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First International Conference in

Military Performance Systems and Methodologies in Software Engineering: Software Engineering for Defence Military Applications

SEDA 2012, 7 febbraio 2012

Circolo Ufficiali delle Forze Armate d'Italia
Palazzo Savorgnan di Brazzà,
Via XX Settembre 2, 00187 Roma

8:00-8:30	Registration
8:30-8:45	Saluto di apertura del Sottocapo di Stato Maggiore dell'Esercito Generale di Corpo d'Armata Domenico Rossi
8:45-9:00	Saluto di apertura del Prof. Giancarlo Succi (Libera Università di Bolzano)
9:00-9:15	Keynote: Amm. di Squadra Quinto Gramellini OIV
9:15-9:30	Keynote: Amm. di Divisione Valter Girardelli SMD UGPPB
9:30-9:45	Break
09:45-10:10	Prof. Paolo Ciancarini (Università degli Studi di Bologna) *The role of software architecture for the development of systems of systems*
10.10-10:35	Proff. Morasca e Lavazza (Università degli Studi dell'Insubria) *A Proposal for a Simplified Model-based Cost Estimation Models for Embedded Real-time Software*
10:35-11:00	Prof. Gerardo Canfora (Università degli Studi del Sannio di Benevento) *Mining software repositories to develop reliable software*
11:00-11:15	Coffee break
11:15-11:40	Prof. Giovanni Cantone (Università di Roma, Tor Vergata) *Configuration and Deployment of Distributed Mission-critical Applications: A Model-based Approach"*
11:40-12:05	Prof. Giancarlo Succi (Libera Università di Bolzano) *Quality Control and Cost Reduction in the Public Sector: a Successful Collaboration University – Army*
12:05- 12:30	Dibattito (Moderatore Prof.Succi)
12:30-14:10	Lunch
14:10-14:30	Prof. Luciano Hinna (Commissione Indipendente per la Valutazione, la Trasparenza e l'Integrità delle Amministrazioni Pubbliche)
14:30-14:50	Colonnello Nicola Marrone (Capo dell'Ufficio di supporto OIV) *Il Controllo Strategico nella Difesa*
14:50-15:10	Capitano di Vascello Pasquale de Candia (Capo Ufficio Controllo di Gestione Stato Maggiore della Difesa) *Il Controllo di gestione nella Difesa*
15:10-15:30	Colonnello Eugenio Martis (Capo Ufficio Controllo Interno di Gestione Stato Maggiore Esercito) *Il Controllo di gestione nell'Esercito*
15:30- 16:00	Dibattito (Moderatore Generale di Brigata Scaccia)

16:00-16:15	Break
16:15-16:30	Alessandro Zardini and Armando Suppa (Universita' degli Studi di Verona) *The creation of value through Knowledge Management*
16:30-16:45	Giuseppe Lami (Istituto di Scienza e Tecnologie dell'Informazione - C.N.R) *Addressing Software Process Capability in the Military Sector with the ISO/IEC 15504 Safety Extension*
16:45-17:00	Bruno Rossi, Sarunas Marciuska, Maximilian Steff *Dealing with Requirements Volatility in a Contracting Environment*
17:00	Saluto di chiusura delle attività a cura del Prof. Giancarlo Succi

Short abstracts

Paolo Ciancarini (Università degli Studi di Bologna and CINI)
Title: The role of software architecture for the development of systems of systems

Abstract: Software systems are more and more large, expensive, and difficult to build and manage. The software architecture of a system is a set of structures including software components, relations among them, and properties of both, that are needed to reason about a system during its design, operation, and maintenance. Documenting the software architecture facilitates communication between customers, developers and users. In economical terms the most important advantage of defining and documenting the software architecture is the possibility of tracing requirements on components and reusing software assets and patterns across different projects, with techniques like "Domain engineering" and "Software product lines". In this talk we describe some issues concerning the development process of complex military systems (or systems of systems) when it is based on the management of architectural knowledge.

CV: Paolo Ciancarini got his PhD in Computer Science in 1988 at the University of Pisa; he is currently Professor of Computer Science at the Univ. of Bologna. He is the director of CINI (Consorzio Interuniversitario Nazionale Informatica) that groups 36 universities for industrial research projects. From 2001 to 2004 he has been the Director of the School in Computer and Internet Sciences (both graduate and undergraduate) of the Univ. of Bologna. From 2008 to 2011 he has been the Director of the PhD Schools in ICT of the Univ. of Bologna. He spent one year in Yale as visiting scientist. He is an affiliate of CNR. He is member of ACM, IEEE, AICA, and ICGA (International Computer Games Association). He is member of IFIP SG16 (Special Group on Entertainment Computing). His research interests include: formal methods for software architectures, coordination languages and models for global computing, agent oriented software engineering, programming systems for cloud computing, and advanced Web technologies for document engineering. He has been involved as a site leader in several projects funded by the European Commission. He has published more than 50 papers in International Journals and more than 100 papers in International Conferences and Workshops..

