

# Curriculum Vitae et Studiorum

of: *Tullio Vardanega*

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## Personal

Family Name: Vardanega  
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Other Information: Performed civilian service over the period: Feb 28, 1986 to Oct 27, 1987  
Lingual Abilities: Italian (mother tongue), English (fluent), French (good), Dutch (fair),  
Spanish (basic).

## Education

- Full mark certificate of education at the Liceo (specialising in classical studies) of La Spezia, Italy (July 1981).
- Full mark laurea degree in Computer Science at the University of Pisa, Italy (July 1986).
- PhD in Computer Science at the Technical University of Delft, The Netherlands (October 1998).

## Research Areas and Specialisation

Engineering of real-time embedded systems. High integrity systems and design for certification. Software reuse. Open source movement.

## Work Experience

### December 2001 - :

Lecturer (associate professor as of October 2004) in Computer Science at the Department of Pure and Applied Mathematics, University of Padua, Italy.

- In charge of the undergraduate classes of *Computer Architectures* (2nd year) and *Software Engineering* (3rd year) for the Bachelor degree in Computer Science and *Concurrent and Distributed Systems* for the corresponding Master degree.
- Co-responsible for the management of the students' stage programme (compulsory for graduation).
- Technical consultant of the 'HRT-UML' technology project co-funded by the Italian Space Agency over the term July 2001 - December 2002 and its follow-on, co-funded by the European Space Agency, over the term October 2003 - December 2004. (The project aims to define a set of UML profiles capable of capturing the expressive power and semantic integrity of the HRT-HOOD computational model.)

- Technical consultant to the European Space Agency Research and Technology Centre, for the definition of architectural standards and development methodologies for on-board embedded real-time applications.

### **July 1991 - December 2001:**

At the European Space Agency Research and Technology Centre (ESA/ESTEC), Noordwijk (Netherlands), as software engineer in the Control, Data and Power Division of the Technical Directorate. Technical involvement in the domain of on-board software systems and architectures. Key person in the area of real-time embedded systems, operating systems in general, programming languages and design methodologies.

Appointment duties included:

- Support to industrial projects in the reference domain (e.g.: member of review boards; activity monitoring; technical consultancy). Responsible for the software systems on board the meteorological satellite *MetOp* over the term 1998-2001 and the telecommunication satellite *Artemis* over the term 1993-1997.
- Conception, definition, and conduction of research and technology transfer programmes. (Over 15 international projects for a total funding in excess of 12 MEuro.)
- Tutoring of young graduate and under-graduate trainees.
- Liaison with international standardisation bodies (e.g.: ISO WG9 (Ada)); technical committees (e.g.: ISO WG9 HRG (Safety & Security Annex Rapporteur Group); programme committees.

### **December 1987 - June 1991:**

At Intecs Sistemi, in Pisa (Italy). Member of the Operating Systems Section. Main activities included:

*January 1988 - March 1991:*

Team leader for the CEC RACE Programme<sup>1</sup>, project 1017: 'Integrated Broadband Communications On-Line Environment'. The project aims included design and development of an open, distributed, on-line extendable software infrastructure for the support of future integrated broadband communications. The project consortium was led by Alcatel SEL of Stuttgart (Germany) and included Alcatel Austria ELIN of Wien (Austria), Alcatel FACE of Pomezia (Italy), Alcatel SESA of Madrid (Spain), CAP Gemini Innovation of Paris (France), Teknon of Darmstadt (Germany), and Intecs Sistemi. The overall project team numbered a maximum of 20 full-time engineers, with a 50% CEC funding in the excess of 3.5 million ECU. Intecs Sistemi's was the second largest partner, with a share of about 25%, and an active team of up to 6 people.

*September 1989 - June 1991:*

Project leader in the Italy's National Research Council (CNR) 'Progetto Finalizzato Informatica', Programme 'Massively Parallel Architectures'<sup>2</sup>, project 'General Purpose Distributed Memory Parallel Operating System'. The main aims of the project were the design and initial development of the foundations for a general-purpose operating system to run on a distributed memory massively parallel hardware architecture. The project was carried out by Intecs Sistemi in conjunction with the Department of Computer Science of the Universities of Pisa and Milan. The team at Intecs Sistemi had a core of 3 full-time people.

## **Other Relevant Experiences**

### **Academic Activities**

*October 1998 - March 2002:*

Co-tutor to Ms P Rodriguez-Dapena, doctoral candidate in Computer Science at the Technical University of Eindhoven (Netherlands). Degree earned and dissertation successfully defended on the 5th of March 2002.

