Client Meeting 2: **Global Concepts and Feedback**

Group 18 – The Dark Knights

Problem Statement and Goals

Problem Statement:

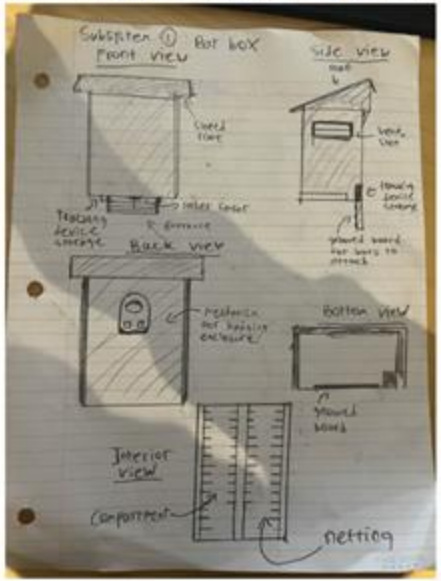
“A need exists for bat conservationists in Canada to track bat visits to bat boxes with a low-cost, weatherproof device that is easy to install, requires minimal maintenance, and does not interfere with bat movement, providing essential data for monitoring populations.”

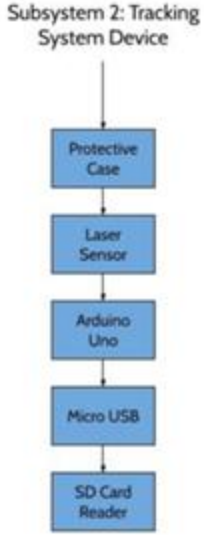
key goals:

- **Low cost** for conservation projects.
- **Weatherproof** to handle Canadian climates.
- **Minimal maintenance** for efficiency.
- **Data Collection for Population Monitoring.**

Concept 1

4.1 First Global Concept and Description





Overview Of Concept 1

Pros	Cons
✓ Interior Storage Device	x Entry of design (wide flap entrance).
✓ Tracking system is valid (can work)	x Tracking accuracy (multiple bats can enter at a time, resulting in inaccurate data).
✓ Climbing grooves (to navigate and move easily)	x Large Ventilation area
✓ Waterproof casing	

Alignment with Problem Statement (Checklist)

- **Waterproof Design**
- **Accurately tracks bat visits**
- **Low- Cost**
- **Minimal maintenance**

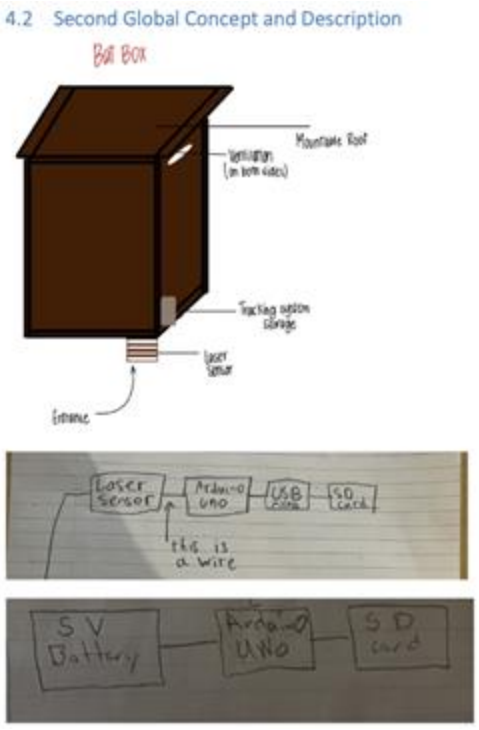
Why Concept 1 was not Chosen

Comprises Tracking Precision. The system tracks visits at the entry point but doesn't guarantee one-bat-at-a-time tracking, which could lead to inaccurate data.

Ventilation Issues. large ventilation area could lead to inefficiencies; a more effective design would place smaller ventilation openings on different sides.

