Vision and Scope Document

Project Title: Drocery Store

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Revision History

Name	Date	Reason for Changes	Version
Sonia Mubasher	27/02/2020	Initial draft, shared using Outlook.	1.0
Wan Nur Irdina Eyman binti Mohd Awallizam	24/03/2020	Received feedback remarks from supervisor on Vision and Scope via email.	2.0
Wan Nur Irdina Eyman binti Mohd Awallizam	1/04/2020	Add more business risk in section 1, not enough was mentioned in last version.	2.1
Sonia Mubasher	3/04/2020	Simplify major features by combining some (sect 2).	2.2
Widanage Vinuri de Silva	3/04/2020	Redo in table form to increase readability and understanding to discuss operating environment (sect 4).	2.3
Sonia Mubasher	3/04/2020	Remove team charter, not necessary (sec 5).	2.4
Sonia Mubasher	4/04/2020	Final version.	3.0

1. Business Requirements

Drocery is a startup company that aims to create a new way to deliver goods from a local grocery store to its customers with the use of drones. Drocery looks to find a grocery store that can take orders online and deliver the items through drones. A software system named DroceryControl will play a significant role to the business operation (receiving orders and dispatching to packaging employees to send to customer).

Multiple roles, both inside and outside the company, are required to make Drocery's vision come to reality. Drocery has hired employees with each employee playing a crucial role in the company such as a PhD specialized in drone operations, drone pilots, chargermen, and packaging employees. Outside the company, Quick Funds taking role as Drocery's investor, SemSoft offering to be requirements engineer and Quad robotics will be the head drone supplier.

1.1 Background

Currently, most deliveries are done using vehicles such as motorcycles, trucks, and planes. With Drocery, drones are introduced as a new method of delivery which is the main appeal of the company and will interest customers into wanting to shop using Drocery. Drones give the advantage of avoiding heavy traffic and using delivery costs would decrease (compared to fuel prices of cars and planes). Deliveries will be made faster, beneficial to all relevant parties and increasing efficiency [2].

1.2 Business Opportunity

Drone delivery can be a truly revolutionary with customers intrigued by the futuristic idea of a machine flying to reach them. Drone delivery is more time efficient for both company and customer's side as drones can skip heavy traffic by using air routes to reach their customers. Emissions from drone delivery is a lot less than standard delivery, conserving energy and delivery costs [1].

1.3 Business Objectives and Success Criteria

As Drocery is using a new and unique method to delivering goods to their customers, a lot of customers can be expected from their interests in receiving their groceries from a futuristic device which will intrigue more customers to try Drocery.

Drone delivery is more efficient, delivering faster to the customer and consuming less energy compared to their predecessors (e.g. motorcycles, trucks, and airplanes).

The company will operate in Semenyih at first but planning to expand and open up Drocery in more locations if the business model proved to be successful.

1.4 Customer or Market Needs

Drocery is a grocery store with a drone delivery service which sets them apart from other local grocery stores. Typical needs of customers include a convenient way for the customer to order their goods from the grocery store with minimal effort and cost while also being time efficient.

Currently, multiple grocery stores have created online websites to cater customer's shopping needs with the following features:

- Scrolling through the items available at the store like a catalogue
- Selecting desired items and 'adding to cart'
- Choosing a payment method (online bank transfer/cash on delivery)
- Inserting address of customer
- Choosing date and time slot that best suits the customer

Drocery hopes to apply the same features on to their software named DroceryControl software system. DroceryControl will play a big role in the company, linking all roles of the company together.

1.5 Business Risks

Startup companies like Drocery have potential business risks. As Drocery will be known for its drone delivery services, the use of drones will rise a lot of risks. Drocery will have a compliance and regulation risk in which new rules may arise [3]. Though drones can fly, they still need aviation authorization to proceed which might set a delay in starting the business.

The main objective of Drocery is to deliver goods to its clients with the use of drones. To achieve this goal, drones must be consistently used. However, from using drones, comes environmental risks because drones are unable to deliver to customers under harsh weather conditions [3]. The company is very reliant on the weather of an area to be successful.

A software system named DroceryControl will be responsible in handling a lot of Drocery's customers and employees. To begin development of the software, a software consulting company needs to be contacted and DroceryControl could take 6 months to be operational, setting another setback. Multiple versions of DroceryControl must be made to ensure that all the features are useful and operational. If there is a fault in the system, it could cost the company a lot creating a potential financial and operational risk [4].

