

Population Movements

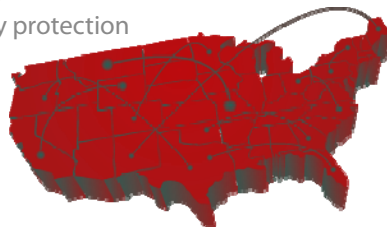
Data Solutions for Your
Transportation Studies



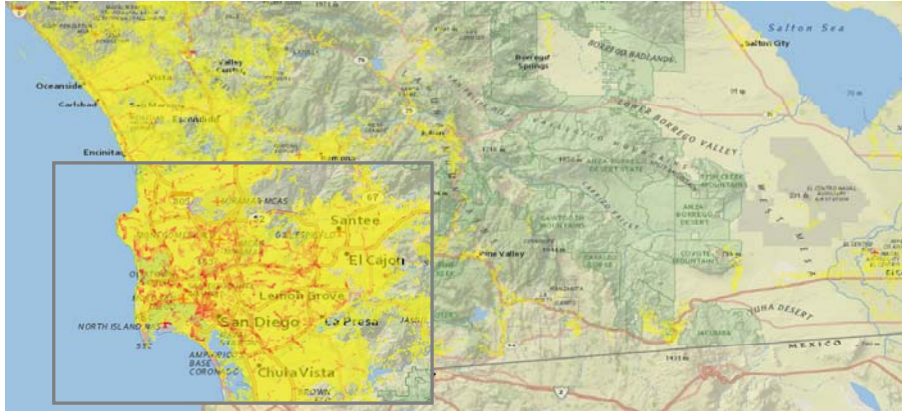
COMPANY OVERVIEW



Patented ***Population Analytics***
15 billion location data points per day
1/3 of the U.S. population
Consumer privacy protection



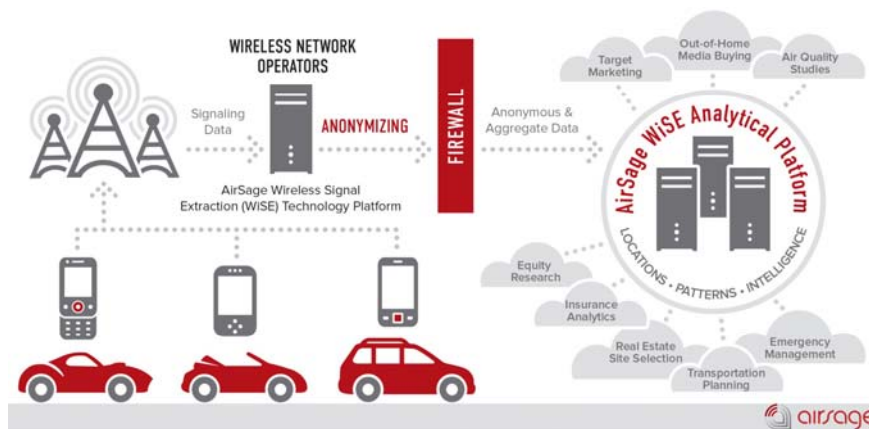
EXAMPLE: POPULATION ACTIVITY



24th July 2012 -- San Diego, CA
 Located 509,211 unique devices



AIRSAge WISE PLATFORM



TYPES OF POINTS

The map displays a street grid in Atlanta, Georgia, with several streets highlighted in yellow. A blue path starts at a blue dot on 17th St NW and moves east, then turns south and east again. A red path starts at a red dot on 17th St NW and moves east. Two callout boxes are present: a blue one labeled "Device on the move?" pointing to the blue path, and a red one labeled "Still at the same location?" pointing to the red dot. The Florida Model Task Force logo is in the bottom right corner.

ACCURACY

Individual Events
Average Accuracy: ~300m
90% Certainty Radius: 250m to 900m

The map shows a downtown Atlanta area with streets like 14th St NE, 13th St NE, Peachtree Walk NE, and Loews. Several red dots represent individual events. A red circle is drawn around a cluster of dots near the Atlanta Event Center at Georgia Tech, with a radius of approximately 100m. The Florida Model Task Force logo is in the bottom right corner.

