



## MCDA Research Groups

### DSS Group - Romania

*DSS Group Romania* was set up in 2002 by Dr. Luminita Duta and Prof. F.G. Filip at the State University "Valahia" of Targoviste to continue and extend to research works which started in early 80ies at the National Institute for informatics (ICI) Bucharest. It is a team of young members from different Romanian universities and research institutes, which has as main goal the research in the field of decision support systems. The group web-page is <http://ssd.valahia.ro/indexuk.html>. The groups' objective is to create a core of researchers from several Romanian universities whose works and publications are oriented towards the study and implementation of DSS in finance, industry, environment protection and transportation. The group is lead by Prof. Florin Gheorghe FILIP, the vice-president of the Romanian Academy. The members of this group are Associate Prof. Luminita DUTA, Assist. Prof. Ana SUDUC, Assist. Prof. Mihai BIZOI, Assist. Prof. Ion ISTUDOR, and Assist. Prof. Ciprian POPESCU from "Valahia" State University of Targoviste, ing. Ioana STANESCU from ATS Targoviste, Associate Prof. Constantin Bala ZAMFIRESCU, Associate Prof. Marius CIOCA, and Assist Prof Ciprian CANDEA from University Lucian Blaga of Sibiu, and mat. dr. Florin BOBOSATU from Technical University "Politehnica" University of Bucharest.

Prof. Filip has given DSS lectures at Polytechnica University from Bucharest, Valahia University of Targoviste, Lucian Blaga University from Sibiu and University of Economic Studies (ASE) Bucharest Romania since 1997. He has been supervising PhD studies in Computer-aided Decision-making at Dept. of Automation and Computers of TU "Politehnica" Bucharest since 1993 and at Romanian Academy since 2002. Dr. Luminita Duta has given courses on DSS at Dept. of Transportation Systems of Technical University "Politehnica" Bucharest (master graduate studies since 2007) and at State University "Valahia" Targoviste since 2002. Some reference books of Prof. FILIP are: Filip, F.G. (2007). "*Decision Support Systems*", 2nd Edition, Ed. TEHNICA, Bucharest; Filip F.G. (2005). *Computer Aided Decision-making: Decision makers, and associated IT Tools*, Ed. TEHNICA, Bucharest; Filip, F.G. (2004). *Decision Support Systems*, Ed. TEHNICA, Bucharest. Prof. FILIP's book "*Computer Aided Decision-Making*" 1st edition, (Expert Publishers & Technical Publishers, Bucharest, 2002 – in Romanian )was awarded in 2003 the "**COPY RO Prize**" as the best Romanian book in IT of the year.

Other recent relevant publications which review, among other contributions, the combination of algorithmic models with AI-based techniques proposed by Prof Filip in mid '80ies and the early applications to production control in the process industries and water systems are: Fillip F.G. (2008) *Decision support and control for large-scale complex systems (Annual Reviews in Control*, 32(1), p.61-70, 2008);, and Filip, F. G., Leiviska, K. (2009). Large-scale complex systems. In: Springer Handbook of Automation (S. Y. Nof, Ed.), Springer, Dordrecht, p. 619-638.

Three main new research directions in integrating advanced DSS in real applications are envisaged by the members of the DSS Romanian group: **1) Decision Support Systems for Public Transportation, 2) Web-based Group Decision Support Systems (for partnership activities facilitation, banking, and medical applications), 3) Decision Support Systems used in Disaster and Environment Management.**

In The White Paper<sup>1</sup> of the European Commission the Intelligent Transportation Systems (ITS) have an important place since they have the potential to provide solutions for the 21st century European transportation. The modern solutions for transportation have to take into account the transportation efficiency and velocity as well as its security of passengers. Specific constituents of ITS' are Decision Support Systems in Transportation (DSST), which are utilized at the operational and organizational management levels. These are intelligent systems that support the decision unit – a human being or a group of persons - in approaching complex situations and decision -making processes. Some articles that treat this subject: *Computer-Based Decision Support for Railroad Transportation Systems: an Investment Case Study* (Duta L., Bituleanu I., Filip F. G., Istudor I) "Informatica Economica" Journal, 13 (. 2), 2009; Integrating DSS in Public Transportation Monitoring Systems (Duta L., Zamfirescu Ctin., Cioca M.) **The 12th IFAC "Large-Scale Systems" LSS 2010 Symposium Lille, France.**

In group and organizational decisions-making processes, not always the participants can meet face to face. Internet changed the perspective on meetings and also on decision making processes. Virtualization of meetings has become a common way for collaboration among employees, customers, partners, trainees and trainers. Group

