

TRB Workshop: Sunday 21st February 2012
Exploring Extreme Weather Impacts on Transportation
System Operations in Europe: Opportunities for Climate
Change Adaptation and Mitigation

Climate Change Modeling and Travel
Behavior Survey from FUTURENET Project
(12-5729)

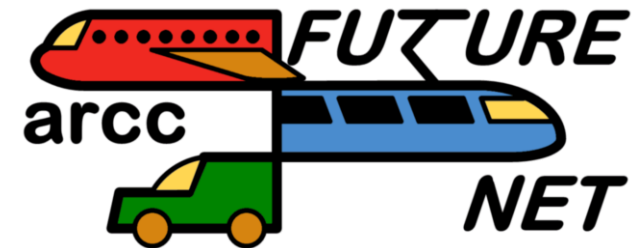
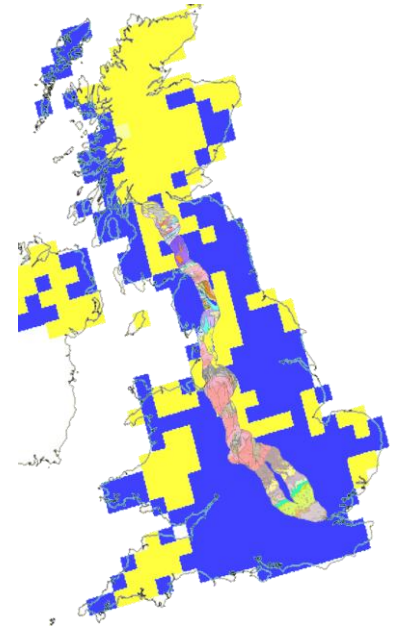
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‘FUTURENET’: Future resilient transport networks

EPSRC-funded ‘FUTURENET’ project
(2008-2013)¹

Examines the impact of predicted
climate change on the 2050 UK
transport network, and investigates
how to make the systems resilient

Part of “Adaptation & resilience to
climate change” (ARCC)
programme



The FUTURENET project

The broad objectives of the FUTURENET are to answer the following two questions:

1. What will the UK transport system look like in 2050?
2. What will be the shape of the transport network in 2050 that will be most resilient to climate change?

Climate change impacts on transport have engineering (physical network) & *socio-economic* (transport demand) dimensions.