ACTIVITY PATTERNS



Behind carrier firewalls, activity patterns can be examined over time to determine:

- Home-Based Work (HBW)
- Home-Based Other (HBO)
- Non-Home Based (NHB)
- Combinations of Home, Work, Other
 - HO, HW, HH, WH...
- Residence Class
- Trips per Day by Type
- Trip Lengths by Type
- Time of Day Information

“The average person doesn’t visit more than 13 persons per month.”
– Marta Gonzalez, MIT



SYNTHESIZING A FULL POPULATION

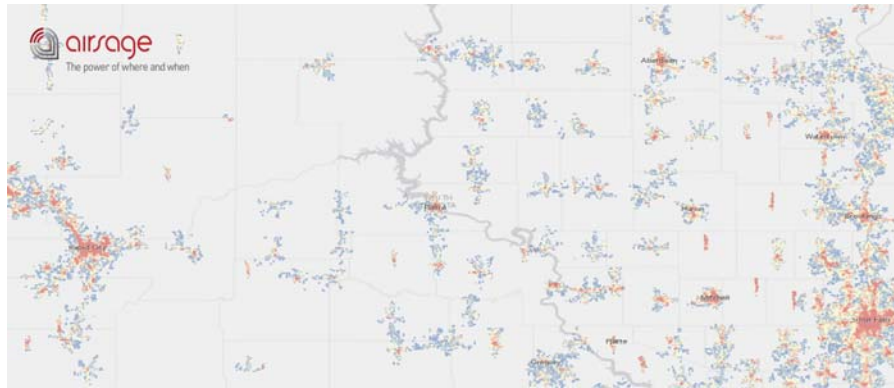


Given our unique insights,
it is now possible to use the data from more than
100 million subscribers to accurately simulate
the full population of the United States.

311 million residents...



EXAMPLE: POPULATION SYNTHESIS



24th October 2012 -- South Dakota

30 million sightings generated by more than 400,000 devices

Synthesized Resident Population of 808,000 people (Census 2011 Est. 824,000)



HOME LOCATIONS



Monday, January 14th 2013

Home Locations of Devices at TRB Conference Venues

More than 4000 Devices Sampled



TRIP MATRIX

5 Data Products


- Arrivals & Departures
- Select Zone Analysis
- Home-Work Matrix
- Trip Matrix
- Select Link Analysis

Resident Trip Purpose Distribution

Home to Work	266,979	10%
Work to Home	184,310	7%
Home to Other	829,565	31%
Other to Other	336,256	13%
Other to Home	709,930	27%
Work to Other	118,331	4%
Other to Work	85,979	3%
Work to Work	15,608	1%
Home to Home	127,391	5%

AirSage aggregates population movements to your custom zone system to create Trip Matrix

- For a specific day
- For an average day, week, weekday, weekend day
- For specific times of a day
- For a specific trip type (Home, Work, Other)
- Zone where trips began (e.g. county, zip, census tract)
- Zone where trips end
- Historic Data going back as far as 2009



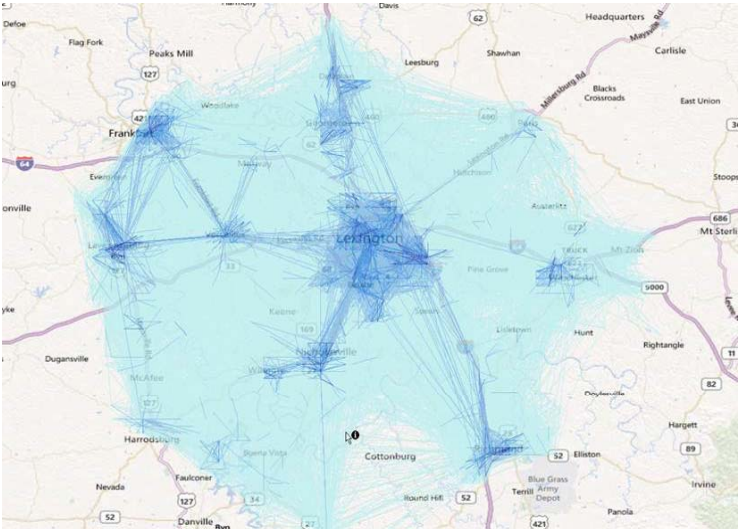
TRIP MATRIX

CASE STUDY – Lexington KY


5 Data Products

- Arrivals & Departures
- Select Zone Analysis
- Home-Work Matrix
- Trip Matrix
- Select Link Analysis

For an **Internal & External** Study Area Analysis containing **more than 1** type of geography for internal and external zones (ex. Internal – census tract, External - county)



24 hour trips in the Lexington, KY metro area



INTERNAL & EXTERNAL



Fayette and Jessamine Counties are Internal.

