

Washington – Baltimore  
Regional Air Passenger  
Ground Access  
Forecast Update



**Aviation Technical Subcommittee**  
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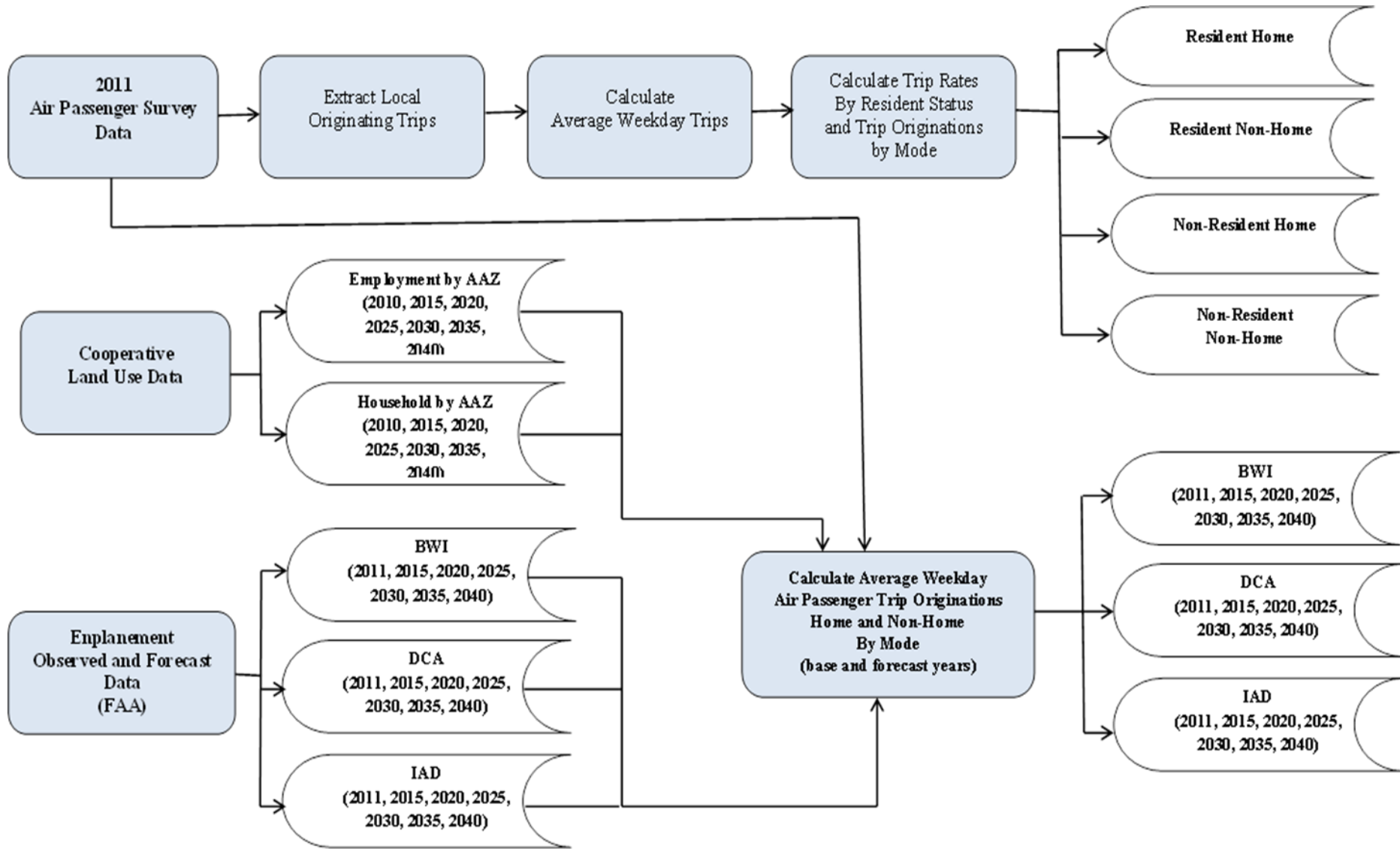


# *Objective*

- Develop average weekday base and forecast years of local originating air passenger trips from each Aviation Analysis Zones to the three regional commercial airports BWI, DCA and IAD by mode



# Air Passenger Ground Access Forecast Update



# *Methodology*

1. Obtain enplanements forecast from FAA for BWI, DCA and IAD for forecast years 2013 to 2040
2. Convert FAA forecast data from U.S. government fiscal year (October to September) to calendar year (January to December).



