

E-Road and E-Rail Censuses and Visualization

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(WP.6)*

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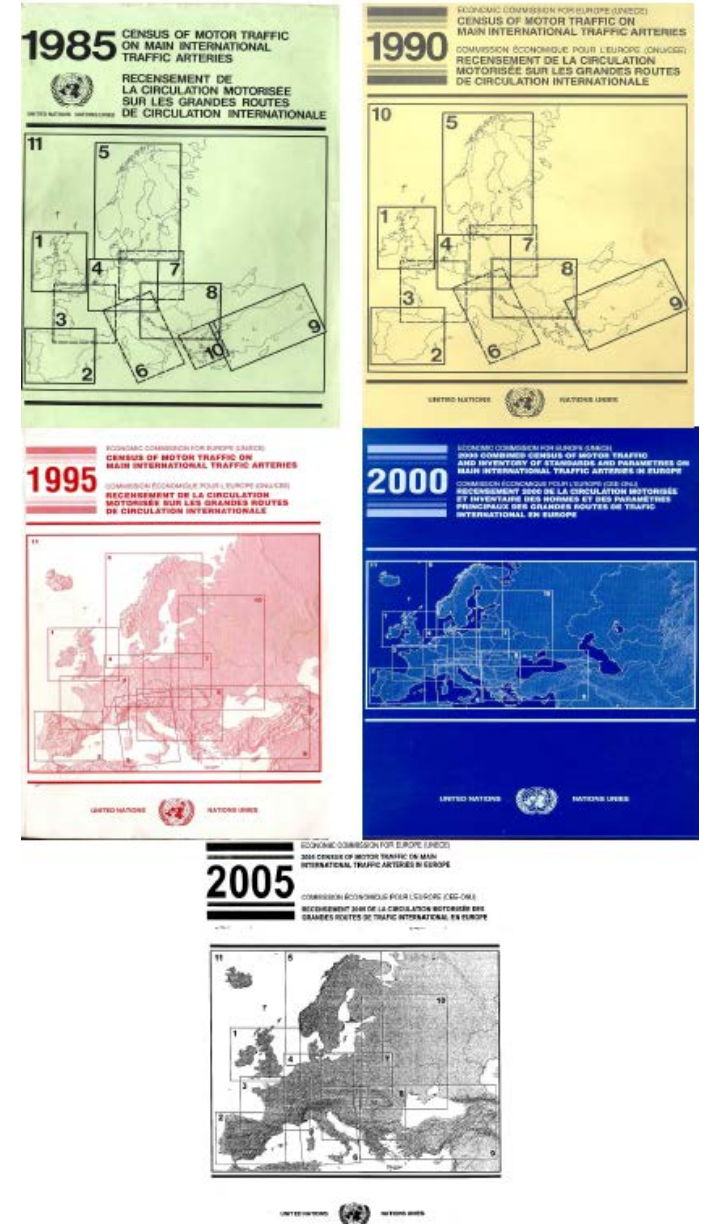
Overview

- Census background
- 2015 E-Road status
- 2015 E-Road interactive map
- Future improvements
- Tool potential applications
- Examples of other traffic visualizations
- E-Rail status and challenges
- 2020 E-Road and E-Rail recommendations



E-Censuses background

- Unique quinquennial data collection surveying infrastructure information and traffic levels on the E-Road network
- E-Road network defined in European Agreement on Main Traffic Arteries (AGR) (the TEN-T core network roughly agrees with this)



E-ROAD Tables

- Total length of E-Roads by width and number of carriageways and lanes
- E-Road sections' average annual daily traffic (AADT)
- Counting posts on E-Roads
- Distribution of motor traffic by vehicle category (A, B, C, D)
 - Two wheelers, passenger and light goods vehicles, heavy vehicles, buses and coaches)
- Specific AADT (traffic at night, holidays, peak hours)



E-ROAD Census Status

- Data for 21 countries received:
 - Austria, Azerbaijan, Belarus, Bulgaria, Croatia, Czechia, France, Georgia, Germany, Hungary, Latvia, Lithuania, FYR Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey, United Kingdom
- Data quality ranged from basic E-Road infrastructure information, to comprehensive AADT levels for different vehicle types and multiple years
- Some countries didn't fill in the census but pointed us to the right data

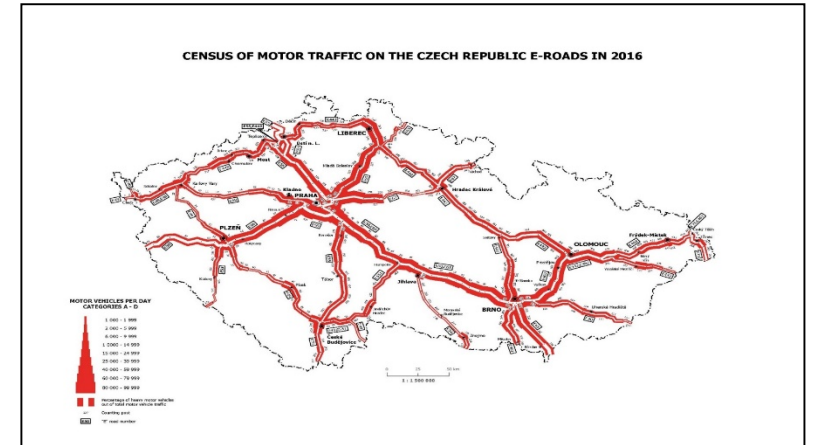


Results Disseminated

/ TRANSPORT STATISTICS / STATISTICS AND DATA ONLINE / E-ROAD CENSUS / TRAFFIC CENSUS 2015

Traffic Census 2015

Country	Questionnaire	Map	Shapefiles	Documentation
Austria	XLS		ZIP	
Azerbaijan	XLS			
Belarus	XLS			
Bulgaria	XLS		ZIP	
Croatia	XLS	PDF		
Czechia	XLS	PDF / JPG	ZIP	DOC
France	XLS	PDF	ZIP	
Georgia	XLS			
Hungary	XLS			
Latvia	XLS		ZIP	
Lithuania	XLS	PDF / JPG	ZIP	
Poland	XLS	PDF	ZIP	DOC
Romania	XLS			
Serbia	XLS	PDF		
Slovakia	XLSX	PDF		
Slovenia	XLS	PDF	ZIP	
Sweden	XLS			DOC
TFYR of Macedonia	XLSX			DOC
Turkey	XLS	PDF		
United Kingdom	XLS	PDF	ZIP	

