Moving **Albatross** & **Ramblas** to Practice: State of Affairs

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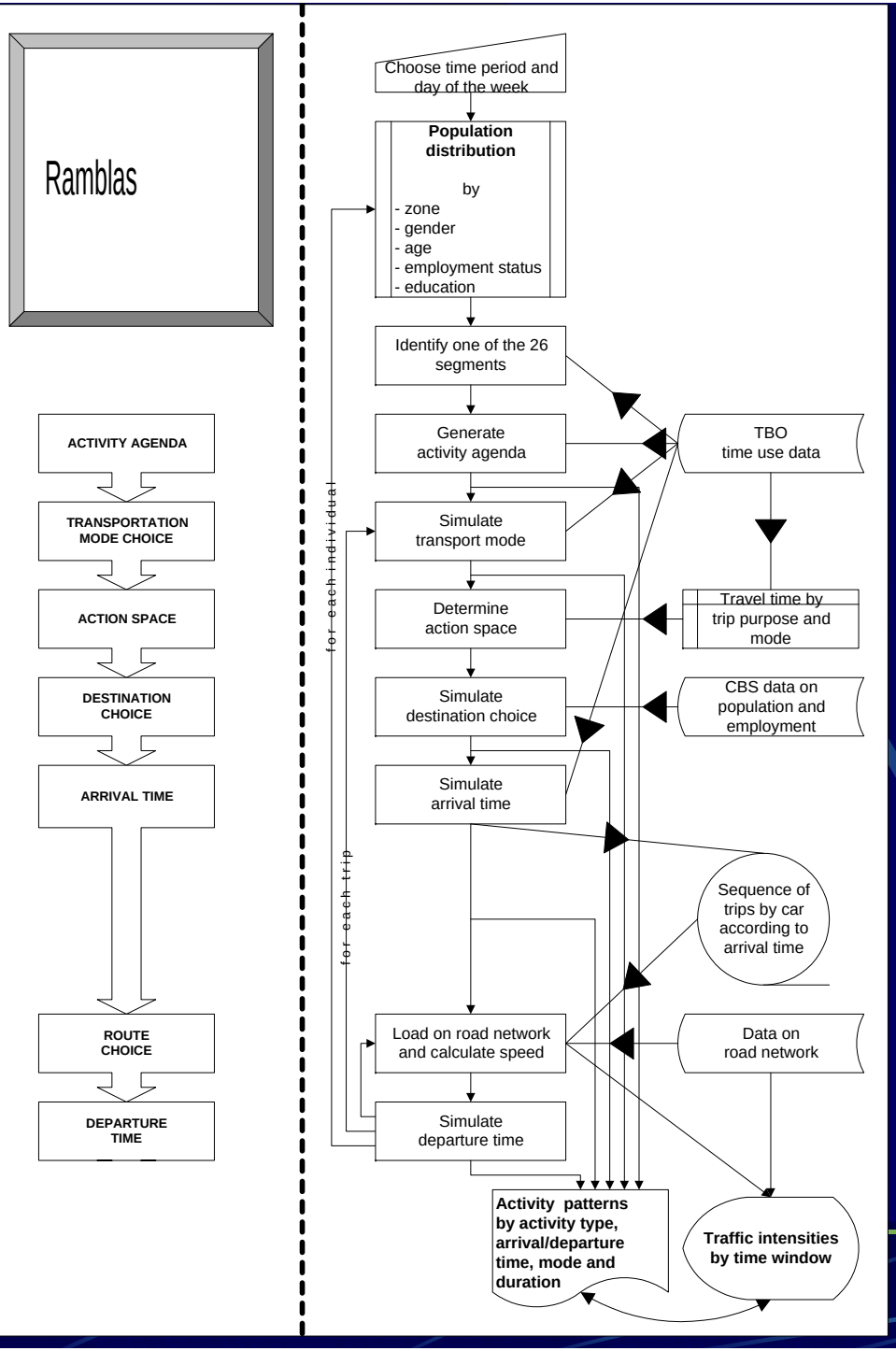
Activity-based Models Urban Planning Group