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<sup>1</sup>RACE, Research and development in Advanced Communications technology in Europe, was a multi-annual programme partially funded by the CEC over the period 1988-92.

<sup>2</sup>This Programme, partially funded by CNR, was to cover the period 1990-1993, and was intended to foster the use of parallel architecture technologies.

Dissertation entitled ‘Software Safety Verification in Critical Software Intensive Systems’, ISBN 90-386-0953-0. *Academic Years 1997-98 to 2001-02:*

Guest lecturer in the master courses on real-time systems and software engineering at the Faculty of Information Technology of the Technical University of Delft (Netherlands) *Academic Years 1988-89 to 1990-91:*

Teaching assistant in the course of ‘Computer Architecture’ of the ‘Scuola Diretta a Fini Speciali in Informatica’, held by the Department of Computer Science of the University of Pisa. *June 1990 - July 1991:*

Graduation thesis co-advisor to Mr. A. Caprai and G. Marconcini, ‘Design Methodologies for Parallel Filtering and I/O Services Suited for Distributed Memory Multi-Processors’, Department of Computer Science, University of Pisa (Italy), July 1991.

## Scientific and Research Activities

*Relation with the European Commission, Directorate General Information Society:*

- Selected reviewer on behalf of the European Commission for the: (1) IST Framework Programme VI key area 2.3.2.5 ‘embedded systems’, call 2 (October 2003) (2-3) IST Framework Programme V key areas IV.2.1 ‘real-time distributed systems’ (calls September 2000 and October 2001) (4) ESPRIT Framework IV (call May 1997); (5) ESSI Software Best Practice call for proposals (call March 1995);
- Member of the expert committee that reviewed the draft 2001 work programme of the IST Framework V (May 2000)
- Selected continued reviewer, on behalf of the European Commission, of the:
  - IST project IST-2001-34140 FIRST (Flexible Integrated Real-Time Systems), from January 2003 to April 2005
  - IST project IST-2001-37269 FLEXICON (Flexible Control Systems Development and Integration Environment for Distributed Systems), from January 2003 to August 2005
  - ESPRIT project 26456 RAPIER ‘Rapid Prototyping Environment for Real-Time Distributed Systems’, from January 1998 to March 2000.

*Program Committees:*

- PC member of the International Workshop on Real-Time Ada Issues; PC chair for the 12th edition scheduled in September 2003
- PC member of the Euromicro Conference on Real-Time Systems
- PC member of the International Conference ‘Reliable Software Technologies - Ada Europe’ PC chair for the 10th edition scheduled in June 2005
- PC member of the International Workshop on Exception Handling for a 21st Century Programming Language (May 2001).

*Refereeing, Invited Talks and Other Collaborations:*

- Referee for submissions to: ‘IEEE Transactions on Computers’, ‘Real-Time Systems’, ‘Software - Practice and Experience’, ‘Information and Software Technology’, ‘Control Engineering Practice’
- Referee for submissions to: ‘The International Conference on Dependable Systems and Networks’
- Invited speaker at the International Colloquium on Numerical Analysis and Computer Science with Applications, Plovdiv, Bulgaria (August 1999)
- Editor-in-chief of the ‘Ada User Journal’ magazine, published by Ada-Europe (<http://www.ada-europe.org>).

*Organisation of Events:*

- Principal organiser of the International Seminar on the Role of Open-Source Software in the Space Business’, held at ESTEC on October 2000, with over 60 participants
- Principal organiser of the International Symposium on On-Board Real-Time Software, held at ESTEC on November 13-15, 1995 (over 100 participants).

## Publications

### Graduation Thesis

‘Parallel Processing of Functional Languages: Computational Models and Evaluation’, Department of Computer Science, University of Pisa (I), July 1986.

### Doctoral Thesis

‘Development of On-Board Embedded Real-Time Systems: An Engineering Approach’, Faculty of Information Technology and Systems, Technical University of Delft (Netherlands), October 1998. Published in the European Space Agency’s ‘Special Publications’ series (Ref. STM-260, ISBN 92.9092.334.2). Adopted as reference document to the development of on-board software in new-generation space projects at European level.

