

COUNTY ROAD ADMINISTRATION BOARD

JAY WEBER, EXECUTIVE DIRECTOR

CRAB QUARTERLY REPORT

Issue 14

January 2015 – April 2015

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2015 WSACE ANNUAL CONFERENCE

At this year's conference in Leavenworth June 16-18 we will be celebrating the 50th anniversary of the County Road Administration Board. On Tuesday evening we will be holding a reception for current and former CRAB staff, board members and WSACE members.

Conference sessions will also focus on CRAB's role as regulator and supporter of county road departments around the state. The conference will be held at the Enzian Inn. Please visit the WSACE website <http://wsace.org/> for information on reservations and registration. See you in June!

APRIL 2015 CRABOARD MEETING

CRABoard Meeting Agenda

The CRABoard meeting agendas are posted ten days prior to the next CRABoard meeting. The Board's next scheduled meeting is July 16-17, 2015 in Olympia. Past agendas and meeting minutes can also be found at the following link:

<http://www.crab.wa.gov/CRABoard/meetings/meeting.cfm>

Staff Contact: Karen Pendleton, Karen@crab.wa.gov, (360) 350-6077

Public Hearing set for July 2015 CRABoard Meeting

The CRABoard set a public hearing for July 16, 2015 for revision to WAC 136-167-040 - Lapsing of RATA allocation for approved projects. This would allow an additional extension for projects held up for reasons entirely outside the county's control, such as by jurisdictions not subject to eminent domain law, or delayed due to court intervention. Staff Contact: Karen Pendleton, Karen@crab.wa.gov, (360) 350-6077

Summary of State Auditor's Reports Findings

Staff reported that four county audit reports representing four counties had been reviewed since the January 2015 Board meeting. Two audits contained a total of two findings issued and none involved County Road Funds in some form. Staff Contact: Walt Olsen, Walt@crab.wa.gov, (360) 350-6080

County Engineer/PWD Changes

Staff reported the following changes since January 2015:

Franklin County continues under Acting County Engineer appointment of Dan Ford, PE after resignation of County Engineer Matthew Rasmussen, PE. On March 4, 2015 Franklin County appointed Craig Erdman, PE as the acting County Engineer, effective March 7, 2015 until a permanent appointment is made.

Spokane County announced the retirement of Bob Bruggeman, PE effective March 16, 2015. Spokane County appointed Chad Coles, PE as interim County

Engineer, effective March 17, 2015. By phone, Spokane County has notified the Board that Mitch Reister, PE, Chelan County has accepted and been appointed Spokane County Engineer, effective April 27, 2015.

RATA Funding

The CRABoard allocated \$40,188,388 in new funding to new and partially funded projects. These funds come from 2015-2017 estimated revenue and turned-back funds. Staff Contact: Randy Hart, Randy@crab.wa.gov, (360) 350-6081

Project Requests Heard By the CRABoard

Columbia County's Tucannon Road was given an extension in lapsing of construction. Jefferson County was granted emergency repair funding for Dosewallips Road which suffered collapse due to the encroaching river after heavy rains. Spokane County's Bigelow Gulch project was given a moratorium on lapsing until further notice since the NEPA document is involved in a lawsuit. Yakima County's North Meyers Bridge # 502 was granted an additional extension to lapsing as tribal right of way on an adjacent bridge project delayed progress beyond the county's control.

Staff Contact: Randy Hart, Randy@crab.wa.gov, (360) 350-6081

Resolution 2015-005 Annual Certification

The CRABoard adopted resolution 2015-005 issuing certificates of good practice to all thirty-nine counties.

TRAINING

CRAB Training February – April 2015

Date	Subject	Location	Participants	Counties Represented
March 11	County Engineer "Lite"	Skamania County	3	1
March 17-18	AutoCAD 3D Fundamentals	CRAB Offices	7	3
March 20	Introduction to CRAB	Skagit County	30	1
April 15	Introduction to UAVs (Drones)	CRAB Offices	9	5 + DNR

Future Training Schedule April – July 2015

Date	Subject	Location	Registration Deadline
April 28-29	Autodesk Infracore	CRAB Offices	April 24
May 5-7	Civil 3-D	CRAB Offices	May 1
May 12-14	County Engineer	CRAB Offices	May 8
June 3	Mobility 4.0	Thurston County	
June 24-25	Mobility 4.0	CRAB Offices	June 19