Sandro Morasca and Luigi Lavazza (Università degli Studi dell'Insubria)
Title: A Proposal for a Simplified Model-based Cost Estimation Models for Embedded Real-time Software

Abstract: Most cost estimation models require a measure of the functional size of the application to be developed. To this end, FPA (Function Point Analysis) is one of the most used functional size measurement methods. FPA was originally proposed for traditional data processing systems, but it has been successfully adapted also to measure real-time and embedded systems, which are the core of typical defense applications. Since functional size measurement according to FPA can be quite expensive and time consuming, researchers have proposed "simplified" processes, which are expected to provide reasonably accurate measures, but require less effort and time. In this paper, we illustrate the application of these simplified techniques to UML models of software. This requires the establishment of a precise mapping between UML elements and the so-called Basic Functional Components, upon which FPA measurement is based. As a result, it is possible to decrease the cost of modeling, and consequently the cost of measurement and estimation. The relatively low cost of the estimation models also allows developers to build different alternative models, to perform what-if analysis and choose the most economically sensible option.

CV: Sandro Morasca is a Professor of Computer Science at the Università degli Studi dell'Insubria in Como and Varese, Italy. In the past, he was an Associate Professor and Assistant Professor at the Politecnico di Milano, Italy. He was a Faculty Research Assistant and later a Visiting Scientist at the Department of Computer Science of the University of Maryland at College Park. Sandro Morasca has been actively carrying out research in the Software Engineering field and has so far published over 20 journal papers (9 of which in IEEE and ACM Transactions) and 70 conference papers. Sandro Morasca has served on the PC of a number of international software engineering conferences and is currently on the editorial board of "Empirical Software Engineering: An International Journal," published by Springer-Verlag, whose Impact Factor now ranks second among Software Engineering scientific journals. Sandro Morasca has been involved in a number of national and international projects. He is the President and one of the founders of

OpenSoftEngineering s.r.l., a spin-off company of the Università degli Studi dell'Insubria, whose primary missions are the promotion of the use of Open Source Software and the assessment of its quality. Sandro Morasca's current research interests focus on: Empirical Software Engineering, Software Quality, Applications of Software Measurement, Foundations of Software Measurement, Software Testing, Open Source Software

Luigi Lavazza is associate professor at the University of Insubria at Varese, Department of computer science and communication. He also cooperates with CEFRIEL (ICT Center of Excellence For Research, Innovation, Education & industrial Labs partnership), the centre of excellence of Politecnico di Milano for research, innovation and education in Information and Communication Technology.
His research interests include: Software process modeling, measurement and improvement; the measurement of software products, especially concerning quality and the functional size; Model based development, especially concerning real-time and embedded software; Requirements engineering and software development environments and tools. He participated in several research projects co-funded by the European Union or by the Italian government, often guiding the research unit of CEFRIEL or of the researchers of the University of Insubria at Varese. He is co-author of over 100 scientific articles, published in international journals, or in the proceedings of international conferences or in books. He serves on the program committees of a several international conferences; he is member of the editorial board of the IARIA International Journal On Advances in Software. Luigi Lavazza is an IARIA fellow and member of the IEEE computer society.

Gerardo Canfora
Title: Mining software repositories to develop reliable software

Abstract: In the last decade, there has been a flourishing activity related to the inception of software engineering methods and tool built upon data extracted from various software repositories, such as versioning systems, bug tracking systems, mailing lists, or security bulletins. Such repositories, if properly integrated, provide useful information about changes occurring in software systems, specifically to help understanding when and where a change does occur, who performs it, and why. Also, it would be possible to profile developers, understanding the nature and duration of their collaborations, and the activities they often perform. In this position paper we explain how different ideas that came out from research in mining software repositories could be applied in the context of military application development, where high reliability and security is often required, and where it is desirable to monitor not only the quality of the source code, but also the developers' activity on software artifacts.

