

# RADFORD UNIVERSITY

Board of Visitors

## ACADEMIC EXCELLENCE AND RESEARCH COMMITTEE MEETING

2:30 P.M.

DECEMBER 6, 2018

MARY ANN JENNINGS HOVIS MEMORIAL BOARD ROOM  
MARTIN HALL, THIRD FLOOR, RADFORD, VA

### **DRAFT** **MINUTES**

#### **COMMITTEE MEMBERS PRESENT**

Dr. Susan Whealler Johnston, Chair  
Dr. Rachel D. Fowlkes, Vice Chair  
Ms. Krisha Chachra  
Mr. Randy J. Marcus  
Ms. Georgia Anne Snyder-Falkinham  
Dr. Jake Fox, Faculty Representative (Non-voting Advisory Member)

#### **OTHER BOARD MEMBERS PRESENT**

Mr. Mark S. Lawrence, Rector  
Mr. Robert A. Archer, Vice Rector  
Dr. Thomas Brewster  
Dr. Jay A. Brown  
Ms. Karyn K. Moran  
Ms. Lisa Throckmorton  
Ms. Myriah Brooks, Student Representative (Non-voting Advisory Member)

#### **OTHERS PRESENT**

Dr. Brian O. Hemphill, President  
Ms. Karen Castele, Secretary to the Board of Visitors and Special Assistant to the President  
Dr. Kenna Colley, Interim Provost and Vice President for Academic Affairs  
Mr. Danny M. Kemp, Vice President for Information Technology and Chief Information Officer  
Ms. Wendy Lowery, Vice President for University Advancement  
Ms. Kitty McCarthy, Vice President for Enrollment Management  
Mr. Chad Reed, Vice President for Finance and Administration and Chief Financial Officer  
Ms. Ashley Schumaker, Chief of Staff and Vice President for University Relations  
Dr. Susan Trageser, Vice President for Student Affairs  
Mr. Allen Wilson, Senior Assistant Attorney General, Commonwealth of Virginia  
Other Radford University faculty and staff

### **CALL TO ORDER**

Dr. Susan Whealler Johnston, Chair, formally called the Academic Excellence and Research Committee meeting to order at 2:45 p.m. in the Mary Ann Jennings Hovis Memorial Board Room in Martin Hall. Dr. Johnston welcomed everyone to the December meeting.

### **APPROVAL OF AGENDA**

Dr. Johnston asked for a motion to approve the December 6, 2018 agenda, as published. Ms. Georgia Anne Snyder-Falkinham so moved, Ms. Krisha Chachra seconded, and the motion carried unanimously.

### **APPROVAL OF MINUTES**

Dr. Johnston asked for a motion to approve the minutes of the October 2, 2018 meeting of the Academic Excellence and Research Committee, as published. Ms. Snyder-Falkinham so moved, Ms. Chachra seconded, and the motion carried unanimously.

### **FACULTY SENATE REPORT**

*The Faculty Senate Report was moved up on the agenda due to Dr. Fox's commitment to lead a Faculty Senate meeting at 3:30 p.m.*

Faculty Senate President Jake Fox provided an update on the General Education initiative and reported the efforts are going well. Dr. Fox also reported on the formation of the Ad Hoc Team for Civic Engagement and the pending approval of the General Education Guiding Principles. A copy of the report is attached hereto as ***Attachment A*** and is made a part hereof.

### **ACADEMIC AFFAIRS REPORT**

Interim Provost and Vice President for Academic Affairs Kenna Colley provided an update of recent activities. Dr. Colley announced the most recent State Council of Higher Education for Virginia (SCHEV) approvals for Radford University, which included the Bachelor of Science degree in Sport Management, the Bachelor of Science degree in Allied Health Sciences and the Bachelor of Science degree in Cybersecurity. Dr. Colley announced the faculty members who were recently awarded emeritus status and extended congratulations to:

- Dr. Douglas Mitchell from the Department of Occupational Therapy;
- Dr. Judy Guinan from the Department of Biology;
- Dr. Laura LaRue from the School of Nursing;
- Dr. Jim Borling from the Department of Music; and
- Dr. Al Wojtera from the Department of Music.

Dr. Colley further reported that Radford University has two representatives, Dr. Melissa Grim and Dr. Ben Gordon, who are serving on the Medical Education High School Track Subcommittee in partnership with Carilion Clinic, Jefferson College of Health Sciences and local school divisions. This effort is to increase exposure and preparation of medical and health sciences to students while still in their high school years. Dr. Colley announced that, following a national search, Susanna Carrillo has been named the new Assistant Provost for Global Education and Engagement. Ms. Carrillo has extensive international experience, including senior roles at The World Bank and SENAI and currently serves on the Board of Directors for the National Association of International Educators (NAFSA). Her start date is December 10, 2018. In closing, Dr. Colley announced that Dr. Agida Manizade, Professor of Mathematics and

Statistics, was chosen as Radford University's most recent recipient of the Virginia Outstanding Faculty Award, administered by the SCHEV.

### **PRESENTATION**

As an academic program and strategic plan update, Professor of Geology Skip Watts presented an overview of the Geohazards and Unmanned Systems Research Center, including past and current projects. Dr. Watts described how he, colleagues and students use drones to collect data to be analyzed and how they can better understand, and in some cases prevent, problems associated with floods, sinkholes, landslide, earthquakes and water resources. A copy of the presentation is attached hereto as *Attachment B* and is made a part hereof.

### **ADJOURNMENT**

With no further business to come before the Committee, Dr. Johnston asked for a motion to adjourn the meeting. Ms. Snyder-Falkinham made the motion, Ms. Chachra seconded, and the motion carried unanimously. The meeting adjourned at 3:32 p.m.

Respectfully submitted,

Ms. Vickie Stewart Taylor  
Executive Assistant  
to the Provost and Vice President for Academic Affairs  
Secretary to the Committee

**Faculty Senate President's Report to the  
Academic Excellence and Research Committee  
of the Board of Visitors  
December 6, 2018**

**I. Recent Events and Motions from the Faculty Senate**

- A. Passage/Adoption of the General Education Values Team Recommendations
  
- B. Formation of the Ad Hoc Team for Civic Engagement
  
- C. Pending Approval of the General Education Guiding Principles
  
- D. Website for Continued Updates on General Education Reform:  
<https://www.radford.edu/content/academic-programs/home/general-education.html>

## **18-19.01 Motion for the Creation of Radford University General Education Principle and Model Team**

Referred by: Faculty Senate Executive Council

### **MOTION:**

The Faculty Senate recommends the establishment of the Radford General Education Principles and Model Team to identify and make recommendations on the guiding principles and model for a general education curriculum at Radford University based on the values identified by the Academic Values Exploration Team.

To ensure diversity and equity of representation of many faculty perspectives and that all faculty have access to provide input into that process, the team will comprise 2 full time Teaching and Research faculty representatives nominated and elected from each undergraduate college (CHBS, ACSAT, COBE, CVPA, CHED, and Waldron) as voting members on the team. Although these voting members are elected at the college level, their mission will be to represent views from across the Radford University community. One additional non-voting member, the Interim Director of the Core Curriculum, will be appointed as facilitator/chair of the team. It is expected that this team will need to meet weekly to ensure adequate progress towards completion of the charges within the timeline specified.

The team charges are to:

- 1) Review the accreditation expectations related to general education from SACSCOC and SCHEV in consultation with the Office of Institutional Effectiveness and Quality Improvement.
- 2) Conduct focus groups to solicit input from the following stakeholders and constituencies:
  - a) Radford University T&R faculty
  - b) Jefferson College faculty
  - c) Current students
  - d) A&P faculty
  - e) Alumni
  - f) McConnell Library
  - g) Center for Career and Talent Development
  - h) Academic Advising
  - i) Student Affairs
  - j) Any others identified by the team
- 3) Identify the guiding principles, based on the values identified by the Academic Values Exploration Team and in light of the Strategic Plan, which will guide development of general education at Radford University. Guiding principles are statements of mandatory institutional requirements that any general education model and program must fulfill at Radford University

The expectation is that these principles will not prescribe the model of general education but rather identify necessary attributes of any model of general education. This recommendation will be submitted to Faculty Senate Executive Council no later than November 15, 2018 for subsequent review and approval by Faculty Senate.

4) Review peer institution and other college and university general education models for ideas and principles that might inform the development of general education at Radford University.

5) Upon deliberation and approval of guiding principles of general education by the Faculty Senate, this team should develop and recommend a model with which general education learning goals and outcomes could be fulfilled.

6) Drafts of all team recommendations should be circulated via public forums and the general education website for input and discussion. Feedback on the model of general education should be collected in consultation with each academic department in addition to the focus groups identified in charge #2 (above).

Recommendations for the general education model will be submitted to the Faculty Senate Executive Council no later than March 1, 2019, for subsequent review and approval by the Faculty Senate.

#### RATIONALE:

Broad review of general education at Radford University has not been conducted within the past ten years. Such a review is even more appropriate in light of the new Strategic Plan and the recent recommendations developed by the Academic Values Exploration Team.

