

# Status Report: Ongoing review of O-D cellular data for the TPB modeled area

Presentation to the Travel Forecasting Subcommittee  
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# Recap of the AirSage (AS) product:

- ▣ Origin-Destination (O-D) data
- ▣ Developed from continuously monitored mobile device movements
- ▣ Collected on weekdays during April 2014
- ▣ Geocoded to 3,722 zone level of analysis
- ▣ Data is anonymously mined from two carriers:
  - Verizon Wireless
  - Sprint Corporation
- ▣ Data are provided as aggregate flows (daily & period)
- ▣ O-D trips segmented by resident type and purpose



# Note: Verizon & Sprint are not the only carriers serving the region

**Largest Wireless Communications Providers  
Serving the Washington, D.C. Region**

Operator	U.S. Subscribers (Millions)	Coverage	Period
Verizon Wireless	125.3	Contiguous US; AK, HI	Oct. 2014
AT&T Mobility	118.7	Contiguous US; AK, HI, PR, VI	Oct. 2014
Sprint Corporation	54.8	Contiguous US; HI, PR, VI	Oct. 2014
T-Mobile US	52.9	Contiguous US; HI, PR	Oct. 2014
U.S. Cellular	4.7	23 states, incl. DC, MD, VA, WVA	Oct. 2014
nTelos	0.5	VA, WV, MD, OH, KY, NC	Sept. 2014
Shentel	0.3	VA, PA, MD, WV	Oct. 2011

Source: [http://en.wikipedia.org/wiki/List\\_of\\_United\\_States\\_wireless\\_communications\\_service\\_providers](http://en.wikipedia.org/wiki/List_of_United_States_wireless_communications_service_providers)



# Planned uses of AS data:

- Immediate use: A basis for updating exogenous trip forecasts in the travel model
  - External and through trips
  - Internal non-resident trips (visitor-tourist trips, e.g.)
  
- Additional potential uses:
  - Special generators
  - Sub-area analysis
  - Model checking



# Previous reports to the TFS

- ▣ July (“first-cut” O-D data)
  - Overview of the AS data development process
  - Initial summaries of the data
  
- ▣ September (more refined O-D data sets)
  - Comparisons of AS trips and land activity (TAZ & TAD levels)
  - AS trip rates (TAZ & TAD levels)
  - Comparisons of AS trips and modeled trips, by purpose
  - Comparisons of AS trips and counts at external stations

Note: findings were shared with AS staff on Nov. 5



# For today

First-cut plots/summaries of:

- ▣ Non-resident travel
- ▣ External travel



# Recap: Pros & cons of AS data

- Pros: a *substantial* sample size
  - ▣ 5.3M interchange records in daily O-D file
- Cons: AS trips *not congruent* with HTS trips
  - ▣ Includes linked & unlinked trips
  - ▣ Trip records are aggregate
  - ▣ Trip flow purposes and resident classes are inferred
  - ▣ Travel mode is unknown
  - ▣ Trip detection/tracking is dependent on device signals



