

SPARR \odot W

SGM 2/23



PINK BAGEL: CAMPAIGN 1

RETAIL vs. DISTRIBUTION

**Sparrow Drones**
shared this

Lost inventory causing lost revenue? Use Sparrow Drones to count and locate items in your retail store.

*IT'S A BIRD...IT'S A
PLANE...IT'S...*



SPARROW!

*YOUR RETAIL INVENTORY
MANAGEMENT SUPERHERO!*

Sponsored by Sparrow Drones
6 Likes • 1 Comment

 Like  Comment  Share

**Sparrow Drones**
shared this

Don't let disorganized inventory delay your outgoing shipments. Use Sparrow Drones to count and locate items in your distribution center!

*IT'S A BIRD...IT'S A
PLANE...IT'S...*



SPARROW!

*SUPERMAN FOR
DISTRIBUTION CENTER
INVENTORY MANAGEMENT!*

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PINK BAGEL: RESULTS

RETAIL

CTR

0.76%

Impressions: 1,053
Clicks: 8

DISTRIBUTION

CTR

0.15%

Impressions: 667
Clicks: 1

OTHER

1 like



1 follower

\$54 (\$6/click)




PINK BAGEL: CAMPAIGN 2




COUNT vs. LOCATION



 **Sparrow Drones**
shared this 

Know exactly what you have in stock when you go "check the back." Get accurate, up-to-date data on your inventory counts using Sparrow Drones. sparrowdrones.org

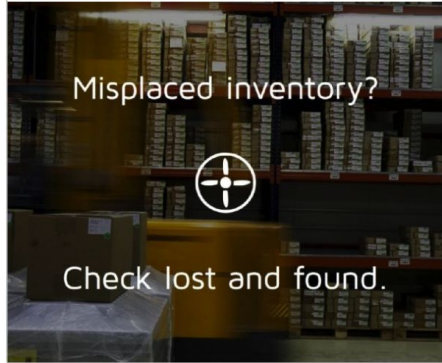


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Don't let lost inventory cause lost revenue. Use Sparrow Drones to accurately locate all your items. sparrowdrones.org




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PINK BAGEL: CAMPAIGN 3

DEDICATED UI vs. DATA INTEGRATION

 **Sparrow Drones**
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Tired of SAP WMS? Try Sparrow: sleek, modern inventory management. sparrowdrones.org



INCIDENTS REPORT

MISPLACED ITEMS

Article #	NAME	ASSIGNED LOCATION	ACTUAL LOCATION	LAST SCAN
143.634.34	White oak wood table	Aisle 5, Shelf 8	Aisle 5, Shelf 1	02/24/2015 10:30 p.m.
143.634.34	White oak wood table	Aisle 5, Shelf 8	Aisle 5, Shelf 1	02/24/2015 10:30 p.m.
143.634.34	White oak wood table	Aisle 5, Shelf 8	Aisle 5, Shelf 1	02/24/2015 10:30 p.m.




MISSING ITEMS


Article #	NAME	ASSIGNED LOCATION	ACTUAL LOCATION	LAST SCAN
143.634.34	White oak wood table	Aisle 5, Shelf 8	Aisle 5, Shelf 1	02/24/2015 10:30 p.m.
143.634.34	White oak wood table	Aisle 5, Shelf 8	Aisle 5, Shelf 1	02/24/2015 10:30 p.m.

Your warehouse isn't stuck in the industrial revolution. Don't let your WMS.


Sponsored by Sparrow Drones

6 Likes • 1 Comment

 Like  Comment  Share

 **Sparrow Drones**
shared this




Sell more with SAP + Sparrow! Increased warehouse intelligence integrated directly into SAP WMS. sparrowdrones.org



Give SAP WMS wings.
Continuous, real time, inventory data.