## A. BWI Marshall (BWI)

<b>Forecast Year</b>	<b>Enplanements</b>	<b>Difference</b>	
		<b>No.</b>	<b>%</b>
2010 <sup>1</sup>	10,996,713		
2015 <sup>2</sup>	10,950,496	-46,217	-0.42%
2020 <sup>2</sup>	12,665,736	1,715,240	15.66%
2025 <sup>2</sup>	14,569,596	1,903,860	15.03%
2030 <sup>2</sup>	16,761,920	2,192,324	15.05%
2035 <sup>2</sup>	19,286,631	2,524,711	15.06%
2040 <sup>2</sup>	22,194,357	2,907,725	15.08%

<sup>1</sup> *Observed Years*

<sup>2</sup> *Forecast Years*

*Note:- Forecast based on FAA TAF Fiscal Year annual percent increase*



## B. Ronald Reagan Washington National (DCA)

<b>Forecast Year</b>	<b>Enplanements</b>	<b>Difference</b>	
		<b>No.</b>	<b>%</b>
2010 <sup>1</sup>	9,035,544		
2015 <sup>2</sup>	10,013,171	977,627	10.82%
2020 <sup>2</sup>	10,523,940	510,769	5.10%
2025 <sup>2</sup>	11,060,767	536,827	5.10%
2030 <sup>2</sup>	11,624,979	564,213	5.10%
2035 <sup>2</sup>	12,217,972	592,993	5.10%
2040 <sup>2</sup>	12,841,211	623,239	5.10%

<sup>1</sup> *Observed Years*

<sup>2</sup> *Forecast Years*

*Note:- Forecast based on FAA TAF Fiscal Year annual percent increase*



## C. Washington Dulles International (IAD)

<b>Forecast Year</b>	<b>Enplanements</b>	<b>Difference</b>	
		<b>No.</b>	<b>%</b>
2010 <sup>1</sup>	11,812,905		
2015 <sup>2</sup>	11,608,411	-204,494	-1.73%
2020 <sup>2</sup>	13,737,545	2,129,134	18.34%
2025 <sup>2</sup>	15,870,722	2,133,177	15.53%
2030 <sup>2</sup>	18,350,007	2,479,285	15.62%
2035 <sup>2</sup>	21,234,177	2,884,170	15.72%
2040 <sup>2</sup>	24,592,421	3,358,243	15.82%

<sup>1</sup> *Observed Years*

<sup>2</sup> *Forecast Years*

*Note:- Forecast based on FAA TAF Fiscal Year annual percent increase*





# *Methodology*

3. Obtain land use forecast of household and employment base year 2010 and forecast years to 2040 for the Washington/Baltimore Air System Planning Region
4. Summarize Household and Employment data from 4,374 TAZ to 161 AAZ



## Air Passenger Ground Access Forecast Update

### Household Forecast

Year	Household	Change	Percent Growth	
2010	3,159,157	-		
2015	3,363,864	204,707	2010 - 2015	6.5%
2020	3,553,276	189,412	2015 - 2020	5.6%
2025	3,728,913	175,637	2020 - 2025	4.9%
2030	3,875,745	146,832	2025 - 2030	3.9%
2035	4,002,979	127,234	2030 - 2035	3.3%
2040	4,114,488	111,509	2035 - 2040	2.8%

Source:- MWCOG Round 8.1 and BMC Round 7.2 Cooperative Land Use Forecast

### Employment Forecast

Year	Employment	Change	Percent Growth	
2010	5,084,030	-		
2015	5,404,785	320,755	2010 - 2015	6.3%
2020	5,791,114	386,329	2015 - 2020	7.1%
2025	6,122,830	331,716	2020 - 2025	5.7%
2030	6,401,899	279,069	2025 - 2030	4.6%
2035	6,624,866	222,967	2030 - 2035	3.5%
2040	6,837,100	212,234	2035 - 2040	3.2%

