UAS Best Practices & Uses In Restoration

SWG Round Table
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Project: Bear, Mary's, Ferris

Best Practices Reminders

- Careful flying indoors during quarantine, social distancing still applies to dronies
- Remote Pilot Certification- 14 CFR Part 107 certification for UAS commercial use
  - Recertification every 2 years
- Registration
  - FAA (Federal Aviation Administration)
    - Registration required and number posted on UAV
  - ODA (Oregon Department of Aviation)
    - Registration required

"Willy"

Project: Dairy Creek

Best Practices continued

- Airspace
  - LAANC (Low Altitude Authorization and Notification Capability)
    - FAA program that supports UAS integration into controlled airspace. LAANC automates the application and approval process for airspace authorizations. Through automated applications developed by an FAA Approved UAS Service Suppliers (USS), pilots apply for an airspace authorization.
  - Ceiling
    - 400 feet AGL
    - 500 feet below clouds
    - Or according to restricted airspace limits
- Flight Logs
  - FAA requires flight logs but no submissions
  - ODA requires annual flight log report

FAA Airspace Authorization

- AIRMAP is a LAANC authorized UAS Service Supplier used to apply for authorization in controlled airspace (i.e. PDX and AST)

  - Once submitted, authorization is almost instantaneous if you are planning to fly within the maximum altitude of the controlled airspace. If you are planning to fly above the ceiling within the controlled airspace, authorization is processed manually by the FAA and may take up to 30 days.

    - Draw polygon of flight boundary
    - State desired maximum flight altitude
    - Designate a date and time

Airspace Authorization Pointers

- Submit a couple of authorization requests
    - Contingency dates in case of bad weather
    - Multiple altitudes in case FAA rejects authorization request
    - Delete any contingency dates you are not planning to use
- Airmap app works better than the website
- Once authorization has been granted use the same framework to gain access into that airspace in the future

Project: Fee-Simon

CREST use of UAS in Restoration

Orthomosaic Mapping

- Different levels of mapping according to required accuracy

  - Reconnaissance mapping- used to get a real-time aerial snapshot of a site with optimal resolution (~1-2 inch/pixel)
    - No Ground Control Points (GCPs) used
    - Used for early feasibility, photo points, marketing, and presentations

  - Precision mapping- used to map a site for use in later stages of design and for as-builts
    - GCPs established according to topography and size of the site
    - Digital Surface Model (DSM) produced
    - $$$$$$- require added field time with GCPs and more rigorous post-processing

crest
COLUMBIA RIVER ESTUARY
STUDY TASKFORCE

Ortho mapping pointers

- Start flying grid at furthest point

- Fly as close to noon as possible to minimize shadows

- Frontal overlap/side overlap: 80%/80% to increase matched features for a better ortho and DSM

- GCPs should be spaced throughout site at varied elevations to capture topographic diversity

