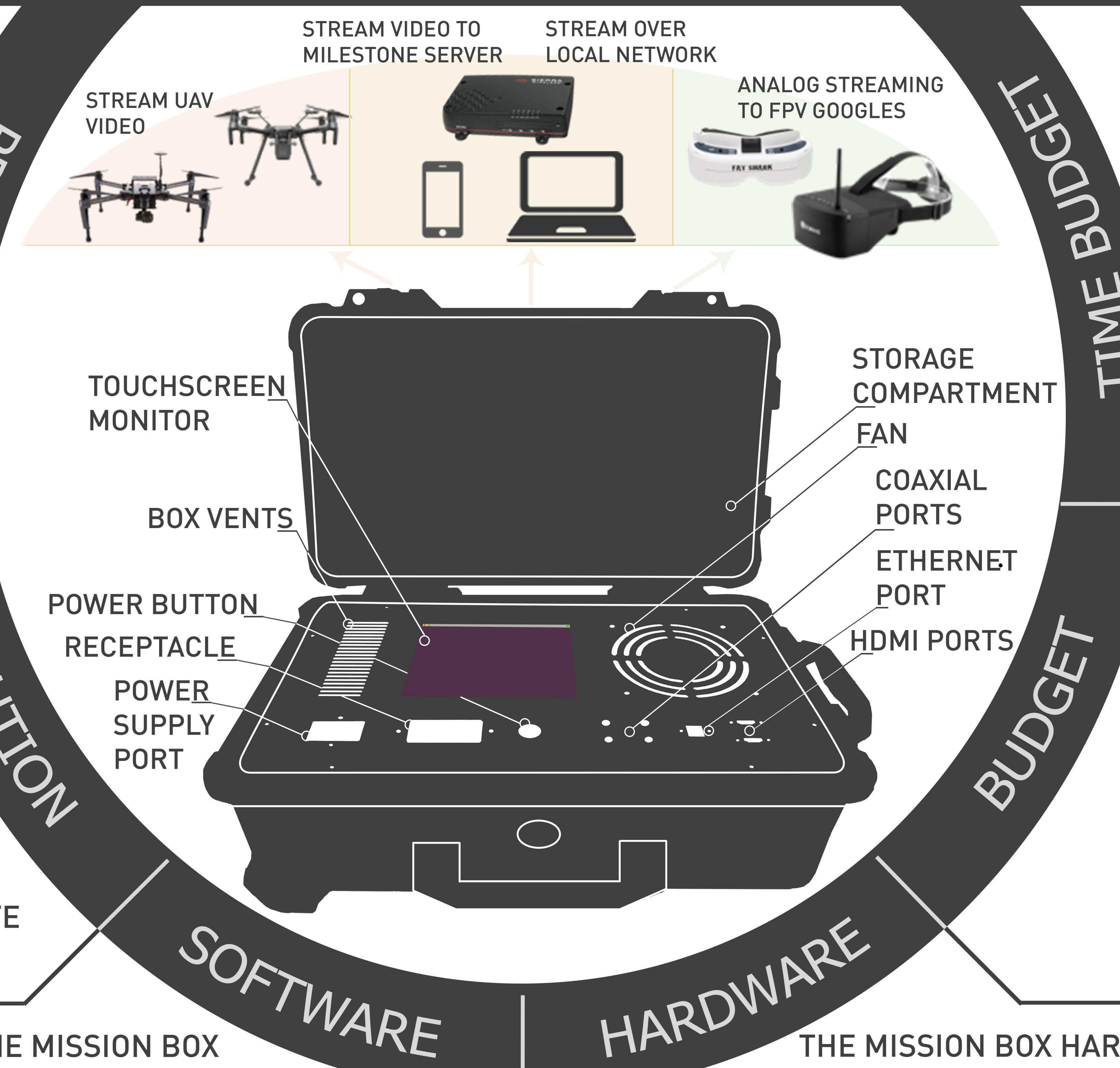


MISSION BOX

ADVISORS: DR. ARTHUR HELMICKI; DR. VICTOR HUNT; DR. MEHDI NOROUZI
TEAM MEMBERS: ASWIN BALASUBRAMANIAM (EET); JINBING YANG (COMPUTER ENGINEERING)