Source:- MWCOG Round 8.1 and BMC Round 7.2 Cooperative Land Use Forecast



5. Review 2011 Regional Air Passenger Survey Data
  - A. Adjust survey weight to annual passenger for 2011
  - B. Select local originating passenger trips

**Annual Trip Originations by Airport (in Thousands)**

Enplanement Type		Airport			
		BWI	DCA	IAD	Total
Local origination	<i>Number</i>	8,758	8,215	7,493	24,466
- ( <i>Came by ground transportation</i> )	<i>Percent</i>	78%	88%	65%	76%
Connected from another Flight	<i>Number</i>	2,466	1,147	4,078	7,691
- ( <i>Local and/or International</i> )	<i>Percent</i>	22%	12%	35%	24%
<b>Total Annual Enplanements</b>	<i>Number</i>	<b>11,224</b>	<b>9,363</b>	<b>11,570</b>	<b>32,157</b>
	<i>Percent</i>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Percent of Air System Planning Region</b>		<b>35%</b>	<b>29%</b>	<b>36%</b>	

*Source:- 2011 Washington-Baltimore Regional Air Passenger Survey*



## C. Select trips originating within the Washington/Baltimore Air System Planning Area

**Annual Enplanements Internal/External originations  
by Airport (in Thousands)**

Enplanement Type		Airport			
		BWI	DCA	IAD	Total
Within Air System Planning Region - ( <i>Internals</i> )	<i>Number</i>	7,705	8,094	7,109	22,908
	<i>Percent</i>	88%	99%	95%	94%
Outside Air System Planning Region - ( <i>Externals</i> )	<i>Number</i>	1,054	121	383	1,558
	<i>Percent</i>	12%	1%	5%	6%
<b>Total Annual Enplanements</b>	<i>Number</i>	<b>8,758</b>	<b>8,215</b>	<b>7,493</b>	<b>24,466</b>
	<i>Percent</i>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

- *Internal* originating trips are local originating trips within the Washington/Baltimore Air System Planning Area.

- *External* originating trips are trips originating from PA, DE, WV, NJ or external VA and MD

Source:- 2011 Washington-Baltimore Regional Air Passenger Survey



# Calculate Forecast Years Local and Internal AAZ Originating Trips

Year	Local Originations			Total
	BWI	DCA	IAD	
2010	8,580,691	7,928,207	7,649,818	24,158,715
2011	8,758,172	8,215,338	7,492,613	24,466,123
2015	8,544,628	8,786,022	7,517,391	24,848,041
2020	9,883,023	9,234,194	8,896,179	28,013,396
2025	11,368,597	9,705,231	10,277,585	31,351,413
2030	13,079,258	10,200,298	11,883,124	35,162,680
2035	15,049,280	10,720,617	13,750,859	39,520,756
2040	17,318,167	11,267,476	15,925,595	44,511,238

Internal Originations			
BWI	DCA	IAD	Total
7,548,371	7,811,181	7,258,564	22,618,116
7,704,500	8,094,074	7,109,399	22,907,973
7,516,647	8,656,334	7,132,910	23,305,891
8,694,023	9,097,891	8,441,179	26,233,093
10,000,872	9,561,976	9,751,932	29,314,779
11,505,728	10,049,734	11,275,355	32,830,817
13,238,742	10,562,373	13,047,563	36,848,679
15,234,665	11,101,161	15,111,071	41,446,897



## Air Passenger Ground Access Forecast Update

- Local originating trips are departing passengers who's trip starts from one of the region's three airports.
- Internal AAZ originating trips are local originating trips within the Washington/Baltimore Air System Planning Area
- Local originating trips are calculated based on the 2011 Air Passenger Survey data to be 78% for BWI, 88% for DCA and 65% for IAD, of the total enplanements
- Internal originating trips are calculated based on the 2011 Air Passenger Survey data to be 88% for BWI, 99% for DCA, and 65% for IAD, of the total local originating trips, that are within the 161 internal AAZ's
- These data does not include external zones for PA, DE, WV, NJ or external VA and MD



