Integration of Unmanned Aerial Vehicles in Daily Forest Operations, from Cruising to Regeneration Survey

BOGDAN STRIMBU (Assistant Professor, Oregon State University)

Unmanned Aerial Vehicles are expected to change the face of forestry as we know it. There are already significant advances in execution of various tasks that are either expensive or resource unfeasible, particularly in areas where access is difficult. The presentation focused on regeneratic success, damage, soil compaction, and inventory.

Key Points:
- Unmanned aerial vehicles (drones) is a current tool: sample up front, cruise, then extrapolate
- Drones are the biggest change in the forestry world: explosive development, way faster than smart phones
- Half of inventory work is using them; sensors are cheap
- Computation: small drone can't have high grade sensor but can calculate instead
- Trade-offs: fixed wing flies longer but gets less data; copter get more data but has shorter flights
- Chopper:
    - Sensor, rgb camera, fly under canopy with fish-eye lens
    - Record images but they need analyzed
    - Process them raster to raster or raster to vector
- Application: 1000's of points ($100s/m^2$): gives you images of trees
- Sub-inch resolution
- Classification algorithm 95% accurate, better than the human eye
- Finds trees, ID's crown, always >85% (in uneven age, multi-storied stand)
- 99% accurate in plantations
- Need qualified personnel, develop it, capture it in minutes and then have it to analyze as you want

QUESTIONS & ANSWERS:

Question: How do you calibrate field of view on the drone?
   Answer: Above canopy is easy. Fly more than you think. Point cloud corrects for height ar tilt. New rules for drone pilots allows easier process.

Q: Doesn't the camera on the drone have GPS?

    A: Point cloud scales it. Don't need GPS. Can georeference it with technology. Lots of movement with chopper with wind and trees, but it is accurate.

Q: On the drones, does it do tree species identification?

    A: No, work in progress. Even LiDAR is challenged by that. Classification with 3D component to try and help. Drone work is a different world.

Q: What about wildlife harassment with the drone? What safeguards are in place?

    A: The technology is new; we're learning. Coarse approaches. Restrictions on listed wildlife species. Private drones are modified. There are no standards.