Sponsored by Sparrow Drones

6 Likes • 1 Comment

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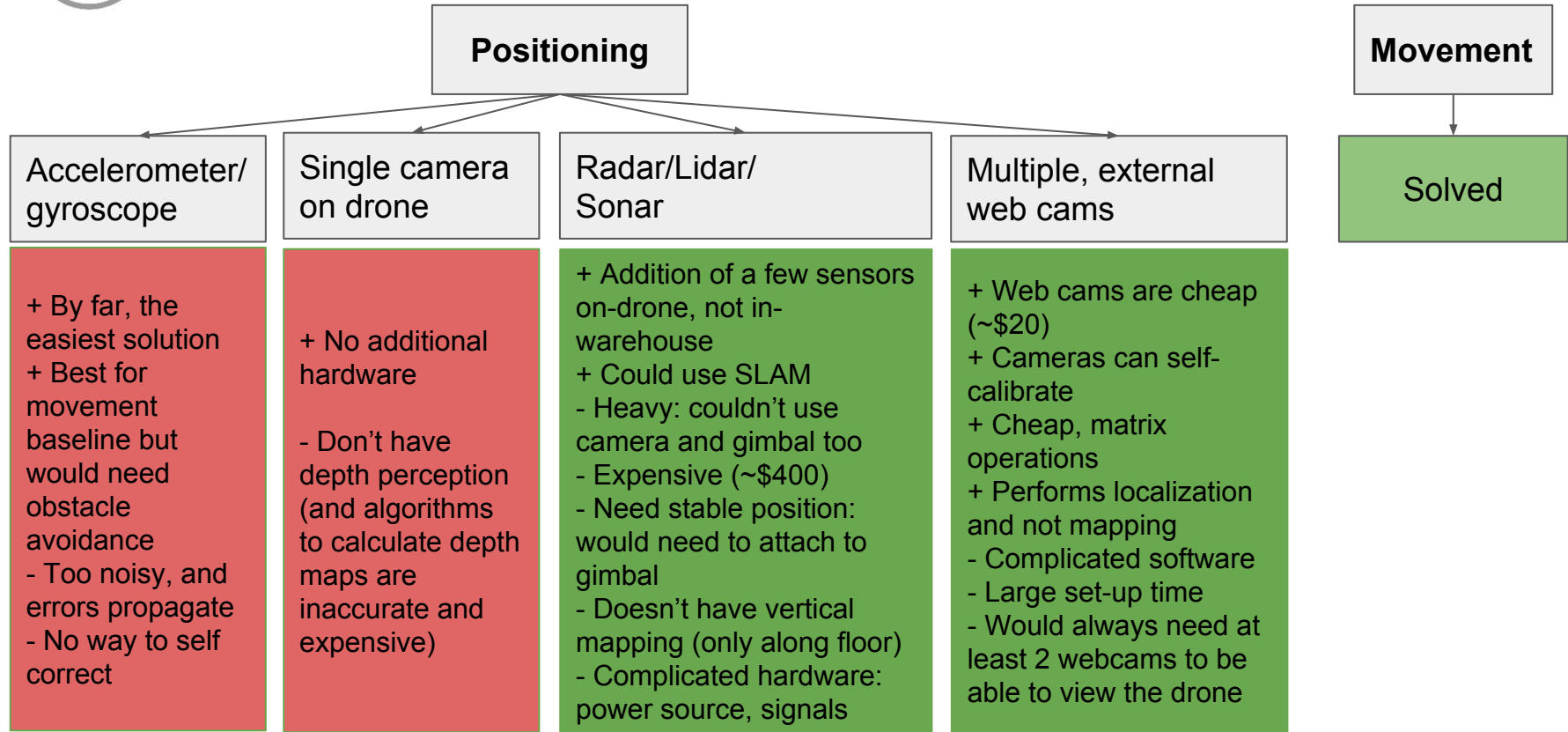
NESTLE AND LIAISON MEETING



1. **Terry Dunlap, Director: MES, E&A, and IT**
2. Problems with RFIDs
 - a. Nestle doesn't have RFIDs inside their packages
 - b. Nestle is a food company, so individual packages are high value, and it would be high cost to add a RFID transponder to every package
 - c. Warehouses are dense, and you might be reading multiple RFID tags at once and confusing them
3. Nestle has 99% inventory accuracy right now, so again, the retail space is likely where more value could be added
4. They'll pass us onto potential contacts (i.e. warehouse managers) who have more information