Includes:

- ✓ Day part segmentation
- ✓ Trip purpose segmentation
- ✓ Residence class segmentation

As well as:


- ✓ Internal – Internal Trips
- ✓ Internal – External Trips
- ✓ External – Internal Trips
- ✓ External – External Trips



Lexington, KY metro area



LEXINGTON, KY



Devices classified using statistical clustering of activity:


- Home Locations – assumed to be primary nighttime cluster
- Work Location – assumed to be primary daytime cluster

Weekday Sample Trips – September 19, 2012

Resident Worker	57%		
Home Worker	34%		
Inbound Commuter	2%		
Outbound Commuter	1%		
Long-term Visitor	3%		
Short-term Visitor	3%		

Overall Study Area Data:

Devices seen	54,686
Residents seen	46,812
Trips	179,368
Resident Trips	168,192
Trips per Resident per day (mean)	3.6



TRIP GENERATION SUMMARY



Daily Trips	NHTS 2001	AirSage 2012 Fayette and Jessamine Counties	AirSage 2012 Fayette and Jessamine Counties (Resident)	AirSage 2012 All Counties
Home Based Work	156,854	163,655	163,655	251,887
Home Based Other	618,189	737,980	737,980	1,402,674
Non Home Based	349,297	431,804	372,423	864,044
Total Internal	1,124,339	1,333,439	1,274,058	2,518,606
Household Trip Rates				
HBW	1.19	1.15	1.15	0.95
HBO	4.69	5.59	5.59	5.27
NHB	2.65	3.38	2.83	3.25
Total	8.53	10.12	9.57	9.47



TRIP GEN - CONTINUED



Fayette and Jessamine	HBW	HBO	NHB	Total	Percent
I-I	163,655	737,980	431,804	1,333,439	69%
I-E	16,766	139,482	98,311	254,559	13%
E-I	19,674	148,032	111,767	279,473	14%
E-E	1,324	38,855	35,655	75,835	4%
Total	201,419	1,064,350	677,537	1,943,306	100%



OD FLOWS - COUNTY TO COUNTY



COUNTY	Scott	Bourbon	Fayette	Woodford	Clark	Jessamine	Mercer	Madison	Garrard	TOTAL
Scott	112,386	2,148	67,167	7,510	3,411	6,437	3,758	10,884	1,367	215,067
Bourbon	2,080	21,939	13,035	955	1,166	1,031	614	1,677	259	42,757
Fayette	58,497	12,338	1,070,276	41,279	21,810	70,889	20,423	60,932	9,441	1,365,885
Woodford	6,182	816	40,913	52,210	1,740	6,052	3,383	5,711	950	117,957
Clark	3,785	1,181	25,913	2,472	59,812	2,681	1,411	5,532	643	103,431
Jessamine	5,480	952	69,092	6,254	2,073	123,181	4,117	6,622	4,343	222,113
Mercer	2,950	571	19,994	3,475	1,135	3,808	57,356	3,940	2,765	95,995
Madison	11,271	1,802	70,415	7,201	5,285	7,802	4,698	194,834	3,544	306,851
Garrard	1,197	226	9,812	1,034	629	4,412	2,720	3,278	25,226	48,534
TOTAL	203,829	41,974	1,386,616	122,390	97,062	226,295	98,481	293,408	48,536	2,518,591



HOME – WORK MATRIX



2012 Airside	Scott	Bourbon	Fayette	Woodford	Clark	Jessamine	Mercer	Madison	Garrard	TOTAL
Scott	12,627	157	6,707	430	104	118	53	213	11	20,420
Bourbon	293	3,330	1,922	65	163	94	0	90	0	5,957
Fayette	3,994	819	134,077	2,396	935	4,213	375	2,439	119	149,367
Woodford	254	33	3,267	7,402	8	371	262	72	17	11,686
Clark	176	164	3,918	104	5,838	122	26	472	38	10,858
Jessamine	229	54	8,786	340	90	14,185	291	273	216	24,464
Mercer	62	0	1,276	328	44	354	7,925	133	204	10,326
Madison	345	0	5,534	52	253	356	56	27,837	218	34,651
Garrard	65	0	1,293	43	0	968	359	469	3,856	7,053
TOTAL	18,045	4,557	166,780	11,160	7,435	20,781	9,347	31,998	4,679	274,782