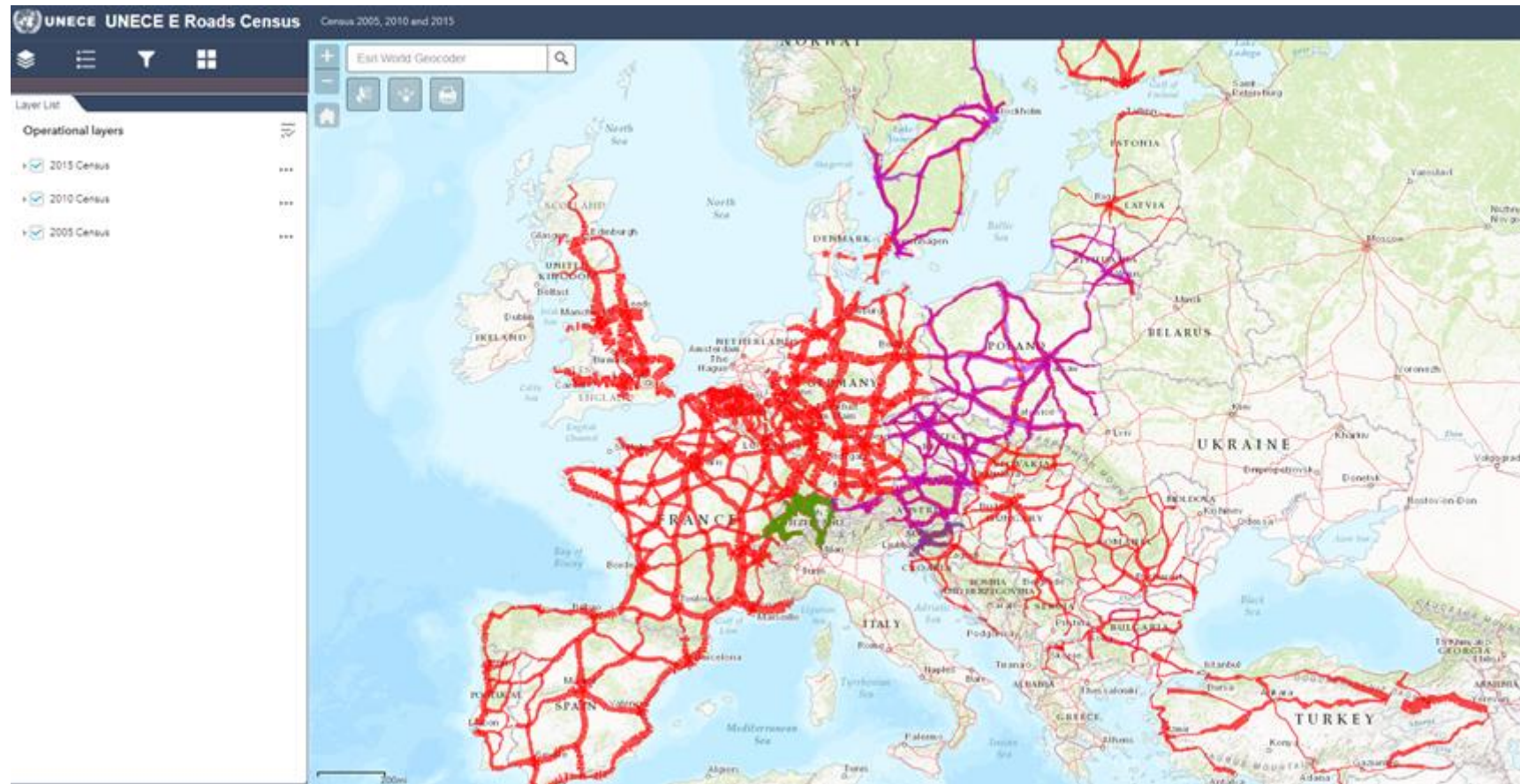


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Interactive Map

unece.org/trans/main/wp6/e-roads_maps.html



Getting the Data

Statistics
Office



Infrastructure
agency

- Data seem to be typically produced by infrastructure managers rather than NSOs.
- Communication within government necessary to obtain the data. (Offer statistics expertise in exchange?)



Future Improvements

- Add more countries!
- Include non-AGR countries (Canada, USA)?
- Consider creating separate layers for HGV traffic (plus night traffic, peak traffic, holiday traffic?)
- Add number of lanes in shapefile to get a better idea of congestion and infrastructure levels

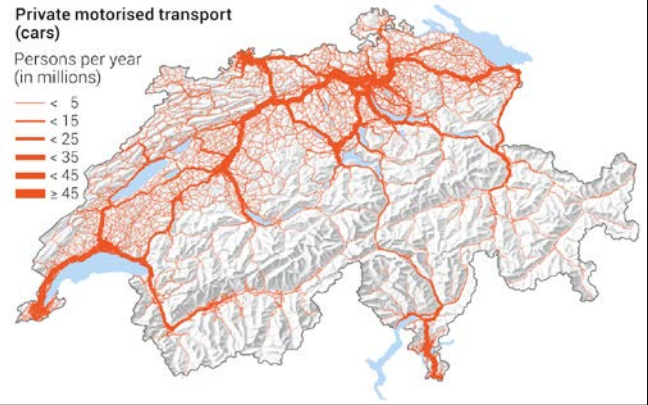


Potential Uses

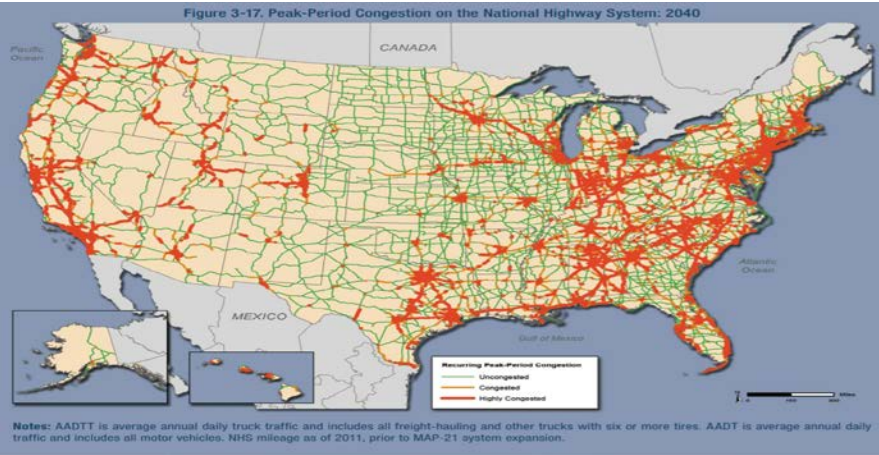
- Visualizing access to international roads and measuring country connectivity (e.g. Euro-Asian links)
- Quantifying key border crossings (500 trucks a day = \$X of trade per year)
- Identification of international traffic hotspots and (with E-Rail and E-IWW networks) potential for modal switching
- Combining with accident data to identify motorway accident hotspots (fatalities per AADT level)?
- Quantifying long distance bus traffic (but would need more data either in the Shapefile or table 7)



