

Last Mile Delivery Using UAS

Darryl Jenkins

March 9, 2017

The Necessary and Sufficient Conditions for last mile Delivery

- The sufficient conditions are the economics and that is what is pushing this.
- The necessary conditions are:
 - 1. Regulations, and
 - 2. Infrastructure

Companies Interested in the UAS Delivery Sector

- Alphabet Wing,
- Amazon,
- Walmart,
- Dominoes,
- Mercedes-Benz and Matternet,
- Most of the testing is done outside of the United States.

The Pressures Pushing UAS Package Delivery

- Last mile delivery costs currently range from \$2.50 to \$10.00 per unit.

The Pressures Pushing UAS Package Delivery

- The large number of products less than five pounds delivered each day.
 - In the U.S. over 1,000 products are sold online every second.
 - 85 to 90% of these weight less than five pounds.
 - Do the arithmetic (73,000,000 packages/day)

The Pressures Pushing UAS Package Delivery

Insurance	\$0.02
Command and Control	\$0.02
Communication	\$0.02
Labor	\$0.02
Maintenance	
Batteries	\$0.40
Motors	\$0.08
Rotors	\$0.01
Electrical	\$0.00
Battery Recharging	\$0.02
Air Space Charges	\$0.02
Total Hourly Operating Costs	\$0.61

The Pressures Pushing UAS Package Delivery

Capital Cost				
	20 hours per Week	30 Hours per Week	40 Hours per Week	50 Hours per Week
\$1,000	\$1.00	\$0.67	\$0.50	\$0.40
\$2,000	\$2.00	\$1.33	\$1.00	\$0.80
\$3,000	\$3.00	\$2.00	\$1.50	\$1.20
\$4,000	\$4.00	\$2.67	\$2.00	\$1.60
\$5,000	\$5.00	\$3.33	\$2.50	\$2.00

The Pressures Pushing UAS Package Delivery

Fully Allocated Cost					
	20 hours per Week	30 Hours per Week	40 Hours per Week	50 Hours per Week	
\$1,000	\$1.61	\$1.28	\$1.11	\$1.01	
\$2,000	\$2.61	\$1.94	\$1.61	\$1.41	
\$3,000	\$3.61	\$2.61	\$2.11	\$1.81	
\$4,000	\$4.61	\$3.28	\$2.61	\$2.21	
\$5,000	\$5.61	\$3.94	\$3.11	\$2.61	

The Necessary Conditions for UAS Package Delivery

UTM will not resemble anything currently used to separate aircraft. A new model is needed.

The Necessary Conditions for UAS Package Delivery

- 1. Infrastructure,
- 2. Financing for the build out,
- 3. A business plan to pay for operations,
- 4. Regulations,
- 5. Command and Control for the companies to track and follow deliveries,
- 6. Operational Plans and Standards

The Roll Out Process

- 1. Rural
- 2. Exurbia
- 3. Suburbs
- 4. Inner city
- 5. Inner city with large buildings

Conclusions

- UAS will one day become ubiquitous.
- Simple economics are pushing the industry.
- What other companies are going to use UAS for delivery?
- What are the various different potential business models.
- It is not difficult to imagine a day in the future where there are between 20,000,000 and 100,000,000 UAS operations/ day

Thanks

- Darryl Jenkins
- 540-364-6913

flyairjenkins@gmail.com