



2015 REGIONAL AIRPORT GROUND ACCESS

Travel Time Study

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Travel Forecasting Subcommittee
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About the project

- Has been done many times in the past – formerly used the “floating car” methodology to measure highway speeds
- First time for this project with a “big data” approach – millions of records processed
- Data were analyzed for the years September 1, 2011 through August 31, 2012 and September 1, 2014 through August 31, 2015
- Routes from previous versions of the report have been largely retained
- Because of the availability of probe data, it was easy to expand origin locations to relatively distant places like Front Royal, Hagerstown, York and Easton
- Travel routes **between** the airports also included
- Presented to Aviation Technical Subcommittee in March 2016.



Outline of presentation

- Three main points
- Methodology
- Demographics
- Additions to transportation system
- Data availability
- Travel Time Index and Planning Time Index findings
- Managed Lanes
- Transit to the airports
- Questions and comments



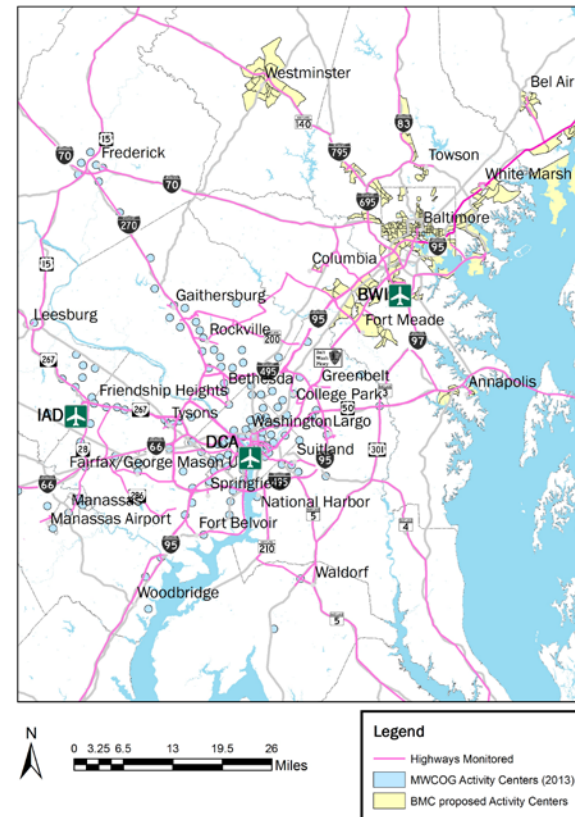
Three Main Points

- As measured by Travel Time Index (TTI), travel times to the airports have not changed much from 2011-2012 to 2014-2015
- Travel to BWI experiences the highest TTI in P.M. (3:00-7:00 P.M.); while IAD and especially DCA have the highest TTI in A.M. (6:00-9:00 A.M.)
- There are some points on the highway network that are severely congested (TTI greater than 2)



Methodology

- Network is made up of over 2,000 TMC (transportation message channel) links – vary in length from less than 0.1 mile to more than 5 miles
- Computed mean speeds, average travel time, travel time index (TTI) and planning time index (PTI).
- TTI is observed travel time divided by free-flow travel time and not less than 1
- PTI is 95th percentile travel time divided by free-flow travel time, always greater than TTI.



Methodology (cont'd)

- Mean speed is weighted **harmonic mean** or the “reciprocal of the arithmetic mean of the reciprocals” – computed for each routing by TMC (with each TMC assigned a weight according to its length)
- Wikipedia has an article describing the harmonic mean:
https://en.wikipedia.org/wiki/Harmonic_mean
- Travel time is the sum of average travel times for each route
- Travel time by transit estimated from published timetables for travel to the airports on weekday mornings



Methodology (cont'd)

- Dates of both analysis years classified into one of exactly three categories:
- **Midweek** (Tuesdays, Wednesdays and Thursdays)
- **Weekend** (Fridays, Saturdays, Sundays, Mondays)
- **Holiday** (expansive definition - secular and major religious holidays – the days around Thanksgiving and Christmas are classified as holidays)
- No overlap between holidays and the other days of the year



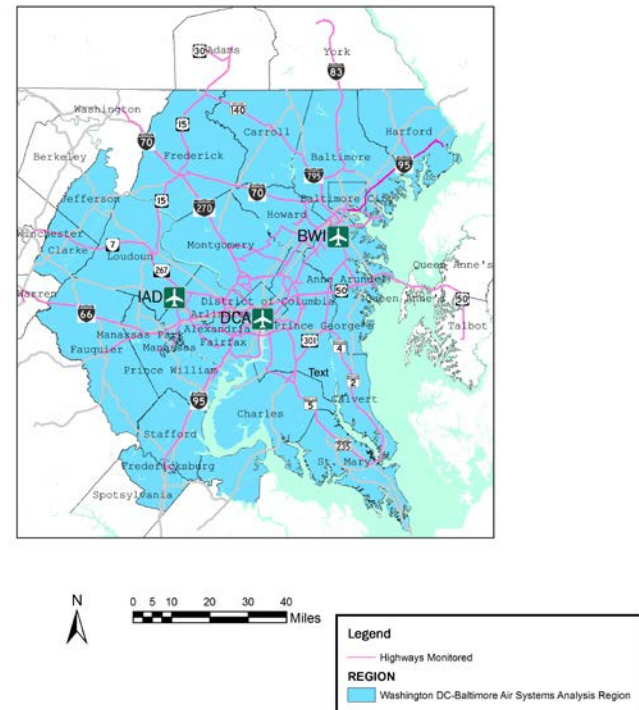
Methodology (cont'd)

- Times of day used for analysis:
 1. 12 Midnight - 5:00 A.M.
 2. 5:00 - 6:00 A.M.
 - 3. 6:00 - 9:00 A.M.**
 - 4. 9:00 A.M. - 3:00 P.M.**
 - 5. 3:00 - 7:00 P.M.**
 6. 7:00 - 11:59 P.M.
- Most emphasis is on the three periods between 6 A.M. and 7 P.M.