CV: Gerardo Canfora is a professor of computer science at the Faculty of Engineering of the University of Sannio, Italy. He serves on the program and organizing committees of a number of international conferences. He was general chair of WCRE'06 and CSMR'03, and program co-chair of WETSoM'10, ICSM'01 and ICSM'07, IWPSE'05, CSMR'04 and IWPC'97. Canfora is co-editor of the "Journal of Software: Evolution and Processes" (former: "Journal of Software Maintenance, Research and Practice); from 2000 to 2004 he was an associate editor for IEEE Transactions on Software Engineering. He leaded several national and international research projects, served as a reviewer and an evaluator for the European Commission, and was a consultant for public bodies and ICT companies. Canfora authored more than 150 conference and journal papers; his research interests include software maintenance and evolution, empirical software engineering, and service-oriented computing.

Giovanni Cantone
Title: Configuration and Deployment of Distributed Mission-critical Applications: A Model-based Approach

Abstract: Configuration and deployment of systems for defence and air traffic control is often a complex task because the system is usually distributed on different geographic areas, composed by hundreds of components (e.g. applications, processes, services, hosts), running under multiple HW constraints and on different resources, and being subject to mission critical requirements. The configuration of such systems involve the production of many configuration files describing the structure of the system in general, the configuration parameters of each component, and how each component has to interact with the others. Due to the considerable size and complexity of the configuration files, the adoption of a manual approach is clearly error prone. This talk presents a model based-approach for supporting the configuration of

distributed mission-critical applications. The proposed approach has been validated in the context of SELEX Sistemi Integrati, via two benchmarks and a pilot study.

CV Giovanni Cantone is a full professor of Experimental software engineering, and Software systems engineering in Department of Informatics, Systems, and Production engineering of the University of Rome Tor Vergata, Roma, Italy. Formerly, he served as Associate professor in the Dept. of Informatics and Systems of the University of Naples Frederick the 2nd, and was Research Associate in the University of Maryland Dept. of Computer Science. His main research interests are in Software engineering. He participated to international projects and cooperates with companies to develop applied research in the domain of large systems. He authored more than one hundred scientific publications. Giovanni Cantone is a founding member and current member of the International Software Engineering Research Network. He has been the promoter and organizer of the 1st Empirical Software Engineering Intl. Week, and co-Program Chair and member of the Steering committee of the ACM IEEE International Symposium on Empirical Software Engineering. He is current member of the Program Committee of several Intl. conferences, and reviewer for several software engineering journals. He has been guest-editor for Advanced Software Engineering (Hindawi Publishing Corporation), and Real-time Systems (Kluwer Academic Press/Springer). See www.uniroma2.it/~cantone/ for additional information. Contact him at cantone@uniroma2.it.

Giancarlo Succi
Title: Quality Control and Cost Reduction in the Public Sector: a Successful Collaboration University - Army

Abstract: The University and the Army can successfully cooperate to support each its own mission - the history and example coming from other countries are clear evidences of this. With such idea in mind a cooperation has been set up between the Stato Maggiore dell'Esercito Italiano and the Free University of Bolzano / Bozen. The cooperation has focused on a specific project: the elicitation of requirements, the design, and the initial prototyping of SiAPS+, a tool to support different phases of strategic planning throughout the different levels and organizations of the Italian Army. The whole project has been carried out using the key tenets of agile methods, including a very comprehensive testing, short releases, constant interaction with the customer, re-assessment of the strategic needs. Moreover, to ensure the maximum freedom of all the follow-up development and to reduce the costs of licenses, the project has taken full advantage of Open Source systems, including the Eclipse IDE, Spring, and Postgres. The project has been successful and we are now in the phase of planning its follow-up.

CV: Giancarlo Succi is Professor with Tenure at the Free University of Bozen-Bolzano, Italy, where he directs the Centre for Applied Software Engineering and is the dean of the Faculty of Computer Science. Before joining the Free University of Bozen-Bolzano, he has been Professor with Tenure at the University of Alberta, Edmonton, Alberta, Associate Professor at the University of Calgary, Alberta, and Assistant Professor at the University of Trento, Italy. The research interest of Giancarlo Succi involve multiple areas of software engineering, including open source development, agile methodologies, experimental software engineering, software engineering over the Internet, and software product lines and software reuse. Giancarlo Succi is a Fulbright Scholar. He coordinated the FP5 EU project Name and the FP6 EU project COSPA. He is a member of ISERN the International Software Engineering Research Network isern.iese.de coordinated by the Fraunhofer Institute in Software engineering.

