NMO S4 SPRINT ONE

Name – Manish Pawane

Dept – Information & Technologies.

ASSIGNMENT TAKEN

Development of Software Tool for Arial Vehicle (Drone) Delivery Door Step Keeping Information & Technologies System Secured for Better Business Interfaces Management.

CASE UNDERSTANDING

As per growing demand for online Purchas on food and Medical products the Courier company wants to focus into Hyper local delivery space and drive innovation in the courier delivery market space by efficiently use of drones for local delivery, there by significantly reducing product delivery time and increasing productivity, enhancing customer experience and positioning itself as market leader. As per the current situation, it needs to gain trust of customers and needs to bring automation to the process, just the way Swiggy, Uber eats and Zomato have brought automation in order booking and order fulfillment process. On other hand, the drones will have to run on the regulations set forward by Directorate General of Civil Aviation (DGCA) and will have to comply with the restrictions around speed, acceleration and altitude of the drones. Moreover, since India is still experimenting with BVLOS, Airway Delivery may need to wait a little longer than planned for getting licenses from DGCA. Need for an app to advent into B2C sector while establishing presence across B2B sector.

Management platform will require real-time drone tracking capabilities that will show the live status of drones in-flight and in reserve. For analysis and data insights, Airway Delivery needs MIS Reporting tools to gain visibility into the following:

- What if the recipient is not available at the drop location, what will be the command for drone to do then?
- The company needs to work on exception scenarios associated with drone delivery?
- What are the ordering patterns of the customers?
- What climate conditions are being faced by the drones? (eg. Rainy Session)
- How many orders have been picked-up and how many have been delivered, delayed?
- How many drones are in-transit and which location are they in?
- Will be there any portable charging stations? What number of and how much distance apart?
- What if the drone has battery discharge issue, will their any portable battery exchange points in-between and on bounders of the map to be travelled?
- What type and number of batteries will this point have? Will they be charging in auto form?
- High Power of connection is required to interact with drone.

BCS SOLUTION SUMMARY

The role of company to gain output on both B2B and B2C fronts, to effectively execute the drone delivery and achieve desired results, company will need Advanced IT Infrastructure which will include:
1. AI based Drone Delivery Management System
2. MIS System which can efficiently run for following processes: CRM To Manage Customer Data, Maintain records of total orders received, total orders shipped, total orders returned and total orders cancelled and payment and reimbursement Logistics & Warehouse management
3. Supply Chain Management
4. Business Interfaces: Customer App, Agent App, Manager App.

Our short-range and long-range drones will be equipped with IOT sensors to detect GPS coordinates, altitude, speed, acceleration, temperature, wind speed, roll, yaw, pitch, RPM of rotor and distance from the delivery location. This system will enable live tracking of each drone and will also alert the operators in case a drone malfunctions, or any of the DGCA guidelines have been violated.

This will help in keeping transparency of operations and will help in surfacing genuine data for investigation during any litigation filed by DGCA or any other authority against Airway Delivery. The live tracking parameters from drone will be populated in the “Drone Live Status” MIS Tool where the backend operator will have granular visibility on the performance, location and activity of each drone in BVLOS operation.

SOLUTION

IT infrastructure –

Booking, Dispatch and Delivery (BDD) Process:

- Customer books order for delivery using an “AIR FAST Mobile App”, which requires entering the pickup location and drop location, and the pickup time, travelling time and then paying using UPI.
- Our app enlists products of associated sellers. Customer places an order using the app.
- Product details are shared with the seller and product is shipped to the nearest warehouse.
- The order management system checks which URL has the customer come from, by checking the Urchin tracking Module (UTM)
- This gives insight on whether the customer has come from a social media campaign or organically through website/app – updated on “Marketing” MIS Sheet.
- The recipients of the packages get a notification, where they need to confirm if they will be available for receiving the packages – if yes, then they get a QR code.
- Whatever orders Airway Delivery receives over a 30-minute period, they will be segregated as per geographical zones.
- Next, the drop locations of those orders will be arranged in a sequence decided by the Route Optimization Engine, based on Traveling Salesman Algorithm.
- Subsequently, the pickup locations will be arranged in a sequence that is reverse of the drop location sequence, so that the drone collects up the items in a stack, not in a queue.
- The drone takes flight and during transit, all the parameters (speed, altitude, location, etc.) are tracked live in the “Drone Live Status” MIS Tool – it flies using cameras for visual analysis and obstacle avoidance algorithms on a specified route.
- Any deviation from the SLAs trigger an alert and the backend operator can take manual control of the drone to bring it on the desired course.
- Drone reaches the first recipient and descends on the window/doorstep
- The receiver of the package scans the QR code from his mobile phone on the QR scanner mounted on the drone.
- The bottom-most package in the queue – the one associated with the QR code – is released and the drone leaves.
- “Delivery” MIS Sheet is updated in real-time.
- Receiver and Customer give feedback, which is updated on “Customer Analysis” MIS Sheet, along with time taken to reach the drop location and any issues faced on the way.

