



NEST

# GIACS

General Integration of the Applications of  
Complexity in Science

Coordination action



Italian National Agency for New Technologies, Energy and the  
Environment

***D3 - Complexity in Human and Infrastructures  
networks***

Fourth six.month report  
**(15.01.2007 – 14.07.2007)**

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## 1. Preface

In the fourth period of activities of GIACS project (15.01.2006 – 14.07.2007), ENEA has continued its efforts towards the fulfilments of the remaining two Tasks of WP3. During this time ENEA has also participated in other GIACS related activities such as general meetings, workshops and conferences. Most of the activities are documented and reported in the GIACS web site on the page devoted to WP3, which is continuously updated by ENEA. ( [www.giacs.org/node/154](http://www.giacs.org/node/154) )

The purpose of this document is to give a summary of these activities and their results, it is divided in two sections. The first section describes the activities directly related to the task. The second section reports other related activities.

## 2. Task related activities

### 2.1 Steps towards Deliverable D3.3

A major task of GIACS WP3 is the realization of a specific event able to group people from the research communities (from different disciplines from physics, to engineering, from economics to social sciences) with Critical Infrastructures stakeholders.

A very good occasion seemed to be represented by the European Conference of Complex Systems 2007, which will be held in Dresden on October 1-5, 2007. Within the Conference, there was the possibility of organizing satellite events which, on one side, could make use of the presence in Dresden of a large part of the research communities acting in the CS domain, on the other side where a number of operators and stakeholders in the field of CI could be attracted. The idea was thus to suggest the organization of a Satellite Workshop of the following title: "Critical Infrastructures as Complex Systems" which points to the essence of the GIACS ideas about this matter: is there any possible convergence of interests of the CS community to themes which have the goal of ensuring a better control, an increase of safety and security, an increase of robustness of CIs? Certainly CI operators will be attracted by the possibility of debating these issues with a forum of outstanding specialists in several domains.

The organization (cared by V. Rosato-ENEA- and G. Le Grand –ENST) has produced a good impact on the community. The Satellite Workshop (visible from the Satellite Events of the main event web page ([www.trafficforum.org/dresden](http://www.trafficforum.org/dresden)) will contain a number of invited talks and several oral contributions chosen among those submitted to the organization. The Satellite will also host a poster session which will collect all contributions which could not receive space for a full oral presentation.

A large number of operators and stakeholders, all over Europe, have been invited to participate and to contribute to the works. As you will see in the enclosed agenda of the event, only a few have replied by presenting a specific presentation. Many of them, however, are expected to participate, due to the intrinsic interest in the topics and the high level of all the speakers. In particular, we have intended to give also an overview of the situation in US and we have invited two leading scientists in the field of CIs: one from AT&T, expert in the Internet network (dr. Walt Willinger) and the other, from the academic side (prof. R. Iyer) with expertises in the problems of system's security and vulnerability.

As a corollary of this experience, a number of major efforts have been planned, in the new spirit of collaboration between industry and research, on themes typical of the control of CIs. In particular, a visit performed by V. Rosato at the TUD Dresden has allowed to put on the table a number of common problems and possible common

interests to be tackled in the frame of the forthcoming actions of FP7, in particular the Joint Call between ICT and Security Themes FP7-ICT-SEC-2007-1.