Drocery will rely greatly on their working staff to successfully make deliveries. From the reliance on its staff, workforce risks may emerge in trying to maintaining sufficient staff members with the required skills [3].

2. Vision of the solution

This will enable SemSoft – the engineering and consulting company to establish the software system called DroceryControl that the people from Drocery are envisioning that takes orders online and delivers the goods immediately by drones. It will be the linchpin of the business and decisive for its success. The primary focus of the solution is to provide a web interface or a mobile app which is developed separately and will communicate with the DroceryControl system also, with other software systems. So, the customers would be able to place orders. The business model should prove to be sustainable, extremely reliable and extensible so that future functionalities maybe included easily.

2.1 Vision Statement

DroceryControl is an Internet-based application that will accept orders placed by the customers and also, will act as a control interface to the pilots who will take control of the drones in special situations. DroceryControl system will ensure fast delivery, better quality, flexibility, operational effectiveness and safety unlike the current delivery system people don't have to wait so long for their products.

2.2 Major Features

- Receive orders from customers and dispatch them to packaging employees.
- Provide an interface for the drone pilots to steer the drones and show imagery and positions of drones in real-time according to the destination of the orders.
- Present a control interface to the pilots, assign deliveries to them and inform them about their parameters e.g. name of the customer, address and coordinates and handover the inputs from the pilots to the drone control software.
- Show the pilots the sight of the drones assigned to them and a map with their current positions as well as the location of their targets and continuously check whether the UAV is still within a defined region of operation otherwise issue warning.
- Administer the control stations and produce an overview for each charging station with the time and duration of charging events and the amount of energy provided.
- Check the availability of the products before accepting the orders.
- Confirm the order by sending email to the customer and at the same time start the dispatching process for the packing staff so, they would be able to review a list of the orders assigned to them in the system.
- Calculate possible routes and suggest groupings of orders.
- Provide a backend which allows performing statistical analyses and displaying graphs.
- Undergo a quality control and additional confirmation by a supervisor for deliveries to VIP's. Also, send notifications to customers who have not yet paid for their orders.
- Keep track of every order's status and ask the user to check and confirm the order and enter his personal data.

2.3 Assumptions

- The drones will be purchased by Drocery as completely operational units with standard control software which also provides an interface to communicate with other software systems.
- The packaging employees will be responsible for the regular maintenance of the drones.
- Drones will fly autonomously most of the time but in special situations human pilots will take control.

- Many of our pilots will also be customers of us.
- Each pilot can be responsible for the operation of up to five drones at the same time.
- The battery charge status of each drone will be continuously monitored and if it drops below 10%, a warning will be issued to the pilot and the location and route to the next charging station will be displayed.
- If the battery charge falls below 5% and the system calculates that the next charging station cannot be reached, an automated emergency landing will be initiated by the system.
- Equip the transport boxes mounted to the drones with temperature sensors which will continuously monitor the temperature inside the transport boxes.

2.4 Dependencies

- Operation of the drones has to be approved by the aviation authorities.
- The pilots must prove their proficiency in operating drones through an internal assessment program.
- After successfully passing the evaluation, the pilots will get login credentials to access the DroceryControl software system from home over a secure Internet connection.
- Drone delivery requires daylight at the moment. During this time, the Drocery software system needs to be available without any interruptions.
- The pilots will have a broadband stable Internet connection and it has to be secured against unauthorized access and any manipulations or jamming.
- The data will end up in the same database of orders and products within the system for both web interface and mobile application.
- Anyone who wants to be a chargerman should first register on the already existing Drocery website.
- DroceryControl system should be able to interoperate with the specialized accounting software AbaSaga which is already running.

3. Scope and Limitations

Scope and Limitations – The project will be limited to a report that will provide detailed documentation to start up a drone-based grocery store. This is a store which takes orders online and delivers goods immediately by drones.

3.1 Scope of Initial Release

The report provided by our group will enable ‘’Drocery’’ a drone-based grocery store to establish the realistic expectations of the stakeholders. While the purpose of this document is strictly focused on implementing the drone with all the features that customers would require.