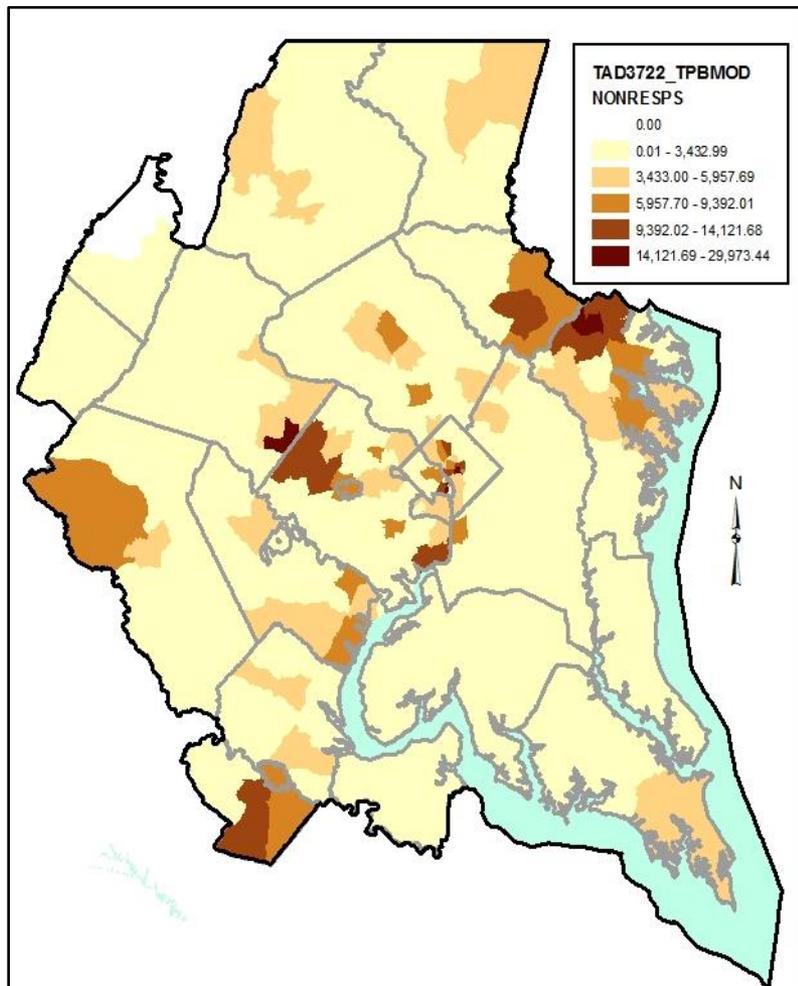
# Internal Non-Resident AS Trips

- 946,000 trips out of 20,358,000 (~4.5%)
  
- Non-resident travel: what comes to mind?
  - ▣ Visitors/tourists/conventioners
  - ▣ Business travelers
  - ▣ Temporary government/military personnel
  - ▣ Non-resident students
  - ▣ Non-resident shoppers
  
- How does AS define non-residents?
  - ▣ “Observed” in the study area less than 14 days

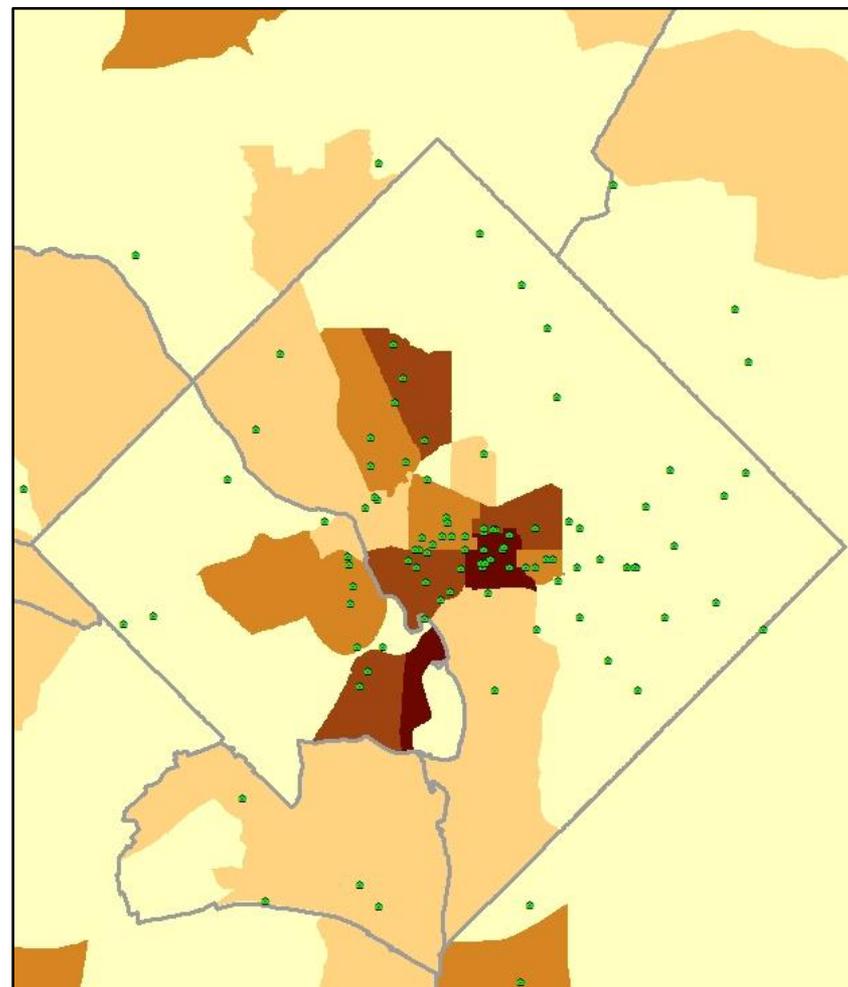


# 2014 AirSage Internal Non-Resident Productions (District Level)

(Modeled Region)