Passenger traffic flows in 2015



Country traffic visualisation examples



Denmark: necessary data but unmapped

VEJ22: AVERAGE DAILY MOTOR VEHICLE TRAFFIC BY ROAD SEGMENT
Unit : number

Select **Advanced selection** Information

ROAD SEGMENT (155)

More options...
E45 Sydjyske Motorvej, ved Frøslev (Landegrænsen)
E45 Sydjyske Motorvej, vest for Haderslev
E20 E45 Sydjyske Motorvej, nord for Kolding
E20 Esbjergmotorvejen, vest for Holsted
E45 Midtjyske Motorvej, på Vejlefjordsbroen
E45 Midtjyske Motorvej, ved Horsens
E45 Midtjyske Motorvej, ved Stilling
501 Aarhus Syd Motorvejen, nf.<50>
18 Midtjyske Motorvej, sf.<13>, Arnborg
18 Midtjyske Motorvej, sf.<15>, Herning
15 Herningmotorvejen, øf. Kløverbladet
15 Herningmotorvejen, mellem <22> og <23>
15 Herningmotorvejen, mellem <37> og <38>
15 Herningmotorvejen, vf.<40>
Herning Syd, sf.<15>, Herning
Herning Syd, vf. Motorvejskryds
E45 Nordjyske Motorvej ved Hadsten
E45 Nordjyske Motorvej ved Randers
E45 Nordjyske Motorvej, syd for Hobro
E45 Nordjyske Motorvej, nord for Haverslev
E45 Nordjyske Motorvej, syd for Aalborg
E45 Limfjordstunnellen
E45 Frederikshavnsmotorvejen ved Vodskov

YEAR

More options...
2016
2015
2014
2013
2012
2011
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2000
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1997
1996
1995
1994

Number of selected data cells for the table: 1 (select max. 10000)

