

Experiment Description: SHARE 2012 (September)

Input required by June 15th

Investigator: Kelly Canham (and whom-ever is taking this over when I get outta here)

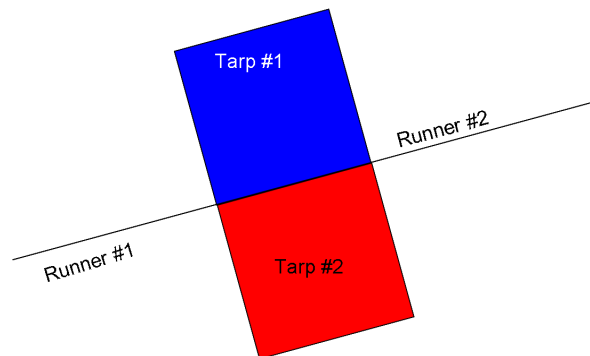
Support Crew: whom-ever is taking this over (maybe Dave Messinger)
Kac7669@rit.edu, 978-495-0235

Short Title: Spectral unmixing abundance truth-edge

Objectives: To obtain ground-truth information for spectral unmixing. This experiment will attempt to provide such ground truth for 2, 3, or possible 4 materials mixing in a single pixel. Using an edge which can be measured from the image itself, the abundance of each material along the edge will be calculated. The same image can be spectrally unmixed and then the edge-calculated-abundance can be directly compared to the spectral unmixing abundance.

Deployments: At least 2 large tarps and 2 rolls of thin, flat, straight runners. The size of the tarps will depend on the size of the pixel footprint, each tarp should be at least 10-pixels square. Therefore, for a 2m pixel footprint, the tarps should be 20m square. The tarps should be made of different matte materials and be uniform (i.e. calibration tarp or blue, plastic, camping tarp or thick/opaque painters tarp or blankets/quilts or plywood boards or Tyvek). The runners must be a matte material which could be tape (masking tape, painters tape, etc), ribbon, thick rope, or other thin straight materials (PVC pipe, paper banner) and needs to be several (at least 10) pixels long and needs to be approximately 1/10 pixel pitch in width. Therefore, for a pixel footprint of 2m, the runner should be 20m long by approximately 20cm wide. The runner material must be contrasting to the background material. So, if the targets are setup on grass or asphalt (dark materials) the runner should be bright. Stakes/hammer will be needed to tack the tarps and runners to the ground.

Figure 1 Basic setup.



Flight Lines: Avon, NY, park

Figure 2 Example setup of tarps and one runner/line at Avon Park. Only one runner/line is shown since the other line is covered by asphalt/grass edge.



Flight Constraints: Hyperspectral imager at high-sun angle and no clouds. Only one GOOD image that covers the entire target is needed.

Ground Truth Required:

Spectroradiometer (ASD) reflectance data for the tarps, runner, and background materials. Ideally several measurement across total spatial area of each material and edge/mixed material measurements. This is to prove that the tarps are spectrally uniform over their region. The edge/mixed measurements are to prove that linear mixing of the two materials Spectral measurements can be made prior to flight.

Atmospheric conditions need to be recorded at time of flight for image atom correction.

Also want the GPS position of each tarp corner and runner endpoints. And the heading angle of the edge is desired to be recorded.

Equipment: 20m painter tarp (size based on pixel footprint of HSI sensor)
20m blue tarp (size based on pixel footprint of HSI sensor)
40m thick white rope (size based on pixel footprint of HSI sensor)
ASD or other portable spectroradiometer with VIS-SWIR spectral range

GPS

At least 12 Stakes or 8 weights and 4 stakes

Hammer

Tape Measure

Compass (to determine heading, unless GPS can do this)

Radiosonde or met-station or constant-panel and 10-channel-solar-radiometer for atmo info.