Demographics

- Primary region included in the demographic analysis is shaded in blue (Washington / Baltimore Air System Planning Region - includes MWCOG and BMC member cities and counties and some outlying jurisdictions)
- Some travel time “runs” have extended beyond the shaded counties
- All data are at the county level



Demographic changes

All Cities and Counties	2011 Estimated Population	2014 Estimated Population	Change in Estimated population (2014 minus 2011)	2011 Estimated Nonfarm Employment	2014 Estimated Nonfarm Employment	Change in Estimated Nonfarm Employment (2014 minus 2011)
MWCOG/NC RTPB cities and counties (DC, MD and VA, not Fauquier County, VA)	5,179,000	5,412,000	233,000	2,714,000	2,805,000	91,000
BMC/BRTB cities and counties (all in MD, not Queen Anne's County, MD)	2,687,000	2,737,000	50,000	1,304,000	1,341,000	37,000
All other counties (MD, VA, PA, WV)	1,704,000	1,742,000	38,000	822,000	841,000	19,000
Totals	9,569,000	9,890,000	321,000	4,840,000	4,987,000	147,000
Sources:						
Population Estimates:						
Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014						
Source: U.S. Census Bureau, Population Division						
Employment Data: Bureau of Labor Statistics, Local Area Unemployment Statistics (LAUS)						
Data are rounded to nearest 1,000						

- Population increase in COG/TPB region was 235,000; 51,000 in BMC/BRTB region; and 38,000 in others
- Employment increased by almost 91,000 in COG/TPB region; 37,000 in BMC/BRTB region and 19,000 in others



Additions to the transportation system

- MD-200 mostly complete November 2011 - I-370 to I-95
- 495 Express Lanes opened November 2012 from Springfield to just north of VA-267
- 95 Express Lanes converted from HOV-3 from Turkeycock Run (near Fairfax County/City of Alexandria border) and extended south to Garrisonville in Stafford County in December 2014
- I-95 Express Toll Lanes (Baltimore County and City) open December 2014 from East Baltimore to north of Md. 43 in White Marsh



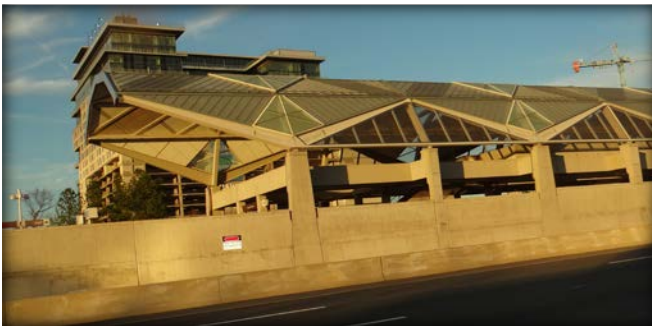
Additions to the transportation system (cont'd.)

- 11th Street Bridge, SE and interchange with I-295/I-695/DC-295 (with all movements open in December 2012)



Additions to the transportation system (cont'd.)

- Phase 1 of the Silver Line opened to revenue service in July 2014, providing service from East Falls Church to Wiehle-Reston East, with express bus service continuing on to the main terminal at IAD (Phase 2 to the airport is currently under construction)



Data Availability Issues

- MD-200:
 - No data available for 2011/2012 from Vehicle Probe Project (VPP)
 - But COG/TPB staff did perform travel time runs shortly after opening to I-95, and speeds are assumed to be 55 MPH for 2011/2012 only – and only after November 2011
- No VPP data available for:
 - 95 Express lanes between VA-630 (Garrisonville) and VA-234 (Dumfries)
 - I-95 Express Toll Lanes in Maryland
 - VA-286 (Fairfax County Parkway) across Fort Belvoir North Area (newest section of VA-286)
 - VA-234 (Prince William Parkway) between VA-28 and I-66