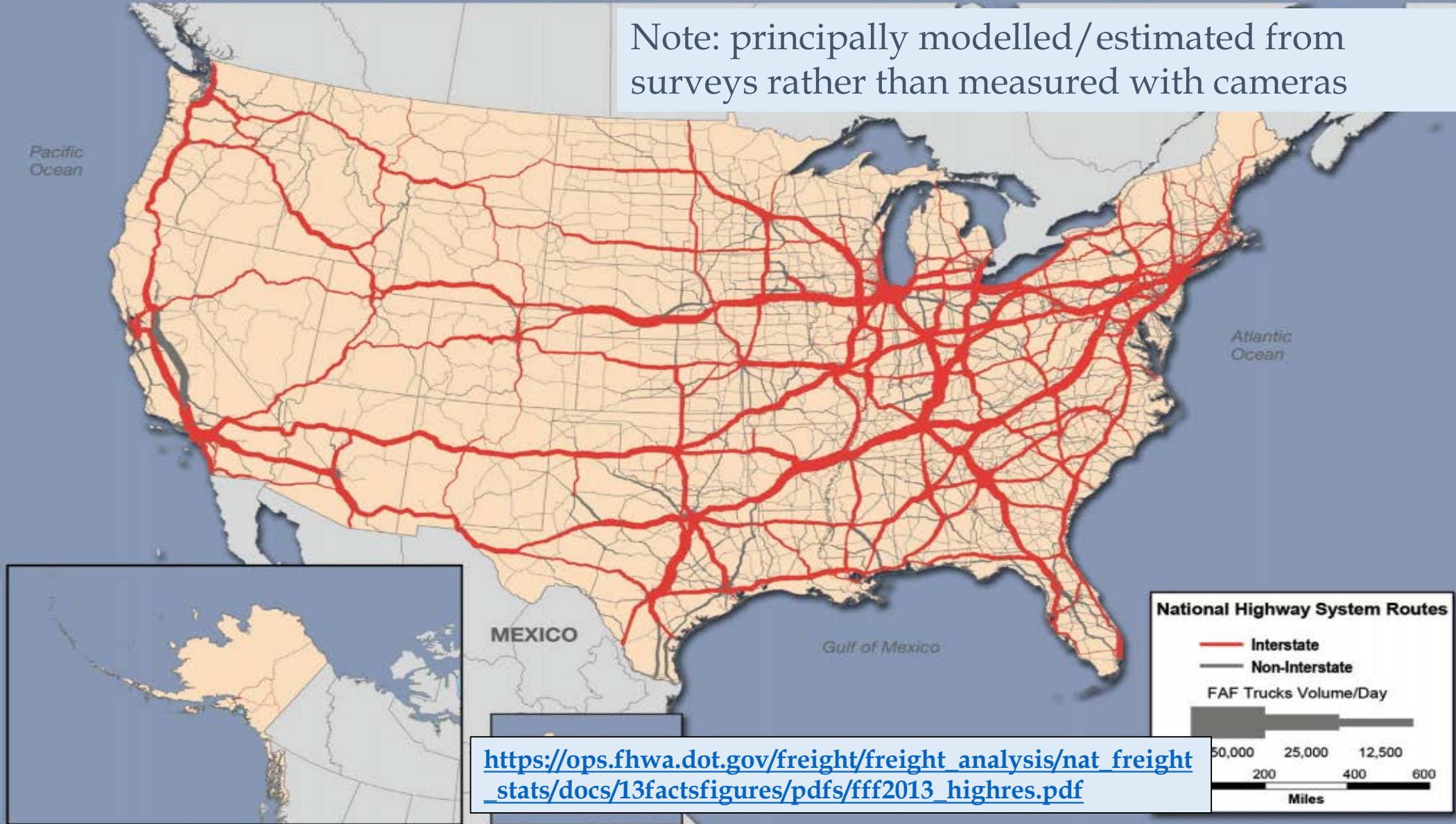
CANCEL **SHOW TABLE**



United States

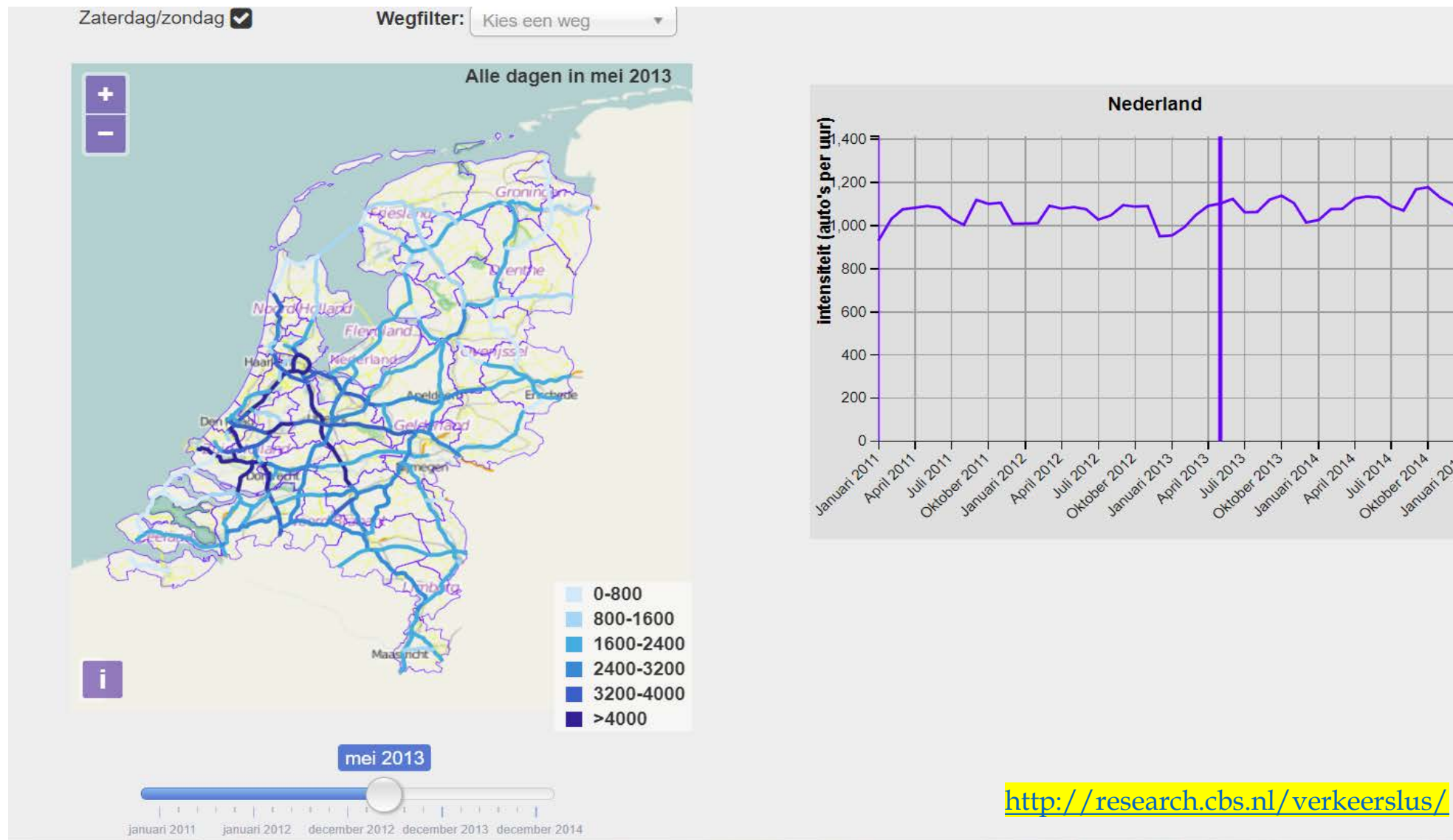
Figure 3-12. Average Daily Long-Haul Truck Traffic on the National Highway System: 2011

Note: principally modelled/estimated from surveys rather than measured with cameras