Drone Localization





Webcam Drone Localization

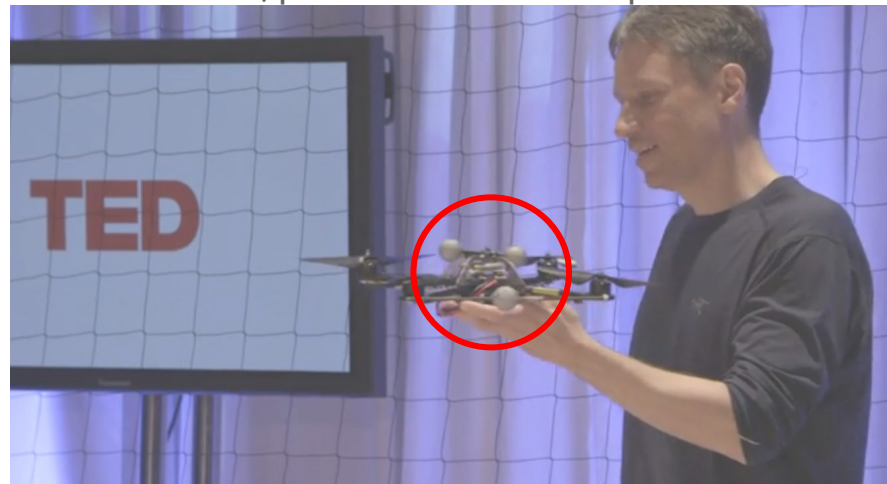
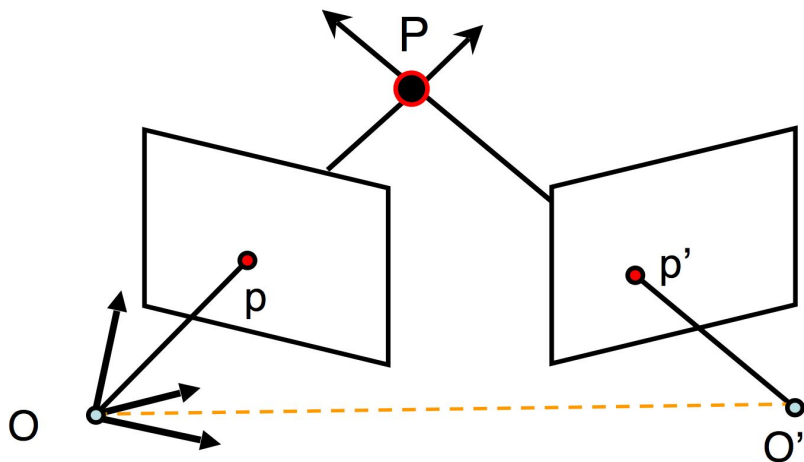
1. The problems with just using the single camera mounted on the drone
 - a. You need stereo vision (so 2 cameras) to get depth perception.
 - b. There are [algorithms](#) to get depth maps with a single camera using CNNs, but:
 - i. They're very inaccurate,
 - ii. You need large training datasets (and the publicly available ones won't have similar appearances as our warehouse setting)
 - iii. They're computationally expensive
 - c. Even given an accurate depth map, navigating without knowing your global location is another computer vision problem in itself
 - d. Even then, you still have the problem of not knowing where you are in the warehouse!





