Invitation for the contribution of a chapter to the book

“Intelligent Infrastructures”

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1 Introduction

Society heavily depends on infrastructure systems, such as road-traffic networks, water networks, electricity networks, etc. Infrastructure systems are hereby considered to be large-scale, networked systems, that almost everybody uses on a daily basis, and that are so vital that their incapacity or destruction would have a debilitating impact on the defense or economic security and functioning.

The operation and control of existing infrastructures are failing: too often we are confronted with capacity problems, unsafety, unreliability and inefficiency. The problems different infrastructure sectors are dealing with have very much in common. How to use the available capacity to its maximum? How to do this in the most efficient way? How to prevent congestion, without neglecting the proper safety precautions? How to respond adequately to fast changing conditions and market demands? How to keep up the quality and reliability users are accustomed to? There are no easy solutions to these problems, because large infrastructure systems have many components and levels, involving different parties, all primarily pursuing their own local performance objectives.

To address these issues, infrastructures have to be made more *intelligent*, i.e., being able to more autonomously determine how to operate the infrastructure, taking into account the most up-to-date state of the infrastructure, and taking into account the existence of several decision makers, such that ultimately the infrastructure is operated in a pro-active way and issues are resolved quickly.

2 Content

In this book we bring together approaches for making infrastructures more intelligent. Intelligence is hereby used to address the following problems that are common to many types of infrastructure systems:

1. How to more efficiently use available transport capacity?
2. How to improve the reliability of service?
3. How to make infrastructures more environmentally sustainable?
4. How to enhance infrastructure security?

This book considers the way in which infrastructures are functioning today, how they will evolve into infrastructures of the future, and how novel and advanced methods and tools can be used to improve the performance of these next generation infrastructures.

3 Audience

The intended audience of this book consists primarily of researchers and (technically-oriented) policy makers. The readers aimed at have backgrounds in varying types of infrastructure networks.

4 Structure overview

The book will be structured along two lines: an infrastructure dependent line, and a cross-infrastructure problem line. The first structure of the book is made by five parts, each containing chapters related to a particular infrastructure. The parts in which the book will be divided are: (I) general infrastructure modeling and control, (II) electricity networks, (III) road networks, (IV) water networks, and (V) coupled networks.

A secondary structure in this book is provided by the problem themes that the individual chapters deal with. Each chapter will for its corresponding infrastructure focus on one or more of the four problems common to infrastructure systems, i.e., related to: (1) capacity management, (2) reliability of service, (3) sustainability, and (4) security. This will illustrate how related problems are tackled in different infrastructures and stimulate cross-infrastructure solutions.

5 Guide for authors

You are invited to contribute a chapter to this book about your infrastructure and problem(s) of expertise. Chapters are expected to be between 20 and 30 pages. A LaTeX style file and a Word template will be made available.

To obtain a coherent book, that is of general interest to the audience of this book, please pay special attention to address in your contribution at least the following 4 topics in relation to your infrastructure system and common problem(s):

1. Infrastructure system
    - What is your infrastructure and how do you consider/model this infrastructure?
    - What are the actors/controllers in your infrastructure?
    - Are there conflicts of interest among the actors?
2. Problem definition
    - How do you interpret one or more of the common infrastructure problems for your infrastructure?
3. Proposed solution & results
    - What is the state-of-the-art in solving the common problem(s) in your infrastructure?
    - How do you propose to solve this/these using intelligence?
    - What kind of communication/cooperation/negotiation/... is present between the actors?
    - What makes your approach intelligent?
    - How does your approach compare to existing approaches?
4. Evaluation & recommendations
    - What are the conditions under which your approach can be implemented in practice?
    - How could your approach be used to solve related problems in other infrastructures?
    - What are important directions for future research?

6 Submission details

The language of the book is English. All chapters must be original, unpublished, and not currently under review by any other publication or conference. By submitting the manuscript the authors stipulate that they hold the copyright to the manuscript and transfer it to the publisher upon publishing.

- By December 5, 2008 authors should have indicated their intention to contribute.
- Full chapters should be submitted by e-mail to r.r.negenborn@tudelft.nl and z.lukszo@tudelft.nl by March 15, 2009.
- After submission the chapters will be internally reviewed.
- Authors will receive review feedback by April 30, 2009.
- Reviewed chapters should be submitted by June 15, 2009.

After this, final editing will be done by the editors and the book will be prepared for publication. We plan to publish the book by the end of 2009 with Springer. We are also planning to organize around that time a workshop at which the contributions to the book can be presented.

7 Summary of key dates

Confirmations of participation by authors	December 5, 2008
Full chapter submitted by authors	March 15, 2009
Initial feedback sent out to authors	April 30, 2009
Chapter revisions submitted by authors	June 15, 2009
Editing final book finished by editors	September 30, 2009
Book is published	end of 2009

8 The editors

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