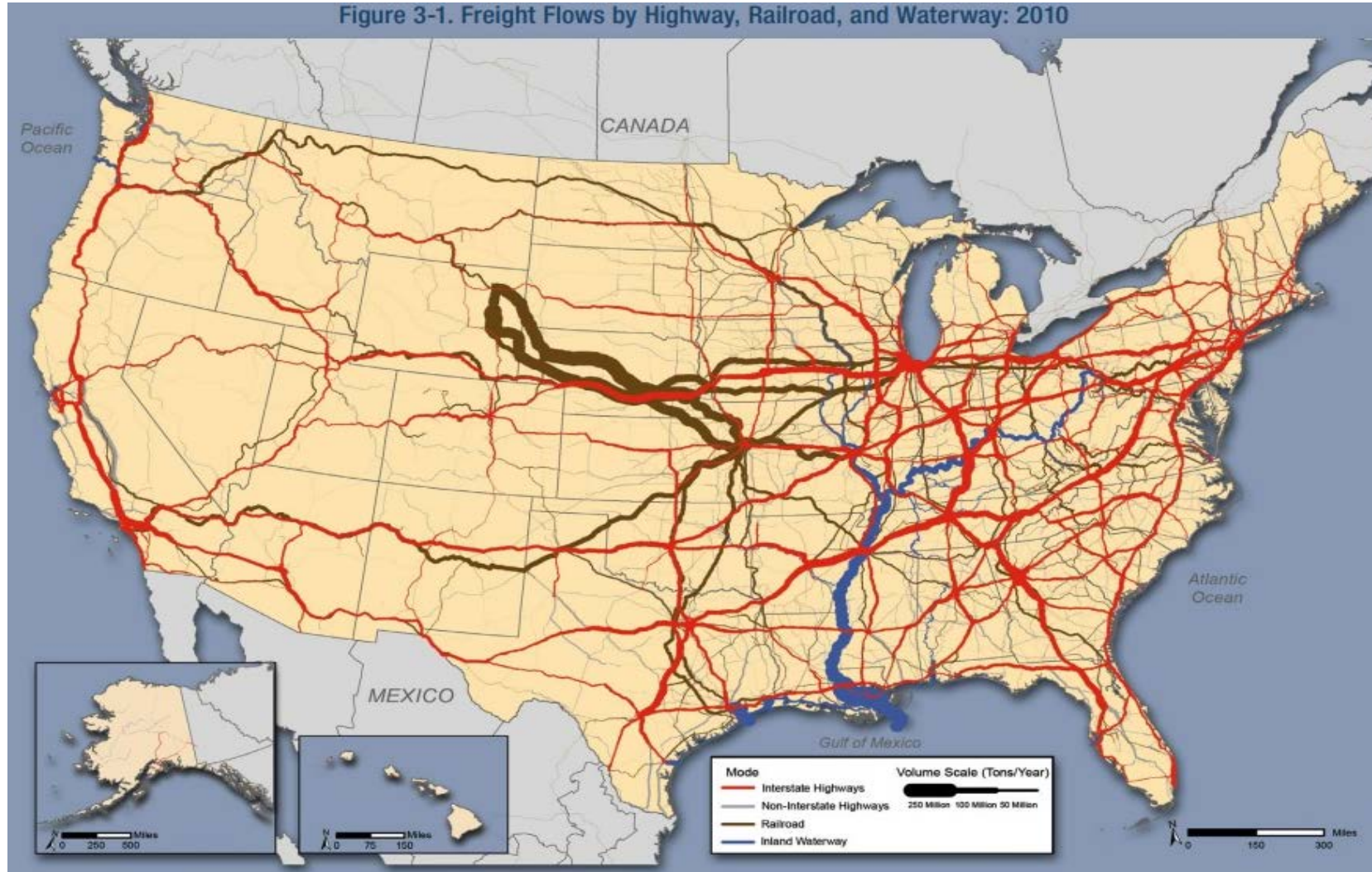


[https://ops.fhwa.dot.gov/freight/freight analysis/nat freight stats/docs/13factsfigures/pdfs/fff2013_highres.pdf](https://ops.fhwa.dot.gov/freight/freight%20analysis/nat%20freight%20stats/docs/13factsfigures/pdfs/fff2013_highres.pdf)