- Ramblas:
  - data-driven simulation
- Albatross:
  - rule based system
- Aurora:
  - utility-based model of (re-)scheduling decisions
- Patricia :
  - Nested logit – model suite:
    - no development; served as benchmark

Ramblas

Ramblas

- Update of 1970s integrated land use – transportation model
- Uses nationally available information only
  - Activity-travel patterns
  - Demographic information
  - Building programs
- Series of Monte Carlo draws to simulate activity-travel patterns and traffic flows


Ramblas
ACTIVITY AGENDA
TRANSPORTATION MODE CHOICE
ACTION SPACE
DESTINATION CHOICE
ARRIVAL TIME
ROUTE CHOICE
DEPARTURE TIME
Choose time period and day of the week
Population distribution
by
- zone
- gender
- age
- employment status
- education
Identify one of the 26 segments
Generate activity agenda
TBO time use data
Simulate transport mode
Travel time by trip purpose and mode
Determine action space
Simulate destination choice
CBS data on population and employment
Simulate arrival time
Sequence of trips by car according to arrival time
Load on road network and calculate speed
Data on road network
Simulate departure time
for each individual
for each trip
Activity patterns by activity type, arrival/departure time, mode and duration
Traffic intensities by time window

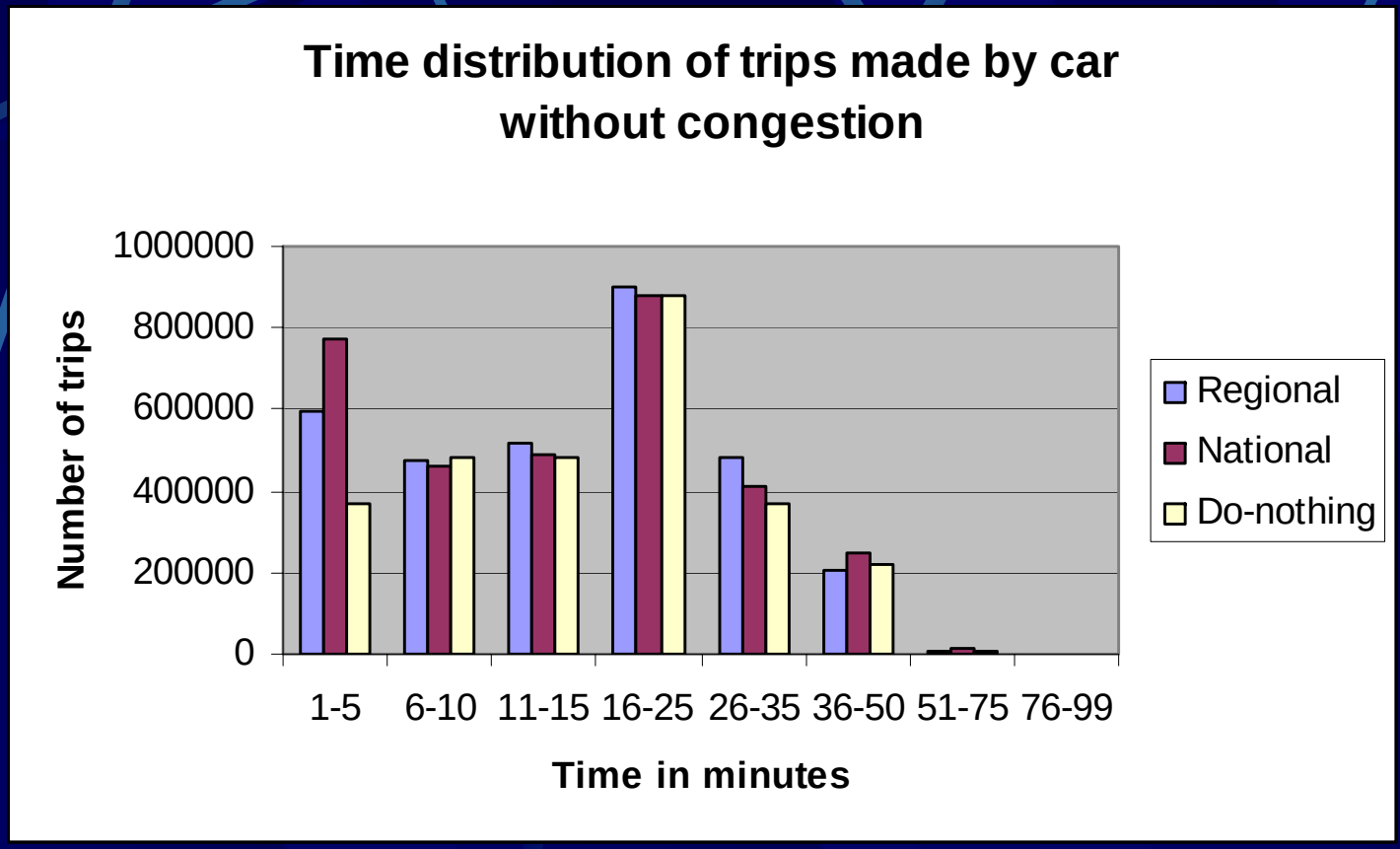
Ramblas

- Expanded:
  - Interregional traffic
  - Policy scenarios / building programs

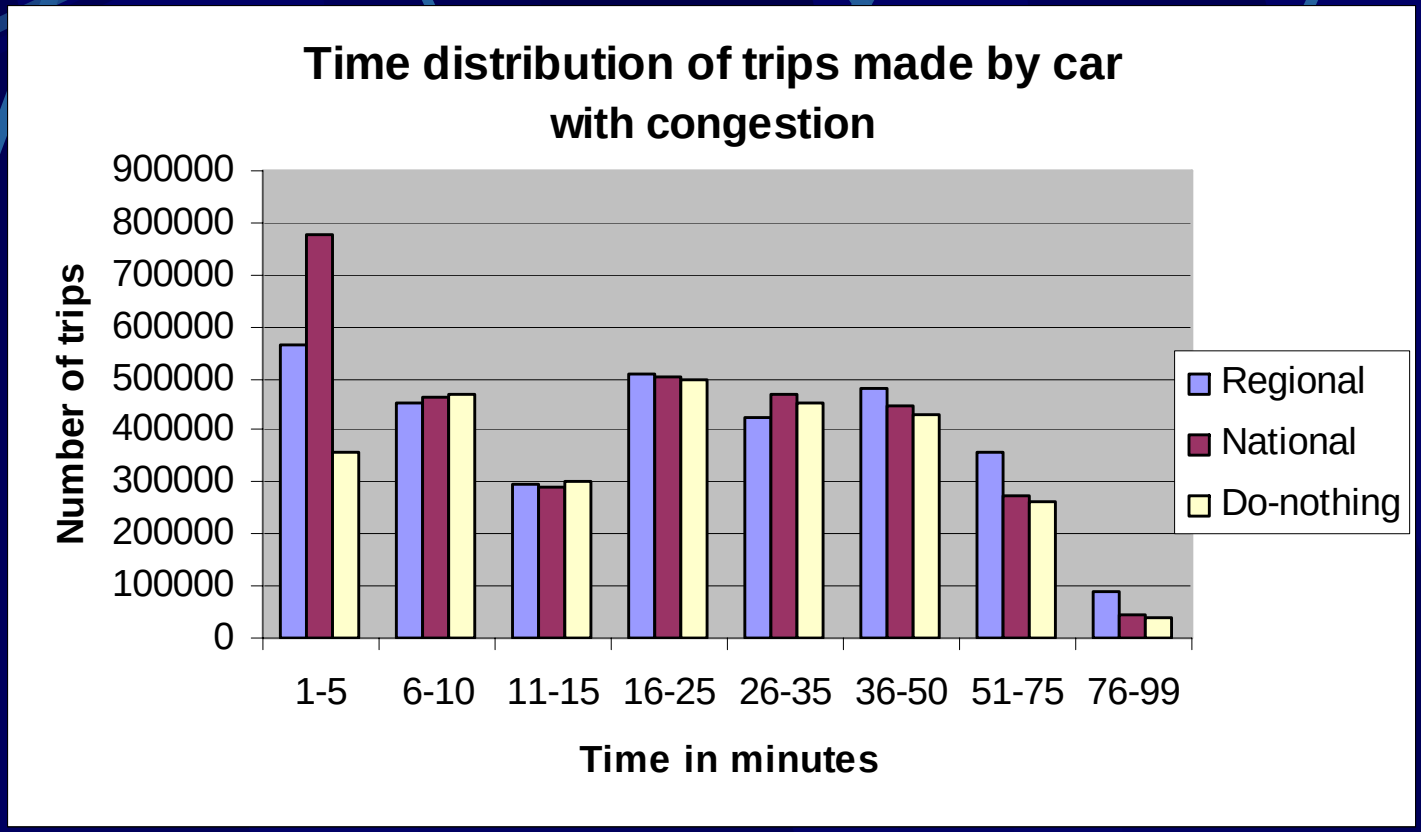
Ramblas

- Application:
  - Amsterdam North Wing scenarios

Ramblas


Time distribution of trips made by car without congestion
Number of trips
1000000
800000
600000
400000
200000
0
1-5
6-10
11-15
16-25
26-35
36-50
51-75
76-99
Time in minutes
Regional
National
Do-nothing