Staff Contacts: Jim Oyler, JimO@crab.wa.gov, (360) 350-6090 (Mobility)

Jim Ayres, JimA@crab.wa.gov, (360) 350-6091 (AutoCAD, Autodesk Design Systems)

Jeff Monsen, Jeff@crab.wa.gov, (360) 350-6079 (Engineer's Training)

UNMANNED AERIAL VEHICLE (UAV)

CRAB Design Systems Program has embarked on a new frontier, one that reaches far beyond just design system software and into the world of aerial mapping using UAVs. What is a UAV? An **Unmanned Aerial Vehicle (UAV)** is a type of aircraft which has no onboard crew or passengers. UAVs include both autonomous and remotely piloted vehicles. As with any new innovative technology there is expected to be skepticism and questions and UAVs are no exception.

There are many UAV perspectives and some may view this new technology as a *Disruptive Technology*. What exactly is a disruptive technology? It is one that displaces an established technology and shakes up the industry or a ground-breaking product that creates a completely new industry. Here are a few examples of disruptive technologies: personal computers displaced the typewriter; email replacing snail mail, etc... Now as it relates to our industry we have automated survey systems, GPS, handheld devices, data collectors, LiDAR—all huge advancements in the Surveyors Domain. Even with all these substantial shifts in technology we still have not replaced boots on the ground, the professional surveyor and engineer.

So what are some of the purposes that this new technology can be useful for? There are unlimited applications for UAVs such as:

- Mapping
- Photogrammetry
- Digital terrain models
- Mining and quarry survey conservation
- Preliminary site mapping for mission planning
- Recovery monitoring or building site monitoring,
- Land management archeology research (e.g. biology, remote sensing, collective operation, low-altitude flight control)

Data collected by UAVs are stored, manipulated and optimized depending on what you are looking to do with the data. It's then georeferenced and tagged in a way that you can access that data in the cloud. So really, it is not a hobbyist flying contraption (drone) which many assume it to be but rather an information services data collecting tool.

So why map with UAVs?

- 1) Compared to conventional aircraft, using a UAV is easier, safer, and more efficient.
- 2) High precision UAV mapping accuracy is comparable to GPS.
- 3) Photographic rich data, quality assured, seamlessly imported into design systems such as Autodesk's *Infraworks®* and *Civil3D®*, which all 39 counties are using for their design system.

Last year Jim Ayres started receiving calls from counties inquiring about this new technology and had little to offer in support. So at the annual fall **Road Design Conference** we invited Todd Ferris, a professional surveyor from Montana and an expert on UAVs, to come to present on everything UAV. That single presentation was the most highly attended and of the longest duration of all presentations at the conference.

Based on that demand shown from the county conference attendees, CRAB Design Systems Program began in full earnest to do what they could to provide support, education, and research into UAV for the counties that have shown an interest.

On April 15, 2015 CRAB held its first **UAV Demonstration Class**. This course was designed especially for Washington State Counties that wanted to learn to leverage this new innovative technology to reduce the time spent collecting accurate data.

The purpose of this demonstration was to provide counties with the fundamental understanding of UAVs and how they can best utilize this tool to give them the best rate of return of all the mapping tools in their toolbox.

By the end of the demonstration counties learned:

1. The history & types of UAVs
2. What applications & why to map with a UAV
3. Pre-flight setup and post flight data processing
4. UAV data that will be collected can be imported into design systems such as Infracore® and Civil 3D®
5. Current FAA authorization requirements to fly a UAV
6. To remove the word "Drone" from their vocabulary!

Each student was able to examine the UAV. Below, *Matt Balder, Thurston County Engineering*, checking out the UAV device, the eBee.

We showed that by acquiring terrain data from the sky – in the form of geo-referenced digital aerial images, counties can gather millions of data points in one short flight. With collection made simple, county professionals can focus their energy on using and analyzing data, rather than struggling on how to gather it.



One consequence we found was that with such a large increase in the amount of physical data being collected, this does mean an increase in office time spent processing and utilizing this data. However we feel this consequence is cancelled out many times over by the huge time savings a UAV produces out in the field.

We also found that less time spent on the ground means that safety is improved by minimizing risk to county crews when measuring locations such as unstable slopes, pit sites and potential roadway realignment proposals.