Netherlands

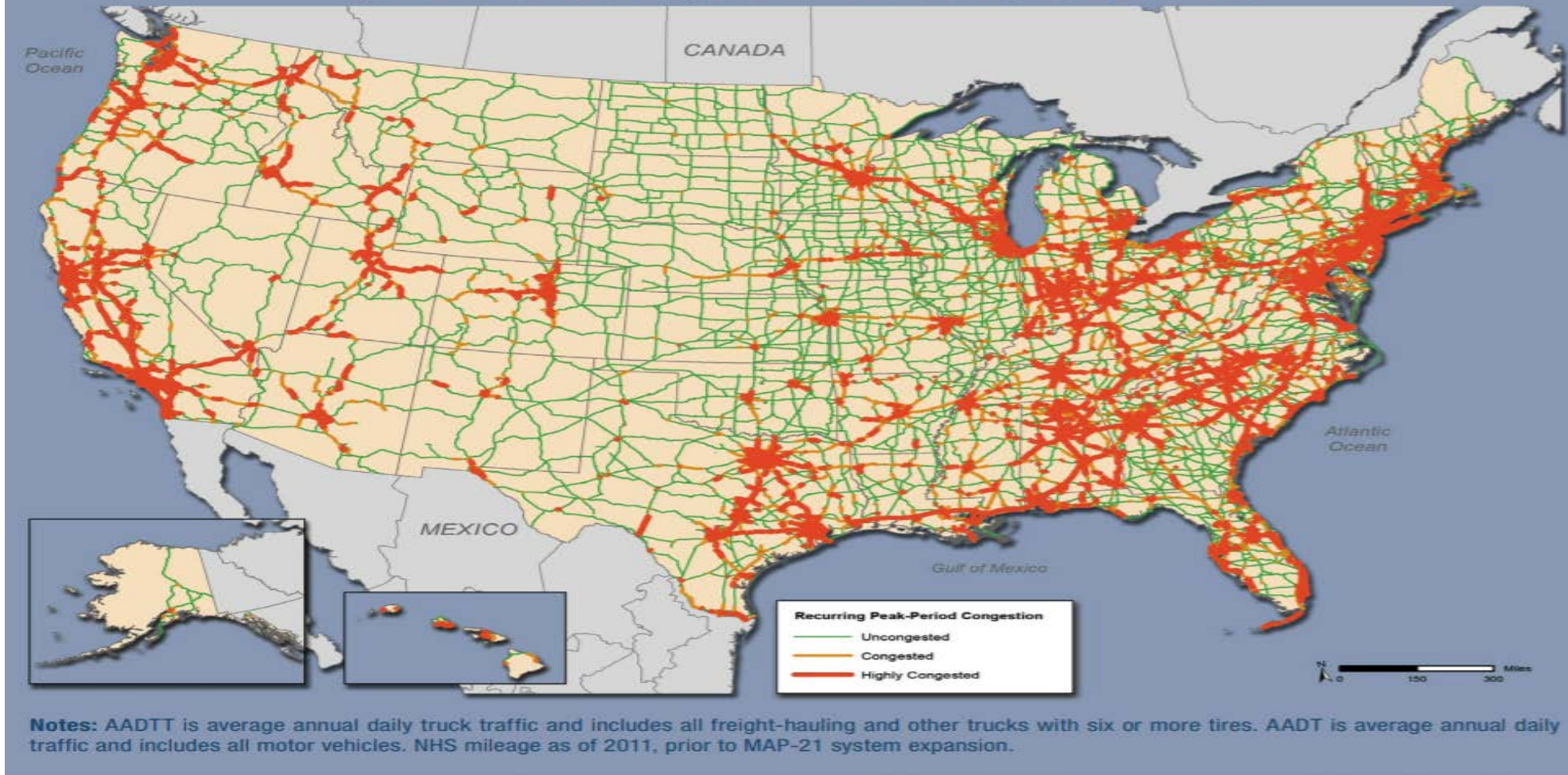


Mapping IWW and rail traffic and potential for switching



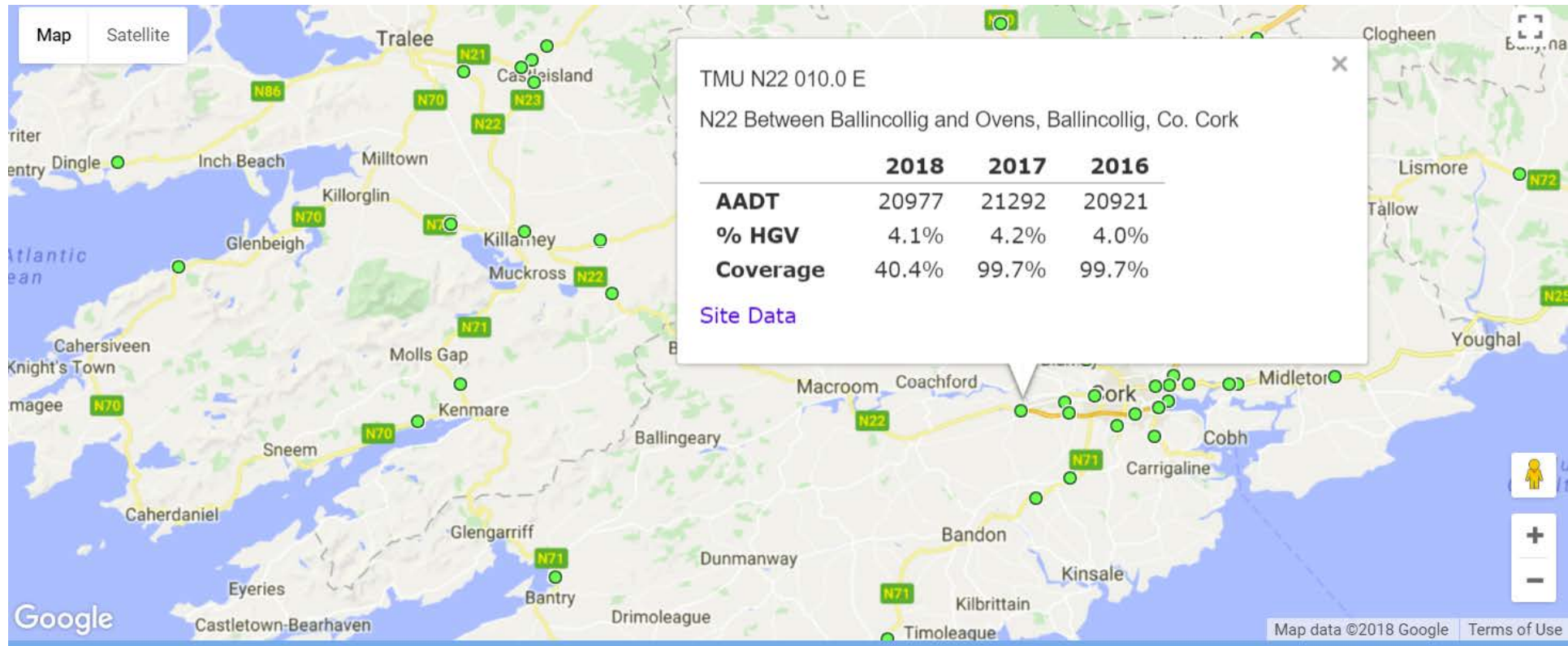
[https://ops.fhwa.dot.gov/freight/freight analysis/nat freight stats/docs/13factsfigures/pdfs/fff2013_highres.pdf](https://ops.fhwa.dot.gov/freight/freight%20analysis/nat%20freight%20stats/docs/13factsfigures/pdfs/fff2013_highres.pdf)

Figure 3-17. Peak-Period Congestion on the National Highway System: 2040



- Measurement of congestion
- From E-Road census, calculation possible if peak traffic and lane numbers were given (but “congestion” can be measured many different ways)

Ireland



[https://www.nratrafficdata.ie/c2/gmapbasic.asp?sgid=ZvyVmXU8jBt9PJE\\$c7UXt6](https://www.nratrafficdata.ie/c2/gmapbasic.asp?sgid=ZvyVmXU8jBt9PJE$c7UXt6)

