UAV package delivery for metro Denver

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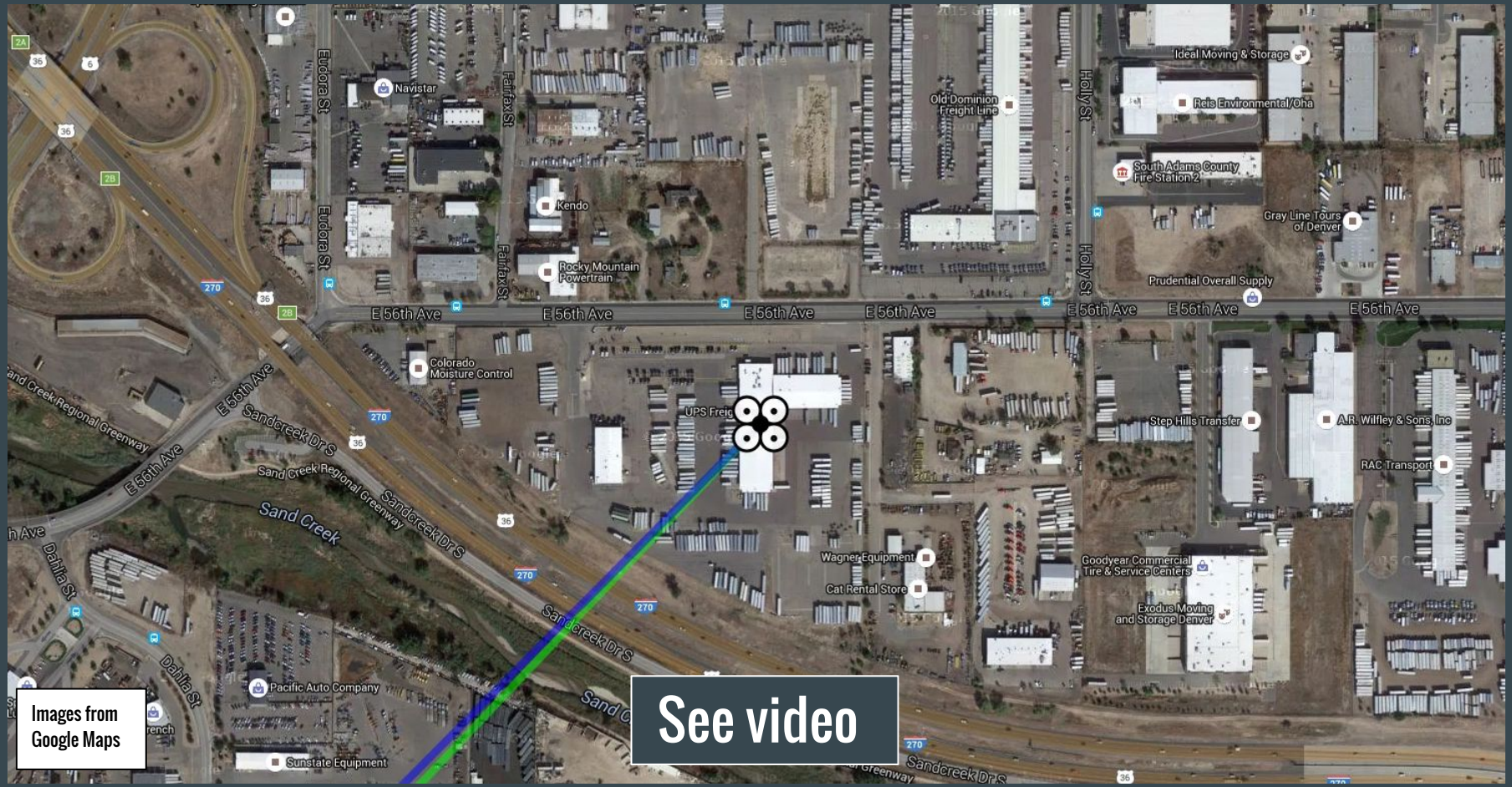