As a faculty-driven effort this review is intended to be transparent and open to wide ranging input and communication from across campus. This review process is intentionally designed to result in actionable conclusions based on broad faculty buy-in, which will be essential in the success of any general education initiatives.

## 18-19.02 Motion to Create Ad Hoc Team for Civic Engagement

Referred by: Faculty Senate Executive Council

### MOTION:

The Faculty Senate recommends the creation of an *ad hoc* team to develop an assessment strategy for the State Council of Higher Education (SCHEV) required competency of civic engagement.

The team charges are:

- To define civic engagement for purposes of this SCHEV competency
- To define criteria for the identification of appropriate curricular and/or non-curricular activities that should be considered part of students' civic engagement
- To specify goals and objectives related to the competency of civic engagement
- To identify an assessment strategy for measuring attainment of competency of civic engagement
- To provide a report fulfilling the above charges to Faculty Senate by November 16, 2018

Team members will include:

- One T&R faculty representative from each of the undergraduate academic colleges (ACSAT, CEHD, COBE, CHBS, CVPA, Waldron), appointed by Faculty Senate Executive Council
- The Student Affairs Co-Director of the Citizen Leader Program
- The Academic Affairs Co-Director of the Citizen Leader Program
- The Associate Vice President for Student Life
- One representative from the Office of Institutional Effectiveness and Quality Improvement
- The Interim Director of Core Curriculum to act as convener of the team
- Up to two additional team members from community partner constituencies will be identified by the group prior to addressing the charges.

### RATIONALE:

SCHEV requires all Virginia colleges and universities to identify goals and objectives related to the competency of civic engagement. In a recent report to SCHEV, Radford University indicated that the plan for fulfilling the Civic Engagement competency would be forthcoming. This team is charged with defining civic engagement, specifying goals and objectives, and identifying an assessment strategy for this required SCHEV competency. This competency, unlike all others, can be fulfilled within curricular or non-curricular activities.

## **18-19.03 Motion to Adopt the Academic Values Recommended by the Academic Values Exploration Team (AVET)**

Referred by: Faculty Senate Executive Council

### **MOTION:**

The Faculty Senate approves the adoption of the values identified and developed by the AVET to guide the development of general education at Radford University.

### **RATIONALE:**

The faculty of Radford University are currently engaged in an ongoing effort to review and revise our general education curriculum. These recommendations are intended to define what lies at the heart of a Radford University education and guide our efforts moving forward.



## 18-19.03 Addendum

To: Dr. Jake Fox, President, Faculty Senate

From: Dr. Nicole Hendrix, Interim Director, Core Curriculum

Date: Monday, September 10, 2018

Re: Recommendation for Academic Values Underlying General Education

During Summer 2018, fourteen Teaching and Research faculty from across campus and Roanoke locations and eight non-voting advisory members of the academic and student community came together to identify the academic values underlying general education. In the beginning, the team defined academic values.

“Academic values inspire and guide Radford University student experiences in general education.”

The next stage of the team’s work focused on reviewing potential academic values from many sources. In addition to examining academic institutions, these individuals sought information from many other arenas and now seek input from the campus and broader Radford community. To that end, the Radford University Academic Values Exploration Team recommends the following academic values for general education:

**Exploration:** Going beyond one’s limits to experience diverse subjects and disciplines for innovative learning and opportunities for self-discovery.

Tagline: “Forge your own path.”

**Evaluation:** The ability to discern and use reasoning, critical thinking, and evidence-based research to make informed decisions.

Tagline: “Transform information into insight.”

**Engagement:** Integrating knowledge, methods, and experiences to establish connections across concepts, disciplines, and communities.

Tagline: “Become more than the sum of our parts.”

## **18-19.06 Motion to Approve the Guiding Principles Established by the Radford University General Education Principle and Model Team**

Referred by: Faculty Senate Executive Council

### **MOTION:**

The Faculty Senate recommends approving the guiding principles established by the Radford University General Education Principles and Model Team.

1. The general education program is student centered. Therefore, the general education program:
  - a. is easy to understand, explain, and navigate;
  - b. allows student choice;
  - c. encourages timely graduation;
  - d. accommodates the needs of students (freshman, transfer, non-traditional, first-generation, veterans, international, etc.).
  
2. The general education program promotes strong foundations for student learning and success on campus and beyond. Therefore, the general education program:
  - a. provides opportunities to develop abilities and gain knowledge useful within and across disciplines;
  - b. exposes students to diversity of perspective and depth of knowledge through coursework outside their discipline;
  - c. encourages engagement with and guidance by full-time faculty;
  - d. ensures reliable and valid assessment of learning goals and outcomes.
  
3. The general education program reflects the identity and responsibilities of Radford University. Therefore, the general education program:
  - a. embodies the Academic Values, Vision, Mission, and Core Values of Radford University;
  - b. aligns with regional, state, University, college, and department accreditation requirements;
  - c. invites all Radford University colleges to contribute to General Education;
  - d. adapts to internal and external factors (transfer issues, legislative changes, accreditation-University, department, SACSCOC, and SCHEV, etc.).

### **RATIONALE:**

In response to FS Motion 18-19.01 the Radford University General Education Principles and Model Team submits these guiding principles for approval.

# Radford University Geohazards and Unmanned Systems Research Center

Attachment B



**RADFORD**  
UNIVERSITY  
Department of Geology

**Dr. Skip Watts**  
For the Radford University Board of Visitors  
December 6, 2018



GOAL 3 - Radford University will garner recognition for signature academic programs that provide expertise for enhancing information safety and security for Virginians and the global community.

3. Establish centers of excellence to support the Radford University Security Studies Initiative and Summer Institute and the Geohazards and Unmanned Systems Research Center.

and market CBE programs to non-traditional student populations who would best benefit from a competency-based option for the attainment and ultimate completion of a desired degree or certificate.

D. Provide opportunities through which students in information safety and security programs will be consistently engaged in high-impact practices and co-curricular experiential opportunities.



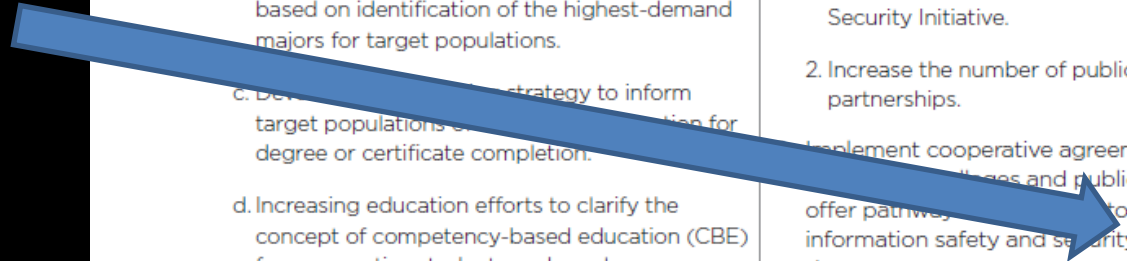
for a competency-based system that permits "competency mapping" to be used in assessing whether candidates meet criteria for courses and degree programs by:

- a. Designing a system of assessing experiences and life achievements that apply to respective course credit.
- b. Designing a competency-based structure based on identification of the highest-demand majors for target populations.
- c. Developing a strategy to inform target populations of the opportunity for degree or certificate completion.
- d. Increasing education efforts to clarify the concept of competency-based education (CBE) for prospective students and employers.

B. 1. Increase the number of public and private partnerships.  
2. Increase the number of public and private partnerships.  
3. Implement cooperative agreements with colleges and public schools to offer pathways to pursue information safety and security certificate degree programs.

essential cooperative agreements that meet the objectives of Radford University's Safety and Security Initiatives.  
the number of cooperative agreements.  
opportunities through which students in information safety and security programs will be consistently engaged in high-impact practices and co-curricular experiential opportunities.

1. Establish centers of excellence to support the implementation of Radford University's Security Studies Initiative and Summer Institute and the **Geohazards and Unmanned Systems Research Center**.

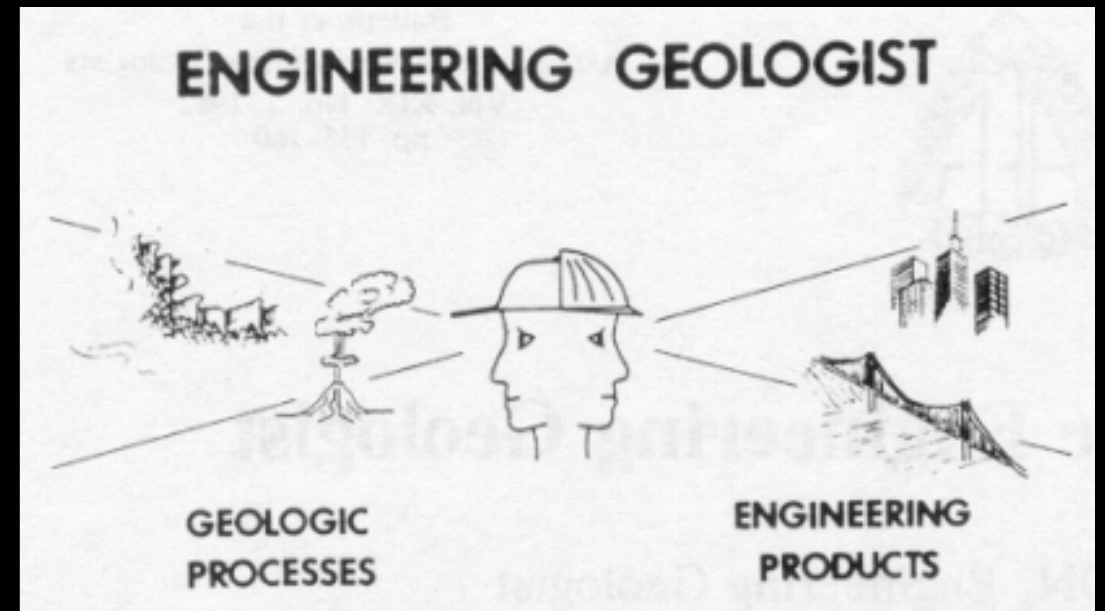


## Geohazards - Radford University has done it well, for over 30 years...

*Engineering Geology* is the science of geology applied to environmental and engineering concerns, including the safety and performance of infrastructure, and to public health, safety, and welfare.'

