 5th, 2008 1:00 pm - 3:00 pm | Stuart, VA

For further information: <http://www.cnr.vt.edu/gep/rockyknob.html>

### Nineteenth Annual Virginia GIS Conference, September 29-30, Roanoke, VA

Sponsored by: Virginia Association of Planning District Commissions (VAPDC)

Further information: <http://www.vapdc.org/gis.htm>

# Digital Database of Virginia's Trail System Under Development

By: Steve Sedlock and Ana Constantinescu, Center for Geospatial Information Technology, Virginia Tech  
John McGee, PhD, Department of Forestry / Virginia Cooperative Extension, Virginia Tech

Virginia is so rich in bike and hiking trails, yet there is no seamless statewide database that would ensure efficient planning. But this will change soon as a statewide project will create an Internet-based digital repository of existing and planned bicycle and pedestrian infrastructure, including bike lanes, hiking and horseback riding trails.

The project is coordinated by Virginia Tech's Center for Geospatial Information Technology (CGIT) and the Virginia Geospatial Extension Office at the Department of Forestry, and is funded by the Virginia Department of Conservation and Recreation and the Virginia Department of Transportation (VDOT).

## Need for a seamless database of trails

“Currently, information on bicycle and pedestrian facilities comes to us from many different sources and in many different formats, making statewide planning analysis extremely time consuming and difficult,” explains Kimberly Spence, statewide planning program manager at VDOT. Additionally, county and city boundaries may act as barriers against future planning and expansion. “You cannot gain a regional perspective of

the trail and bike route systems, which makes planning very difficult,” says John McGee, one of the project initiators and assistant professor in the Department of Forestry and geospatial extension specialist with Virginia Cooperative Extension.

Both VDOT and the DCR have expressed the need to consolidate, standardize, digitize, and integrate the available trail infrastructure data into a statewide, seamless digital file compatible with GIS.

Applications being developed will streamline the decision making process by including bicycle and pedestrian infrastructure into VDOT's geospatial data assets, and making them available to managers, through a user-friendly interface supported by analytical tools.

## Project objectives and progress

The team of researchers and graduate students from CGIT is working to convert the available bike and pedestrian infrastructure information into a standard, seamless digital format. The researchers first performed a



For the purpose of this project, the bicycle and pedestrian infrastructure refers to designated bike routes on shared roadways, marked bike lanes, paved shoulders, wide outside lanes, shared use paths that lie within the highway right of way, as well as off-road trails recognized by local, state or federal governments.

literature review and a statewide needs assessment to identify the availability and format of the existing trail data. The next step was to create a model of how the trail data will be represented in GIS and used by planners.

Data collection focused predominately on bike trails, but if additional data on

(Continued on Page 13, top)

# Digital Trail System

(Continued from Page 12)

pedestrian trails (excluding sidewalks) was available, it was included in the database.

CGIT completed a pilot bike trail database for Virginia's New River Valley which includes Giles, Pulaski, Montgomery, and Floyd counties and city of Radford. Researchers are now

extending the database model to the rest of the state.

Applications being developed will provide VDOT and DCR managers and other stakeholders with the ability to query, display, and analyze facilities data within a dynamic geospatial environment.

## What's next?

Even though the trail database will not be available for direct public Internet access, anyone can ask his or her local planning district commissioner for the

latest trail information. In the future, and as funding allows, CGIT will continue to extend and adapt the data for public use.

"This is where we can really begin to dream, as we enhance the data to include nearby facilities such as campgrounds, pet-friendly areas, restaurants, lodging, and other businesses," says McGee.



## VAMLIS Conference Poster Presentation Winners

This year, a panel of judges were given the difficult task of identifying the "best of the best" GIS posters at the VAMLIS Spring Conference. After intense deliberation, the judges honored 3 posters in each of three categories: professional, higher education, and pre-college education.

We would also like to acknowledge the Virginia Space Grant Consortium for providing cash prizes for the higher education and pre-college category winners. VAMLIS members provided fun and exciting prizes for the professional category winners. Keep your best posters on hand for next year's poster competition!

### Professional Category Honors

1st Place: *Priority Assessment of Major Programed Interstate and Primary Projects*. Ross Hudnall, VDOT.

2nd Place: *Geologic Map of Rockbridge County, Virginia*. Gerald Wilkes; Edward Spenser, PhD; Nick Evans and Elizabeth Campbell, VDMME.

3rd Place: *Atmospheric Ca<sup>2+</sup>Wet Deposition Within the Continental United States and Implications for Soil Inorganic Carbon Sequestration*. Meggan Goddard (GoogleEarth), John Galbrieth (Virginia Tech), et al.