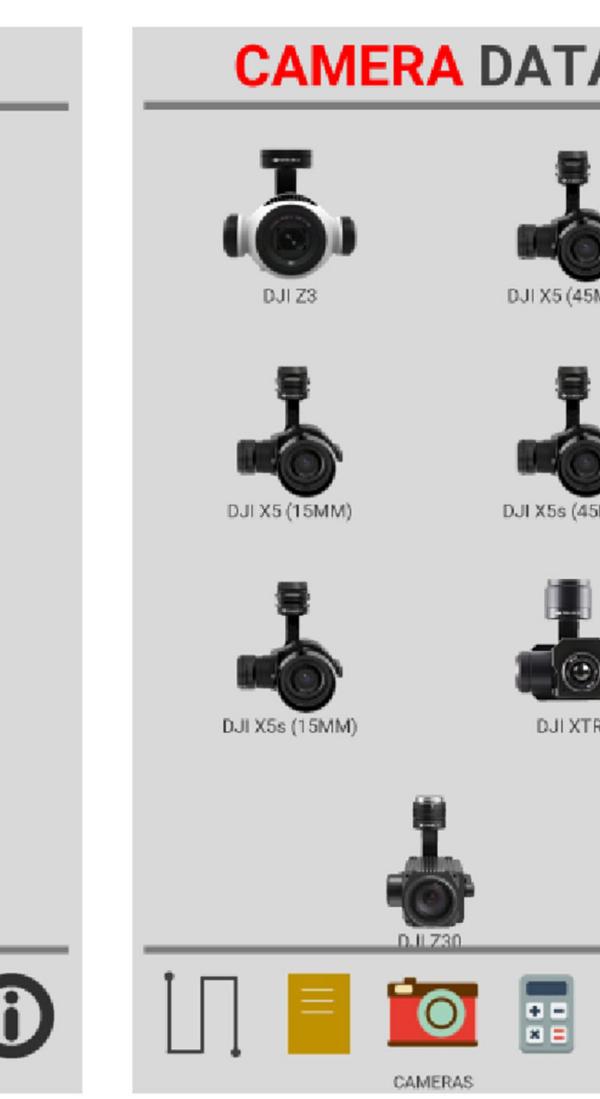
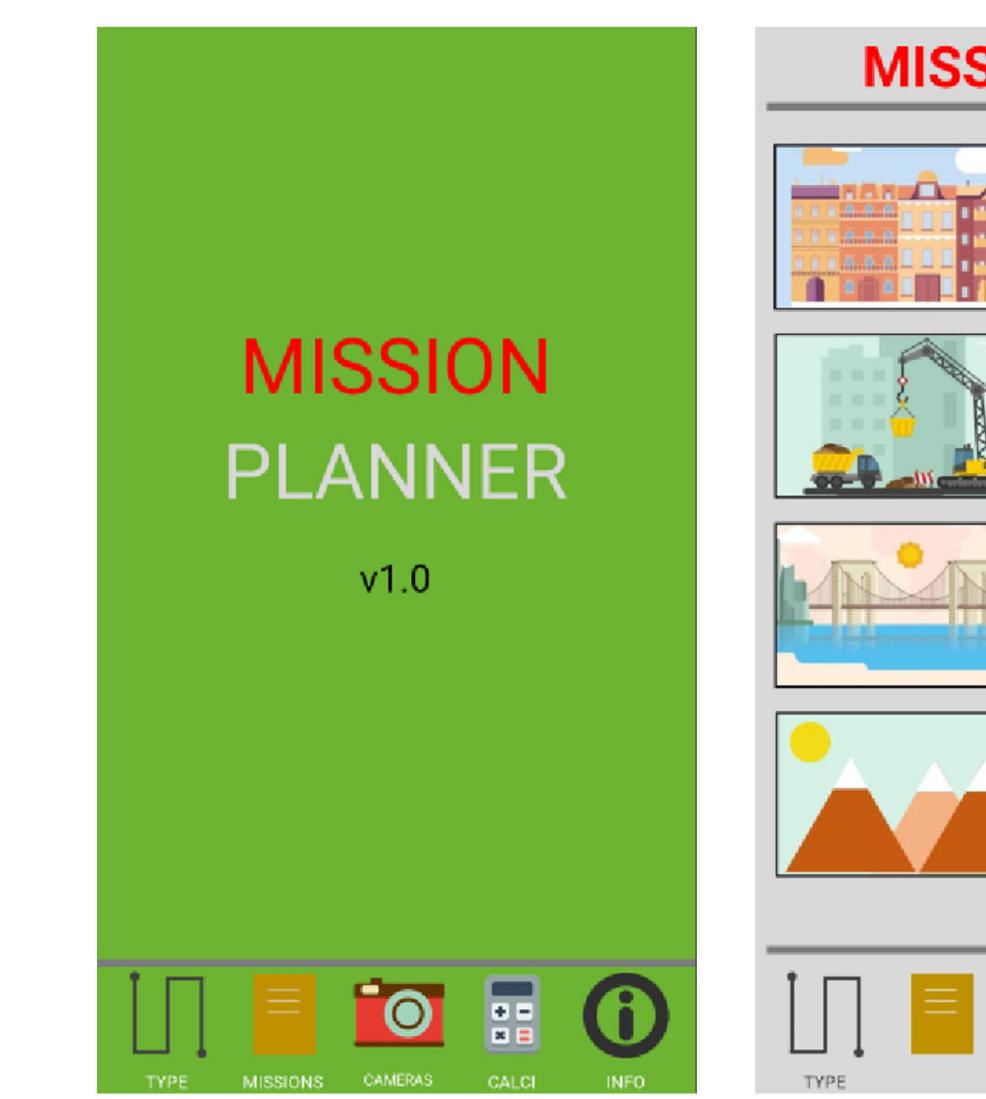