Ramblas


Time distribution of trips made by car with congestion
Number of trips
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
1-5
6-10
11-15
16-25
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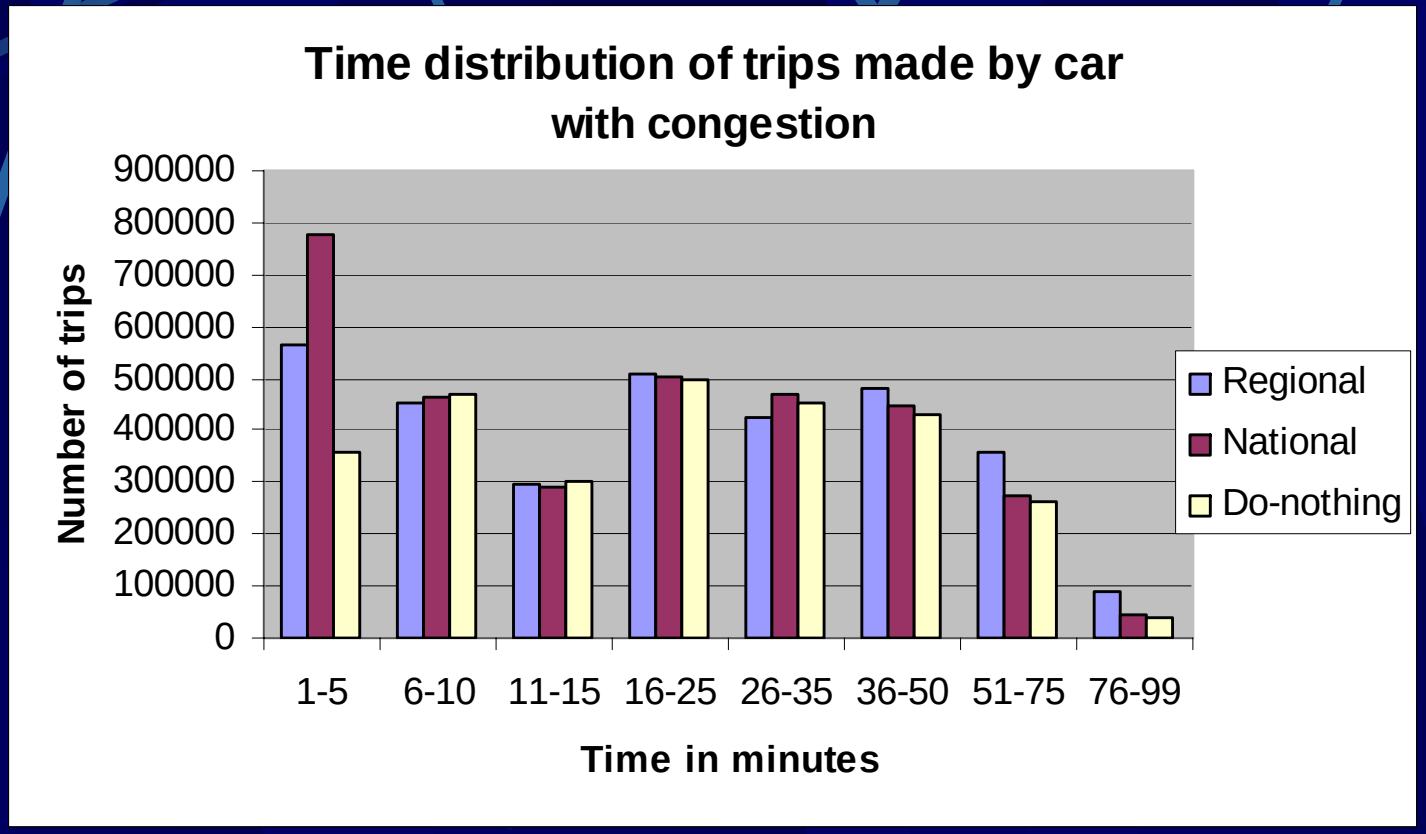
Ramblas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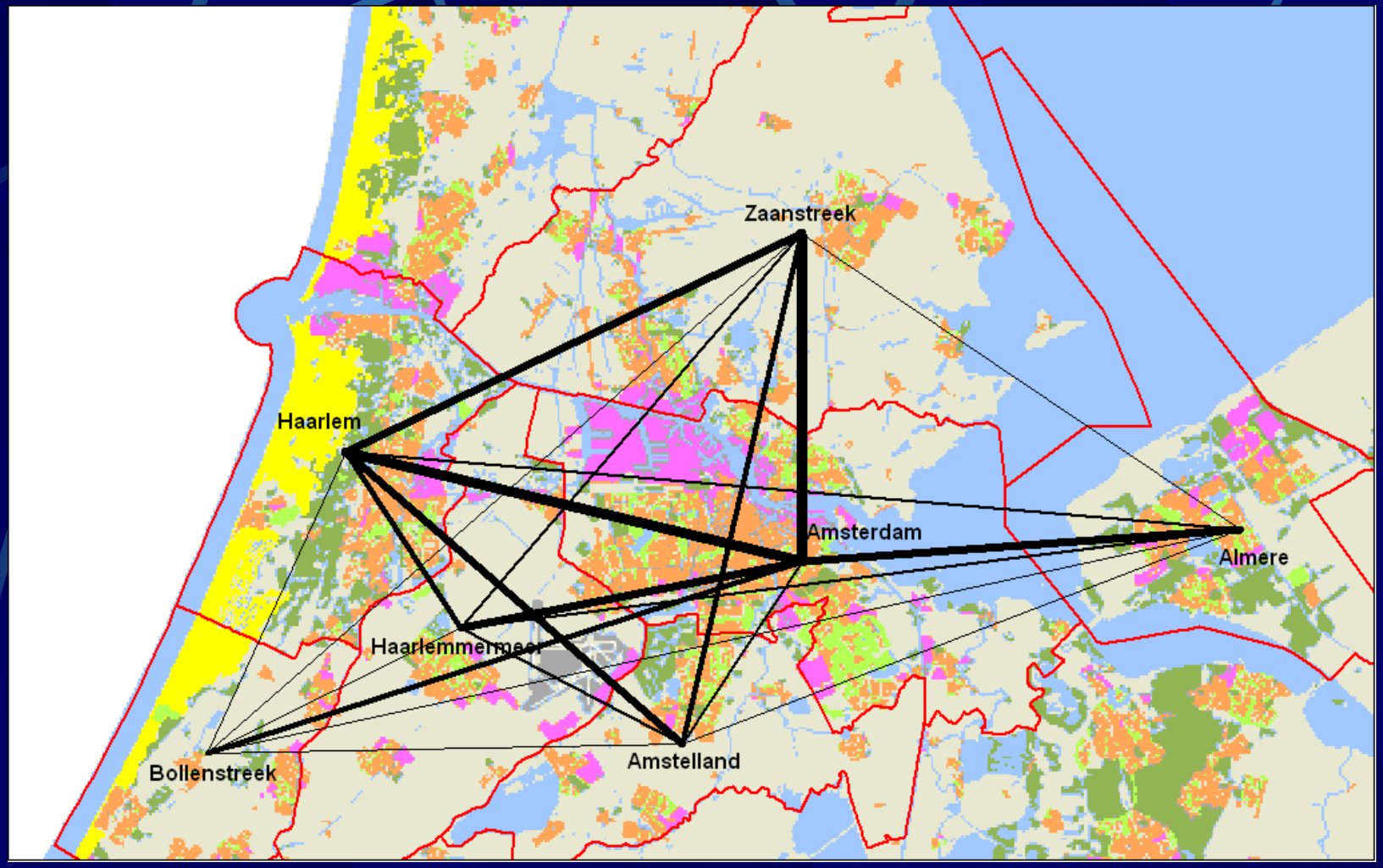
Ramblas