3.2 Scope and Subsequent Release

Several key features envisioned for Drocery include:

- Expand to several cities and countries
- Different types of drones with different capabilities
- Employ pilots to control and operate the drones
- Web based ordering system which is called DroceryControl which will receive orders from customers and dispatch them to packaging employees who will manually load the goods into designated transport boxes which then will be attached to the assigned drone
- High resolution cameras and GPS receivers and will send imagery and their position in real-time to the DroceryControl system
- Several charging stations
- Install drones with temperature sensors to monitor the temperature in the transport box
- Customer account inquiries

3.3 Limitations and Exclusions

- This report is entirely focused on starting up the drocery store, how the drone is going to operate and to implement web-based ordering system.

- Some of the products are deep- frozen, the food safety authorities will not allow to sell the products if they fail to meet the temperature in the transport box using the temperature sensors.
- If the GPS cameras don't work due to technical issues, then it will not reach the customers on time which will create a bad reputation of the company.

4. Business Context

4.1 Stakeholder Profiles

Stakeholder	Major Value	Attitudes	Major Interests	Constraints
Executives Alice (CEO) Bob (marketing and order management) Carol (CFO, Head of HR)	Business administration graduate. Marketing exposure to generate new customers	Innovative business plan compared to current market	Marketing; order management; customer service; HR	Drone operations have yet to be authorized. No specialists in informatics
Dave (Drone operations)		Immediately excited for the project	specializing in Drone operations	
Pilots	Improved productivity. Ability to manually override drone operations.	Drone piloting enthusiasts	High reliability	Employed as a supplementary occupation; At least 20 years old; has to pass an internal

	Quick access to data.			assessment program
Charge-men	Convenience. Improved delivery efficiency. Reduce rework, cost and time.	Interested in setting up charging stations o their rooftops		Register on the Drocery website; Not employed by the company; Credited according to usage of their station
Packaging Employees	Improved productivity; order handling; manually load goods; drone maintenance			Will be assigned a list of orders, basic knowledge of drones
Quick Funds (Investor)	Increased revenue.	Receptive but cautious		
Quad Robotics (Drone supplier)	Automation of previously manual tasks			Initial investment of only 10 drones.

4.2 Project Priorities

Dimension	Driver (state objective)	Constraint (state limits)	Degree of Freedom (state allowable range)
Schedule	Will be operational within 6 months		- More features and changes are allowed once the initial system is working. - System should be designed to be extended in the future where it'll accommodate working with restaurants. - Due to deadline constraints, some of the functionalities may be postpones for later releases within about one or two years. (ex: integrating restaurants, marketing and debt collection)
Features	- Orders are placed through a web interface or a mobile app that will communicate with the Drocery Control System.	- If drone charge drops below 10%, they will be routed to the nearest charging station.	- Initially delivery will happen with the Semenyih area, but it is planned to

	Both will have the same functionality. - Battery charge status the drone is continuously monitored. - Drones with fly autonomously most of the time - Products are assigned one of two categories- products sold by piece and products sold by weight. - Drones will be equipped with high resolution cameras and GPS receivers. - Drocery Control System should be able to interoperate with our specialized accounting software AbaSaga.	- Drone operations have yet to be approved. Legal constraint regarding drones - No payroll department	expand to several cities, probably in different countries (as long as drone operations within the area is legal) - System should be extensible so that future functionalities may be included easily.
Quality	Efficient and fast delivery. Mapping of address and coordinates will be based on optimum delivery paths	Safety control measures for drone control Several orders are shipped together as long	Software must pass user acceptance testing before release.

	Orders may be grouped together for efficient delivery Availability of deep-frozen products.	as the weight limit is not exceeded. Several orders are shipped together as long as the weight limit is not exceeded.	
Staff	3 executives (CEO, head of marketing and order management, CFO), drone operations employee, 3 pilots		Charge-men will be employees throughout the city and will increase as the delivery area expands, more pilots will be employed once more drones are bought, number of packaging employees will depend on the number of orders.
Cost	Price of products change depending on whether they are sold by piece or weight.		

4.3 Operating Environment

Dimension	Features	Schedule	Constraints
Geographical Distribution	Operational area is Semenyih.	the company has plans of expanding this to several cities, in different countries.	Drone operations can only be conducted within legally approved regions. May hinder the delivery process.
System Access	Currently system access has only been granted to the company executives and the head of drone operations.	The users will access the system through a web interface or a special mobile app which will be developed separately. Also, employees like the pilots should be able to access the system, by providing login credentials.	Access for customers should be available at home over a secure internet connection.
Data Gathering	- Customer's orders and available stock will be saved within the same database. - The stock availability will be checked before confirming an order.	If the system discovers that an order has not been paid for more than 45 days after delivery, then an email will be sent to the customer	Mapping data will be limited to the Semenyih region until further expansion.

