

# Drones for Deliveries

---

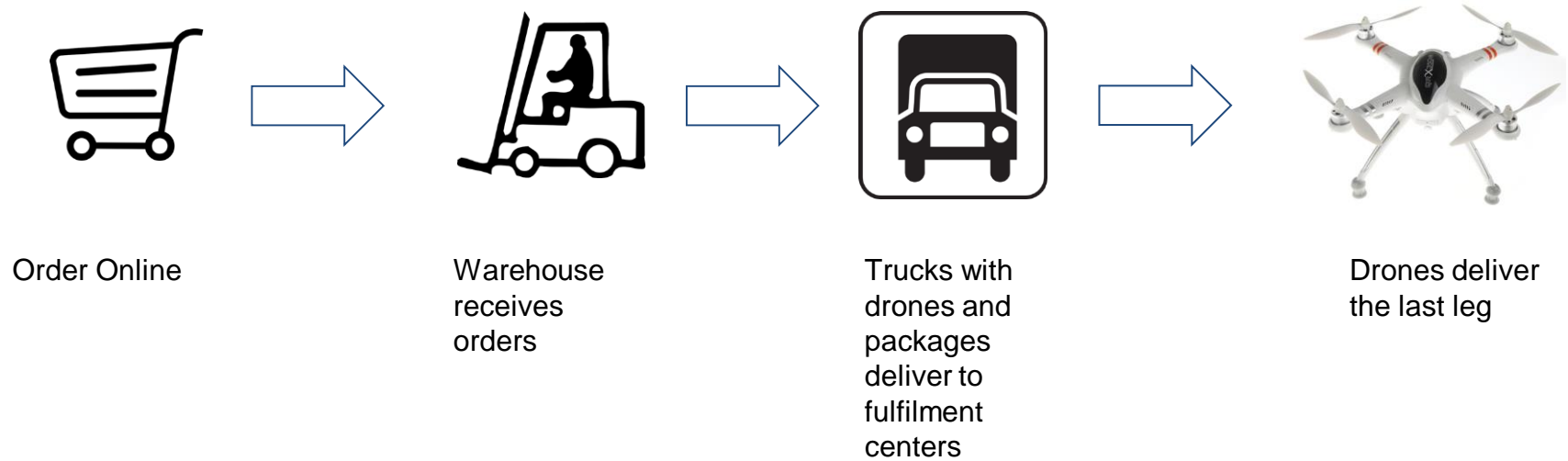
Simran Brar, Ralph Rabbat, Vishal Raithatha,  
George Runcie, Andrew Yu

This work was created in an open classroom environment as part of a program within the Sutardja Center for Entrepreneurship & Technology and led by Prof. Ikhlq Sidhu at UC Berkeley. There should be no proprietary information contained in this work. No information contained in this work is intended to affect or influence public relations with any firm affiliated with any of the authors. The views represented are those of the authors alone.



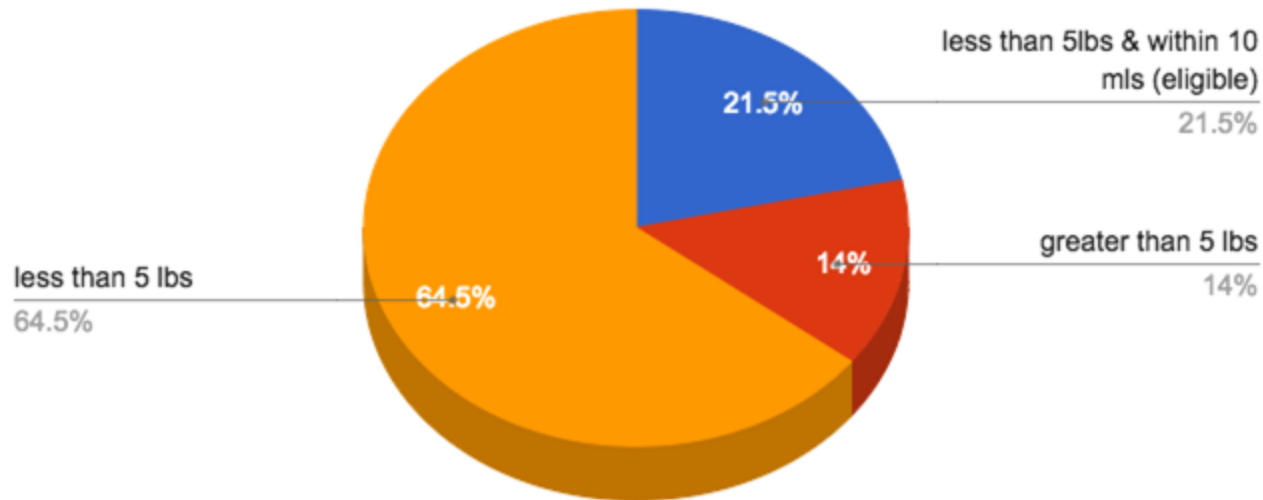
Drones will handle last mile delivery  
of most lightweight packages