- IN THE CURRENT MARKET, THERE DOES NOT EXIST A SINGLE UNIFIED SOLUTION TO SECURELY STORE AND STREAM VISUAL DATA CAPTURED USING UAV, AND EFFICIENTLY PROGRAM A UAV TO CAPTURE THE NECESSARY IMAGES TO CREATE A 3D MODEL OF A STRUCTURE
- THE PROJECT INTENDS TO SOLVE THE ISSUES OF ACCESSIBILITY FOR A SPECIFIC TARGET AUDIENCE WHO SECURELY STREAM AND STORE VIDEOS CAPTURE USING UAV, AND PROGRAM UAV TO EFFICIENTLY CAPTURE IMAGES OF A STRUCTURE TO CONSTRUCT ITS 3D MODEL



- A REMOTE ONE-STOP SOLUTION TO SECURELY STORE AND STREAM UAV VIDEOS AND PLAN EFFICIENT FLIGHTS FOR UAVS
- THE FIRST PART OF THE PROJECT HELPS IN:
 - SECURE TRANSMISSION AND STORAGE OF VIDEOS/ IMAGES
 - EASY COMMUNICATION WITH MAJORITY OF DJI SYSTEMS
 - VIEWING OF UAV VIDEO SECURELY ON MULTIPLE DEVICES AT THE SAME TIME
- THE SECOND PART OF THE PROJECT HELPS PILOTS TO GENERATE EFFICIENT FLIGHT PLANS AS PER THEIR REQUIREMENTS