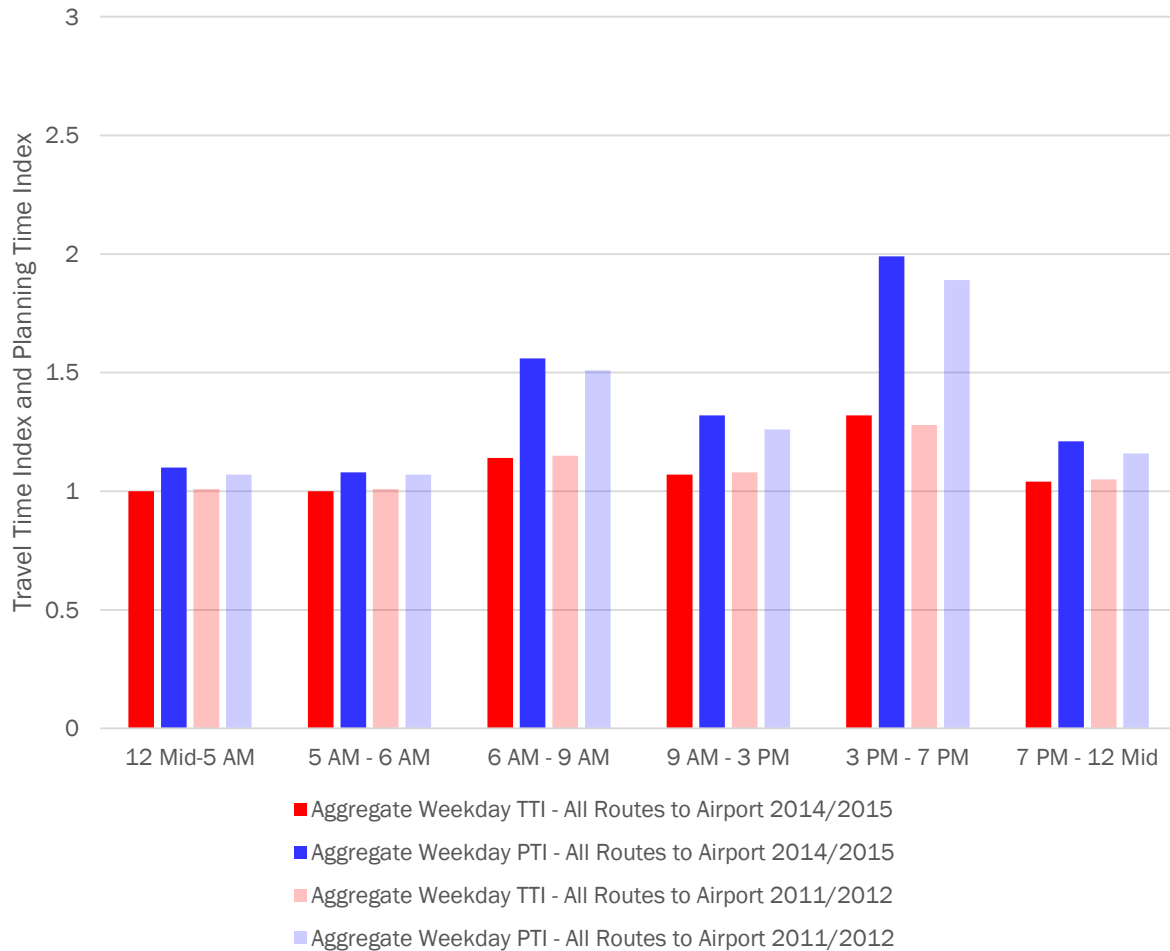


Findings (TTI and PTI)

- At the aggregate level, TTI and PTI to the airports from analyzed origins have changed relatively little from 2011-2012 to 2014-2015
- The highest observed aggregate TTI during 2014-2015 was travel to DCA on midweek mornings at 1.47 (PTI was 2.49), little changed from 2011-2012
- Travel to BWI experiences its highest TTI during the afternoons during all days of the week
- Travel to IAD has the highest TTI and PTI on weekday mornings, but on weekends and holidays, TTI is slightly higher in the afternoons