### Higher Education Category Honors

1st Place: *Kite Photography and Image Enhancement for Estimation of Productive Ground Cover in Virginia's Pastures*. Arvind Bhuta, Candice Luebbering, Andrew Foy, and James Campbell. - VT - \$250 prize

2nd Place: *Integrating User Input Into Regional Wine Tourism Maps*. Katherine Pritchard, et al - VT.- \$150 prize

3rd Place: *Combating Lyme Disease Networks in Virginia*. Joby Kaufman - VT - \$100 prize

### Pre-college Education Category Honors

1st Place: *911 address Verification for Page County*. Page County High School - \$250 prize

2nd Place: *Analysis of the Spread of Galuim Trunicum*. Clarke County High School - \$150 prize

3rd Place: *Nitrate Levels in Lew Creek, Staunton, VA*. Shenandoah Governor's School - \$100 prize

# GIS Supports Bioenergy in Virginia

(Continued from Page 5)

2.) that feedstock bales will not be stacked.

If the harvest of the 2000 ac of production fields can be managed so that the SSL can be filled (and emptied) twice each year, then the size, and thus the storage cost, can be halved.

## Transportation Analysis

The road network was used to calculate the distance from each SSL to the plant location. This distance ranged from 2.6 mi to 43.3 mi. and averaged 25.8 mi across the 199 SSLs in the 30-mi radius.

The tonnage stored at each of the 99 SSLs across the 20-mi radius around Gretna was used to calculate a “ton-mi” parameter. This parameter gives the average distance each ton travels. The ton-mi decreased from 20.2 to 19.0 as the acreage increased, Scenario 1 to Scenario 6. This decrease was less than expected because the density of production fields was not evenly distributed across the entire 20-mi radius.

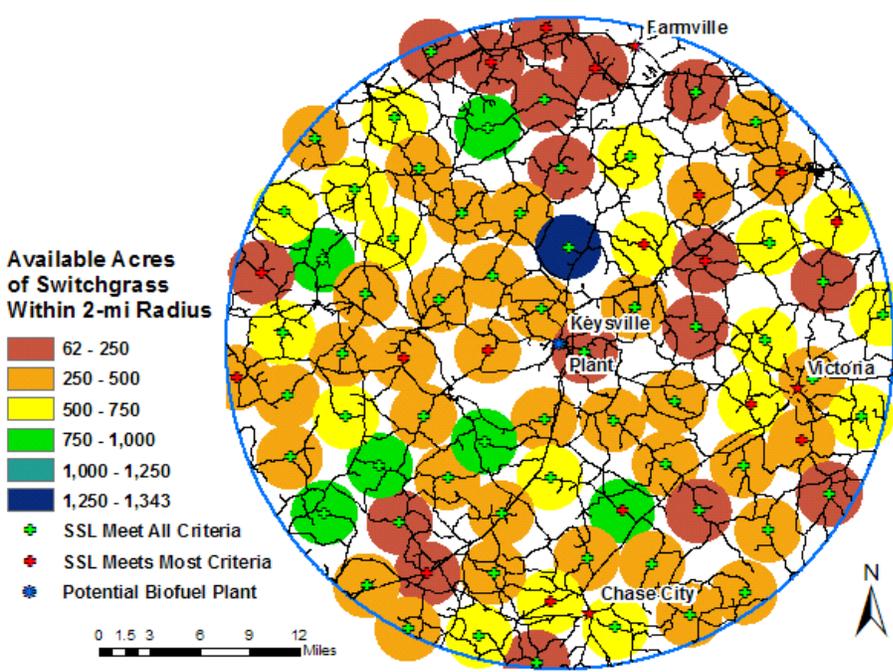
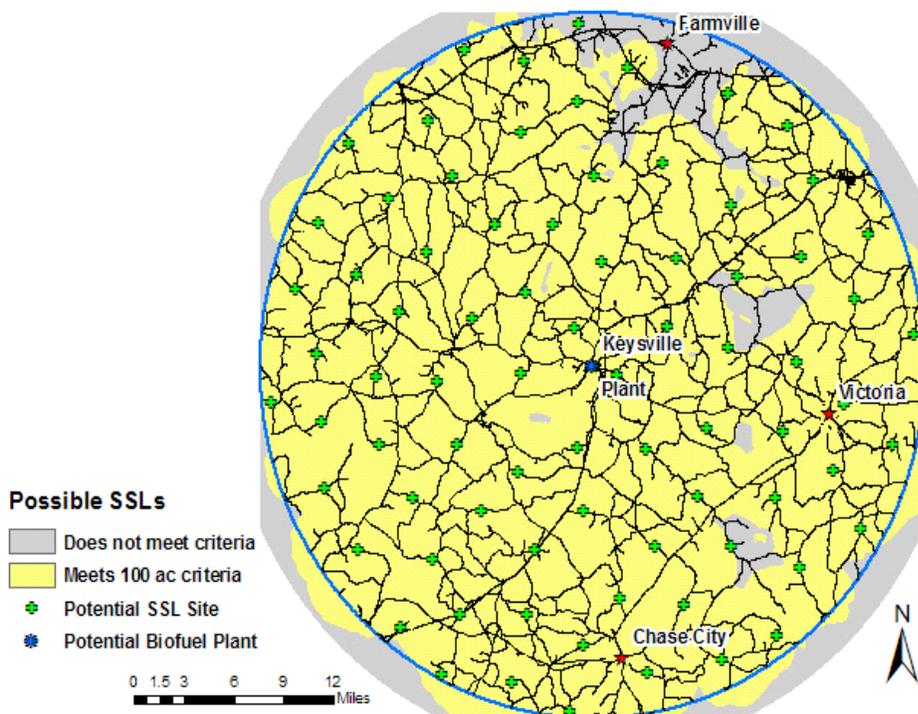
The tonnage stored at each of the 199 SSLs across the 30-mi radius around Gretna was used to calculate a ton-mi parameter, and this parameter decreased from 27.8 to 26.5 as the acreage increased, Scenario 1 to Scenario 6. In general, the ton-mi parameter was about 38% larger for the 30-mi area as compared to the 20-

mi area. This increase in hauling distance is a significant issue.