## Satellite Workshop: Critical Infrastructures as Complex Systems

October 5, 2007

Dresden

Central Lecture Hall, Dresden University of Technology

<http://www.trafficforum.org/dresden>

### Workshop Agenda

Time	Speaker	Title of the Talk
<b>Session I</b>	<b>Chair: Gwendal Le Grand</b>	
09:00-9:15	V. Rosato ENEA, I	<i>Workshop Introduction</i>
09:15-10:00	R.K. Iyer Urbana, USA	<i>t. b. a.</i>
10:00-10:15	Walter Schmit IABG, D	<a href="#"><u>Simulation and Test: Instruments for Critical Infrastructure Protection (CIP)</u></a>
10:15-10:30	Hermann Dellwing IABG, D	<a href="#"><u>Knowledge based Emergency Management Tool</u></a>
10:30-10:45	Massimo Salzano (University of Salerno, I)	<a href="#"><u>The Effect of Globalization on Network's Nodes of Different Structural Characteristic: an Heterogeneous Agent Simulation.</u></a>
10:45-11:15	Coffee break	
11:15-12:00	W. Willinger AT&T, USA	<a href="#"><u>(White) Lies, Damned Lies, and Statistics: A Critical Assessment of Preferential Attachment-type Network Models of the Internet</u></a>
12:00-12:15	Yoshio Kajitani Central Research Institute of Electric Power Industry, J	<a href="#"><u>Modelling interdependencies of critical infrastructures under natural disaster- A case of supply-type and transportation-type infrastructures</u></a>
12:15-12:30	M. Laumanns ETHZ, CH	<a href="#"><u>Repair strategies for minimizing the risk of cascading failures in electricity networks</u></a>
12:30-12:45	Lubos Buzna University Dresden, D	<a href="#"><u>Evolution of high-voltage electricity networks topology</u></a>
12:45-14:00	Lunch	
<b>Session II</b>	<b>Chair: Vittorio Rosato</b>	
14:00-14:45	J.C. Laprie LAAS, F	<a href="#"><u>Modelling Interdependencies between Electricity and Information Infrastructures</u></a>
14:45-15:00	Roberto Setola Campus-Biomedico I	<a href="#"><u>Model Critical Infrastructure via a Mixed Holistic-Reductionistic approach</u></a>
15:00-15:15	Claude Chaudet ENST, F	<a href="#"><u>High-level modelling of critical infrastructures interdependencies</u></a>
15:15-15:45	Poster presentation: L. Issacharoff (U. Dresden) M. Schläpfer (ETHZ)  J. Habenberger (ETHZ)	<a href="#"><u>Vulnerability of freeway networks</u></a> <a href="#"><u>Reliability Analysis of Electric Power Systems Using an Object-oriented, Hybrid Modelling Approach</u></a> <a href="#"><u>Comparison of Network Methods and the Agent Based Modelling Approach in the Vulnerability Analysis of Electric Power Systems</u></a>

15:45-16:15	Coffee break	
16:15-17:00	V. Latora University of Catania, I	<a href="#"><i>The Multiple Centrality assessment</i></a>
17:00-17:20	G. Le Grand ENST, F	<i>Concluding remarks</i>

## 2.2 ENEA per il governo e la sicurezza delle Grandi Reti Tecnologiche ed Energetiche

In the frame of the activities of the ENEA's Project on "Complex Networks and Infrastructure Protection" (whose launch has been reported in the previous Report), the ENEA's group involved in GIACS has prepared and realized a new Workshop, with the participation of the most relevant Italian stakeholders. Copy of all the materials presented at the Workshop are available at the website: <http://www.enea.it/com/web/convegni/GovernoSicurezza220607/resoconto220607.html>

The ENEA group has recently started the pianification of a number of small scale workshop with the major Italian companies whose strategic development is related to the problems of Security and Safety in CIs, either with the goal of realizing a new-generation tools, and as the occasion for advanced type of services to the stakeholders. These companies are (mainly) in the Finmeccanica galaxy (Finmeccanica is one of the largest italian company, active in different technological fields, from ICT to Defense, from Civil Protection tools to nuclear power plants). In the course of the considered period, a number of preparatory meeting has been performed (mainly in Roma). They will followed by a number of visits which will be done, in next months, at the different companies sites, also together with CI stakeholders, in order to start strengthening possible collaborations. The ENEA group has strategically suggested the reinforcement of the group to interface CI operators by "using" the strength and the visibility of a company such as Finmeccanica, which will introduce robustness and a large assertiveness to the group.

## 3. Participation in various dissemination activities and GIACS events

Hereafter it has been reported the GIACS events in which ENEA has taken part, as well as ENEA's contributions to these events.

V. Rosato, Participation to GIACS Evaluation and Assessment Committee Meeting, Turin, January 19, 2007

V. Rosato, Invited Talk at the "Transportation and Traffic Science Colloquim" at the TUD Dresden; "Topology and functions in Complex Systems", Dresden April 23, 2007

V. Rosato, Invited Talk at the Dept. of Economics and Statistical Sciences: "Correlation between topology and function in Complex Infrastructures", Salerno May 9, 2007.