IPS Safety

Pratik(PM) | Sagar(DM) | Swapnil(OM)

Agenda

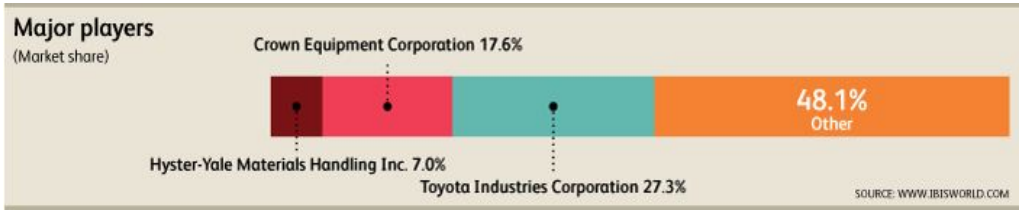
- Who is Crown?
- Key Warehouse Trends
- Challenges in Warehouses
- InfoLink Current Offer
- Design Challenge
- Our Process
- Market Analysis
- Consumer Segment
- 3 Solutions
- Final Solution
- Business Canvas Model and SWOT Analysis
- Future Work

Market Research

Industry

Industry revenue for 2016 is $9.8 bn and profits are at $559 mn

Industry revenue is forecast to grow at an annualized rate of 3.0% and profits to grow at 6.4%

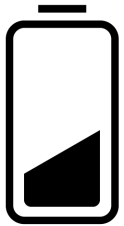


Industry	Employment (1)	Percent of industry employment	Hourly mean wage	Annual mean wage (2)
Warehousing and Storage	123,170	13.55	$16.21	$33,710
Employment Services	66,910	1.85	$14.76	$30,710
Grocery and Related Product Merchant Wholesalers	23,450	3.16	$16.93	$35,220
General Freight Trucking	13,510	1.35	$17.52	$36,450
Building Material and Supplies Dealers	12,060	1.08	$15.40	$32,020

Trends in the Industry

Safety

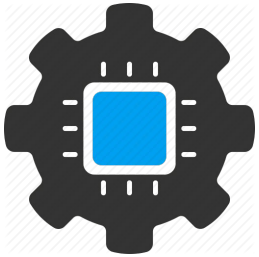
OSHA reports nearly 100,000 workers were injured due to accidents caused by operator errors. These accidents reduce productivity, increase costs through fines and legal costs. It’s critical to design machines that improve operator safety



Energy Efficiency

There is an increase in demand for electric forklifts. It has to be ensured that the fleet can operate throughout the shift while keeping the charging downtimes to a minimum.

Trends in the Industry



Automation

Advances in automation have made warehouses safer and improve productivity. Even in an automated work environment there is a need for certified operators.

Fleet Management

Fleet management tools can improve the ROI by reducing impacts, improving productivity and tracking operational costs

Common Warehouse Problems

Inventory location

Without adequate insight into location, pickers take longer to find the items to ship which slows operation and increases costs

Space utilization

It's about optimizing that space to avoid unnecessary labor.

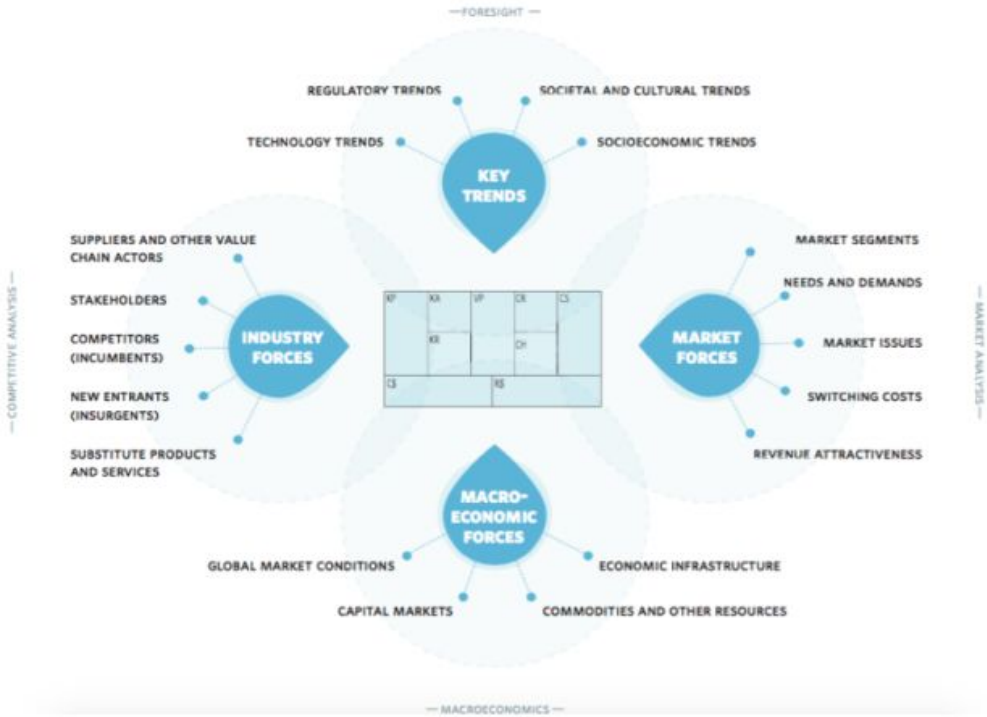
Picking optimization

For warehouses with manual processes there is no common route to pick items for shipment