Includes:

- evaluating subsurface geologic structures, stratigraphy, and water conditions affecting the things humans build;
- exploring and developing rock, soil, and water resources;
- evaluating natural hazards including earthquakes, landslides, floods, subsidence, radon, and asbestos; and,
- multidisciplinary teamwork !



"If it's going to be built, let's see that it's done right!"

**Floods - Sinkholes - Landslides - Earthquakes - Water Resources - Pipelines**

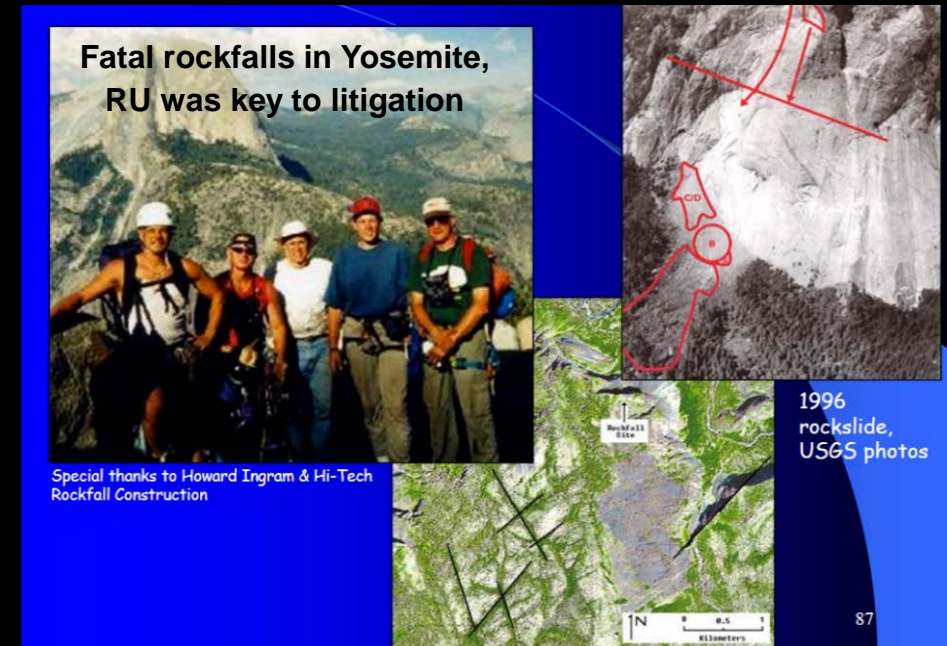
## Related disciplines

- Geotechnical Engineering (VT)
- Geological Engineering (No where in eastern US)
- Environmental Geology (Numerous)
- Mining Engineering (VT)

We have advocated at RU for years to establish an ABET accredited program in *Geological/Geophysical Engineering* - CIP Code 14.3901

No program in *Geological Engineering* has existed east of the Mississippi River.

“A program that prepares individuals to apply mathematical and geological principles to the analysis and evaluation of engineering problems, including the geological evaluation of construction sites, the analysis of geological forces acting on structures and systems, the analysis of potential natural resource recovery sites, and applied research on geological phenomena.”





Engineering Geology - Radford University  
Emergency response for VDOT

I-81 mile post 125  
Christiansburg, VA  
August 2013

Radford University assisting VDOT in reopening I-81

with...  
**Carl Benson**  
 Geotechnical Engineering Program Manager at Virginia Department of Transportation

**THE ROANOKE TIMES**  
 WEDNESDAY AUGUST 28, 2013 roanoke.com

# Unstable slope may close I-81 for days

Southbound traffic will be detoured at Dixie Caverns onto U.S. 11/460 and back onto I-81 at Christiansburg.

By Melissa Powell  
 mpowell@roanoke.com  
 380-8622

A section of southbound Interstate 81 in Montgomery County closed Tuesday afternoon and could remain closed for up to 10 days as crews work to repair an unstable slope.

Traffic will be detoured at Exit 132 (Dixie Caverns) onto U.S. 11/460 and back onto I-81 at Exit 118 (Christiansburg), according to a Virginia Department of Transportation news release. The detour will remain in place until the unstable material on the slope can be brought down, and it is unknown at this time how long that will take, the release stated.

VDOT spokesman Jason Bond said a scheduled blast on Monday caused a crack in the unstable slope near mile marker 124 to grow about 70 feet in length.

Because the slope, which is about 100 feet tall and starts about 25 feet up from the base of the shoulder of the road, now has more unstable material, Bond said VDOT personnel are concerned that if the material were to slide, it would spill out onto travel lanes.

Crews working on the ongoing project to construct a truck climbing lane between mile markers 120 and 125 first discovered the unstable slope in May, Bond said. Blasting began in July to repair the slope, and Monday's blast made the crack grow from about 30 feet to 120 feet in length.

"Blasting is not an exact science, and you are dealing with an unstable slope," Bond said. "We put a plan in place to stabilize the slope, but once you start implementing that plan, there are variables that you can't control."

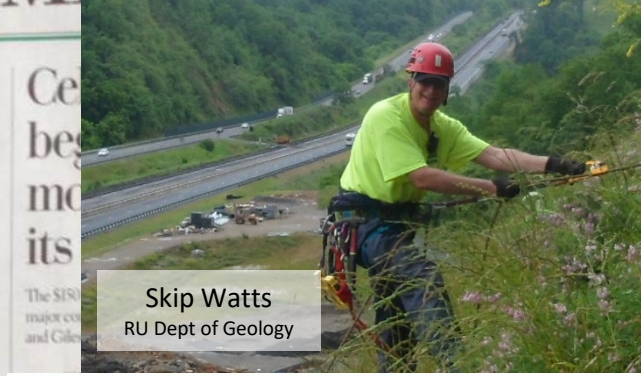
Another blast is scheduled for today at 9 a.m.

"We're hopeful tomorrow's blast will loosen the material enough that we will be able to open [I-81] back," Bond said Tuesday. "If we're not able to do it after tomorrow's blast, we don't know how long, at this point, it will be before we can reopen the road."

During the blasting today, state police will slow traffic on northbound I-81 beginning at mile marker 114 to keep the area near the blast clear. Once the blast has occurred, traffic will be released to travel at a normal speed. Drivers should expect delays. During blasting, traffic accessing the on-ramps onto northbound I-81 at Exit 119 will be slowed.

**ANOTHER BLAST SET FOR TODAY**  
 A blast is scheduled for today at 9 a.m. During the blasting, state police will slow traffic on northbound I-81 beginning at mile marker 114 to keep the area near the blast clear. Once the blast has occurred, traffic will be released to travel at a normal speed. Drivers should expect delays. During blasting, traffic accessing the on-ramps onto northbound I-81 at Exit 119 will be slowed.