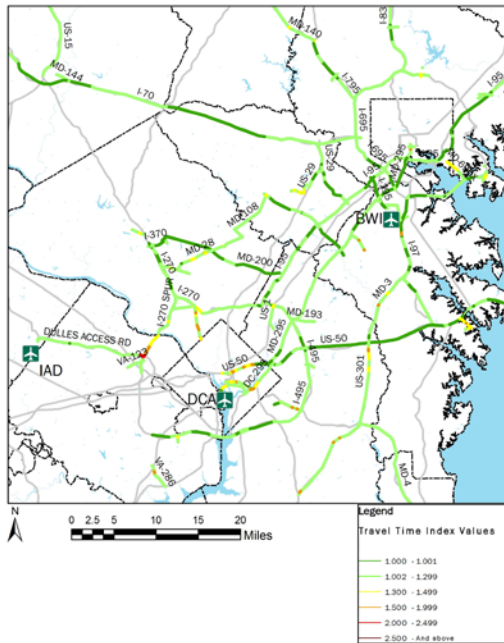
TTI and PTI - BWI



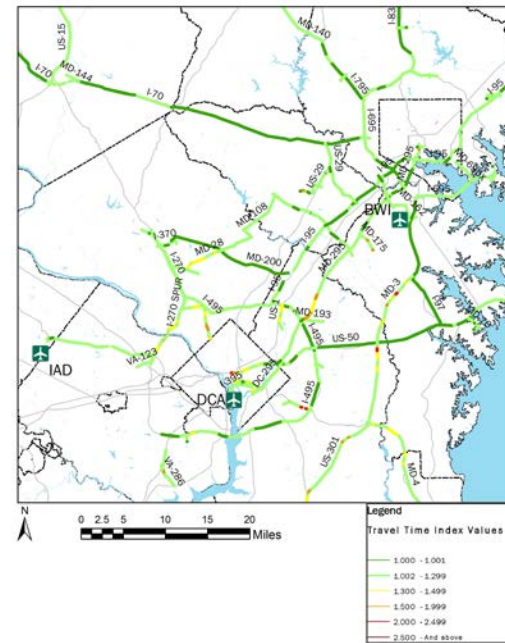
- TTI – highest on weekday afternoons



Plot of TTI values to BWI – midweek mid-days



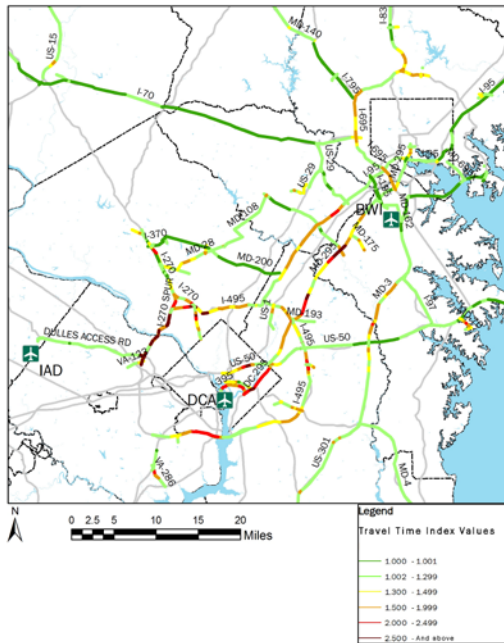
2014-2015 midweek mid-days TTI to BWI



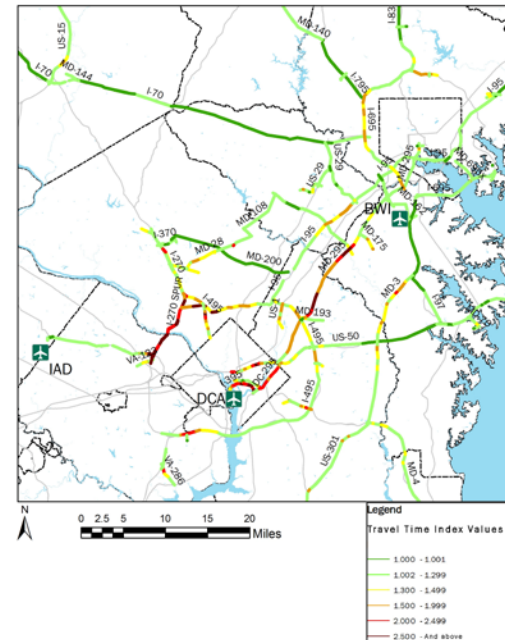
2011-2012 midweek mid-days TTI to BWI