Business Models

Warehouses are preferring small electric machines which gives Crown the opportunity to create smart forklifts that can increase the capabilities of their fleet management solution. IOT is emerging field and Crown should integrate IOT in warehouse design while keeping a balance in cost structure and innovation

UPS is a big presence in warehousing and they are pushing latest IoT technologies like smart glasses to improve productivity and efficiency. Competitors like Toyota and Hyster are developing hybrid vehicles and considering alternate fuel options. W&H Systems, Forte are working towards Smart warehouse design and are direct competitors in that space



The market is moving towards automation pushing smart products and devices that can automate tasks and in some cases, eliminate the need of human intervention. The biggest growth lies with e-commerce industry. With rise in digital transactions and shopping the brick and mortar shops have been replaced with centralized warehouses which would require forklift, warehouse equipment and fleet management solutions.

A rise or fall in warehouse demand would translate to a rise or fall the demand for warehouse equipments and smart warehouse solutions. Chinese and Japanese manufacturers are dominating the market with their aggressive pricing. Use of smarter equipment and better management systems would mean less sale of warehouse equipments as companies would try and reduce costs

Who helps you (Key Partners)

Who will help you?

- Retail and Seller Network
- Third party manufacturers
- Cooperation with CLARK
- United States Environmental Protection Agency (EPA)

What you do (Key Activities)

How do you do it?

- Manufactures warehouse equipment
- Designs the equipment
- Produces the equipment
- Business Intelligence

Who you are & what you have (Key Resources)

What do you need?

- Intellectual property
- Physical, Raw resources
- Human
- Automation and fleet management technology
- Extensive Sales network

How you help (Value Provided)

What do you do? How is it unique?

- Electric and IC engine forklifts
- Forklift parts
- Service provider for other warehouse products
- Smart warehousing and logistics, through InfoLink
- Battery manufacturing
- Temperature controls for coal furnaces
- Remote order picking technology, through QuickPick
- Motorized hand guided work trucks
- Internal combustion engines

How you interact (Customer Relationships)

How do you interact?

- Self Service
- Automated service
- Dedicated personal assistance
- Renting forklifts
- Leasing forklifts
- Online ordering

How they know you & how you deliver (Channels)

How do you reach them?

- Website
- Dealer stores
- Own retail network
- Partner retail network

Who you help (Customers)

Who do you help?

- Industrial Workers
- Warehouses
- Distribution Centers/fulfillment centers
- Construction Companies
- Logistic Centers
- Manufacturing companies in USA
- Transportation Companies

What you give (Costs)

What will it cost to launch and maintain your business?

- Fixed Costs: Investments, Raw Materials , Human resources, Machines
- Variable Costs: Sales, Channels

What you get (Revenue and Benefits)

How much will you make?

- Asset Sales
- Leasing and Renting
  - Usage fee
  - Projects
- Subscription fee
- Ohio awarded Crown $1 million in grant funding
- Shares

Value Proposition Model

Gains creators

- Forklifts
- Diverse forklift vehicles
- Energy efficient
- Smart warehousing solutions
- High safety

Gains

- Forklifts
- Fleet Management
- Warehouse solutions
- Warehousing logistics
- Battery and parts manufacturing
- Strong Dealerships across USA

Painkillers

- Solid build quality
- High Efficiency
- High accuracy
- Special online customer trainings

CROWN

CUSTOMER

Gains

- Reliable products
- Efficient workflows
- High Productivity
- High accuracy
- Training programs
- High Automation

Tasks

- Move objects
- Inventory management
- Picking
- Loading and unloading

Pains

- No safety in certain situations
- Vehicle breakdowns
- Need of more accuracy at times
- Insufficient task completion