## D. Calculate Average week day enplanements by airport

Forecast Year	Airports			Total
	BWI	DCA	IAD	
2010	21,183	23,769	20,505	65,457
2015	20,674	25,418	20,577	66,669
2020	23,922	26,716	23,713	74,351
2025	27,503	28,087	28,132	83,722
2030	31,641	29,500	32,526	93,667
2035	36,535	30,938	37,810	105,283
2040	41,884	32,604	43,598	118,086



E. Summarize local originating trips  
resident/non-resident and Home and Non-Home  
originations by airport

<b>BWI</b>					
<b>Year</b>	<b>Resident</b>		<b>Non-Resident</b>		<b>Total</b>
	<b>Home-based</b>	<b>Non-Home Based</b>	<b>Home-based</b>	<b>Non-Home Based</b>	
<b>2010</b>	10,194	1,562	3,395	6,032	<b>21,183</b>
<b>2015</b>	9,944	1,536	3,308	5,886	<b>20,674</b>
<b>2020</b>	11,435	1,812	3,807	6,868	<b>23,922</b>
<b>2025</b>	13,056	2,119	4,352	7,976	<b>27,503</b>
<b>2030</b>	14,973	2,476	4,994	9,198	<b>31,641</b>
<b>2035</b>	17,240	2,884	5,746	10,665	<b>36,535</b>
<b>2040</b>	19,739	3,325	6,587	12,233	<b>41,884</b>





## *Air Passenger Ground Access Forecast Update*

<b>DCA</b>					
<b>Year</b>	<b>Resident</b>		<b>Non-Resident</b>		<b>Total</b>
	<b>Home-based</b>	<b>Non-Home Based</b>	<b>Home-based</b>	<b>Non-Home Based</b>	
<b>2010</b>	8,417	1,751	2,900	10,701	<b>23,769</b>
<b>2015</b>	9,025	1,852	3,134	11,407	<b>25,418</b>
<b>2020</b>	9,256	1,945	3,239	12,276	<b>26,716</b>
<b>2025</b>	9,673	2,027	3,387	13,000	<b>28,087</b>
<b>2030</b>	10,195	2,119	3,558	13,628	<b>29,500</b>
<b>2035</b>	10,746	2,213	3,754	14,225	<b>30,938</b>
<b>2040</b>	11,314	2,327	3,955	15,008	<b>32,604</b>

<b>IAD</b>					
<b>Year</b>	<b>Resident</b>		<b>Non-Resident</b>		<b>Total</b>
	<b>Home-based</b>	<b>Non-Home Based</b>	<b>Home-based</b>	<b>Non-Home Based</b>	
<b>2010</b>	10,189	905	3,095	6,316	<b>20,505</b>
<b>2015</b>	10,248	889	3,101	6,339	<b>20,577</b>
<b>2020</b>	11,691	1,028	3,506	7,488	<b>23,713</b>
<b>2025</b>	13,828	1,207	4,130	8,967	<b>28,132</b>
<b>2030</b>	15,964	1,401	4,776	10,385	<b>32,526</b>
<b>2035</b>	18,570	1,617	5,554	12,069	<b>37,810</b>
<b>2040</b>	21,327	1,871	6,381	14,019	<b>43,598</b>



## F. Calculate trip rates by airport

### 1. Resident Home Based Trips

AAZ<sub>x</sub> Resident Origin Home Trips (2011)

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AAZ<sub>x</sub> Number of Household (2010)

### 2. Resident Non-Home Based Trips

AAZ<sub>x</sub> Resident Origin Non-Home Trips (2011)

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AAZ<sub>x</sub> Number of Employment (2010)



### 3. Non-Resident Home Based Trips

$AAZ_x$  Non-Resident Origin Home Trips (2011)

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$AAZ_x$  Number of Household (2010)

### 2. Non-Resident Non-Home Based Trips

$AAZ_x$  Non-Resident Origin Non-Home Trips (2011)

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$AAZ_x$  Number of Employment (2010)

#### Trip Rates

Airport	Resident		Non-Resident	
	Home	Non-Home	Home	Non-Home
<b>BWI</b>	0.60775	0.05088	0.19624	0.19169
<b>DCA</b>	0.61875	0.04200	0.21330	0.33175
<b>IAD</b>	0.56084	0.02189	0.18935	0.16928