Plot of TTI values to BWI – midweek afternoons



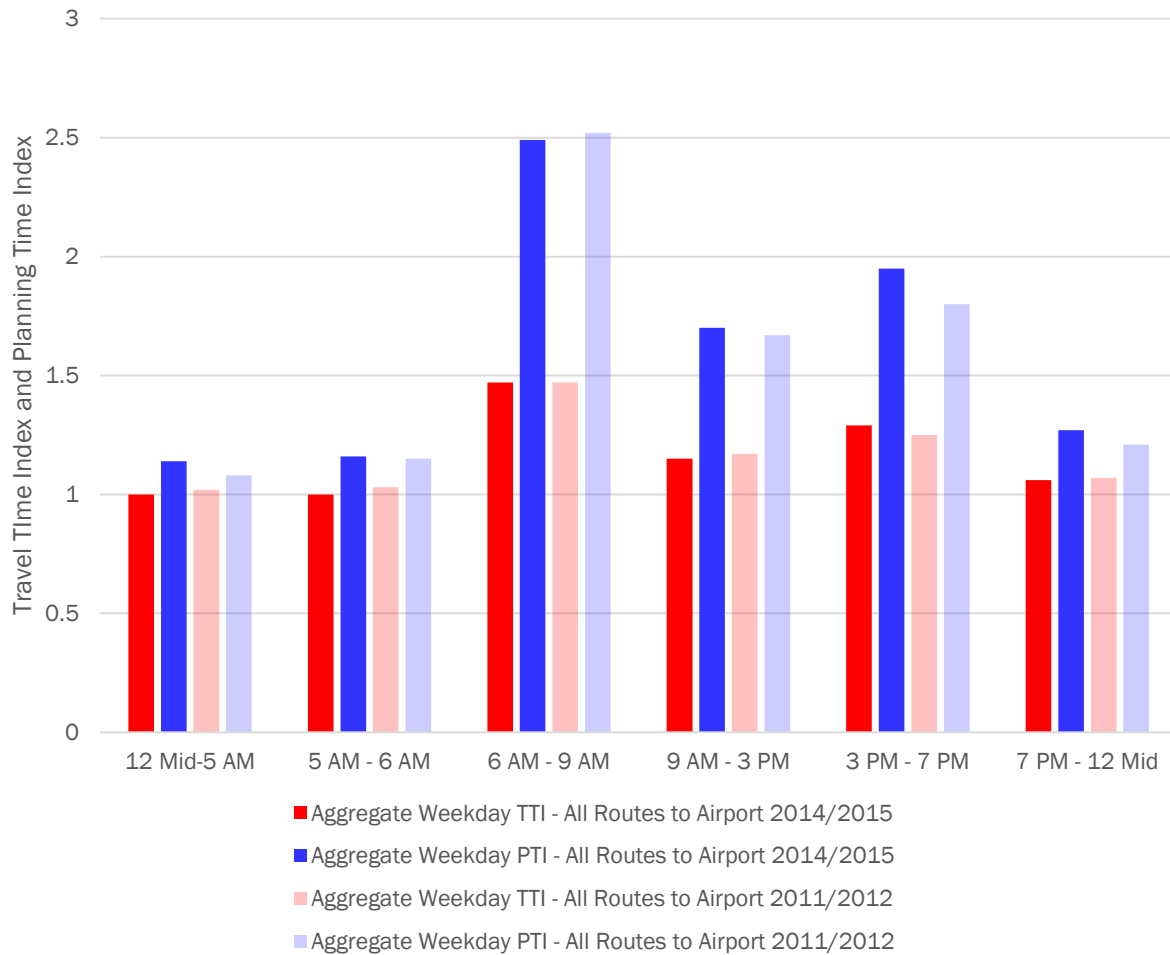
2014-2015 midweek afternoons TTI to BWI



2011-2012 midweek afternoons TTI to BWI



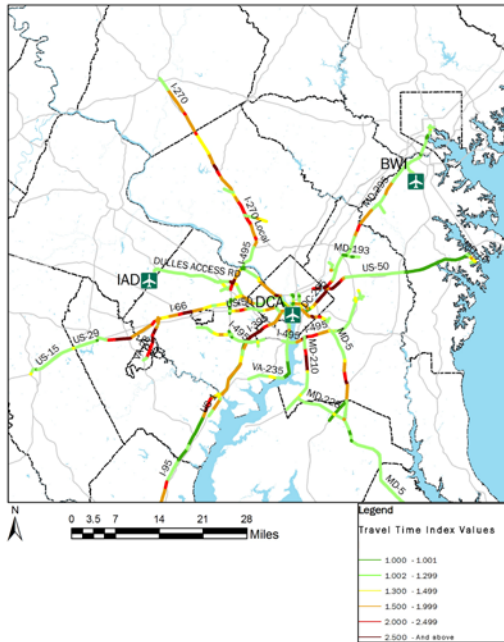
TTI and PTI - DCA



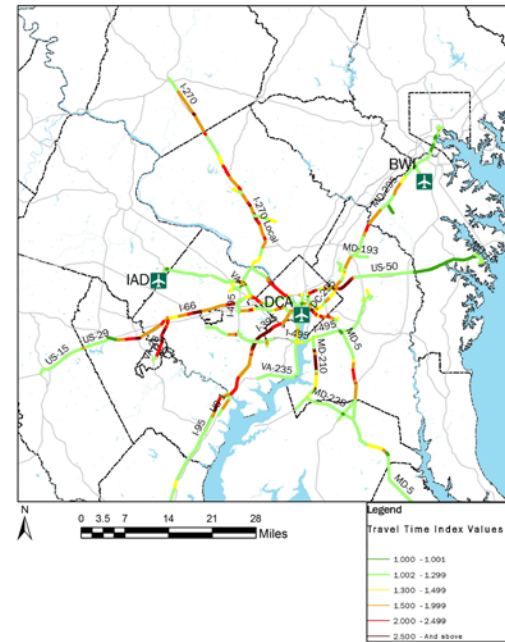
- TTI – highest on weekday mornings



Plot of TTI values to DCA – midweek mornings