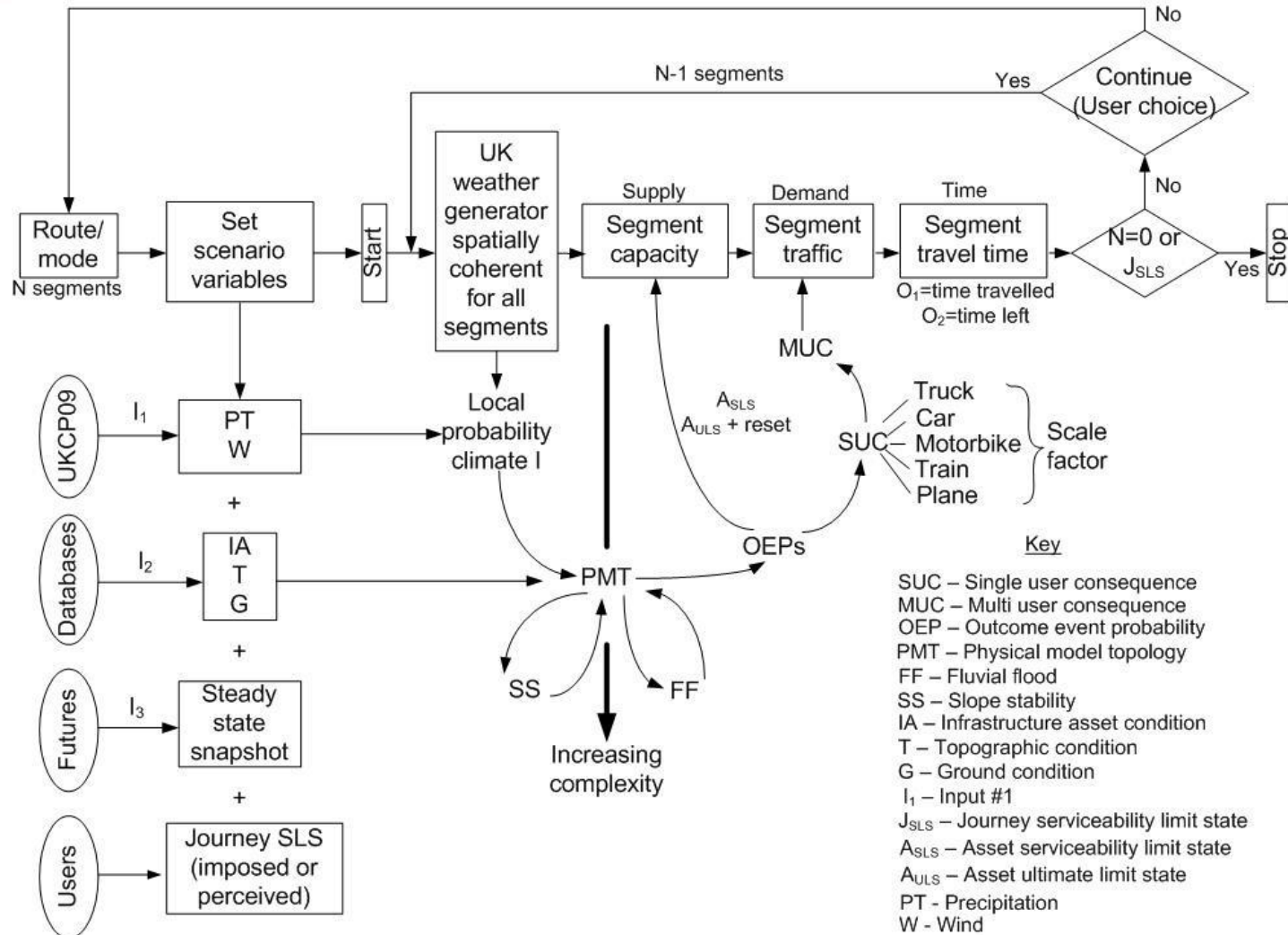
Climate change modelling

Two types of modelling:

1. Detailed physical models for effect of meteorology on specific infrastructure types
2. Large-scale statistical models for effect of meteorology on corridor segment traffic velocities

For more information see Tuesday pm poster session 586: 'Future Resilient Transport Networks: Assessing Transport Network Security in the Face of Climate Change' [\(12-0279\)](#)

Development of operational concept in FUTURENET



Travel behavior survey

- As extreme weather events are forecast to become more frequent as a consequence of climate change - there is a clear need to look user response & adaptation
- Few studies have integrated discrete choice SP experiments and (SNA) social network analysis
- Route London to Glasgow as case study, survey of at least 2,000 respondents

Travel behavior survey research design

- 2 SNA/transport workshops
- Internet panel survey by Ipsos MORI
 - First pilot: Nov/Dec 2010, 116 respondents
 - Second pilot: April 2011, 50 respondents
- Main data collection effort: 2,000 people sample survey in September 2011 (+ boost)
 - 1,000 are in each of Glasgow & London
- London split into 4 sub-areas selected by: location (N-E-S-W & Inner/Outer), deprivation levels & not neighbouring

Travel behavior survey

Background questions relating to quota, personal/household demographics, general transport information, environmental attitudes & previous travel London - Glasgow

Travel uncertainty: report & describe previous trips (over 3 hrs) affected by extreme weather / natural events (up to 3, over last 3 years): information on trip, disruption, & reaction to service change / failure

The Social Network Analysis (SNA) section

- Name generator technique: list those you “have regular contact with, and/or who are the most important to you, and/or those you would want help to discuss personal matters, and/or those you can trust, and/or those you really enjoy socialising with”
- Further information (up to 10 contacts): live with (neighbourhood / city / UK / EU), relationship, time know, meet, communicate (plus for main survey:- age, gender, car ownership/use)
- Respondents indicate which of their contacts they turn to for advice on travel decisions, and, in particular, who (and why) they would contact if they were experiencing an uncertain situation prior or while travelling



Please now consider the people (above 14 years of age) who are part of your social circle. In order to identify them, please consider those people who you have regular contact with, and/or who are the most important to you, and/or who you would want help to discuss personal matters, and/or who you can trust, and/or those you really enjoy socialising with. Please list below the first names of these people (These names will be used later in the questionnaire to help you identify people you have listed here as in your social circle, so you can use whatever name you wish, but please be sure you will know to whom they refer to). If two or more people have the same name, please also add a number e.g. Peter 1, Peter 2, Peter 3 etc. Please also indicate whether they live with you or not.

	Name	Does this person live with you	
		Yes	No
Person 1	Angela	<input checked="" type="radio"/>	<input type="radio"/>
Person 2	Michael	<input type="radio"/>	<input checked="" type="radio"/>
Person 3	Olivia	<input type="radio"/>	<input checked="" type="radio"/>
Person 4	Jack	<input type="radio"/>	<input checked="" type="radio"/>
Person 5	Thomas	<input type="radio"/>	<input checked="" type="radio"/>
Person 6		<input type="radio"/>	<input type="radio"/>
Person 7		<input type="radio"/>	<input type="radio"/>
Person 8		<input type="radio"/>	<input type="radio"/>
Person 9		<input type="radio"/>	<input type="radio"/>
Person 10		<input type="radio"/>	<input type="radio"/>
Person 11		<input type="radio"/>	<input type="radio"/>
Person 12		<input type="radio"/>	<input type="radio"/>
Person 13		<input type="radio"/>	<input type="radio"/>
Person 14		<input type="radio"/>	<input type="radio"/>
Person 15		<input type="radio"/>	<input type="radio"/>
Person 16		<input type="radio"/>	<input type="radio"/>
Person 17		<input type="radio"/>	<input type="radio"/>
Person 18		<input type="radio"/>	<input type="radio"/>
Person 19		<input type="radio"/>	<input type="radio"/>
Person 20		<input type="radio"/>	<input type="radio"/>