### Technical Reports

- A. Burns, B. Dobbing, T. Vardanega, ‘Guide for the Use of the Ada Ravenscar Profile in High Integrity Systems’, University of York (UK) Technical Report YCS-2003-348, January 2003. (To also become an ISO/IEC Technical Report. Number to be assigned).  
<http://www.cs.york.ac.uk/ftplib/reports/YCS-2003-348.pdf>
- B. Wichmann editor, ‘Guide for the Use of the Ada Programming Language in High Integrity Systems’, Technical Report ISO/IEC JTC1/SC22 N350 (October 1999), [http://www.iso.ch/iso/en/itrf/PubliclyAvailableStandards/c029575\\_ISO\\_IEC\\_TR\\_15942\\_2000\(E\).zip](http://www.iso.ch/iso/en/itrf/PubliclyAvailableStandards/c029575_ISO_IEC_TR_15942_2000(E).zip)
- Tullio Vardanega, ‘Development of On-Board Embedded Real-Time Systems: An Engineering Approach’, Technical Report STR-260, ISBN 90-9092-334-2, European Space Agency, October 1999.

### Journals

- T. Vardanega, J. Zamorano, J.A. de la Puente, ‘On the Dynamic Semantics and the Timing Behaviour of Ravenscar Kernels’, *Real-Time Systems*, Kluwer Academic Publishers. Accepted, July 2004.
- T. Vardanega, G. Caspersen, ‘Engineering Reuse for On-board Embedded Real-Time Systems’, *Software - Practice and Experience*, John Wiley & Sons. 32(3): 233-264, March 2002.
- P. Rodríguez-Dapena, T. Vardanega, J. Trienekens, A. Brombacher, J. Gutiérrez-Ríos, ‘Non-functional requirements: the new driving force of software development’, *Software Quality Professional*, American Society for Quality. 3(4):12-22, September 2001.
- T. Vardanega, ‘On the Distribution of Control Functions in New-Generation On-Board Embedded Real-Time Systems’, *Parallel and Distributed Computing Practices*, Special Issue on Parallel and Distributed Real-Time Systems (J. van Katwijk and J. Zalewski, ed.), Nova Science Publishers. 2(1):89-102, March 2000. (Invited paper.)
- T. Vardanega, J. Gaisler, ‘Lessons Learned from the Implementation of On-Board Tolerance to Physical Faults in Ada’, *International Journal of Computer Systems: Science & Engineering*, Special Issue on Developing Fault-Tolerant Systems with Ada (A. Romanowsky and A. Wellings, ed.), CRL Publishing. 15(1): 19-32, January 2000.
- T. Vardanega, J. van Katwijk, ‘A Software Process for the Construction of Predictable On-Board Embedded Real-Time Systems’, *Software - Practice and Experience*, John Wiley & Sons. 29(3): 235-266, March 1999.
- T. Vardanega, J. van Katwijk, ‘Productive Engineering of Predictable Embedded Real-Time Systems: The Road to Maturity’, *Information and Software Technology*, Elsevier. 40(13): 745-764, November 1998.
- T. Vardanega, ‘On the Construction of New-Generation On-Board Real-Time Systems’, *Integrated Computer-Aided Engineering*, Special Issue on Real-Time Systems (S. Son, ed.), IOS. 5(3): 227-243, July 1998.

