



Multilevel transport model for transport analysis of CIVITAS DYNAMO tasks

Summer University

Developing "Mobility 2.0" systems and services

Palma (Mallorca), 4-6 November 2015

Jacek Oskarbski

Gdańsk University of Technology



Assumptions for the concept of developing a system for forecasting and traffic analysis in Gdynia



Multi-level model of transportation systems (MST-Gdynia):

- cover an area of Gdynia, but to be fed with data from regional and national models
- have a hierarchical structure consisting of layers of different management levels
- enable the efficient exchange of information and data between management layers as well as the Transport Planning System and software to traffic control, which is implemented within TRISTAR system
- enable the provision of data to the various tasks arising from the process of functioning of the transport systems and facilities, which will facilitate optimal decision-making
- provide data for planning work, feasibility studies of transport facilities, projects of changes in the traffic arrangement plans, taking into account geometric solutions at intersections and interchanges and advanced traffic control



Assumptions for the concept of developing a system for forecasting and traffic analysis in Gdynia



Multi-level model of transportation systems (MST-Gdynia) should:

- set up data and information for updating Gdynia's SUMP and provide detailed analyses and verification of effects on mobility management initiated by SUMP proposals and measures
- provide simulation tools to convince residents of Gdynia to proposed SUMP and other solutions





3





Development of tool for transport analysis - MST







Multi-level Model of Transportation Systems



Strategic level includes the provision of data to develop a transport policy, the implementation of planning studies and network studies. The model is also used to collect the data for the mesoscopic model, including the existing and planned routes located in the vicinity of the city.





MST-Gdynia



130

Transportation network – baseline scenario



MST-Gdynia





Strategic level (VISUM)

Example of traffic flow chart

- (morning peak)
- Assignment





Gdynia 2012 - Kartogram natężenia ruchu kołowego w godzinie szczytu porannego 7:00-8:00 [P/h

Strategic level (VISUM)





Example of PT passenger flows chart (morning peak) PTV Visum FUNDACJA ROZWOJU INŻYNIERII LĄDOWEJ 2012 dr hab. inż. Kazimierz Jamroz, mgr inż. Krystian Birr, mgr Tomasz Budziszewski

nia 2012 - Kartogram napełnień pojazdów transportu zbiorowego w godzinie szczytu porannego 7:00-8:00 [P/h



10

CiViTAS Summer University Jacek Oskarbski

Multi-level Model of Transportation Systems Tactical level (SATURN/DRACULA)



Tactical level includes the provision of data to develop a decision-making papers (network and corridor studies, feasibility studies), projects of traffic arrangement, traffic control and evaluation of planning solutions effectiveness as well as for traffic management purpose.





Operational level (VISSIM + SATURN/DRACULA)



Operational level includes the provision of data to develop specific projects of traffic arrangement, traffic control programs and visualization of traffic in street network components (e.g. junctions).



Simulation



Multi-level Model of Transportation Systems



	Level of	Strategic	Tactical	Operational
Area	management			
		Transport	Transport network/	Street, PT line,
	Object	network	streets and PT lines	set of junctions,
				junction
	Model type	Macroscopic	Mezoscopic	Microscopic
Region		VISUM		
City	Tool	VISUM	SATURN/DRACULA	
Cordon		VISUM	SATURN/DRACULA	
Local			SATURN/DRACULA	VISSIM,
				DRACULA

After implementation of TRISTAR system in Gdynia the models will be supplied with the information on traffic parameters in real-time.



Monitoring and Traffic Surveillance System -

Examples of detection systems in TRISTAR:

- traffic measurement stations 161 intersections indicative loops
- Traffic Control System inductive loops or video detection
- bluetooth and Wi-Fi sensors incident detection algorithms
- ANPR cameras Driver Information System / Traffic Safety Management System
- Public Transport Vehicles PT Vehicles Management System / priorities for PT vehicles in TCS





Dedicated bus lanes



Strategic level (VISUM)

Operational level (VISSIM)



Tactical level (SATURN)



Automatic Incident Detection





Kartogram potoków pasażerskich na linii PRT w godzinie szczytu popołudniowego 15:00-15:59.

Personal Rapid Transit





1.11.2	Scenario					
Indicator		W0	W1	W2	W3	
avelled distance PrT	[poj.km]	6671,4	6673,4	6667,1	6661,8	
avelled distance PT	[pas.km]	8091	8807	8820	9395	
otal travel time PrT	[h]	180,87	180,91	180,73	180,56	
otal Travel Time PT	[h]	1030,13	1043,45	1028,08	1045,80	
verage speed PrT	[km/h]	36,884	36,887	36,890	36,896	
verage speed PT	[km/h]	7,85	8,44	8,58	8,98	
			🐛 🧍 THE EU	ROPEAN UNION		

* * *

LEGENDA

24



WIM





Mezoscopic

Parametr		Scenariusz					
		S0	S1	S2	S3	S4	
Kolejki na wlotach		799,5	797,1	996,2	796,0	1237,4	
Kolejki pozostające na wlotach,							
wynikające z przekroczenia							
przepustowości		605,6	446,4	2243,9	521,7	3814,2	
Całkowity czas podróży		5511,7	5349,5	7994,4	5409,5	10322,1	
Średnia prędkość		40,8	41,6	32,5	41,4	27,6	
Praca przewozowa		225007,6	222305,2	259856,9	224124,3	285367,5	
Liczba odbytych podróży		31951,9	31553,3	37396,1	31784,7	42332,7	
Wskaźnik zużycia paliwa		19790,6	19574,6	25560,2	19796,7	26009,4	
Liczba zatrzymań pojazdów w							
przeciągu jednej godziny		141087,9	176569,0	254733,2	176482,7	293254,3	
zanieczys zczenia	СО	1834,43	1819,05	2504,30	1828,96	2643,60	
	CO2	19797,35	19580,00	25575,53	19801,52	26039,87	
	NOX	486,09	488,40	582,50	487,26	584,03	
	HC	334,16	331,72	451,09	333,29	598,71	
	PB	1,96	1,96	2,51	1,96	3,34	
	PM10	1,96	1,96	2,51	1,96	3,34	

10. ul. Chwaszczyńska 2 WIM-HS

9, al, Zwyclęstwa WIM-HS

7. ul. Chwaszczyńska 1 WIM-HS



Thank you!

Jacek Oskarbski

Contact Details

Gdansk University of Technology Gdansk, Narutowicza 11/12, 80-233 joskar@pg.gda.pl http://www.civitas.eu





THE CIVITAS INITIATIVE IS CO-FINANCED BY THE EUROPEAN UNION