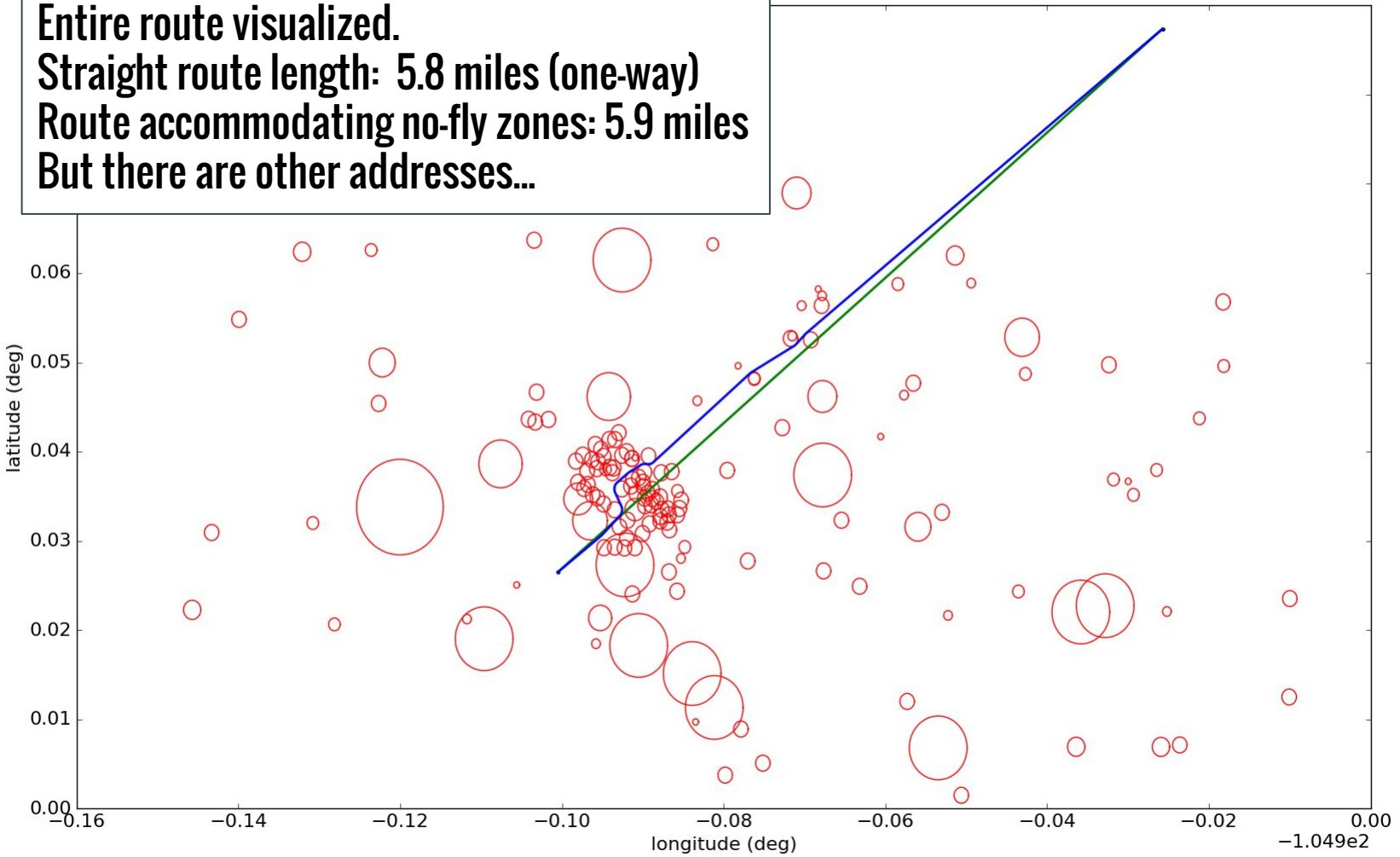
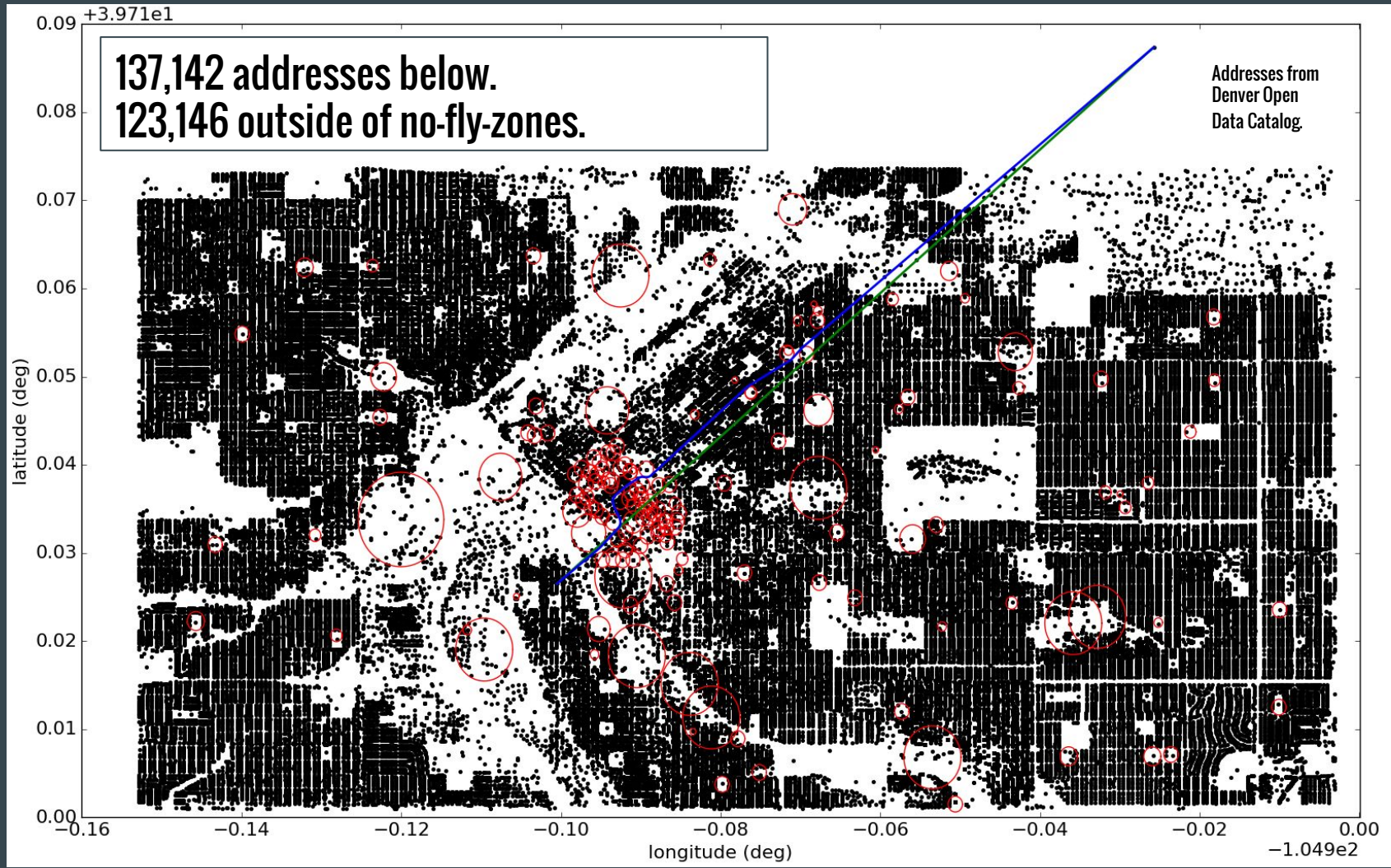
4.21.2016