To wrap up the classroom instruction we covered the current FAA authorization requirements to fly a UAV. For public aircraft operations, the FAA issues a Certificate of Waiver or Authorization (COA) that permits public agencies and organizations to operate a particular aircraft, for a particular purpose, in a specific area. The COA allows an operator to use a defined block of airspace and includes special safety provisions unique to the proposed

operation. COAs usually are issued for a specific period – up to two years in many cases. CRAB has already been proactive in reaching out to the FAA in an attempt to obtain a “blanket coverage” permit for all 39 counties in the state.

After classroom instruction, we took the class out into the field for an in-flight demonstration. The site location was Thurston County's Rainier Pit site. The site area consisted of several piles of material irregular in shape and size with a total land area of 30 acres.

Todd Ferris (far right) demonstrates how to setup up the UAV for the field flight demonstration.



Phyllis Kanyer, Kitsap County Surveying, preparing for the UAV takeoff!



We also found out bald eagles don't like UAVs invading their airspace!

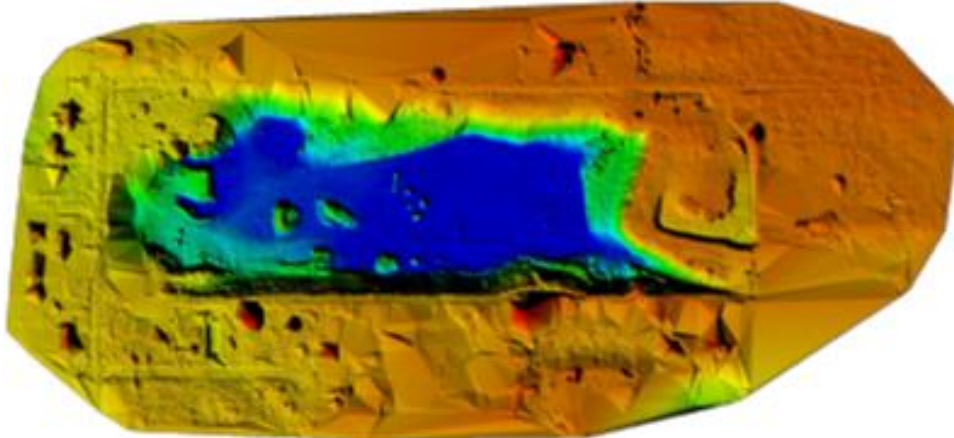


Once we finished with the data collection from the field we headed back to the CRAB training room where Todd explained how to post process the data. Typically this would take weeks to do but we were able to achieve the results in 20 minutes.

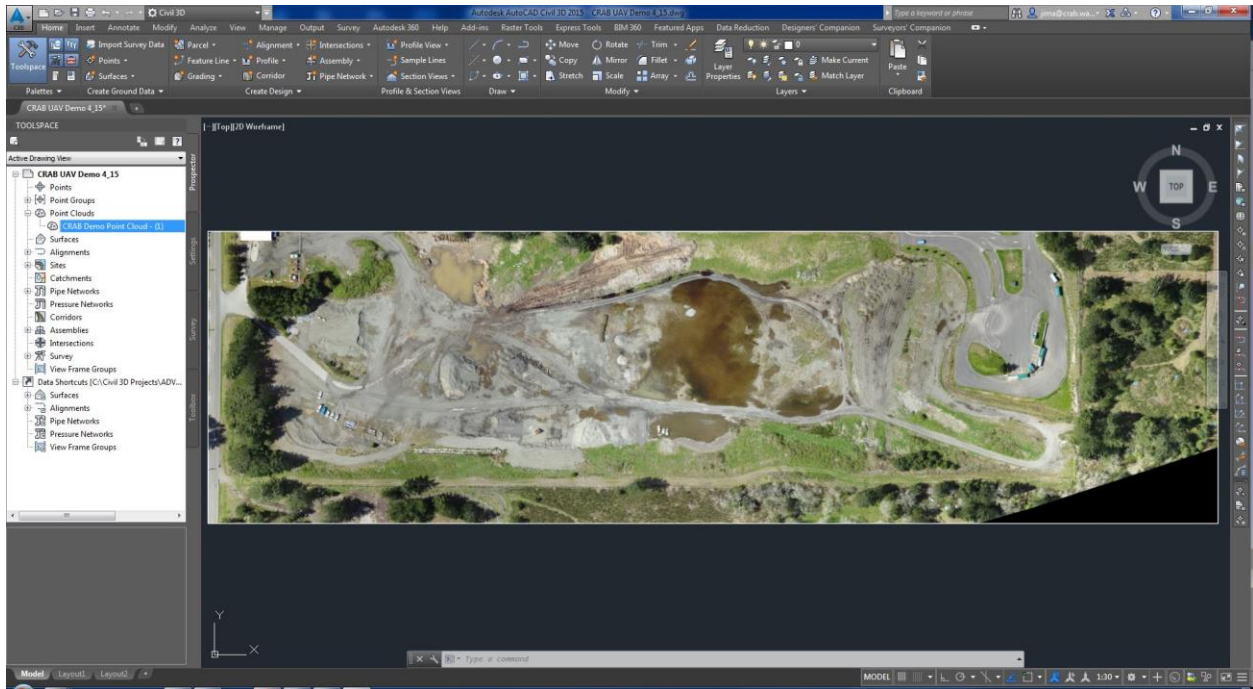
This is a composite of the photogrammetry taken during the flight of the county pit site.



