The Actors Behaviour Improving in the "*MobiSim*" Model

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The simulation model, named MobiSim, was elaborated on the demand of the French Ministry of Transport (the model was presented during XX International Conference of the System Dynamics Society in Palermo). The objectives were to create the tool for a relevant assistance in strategic decision-making on the transportation system development in the relationships (interconnections) with the territory development in the metropolitan area. Two model realisations: TourSim and MobiSimII and the interface allowing to establish scenarios, visualize and analyze the output results, were create with the ***Vensim*** *simulation software. They were applied for the exploration of the person's displacement evolution scenarios in the French agglomerations of a different size. The model's applications output correct and logical results in there large lines. Nevertheless, the model modifications concerning the behaviour of the different actors must be made, which will allow improving the relevancy of the simulation results.*

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The principal objective of MobiSim model elaboration is to provide a realistic representation linked to the person's mobility in France in 20 years, on the one hand, and to demonstrate the feasibility of an operational simulator, on the other hand. In the centre of the model is the system of interactions between household's behaviour, transportations systems and urbanisation processes. The interactions between transport and land use (habitats and the urban activities location) are explicitly integrated in this model.

The model applications for two different French metropolitan areas with 560,000 (Tours) and 1,650,000 (Lyon) population show that there is no solution to the congestion and transportation pollution problem by decisions only inside of the transportation system.

Fig.1 shows the results of the Scenario 1 simulation. Scenario 1 corresponds to the current tendency to solve the congestion problem with the investments in the road transportation system, and the pollution problem with the emissions limitation programs. In 20 years, the total mass of people displacements in Urban Area of Lyon increases of 28%. This growth profits especially with displacements in private cars, which observe an increase of 40%. Displacements in Public Transports decrease by 7% and displacements of light modes (walk, bike) increase by 13%. In terms of shares of market, the private car gains 6 points passing from 66% to 72% of total displacements. Mass Transit loses 4 point of shares of market.
The spreading out of the periphery zone persists with a progression of 46% in 20 years. The total travel distance in private cars increases by 145% in 20 years (see the results of the model simulation below). In spite of increasing of the traffics and travel distance, one observes a stabilization of the CO2 emissions thanks to the renewal of the private cars flit and a reduction of the fuels consumption.

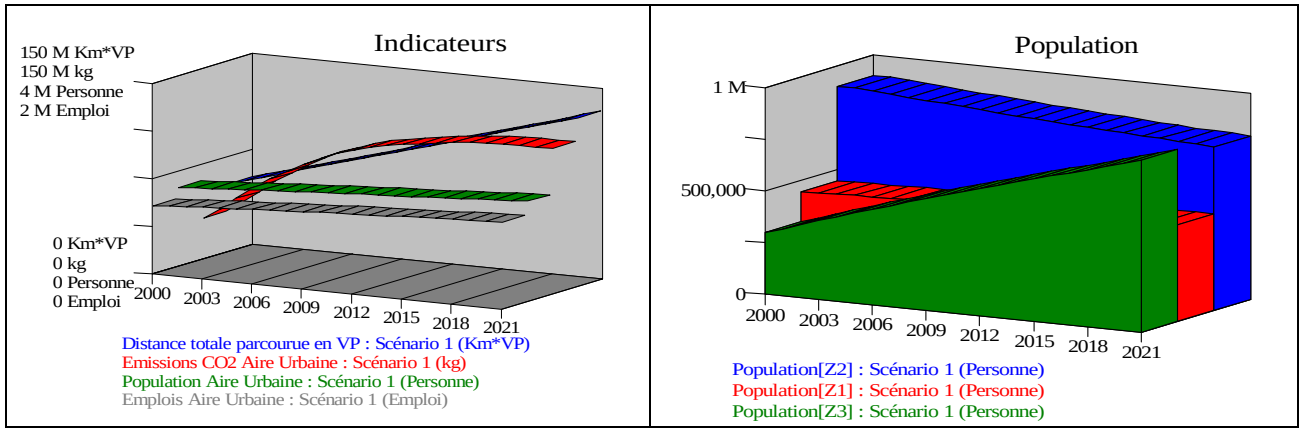

Fig.1

The best solution were fined in the combination of the different political and policy decisions: by increasing the Public Transit Capacity, by paying for the urban freeway, by improving urban land supply and by reducing speed limits for the cars. (see Fig.2 for scenario 5 simulation)