What might delivery look like in a metro area?

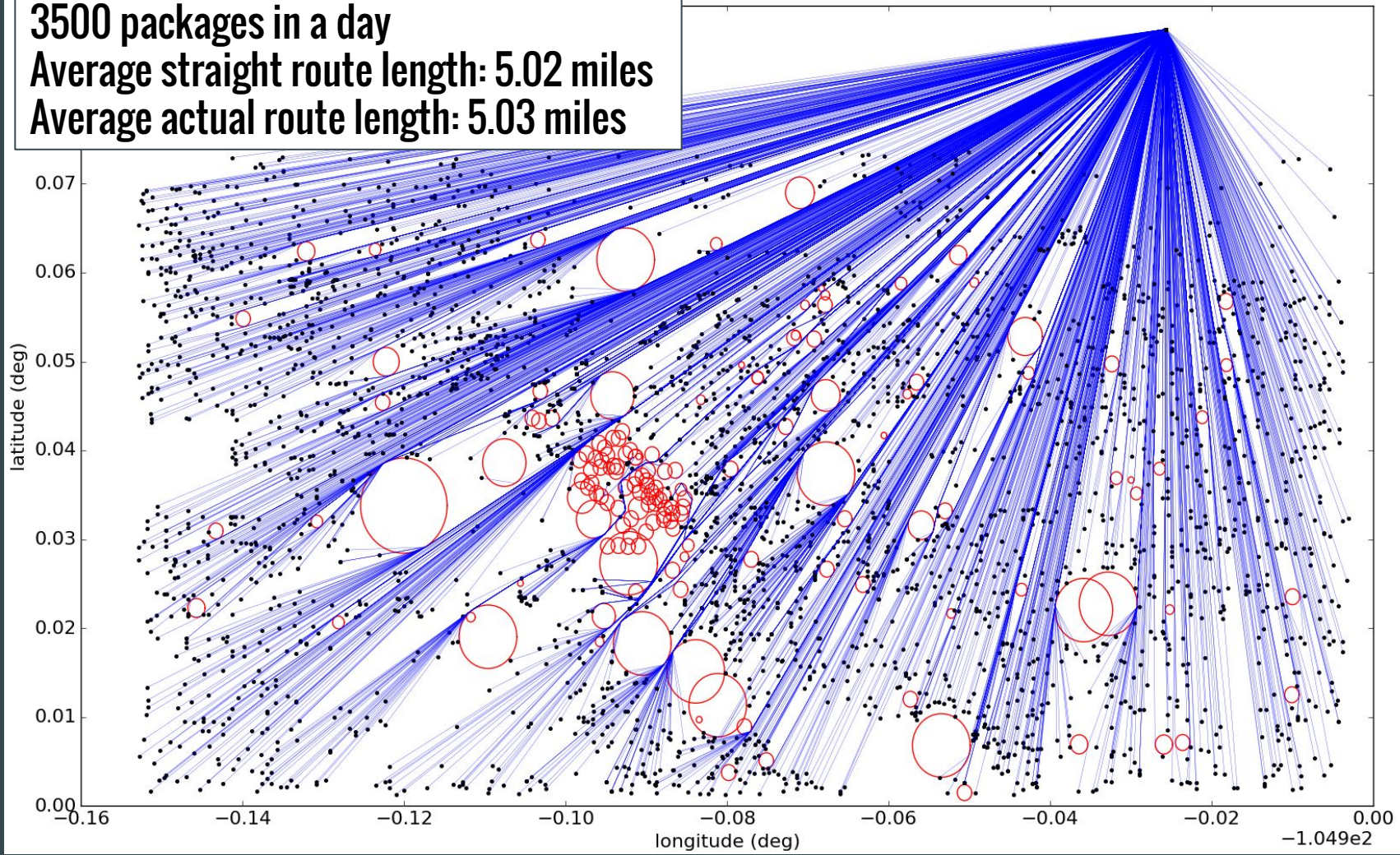


Entire route visualized.
Straight route length: 5.8 miles (one-way)
Route accommodating no-fly zones: 5.9 miles
But there are other addresses...