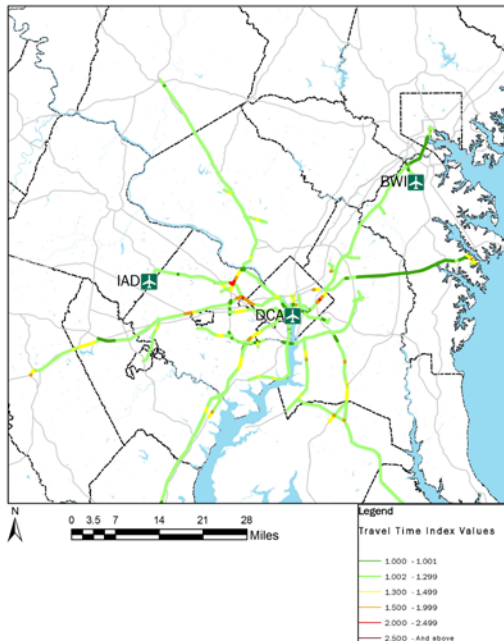
2014-2015 midweek mornings
TTI to DCA



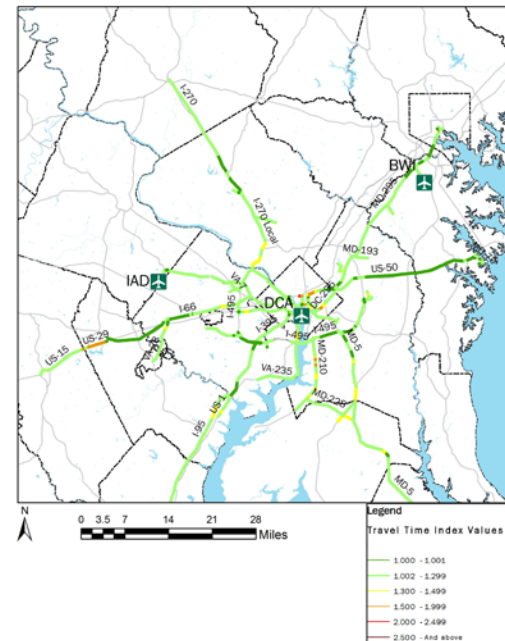
2011-2012 midweek
mornings TTI to DCA



Plot of TTI values to DCA – midweek mid-days



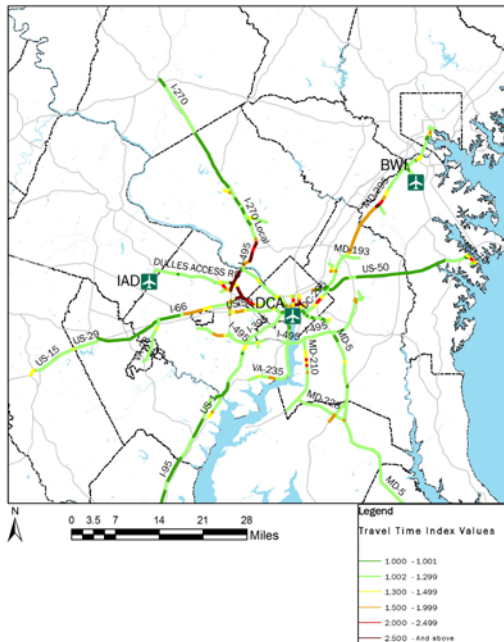
2014-2015 midweek mid-days TTI to DCA



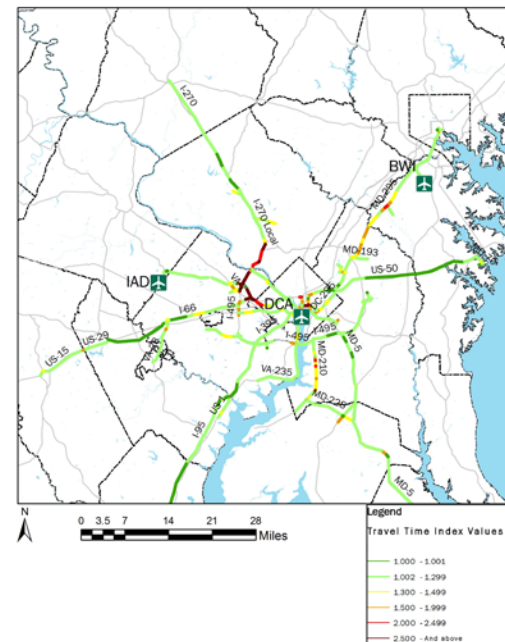