Zaanstreek
Haarlem
Amsterdam
Almere
Haarlemmermeer
Amstelland
Bollenstreek

Albatross

Background and Objectives

- Albatross was developed for the Dutch Ministry of Transport (1997 - …)
- Aim 1: Explore potentials of activity-based approach to travel demand modeling
- Aim 2: Explore potentials of a rule-based model of individual activity scheduling decisions

Features of the Albatross Model

- Choice facets modeled
  - What
  - With whom
  - How long
  - When
  - Where
  - Transport mode
  - Trip chaining

Features of the Model (continued)

- A household-day is the unit of analysis
  - Interactions between individuals within households
  - Daily basis
- Takes space-time and logical constraints into account

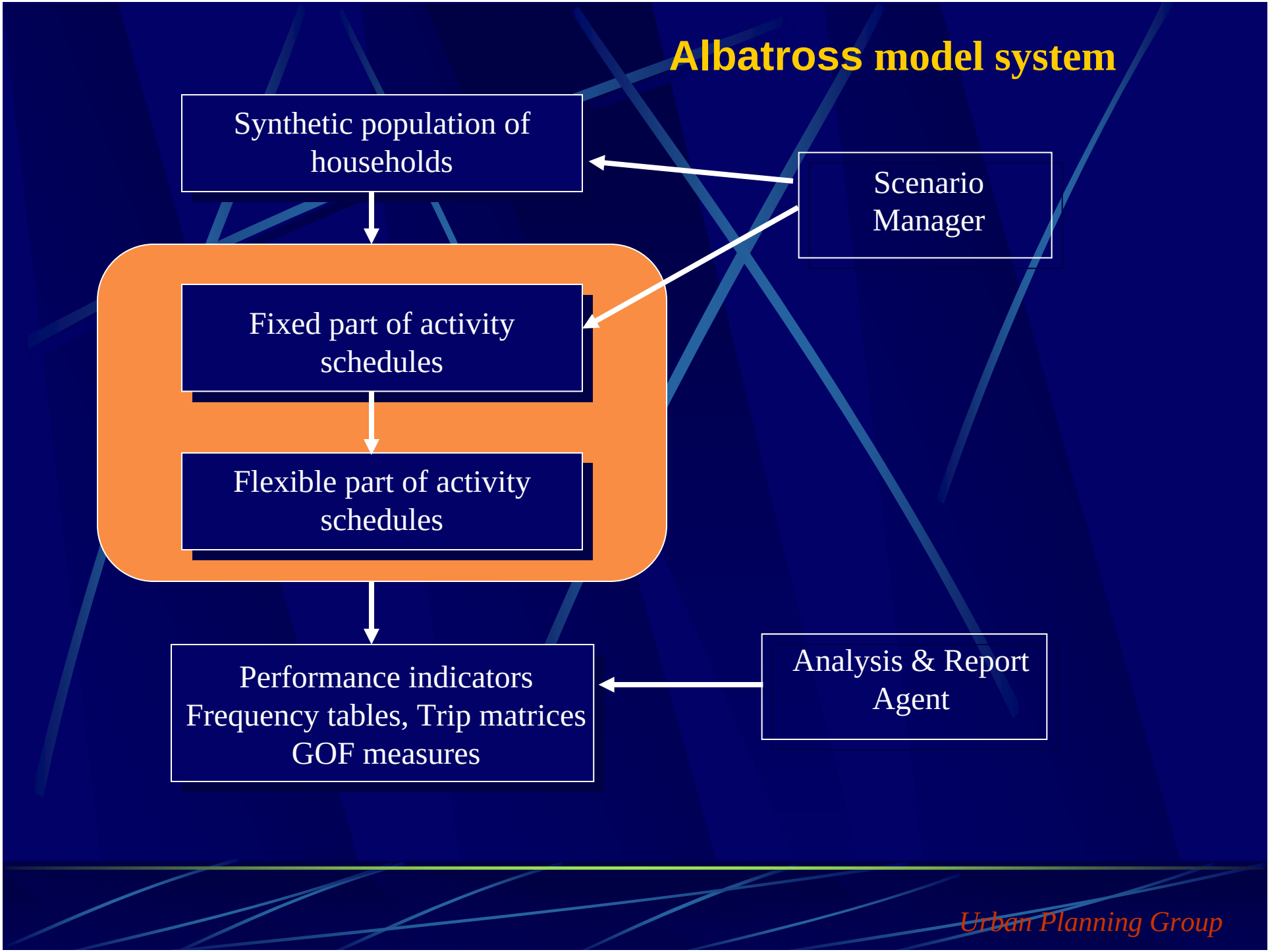
Features of the Model (continued)