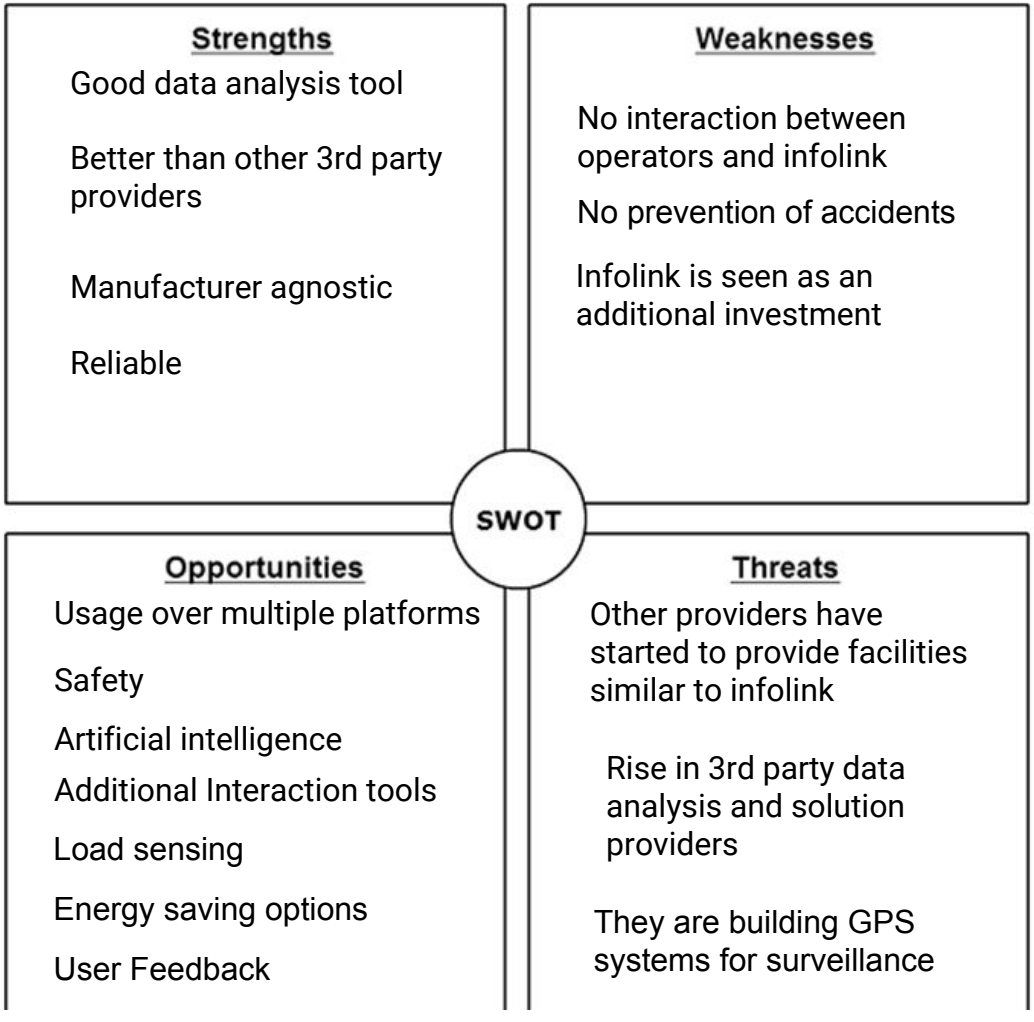

Strengths
Market leader
Brand
barriers of market entry
monetary assistance provided
existing distribution and sales networks
high growth rate
high profitability and revenue
skilled workforce
Weaknesses
Cater to small specific customer group
Niche marketing
Maintenance
Depreciation
Consumer adoption and learning
future cost structure
future productivity
SWOT
Opportunities
Globalization- so they can reach more people
Manu. Is increasing because demand is increasing
growth rates and profitability
income level is at a constant increase
new markets
Threats
Competitors
A better tech can replace it
Better hardware solutions
Software that improves workflow using enhanced integration of hardware software
government regulations
increase in labor costs

InfoLink

Crown InfoLink

- Track truck fleets and operators
- Capture data from the sensor
- Detect and analyze vehicle impacts
- Provide Dashboards and detailed reports
- Tracking compliance and maintain digital records
- Optimize battery/energy consumption
- Schedule service to optimize downtime

CROWN InfoLink™


Strengths
Good data analysis tool
Better than other 3rd party providers
Manufacturer agnostic
Reliable
Weaknesses
No interaction between operators and infolink
No prevention of accidents
Infolink is seen as an additional investment
SWOT
Opportunities
Usage over multiple platforms
Safety
Artificial intelligence
Additional Interaction tools
Load sensing
Energy saving options
User Feedback
Threats
Other providers have started to provide facilities similar to infolink
Rise in 3rd party data analysis and solution providers
They are building GPS systems for surveillance

Challenge

The Challenge

Create a Product, Service or both

- That includes some kind of hardware element
- That can live on the InfoLink platform
- That has some type of application control or analysis
- That is either Crown made/owned, or Outside entity provider/partner

Company Goal would be to drive players to the platform

- For end user, or dealer channel benefit
- Enhance Crown brand leadership that starts with lift trucks

Our Understanding of the Challenge

Key Market Trends

- Safety
- Automation
- Fleet Management

To design a product that leverages InfoLink current capabilities to improve operator safety in a cost efficient solution

Our Process

- Understanding Problem Space
- Market Research
- End-User Research
- Brainstorming Viable Solutions
- Selecting the Final Solutions
- In-depth Study of Methodology of Final Solution
- Creating the Business Model
- Considering the Future Aspects

Market Analysis

Safety

OSHA reports nearly 100,000 workers were injured due to accidents caused by operator errors. These accidents reduce productivity, increase costs. It's critical to design machines that improve operator safety

Smart Warehouse

A Zebra Technologies survey noted that 7 out of 10 supply chain decision-makers plan to increase their use of technology to create smart warehouses by 2020

Fleet Management

Fleet management tools can improve the ROI by reducing impacts, improving productivity and tracking operational costs and companies have started to understand the benefits

Market Analysis

Automation

Automation, which uses data-driven software to improve operational efficiency in machines is being used by warehouses across the world

Picking Optimization

Warehouse managers are using a wide array of technologies to ensure that goods, materials and products flow effortlessly in their warehouse

Ecommerce

E-Commerce companies are creating more infill centers with a sole purpose of improving operations and services

Competitive Analysis

Competitive analysis : Competing with InfoLink

CAT Connect

- Geo Location

GPS Based

- Geo Fencing

GPS Based

T Matics

- T Matics Mobile

Operates via
Cellular Signal upto any amount of fleets

- T Matics Command

Can operate over WIFI and Cellular both
Upto at least 10 fleets.

Hyster Tracker

- Automatic Shutdown options

- Saves Energy

- No operation truck shutdowns.

iWarehouse

- Load Sensing

- Ability to view the productive hours

Occupied Forklifts
vs
Empty Forklifts

Competitive analysis : Third Party Companies

ARI Fleet Management : **Lease Scheduling**

Rastrac Management : **GPS Tracking Solutions**

Doering Fleet Management : **Vehicle Fleet Management**

Merchant Fleet Management : Open to **any Vehicle Brand** & lease management.