## Conferences and Symposia

- T. Vardanega, 'A Property-Preserving Reuse-Geared Approach to Model-Driven Development', *The 12<sup>th</sup> IEEE International Conference on Embedded and Real-Time Computing Systems and Applications* (invited paper), 223-230, IEEE, August 2006 (ISBN: 0-7695-2676-4, ISSN: 1533-2306).
- V. Cechticky, M. Egli, A. Pasetti, O. Rohlik, T. Vardanega, 'A UML2 Profile for Reusable and Verifiable Software Components for Real-Time Applications' in Maurizio Morisio et al. (Eds.): "Reuse of Off-the-Shelf Components", *Proc. 9<sup>th</sup> Int'l Conference on Software Reuse (ICSR'06)*, Torino, Springer. LNCS(4039):312-325, giugno 2006 (ISBN: 3-540-34606-6, ISSN 0302-9743).
- J. A. Pulido, S. Urueña, J. Zamorano, T. Vardanega, J. A. de la Puente, 'Hierarchical Scheduling with Ada 2005', *Reliable Software Technologies — Ada-Europe 2006*, Springer. LNCS(4006):1-12, June 2006 (ISBN: 3-540-34663, ISSN: 0302-9743)
- M. Bordin, T. Vardanega, 'Automated Model-based Generation of Ravenscar-compliant Source Code', In: *Proc. 17<sup>th</sup> Euromicro Conference on Real-Time Systems*, July 2005, IEEE, 69-77, July 2005 (ISBN: 0-7695-2400-1, ISSN:1068-3070).
- M. Bordin, T. Vardanega, 'A New Strategy for the HRT-HOOD to Ada Mapping', *Reliable Software Technologies — Ada-Europe 2005*, Springer. LNCS(3555):51-66, June 2005 (ISBN: 3-540-26286-5).
- T. Vardanega, A. Wellings (eds.), *Reliable Software Technology - Ada-Europe 2005. Proceedings of the 10th International Conference on Reliable Software Technologies — Ada-Europe 2005*, Springer. York (UK), June 2005. LNCS(3555), XV, 273 p., ISBN: 3-540-26286-5.
- T. Vardanega, M. Di Natale, S. Mazzini, M. D'Alessandro, 'Component-Based Real-Time Design: Mapping HRT-HOOD to UML', IEEE CS Press, pp. 6-13, September 2004 (ISSN: 1089-6503). In: *Proc. 30<sup>th</sup> Euromicro Conference*.
- T. Vardanega (ed.), 'Proceedings of the 12th International Real-Time Ada Workshop', *Ada Letters*, ACM Press, XXIII(4), December 2003, pp.6-92  
[http://www.sigada.org/ada\\_letters/issues/dec2003/index.htm](http://www.sigada.org/ada_letters/issues/dec2003/index.htm)
- T. Vardanega, 'Ravenscar Design Patterns: Reflections on Use of the Ravenscar Profile', *Ada Letters*, ACM Press, XXIII(4):61-69, December 2003. (Proc. 12<sup>o</sup> Int'l Real-Time Ada Workshop)
- S. Mazzini, M. D'Alessandro, M. Di Natale, G. Lipari, T. Vardanega, 'Issues in Mapping HRT-HOOD to UML' *15th Euromicro Conference on Real-Time Systems 2003*, IEEE, 221-228, July 2003.
- S. Mazzini, M. D'Alessandro, M. Di Natale, A. Domenici, G. Lipari, T. Vardanega, 'HRT-UML: Taking HRT-HOOD onto UML' *Reliable Software Technologies — Ada Europe 2003*, Springer Verlag. Lecture Notes in Computer Science (2655):405-416, June 2003.
- A. Wellings, T. Vardanega, 'Report of Session: Language Changes for Scheduling, Modeling and Analysis', *Ada Letters*, ACM Press, XXII(4):125-127, December 2002. (Proc. 11<sup>th</sup> Int'l Real-Time Ada Workshop)
- A. Alonso, R. López, T. Vardanega, J.A. de la Puente, 'Using Object Orientation in High Integrity Applications: A Case Study' *Reliable Software Technologies — Ada Europe 2002*, Springer Verlag. Lecture Notes in Computer Science (2361):357-366, June 2002.
- T. Vardanega, 'Session Summary: Object Orientation and Exception Handling for Ada' *Ada Letters*, ACM Press, XXI(3):11-12, September 2001. (Proc. Int'l Workshop on Exception Handling for a 21st Century Programming Language)
- T. Vardanega, 'A Case for Exceptions', *Ada Letters*, ACM Press, XXI(3):26-30, September 2001. (Proc. Int'l Workshop on Exception Handling for a 21st Century Programming Language)
- T. Vardanega, R. García, J.A. de la Puente, 'An Application Case for Ravenscar Technology: Porting OBOSS to GNAT/ORK', *Reliable Software Technologies — Ada Europe 2001*, Springer Verlag. Lecture Notes in Computer Science (2043):392-404, May 2001.