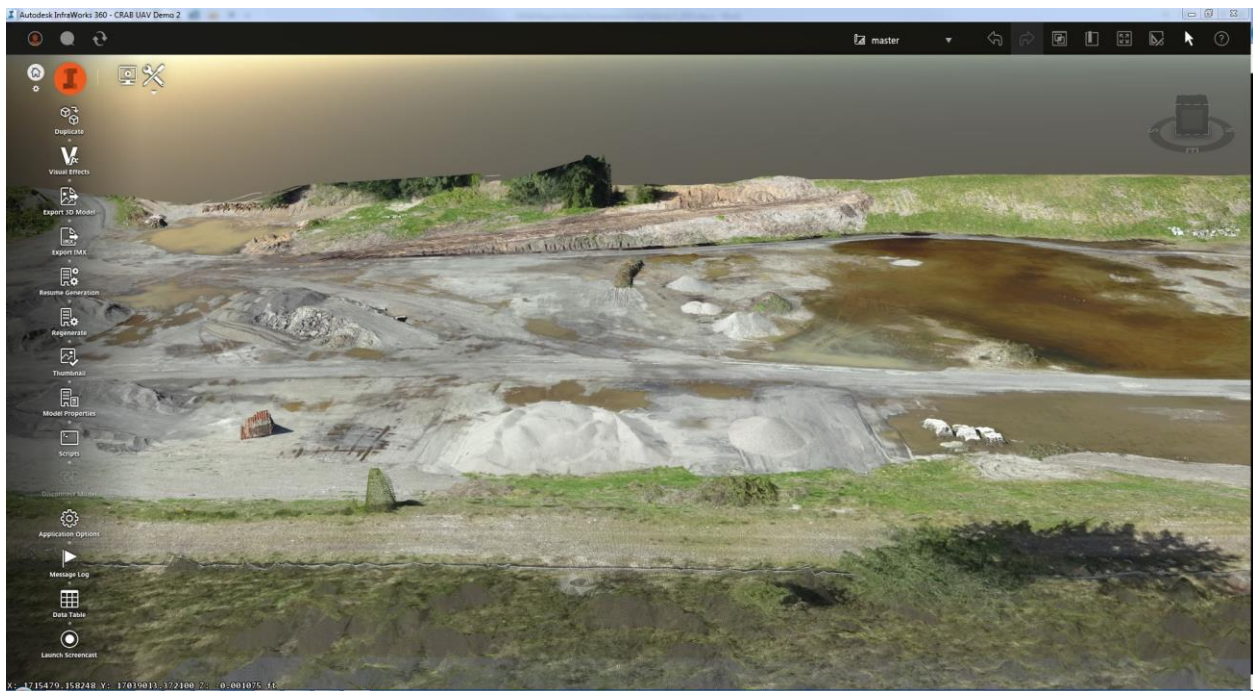
129 photos were taken, only 124 were used in post-processing (due to interference with the bald eagle!)



Above is the actual Digital Terrain Model (DTM) compiled by the software from the data collected from the flight. The model image displays elevation differences of the existing ground terrain. The color ranges from red (higher elevation) to deep blue (lower elevation). Stockpiles were then selected (see tiny mounds in center left of site) and volumes then can be calculated.



Photographic rich data seamlessly imported into Autodesk Civil3D® ready for surface creation.



Above is a screen capture of the same data after being imported into Autodesk's InfraWorks®, a conception design system software. This program allows engineer's to take advantage of accelerated design process that uses data-rich 3D models for high-end visualizations.