2011-2012 midweek mid-days TTI to DCA



Plot of TTI values to DCA – midweek afternoons



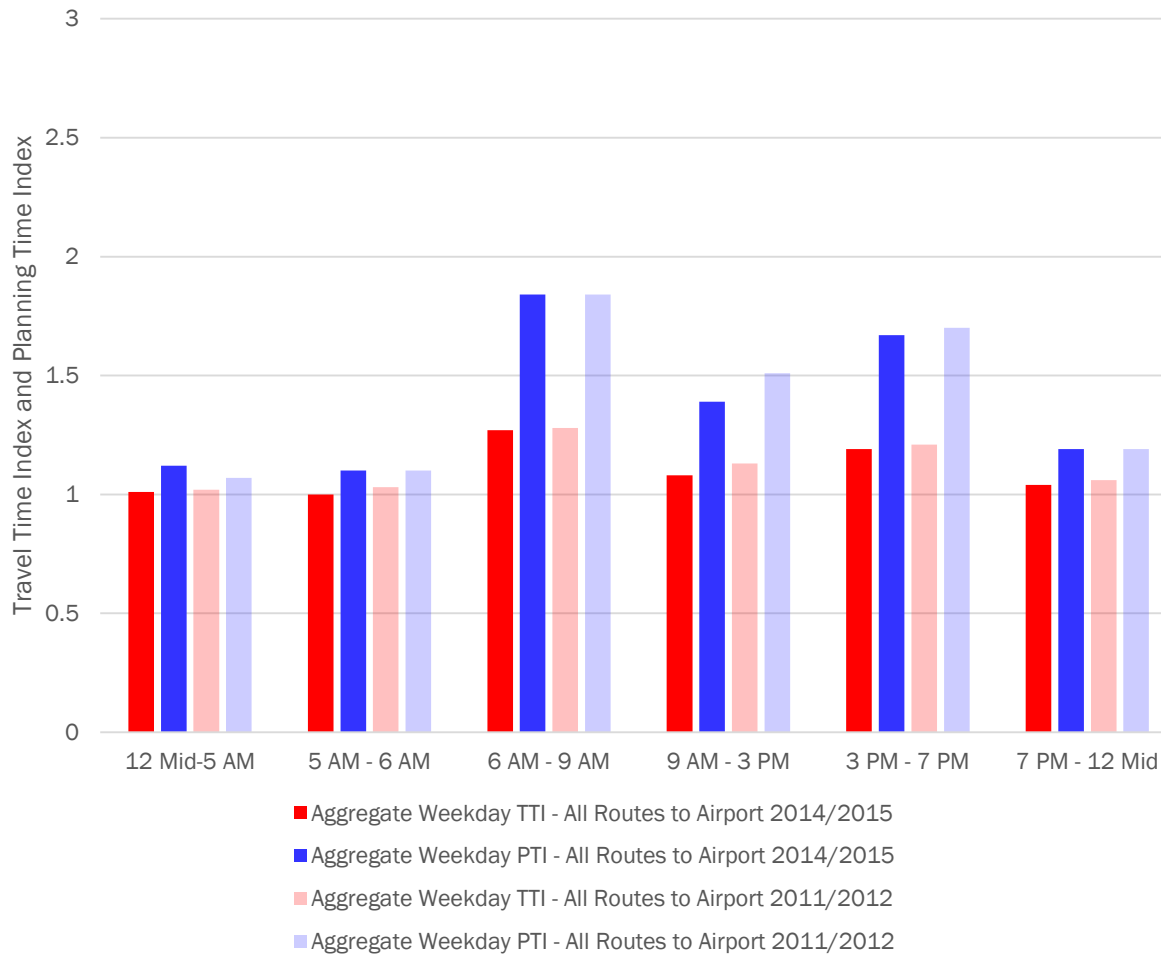
2014-2015 midweek afternoons TTI to DCA



2011-2012 midweek afternoons TTI to DCA



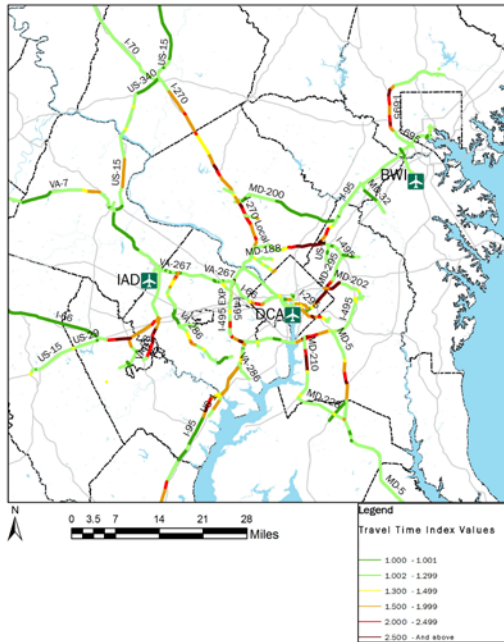
TTI and PTI - IAD



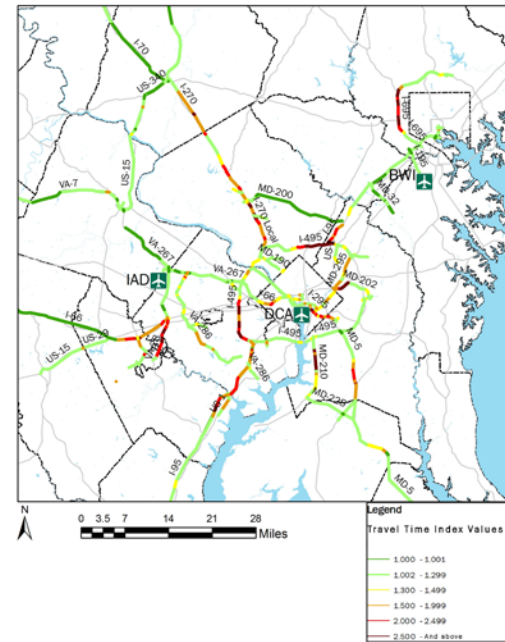
- TTI – also highest on weekday mornings