I-81 Unstable Slope  
 Christiansburg, VA, 08/2013



Skip Watts  
 RU Dept of Geology



Brendan Fisher  
 RU Geology Alumnus



IRO--6216  
 6-4-13, WSH



\$17M cost overrun for the Smart Road due to lack of engineering geologic study



# The Smart Road



RU was instrumental in solving rockslides at Virginia's Smart Road



# Virginia's Smart Road rockslide problem...



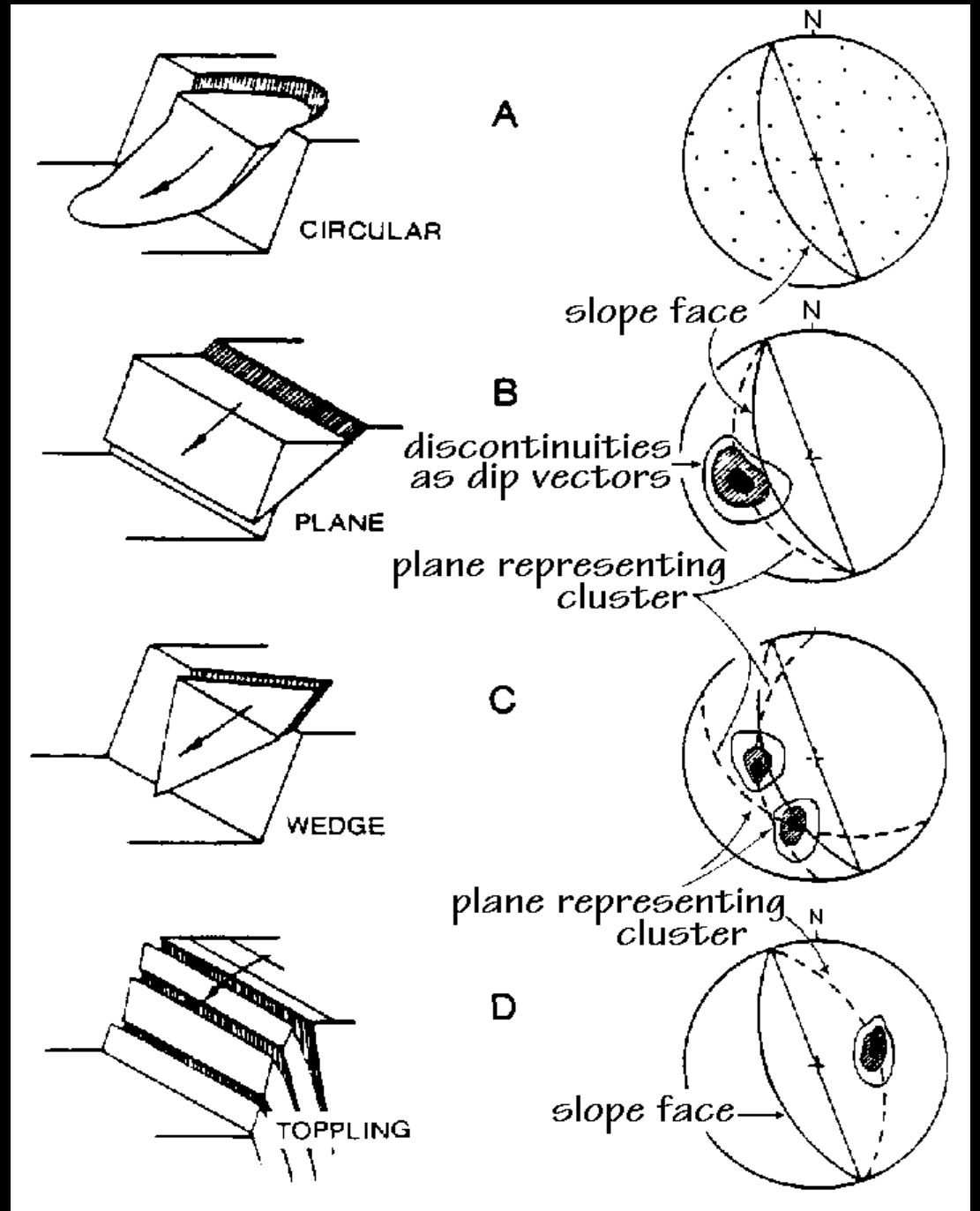
Radford University graduate  
research by Robin Reed



# Types of Rock Slope Failures



Dip Vector Stereonets



# GeoHazards & Unmanned Systems Research Center

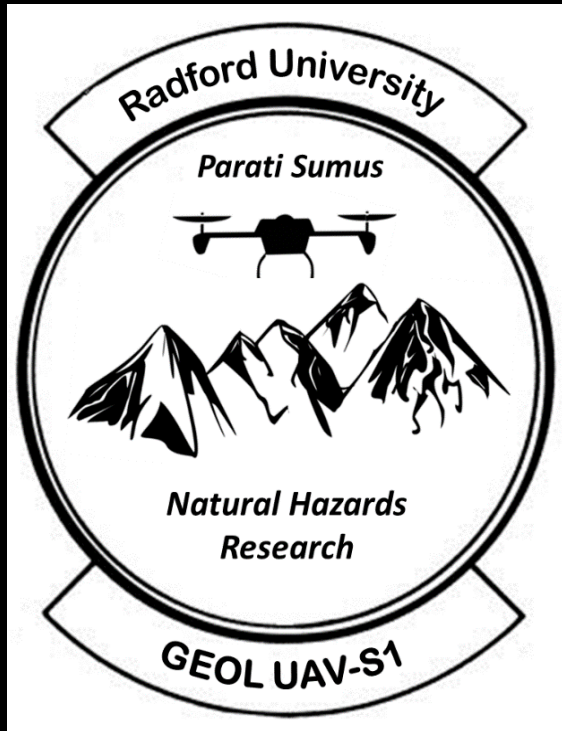
- Three years of start-up and preliminary operations, seed money now provided by the Provost starting fall of 2018
- 12 FAA-registered aircraft of various sizes and capabilities, purchased with ETF funds
- FEMA Certified for Disaster Response
- Now offering FAA remote pilot certification training



## Mission

- Flight Operations Research: to develop and test best practices for using unmanned systems to investigate and mitigate natural hazards and for rapid data collection in potentially dangerous locations
- Student Training: aircraft operations and safety; mission planning for natural hazards reconnaissance; GIS data processing for digital modeling; extracting geologic structure data; hazard inventories
- Technology Transfer: to assist industry and government agencies in adapting and implementing these emerging unmanned technologies for public safety and economic development

# Radford University FAA-Registered Aircraft



[cwatts@radford.edu](mailto:cwatts@radford.edu)  
(Skip Watts)



Fixed wing...



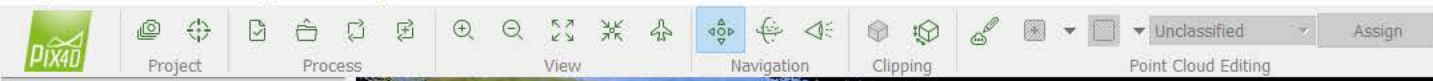
albris  
senseFly

albris  
The intelligent mapping &  
inspection drone



Previously eXom

Infrared on the fly... senseFly



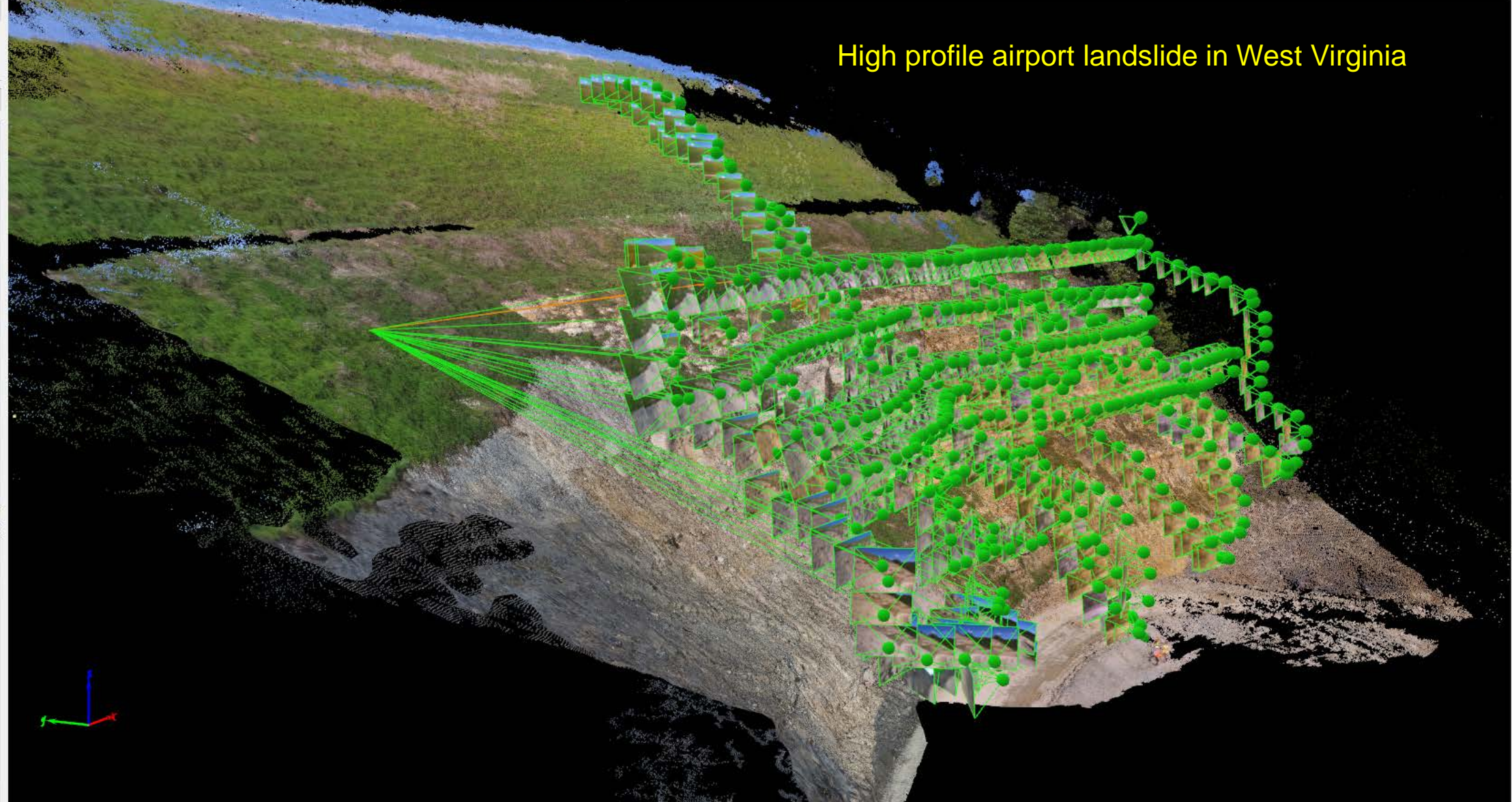
**Create**

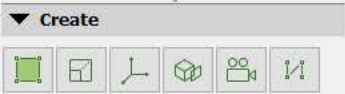
A set of icons for creating new elements in the project, including a camera, a point cloud, a triangle mesh, and a point group.