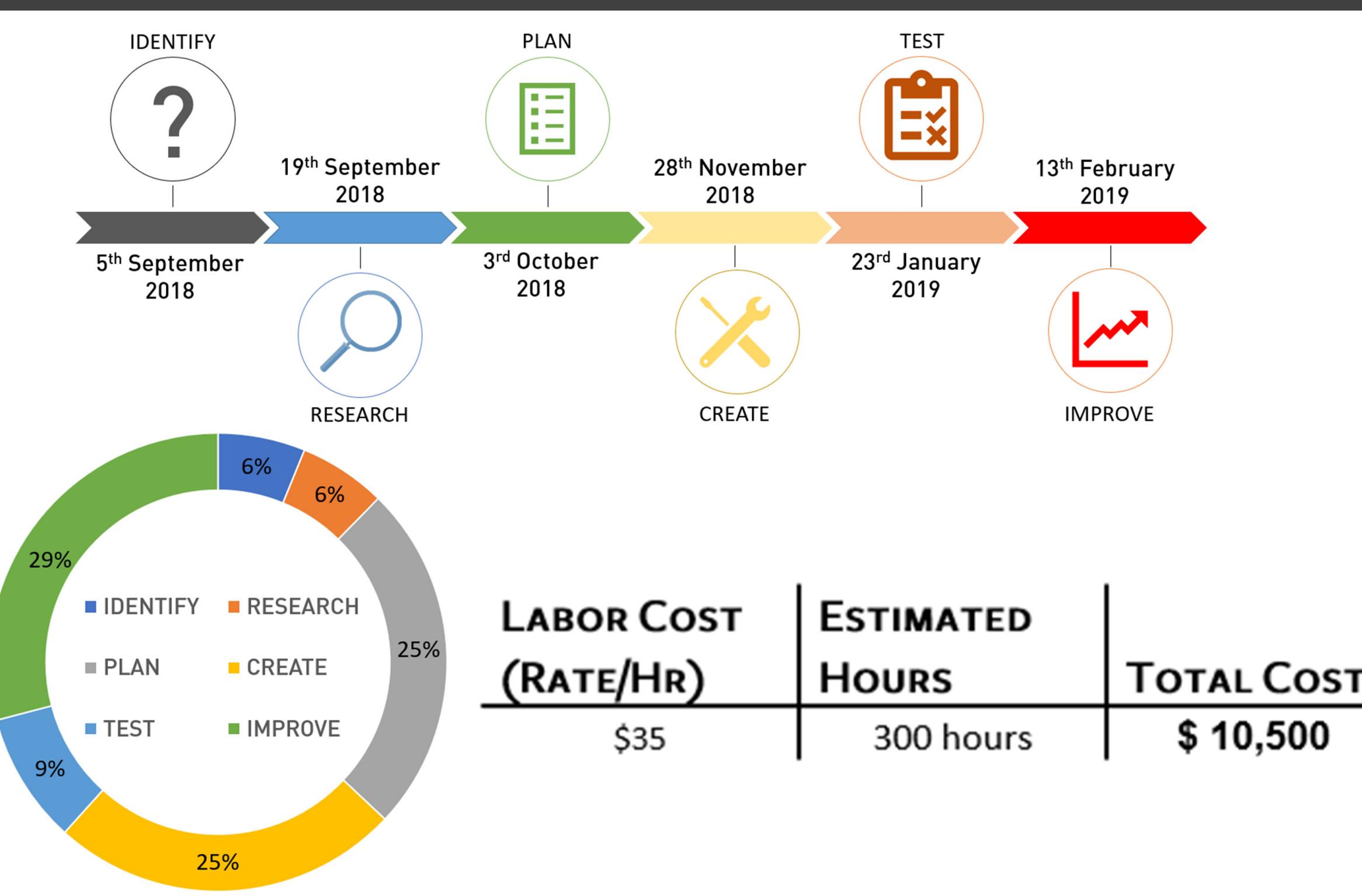
THE SOFTWARE PART OF THE PROJECT INCLUDES THE GUI FOR THE MISSION BOX AND THE ANDROID BASED MISISON PLANNER APPICATION.



- THE GUI HAS THE FOLLOWING FUNCTIONS:
- ALLOWS USERS TO VIEW LIVE VIDEOS CAPTURED USING THE UAVs.
 - PROVIDES USERS THE ABILITY TO RECORD THE STREAMED VIDEO, CONTROL THE MODEM, AND CONTROL ANALOG STREAMING OF THE VIDEO.
 - DISPLAYS THE VOLTAGE AND CURRENT LEVELS OF THE MISSION BOX SYSTEM

- THE ANDROID APPLICATION IS INTEGRATED WITH THE MISSION BOX UI.
- THE APPLICATION HAS THE FOLLOWING FUNCTIONS:
- GENERATES EFFICIENT FLIGHT PLANNING INSTRUCTIONS AS PER USER REQUIREMENTS.
 - SAVES GENERATED INSTRUCTIONS AS A PDF.
 - PROVIDES DETAILED INFORMATION ABOUT UAV CAMERAS.