# How will it work?



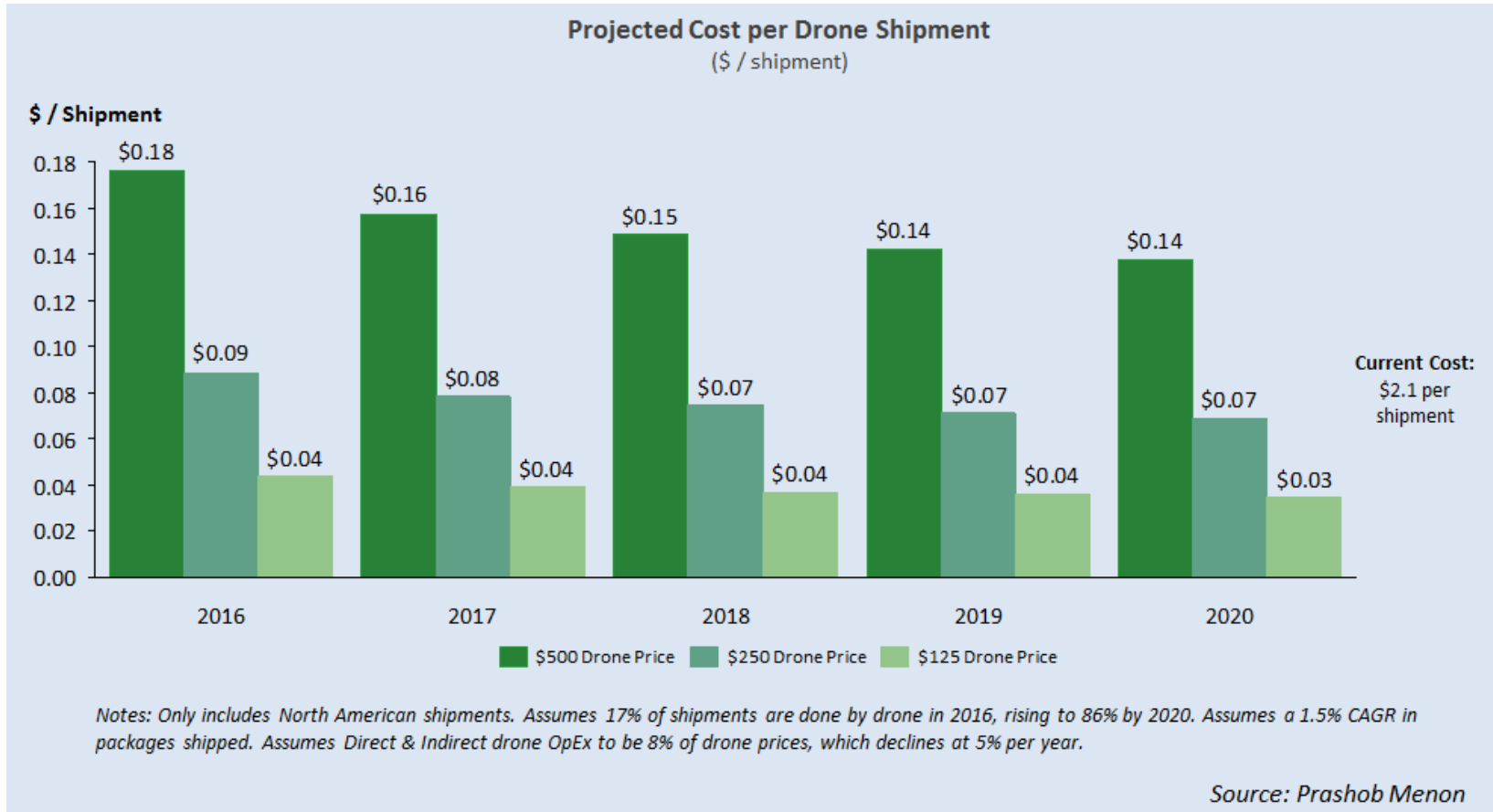
# Market Analysis

# Packages for delivery



[Keeney, Tasha. "How can Amazon Charge \\$1 for Drone Delivery?" Ark Invest.](#)

# \$500M savings per year for Amazon



[Menon, Prashob. Ivey Business Review.](#)

# Current Players

## Drone Startups



Flight Control Expert

3DR

MATTERNET

Lifting the rising billion

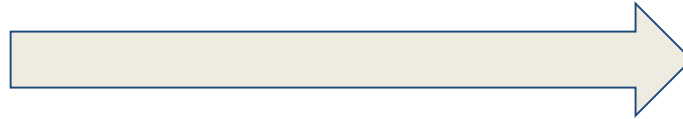


Flirtey

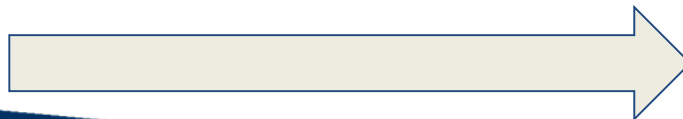
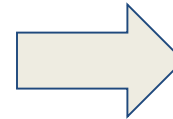
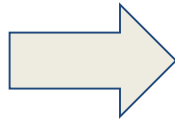
HorseFly