- Uses a detailed classification of activities
  - Paid work
  - School
  - Voluntary work
  - Bring/get persons
  - Other non-leisure fixed
  - Daily shopping
  - Non-daily shopping
  - Service related
  - Social activities
  - Leisure activities
  - Sleep

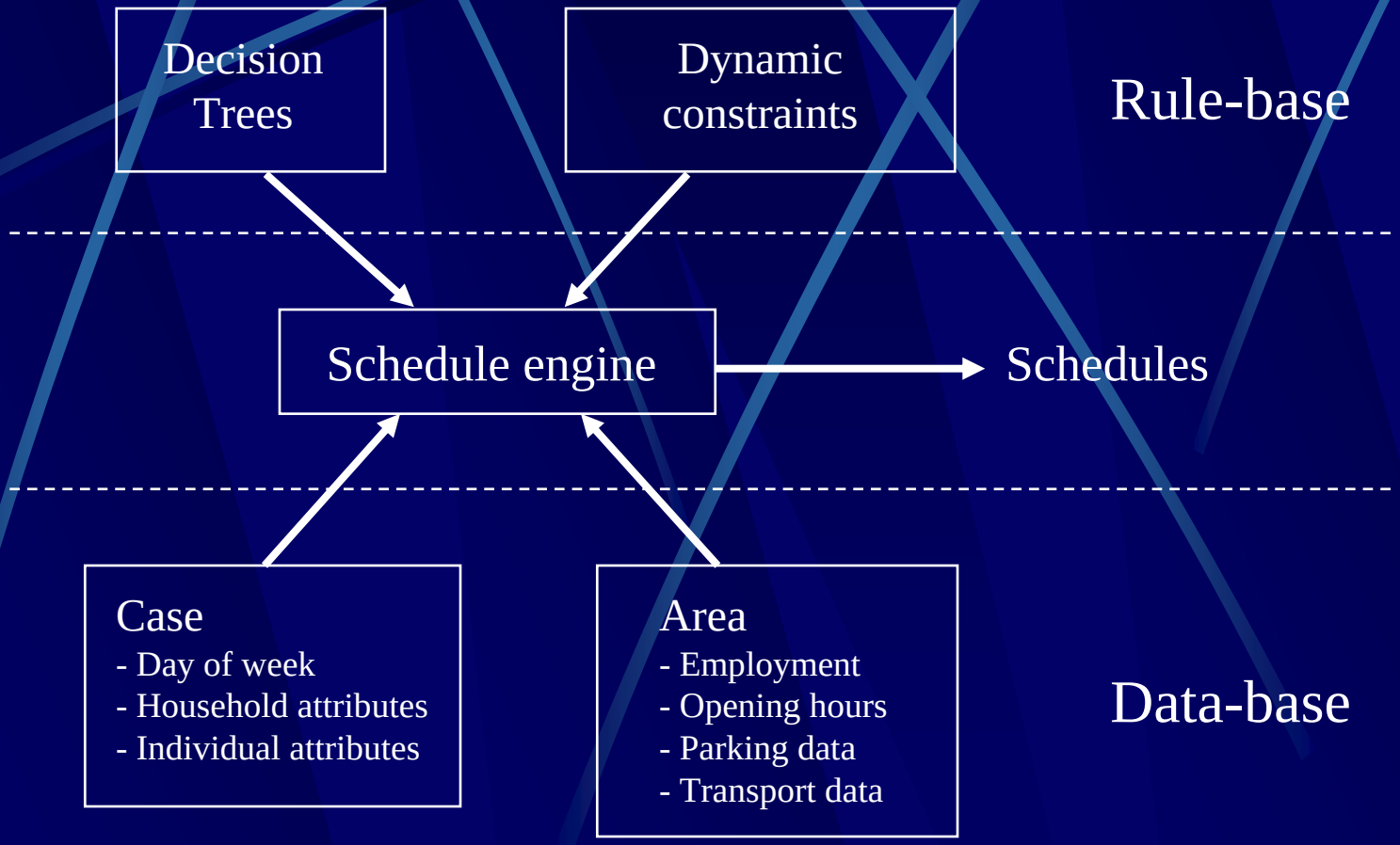
Features of the Model (continued)