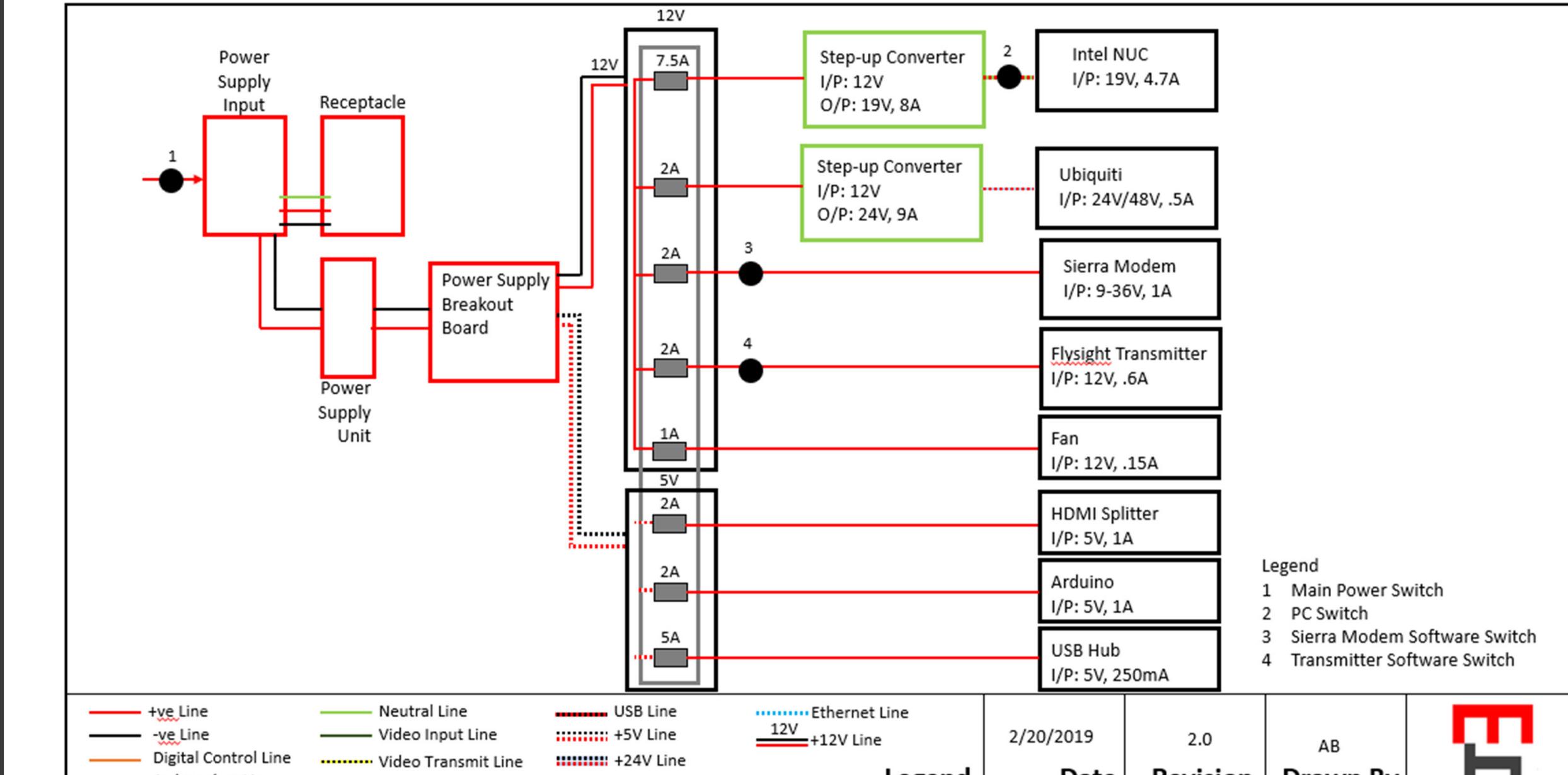
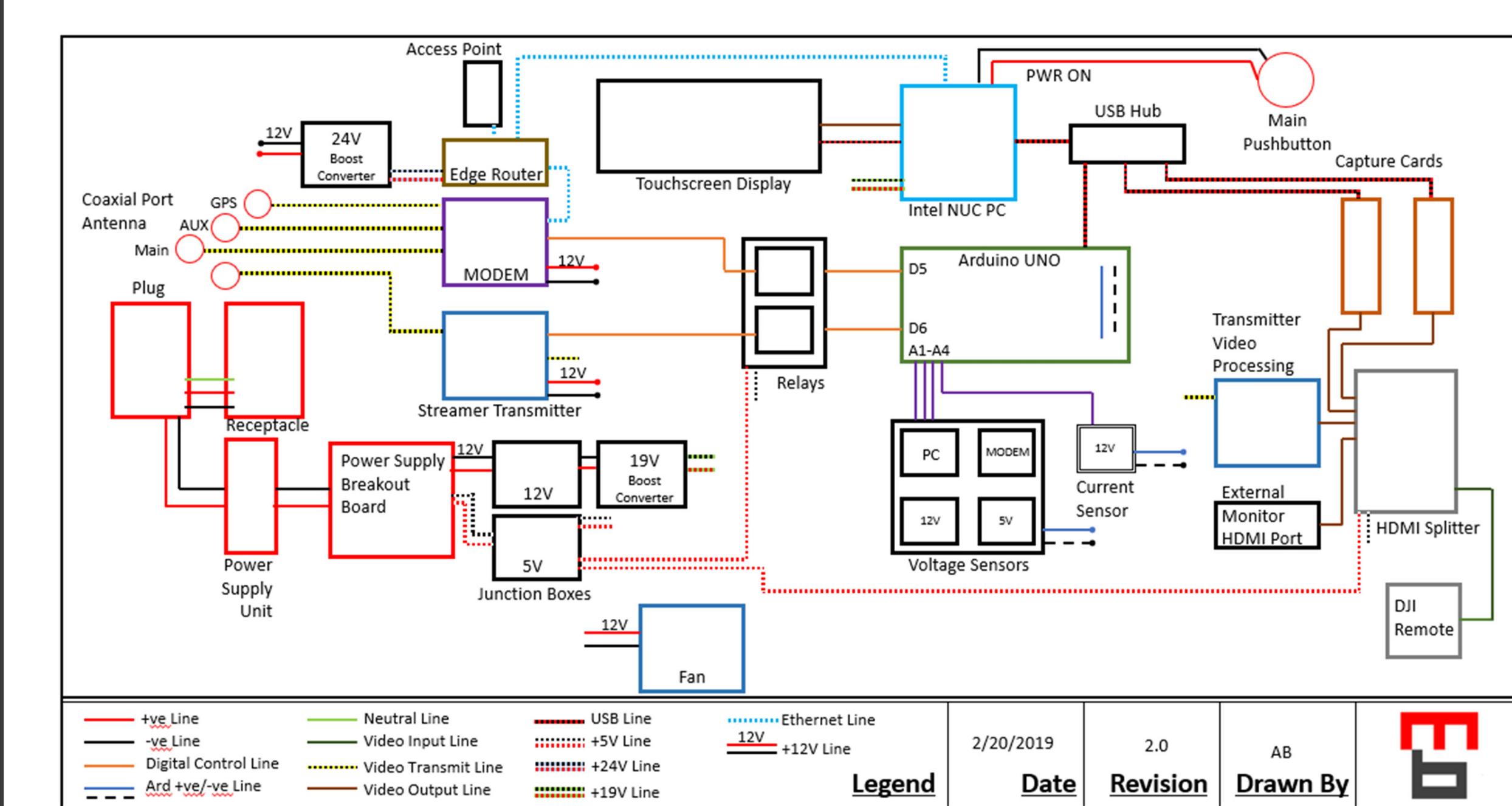
FUTURE RECOMMENDATIONS: IMPLEMENT UAV CONTROLS, PROCESS 3D MODELS USING IMAGES CAPTURED, AND IMAGE AND VIDEO PROCESSING TO ESTIMATE TRAFFIC DATA.



