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**Client Questionnai****re**

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Gathering Customer Requirements

In their mind, your customer likely has a clear picture of what the system that they would like designed and constructed looks like. More importantly, they know what the device does. Your job as an engineer is to find out what is in the mind of your customer.

Your customer is not likely to give you measurable requirements, as they will not typically have the technical skills to tightly specify their desired system. It will be your job, after gathering the customer's requirements, to translate the customer's vision into engineering requirements. Requirements that you can measure to determine success or failure.

Lead your customer through the following interview and take copious notes while they talk. If the customer wants to draw you pictures, by all means let them draw. Note that they may show you or tell you about a common object that represents a property of the system; if so, take note of that object.

**System**

* Please describe what the completed system does. *(Ask the following questions if needed.)*

The completed system will enclose an area in which it monitors and corrects the temperature, humidity, and lighting to match the desired input values.

* + What information and/or action does the system create?

It heats, cools, humidifies, dehumidifies, and lights the space

* + What does the user have to do to the system?

The user must plug in, adjust desired levels, and refill water/replace filter(s)

* + How long does the system operate on its own?

It depends on the input settings, but shouldn’t need to be checked more than once a day on highest settings

* + Does it crash gracefully?

It has few moving parts and no memory storage, and thus will not have issues with rebooting

* Does the system allow for user error? Will it still continue to work afterward?

If the water levels aren’t refilled, the humidifier will not work. Otherwise, it will continue to bring levels toward input settings.

In order to fulfil the needs of the consumer, the system must run consistently and have an easy interface, as the purpose of the system is to simplify a more complex process. Thus, it must be reliable and simple for the user.

**Physical Properties**

* What is the size of the system?

It will be table-top sized, roughly 3x3x3

* What is the weight of the system?

Roughly 20-30 lbs.

* How durable is the system?

It won’t likely survive any significant blows or drops, but will be fine with normal use

# **Design**

* Are there any conditions that make the system easier to design?
  + Off the shelf components

Use of aftermarket heating elements, compressors, fans, and lights will significantly simplify the design

* + Leverage existing systems or protocols

See above

# **Environment**

* Where does the system operate?

Indoor settings away from weather exposure

* + What is the temperature range?

~15 to 32 degrees Celsius

* + What is the humidity range?

~ 0 – 98 percent

* + Are there any special operating conditions? (e.g., high vibration, shock, dust, etc.)

Soil and water will be placed inside the device

The system will be designed to operate indoors. This means no exposure to excess liquid, direct sunlight, wind and other such environmental factors. As it does deal with agriculture, there will be soil, water, etc. inside of the system, so it must be easily cleaned, and the chamber portion of the device will be relatively sealed off from the electronic components.

# **Power Supply**

* What powers the system?
  + Does the system have wall power?

Wall power

* + Does the system need a backup if the power goes out?

No, nothing is needed to save, so it will simply not work while not powered and will restart as normal once powered again

* + If the system is battery powered, what is the required battery life?

N/A

The system will have a simple display out showing current levels and will show settings when the setting knobs are adjusted. This ensures a simple system overall for the average consumer to use.

# **Costs**

* What does the system cost? (*Free is not an option.*)
  + One-time costs

Estimated $200 - $250

* + Ongoing/maintenance costs

Water ~1 gal/week

Filters ~ 2-3/year

* + Does it require a software license?

No

* + Support Cost?

N/A

# **User Interface**

* Is the UI responsive?

Display out.

* Is the system easy to operate for a first-time user?

Yes, simple knobs to adjust settings

# **Safety**

* What safety concerns are there? (Consider non-physical issues also.)

Heating element – burns

Refrigerant – freezing/poisoning

Heavy/large – injury due to system falling

Fans – possible cuts

Electricity – shock

The system will have wall power, which is the most prevalent source of danger, so the electronic components and such will be in a separate area of the device to ensure no human contact is made aside from initial assembly or later maintenance of the device. The device itself will be developed using government defined safety regulations including but not limited to grounding and insulation.

# **Development Plan**

1. Design
2. Source parts/price components
3. Develop code
4. Assemble individual systems
5. Test individual systems
6. Create/fabricate container
7. Install systems into container
8. Test overall system
9. Debug/refine
10. Finish