Total sample: 2,143

Average number of contacts: 6.47

0 contacts: 215

30 contacts (max): 35

Stated choice experiment



Please now imagine you have to travel between Glasgow to London in a Spring month (such as April) in the future. Even if you have never been to London or would not intend to do so, please imagine what you would do if you have to travel between the two cities.

Please also consider that you could travel to London as an intermediate stop for a further trip (for example in the South of England or continental Europe).

You will be asked to make choices for eight different hypothetical travel situations. Each journey is described, including the reasons why you are undertaking the trip, who you would be travelling with, the importance of the trip, and the weather conditions on the day of travelling. Under these circumstances, you will then be asked to choose from five different travel options (by air, train, car, coach, or would not travel), described by a number of characteristics associated with the trip.

If you are asked about travel companions (e.g. a partner or children), that does not describe your current situation, please imagine what you would do under these circumstances.

Please read carefully the information provided as each travel situation is different, Also note that there is no right or wrong answer, as we are simply interested in people's preferences.

FOR THE FIRST TRAVEL SITUATION, the reason for you to undertake this trip to (or through) London is: **Holiday - Longer stay**

The importance score of the trip (from 0 "not very important, I could have easily postponed the trip to another moment" to 10 "the trip was extremely important and there was no way I could postpone it to another moment) is... **Three**

Please note that a trip with a high importance score may also mean that it is not possible to get reimbursed if you do not travel

Also imagine you are travelling: **On your own**

And please imagine that the average weather over the trip on the day of travelling is:



Severe Weather Alert: Dense fog

Please consider that the weather would be generally fine for your hypothetical return trip, so you should be basing your decisions on the weather of the first leg only.

Choice experiment (8 choice tasks)

Mode choice: Air, Train, Car, Coach or Not travel

Attributes:

1. Scheduled departure time
2. Time taken to reach airport, railway or coach station + waiting time
3. Time taken for journey in normal conditions
4. Cost (single ticket & other costs)
5. Delay (% chance early / on time / late)
6. Time to reach your destination once arrived

Outputs from survey to overall FUTURENET modeling

1. Outputs from the stated choice model (e.g. mode choice, value of time)
2. Route choice on the air, rail & car segments
3. What constitutes travel failure in response to weather situations (25 attitudinal statements on 10 point scale) e.g. delay, re-schedule
4. Response to different weather situations when travelling (21 attitudinal statements on 5 point Likert scale) e.g. travel later, search information

Post choice task questions: integrating SNA

1. Considered what people in respondent's social circle would do
2. People similar to respondent would choose in terms of method of transport (air, train, car, coach) - same as them or not
3. What each of first five members of the respondent's social circle would choose in terms of method of transport (plus confident, change mind)
4. Market share of neighborhood (plus change mind)

When choosing Air have you considered what other people within your social circle (those identified previously), or people similar to you (for example in terms of age, income and neighbourhood) would do in the same situation?

PLEASE TICK ONE BOX ONLY

- | | |
|---|-------|
| <input checked="" type="radio"/> Yes I have considered what people in my social circle would do in the same situation and chosen as I think they would have | 27.0% |
| <input type="radio"/> Yes I have considered what people in my social circle would do in the same situation and I have chosen differently | 3.9% |
| <input type="radio"/> Yes I have considered what people similar to me would do and chosen as I think they would have | 9.4% |
| <input type="radio"/> Yes I have considered what people similar to me would do and chosen differently | 2.4% |
| <input type="radio"/> No, I have decided on my own without thinking what other people would do | 48.3% |
| <input type="radio"/> I do not know | 8.5% |
| <input type="radio"/> Other (PLEASE SPECIFY) <input type="text"/> | 0.3% |

N=4,286

To help you, here are the travel situations you were shown earlier again.

Further developments

- Development of the overall FUTURENET modeling approach
- Analysis & modeling of travel behavior survey
- Integration of this (and other components) into overall FUTURENET model
- Project due to finish: April 2013

Also note: Emerald book due out Summer 2012, edited by Tim Ryley & Lee Chapman: *Transport and Climate Change*

Thank you

Any questions?

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