- T. Vardanega, 'Report of Session: Analysis of the J Consortium Real-Time Java Proposal' *Ada Letters*, ACM Press, XXI(1):17–18, March 2001. (Proc. 10<sup>th</sup> Int'l Real-Time Ada Workshop)
- T. Vardanega, G. Caspersen, 'Using the Ravenscar Profile for Space Applications: the OBOSS Case', *Ada Letters*, ACM Press, XXI(1):96–104, March 2001. (Proc. 10<sup>th</sup> Int'l Real-Time Ada Workshop)
- T. Vardanega, G. Caspersen, J. Storbank Pedersen, 'A Case Study in the Reuse of On-board Embedded Real-Time Software', *Reliable Software Technologies — Ada Europe'99*, Springer Verlag. Lecture Notes in Computer Science (1622):425–436. June 1999.
- T. Baker and T. Vardanega, 'Session Summary: Tasking Profiles', *Ada Letters*, ACM Press, XVII(5):5–7 (Proc. 8<sup>th</sup> Int'l Real-Time Ada Workshop). July 1997.
- T. Vardanega, 'An Evolutionary Approach to the Construction of New-generation Software-Intensive Satellite Control Systems', *Proc. 5<sup>th</sup> Workshop on Parallel and Distributed Real-Time Systems*, Geneva (CH), IEEE, April 1997, pp. 263–268.
- T. Vardanega, 'Tool Support for the Construction of Statically Analysable Hard Real-Time Ada Systems', *Proc. Real-Time Systems Symposium (RTSS-17)*, Washington (DC), IEEE, December 1996, pp. 129–135.
- T. Vardanega, 'On the Development of Hard Real-Time Software for On-Board Control Systems', *Proc. Workshop on Object-Oriented Real-Time Systems*, San Antonio (TX), October 1995; also as Invited Presentation in *Proc. Workshop on Design and Analysis of Real-Time Systems*, Bruxelles (B), Université Libre de Bruxelles, November 1995, pp. 1–5.
- T. Vardanega, P. David, J.F. Chane, W. Mader, R. Messaros and J. Arlat, 'On the Development of Fault-Tolerant On-Board Control Software and its Evaluation by Fault Injection', *Proc. 25<sup>th</sup> Int. Symp. on Fault-Tolerant Computing (FTCS-25)*, Pasadena (CA), IEEE, June 1995, pp. 510–515.
- T. Vardanega, 'On the Use of Ada Tasking in the Building of Satellite Control Software', *Proc. 3<sup>rd</sup> Workshop on Parallel and Distributed Real-Time Systems*, Santa Barbara (CA), IEEE, April 1995, pp. 44–51.
- T. Vardanega, 'Experience with the Development of Hard Real-Time Embedded Ada Software', *Proc. 16<sup>th</sup> Int. Conf. on Software Engineering*, Sorrento (I), IEEE, May 1994, pp. 301–308.
- C. Bailey, E. Fyfe, T. Vardanega and A. Wellings, 'The Use of Pre-Emptive Priority Based Scheduling for Space Applications', *Proc. 14<sup>th</sup> Real-Time Systems Symp.*, Raleigh-Durham (NC), IEEE, December 1993, pp. 253–257.
- T. Vardanega, 'An Open Distributed Operating System Suited for Integrated Broadband Communications Networks', *Proc. 16<sup>th</sup> Conf. on Local Computer Networks*, Minneapolis (MN), IEEE, October 1991, pp. 429–441.
- M.R. Nazzarelli, G. Serazzi, M. Vanneschi and T. Vardanega, 'A Highly Parallel Operating System for Distributed Memory Multiprocessors', *Information Systems and Parallel Computing*, B. Fadini (Ed.), F. Angeli, 1991, pp. 149–158 (in italian).
- F. Panzieri, M. Falcone, S. Sabina and T. Vardanega, 'Issues in the Design of a Real-Time Executive for On-Board Space Applications', *Proc. 6<sup>th</sup> Workshop on Real-Time Operating Systems and Software*, Pittsburgh (PN), IEEE, May 1989.

## Other

- T. Vardanega, P. Plancke, 'Architectural Views of the Packet Utilisation Standard', *Data Systems in Aerospace*, Dublin (IRL), EUROSPACE, May 2002.
- T. Vardanega, S. Ekholm and A. Paganone, 'Predictable Ada Tasking in the Implementation of the Data Handling Software for the Eureka Platform', *Proc. Symp. on On-Board Data Management*, Rome (I), EUROSPACE, January 1994.

- F. Teston and T. Vardanega, 'Asynchronous and Packetized Systems Engineering Tools', *Int. Symp. on Real-Time Embedded Processing for Space Applications*. Les Saintes-Maries-de-la-Mer (F), CNES, November 1992.
- T. Vardanega, 'Principles Behind a Distributed Operating System Suited for IBC Network Control', *Proc. 2<sup>nd</sup> Int. Workshop on Telecommunication Information Network Architectures (TINA)*, Chantilly (F), May 1991.
- F. Panzieri, M.R. Nazzarelli, S. Trivellini and T. Vardanega, 'Integrated Broadband Communications Network: Design Issues', *Proc. Workshop on Communications Networks and Distributed Operating Systems within the Space Environment*, Noordwijk (NL), ESA, October 1989.
- F. Panzieri, S. Sabina and T. Vardanega, 'Data Management System Communications Enhancements', *Proc. Int. Symp. on Space Software Engineering: Columbus and Space Infrastructures*, Torino (I), ESA, December 1988.