(Zoomed into the "Core" of the Region)

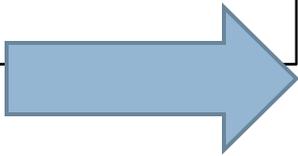


Note: dots represent visitor attractions

**Examination:**

-Districts with the most AS non-resident travel were examined

-Generally, locations deemed reasonable

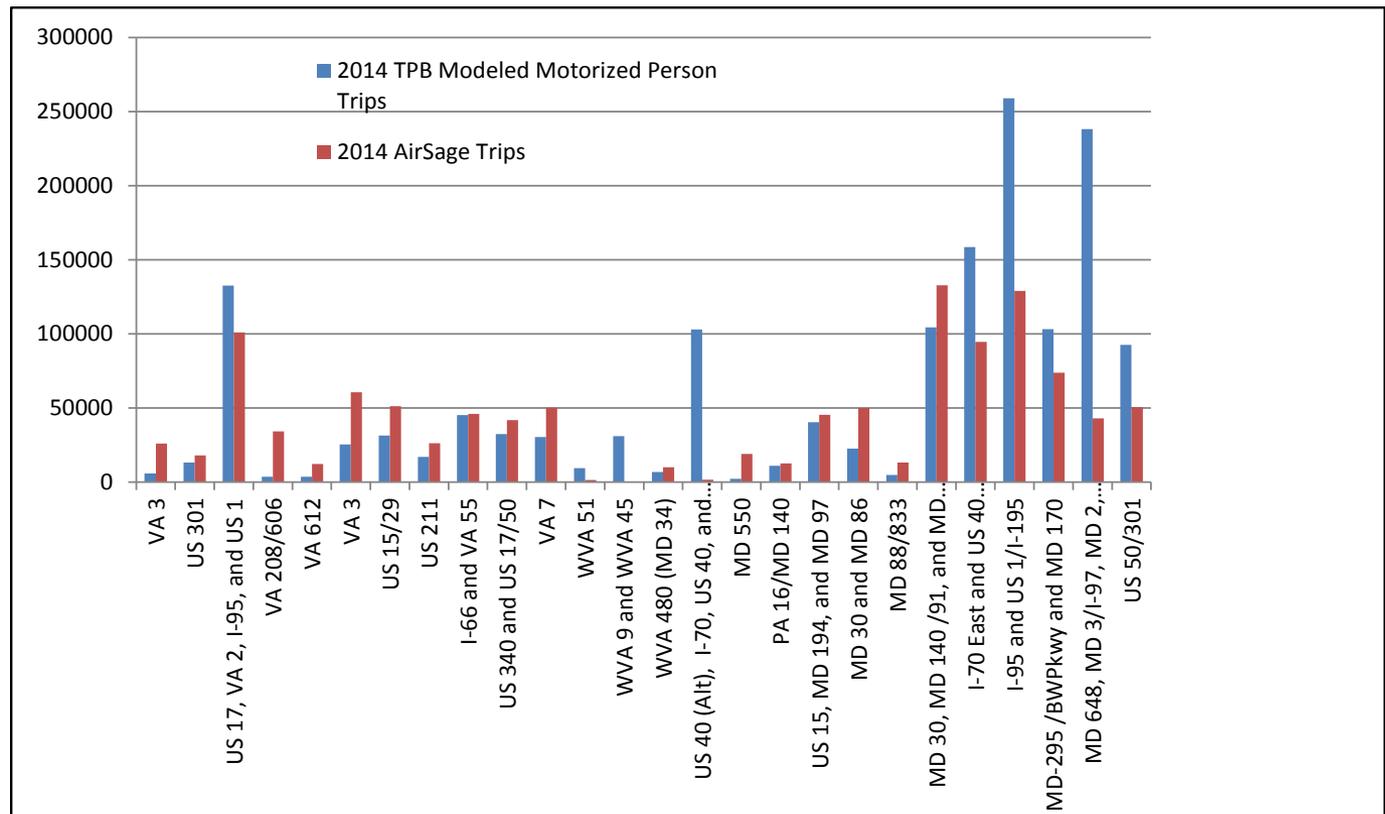


District	Non-Resident Trip Origins	Generators in/near the District
249	30,000	National Airport - Area
322	18,700	Dulles Airport
13	18,400	National Mall
5	17,100	Federal Center Area
195	16,600	BWI Airport
172	14,100	Columbia Mall
294	13,500	Mt. Vernon/G. Washington's Home
4	13,100	Verizon Center/Warner Theater/Nation Museum of American Art
11	12,500	Union Station
250	12,500	Pentagon City
312	12,200	Steven F. Udvar-Hazy Center/National Air & Space
196	12,200	Arundel Mills Mall Area
14	11,800	National Mall
403	11,600	Spotsylvania Town Centre
