

ME, ECE, IE Capstone Design Programs

Team #36 Hands-off Chicken Coop

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Objective

Design a safe, portable coop requiring nominal human input for proper chicken care

Functional Requirements

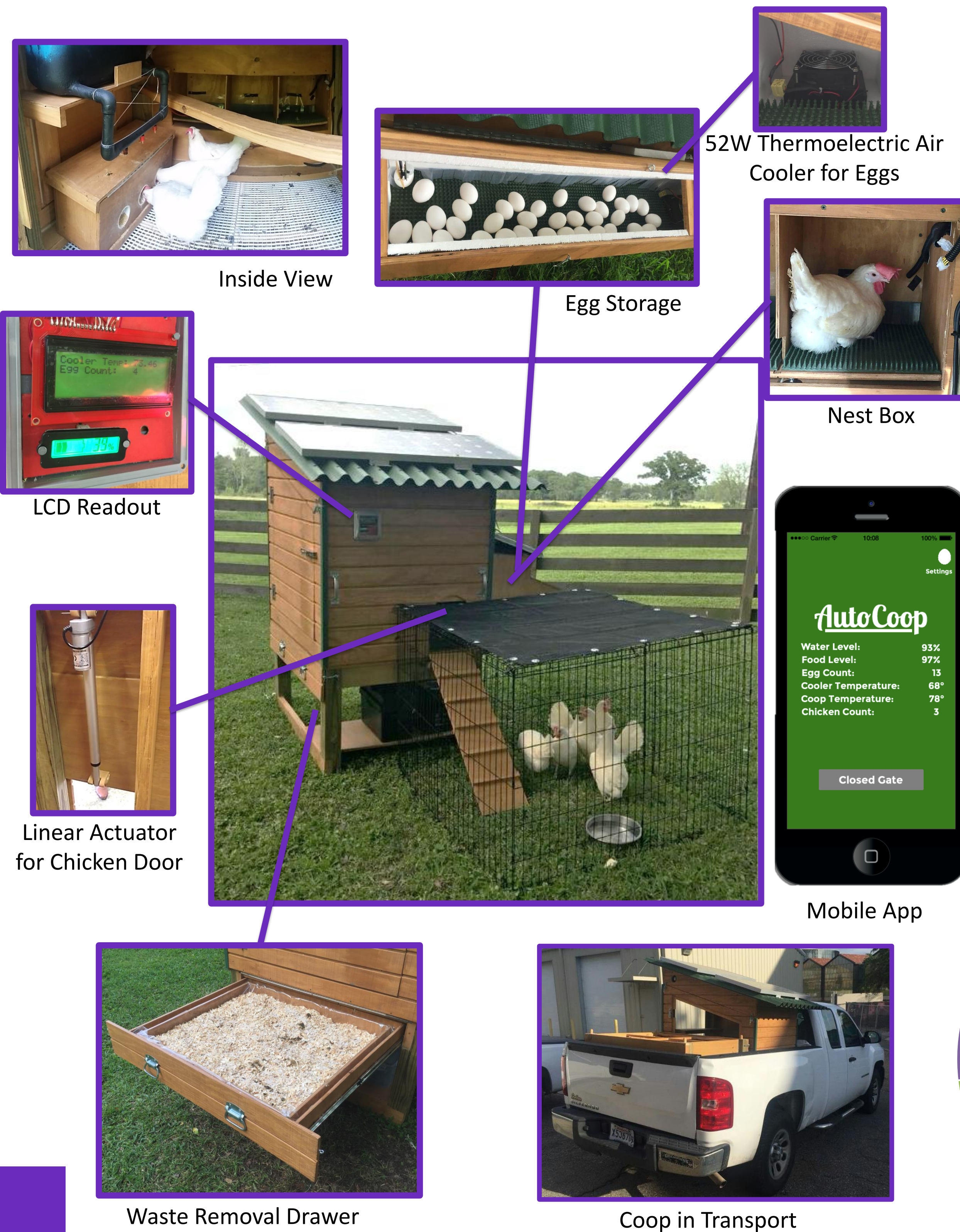
- Automatically (7 days)
  - Feed and water chickens
  - Collect and store eggs, cool to room temperature
  - Operate door to provide outside time
- Simplify
  - Food and water replenishing
  - Waste removal
- Portable: able to be moved by 3 people

Analysis

- Food and water supports: treated as distributed loads across a beam
- Heat transfer of egg storage to maintain 70°F: radiative, convective, and conductive effects considered
- Drawer slides: cantilever beam analysis
- Wind loading: tipping, roof tearing off, pin shear
- Weight support: buckling, compression
- Power: all loads, battery and solar panel sizing

Safety Considerations

<b>Door</b> • Predator protection • Proximity sensing	<b>Egg Quality</b> • Refrigerated • Food safe materials	<b>Waste Removal</b> • Ergonomic • Prevent illness	<b>Power</b> • Lead acid battery • Weather proof • Back up power • Wire safety
<b>Food and Water</b> • Hygienic • Pest protection	<b>Structure</b> • Sturdy • Lift safety	<b>Manufacturing</b> • PPE	