	- Mapping data with all the relevant customer addresses, charging stations, optimum routes will be provided by an external geodata service.	reminding them to settle the bill.	
Response Time	- When a drone witches over from autonomous mode to manual mode the latency should be as small as possible due to safety since drones move quite fast and with significant baggage. - The latency should not surpass 200ms between a pilot's input and reception by the drone.		Latency in responding directly affects both the delivery time and the condition of the products.
Security	- Pilots will have a broadband stable Internet connection, which must be secured against unauthorized access,	- If the pilot ignores the warning for more than 3 minutes, system will terminate control and initial autonomous safety landing.	Due to strict regulations from food safety authorities, transport boxes will have temperature sensors mounted

	manipulations or jamming. - During delivery, the system needs to continuously check whether the UAV is within a defined region of operation. If it is out of bounds, warning to the pilot will be issued.	- All drones are equipped with high-resolution cameras and GPS receivers, the imagery and coordinate data from the equipment must be send to the pilots in real time. - The temperature sensors in the transport boxes will have to continuously monitor the temperature inside in real time and relay the information.	on them. The data from the sensors will be sent to the DroceryControl system, which will abort delivery if allowed temperature range is exceeded. - Service interruptions may prevent customers from placing orders. So, uninterrupted access is critical for the operation of the business.

5. Human Resources

In order to complete the project in an effective and timely manner, it is important to have several human resources guidelines to be addressed. The communication strategies section documents the inner workings of the team with one another while the sections 5.1 and 5.2 outlines the team member's skills and attributes and roles and responsibilities to accomplish the goal.

5.1 Technical skills and Attributes

Name	Skills	Attributes
Alice	Leadership and communication skills	- Ability to focus on the vision and to communicate that vision to stakeholders. - Meets with customers and can articulate customer needs, challenges and business goals.
Bob	Microsoft, Database querying, Marketing automation	Creative, Adaptive and sales-minded
Carol	Knowledge of SQL, social media handling, Microsoft.	Problem solving abilities, strong work ethics, Team management skills
Dave	Specialization in drone operations	Problem solving, relevant knowledge, very professional

5.2 Roles and Responsibilities

The table below lists the roles and responsibilities of each team member within the scope of the project.

Name	Role	Responsibilities
Alice	Chief Executive Officer (CEO)	• Making corporate decisions • Managing company's overall activities • Main point of communication between inside and outside the company
Carol	Chief Financial Officer (CFO), Human Resources (HR)	• Managing financial actions of company • Monitoring cash flow + financial planning • Assess financial strengths and limitations of company to propose corrective actions
Bob	Head of Marketing	• Take care of anything regarding products, orders and customers • Conducting strategies for all marketing teams • Managing budgets for Marketing departments • Setting, monitoring, and reporting on team goals
Dave	Employee	• Specializing in drone operations • If drone presents a problem, drone specialist will analyze problem before settling with solution
SemSoft	Engineering and consulting company	• Develop a software which will be used as a main communication medium for company

		• Software will handle orders and deal with sending relevant information to employees
Quick Funds	Investor	Fund the startup company
Quad Robotics	Drone supplier	• Manufacture drones for company use

5.3 Communication Strategies

Drocery wishes to have a software system named *DroceryControl* which will help manage all activities within the company. All company staff will use the software system to do their jobs as it connects every employee to each other. The following features will be included in *DroceryControl*:

- Receive orders from customers
- Order will be sent to packaging employees to deploy
- Interface for drone pilots to navigate drone to client

Emails will actively be used for communication within and outside the company. The following communications will happen via email:

- Chargermen will be sent updates on each charging station
- Confirmation emails will be sent to customers after order has been taken and provide status of the order

6. Project Management

This section will include a list of resources and requirements needed to complete the project successfully. Project management includes customer deliverables and the proposed schedule date for development.

This section will also discuss the format and requirements of the delivery, so the final products is usable for both customers and the development team.

6.1 Deliverables

The engineering and consulting company, Semsoft shall provide the professional services required to design the DroceryControl software which is a web for the company.