Fleet Maintenance Texas : Emergency **OnSite repair** features.

Customer Segment

End-User

Jack

"A simple small warehouse operator"

Age: 28
Work: Warehouse operator
Family: Living alone
Location: Indianapolis, IN
Character: Hard worker

Personality

Introvert	Extrovert
Analytical	Creative
Conservative	Liberal
Passive	Active

Hard-worker | Doesn't work much with technology | Loves job and family

Goals

- Carry out daily tasks to best of his capabilities
- Keep the boxes in correct spots
- Become successful

Frustrations

- Tired of the difficult to use warehouse equipment
- Long hours of manual work at the warehouse
- Get's too tired when he reaches home
- He is constantly concerned about his safety and efficiency at work

Bio

Jack works full time in a small warehouse near his house. This warehouse caters to multiple small and medium size businesses. Jack has recently started working here and operating a forklift is a little difficult for him. His manager John is uses Crown's Infolink to track his colleagues and his performance. However, they can not afford the new Gena that Crown plan's to release to the market.

He is constantly concerned about his safety with the equipment and wonders if there is a solution to that.

JACK:

- **Novice Operator**
- **Works at small Warehouse**
- Recently trained
- Gets easily **bored**
- Worried about **safety**

End-User

John

"Warehouse Manager"

Age: 45
Work: Warehouse Manager
Family: Wife and 2 kids
Location: Indianapolis, IN
Character: Leader

Personality

Introvert	Extrovert
Analytical	Creative
Conservative	Liberal
Passive	Active

Leader | Impatient | Loves job and family

Goals

- To improve the warehouse work accuracy
- To increase the throughput while decreasing spending
- To optimize efficiency in warehouse
- To keep the warehouse operators happy

Frustrations

- Impatient when it comes to good work
- Manage the operators who don't work efficiently
- Take of the safety of the operators

Bio

John is the manager of the warehouse that cater's to small and medium companies. He supervises the staff and communicates with the distribution partners. Being a small warehouse, he can not afford expensive equipment like branded forklifts but is still concerned about the safety and efficiency of his operators.

JOHN:

- **Small Warehouse Manager**
- Wants to keep **track** of his employees
- Financially not very well established
- Worried about operator **safety**

Ideation

Solution 1 - D2X Drones - Drones 2 Vehicles/Drones

- **INTEGRATION** with ForkLift Trucks + InfoLink
- Ability to **CONTROL THE TRUCKS ARIELY** using the InfoLink.
- Provides the operator with **VISUAL STATS** of what is going around the truck.
- **PREVENTS HIGH IMPACTS** using real time surround object detection.
- **CHARGING STATIONS** fitted on the trucks
- Ability to communicate **COMMUNICATE** with other drones.

Solution 2 - Smart headset

Augmented Reality vision of the warehouse

Voice based interactions

Embedded barcode scanner

Digitized order lists

Hands free operations

Simulated pick-to-light system

Solution 3 - Telematics + IPS = IPS Safety

IPS Safety

SAFETY

SPEED CONTROL

Tracks and analyses the speed of the trucks.
Alerts the **manager** at times of abnormality.
It can also reduce the speed or stop a forklift at times of approaching impact.

REAL TIME MAINTENANCE

Real-time data analysis of the truck's functions.
Alerts the **manager and operator** at times when the forklift needs maintenance.

LOCATION TRACKING

Using Ultra-wideband technology, we can accurately (by cm) track the real-time location of forklift.
Alerts the **operator** when he is near another forklift or will hit an aisle.

Metrics to select

How easy or difficult is it for customers to switch to another company?

Is every sale a new effort or will it result in quasi-guaranteed follow-up revenues and purchases?

Are you earning revenues before you are incurring costs?

Is your cost structure substantially different and better than those of your competitors?

Metrics to select

How much does your business model get customers or third parties to create value for you for free?