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<sup>1</sup>[http://ec.europa.eu/transport/strategies/2001\\_white\\_paper\\_en.htm#](http://ec.europa.eu/transport/strategies/2001_white_paper_en.htm#)

decision support systems allow the collaboration between teams' members to achieve common goals and facilitate the decision-making processes. Without the need of traveling and meeting organization, the group decision support applications permit the participation of people from different locations ( Zamfirescu C. B. , Filip, F.G. (2010). Swarming models for facilitating collaborative decisions. **International J. of Computers , Communication and Control-IJCCC** , 4 (1), 125-137 and Zamfirescu C. B. and Luminita Duta (2009). *A stigmergic approach to deal with uncertainty in planning the e-meetings*, Proceedings, **Uncertainty and Robustness in Planning and Decision Making URPD 2010** ([www.inescc.pt/urpdm2010](http://www.inescc.pt/urpdm2010))

One of the most important element that can influence to great extent the success of a system used for decision- making, is the user interface. Users expect from developers to create advanced interactive interfaces which are easy to use and easy to learn, without the need of reading many pages. Some representative papers in this field are:

*Interface Architecture for a Web-based Group Decision Support System* (Suduc AM., Bizoi M, Duta L, Gorghiu G), **Studies in Informatics and Control**, Vol. 18, nr. 3, 2009; Using collaborative platforms for decision support (Bizoi, M., Suduc, A.M., Filip, F.G.) **Proceedings of the 17th International Conference on Control Systems and Computer Science, CSCS 17**, Vol. 2, 2009.

Another research direction of our group is the knowledge-based DSS. The aim is to create Decision Support Systems that combine different types of data and information from various sources in a seamlessly manner and without much user intervention. These properties are related to knowledge processing and decision making activities such as knowledge representation, knowledge management and reuse, reasoning and inference techniques, as well as risk analysis. Two of the papers that treat this aspect: *Web-Based Knowledge-Driven Decision Support Systems* (Stanescu I., Stefan A.), accepted to be presented at **The 12th IFAC LSS 2010 Symposium Lille , France**; *The cognitive complexity in modeling the group decision process* (Zamfirescu Ctin, Duta L, Barna I), **Understanding Intelligent and Complex Systems Conference, UICS 2009**, (<http://uics.upm.ro/>)

*Web Based Decision Support Systems* (WB-DSS) are referring to computerized systems that deliver decision support tools using a Web browser and large Data Bases. Developing the user interface and data managing for Web-based DSS remain the major tasks in building such complex systems. Some works are dedicated to the implementation of WB-DSS that assist the ecology decisions makers

to choose the best solution in the decision process to minimize the risk in environmental and disaster management systems. Through the Web interface the DSS system can present graphical information of different environmental parameters evolution and can be easily integrated with an expert system or an intelligent system. Marius Cioca wrote a book chapter: *Decision Support Systems used in Disaster Management*, in **Decision Support Systems**, (Chiang S. Jao Ed.), INTECH Publishing, 2010  
Other relevant publications are :

*Environment web-based decision support system* (Bobosatu F., Duta L), Proceedings of **The 1st International Workshop on Energy, Transport and Environment Control Applications, ETECA 2009**, (<http://www.etecca.valahia.ro/>); *An Experimental Web- Based Decision Support System In Ecology* ( Bobosatu F. Duta L), **The Scientific Bulletin of Electrical Engineering Faculty**, 2009

Industrial and banking applications are developed on demand of our economic partners. These DSS systems are the results of some national projects and are described in publications as: *Control and Decision Making Process in Disassembling of Used Electronic Products*, (Duta L., Filip F. G.) **Studies in Informatics and Control**, 17 ( 1), 2008; *Evolutionary Programming in Disassembly Decision Making* (Duta L., Filip F. G., Popescu C.) , Proc., **International Conference on Computers, Communications and Control, ICC08**, (<http://www.iccc.univagora.ro/iccc-2008/>); *WEB-Based Decision Support System*, (Istudor I., Duta L., Filip F. G.), **Proc. of the 9th International Conference on Informatics in Economy**, (<http://www.conferenceie.ase.ro/>).

The members of the DSS Group Romania are attending and organizing invited sessions and thematic conferences such as ETECA 2009 International Workshop on Energy, Transportation and Environment, (<http://www.etecca.valahia.ro/>); or the Invited Session organized by Dr. Duta and Dr Cioca entitled *Advanced DSS in complex industrial and management systems*, at The 12th IFAC LSS 2010 Symposium Lille , France (<http://lss2010.ulbsibiu.ro/>);

By attending the **ICT Action IC0602 „Algorithmic Decision Theory“**, The Romanian DSS Group intends to align and integrate its work in an European network of specialists and researchers from the field of Decision Theory, Theoretical Computer Science and Artificial Intelligence.

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