137,142 addresses below.
123,146 outside of no-fly-zones.
Addresses from Denver Open Data Catalog.
+3.971e1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
latitude (deg)
−0.16
−0.14
−0.12
−0.10
−0.08
−0.06
−0.04
−0.02
0.00
longitude (deg)
−1.049e2

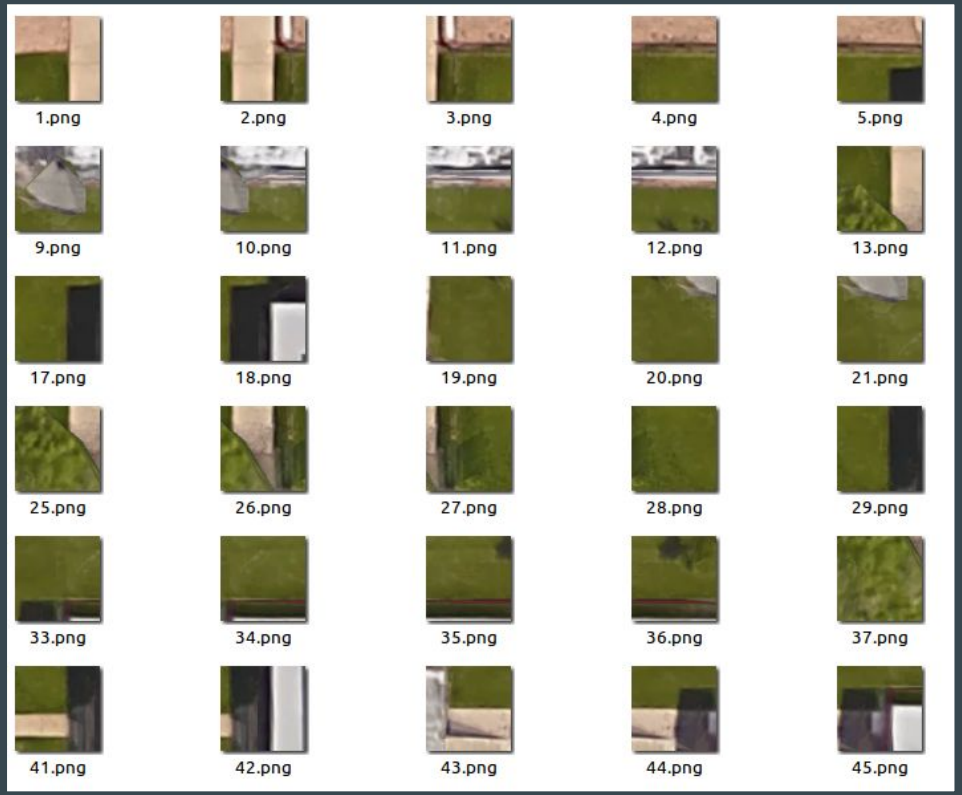
3500 packages in a day
Average straight route length: 5.02 miles
Average actual route length: 5.03 miles



Dropping the package off. Where to land?

Images from Google Maps

Landing Zone or not? A random forest classifier



Model test results

Actual \ Predicted	L.Z.	Not L.Z.
L.Z.	12	1
Not L.Z.	2	405

Recall : 12/13 = 92 %

Precision : 12/14 = 87 %

Technical details

Analysis	Technology	Data
UAV routing	Python graphical analysis javascript bash scripts MongoDB	Google Maps API Denver Open Data Catalog web scraping
Landing zone	Python: Scikit Learn Scikit Image	Google Maps API

Code, presentation, and
video available on github

Thank you!

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