CO_2

**** Work in Progess first early draft version ****

(Outline for each scanner:)

Scanner:
Testobject required: y/n if so what is the object(s)
Method to evaluate quality:
Method for calibration:
Frequency of calibration:

Test Objects

White reflectance Panel

The white reflectance panel is made by SphereOptics. It is uncalibrated and carries only an I.D. number SG3156-U and has a 95% reflectance.

In addition we have a smaller 10x10cm SphereOptics uncalibrated target. I.D. SG3156-U and 95% reflectance.

Color Chart

The [color chart is manufactured by Mennon](#). It is printed almost exclusively in Japanese, but it does have a key of the RGB values of all the color squares.

3D object

The 3D test Object came with a set of [labsphere Spectralon diffuse color standards](#) Art 050-166. All 8 targets are individually labeled.

Test object is made of solid aluminum with an accuracy of 0.1mm and laser engraved checkboard pattern.

Inlays with colour targets are within the box and should be placed onto the object.

- Need to ensure that the test objects are always level. (https://github.com/terraref/reference-data/issues/37)
- Verify that there is no reflectance from surrounding shiny objects (e.g. sensor box, gantry body, fence surrounding the field) that are biasing the reflectance measurements.

Scanner: VIS

Testobject required: y
    Siemens Star, and aluminum reference object
Method to evaluate quality:
    Scan the test object and star at different heights and speed to evaluate resolution and impact of motion blur.
ToDo: Add Methods for evaluation. Will be added next week
Method for calibration:
Unknown yet, In lab this would be performed using a calibrated light source, cost around 20k but changing light conditions will be the biggest challenge here.
Frequency of calibration:
Unknown

Scanner: Hyperspec VNIR and SWIR

Testobject required: y
Spectralon white reflectance target,
http://sphereoptics.de/en/product/zenith-polymer-diffusers/
Method to evaluate quality: Resolution and motion blur methods will be same as VIS
Method for calibration:
Scan white reflectance target
Frequency of calibration: 20 min or less. This will insure that there is < ten minutes between the time of calibration and time of capture.

Scanner: IR

Testobject required: unkown
Method to evaluate quality: unknwon
Method for calibration: Mathematical approach, Matlab Routine from tino
Frequency of calibration: every image

Scanner: Laser Scanner

Testobject required: y
Aluminum block and checkerboard pattern,
Method to evaluate quality:
Displacement from ground truth checkerboard pattern and measured setup
Method for calibration: Scan reference object and send the data to Fraunhofer to create the transformation matrix
Frequency of calibration: Once a year

Scanner: PSII

Testobject required: healthy plant
Method to evaluate quality: Fv/Fm of Healthy plant at around 0.8 remaining similar to VIS
Method for calibration: not required
Frequency of calibration: not required if quality is still sufficient

Remaining sensors currently unknown