- Grid boundary should extend further than area of interest
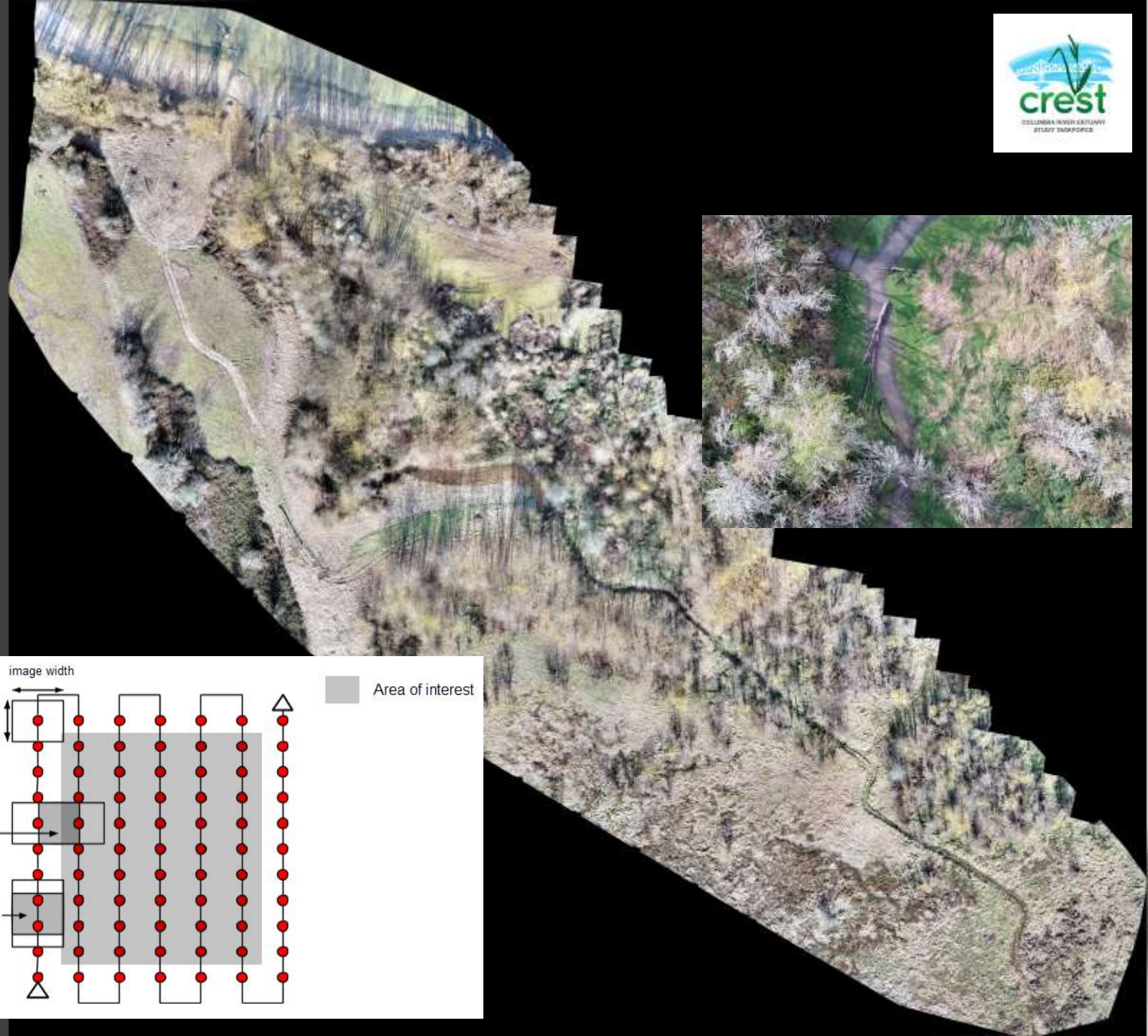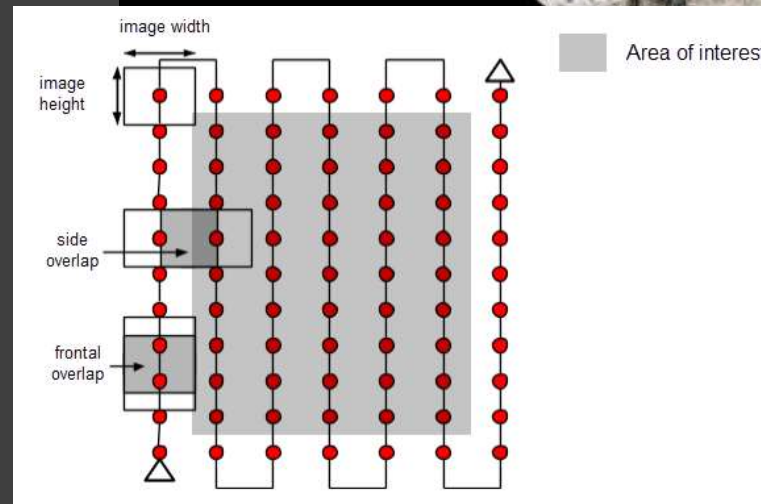
Extracting Topography from Digital Surface Model (DSM)

- An Orthomosaic and DSM are rendered from grid flight
  - Contour lines are created using the DSM
  - Contour line increments are chosen according to topography of site
  - 1 foot contour line increments pictured
- DSM and contour lines tied to GCPs for accurate and true location and elevation
  - GCPs are established using RTK technology

- These functions used for design of projects and for as-builts post-restoration

Photo Points

- AEMR Level III photo points
  - Implementing aerial photo points at all sites
    - 1 year pre-restoration
    - 1 to 5 years post-restoration

- Pre vs Post

- Change over time
  - Specific features
  - Overall site

PRE   POST

PRE   POST

Next Steps

- Multispectral sensor-
  - Captures high resolution imagery in visible and near-infrared parts of the electromagnetic spectrum, allowing for the calculation of vegetation indices used to estimate productivity and to classify vegetation
    - Site scale vegetation monitoring to identify dominant plant communities
      - Pre-restoration- target native plant communities to use as a reference for design and implementation
      - Post-restoration- effectiveness monitoring of vegetation community development over time

- RTK enabled system-
  - Precision mapping with less ground control points
    - Site scale, high grade surveying in a fraction of the time
    - Adaptive management- this tool will allow for efficient site scale monitoring of restoration actions possibly making adaptive management feasible

Acknowledgments

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- ODFW

- NPS

Stay safe during these crazy times.