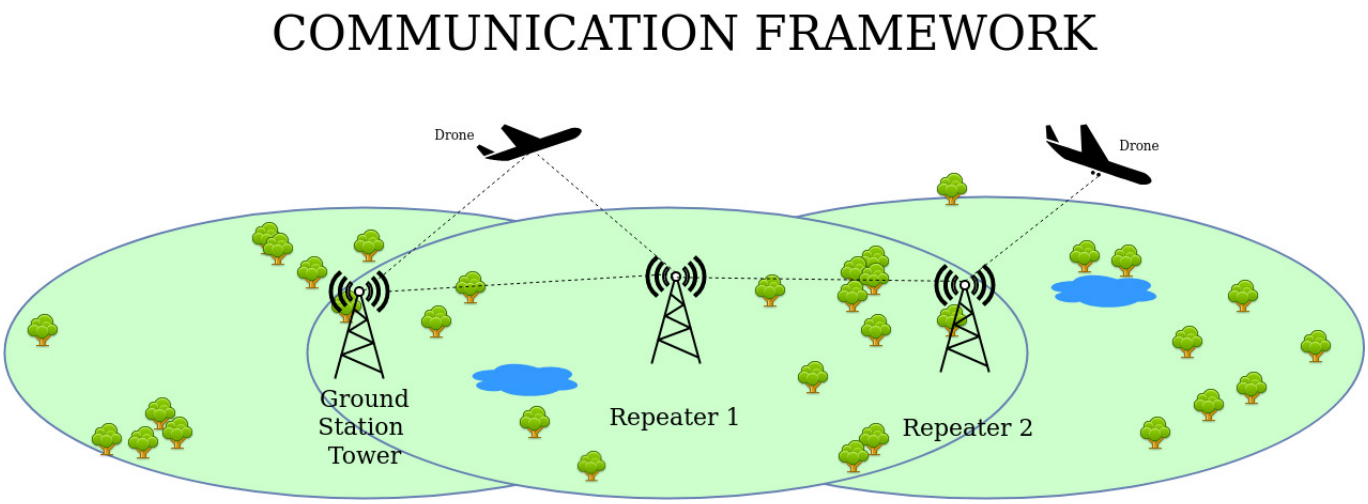
Communication Network Architecture for drone

- This is a high-level formulation of communication network for fleet of drones



- In the above figure, the network connection is represented by connected dots and the coverage area is shown in green color in horizontal direction.
- The figure shows mesh network with repeaters to increase range of the communication

Considerations while creating mesh network:

- The repeaters must be placed inside the coverage area of the last antenna.
- The antenna elevation should be arranged properly to facilitate D2G and G2G communication.

`D2G = Drone to Ground` , `G2G = Ground to Ground`

Possible Frequencies of operation:

1. 2.4Ghz
    - widely accepted
    - no government issues
    - short range of operation
    - easily available devices like antenna
2. 900Mhz
    - government issues
    - long range
    - devices not available easily
3. Both 2.4Ghz and 900Mhz
    - both devices can also be placed so as to get benefits from both
    - but we have to be careful that they don't interfere

Concerns:

1. Security
    - risk of cyber attacks
    - msg must be salted or tokenized so that drones only execute valid messages
2. Uniqueness
    - msg must be easily identifiable by the drone it is intended to
    - unintended drones must ignore the msg
    - unique number must be assigned for each drone
    - this may be already implemented in mavlink
    - reasearch mavlink
3. Interference
    - inter = between rf devices within the network
    - intra = between rf devices within a single node like within GCS
4. Agnostic Design
    - the communication architecture must accept any form of channel like wifi, RF, satellite,etc
    - must accept redundant channels like bothe RF and wifi
5. Consistent
    - the network must able to behave in a stable way
    - i.e if a drone is connected to both repeater and the GCS, and receives identical packets from two sources, it must able to accept a packet and label any other packet as stale
    - similar situation must be dealt within multiple channels of communication like RF and wifi
6. Reliability
    - the network must guarentee sucessful transmission of msg within a determined amount of latency