Preface

In 1985 Prof. Dennis Tsichritzis created in the University of Geneva the Object Systems Group (OSG), assembling a team of prominent young researchers, performing research in the, at the time, pioneering area of Object Oriented programming and systems. For almost 20 years the OSG, produced innovative results, publishing books and papers in international forums, that had a major impact in the domain of Object Oriented research. Through out that period numerous young researchers graduated from the group. Becoming, some years later, took professors and directors in Universities and private companies all around the world.

However all things change! In 2002 Prof. Tsichritzis retired as a University professor, continuing his carrier as vice-president of the Fraunhofer institute in Germany. By this time however, the Object Oriented programming paradigm had been adopted as the standard development methodology for industry and research, and especially for the new mobile technologies, in the form of the Java language. This of course by no means signifies that research in Object Orientation has stopped. On the contrary, new areas and challenges are there, coming from the adoption of new communication means and the needs for faster and more efficient programs and applications.

Nevertheless with the departure of Prof. Tsichritzis the research interests and directions of the new members of the Object Systems Group slowly shifted to more exciting and interesting areas (to our opinion of course!!). Today, with the graduation of the last PhD students working in the area of Object Oriented research, and the departure of the oldest senior researchers (taking professorial positions in different European Universities) the shift has been completed. The new team has oriented itself in conducting research in the domain of mobile and wireless services and systems. This shift in the research directions also triggered a need for a change of the group name to *Advanced Systems Group.*

The Advanced Systems Group (AS Group) aims in conducting research in areas that are directly linked with real world problems at the service and application level of Information Systems. The target is to provide innovative solutions based on advanced technologies that can be integrated to, linked to, or used as, services and applications of human users. The group will pursue research in two major axis: development of new concepts and ideas and integration of technologies and concepts into innovative Information System solutions and services. The group will also seek to collaboration with other groups in Switzerland and Europe. The first directions of the AS group are in the development of new concepts and ideas in solving problems stemming from the wireless and mobile services and applications. The current main themes of the group research lies in the study of wireless network performance measurement issues, development of concepts for new Location Based Services, and integration of trust and security concepts to mobile and wireless applications. The goal being the improvement or the mobile users' experience with the integration of context-aware mechanisms, concepts and services.

But not everything has changed in the transition from OSG to ASG! The publication of a yearly technical report with the collection of the most important

research papers and work done by the group, is one of the things that will continue. This first yearly-report under the ASG name is a collection of the work done in the last 3 years during the research direction shift of the group. It includes 17 papers, most of which have been published in conferences or journals, presenting as well unpublished papers of on-going research.

The first paper, "*Mobile Health Care: Towards a Commercialization of Research Results*", describes the work done at the University of Twente under the guidance of Prof. Konstantas, when he was professor at the UT and before taking over the ASG (OSG at the time) in 2002. This work and collaboration continues until today, and has triggered the new research direction in the ASG. The paper describes the development of an innovative mobile health monitoring system, and how the abstract ideas are becoming commercial services. These issues and problems encountered during the mobile health projects provided the first material for the development of the new research directions of the ASG. This is demonstrated in the second paper, "*Context-aware QoS Provisioning in an m-health Service Platform*" where the problems in the delivery of high level Quality of Service, encountered in the development of the mobile health services, are analysed and new ideas are proposed. The third paper, "*Towards QoS-awareness of Context-aware Mobile Applications and Services*", takes a step further generalising the QoS ideas in a first attempt to merge context information with a QoS-aware mobile service platform in the m-health services domain.

The fourth paper, "*AmbiTrust: Immutable and Context-Aware Trust Fusion*" is a position paper claiming that a deep understanding of trust is needed if we do not want to mislead the users of a technology that is deliberately labelled "human trust technology inside". The fifth paper, "*What is Trust? My Own Point of View*", provides a definition of the notion of trust for computerised services, trying to stay as close as possible to the human notion of trust, for the development of trusted mobile tags. The sixth paper, "*A Social Semantic Infrastructure for Decentralised Systems Based on Specification-Carrying Code and Trust*" in an effort to go beyond pre-established communication schema and to cope with uncertainty, proposes an interaction mechanism based exclusively: on semantic information expressed using specifications, and on a social infrastructure relying on trust and reputation.

The seventh paper, "*SECURE Validation*", reports on the validation results obtained after an evaluation of the SECURE IST EU project's trust-based security model. Starting from the observation that no guidelines or evaluation methodology have emerged defining how the measure the security of different trust models, the SECURE project proposes a methodology, focusing on the whole SECURE approach, rather than on individual elements of the framework or its implementation.

In the eighth paper, "*Trust and Security for Spatial Messaging*", based on the notion of spatial messaging, that is the virtual publication of data in physical places, the trust and security issues for spatial messaging are discussed, and a methodology for the development of a trust model is proposed. The ninth paper, "*GeoVTag: a User's Guide*" presents GeoVTag, an application running on a mobile phone that allows the user to publish anywhere on Earth virtual tags, while the tenth paper, "*FoxyTag*" presents the first steps towards the design of an application allowing a driver to post a virtual tag on a speed camera in order to notify other drivers,

incorporating a trust mechanism for the automatic computation of the trustworthiness of a given tag.

The eleventh paper, *"Towards Hovering Information"*, is a position paper where the concept information linked to a place and free of material support, the hovering information, is presented. In contrast to the previous papers where a central server is needed for the creation of virtual tags, this position paper defines the first ideas for eliminating the server but still having information linked to a location rather than a machine.

The twelfth paper *"Security for Free/Open Source Software Powered by Peer-to-Peer"*, is a position paper presenting the first ideas towards a security roadmap for Open Source Software. The issues and ideas come from the research done in the EDOS IST EU project.

The thirteenth paper, *"A Credential Based Approach to Managing Exceptions in Digital Rights Management Systems"* address the problem of managing exceptions in the context of DRM enabled systems and information assets, defining the problem and proposing a model based on credentials allowing to dynamically account for lawful unanticipated usage situations while still maintaining a given level of persistent protection, governed usage and audit trails. The fourteenth paper, *"Towards a Global Framework for Corporate and Enterprise Digital Policy Management"* makes the case for the necessity of raising the debate at the policy management level (DPM) as the strategic dimension of DRM, arguing that enterprise information systems will have to factor-in persistent protection, governed usage and managed content, proposing a general framework to capture corporate digital policy management. The fifteenth paper, *"Enabling Technologies for the Interoperable Enterprise"* advocates that Digital Right Management/Digital Policy Management systems as well as mobile agents, peer-to-peer and ontologies, can be used to enhance traditional interoperability techniques, describing a framework where such technologies have been integrated and reporting briefly on the experiments made.

The sixteenth paper, *"Specification-Carrying Code for Self-Managed Systems"* proposes the notion of Specification-Carrying Code as an interaction mechanism for self-assembly of autonomous decentralised software components, presenting the principles of the Specification-Carrying Code paradigm, the associated Service-Oriented Architecture, and it explains how self-managed systems can benefit from this paradigm. Finally the last paper, *"On the Use of Formal Specifications as Part of Running Programs"* reviews and discusses the use of formal specifications at run-time from different perspectives: software engineering, run-time code evolution, adaptive middleware, trust and security, or business applications, highlighting the potentialities of the use of formal specifications at run-time as a support for interoperability and adaptability of interacting autonomous components.

For the year to come, the ASG aspires to contribute research results and ideas to the international community, developing collaborations and participating in research project in Switzerland and the European Union. The areas of mobile and wireless systems linking context awareness as well as trust and policies, will be our main research area. Our results will be reported in a year in a new technical report!

Dimitri Konstantas, May 2006