## SOP for the MicaSense (MS) payloads updated 2024\_07\_24 by Jake King

**Flight parameters for 1-2Ha BC forest research trials with Micasense ten band cameras**

* **Flight elevation – 40m young to 60m on mature**
* **Speed – 2ms**
* **Overlap 87X87**
* **Margin – 10m**
* **Terrain following if possible**
* **Timed interval pictures- every 2 seconds**

**Pre-mission preparations:**

1. Ensure SD cards used are in **FAT32 format**, they will not work in EXFAT32 or other formats.
   1. Bring emptied SD cards or at least 50GB free.
   2. Third party software GUIFormat can be used to quickly format into FAT32
2. Open this page up beforehand for magnetometer calibration instructions: [DLS Magnetometer Calibration – MicaSense Knowledge Base](https://support.micasense.com/hc/en-us/articles/115001432308-DLS-Magnetometer-Calibration?source=search)
3. Do Not fly the MS in any moisture and remove the DLS if flying in any moisture.
4. The calibration steps require the drone to be in the most open spot possible. Wear dark non reflective clothing and calibrate against a dark/neutral background. Don not calibrate against a bright orange helipad.

**Set up Procedure: Assuming the preflight steps from the M300 SOP have been followed, the drone compass has been calibrated and the drone is off.**

1. Confirm flight plan on the controller – use the preexisting flight plans and save with date of flight if any changes are made.
2. If site is on lower sea level elevation than takeoff spot, manual take off will be required **(Micasense will not take into account ground level altitude and potentially fly towards the site immediately)**
3. **Turn the controller off**. This prevents remote controller interference.
4. Set the M300 on a raised surface and ensure it is **NOT** powered before attaching the MS.
5. Connecting the MS to the M300 gimbal
   1. The center of the largest groove on the Micasense goes directly under the red dot. Once slotted correctly rotate counterclockwise, should rotate smoothly without force. (Red camera front, blue camera at back)
   2. Plug in the downwelling light sensor (DLS) cable to the MS port near the gimbal connection
   3. Insert the SD cards into the Blue and Red cameras.
6. Set the M300 down at takeoff spot. Avoid shadows covering the DLS to ensure proper light calibration
7. Power on the Drone
8. Power on laptop/phone and turn on wifi – Check for MS rededge Wifi and connect - password is micasense.
9. Open Browser (Edge and Chrome have worked) connect to <http://192.168.10.254>
   1. If connection is taking longer than 3 minutes, check if controller is on and reboot.
   2. If connected you will see information on the home tab - ignore the two warnings at the top (apparently they are always there)
10. If the drone has moved more than 5km, calibrate the magnetometer.
    1. Go to settings (cog icon), navigate to the DLS configuration tab and select calibrate DLS mag, follow the instructions provided to do the calibration dance.
    2. Check the calibration by comparing the bearing on the app with a handheld compass. Redo if there is more than a six degree variation
11. Once the magnetometer has been calibrated, power cycle the drone off. You should be ready to launch the flight with this power cycle, so take care to have the drone in an open area and stand back from the DLS while it calibrates.

**Calibration panel steps:**

**Updated July 2024 to account for this note on the Micasense support site:** [**Best practices: Collecting Data with MicaSense Sensors – MicaSense Knowledge Base**](https://support.micasense.com/hc/en-us/articles/224893167-Best-practices-Collecting-Data-with-MicaSense-Sensors)

“When capturing the panel image using your sensor, use either the Capture button in the camera’s WiFi interface page or push the physical button on the front of the camera. **External trigger mode, timer mode, or overlap mode should not be used for panel captures.** These modes will cause saturation of the panel images.”

1. Power the drone on. You should be ready to launch the flight with this power cycle, so take care to have the drone in an open area and stand back from the DLS while it calibrates.
2. **Remove lens caps.**
3. Connect browser as per step 9 above and check the GPS signal is strong on the home page.
4. On laptop - go to Camera tab->Hit Capture for test images confirming connection.
5. Orientate drone to face directly away from the sun (front and camera side facing away)
6. Place the calibration panel on flat ground in direct light. **Ensure the panel is on flat ground without shadow, and away from bright colored surfaces during the calibration process.**
   1. Lift M300 up by holding on to **both right side arm locks** to about 1m height.
   2. Move towards calibration panel while checking no shadows or reflective surfaces near calibration (such as an orange landing pad)
   3. Hold the drone directly above calibration panel with MS camera centered above it, tilting the drone slightly forward for the camera to be level with the calibration panel. Confirm with visual observer assistance.
   4. Using the capture feature on the Camera tab, capture 5-10 images of the calibration panel. Ensure that the panel takes up at least one third of the image width, and that the QR code and serial number label are visible in the images.
7. You are now ready to start the camera on the next step, so ensure all preparations are complete and the drone is ready to launch.
8. Go to Settings-> Basic Configuration and ensure auto-capture mode is set to timing then hit start (Started once showing stop option instead). MS camera requires no Wi-Fi connection beyond this point, the camera stops when drone is shut off.
9. Turn on the controller and hot swap batteries if required.
10. **Repeat step 6 at the final landing.**
11. If the site is at a lower elevation than the take-off spot, initiate a manual takeoff, once reaching a safe height, initiate the flight plan.

**Post-Flight tasks:**

1. Power down the M300
2. Unplug DLS cable, loosely tie a loop above the gimbal to prevent loose wiring.
3. Put lens caps back on cameras
4. Remove camera by holding onto the button on gimbal connector and rotating camera clockwise.
5. Remove SD cards (Unless next flight is also with micasense camera)
6. Store gear back into MS box.

**Data copying procedure:**

1. Each site has an empty folder titled YEAR\_Mo\_Da within the Flights folder.
2. Copy and paste within the same directory and rename to the current date, and use as the data storage folder for the day’s collected MS photos.
3. Micasense photos will be stored in the SYNC folders within the SD card, when checking the time of the flight, photo time stamps are in UTC, so calculate accordingly.
4. Micasense folder will have a MS\_RED and MS\_BLUE.
   1. When copying, MS photos within the SD cards can be identified as such:
      1. Names ending in \_1 to \_5 = MS RED
      2. Names ending in \_6 to \_10 = MS BLUE
5. After copying onto secure portable hard drive, copy the entire folder structure to the corresponding site to the final data destination at earliest opportunity upon returning from the field.

**\*\*\* Things to note\*\*\***

* Do not attach the MS with the M300 powered on.
* SD cards should **not** be hot swapped/plugged in while drone is on.
* Extra care needs to be taken to ensure panel calibration is done carefully.
* The calibration panel should only be opened for the short time it is needed.
* The DLS should not be touched.
* The MS is not waterproof.
* Time on MS photos is UTC and shows as 7 hours ahead.
* **If** cards need to be formatted (ensure data is double backed up) go to the settings tab, then Storage and Firmware Dropdown, and follow instructions. You must ensure there is no error code from the formatting as the Blue camera is prone to problems.