**Layers**

- Cameras
  - > Display Properties
  - >  Calibrated Cameras
  - Uncalibrated Cameras
  - Disabled Cameras
- >  Rays
- Tie Points
  - >  GCPs / MTPs
  - >  Automatic
- >  Point Clouds
- Point Groups
  - Unclassified
  - Deleted
- >  Triangle Meshes
- Objects
  - >  Polylines
  - >  Surfaces
- Animation Trajectories
  - > Display Properties
  - >  Animation Trajectory 1
  - >  Animation Trajectory 2
  - >  Orthoplanes
  - >  Scale Constraints
  - >  Orientation Constraints

High profile airport landslide in West Virginia





Layers

- Cameras
  - > Display Properties
  - >  Calibrated Cameras
  - Uncalibrated Cameras
  - Disabled Cameras
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- Point Groups
  - Unclassified
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- Triangle Meshes
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    - >  Animation Trajectory
    - >  Animation Trajectory 2
  - >  Orthoplanes
  - >  Scale Constraints
  - >  Orientation Constraints



Not a picture... but Hollywood style CGI of airport landslide from RU drone data...

# 1<sup>st</sup> Ever UAS Geologic Stability Analysis for VDOT

Rachael Delaney

Engineering Geology graduate student



Rt 629 Deerfield, VA



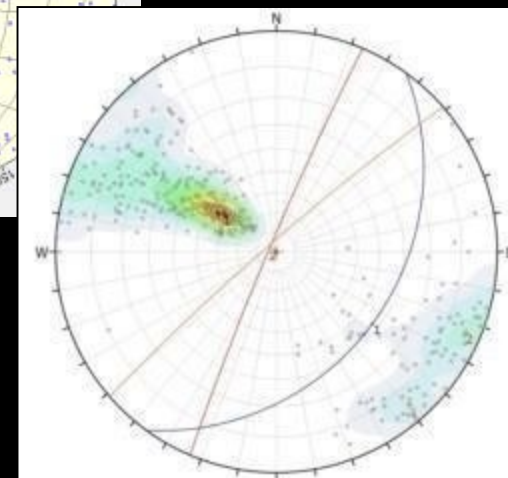
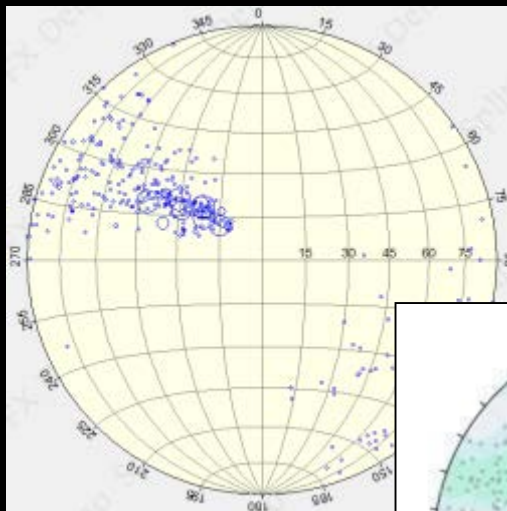
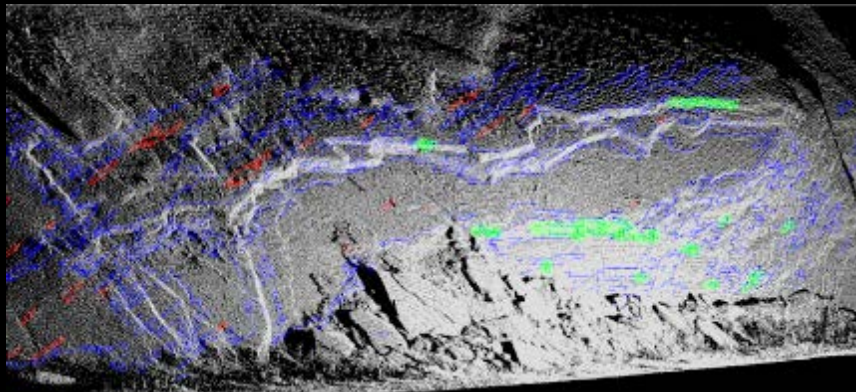
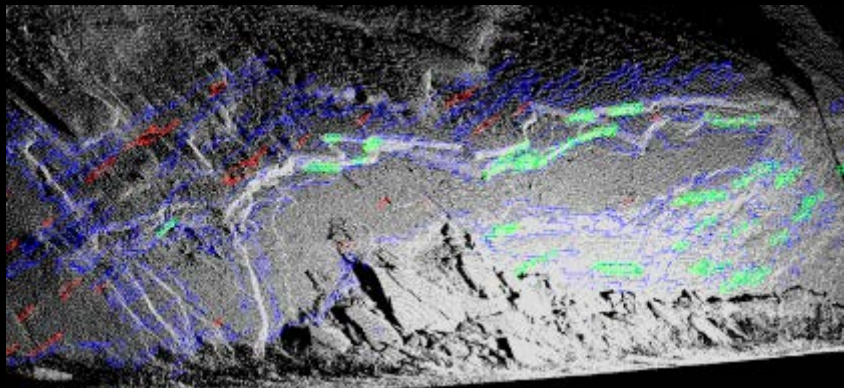
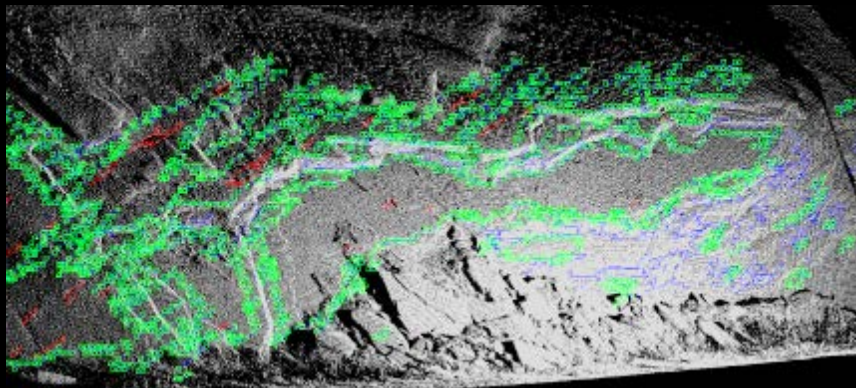


Rt 629 Deerfield,  
VA

Manual UAS flights with  
traffic stopped



## Extraction of discontinuity orientation data using Split-FX software...



Various steps in processing point cloud data to obtain structure data for stereonets using Split-FX

