

(Work in Progress)

The following is my attempt to create a low cost, RTK enabled drone, with images that are geotagged from a high megapixel camera. I have outlined my steps to create this drone, but you are warned to test everything and determine how this impacts equipment warranty before starting. I am not responsible for any errors or omissions that result in damage to your equipment.

Equipment

1. 3DR Solo Drone
(<https://store.3dr.com/products/solo>)



2. Emlid Reach RTK Kit
(<https://emlid.com/shop/reach-rtk-kit/>)



3. Sony A6000
(<http://www.sony.com/electronics/interchangeable-lens-cameras/ilce-6000-body-kit>)



4. Sony E 16 mm F2.8 lens
(<http://www.sony.com/electronics/camera-lenses/SEL16F28>)



5. Tripod
(https://www.amazon.com/AmazonBasics-60-Inch-Lightweight-Tripod-Bag/dp/B005KP473Q/ref=zg_bs_499310_1)



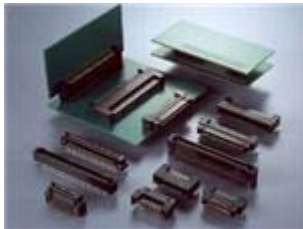
6. Project Enclosure (6x4x2")
(<https://www.radioshack.com/products/radioshack-project-enclosure-6x4x2?variant=5717250565>)



7. USB extension cable (male to female)
(<https://www.amazon.com/AmazonBasics-Extension-Cable-Male-Female/dp/B00NH11PEY/>)



8. JAE Electronics Board to Board & Mezzanine Connectors 30P recept Straight
(<http://www.mouser.com/ProductDetail/JAE-Electronics/TX24-30R-6ST-N1E/?qs=%2fha2pyFaduiqgba8kBa6TteHVWNleLfx3lhQ48ISxiSCqywLxSV2eg%3d%3d>)



9. Small Table
(https://www.amazon.com/gp/product/B0074HYWFG/ref=oh_aui_detailpage_o00_s00?ie=UTF8&psc=1)



10. 3DR Solo/A6000 fixed camera mount (Ian will have to help you with this, since this is a hybrid set up)
(<http://www.imconcepts.com/impstore/>)

11. Vello HSA-CSMSA Multi-Interface to Sony/Minolta Shoe Adapter
(<https://www.amazon.com/Vello-HSA-CSMSA-Multi-Interface-Minolta-Adapter/dp/B014EGVV9E>)



12. PC Male to PC Female Cord, Straight
(<http://www.bhphotovideo.com/c/product/82556-REG/General-Brand-NP6968-PC-Male-to-PC.html>)



13. 3D Robotics EX11A 3DR Solo Leg Extensions (Black)
(https://www.amazon.com/gp/product/B01CG620NK/ref=oh_aui_detailpage_o02_s00?ie=UTF8&psc=1)



14. Ground Plane (sheet metal cut to 100mm circle from hardware store)
15. Miscellaneous: Soldering gun, zip ties, screws, tools (small screwdrivers, pliers, etc),

Tips

1. I bought the 3DR Solo bundle when it went on sale at Amazon (Prime Day) and Best Buy (Fourth of July sale) for a lot less than the retail price.
2. Every now and then there is a sale on Emlid's website for \$20-90 off the Reach kit.
3. I bought my camera and lens from Adorama which included a free camera bundle. Also, they had the "5yr drops and spills" cheapest warranty.

Steps

Base

1. Connect antennae and micro USB to Reach unit.
2. The Reach Base unit will sit in the enclosure on top of the tripod. Drill holes in the side of the Enclosure for the USB and antennae. Place Reach unit in enclosure. Attach the enclosure to the tripod by means of 3M Command strips. Mount antennae on top of the enclosure. The metal lid acts as a ground plane. Connect the USB extension to the USB from the USB from the Reach. Run the USB cable to computer.
3. Follow the Emlid Reach Documents (<https://docs.emlid.com/reach/>) to initially set up Reach.

Drone (Rover)

1. Remove existing gimbals and reinstall gimbal bay (minus the unnecessary dampening balls and mount plate (to reduce weight)).
2. Follow the Emlid Reach Documents (<https://docs.emlid.com/reach/>) to initially set up Reach.
3. Follow Tim V's steps to connect hot shoe adapter to Reach unit. (<http://diydrones.com/profiles/blogs/reach-rtk-gps-can-now-embed-ground-control-points-in-imagery>) I ended up taking the hot shoe adapter apart to remove non-essential pieces to allow for a better fit with the fixed camera mount.
4. Powering Reach: Solder the red (power) and black (ground) of the DF13 6P-to-jumper cable to the Accessory bay port connector (JAE Electronics Board to Board & Mezzanine Connectors 30P recept Straight) pins 17 (or 19) {+5V} and 29 (or 21 or 28) {GND}. Connect to Reach.
5. Attach antennae to Reach and mount antennae on ground plane and fasten to top of 3DR Solo with 3M Command Strips. Tuck Reach and cables into cavity in gimbal bay.
6. Attach accessory mount (with medium-hard dampening balls) to Solo. Attach camera mount to accessory mount via dampening balls and back-up zip tie. Attach Camera.
7. Connect HDMI and Hot Shoe cable to camera.

Reach

1. Follow Emlid documentation to set up Rover and Base for RTK. (<https://docs.emlid.com/reach/>)
2. Use these settings: (Coming Soon).