Planning Tasks:

1. Review configuration
2. Discuss ordering system and software features
3. List and discuss required hardware, network and security configuration
4. Develop upgrade plan for software development
5. Develop test plan for the software

Design Configuration:

1. Web interface design
2. Drone security configuration
3. Charging station hardware configuration
4. Transport box configuration
5. Physical network design
6. Server application configuration
7. Server hardware configuration
8. Efficient service provision ability
9. Naming conventions

Documentation:

1. Completed project plan
2. Documentation of configuration of server, web application, drone security, charging stations
3. Network diagram
4. Delivery routes plan
5. Drone user manual
6. Other documentation

The project will be measured by the complete provision of all documentation for the client to be able to implement the solution.

6.2 Dependencies

In accordance with this project, Drocery shall:

- Provide information within the scope of the project describing the ordering system.
- Any of the executives and drone operation employee; Dave, will be available as the main point of customer contact for further inquiries.
- Arrange meetings with all the relevant people to the project, like the pilots.

To implement the recommendations provided in the document Semsoft shall:

- Provide a working software within the mentioned deadline of 6 months excluding any features that are not directly necessary for basic business operations (such as debt collection or integration of restaurants)
- Be properly licensed for all software required.

External dependencies:

- Quad Robotics will supply the required drones.
- External geodata services shall provide all necessary mapping coordinates and routes.
- ISP-LTE mobile network shall provide a dedicated internet connection to the drones in motion.
- Operation of drone will be approved by the aviation authorities.

6.3 Schedule

Task Name	Start Date	End Date
Vision and Scope Document	Mon 1/27/2020	Sat 2/1/2020
Research Phase	**Sat 2/1/2020**	**Tue 18/2/2020**
Revise vision and scope document	Mon 3/2/2020	Mon 3/2/2020
Identification of required hardware and software	Mon 3/2/2020	Mon 3/2/2020
Research potential design configurations	Wed 5/2/2020	Thu 6/2/2020
Research drone operations	Fri 7/2/2020	Mon 10/2/2020
Research coordinates and route data	Mon 10/2/2020	Mon 10/2/2020
Status report 1	Thu 13/2/2020	Tue 18/2/2020
Design Phase	**Thu 20/2/2020**	**Wed 18/3/2020**
Create network diagram	Sat 22/2/2020	Mon 24/2/2020
Identify design constraints	Wed 26/2/2020	Fri 28/2/2020
Create delivery route diagram	Fri 28/2/2020	Sat 29/2/2020
Drone security configuration	Fri 28/2/2020	Tue 3/3/2020
Firewall configuration	Wed 4/3/2020	Sat 7/3/2020
Server setup configuration	Fri 6/3/2020	Fri 13/3/2020
Webserver configuration	Mon 9/3/2020	Fri 13/3/2020
Database server configuration	Sat 14/3/2020	Tue 17/3/2020
Revise Vision and Scope document	Sat 14/3/2020	Wed 18/3/2020
Status report 2	Mon 16/3/2020	Wed 18/3/2020
Finalization Phase	**Fri 20/3/2020**	**Mon/13/4/2020**
Revise Vision and Scope document	Tue 24/2/2020	Fri 27/2/2020
Recommendation Rough draft	Sat 28/3/2020	Tue 31/3/2020
Final Recommendation	Sat 4/4/2020	Tue 7/4/2020
Project Write-up	Wed 8/4/2020	Thu 9/4/2020
Project Presentation	Sun 12/4/2020	Mon 13/4/2020

7. Educational/program outcomes

The conclusion of this project which is described in this document allows Alice, Bob and Carol to create a start-up business and bring their idea to reality. This drone-based grocery store is specially designed for customers to purchase from home. The end product is also equipped with high resolution cameras and GPS receivers and it also moves fast which increases customer satisfaction.

7.1 General Education

This project will require sustainable business models where the company could operate several hundred drones with different types and different capabilities. Drone will fly autonomously most of the time which will make it more reliable. The success of this project depends on how well they come across the regulations and approvals set by the government on operating drones an also to tackle technical hurdles. They also need to focus on negotiating with the external market where they are getting products and services from. It is also crucial for Drocery to have a more prevalent presence on the internet and becoming more accessible to their customers.

7.2 Information Technology

This project requires a lot of understanding on information technology where they want to have a software system called DroceryControl which will integrate a large portion of the operations of their business. This also involves a system where the interface for the drone pilots to steer the drones according to the destination of the order. Since none of them are specialized in informatics they need help from a software consulting company to develop this software system. The execution of this system will also require the development and maintenance of the drone as well as new ideas for customer satisfaction. Success of this business fully depends on how well they overcome all the technicalities involved in this business.

8. Annotated Bibliography

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