# 1<sup>st</sup> Mitigation Monitoring for Contractor & VDOT



Rock fall protective  
mesh installed

I-77 milepost 5.4 SB  
Fancy Gap Mountain  
July 2018

Natural  
Bridge

Rockbridge  
County, VA



David Johnson  
1860  
Oil on Canvas

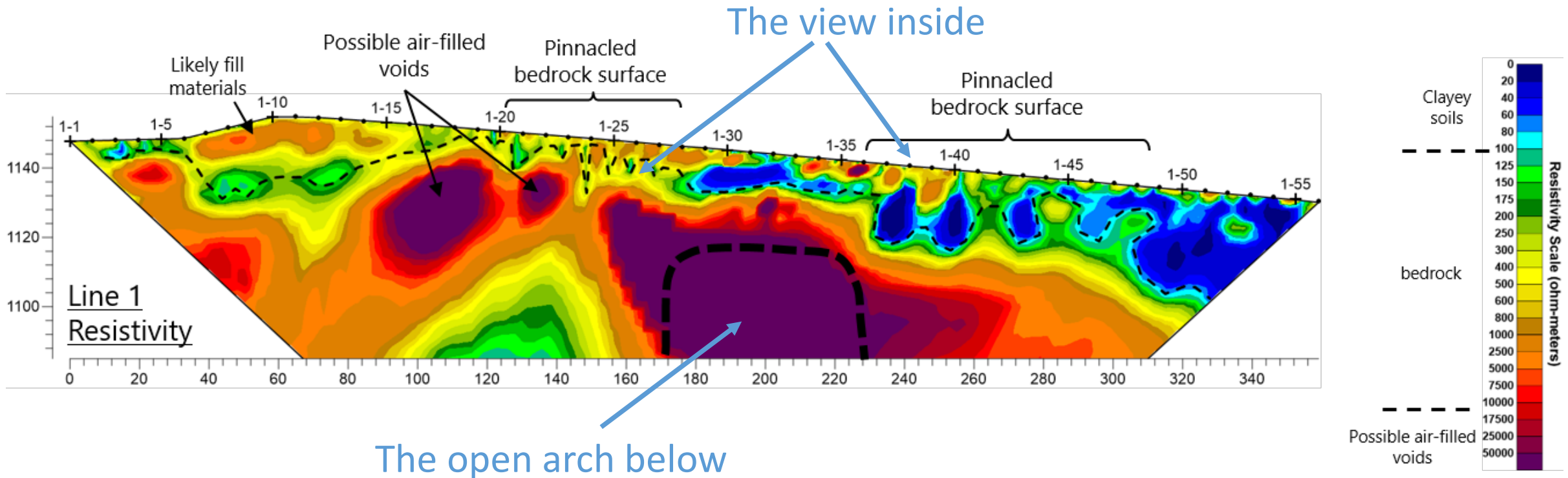
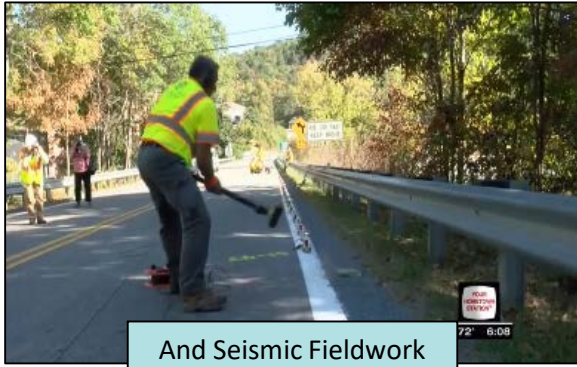
# Engineering Geologic Evaluation of Rock Slope Stability at Natural Bridge, Virginia



1999 fatal rockfall slab

# INTERNAL GEOPHYSICAL MAPPING

## Electrical Resistivity Imaging



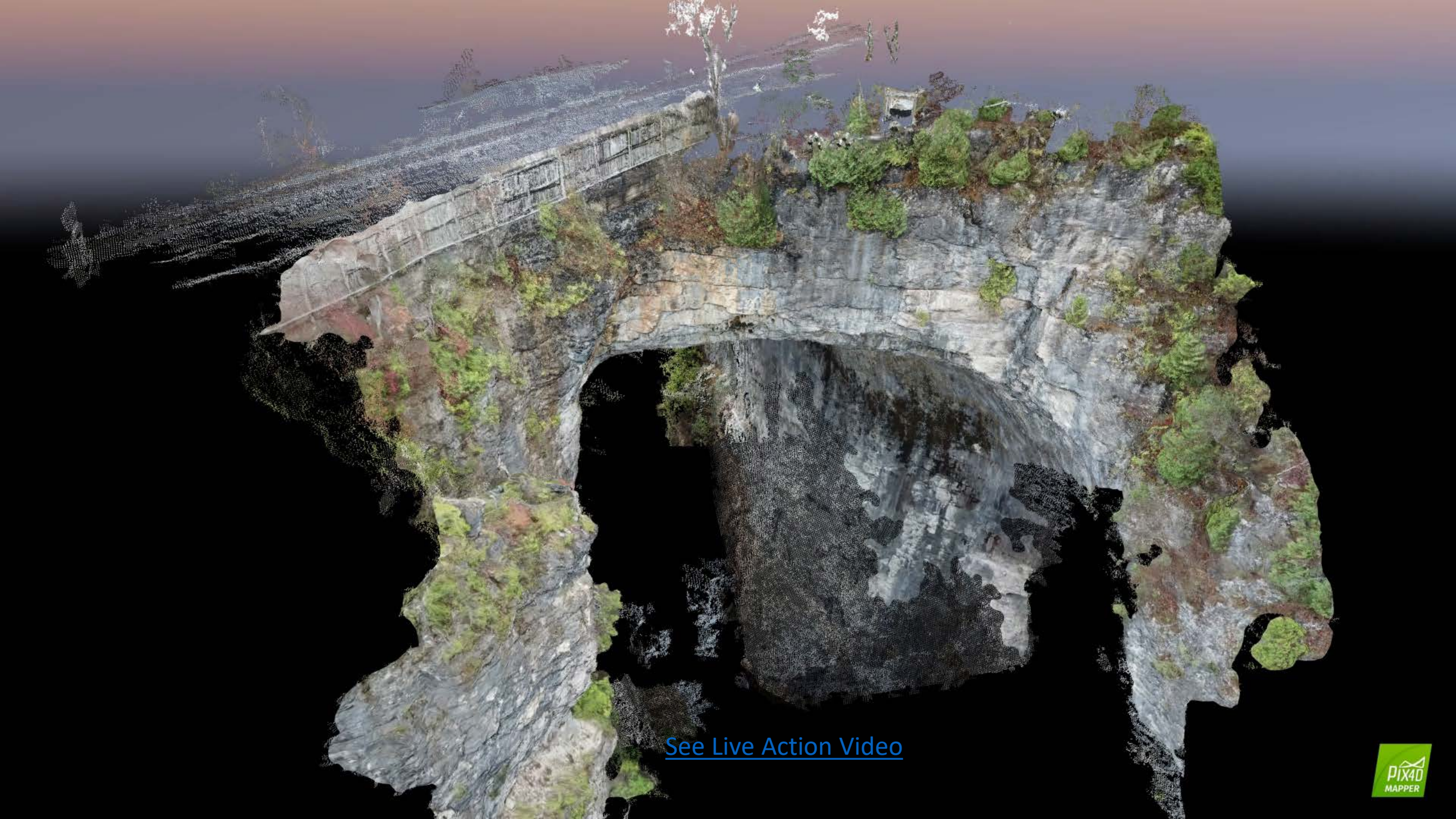
# EXTERNAL MAPPING

## Unmanned Aerial Systems Mapping (UAS)

Concrete buttresses & sensitive rock mass

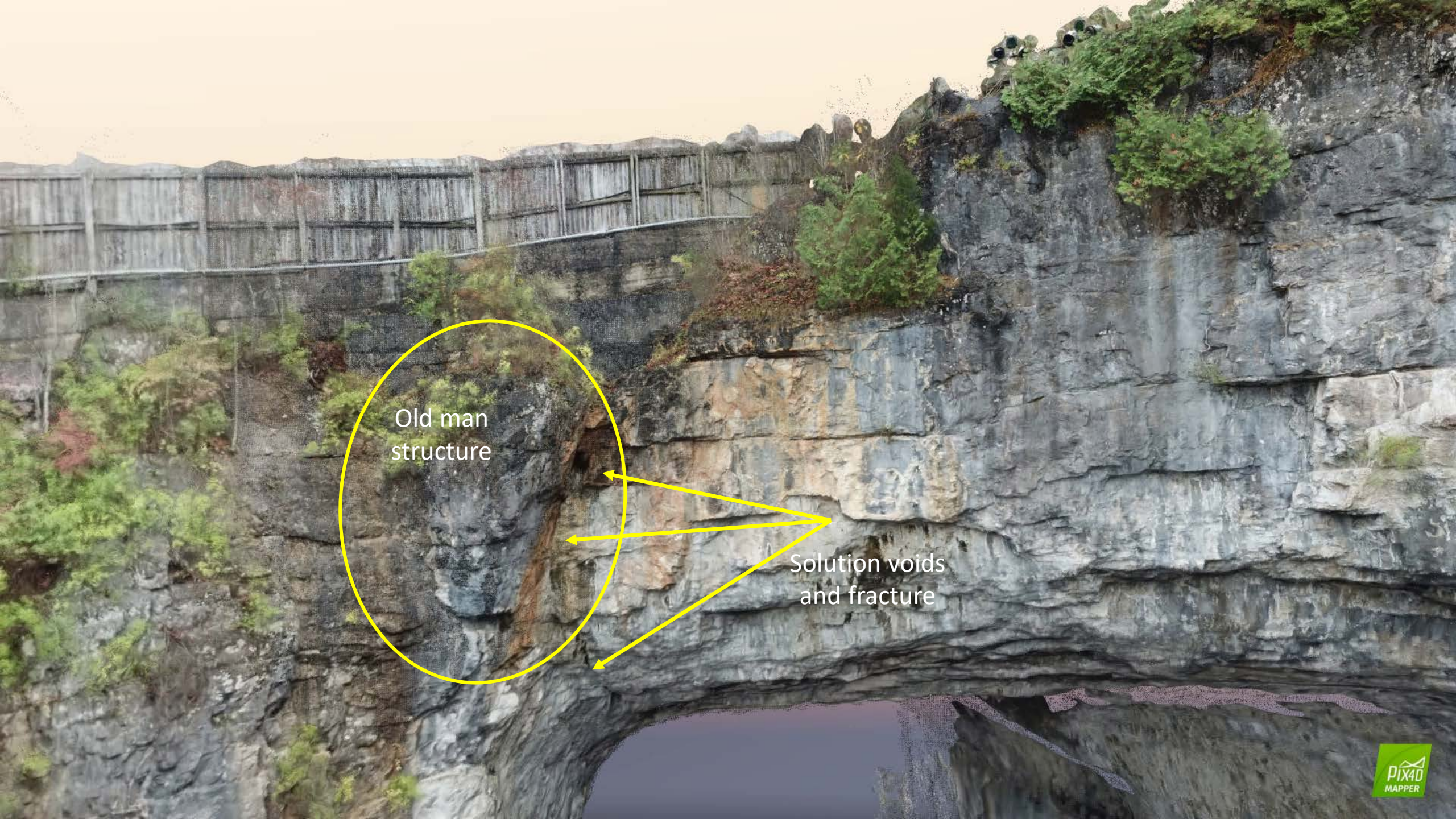
[See Live Action Video](#)