The results of simulations of Scenario 5 show that in 20 years, the total mass of displacements of people in Urban Area of Lyon increases of 11%. This growth profits especially with displacements in Public Transports that observe an increase of 31%. Displacements in the private car increase only by 6%. In term of shares of market, the private car loses 4 points passing from 66% to 62%. Mass Transit gains 2

point of shares of market. The increasing of the periphery zone persists with a more reduced progression of 12% in 20 years. The total distance traversed in VP is in increase of 28% in 20 years.

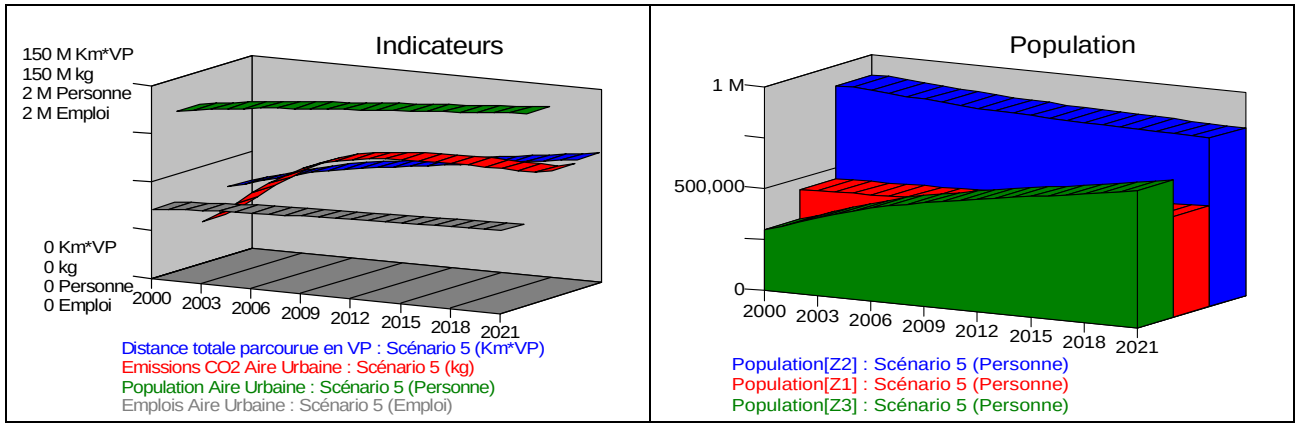

Fig. 2

Simulations highlight the very important role of by reducing speed limits of the private cars. In the first time, these measurements, associated with increasing the Public Transit Capacity, increase the number of displacements in Public Transports and change the modal partition of displacements between the motorized modes. In continuation, with urban accompaniment of the land offer in the City - Centre and in the Suburbs, across longer feedback loops, the increase in the time of displacements pushes the population to settle in the urban Pole (Centre and Suburbs). The city becomes more compact; the stabilization of a number and distance of displacements stabilize, indeed, the private cars emissions. Urban forms, in its space, social and environmental dimensions bring another positive consequence: increasing light modes of displacements. The modification of the displacement conditions has strong impacts on the urban forms and, simultaneously, the urban forms affect the travel demand.

The model's applications output correct and logical results in there large lines. Nevertheless, the model modifications concerning the behaviour of the different actors must be made, which improve the simulation results relevancy. The current evolution in the public decision methods, with participative steps orientation, justifies an increased requirement of tools making possible the management of the conflicts which number multiply proportionally with the number of actors.