Field Demonstration Results:

Completed flight distance = **2.6 Miles**

Land area mapped = **30 acres**

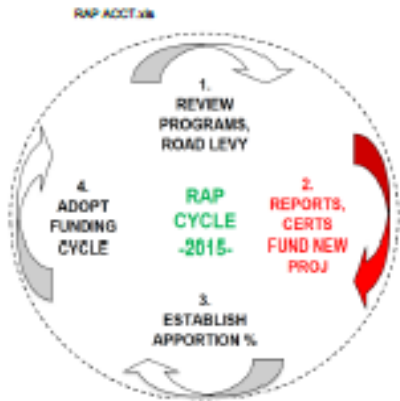
Total flight time = **9 minutes**

In conclusion, we feel that studies have shown that UAV photogrammetry is as accurate as GPS, much faster, and provides a richer representation of geography. Given favorable regulatory conditions from the FAA, this technology looks to play a huge part in the not too distant future for many of our current county methods for mapping. While traditional surveying methods are still needed, UAV photogrammetry is unmatched in terms of efficiency for surfaces above several acres all the while producing equivalent accuracy. In addition, using the UAV surveying method not only produces a DTM but also a geo-referenced, highly detailed orthomosaic, an important added-value for project site documentation.

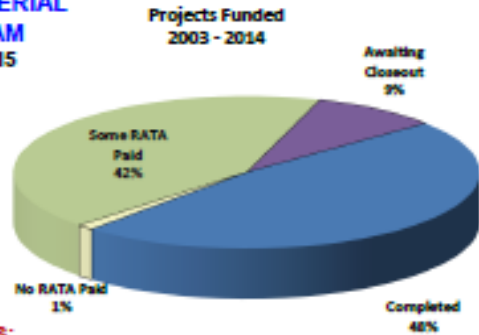
Finally, we feel that we have embarked on an epic journey for our Design Systems Program, one that will help define the integration of UAVs into county mapping needs for many years to come.

Any questions regarding a potential project you may have for a UAV as well as for any of your training needs on the above mentioned software products; Autodesk's Infracore®, Civil3D®, or Intro Into UAVs, please contact Jim Ayres, P.E. Jima@crab.wa.gov, (360) 350-6091.

RURAL ARTERIAL TRUST ACCOUNT (RATA) ACTIVITY AND BALANCE SUMMARY



RURAL ARTERIAL PROGRAM APRIL, 2015



PROJECT STATUS:

Billing Phase	'83-'03	'03-'05	'05-'07	'07-'09	'09-'11	'11-'13	'13-'15	TOTAL
Completed	886	42	26	34	18	1	2	1009
Awaiting Closeout		3		4	3		5	15
Some RATA paid	1		2	7	21	1	41	73
No RATA Paid							2	2
TOTAL	887	45	28	45	42	2	50	1099

FUND STATUS

Anticipated Revenue to end of '13 - '15 Biennium:	
Fuel tax receipts and interest to June, 2013	484,755,956
Estimated fuel tax receipts and interest July 2013 thru June 2015	37,289,913
Total estimated revenue	522,045,870
RAP Expenditures to date:	
To Completed Projects	453,136,284
To Projects In Design or Under Construction	38,506,451
Administration	9,742,441
Total RATA spent	501,385,186
RAP Obligations:	
RATA Balance on Current Active Projects	83,964,188
Pending funds to be allocated (active projects)	21,404,952
Estimated remaining administration through 2013 - 2015 biennium	164,000
Total RATA obligated	105,533,141

QTR1 - 2015 RATA ACTIVITY:

MONTH	BEGINNING BALANCE	MVFT REVENUE	INTEREST + Cash Rcpts	PROJECT PAYMENTS	#	ADMIN CHARGES	ENDING BALANCE
January	\$18,108,480.00	\$1,479,121.70	\$3,142.28	(2,757,528.87)	25	(37,753.23)	\$14,795,481.88
February	\$14,795,481.88	\$1,512,597.89	\$4,178.78	(2,010,378.00)	30	(37,179.41)	\$14,284,681.12
March	\$14,284,681.12	\$1,441,785.80	\$4,788.03	(350,835.00)	11	(\$38,988.07)	\$15,314,414.58
TOTALS:		\$4,433,505.19	\$12,087.07	(5,127,739.87)	66	(111,918.71)	

4/9/2015

Staff Contact: Randy Hart, Randy@crab.wa.gov, (360) 350-6081