

Users Needs and Requirements



sddec24-01

Project Overview:

- Project: Make to Innovate (MTI) group H.A.B.E.T.
- Objective: Develop a high-altitude balloon project for atmospheric data collection and near-space video recording/streaming.
- Altitude Goal: Up to 30,000 meters.
- Current Challenge: Reliable video communication using a 5.8GHz radio signal.
- Solution Approach: Implement software-defined radios for control of 900MHz signal modulation (phase and frequency).
- Key Benefit: On-the-fly signal corrections for clear visual data.
- Design Constraints:
 - Portability
 - Weight: Less than 12 lbs. (FAA regulations)
 - Power consumption monitoring

User Needs:

- The HABET team needs to be able to successfully recover a video signal of their weather balloon in flight at 30,000 meters
- The HABET team also needs to be able to send a camera up to 30,000 meters and successfully mount the camera so the payload doesn't fall
- The research and educational institutions needs data from 30,000 meters to track weather formations and climate change



Requirements:

- Transmit Data:
 - Live video feed
 - GPS signal
 - Sensory data from attached sensors
 - Frequency 900 to 1200 Mhz to conserve energy and increase reliability with range
- Receive Data:
 - Receive and store the data in an easily accessible and human (or kryptonian) readable format for future use/analysis
- Weight:
 - Small and lightweight (under 12 pounds) payload that is easy to attach to your choice of flying object
- Cover Long Distance Without Losing Signal
- Receive a Recognizable and Non-distorted Feed

Engineering Standards:

- IEEE/ISO/IEC 8802-21-1-2018
 - Has insight on SDR communication
- ETSI ES 202 706-1
 - Talks about energy efficiency measurement methods & metrics



Conclusion:

In summary, the HABET team's high-altitude balloon project aims to meet user needs by ensuring a reliable video signal at 30,000 meters, transmitting live data, and maintaining a small, lightweight payload. The project addresses requirements for securely mounting the camera to prevent detachment, supporting research institutions in tracking weather formations and monitoring climate change.