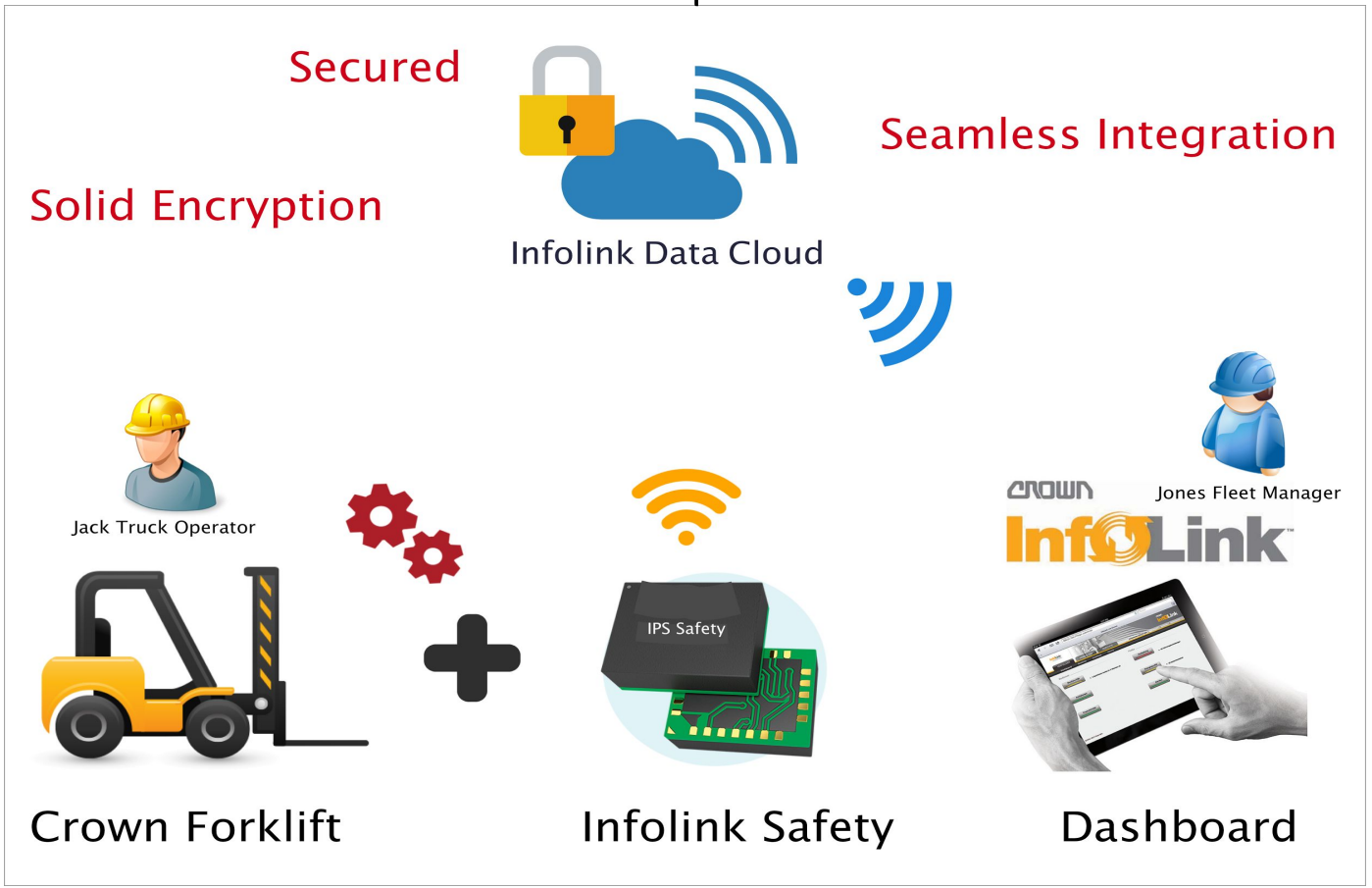
How easily can you grow without facing roadblocks?

How much is your business model protecting you from your competition?

Our Product - IPS Safety based on Micro - Location Technology

A telematics solution that enhances InfoLink capabilities by integrating IPS systems to track forklifts in real time