For the 20-mi radius around Keysville, the minimum distance from an SSL to the plant was 1.6 mi and the maximum was 33.8 mi. Mean distance for the 78 SSLs defined for the 20-mi radius was 18.7 mi. The ton-mi parameter

ranged from 18.2 (Scenario 1) to 18.5 (Scenario 6). When compared to the ton-mi parameter for the 20-mi radius around Gretna, the parameter for the Keysville site was about 7% less.

(Continued on Page 15, Col. 1)



# Bioenergy

(Continued from Page 14)

## Conclusions

The database and analysis procedure developed for this study provides a resource needed by local authorities seeking to attract a bioenergy plant to their locale. If these plants are attracted to SCV, it will require a business plan which provides a “win-win” for the feedstock producer and the plant. SCV has the potential to become the major producer of bioenergy in Virginia.

The two main advantages are:

- 1) the availability of land on marginal soils that can be attracted into production of feedstock without competing with food production, and
- 2) proximity to markets for the energy product produced.

Local leadership will determine if the potential to produce and utilize bioenergy is realized in Southern Virginia.



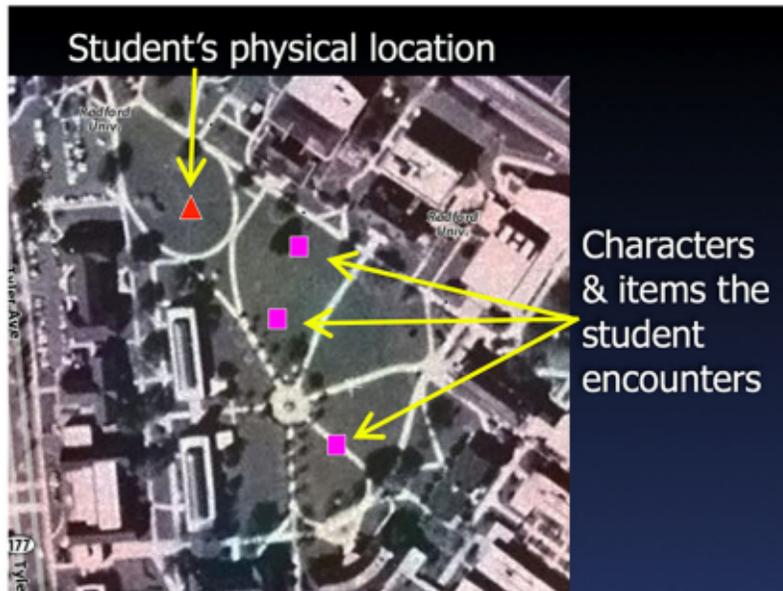
# New River Community College

(Continued from Page 9)

HP. The team project included Daniel Burgess, Laura McCormick and Rena Wilson as programmers; April Tolley, Emily Gabrysch, and Kara Rogers as graphic designers and animators; Jamie St. Clair optimized the video files and created tutorials, and Lauren Robertson and Keath Marx as game

games, guides, and stories can be woven into the landscape by programmers and digital designers. AR is rich in interactivity — full of sound and music, images and text, videos and animation, narrative and dialog, all embedded in the space where you’re standing. Discover the unexpected – games, guides, and stories triggered by your GPS location. View the Roku’s Reward video for a glimpse of future of AR available at the HP video site at [h30415.www3.hp.com/index.jsp](http://h30415.www3.hp.com/index.jsp)

Eaton (NRCC) and Dunleavy (RU) plan to continue to collaborate and create new AR projects in the future.



Sample map displayed on handheld screen

In addition to the place-dependent approach (RU ROAR Tour game) situated at RU Tour, we will also develop place-independent AR simulations (NRCC Alien Rescue game) which can be

superimposed onto any physical area. AR allows us to interact with the outside world in a whole new way. We can experience sounds and images linked to the landscape. Just imagine the games we can build and the stories we can tell. This is just the beginning for AR in education and learning and only limited by our imagination.

play experts and project integration managers. Kara, Rena, Emily, Daniel and Lauren have now graduated from NRCC and are continuing their education at RU. The RU ROAR Tour game was beta tested in June by thirteen girls at the RU Bridge Camp and by community college faculty at the RU Working Connections training conference in May on the RU campus.



As listed on the mscapers.com web site, AR is an immersive media —

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