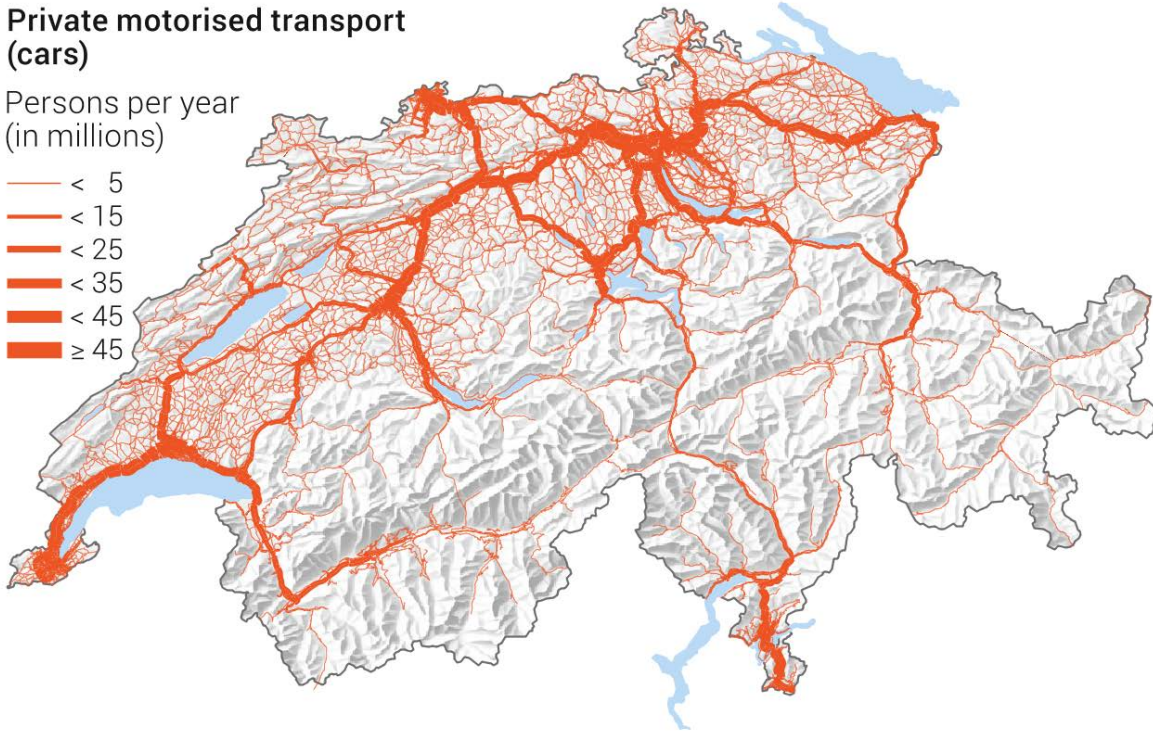


Switzerland

Passenger traffic flows in 2015

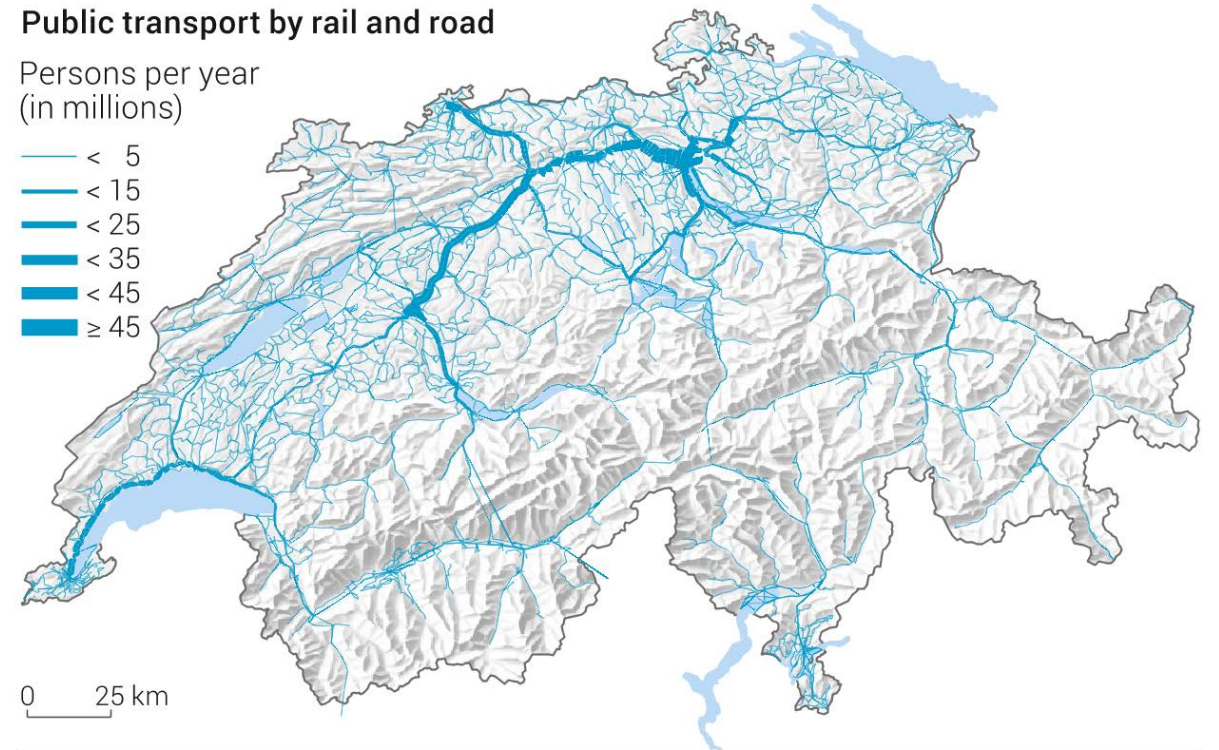
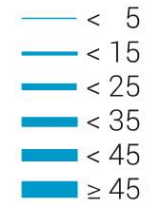
Private motorised transport (cars)

Persons per year
(in millions)



Public transport by rail and road

Persons per year
(in millions)



Sources: FSO – GEOSTAT; ARE – traffic modeling (DETEC), INFOPLAN

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- Measurement of people rather than vehicles (but private transport likely strongly based on direct measurement)



United Kingdom

Figure 7: Connectivity Corridors - containers (Road and Rail)

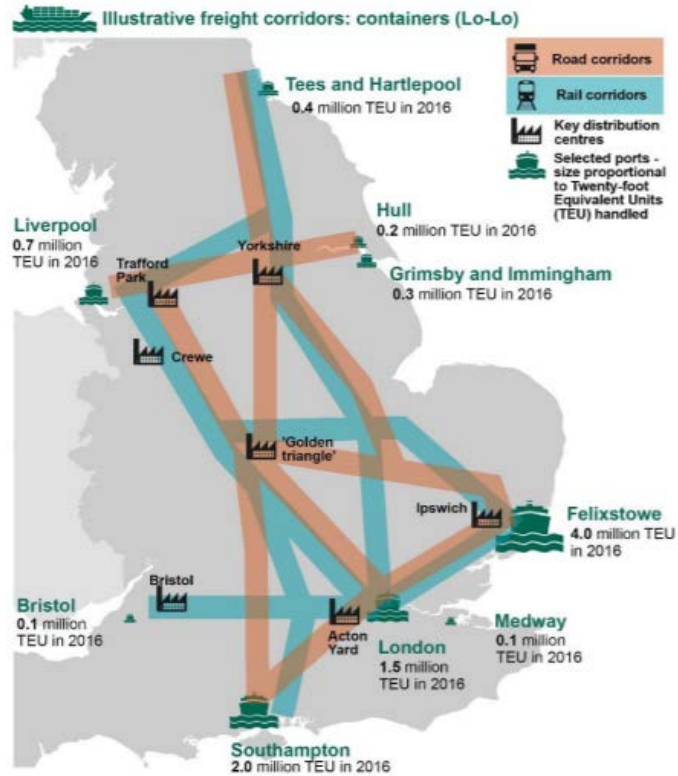
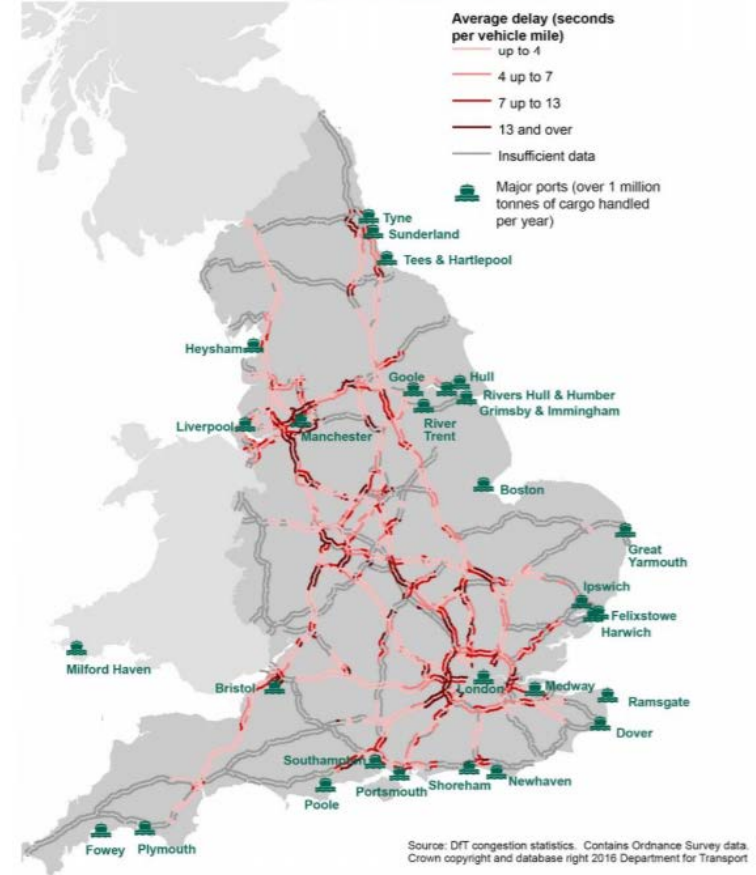