314	11,500	Dulles Airport Area
197	10,900	Maryland Live/Arundel Mills Mall
17	10,400	National Zoo
194	10,400	Maryland Live/Arundel Mills Mall
311	9,900	Fairfax Corner
359	9,400	Potomac Mills Mall Area
246	9,400	Pentagon
398	9,200	Spotsylvania Town Centre
16	8,800	National Mall
292	8,600	Tyson's Corner
404	8,400	Spotsylvania Town Centre
51	8,300	White Flint Mall
174	8,100	Chatham Station Shopping Centre
6	8,000	Wilson Building/Dept. of Treasury/ Dept. of Commerce
170	7,400	Maryland Live/Arundel Mills Mall Area

## External and Through Travel Comparison 2014 AirSage Trips vs. 2014 TPB Model

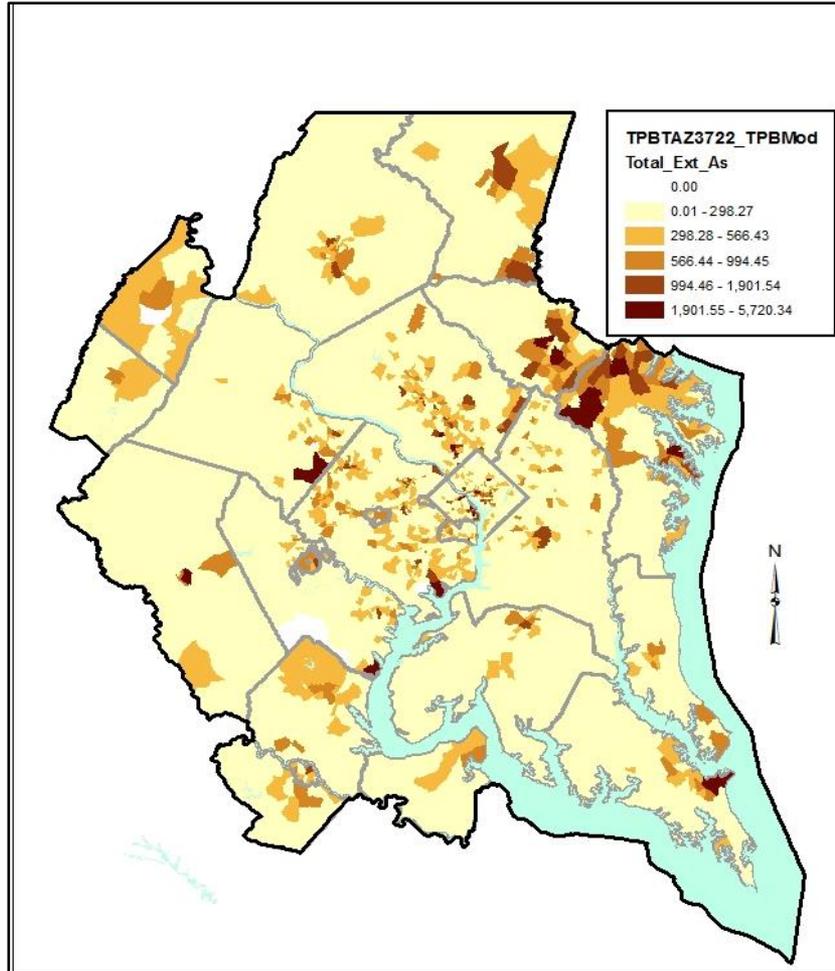
- AirSage trips at external stations are less than modeled trips
- AS thru trips are much less than modeled trips
- Large differences at specific station locations were observed

