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**Professor Stratos Pistikopoulos**  
CPSE Director

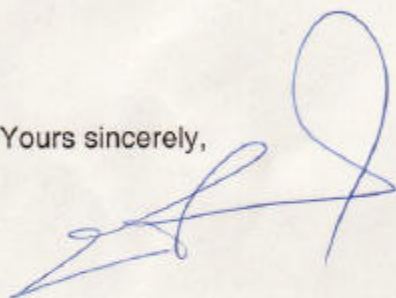
8 June 2004

To the Norwegian Research Council,

Our colleagues at NTNU in Trondheim have invited the Centre for Process Systems Engineering to participate in the proposed project 'Model-Based Decision-Making in Large-Scale Systems'. The project will address challenging problems of central importance to operation of large-scale systems. We hereby confirm our willingness and intent to participate in this project.

We know the people in process systems engineering at NTNU well, through cooperation on EU projects, exchange of doctoral students, and their many publications in journals and conferences. The group has a high international standing, and we would welcome an opportunity to continue and expand our cooperation.

Yours sincerely,



Stratos Pistikopoulos



**Carnegie Mellon**

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**B. Erik Ydstie**  
Professor

June 9, 2004

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Research Application from NTNU on Model-Based Decision-Making in Large-Scale Systems

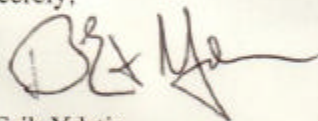
To the Research Council:

We have been invited by our colleagues at NTNU in Trondheim to participate in a proposed research project for Model-Based Decision-Making in Large-Scale Systems. The research topics described in the proposal are challenging and highly relevant to design and operation of large-scale systems.

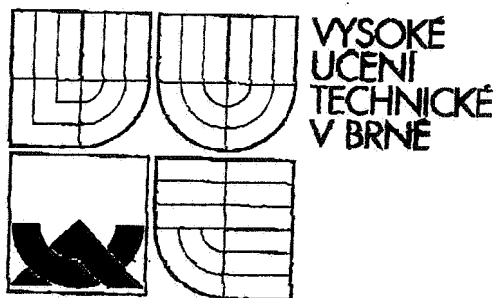
We have, on several occasions in the past, had doctoral students from Trondheim visiting our department for research projects of common interest. These visits have been of varying duration, ranging from 1 month to one year. The visits have resulted in excellent research and joint publications. Our Department has also recruited faculty from Trondheim. We therefore know the group in Trondheim well, and have high respect for its scientific standard and track record.

We hereby confirm our Department's support for the research proposal. It is our intent to participate in the project if it is funded.

Sincerely,



B. Erik Ydstie



Pavel Popela  
Institute of Mathematics  
Faculty of Mechanical Engineering  
Brno University of Technology  
Technická 2  
616 69 Brno  
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In spring and summer 2004:  
Department of Statistics and  
Operations Research  
Faculty of Science  
University of Malta  
Msida MSD06  
Malta

13<sup>th</sup> June 2004.

Asgeir Tomasgard  
Associate Professor NTNU  
Industrial Economics and Technology Management  
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S.P. Andersens vg 5  
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Norway

Dear Sir,

I have carefully read the sent project proposal "Model-Based Decision-Making for Large-Scale Systems". I have found it interesting and very important. It identifies questions that are by my experience of very high importance in Norway and abroad as well and their importance will increase in the future and the answers will be found useful in applications. The reason is that the stated questions seem to me as tightly connected to the existing development of globalization. Till now, they are mainly studied from the economical point of view. However, there is also a recognizable industrial demand for the development of related operations research and optimal control (in general low-level quantitative and high-level mathematical) techniques. The certain progress has been already realized on the side of computational algorithms for large-scale systems but necessary modeling techniques still need significant improvement. So, this is the reason, why I am finding the project proposing to study modeling

aspects for large-scale systems in many details but at suitable level of abstraction very important and valuable.

In the case that the proposed project will be running and you will be interested, I would like to participate in it in a suitable way for your research team. Specifically, the following areas are of my interest:

- The efficient techniques for building of large-scale decision-making models, especially, the composition of various models considered from both syntactical and semantical aspects;
- the algebraic transformations for decision-making models with focus on decomposition approaches for large-scale models;
- the concepts of optimal and suboptimal solutions resulting from various approximations of large-scale models, their evaluation and theoretical properties;
- the applications of abovementioned research to engineering branches in which I have participated recently, e.g., water management (involving both long and short term planning), production control (especially for iron works), and complex engineering design (plate heat exchanger design, reliability and optimization aspects in civil engineering applications).

Regarding my research experience related to the project theme, I have to mention my participation in several engineering and modeling-related projects listed below.

Project GAČR 106/96/0962, Prague 1999: Expert Database System for Metallurgical, Structural, and Mechanical Characteristics of Iron.

Project FME, Brno 1997: Decision Models in Mechanical Engineering.

Project GAČR 103/94/0562, Prague 1996: Construction Reliability Based on Monte-Carlo Simulations.

Project GAČR 106/93/0566, Prague 1996: Mathematical Models and Expert Database System for Mechanical and Metallurgical Characteristics of Workable Alloy and their Relationships.

Project BUT 308-1-99146/D, Brno 1995: An Object-oriented Analysis for Decision Making under Uncertainty.

The conclusion that I have derived from my participation in the projects is that modeling of large-scale systems must be also studied in general as we do with colleagues in the running Project MŠMT CEZ: J22/98: 261100009, Prague: Non-traditional Methods for Complex and Uncertain Systems.

Yours sincerely,

  
Pavel Popela