- Fixed activities and travel are predicted on a continuous time scale

Albatross model system



The Scheduler



Scenarios the user can implement

- Variable travel cost by mode and time of day (in and off peak)
- Travel times by mode (in and off peak)
- Opening hours daily and non-daily facilities
- Schedule skeleton
- Population

Phase 1: development and testing

- Activity diary data collection in a limited study area (1223 households, 2 days, 1997)
- Data cleaning tool Sylvia (TRR 1999)
- Albatross 1, schedule skeleton is given (TRR 2000, book 2000, TR B 2004)
- Comparison with utility-based models (IATBR 2001)
- Face validity tests (WCTR 2001)

Phase 2: extensions and upscaling

- Spatial transferability study (TRB 2002)
- Generating schedule skeletons
- Population synthesis (ETC 2002)
- Stated adaptation choice experiment and model (TRB 2003, Transp. Policy 2003)
- Adding travel costs variables
- Upscaling to national level (TRB 2003)
- Pooled activity diary data set of 9985 person-days

Phase 3: sensitivity testing and application

- Refinement of the location module
- Feature selection
- Sensitivity analyses
- Test application

Sensitivity tests

Population	Work status	Increase labor participation of women
	Number of adults	Increase single-adult households
	Age group	Graying of the population
	Income group	General increase in income
	Number of children	Increase of childless households
	Car possession	Increase of number of cars
Travel times	Car speed	increase car travel time (10 and 20%)
	Public-transport speed	increase in-vehicle train travel time (10
		increase BTM travel time (10 and 20%)
	Combined	Scenarios
Opening hours	Opening hours daily (D)	Widening of opening hours, all days of the
	Opening hours non-daily (N)	Widening of opening hours, all days of the
	Opening hours D & N	Widening of opening hours, all days of the
Travel costs	Car per km costs peak (P)	Sensitivity tests over a range
	Car per km costs off peak (N)	Sensitivity tests over a range
	Car per km costs P & N	Sensitivity tests over a range
	PT per km costs peak	Sensitivity tests over a range
	PT per km costs off peak	Sensitivity tests over a range
	Combined	Scenarios
Spatial distribution of facilities	Employment total	
	Number of schools	
	Population	
	Employment daily shops	
	Employment non-daily shops	
	Employment banks	
	Employment ‘horeca’	
	Urban density	De-urbanization
	Combined	Spatial separation Work and Home
		Spatial separation (Work and Facilities)
		Concentration of facilities
Schedule skeletons	Start time work	Avoid peak travel scenario
	Duration work	From 5- to 4-days work week
	Start time secondary fixed	
	Duration secondary fixed	

Sensitivity of activity-travel decisions

- Activity type choice
  - Sensitive to household characteristics
- Number of activity
  - Quite constant
- Timing
  - Sensitive to activity type and available time slots
- Trip chaining
  - Pretty constant
- Location choice
  - Sensitive to hh characteristics, accessibility, mode
- Mode
  - Sensitive to trip length and car availability

Test applications

- Will start later this month