THE TOTAL COST OF THE PROJECT IS **\$46,703.00**. MAJORITY OF THE HARDWARE WAS BORROWED FROM UCII'S LAB. MOST OF THE SOFTWARE WERE DOWNLOADED FOR FREE OR WERE OPEN SOURCE.

HARDWARE	SOFTWARE/APPLICATION
Total Cost: \$43,043.00	Total Cost: \$3,660.00
Note: Majority of the hardware was procured through UCII	Note: Majority of the software were free and open sourced

THE MISSION BOX HARDWARE IS PACKAGED IN A PELICAN BOX WITH WHEELS AND IS EQUIPED WITH A 7" TOUCHSCREEN DISPLAY TO INTERACT WITH THE UI.



THE MISISON BOX CONTROLS SYSTEM CONSISTS OF FOUR MAIN COMPONENTS:

- INTEL NUC PC
- SIERRA RV50 MODEM
- ARDUINO UNO
- UBIQUITI EDGE ROUTER

THE ELECTRIC COMPONENTS PRESENT IN THE BOX IS PROTECTED FROM OVERCURRENT DRAW USING FUSES. THE MISSION BOX POWER SYSTEM CONSITS OF FOUR MAIN COMPONENTS.

- CORSAIR SF450 POWER SUPPLY
- DC-DC BOOST CONVERTER (12V-24V)
- DC-DC BOOST CONVERTER (2V-19V)
- POWER SUPPLY BREAKOUT BOARD