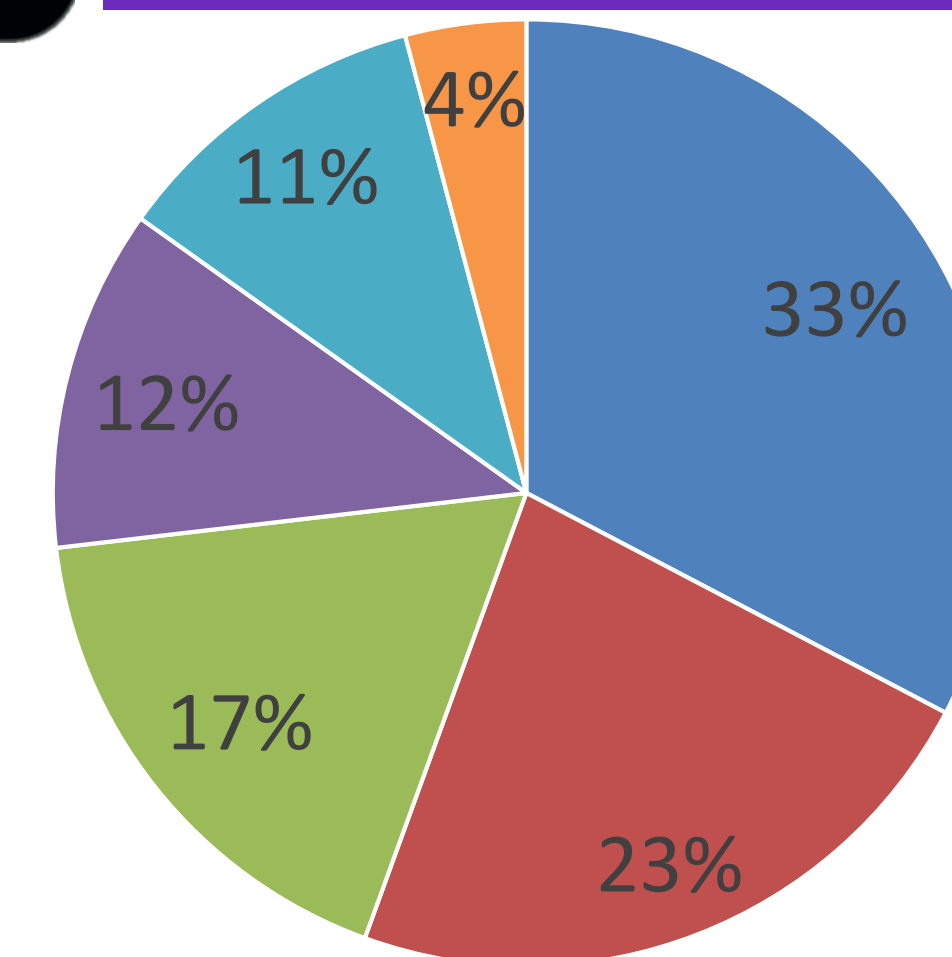
Potential Customers

Backyard chicken owners, Small/Industrial Farm Owners, Manufacturers, Maintenance Workers, Distributors

Testing

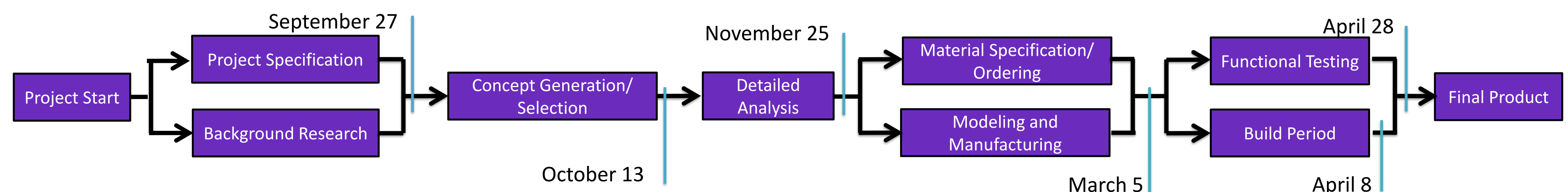
Tested Variable	Units	Target	Actual
Food storage	Lb	9	24
Water storage	Gal	4	4.6
Egg storage capacity	Eggs	35	63
Maintenance time	Minutes/week	20	10
Max coop lifting weight	Pounds/section	150	144
Assembly time	Minutes	20	16

Budget



<b>Budget</b>	\$4250
<b>Spent</b>	\$3546.22
<b>Surplus</b>	\$703.78

Timeline



Sponsors: John Darbonne, Phillips 66

Advisers: Dr. Warren Waggenpack