	External_Origins	Thru_Origins	External_Destins	Thru_Destins	Total_Extl/Thrus Ends
<b>2014 TPB Modeled Trips</b>	628,712	160,607	578,564	160,607	1,528,490
<b>2014 AirSage Trips</b>	534,813	42,214	526,466	42,214	1,145,708
<b>Ratio: AS/TPB</b>	0.85	0.26	0.91	0.26	0.75

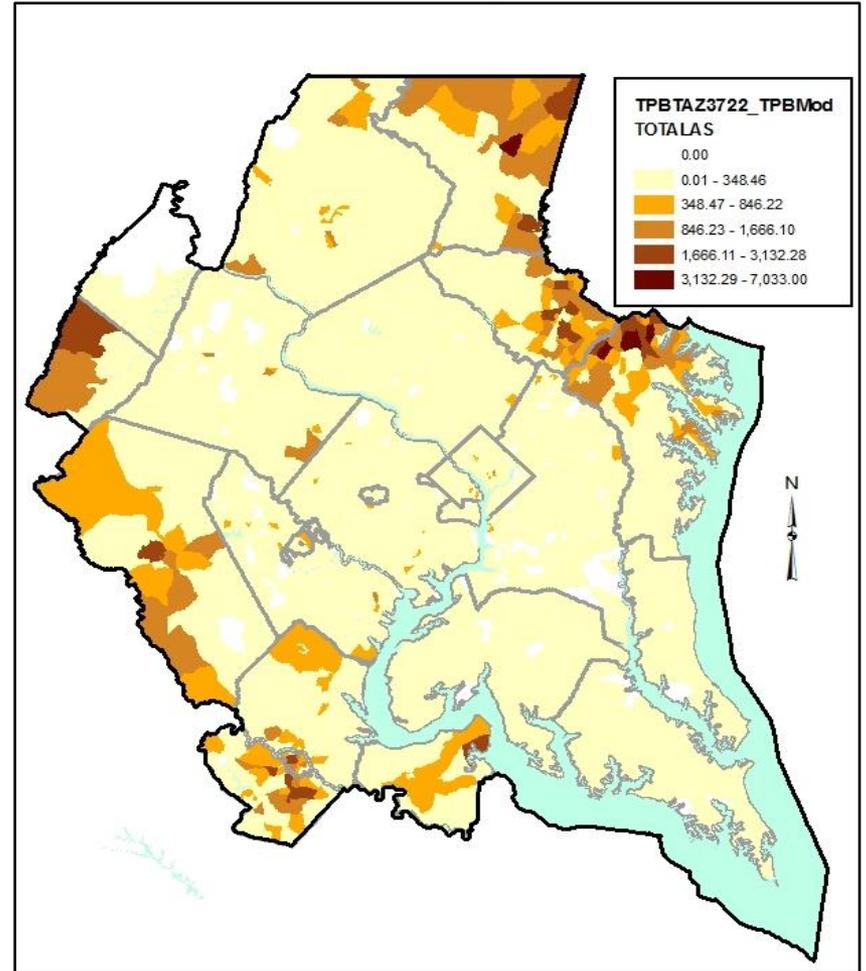


# Comparison of External-to-Internal Trip Attractions / Zone Level (2015 modeled person trips vs. 2014 AS trips)

2015 TPB Modeled



2014 AirSage



# Observations

- AS external (E-I) trip pattern is much more concentrated at the periphery of the study area than the modeled pattern
- Trip lengths calibrated to the AS pattern will be less than that of the existing modeled trip lengths
- Calibrating trip distribution to the AirSage pattern will result in a decline in VMT
- This gives staff something to think about



# Conclusions & Next steps

- Staff is working with AirSage to update the external shed boundaries; the update will not change the number of external/thru trips but will affect the “purpose” coding of external trips
- The AS non-resident trip patterns appear reasonable, promising
- The AS external trip patterns are under evaluation
- More thought is needed about exactly how to proceed with model building