Management Information System:

MIS system will consist of 3 main software that will help gather and report information which will provide us with valuable insights for business development and help in efficiently managing all orders, keeping track of logistics, marketing spends revenue and more.

MIS-CRM:

1. Order Management:

The MIS system linked with the Manager App will allow us to keep track of all incoming and outgoing orders. All orders in different stages from warehouse entry to QR code assignment to drone delivery will be tracked and stored

2. Tracking marketing activities, associated spends and results:

This will give us a comprehensive understanding of marketing activities, spends and ROI. By using the information from MIS we can differentiate performing marketing channels from the non-performing ones and thereby allocate spends to maximize returns

3. Maintaining customer database (leads):

All leads will be stored and rated as per the conversion status

4. Tracking Revenue:

Total revenue generated from different business operations will be maintained. Revenue details by customer, by marketing channel, by time (Day/Month) and by location will be available

5. Forecasting & Identifying growth opportunities:

This will help us get projections based on current performance and future trends and assist in setting business targets accordingly

MIS-Logistics & Warehouse Management:

As apart of MIS, Logistics & Warehouse Management will help in

1. Seller Inventory Management:

Real-time inventory information is updated across multiple locations (both offline and online sites and multiple warehouses) simultaneously. Software will be equipped with Auto inventory replenishment, Handheld support, FIFO stock picking support.

2. Logistics integration:

Every package moving In and Out of the warehouse will be tracked and other features including gate pass management, purchase order management, Stock transfer and return to vendor will be enabled for efficient tracking and records

3. Return Management:

Courier returns or customer initiated returns will be tracked, It will be integrated with accounting ERP and the supplier's account and all the updates will be shared with internal teams and the customers.

Supply Chain Management:

Procurement: After Purchase order processing, receipt confirmation, and invoice verification, our agents collect orders from the client's location and order is transferred to our nearest warehouse for last-mile delivery.

Warehousing & packaging: Upon arrival at the warehouse, order are packed in boxes as per required specification for drone delivery

Cross Docking: In cases where products are packed as per specification by the client then Just QR codes are assigned and orders are uploaded on to the drone based on their delivery location, size and designated delivery time

Order fulfillment and sales order processing: Once orders are successfully delivered to the customers, a sales order is generated and shared with client updating them about the status of order delivery

Business Interfaces:

This is required to create a marketplace for customers to buy products on and get delivered in the shortest possible time. We will need an app that enlists all of our clients' products (Businesses whose products we are delivering). Customers will place an order on our app and the product will be collected from the manufacturer, packaged as required and shipped using drone delivery.

This approach will create unique value propositions for businesses to partner with us and we will not only be providing fastest courier services available but also have a marketplace where businesses can sell their products.

For efficient management of all activities, along with customer app, we will have applications for agents and managers

Customer App:
Key features

1. Enhanced GPS System to mark delivery points:

If customers want to get package air delivered on their preferred locations, they can use integrated enhanced GPS mechanism to pinpoint the marker on the delivery point

2. Real -Time Tracking:

Customers will be able to track Estimated time for arrival with precision of upto 90 secs or less and know current location of their order

3. Payment gateway integration:

To make payments using UPI, Net banking or Credit/ debit cards

4. Notifications:

Give regular Notification to customer about order status, distance & time of arrival

5. QR Code Scanner:

This will be used when customer wants to collect orders from drone which has landed on the ground (alternative to air dropping), drones will be equipped with QR scanner and once customers scans the QR code, and their matches with the one on the package onboard the drone then package will be passed out to the customer