QuiQui

## Logistics Companies



FedEx



## Retailers



Google



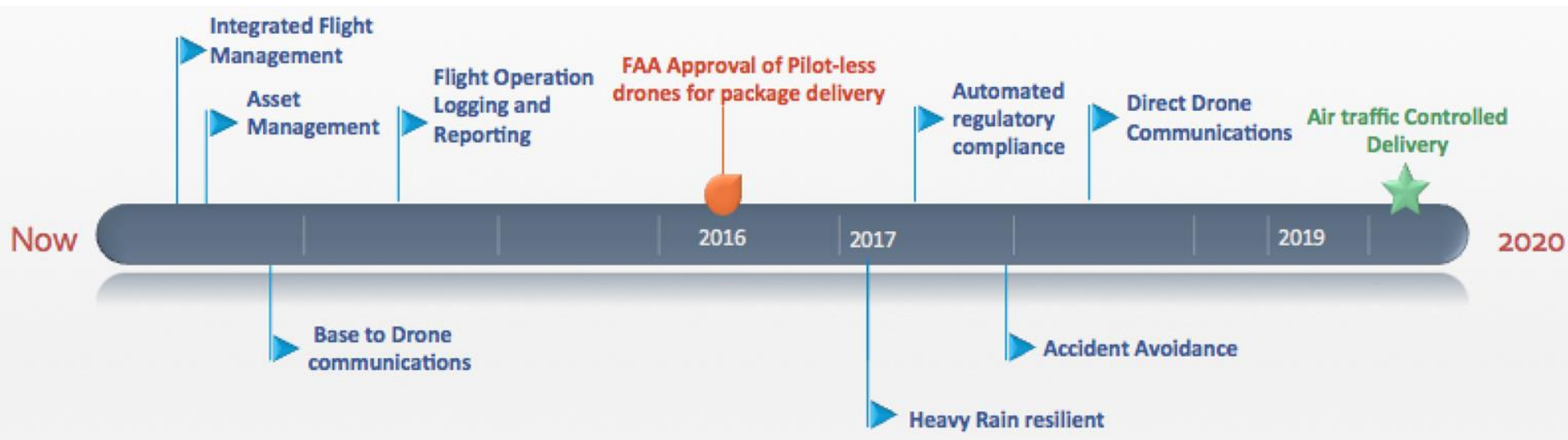


# Technology Analysis

# Technology Analysis of Drones

| Grade \ Aspect         | Consumer                              | Enterprise                          | Military                              |
|------------------------|---------------------------------------|-------------------------------------|---------------------------------------|
| <b>Function</b>        | Carries cameras for pics and videos   | Package delivery, farming, topology | Delivers weapons                      |
| <b>Cost</b>            | \$500                                 | \$5,000-\$10,000                    | \$5,000,000                           |
| <b>Package weight</b>  | 1-2 pounds                            | 5-7 pounds                          | 200 pounds                            |
| <b>Charging time</b>   | ~120 min                              | ~60 minutes                         | hydrogen fuel cell 10 minutes         |
| <b>Solar charging</b>  | n/a                                   | Acquila 3 months                    | In development                        |
| <b>Flight distance</b> | ~3 miles                              | 2 lbs package for 12 miles          | 48 hours                              |
| <b>Example</b>         | 3D Robotics \$500; 22 min flight time | MatternetOne \$5K; range 12 miles   | NG Global Hawk \$223M, range 14,154mi |

# Technology Outlook



# Societal Factors

- Societal issues (Privacy, Safety, Liability, etc.)
- Environmental factors (Noise, birds, etc.)



DHL 'parcelcopter' prototype in Bonn (Wolfgang Rattay/Reuters)

# Regulations

- Commercial drones require FAA exemption
- New proposed FAA rules for commercial drones (2016)
- Current FAA proposal has limits
  - Height limit of 500 feet
  - Speed limit of 100 miles per hour
  - Daylight & visual-line-of-sight
  - One operator per drone
  - Certified operator
- State laws (Florida SD766, Arkansas HB1349, etc.)
  - privacy protections

# Opportunities

- Home delivery drone manufacturers
- Air traffic coordination (device/software)
- Drone charging stations & landing pads
- Drone Recovery & Safety
- Analytics for drone insurance
- Skilled Technicians for maintenance and support

# Conclusions

- Drones will handle last mile delivery of most lightweight packages
- Key factors: Convenience, Cost
- Creation of an industry and a supporting ecosystem
- Innovators: Amazon, Walmart, Logistics companies