[See Live Action Video](#)





Old man  
structure

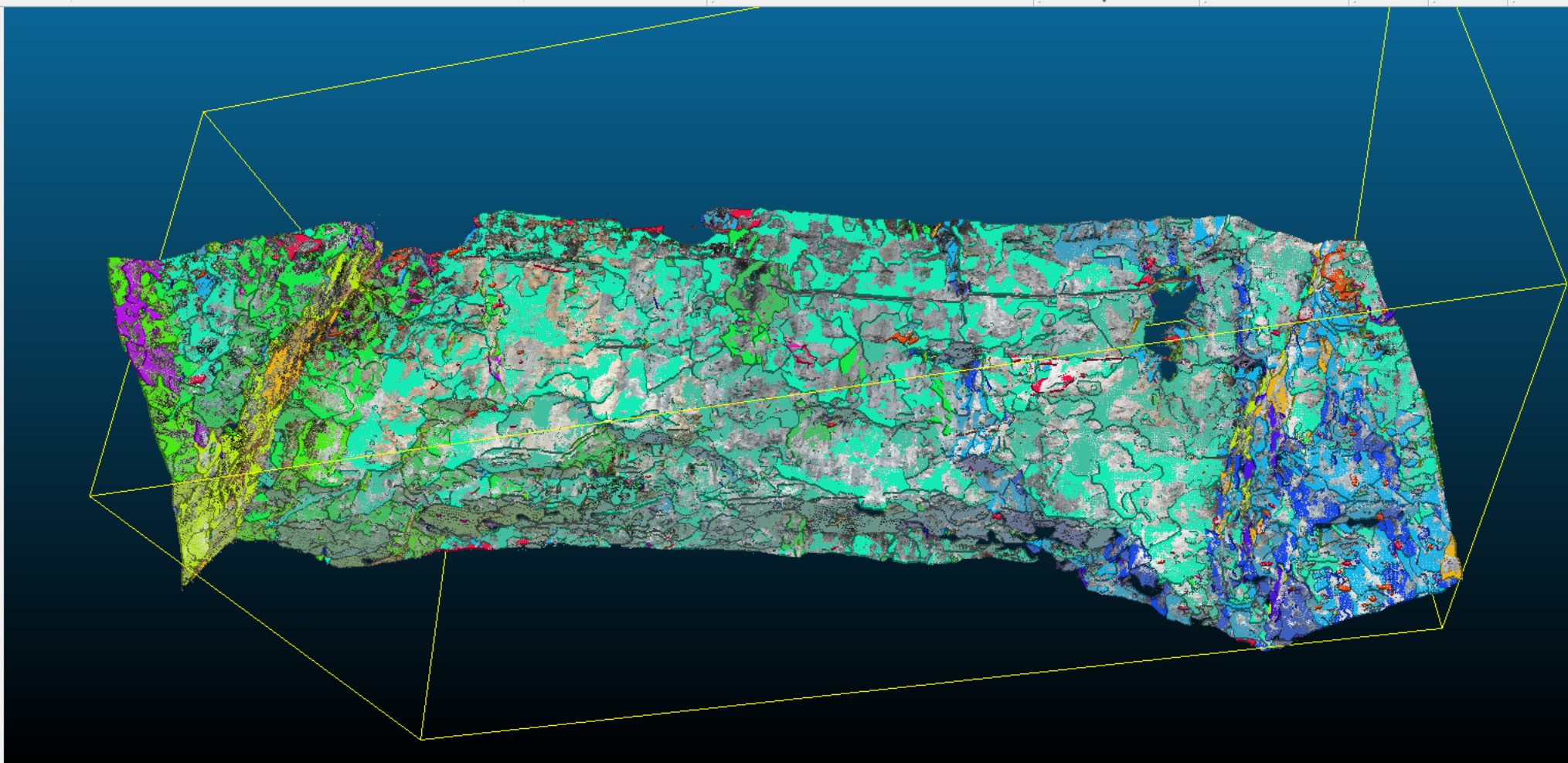
Solution voids  
and fracture



- DB Tree
- + [x] 2017-11-11 N...
  - + [x] 2017-11-11 N...
  - + [x] 2017-11-11 N...
  - + [x] 2017-11-11 N...

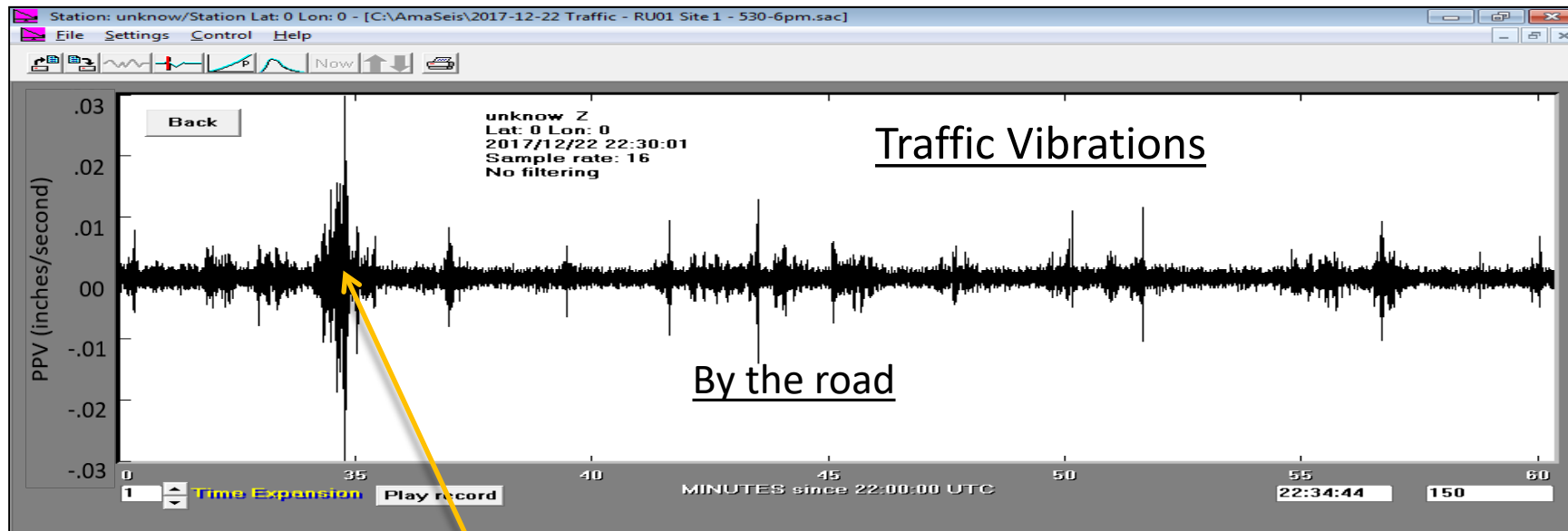
Properties

Property	State/Value
CC Object	
Name	2017-11-11
Show name...	<input type="checkbox"/>
Box dims...	X: 87.1945 Y: 46.1006 Z: 33.0162
Box center	X: 304.848 Y: 871.203 Z: 995.879
Info	Object ID: <input type="text"/>