Model structure

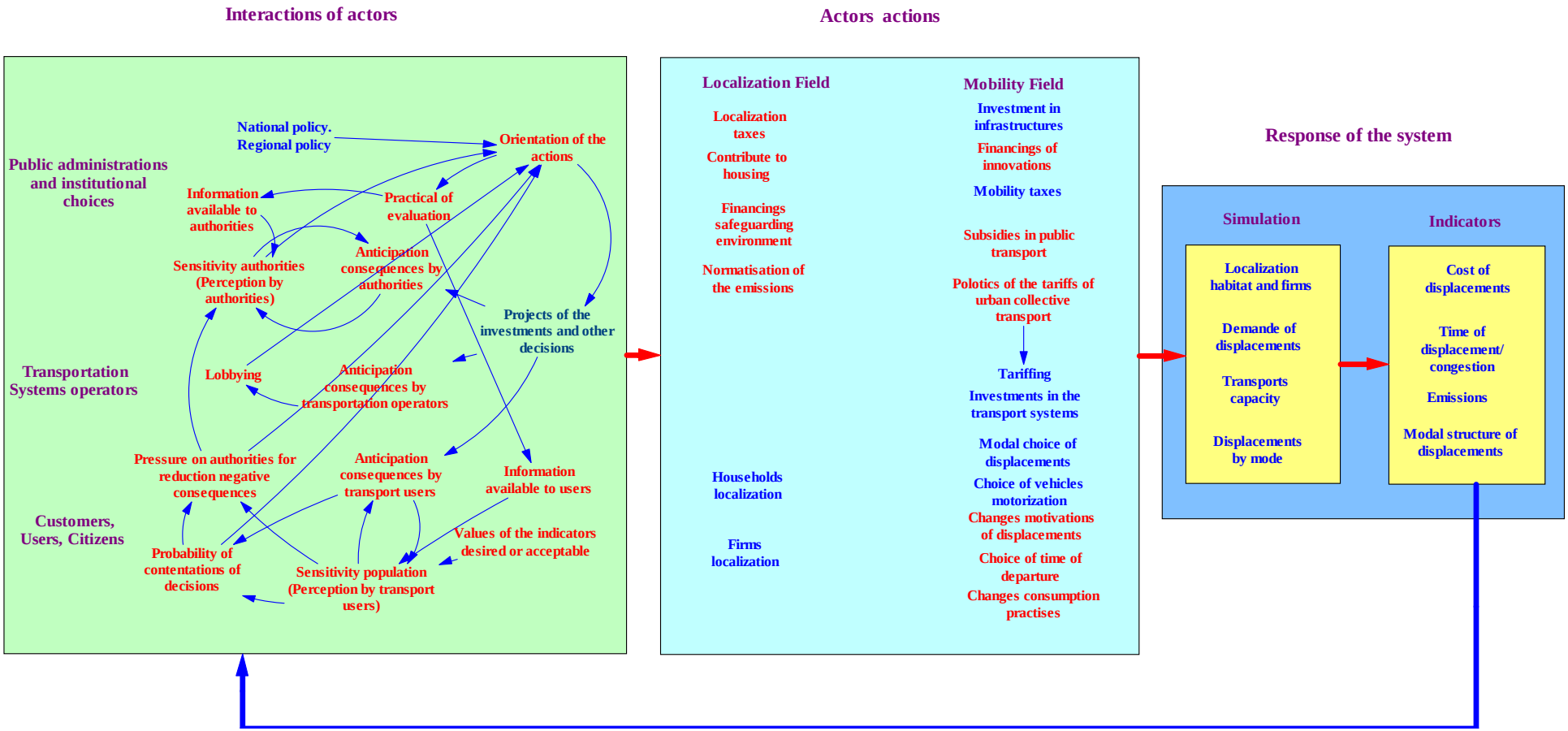

Fig. 3

To make possible the analysis of the mechanisms in the relationship between public, institutional and private actors, fascinating parts in the territory and transport management, the model aggregates participants into communities, each acting in its own interests (see Fig. 3)

The model describes the interactions between three aggregated groups of actors of the system of urban displacements: Public administrations, Transportation system operators, Enterprises and Users of transportation systems. The model make possible to simulate a high-level approach in understanding when different system conflicts become active. These new knowledge permits to evaluate potential policies for their system-wide effects and to achieve the negotiated system balance.

The model is developed in coherence with the urban planning practice.

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