Alessandro Zardini and Armando Suppa
Title: The creation of value through Knowledge Management

Abstract: In every organization, the contents of information contained in digital assets generated in the course of its activities and from external stakeholders must be easily available and useable by organizational actors during various decision-making processes to generate value. Content availability thus may be a necessary but insufficient condition to improve decision making and company performance. This study analyzes how Enterprise Content Management systems (ECMs), which manage enterprise knowledge directly correlated with learning in organizational memory, help generate such value by investigating the extent to which developing such technologies actually contributes to improving the efficacy and efficiency of the decision making processes. From the action research–based methodological approach, significant results emerge in terms of process standardization and enterprise content. The final

effects of the reorganization process help reduce the time to market for the design, production, and sale of new products from 24 months to approximately 18 months after the implementation

CV: Alessandro Zardini is research assistant in Organizational Science at the Department of Business Administration of the University of Verona. He has been teacher of Business Management at the Faculty of Medicine of the University of Verona. He is member of the organizational committee of the master in Business Intelligence and Knowledge Management at the University of Verona. He has been visiting student at the University of Vaduz, Liechtenstein. His research interest includes enterprise content management, software as a service (SaaS) and business intelligence. He is member of the Association for Information Systems.

Giuseppe Lami,
Title: Addressing Software Process Capability in the Military Sector with the ISO/IEC 15504 Safety Extension

Abstract: ISO/IEC 15504 standard is a well known standard aiming at determining process capability and driving process improvement. ISO/IEC 15504 has been recently extended to make consistent judgment regarding process capability or improvement priorities also for safety related systems development. The release of such a safety extension (called ISO/IEC 15504 Part 10 – Safety Extension) makes the whole standard suitable for being applied to many new domains, including the military one. The contents, purpose and intended usage of the ISO/IEC 15504 (including its safety extension) are explained in this paper. A comparison between the ISO/IEC 15504 Part 10 – Safety Extension and other existing safety standards for software is provided in this paper along with a discussion on possible integrations and consequent benefits of its usage

CV: Dr. Giuseppe Lami is a researcher at the Information Science and Technology Institute in Pisa (Italy) where he has worked for 12 years. His research interests are related to software quality evaluation and software process assessment and improvement. He is an Intacs Automotive SPICE Principal assessor. He has been involved, as primary-editor, in the publication of ISO/IEC 15504-10 Safety Extension. He is the president of Automotive SPIN (Software Process Improvement Network) Italia. He previously (2003-2006) worked as Resident Affiliate at the Software Engineering Institute of the Carnegie Mellon University (Pittsburgh, PA - USA).

Bruno Rossi (Free University of Bozen-Bolzano)
Title: Dealing with Requirements Volatility in a Contracting Environment

Abstract: Requirements volatility is a known problem in Software Engineering. In this experience report, we present how such problem was dealt within the context of a military project that aimed at creating a software system to support the Performance Evaluation Model (PEM) for Stato Maggiore Esercito (SME). Typically such project would have been addressed by means of traditional software requirements engineering practices: upfront collection of the requirements, structuring of a large requirements specification document, upfront modelling of the software architecture. This would have meant large costs in terms of development effort in case of changes to the requirements. We identified two driving forces: the need for large requirements documents, that could lead to process rigidity, and changing requirements due to the duration and complexity of the project's domain. To address the two driving forces, we adopted practices from software Agile Methodologies (AM) combined with traditional requirements engineering practices. Finding the right balance between AMs and traditional requirement engineering practices was an important part of the project.
By means of a case study approach, we discuss which practices were found to cope well within the military context, and which were the lessons learnt. Among those, web-driven requirements collection software was not enough for the stakeholders, and needed to be supported by a functional specification document. Conversely, we let the architectural part of the system emerge from the development iterations, and give large importance to acceptance testing also for the communication with the customer. Such importance increased during the progress of the project. In the end, some kind of rigidity was inevitable to be introduced, but finding the right compromise among rigidity and agility needed the constant interaction with the project's stakeholders and several changes and evaluation points. We consider the lesson learnt as useful for similar projects to be undertaken in the military domain.

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CV: Bruno Rossi is a non tenured researcher at the Faculty of Computer Science, Free University of Bozen-Bolzano. He holds a Bsc degree in Applied Computer Science, and a MSc degree in Economics. In April 2008, he received the PhD degree in Computer Science from the Free University of Bolzano-Bozen. His research interests are in the areas of Software Engineering that deal with Free/Libre Open Source Software development models and Software Evolution. In the past few years, he has been appointed as teacher of Software Evolution and Requirements and Design of Software Systems courses. He has participated to important European (COSPA, STREP FP6) and Italian Projects (ArtDeco, FIRB 36 months), and has been involved as an active member in several conference program committees (OSS, HICSS, ESEM, IJCNN, NaBIC).

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