Schematic Representation



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Our Solution - IPS Safety

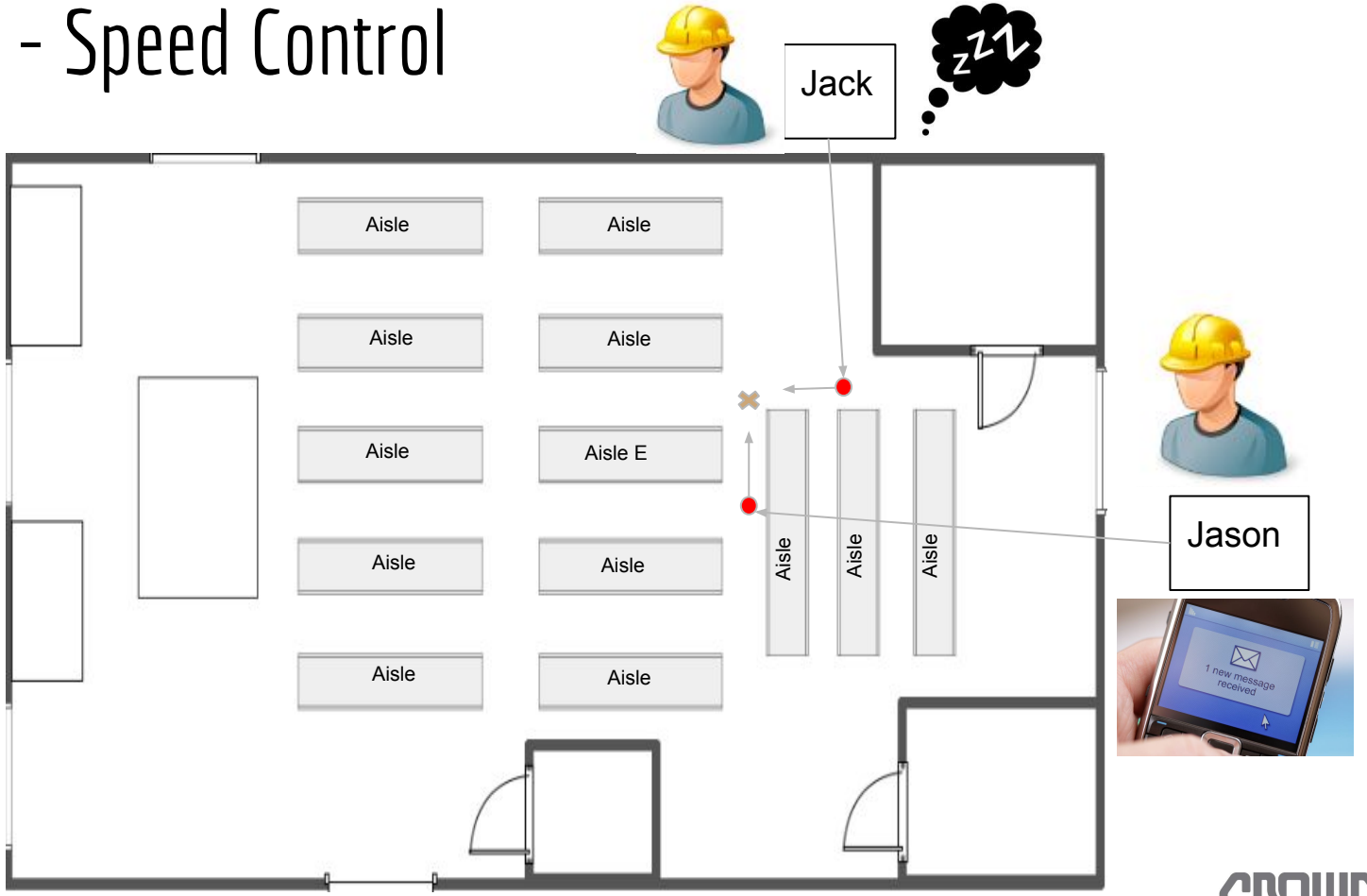
SPEED CONTROL

REAL TIME MAINTENANCE

INCREASE SAFETY

LOCATION TRACKING

IPS Safety - Speed Control



IPS Safety - Speed Track

Logs the speed and route of the operators (like Jack)

Dashboard

John

IPS Safety - Speed Control

Calculate speed and distance

Send alert to InfoLink

Reduces speed

alert

alert

Jack

Jason

Forklift

IPS Safety - Maintenance

IPS Safety - Maintenance

Tracks the forklift's location and logs the problem

Send IPS location to Maintenance

Jeff

Sends alert to manager

John

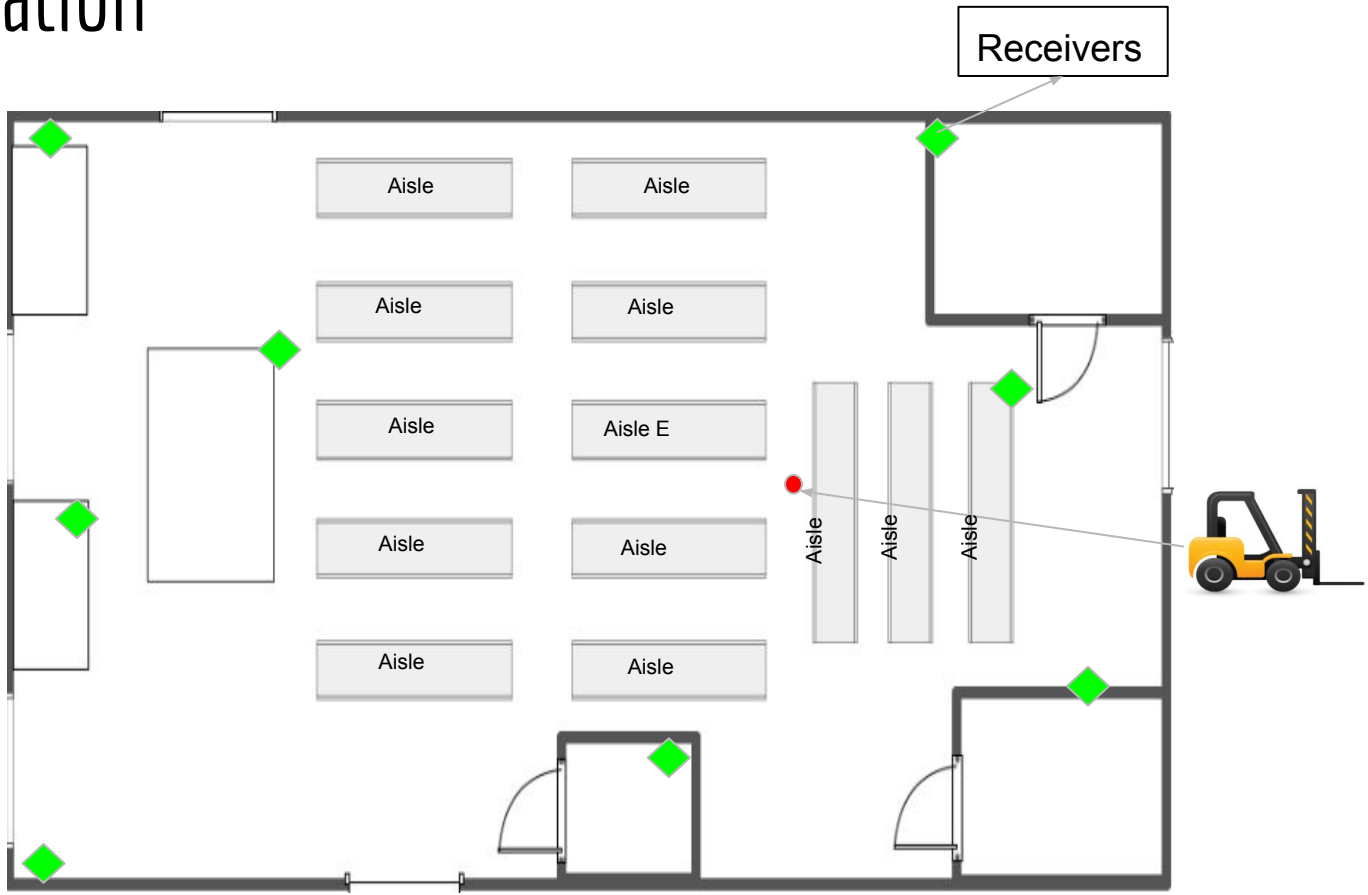
IPS Safety - Maintenance

The IPS Safety will check:

- Engine
- Fuel
- Hardware (like tires)
- Oil and Fluid levels of various components through various sensors

IPS Safety - Location

IPS/Ultra-Wideband Technology



IPS Safety - Location

Tracks the forklift's location

Send IPS location to Dashboard

Dashboard

John

Sends alert there is a **THEFT - ALERT**

John

Problem Space and IPS Safety

Create a Product, Service or both,

- That includes some kind of hardware element - Small portable connected device
- That can live on the Infolink platform - Will use InfoLink Cloud, Dashboard and Interface for alerts and notifications.
- That has some type of application control or analysis - Analyses data for predictability and Accident Prevention.
- That is either Crown made/owned, or Outside entity provider/partner - Crown owned

Company Goal would be to drive players to the platform

- For end user, or dealer channel benefit - Provide safety to Small/Medium scale Warehouses
- Enhance Crown brand leadership that starts with lift trucks - Will enhance lift truck experience by improving operator safety

Features

Feature List

Easy Availability

Seamless Integration

Monthly Subscription

Backward Compatibility

Third - Party Compatible

Maintenance

The Good - Better - Best Strategy

GOOD	BETTER	BEST
IPS Safety Separate Device	IPS Safety in InfoLink Standard and InfoLink Advantage	IPS Safety in Infolink Complete
Sold for people without InfoLink	Sold for people with InfoLink, integrated with InfoLink	Sold as a complete package
Sold Separately	Subscription Model	Sold Separately
No data analytics feature, No cloud storage feature	Features sold using Subscription Model	All features in the device

Marketing Strategy and Focus Area

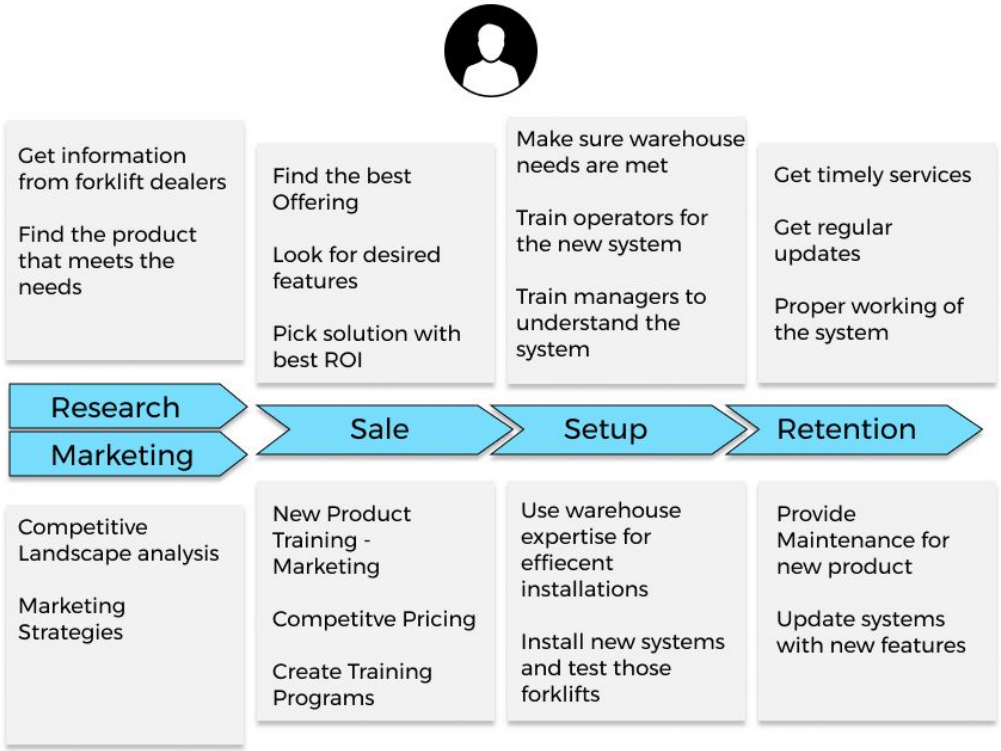
Features	InfoLink **Standard**	Infolink Advantage	InfoLink Complete
Compliance	⊗	⊗	⊗
Impact	⊗	⊗	⊗
Productivity		⊗	⊗
IPS Safety	Additional Subscription	Additional Subscription	Included ⊗
Energy		⊗	⊗
Service & Utilization	⊗	⊗	⊗

Standalone Version of the **InfoLink IPS Safety** will be available.

Compatible with all the third party fleet management systems on the market.

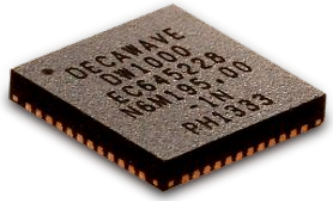
Will include **Monthly Subscription Model** with installation and maintenance.