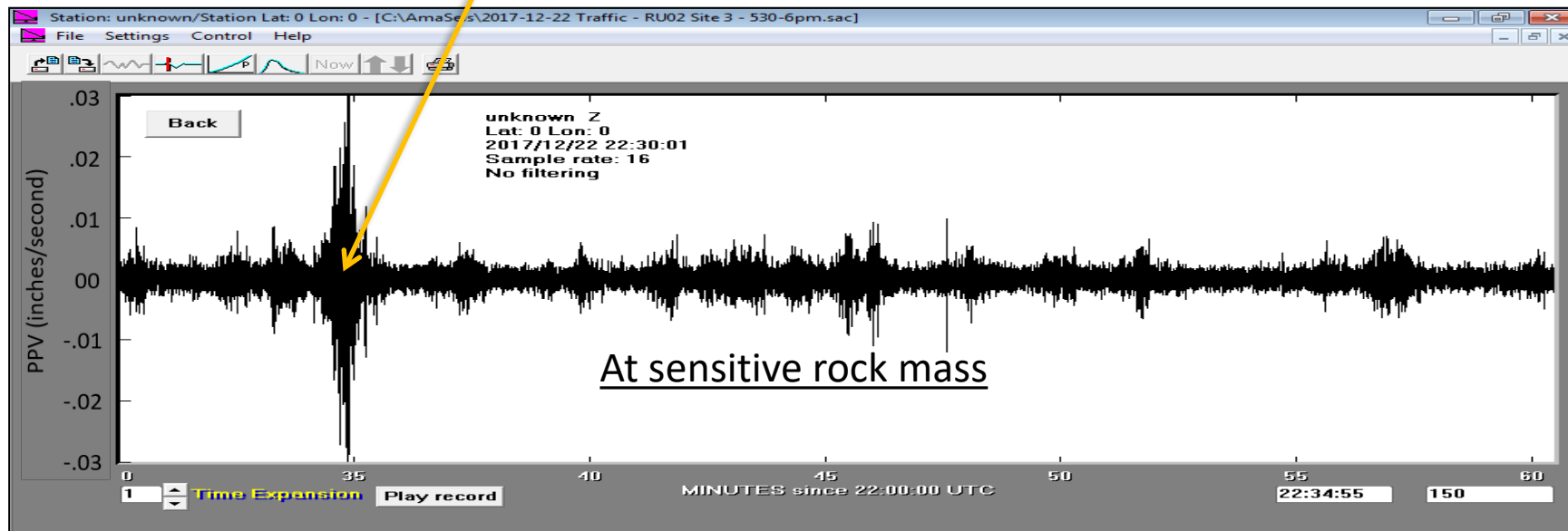


Console

```
[22:34:51] [ccPointCloud::fusion] Global shift/scale information for cloud 'Origin points' will be lost!  
[22:34:51] [ccPointCloud::fusion] Global shift/scale information for cloud 'Origin points' will be lost!
```



Heavy Vehicle Spike: PPV 0.02 to 0.1 in/s





**Time to Global Failure based on strength reduction rates**

<b>Strength reduction/yr =</b>	0.72	psf/yr	<b>Time =</b>	5,000.00	yrs
<b>Strength reduction/yr =</b>	0.50	psf/yr	<b>Time =</b>	7,200.00	yrs
<b>Strength reduction/yr =</b>	0.25	psf/yr	<b>Time =</b>	14,400.00	yrs

## Recent Activities of the Radford University Geohazards and Unmanned Systems Research Center

### Invited talks and other presentations

- Federal Highway Administration (FHWA), invited instructor, national webinar broadcast entitled *Geotechnical & Engineering Geology Use of UAS along Highways*, from Radford University, 11/07/2017
- 2<sup>nd</sup> Annual UAS Public Safety Conference, attended by 4 RU-GRC faculty, Crozet, VA, 03/05-07/2018
- 15<sup>th</sup> Multidisciplinary Conference on Sinkholes, invited keynote on Mountain Lake water loss and landslide history, Shepardstown, WV, 04/04/2018
- VDOT-Natural Bridge, Press Conference releasing results of engineering geologic investigation, Lexington, VA, 04/12/2018
- Department of Conservation & Recreation, invited regarding Natural Bridge safety and stability, Natural Bridge, VA, 05/22/2018
- Association for Unmanned Vehicle Systems International Chapter Meeting (AUVSI), invited talk regarding RU's Geohazards Research Center, Blacksburg, VA, 06/27/2018
- Artis College of Science and Technology, Summer Bridge Program, hands-on drone training for high school girls, Radford, VA, 07/15-20/2018
- American Society of Landscape Architects, invited talk regarding the impact of geohazards on developed landscapes, presented at Natural Bridge, VA, 08/25/2018
- Virginia Transportation Construction Alliance-VDOT Consultants Forum, invited presentation and demo, UAS for highway geohazard investigations and mitigation, Richmond, VA, 10/02/2018
- AUVSI, 2<sup>nd</sup> Annual Unmanned Systems Symposium, presented regarding the use of UAS for geohazards investigations and stability of Natural Bridge, Blacksburg, VA, 10/10/2018
- Rural Planning Caucus of Virginia, 40<sup>th</sup> Annual Conference, invited presentation: water loss; landslide history; and, UAS mapping demonstration over Mountain Lake, at Mountain Lake Lodge, Giles County, VA, 10/17/2018
- 2018 Annual Meeting of the Geological Society of America, RU-GRC student and faculty members provided 3 oral presentations related to UAS geologic mapping and geohazards

# Current Projects of the Radford University Geohazards and Unmanned Systems Research Center

## Partial list of projects underway, proposed, or requested

- VDOT hazard analysis of Natural Bridge in Rockbridge County, successfully completed (\$73,000)
- Request from Department of Conservation and Recreation to develop new mitigation and safety plan for Natural Bridge
- Request from the U.S. Forest Service for stability analysis of the Cascades Waterfall area in Giles County
- New contract with VDOT to develop workflow and protocols for using UAS for highway rockfall hazard studies (\$83,000)
- Contracts with GeoStabilization International (GSI) to use UAS to map and monitor their work for VDOT (\$9,000)
- Contract with Draper-Aden for quarry stability analyses related to housing development (\$2,500)
- Contract proposal with HDR Engineering Consultants for UAS flights and stability analyses at Harpers Ferry, in collaboration with the West Virginia Department of Highways (\$12,000)
- Contract proposal with AEP and GSI for 3D modeling of Hurricane Michael damage at Claytor Dam on the New River
- Request from RU Facilities Management for detailed aerial mapping of campus for planning and documentation
- Request from RU Office of Emergency Management for aerial flood damage mapping
- Request for proposal from Quanta Subsurface for aerial mapping of Cushaw Dam on the James River for rock slope engineering design

## Challenges

- The Geohazards Research Center is operating now thanks to geology faculty willingness to take on heavier loads by adding more sections to their general geology class loads plus adjunct faculty that can be hired for some instructor backfill using contract funds.
- Three out of the five geology faculty are 65 or older. The Center is not sustainable without adding a new faculty member, or a full-time director for the Center, by fall 2019.
- RU Sponsored Programs and Budget Management offices are not accustomed to dealing with grants and contracts within academic programs that can generate excess funds. It continues to create major headaches.

## ADDITIONAL PROSPECTS AND OPPORTUNITIES

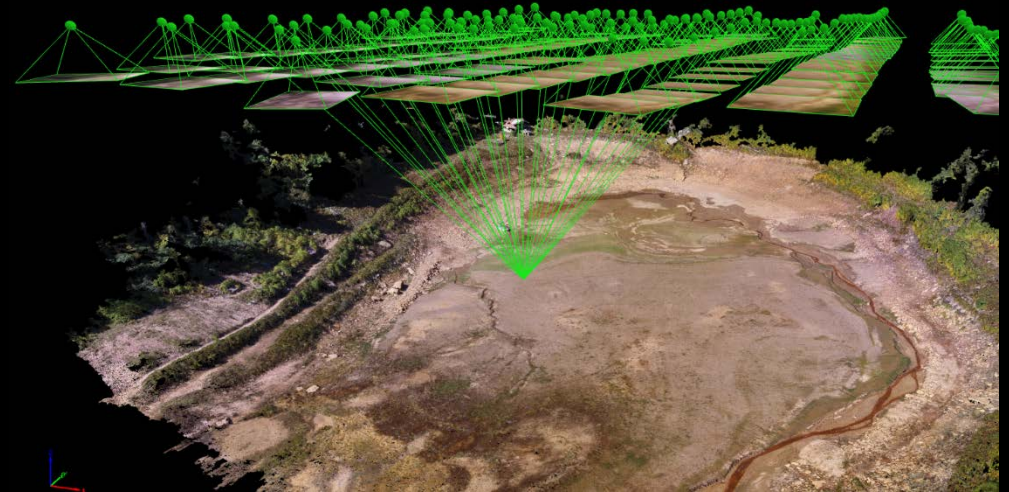
### The SCHEV call for concept papers related to Research Center Capacity Building - due 12/03/18

The Virginia Research Investment Fund (VRIF) was created by the Virginia General Assembly in 2016 to foster economic development and job creation through innovative and collaborative research, development and commercialization efforts and the recruitment and retention of eminent researchers. The Fund encourages cooperation and collaboration among public institutions of higher education and with the private sector. Grants from the Fund are intended to position the Commonwealth as a national leader in science-based and technology-based research, development and commercialization.”

“Concept Papers for Research Center Capacity Building: Concept papers will be accepted for applied research centers focused on commercialization of the product(s) or services resulting from the research (i.e., Translational Research to Commercialization (TR2C) Centers). Limitations exist regarding the areas of research focus. Two or more institutions are required to collaborate.” [Up to \$1.5M available, requires matching funds]

### Partial list of potential eager collaborators

- Virginia Tech NSF program in *Disaster Resilience and Risk Management*
- James Madison University Geological Engineering Center
- Kent State University and Purdue University programs in Engineering Geology
- VDOT and WVDoH
- Federal Highway Administration
- The Association of GeoHazards Professionals
- The Association of Environmental and Engineering Geologists
- Corporate collaborators such as GSI, Draper-Aden, ECS, and HDR



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THANK YOU





End of Board of Visitors Materials