6. Customer Feedback/complaints section:

To help customers provide their feedback on products & services

7. Easy Returns & Refunds:

Option to return products in customer wants

8.Wishlist:

For customers to add and store their preferred products

9. Automated chat bot:

To answer to generic customer queries, help customers with basic information on how to place orders, contact us and more

Agent App:
This will be used by agents to keep track of all orders

Help assigned agent track status of order delivery, QR Scans, and answer to customer queries

Manager App:
To manage details of orders placed at online stores

To generate advanced analytic reports of orders placed by customers

To Track on-field personnel, Location of drones, Route, order dispatch, order delivery, incoming orders and more

Regulatory Technology Infrastructure Deployment

1. **Speed limits:** The regulatory draft has set up a maximum speed limit for drones at 15 meters/second

2. **Altitude:** The drones are only allowed to fly at a maximum height of 50 meters and within the range of 10 Kilo meters from the remote pilot

3. **Geo-fencing:** Drones can fly only up to an altitude of 121.92 meters and cannot enter restricted airspace.

4. **Other device installations:**

- GNSS for horizontal and vertical position fixing
- Autonomous Flight Termination System or Return Home (RH) option
- Flashing anti-collision strobe lights
- RFID and GSM SIM Card/ NPNT compliant for APP based real time tracking
- Fire resistant identification plate inscribed with UIN
- Flight controller with flight data logging capability
- Barometric equipment with capability for remote sub-scale setting
- Detect and Avoid capability
- SSR transponder (Mode ‘C’ or ‘S’) or ADS-B OUT equipment

MIS Reporting

1. **Deliveries Planned vs Fulfilled:** The number of bookings fulfilled on a particular day will be compared against the total bookings received, to give insights into how well the operators are working and if drone capacity must be increased

2. **Expected Delivery Time vs Actual Time Taken:** This will provide insights into how well Airway Delivery is meeting its commitments of on-time delivery and if customers are getting the best ROIs

3. **Time to Service vs Time between Orders:** This MIS shall provide insights into how fast we are servicing customers and how frequently they are ordering – it gives insights into whether the customers who face delays are showing decline in orders or not, and thus Marketing team can target them with special offers

4. **Average Time taken to service pin-codes:** The data can show which areas are readily serviceable and which areas lead to highest turnaround times – so that the Finance department can customize the pricing options for each pin-code based on how much energy is spent on drones for servicing customers there

5. **Average rating vs Total orders:** The customer-related data shows which customers are happy with our service, and if they are placing more orders than those who are dissatisfied with the drone services

6. **Drone Live Status:** Each health parameter of drone, especially its speed and altitude, will be monitored closely on per-second basis in a live tracking MIS sheet for regulatory compliance purposes

Management principles:
We are targeting the seven wastes of operations management, viz. overproduction, inventory, motion, defects, over-processing, waiting, and transport

- Drone traceability and route optimization for last-mile delivery
- Automation and Centralization of reporting
- Transparency in scalar chain
- Omni-channel marketing strategy
- “Unity of command” and “unified direction” through unified reporting
- Sustainability and eco-friendliness by reducing fuel spending on delivery vehicles

CONCLUSION

With the use of “AIR FAST APP” System, MIS tracking and supply chain management, we are confident that our Company will be able to rapidly grow towards customer base, position itself as market leader by pioneering the use of latest technology, provide quick & smooth delivery to its customer’s satisfaction and thus achieve financial objectives.

Due to use of portable battery charging stations the drone can travel maximum distance and can attend maximum order, which increase efficiency and productivity to satisfy customer needs.

Air based delivery services (Drone) are still on ground level stage in India and are awaiting regulatory approvals from DGCA BODIES. Airway Delivery is entering the market at the right time as the barriers to entry are low and the Ministry of Aviation is encouraging startups to enter into consortia of Dunzo and Swiggy.

The company needs to deploy IoT-enabled drones that can be tracked live on a MIS dashboard. All IT regulatory compliances related to speed, permissible altitude, size, payload weight, geo-fencing, etc. will have to be followed using autonomous IoT systems.

Comprehensively developed MIS sheets will be instrumental in keeping track of all financial parameters, regulatory aspects, performance metrics, customer sentiments and performance of the backend drone operators – and this will unify the operations for all departments, like finance, supply chain, marketing, HR, IT and legal.