- Could cause structural strain. If wind consistently hits one opening, it could place undue stress on the part of the structure, making it more prone to wear or damage.
- This could also affect the tracking accuracy. If the internal conditions are not optimized, it could affect the performance of the electronic components, indirectly impacting tracking accuracy.

Concept 2



Overview Of Concept 2

Pros	Cons
✓ Ventilation on both sides (small).	x Mountable Roof Concerns (need to pay extra attention if hanging the roof from the top)
✓ Small flap entrance (allowing the least amount of bats to enter at the same time).	
✓ Tracking system is well protected and low- budget.	

Alignment with Problem Statement (Checklist)

- **Waterproof Design**
- **Accurately tracks bat visits**
- **Low- Cost**
- **Minimal maintenance**

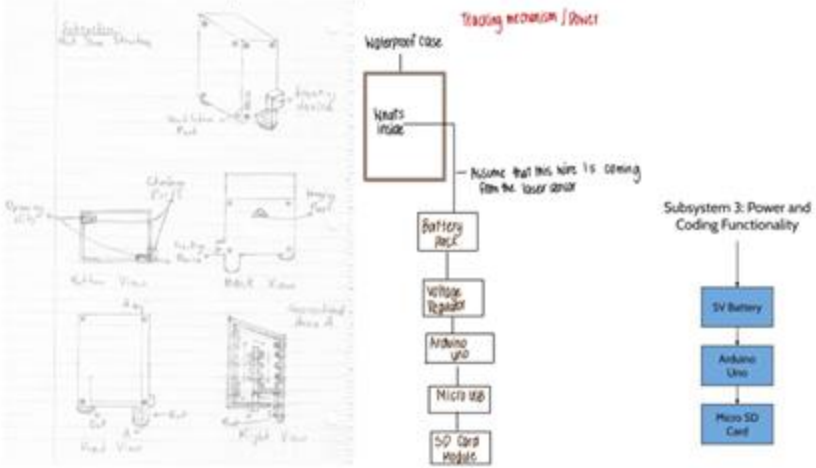
Why concept 2 was chosen

Balance between functionality and ease of implementation. The combination of tracking precision, weatherproofing, and ventilation design ensures that the bat box is well-suited to Canadian climates while fulfilling the client's need for a low-maintenance, low-cost solution.

Less Interference. Although the mounted roof may be a draw back, it provides **predator protection**. Hanging the bat box higher up or from tree or structure makes it harder for ground-based predators (like raccoons, cats, or other climbing animals) to reach the entrance.

Concept 3

4.3 Third Global Concept and Description



Alignment with Problem Statement (Checklist)

- **Waterproof Design**
- **Accurately tracks bat visits**
- **Low- Cost**
- **Minimal maintenance**

Overview Of Concept 3

Pros	Cons
✓ Small Vent	x Unclear entry mechanism
✓ Tracking system is well protected and can work	x Too much tracking and power devices
✓ Good sized entrance (meaning not a lot of bats will enter at the same time)	x Not a well distributed air flow system

Why concept 3 was not chosen

Complex set-up with multiple devices. The concept includes numerous power and tracking devices, making the setup more complicated. This goes against the goal of keeping the system low-maintenance and cost-effective, as managing multiple components can increase the likelihood of technical issues.

Unclear entry mechanism. The design does not specify a clear entry mechanism (e.g., flap or slit), which could lead to issues with accurately detecting and tracking bat entries. This uncertainty could jeopardize the maintenance of the bat box.

Ventilation Limitations: Although ventilation is listed as a pro, the design doesn’t clearly show a well-distributed airflow system. Inadequate ventilation could result in overheating of electronic components, potentially affecting the longevity and reliability of the tracking devices. So the most efficient is to have 2 small vents on different sides.

Questions to ask the Client

- Are there any bat behaviors or roosting habits we should be aware of that might influence the design (e.g., preference for entry types)?
- How do you feel about the power options we've considered (e.g., battery)? Would you prefer a specific energy source? Battery is good.
- Where will the bat box be placed? Does this location have access to both the internet and a power outlet? No