Journey Map


Get information from forklift dealers
Find the product that meets the needs
Find the best Offering
Look for desired features
Pick solution with best ROI
Make sure warehouse needs are met
Train operators for the new system
Train managers to understand the system
Get timely services
Get regular updates
Proper working of the system
Research
Marketing
Sale
Setup
Retention
Competitive Landscape analysis
Marketing Strategies
New Product Training - Marketing
Competitve Pricing
Create Training Programs
Use warehouse expertise for effiecent installations
Install new systems and test those forklifts
Provide Maintenance for new product
Update systems with new features

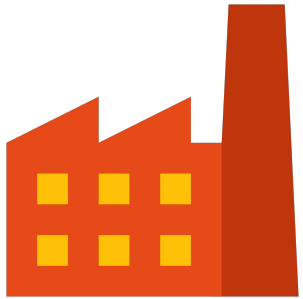
Key Partners

- Chip Manufacturers - DecaWave is Irish manufacturer of UWB chips and has presence in warehouse operations
    - Consumer pricing for UWB chips ranges from $15 - $22 each [semiconductorstore.com]
- Retail and Seller network - Crown retail stores and partner retail stores.



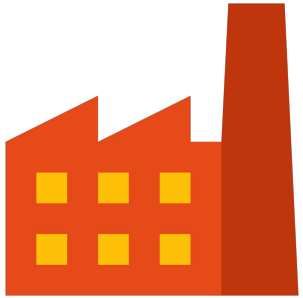
Key Activities

- Hardware Manufacturing - Procuring UWB chips and creating the new IPS safety module
- Software Integration - Modifying dashboard to show data from IPS module
- Marketing - Direct communication with clients, ad campaigns
- Service Updates - Software updates to Infolink and IPS safety
- Component Installation - Retrofitting vehicles with new hardware, Installing on new vehicles



Key Resources

- Human Resources - Employees working in production, sales and marketing, software development
- Intellectual resources - Crown's R&D on Indoor positioning, InfoLink technology
- Physical resources
  - InfoLink integrated forklifts
  - InfoLink Modules
  - IPS modules



Distribution Channel for Crown

Infolink Complete - InfoLink + IPS Safety Bundle Pack.

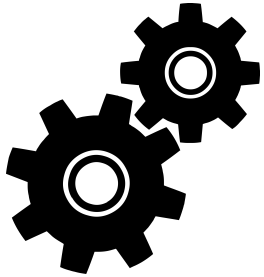
- Available with Crown Dealerships in USA and on Company's Website
- Available with Partner retail channels
- Accessible to Other Forklift Trucks & Third - Party Fleet Management platforms
- Regular Service & Maintenance Check ups will be delivered to all Customers with IPS Safety.

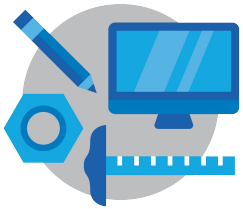
Customer Relations

- Self Service - Product Documents and Operator manuals
- Personal Service - Crown's Integrity Service system
- Customer feedback channels - Crown's service request application

Cost structure

- Production costs - Integrating new technology into IPS, Upgrading forklifts
- Marketing and sales costs - Training existing employees, Advertising, Notifying the retail network
- Design and Development costs - Updating InfoLink, Creating compatible modules, Integrating IPS
- Fixed costs - New employees hired to address additional production and maintenance due to IPS safety





Revenue streams

- Asset sales - New infolink module, stand-alone IPS module
- Maintenance - Providing services to upgraded forklifts and users of new system
- Subscription fees - New subscription plan for InfoLink Safety
- Installation Fees - One time installation fees to install the new module in forklifts

Business Canvas Model

Key Partners

Retail and Seller network

Chip Manufacturers

Key Activities

Design

Production

Component installations

Marketing

Service Updates

Key Resources

Intellectual Property

Physical Resource

Human Resource

Value Proposition

Safety

Real time tracking

Real time vehicle status

Impact prevention

Operator Monitoring

Customer Relationships

Customer Care Call lines

Personal Service

Customer feedback channels

User Reviews

Channels

Crown Retail channels

Partner Retail channels

Media and Advertisements

Customer Segments

Small warehouses

Current customers

Cost Structure

Production costs

Design and Development costs

Marketing and Sales costs

Fixed costs

Revenue Streams

Asset Sales

Installation fees

Subscription fees

Maintenance

SWOT

Strengths	Weaknesses
- Increases customer base - Low barrier to entry - Provide enhanced data analysis to managers - Saves Money on Maintenance - Less expensive device for small warehouses - Trusted Brand	- It requires significant Software development for Crown - It is a new product, so will take time to adopt - Will need InfoLink platform and cloud for a few functions
Opportunities	**Threats**
- Can include other attributes of telematics - Create more functionalities with the integration of Ultra-wideband technology - Further enhance the experience of the operator with automation	- It will not be accepted by the operators - It's not a new technology - Third party service providers

Future Scope

Through integration of IPS we can include many other features:

- Route tracking
- Synchronization amongst Operators
- Heat Maps

Takeaways

- Just not design but **Design to Grow**.
- Market analysis and user analysis
- **Pain points** and **Gains** involved in the design.
- Compatibility of **Design with Business**
- Can the design cater to **Business Innovation?**
- Know the **Business aspects** revolving around the design.
- A **Good Design** always needs a **Good Business model**.

Questions?