G. Calculate trip mode share for Home and Non-Home

## Home Originations

1. Auto Driver Home Origination
2. Auto Passenger Home Origination
3. Transit Passenger Home Origination
4. Airport Transit Passenger Home Origination
5. Other mode Passenger Home Origination

## Non-Home Originations

1. Auto Driver Non-Home Origination
2. Auto Passenger Non-Home Origination
3. Transit Passenger Non-Home Origination
4. Airport Transit Passenger Non-Home Origination
5. Other mode Passenger Non-Home Origination



# *Air Passenger Ground Access Forecast Update*

## BWI

Year	Auto Driver	Auto Passenger	Transit	Airport Transit	Other	Total
2010	12,443	5,232	1,105	2,122	282	21,183
2015	12,140	5,104	1,084	2,066	281	20,674
2020	14,045	5,892	1,276	2,386	322	23,922
2025	16,138	6,766	1,460	2,770	369	27,503
2030	18,571	7,803	1,671	3,173	423	31,641
2035	21,434	9,006	1,924	3,687	484	36,535
2040	24,598	10,330	2,212	4,194	549	41,884

## DCA

Year	Auto Driver	Auto Passenger	Transit	Airport Transit	Other	Total
2010	12,784	4,217	4,597	1,848	323	23,769
2015	12,444	6,296	4,724	1,847	93	25,403
2020	13,119	6,583	4,947	1,952	95	26,696
2025	13,917	6,864	5,128	2,063	92	28,064
2030	14,654	7,220	5,335	2,172	94	29,475
2035	15,411	7,583	5,549	2,273	96	30,913
2040	16,302	7,978	5,817	2,380	101	32,578

## IAD

Year	Auto Driver	Auto Passenger	Transit	Airport Transit	Other	Total
2010	11,550	5,992	406	2,416	141	20,505
2015	11,044	5,443	3,344	683	62	20,576
2020	12,720	6,281	4,005	634	69	23,709
2025	15,120	7,440	4,448	1,045	78	28,131
2030	17,503	8,608	4,903	1,419	90	32,523
2035	20,373	10,002	4,215	3,103	103	37,797
2040	23,530	11,527	4,843	3,582	119	43,602



## H. Calculate trip Time-of-Day Split

### One-Hour before flight time

1. AM trips = flight time 700 to 1000 (7:00 AM to 10:00 AM)
2. PM trips = flight time 1600 to 1900 (4:00 PM to 7:00 PM)
3. Off-Peak trips = flight time 600 to 700, 1000 to 1600, and 1900 to 2400  
(6:00-7:00 AM, 10:00 AM-4:00 PM, and 7:00 -12:00 PM)

### Two-Hour before flight time

1. AM trips = flight time 600 to 900 (6:00 AM to 9:00 AM).
2. PM trips = flight time 1500 to 1800 (3:00 PM to 6:00 PM)
3. Off-Peak trips = flight time 900 to 1500, and 1800 to 2400  
(9:00 AM-3:00 PM, and 6:00 12:00 PM).



## Air Passenger Ground Access Forecast Update

Time Period	One-Hour Before Flight Departure				Two-Hour Before Flight Departure			
	BWI	DCA	IAD	Total	BWI	DCA	IAD	Total
AM-Peak	5,948	4,381	4,629	<b>14,958</b>	6,084	4,097	4,859	<b>15,040</b>
	28%	18%	23%	23%	29%	17%	24%	23%
PM-Peak	3,839	5,233	5,866	<b>14,938</b>	2,976	6,136	5,249	<b>14,361</b>
	18%	22%	29%	23%	14%	26%	26%	22%
Off-Peak	11,397	14,153	10,018	<b>35,567</b>	12,125	13,534	10,405	<b>36,063</b>
	54%	60%	49%	54%	57%	57%	51%	55%
Total	<b>21,184</b>	<b>23,767</b>	<b>20,513</b>	<b>65,464</b>	<b>21,184</b>	<b>23,767</b>	<b>20,513</b>	<b>65,464</b>
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source:- 2011 Washington-Baltimore Regional Air Passenger Survey