Plot of TTI values to IAD – midweek mornings



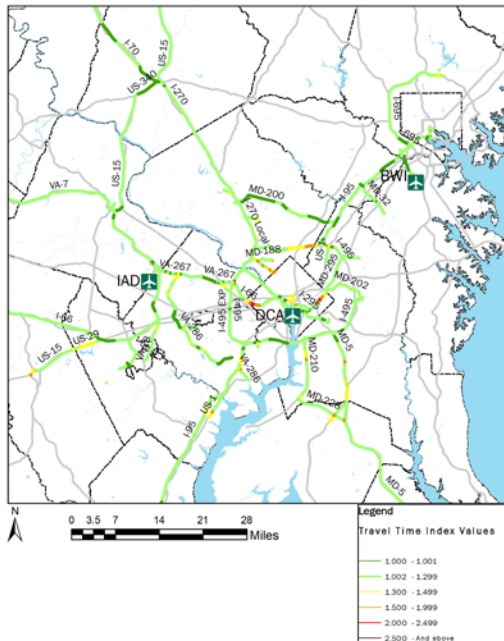
2014-2015 midweek mornings TTI to IAD



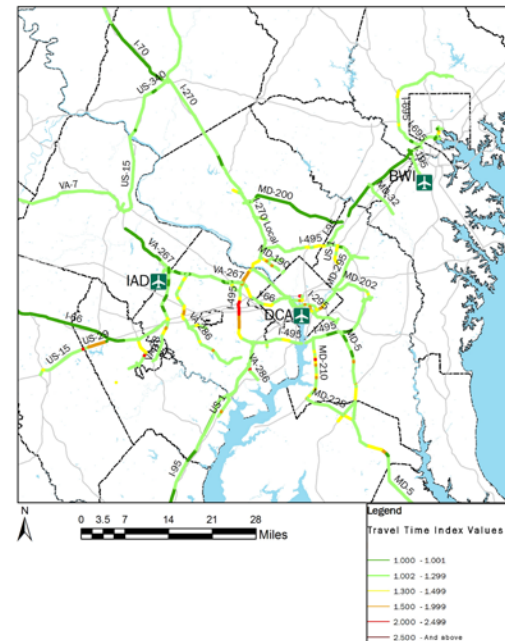
2011-2012 midweek mornings TTI to IAD



Plot of TTI values to IAD-midweek mid-days



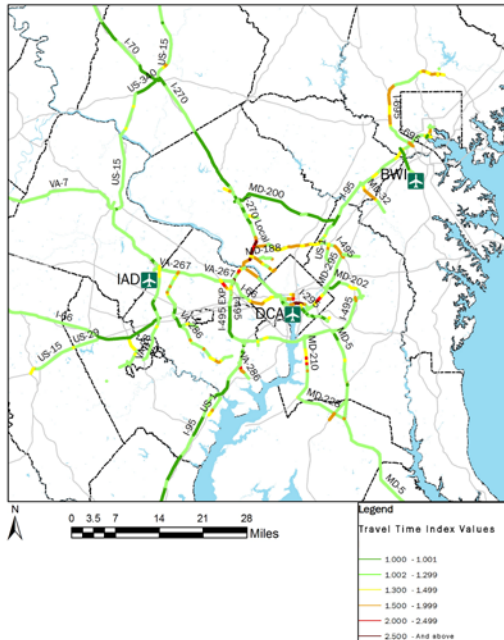
2014-2015 midweek mid-days TTI to IAD



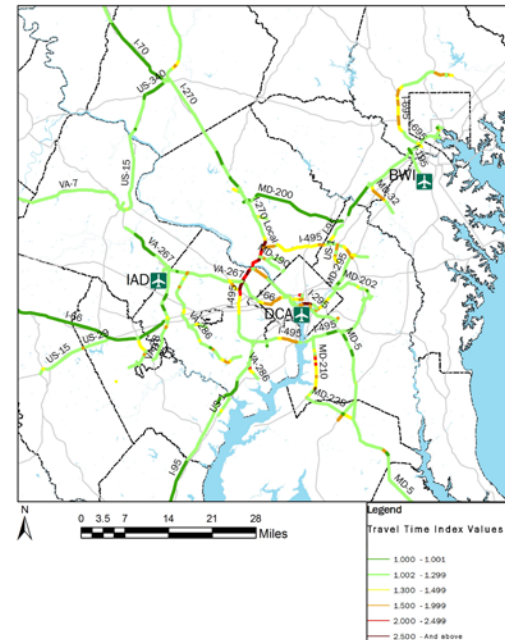
2011-2012 midweek mid-days TTI to IAD



Plot of TTI values to IAD – midweek afternoons



2014-2015 midweek afternoons TTI to IAD



2011-2012 midweek afternoons TTI to IAD



Managed Lanes

- Considerable highway capacity added
 - MD-200 – I-370 to I-95 opened November 2011
 - 495 Express Lanes (I-495 from Springfield to McLean)
 - 95 Express Lanes conversion of I-95/I-395 HOV lanes between Dumfries and Turkeycock Run ramps near the Fairfax County/City of Alexandria border
 - I-95 Express Toll Lanes (Baltimore County and Baltimore City)



Gaithersburg to BWI saves time with MD-200 (as compared to I-270 to I-495 to I-95)

- 12 Minutes in A.M.
- 6 Minutes in Mid-Day
- 13 Minutes in P.M.



Fredericksburg via 95 Express Lanes *and* I-395 (HOV-3 lanes) to DCA saves time as compared with parallel conventional lanes

- 25 Minutes in A.M.
- 4 Minutes in Mid-Day



Springfield to IAD via 495 Express Lanes saves time as compared to using conventional lanes of I-495

- 7 Minutes in A.M.
- 1 Minute in Mid-Day
- 5 Minutes in P.M.



Transit to the airports

- It is possible to take transit to the airports
- Especially from the downtown areas, and some suburban locations
- Less than 20 minutes by Metrorail from downtown D.C. (16th and K, N.W.) to DCA
- D.C. to IAD travel is about 1 hour 15 minutes
- D.C. to BWI about 1 hour 45 minutes



Transit to the airports (cont'd.)

- Baltimore City (Penn Station) to BWI is about 30 minutes by MARC commuter rail, or about 50 minutes by light rail
- Baltimore City to DCA is about 1 hour 15 minutes, to IAD over 2 hours
- Gaithersburg to BWI is 1 hour 8 minutes on MTA 201 bus
- Tysons to IAD slightly over 30 minutes

Travel time data are based on published schedules available at time of report preparation, not observed by field data collection



Questions and comments

- Comments and questions welcome
- Verbal comments and questions now
- Full *draft* report can be downloaded from the COG Web site here:
<http://www.mwcog.org/uploads/committee-documents/ZlxeV1ha20160401084328.pdf>
- Please submit written comments and questions by e-mail to me at this address: zill@mwcog.org
- Please submit any questions or comments within 30 days
- Report will possibly be reviewed by a committee at the Baltimore Region Transportation Board

- Thank you!



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