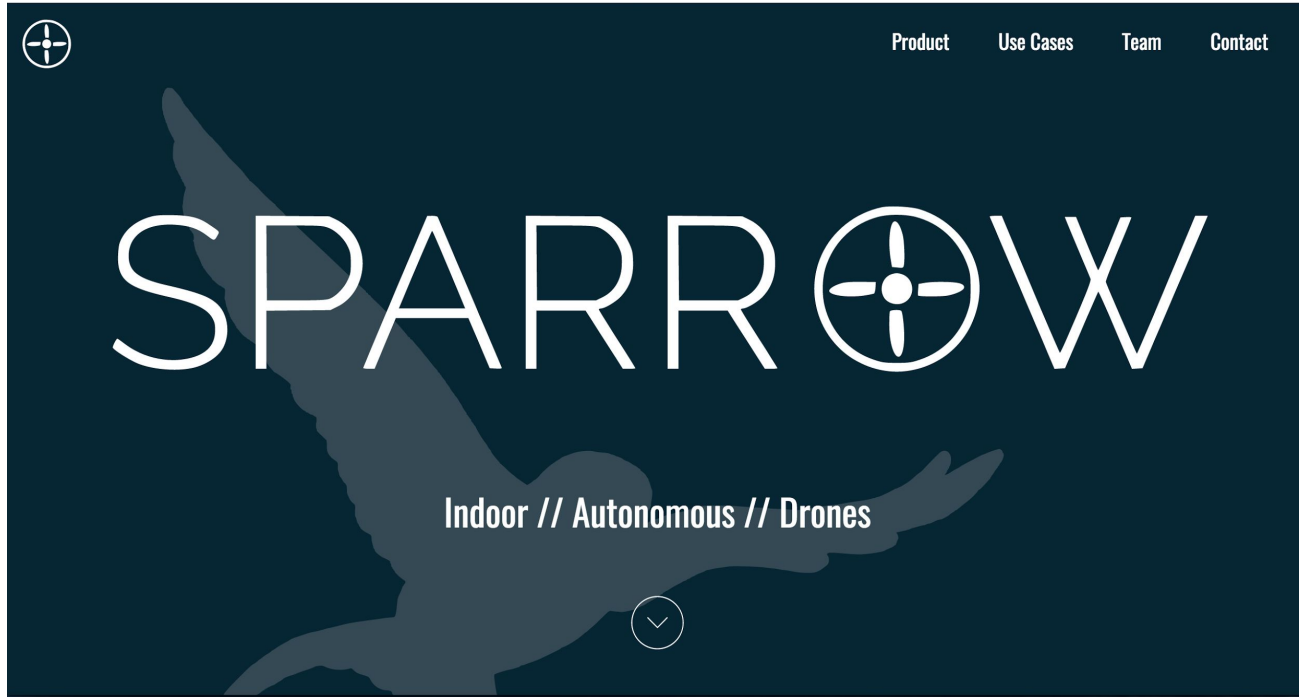
Webcam Drone Localization

1. Instead, use a network of cheap webcams mounted around the warehouse
 - a. At any point in time, a drone is visible from 2 cameras
 - b. These 2 cameras can **triangulate** the exact position of the drone, measured relative from some origin point in the warehouse (standard computer vision problem)
 - c. Then, knowing the position and a map of the environment, perform movement update





WEBSITE



<http://sparrowdrones.org/>



ROADMAP

DRONE PLATFORM

1. Test indoors with **obstacle course**
2. Choose best **localization** method
 - a. Onboard sensor technology using **sonar/radar**
 - b. External sensing via **computer vision**
3. **SUCCESS IF:** Drone is able to navigate a moderately difficult indoor course (has to pause and turn directions to avoid obstacles)

APPLICATION

1. **Web application** that tracks drone location
2. Focus on UI interface, Wizard of Oz backend for now
3. **SUCCESS IF:** User is able to specify a path and we are able to animate the drone flying along that path



TEAM DELEGATION

Application: Andrei

Sonar/Lidar/Radar: Pavitra, Catherine, Andrew

Webcam-based Localization: Amy

Reshuffle teams after best localization method is established

Proposed Final Teams:

1. Drone navigation
2. Application
3. Inventory Sensing (RFIDs, barcodes)



QUESTIONS

- Advice on sonar/radar/lidar vs. installing stationary webcams in the warehouse for localization?
- We're thinking about having a \$75 budget for our ad campaigns (CPC). Does this seem reasonable? Is there a reason to increase our budget?
- Travel: still haven't heard back from SAP on customer meeting days. When is the soft deadline for submitting travel form?