2010 CTPP	Scott	Bourbon	Fayette	Woodford	Clark	Jessamine	Mercer	Madison	Garrard	TOTAL
Scott	11,885	0	5,840	305	75	135	55	155	0	18,450
Bourbon	0	0	0	0	0	0	0	0	0	-
Fayette	5,180	0	121,950	2,055	1165	3,580	435	1,600	0	135,965
Woodford	430	0	4,380	6,250	40	260	80	30	0	11,470
Clark	515	0	5,500	75	8,860	110	0	385	0	15,445
Jessamine	235	0	9,610	250	90	10,735	220	95	0	21,235
Mercer	115	0	1,160	420	55	225	5,595	0	0	7,570
Madison	375	0	7,495	110	555	400	95	27,065	0	36,095
Garrard	0	0	0	0	0	0	0	0	0	-
TOTAL	18,735	-	155,935	9,465	10,840	15,445	6,480	29,330	-	246,230



AVERAGE TRIP LENGTHS



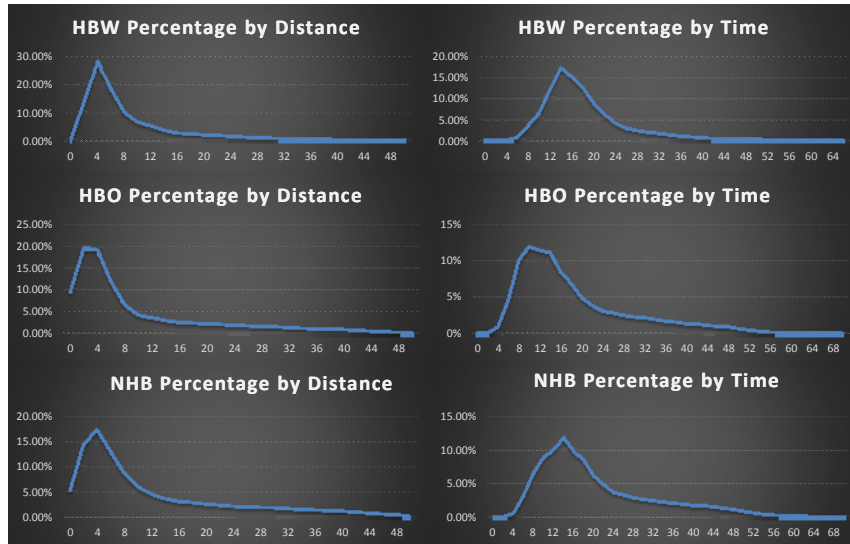
Average Time (minutes)	Whole Area		Urban I-I		Time	
	All	Resident	All	Resident	Min	Max
HBO	19.08	19.08	15.22	15.22	2.97	70.26
HBW	18.49	18.49	17.19	17.19	3.49	67.02
NHB	20.83	19.02	16.01	15.71	3.49	70.3
Average Distance (miles)						
HBO	10.36	10.36	5.45	5.45	0.07	50
HBW	8.81	8.81	6.44	6.44	0.31	50
NHB	12.24	10.29	6.31	6.05	0.13	50

Explained by consideration of

- Using old skims for distance and time
- Using only AM period skims for all times of day



AVERAGE TRIP LENGTHS



AVERAGE TRIP LENGTHS



Three main issues addressed:

Household trip rate per person

Compares well with literature

Residents vs. visitors separated out in the trip matrix

Average trip length

Looks good for urban Counties.



Contact Info:

William (Bill) H. King III, PE

770-329-0863

[*bking@AirSage.com*](mailto:bking@AirSage.com)

Kenneth D. Kaltenbach, PE

502.587.7221

[*kkaltenbach@CORRADINO.com*](mailto:kkaltenbach@CORRADINO.com)