Figure 11: Delay on the Strategic Road Network: December 2016

Delay on the strategic road network: year ending December 2016



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710030/transport-infrastructure-global-future-a-study-england-port-connectivity.pdf

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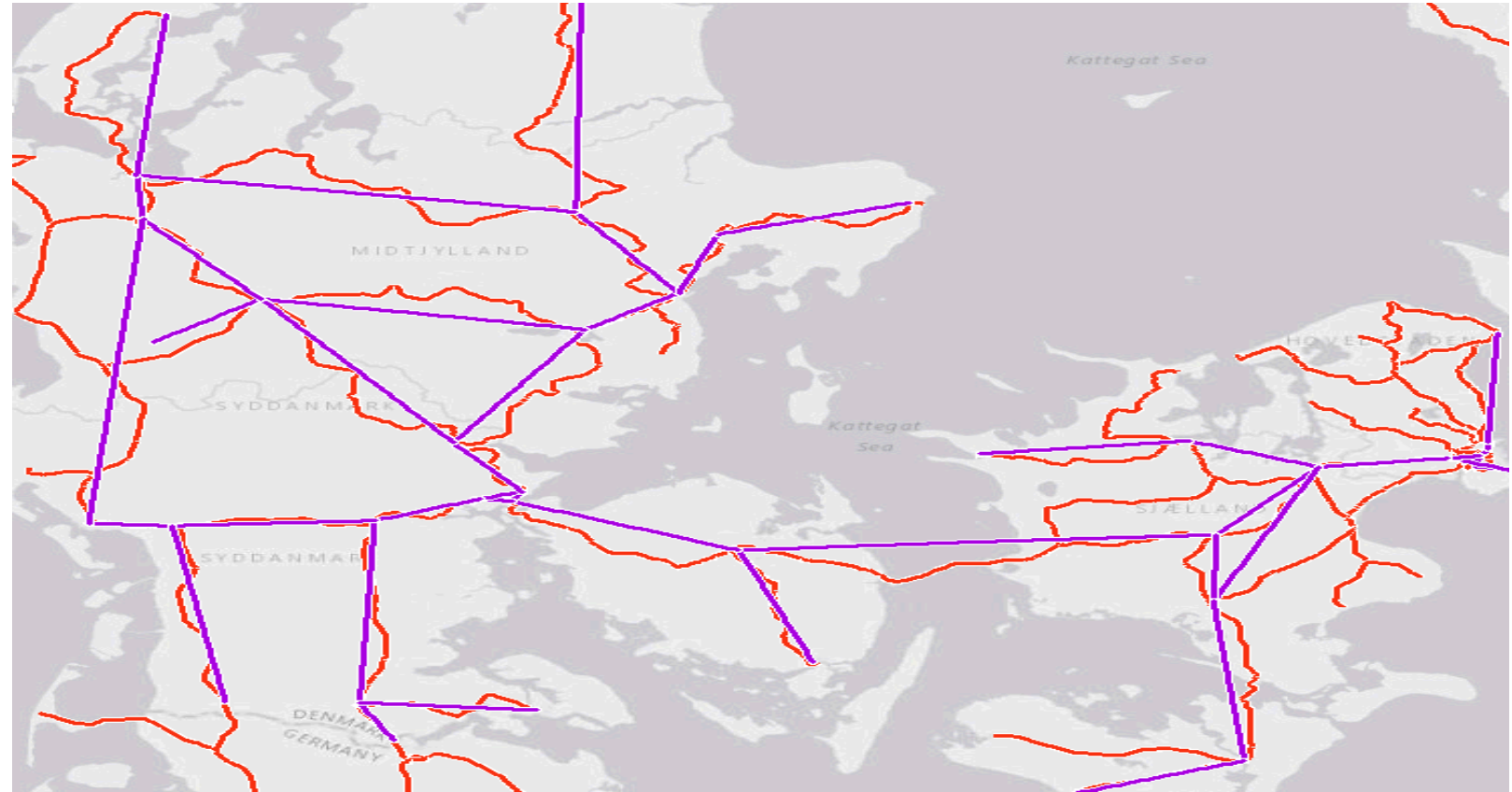
2015 E-Rail Census

- Started in 2005, data collected in cooperation with Eurostat
- Data harder to come by. Censuses received for 10 countries
- Shapefiles even harder (impossible) to come by
- Data for many EU countries is pending from Eurostat
- Data should be easier to produce in theory (could even use timetables if measurement not possible?)
- Passenger/freight clearer to split; trains will be identified as such (may even travel on separate tracks).



(Not ready for dissemination)

<https://unece.maps.arcgis.com/apps/webappviewer/index.html?id=a3b54fd4f3b2454d82240182fbefd090>



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2020 E-Road recommendations

- Recommendations largely unchanged since 2015
- Main change: replace requirement for paper maps with Shapefiles
 - Label Shapefile variable names in a way easy to understand in English, or provide data definitions
- In addition: ask for 2+1 road infrastructure as a memo item
- Recommendation to use same segments as previous years *if possible*
- Any interest in shapefiles by traffic type, to e.g. visualize bus traffic?



2020 E-Rail draft recommendations

- Largely agree with 2015 census
- Requirement for Shapefiles. If no Shapefiles are available, at least provide the coordinates of start and end points (which legislation requires for EU countries, but are not always provided)

UNECE put incorrect deadline. EU regulation 91/2003 (Annex G) specifies 30 June 2022 as deadline



Conclusions

- E-Road and E-Rail censuses are useful infrastructure data sets for international traffic
- Further analytics possible across countries, e.g. % of E-Roads that are classed as motorways, and number of lanes
- Mapping the traffic results provides extra value and has many applications (to be explored)
- Previous census recommendations have been drafted with help of country experts. There's still time if interest.
- Check with infrastructure agencies for data available. With necessary data, producing Shapefiles is straightforward

