



**BISON**  
**IST-2001-38923**

*Biology-Inspired techniques for  
Self Organization in dynamic Networks*

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**Project Coordinator:** Università di Bologna (Italy)  
**Partners:** Telenor ASA (Norway),  
Technische Universität Dresden (Germany),  
IDSIA (Switzerland)

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## 1 Executive Summary

We report on the state of the Project as it concludes its third and final year of activity. Main objectives for the reporting period were:

- to lay the foundations for a systematic understanding of how to generate and appropriate complex adaptive system, given a desired global behavior on a network,
- to conclude the implementation and evaluation of algorithms for routing, searching, monitoring and topology management on dynamic and mobile ad hoc networks,
- to demonstrate the validity of the major results obtained during the course of the project,
- to further develop the simulation environment architecture.

The first of the above objectives has proven to be much more challenging than envisaged and has been refined during the course of the project to seek less ambitious goals. Our current thoughts and results on the subject are described in deliverable D03.2 which revises the first-year deliverable D03. Otherwise, technical progress during the reporting period has been excellent, achieving the stated goals and milestones. We note the following as highlights of our results:

- Extensive study of the “structure vs. function” question through epidemic spreading on networks,
- Continued evaluation of biology-inspired topology management in structured overlay networks,
- Design and implementation of demonstrators “Ant-based monitoring on software IP routers” and “Pheromone-based routing in Mobile Ad-Hoc networks”,
- Completion and distribution of PeerSim Version 1.0 overlay network simulation environment.

As the project neared completion, we have concentrated on activities geared at dissemination of our results. As part of this effort, we have published a post-proceedings of the “SELF-STAR” mid-term meeting held in Bertinoro, Italy in 2004 as Springer-Verlag LNCS Hot Topics Volume no. 3460 “Self-Star Properties in Complex Information Systems”. We have also presented a paper co-authored by all of the project partners describing some of the most interesting project results at the European Conference on Complex Systems. An extended version of the same paper has been accepted for publication in the inaugural issue of the new ACM journal *Transactions on Autonomous and Adaptive Systems*. Mark Jelasity and Ozalp Babaoglu have guest edited the March-April 2006 issue of *IEEE Intelligent Systems* journal on “Self-Management through Self-Organization”. Finally, the project coordinator has been invited to give a keynote address

at the *Second IEEE International Conference on Autonomic Computing* in Seattle, Washington and has been cited in *BusinessWeek Online*.

The Project has requested and was granted a four-month extension in order to conclude its activities smoothly by the new end date 30 April 2006.