Mariusz A. Fecko

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—EDUCATION—

- **Ph.D.** (1999) and **M.S.** (1996) in **Computer and Information Sciences**, University of Delaware, Newark, Delaware, USA
- **M.S.** (1994) in **Computer Science** and **M.S.** (1993) in **Electronics**, AGH University of Science and Technology, Kraków, Poland

—EMPLOYMENT—

Applied Research, Telcordia Technologies, Inc., Piscataway, New Jersey, USA
Director (Sept. 2007–to date), Information Assurance & Security Dept.
Senior Scientist (Mar. 2005–Aug. 2007), ***Research Scientist*** (July 2000–Feb. 2005), Information Analysis & Services Dept.

- **Expertise:** survivable wireless networks—management, control, optimization, diagnostics, autoconfiguration, service discovery, planning; requirements engineering and test automation for software systems
- **Internal R&D and government research projects:**
  - ▶ 2007–09: **Member of Scientific Steering Committee**, "Autonomic Networks and Services in IPv6 Environment (EFIPSANS)," European Union *7th Framework Programme.*

    •Responsible for Telcordia contribution to the proposal (€250K won; total project budget €9.8M). •Co-leader of Work Package on Basic Networking Services (auto-configuration and adaptive self-configuration, routing protocols in autonomic networks).
  - ▶ 2004–09: US Army CERDEC *Proactive Integrated Link Selection for Network Robustness (PILSNER).*

    •Responsible for critical parts of the proposal ($15 million won). •Contributed to the system architecture, design, and implementation for routing, autoconfiguration, and data dissemination. •Led Telcordia team in Phase II design of Domain Area Planning Utility (DAPU) for mission network-level planning. •Supported DAPU transition to WIN-T NMS.
  - ▶ 2001–09: **Co-Principal Investigator** ($2,050,000), "Distributed Survivable Resource Control for Tactical MANETs (DSRC-T)," US Army Research Lab (ARL) *Collaborative Technology Alliance (CTA).*

    •Contributed to the proposal ($70 million won in base program). •Formulated new research and secured funding in the competitive program's option phase. •Led a research team from the industry and academia. •Co-developed techniques for dynamic resource discovery in tactical wireless networks, which were included by ARL among top 10 CTA technologies. •Transitioned results and prototypes to other DoD programs.
  - ▶ 2006: **Technical Lead**, US Army CERDEC *Seamless Soft Handoff Protocols—Phase II*

    •Led the definition of architecture and initial design of Loop-Free IP Fast Reroute Using Local and Remote LFAPs. •Co-authored Internet Draft in IETF Network Working Group.
  - ▶ 2005–06: DARPA ATO *Distributed Diagnostics for Tactical Networks.*

    •Helped obtain seedling funding ($250k). •Defined a full program for a DARPA PM through a mix of theoretical and experimental results.

▶ 2003–04: US Army CERDEC *Multifunctional OTM Secure Adaptive Integrated Comms (MOSAIC).*

•Designed and implemented Domain Announcement Protocol (DAP) that supports dynamic merging and splitting of routing domains, and that enables detection of inter-domain mobility of nodes and routers. •Integrated DAP with FCS-Comms/MC2 for a field demonstration in C4ISR testbed (Ft. Dix, NJ, 2004).

▶ 2001–03: IR&D *XML-based requirements engineering for electronic clearinghouses.*

•Developed tools for processing eXchange Link (XL)/Wireless Number Portability (WNP) business rules, including high-volume conversion to XML and generation of XML Schema/XSLT code. •This effort increased XL's profitability, reduced MR rate by an order of magnitude, and automated WNP message validation.

▶ 2000–01: IR&D *Test automation for advanced service management for Local Number Portability.*

•Co-developed a test library for specification and automatic execution of tests. The tools were applied to testing Advanced Service Management Systems for Local Number Portability.

Computer and Information Sciences Dept, Univ. of Delaware, Newark, Delaware, USA
Post-Doc Fellow (Sep. 1999–June 2000), ***Research Assistant*** (Jan. 1995–Aug. 1999)

- **Research projects:**
  ▶ 1996–2000: **Associate Investigator**, "Formal Specification and Testing of Army Communications Protocols," ARL *Advanced Telecommun./Information Distribution Research Program (ATIRP).*

  •Created a formal specification of US Army radio-network protocol MIL-STD 188-220. •Developed testing methodologies, software, and a test suite for 188-220 conformance testing. •The methodology yielded 100% test feasibility, 200% increase in test coverage, and over 50 improvements to the standard.

A&BBPOL, Kraków, Poland: ***Software Engineer*** (July 1994–Dec. 1994)
Portugal Telecom, Lisbon, Portugal: ***Summer Intern*** (July 1992–Aug. 1992)

—PROFESSIONAL ACTIVITIES—

- **Prog. Co-chair:** The 18th IFIP Int'l Conf. Testing of Communicating Systems (2006)
- **Prog. Committee:** NYMAN'04; ARL CTAC'03
- **Member:** IEEE Comp. Soc.; 4 x Ph.D. Committee at CCNY'00-06
- **Company Training:** SAIC University—Proposal Development & Management (2004)
- **Speaker:** DSS'04; MILCOM'03,01,97-99; NCA'03; SCI'02; QUEST'01; ATIRP'00,01; TestCom'00; FORTE'98; Estelle'98; IPCCC'98; Institut National des Telecommunications, France'97 **(invited)**
- **Reviewer:** IEEE Trans. Softw. Eng.; Int'l J. Comput. Appl.; J. Syst. Softw.; ACM Comput. Rev.; Comput. Commun.; IEEE Commun. Surv.; NSERC of Canada; INFOCOM; TestCom; FORTE; IM, ISCC; IWCSE

—HONORS & AWARDS—

- 3 x Telcordia CEO "Growing the Business" Team Award: for securing 3-year option in ARL CTA, 2005; for winning PILSNER, 2004; and for winning ARL CTA, 2001
- Telcordia Sr. Vice President recognition award, 2004
- ATIRP research selected as one of the six most successful of the five-year ARL FedLab program, 2001

—PUBLICATIONS—

In Books and Refereed Journals

[1] S.S. Batth, M.U. Uyar, Y. Wang, and M.A. Fecko. Fault modeling and detection capabilities for EFSM models. *IEEE Trans. Instrument. Measure.* , 2008. (to appear).

[2] I. Hökelek, M.U. Uyar, and M.A. Fecko. On stability analysis of virtual backbone in mobile ad hoc networks. *[Springer] Wirel. Netw.* **14**(1), pp. 1022–1038, 2008.

[3] M.U. Uyar, S.S. Batth, Y. Wang, and M.A. Fecko. Algorithms for modeling a class of single timing faults in communication protocols. *IEEE Trans. Comput.* **57**(2), pp. 274–288, 2008.

[4] J. Zou, M.U. Uyar, M.A. Fecko, and S. Samtani. Performance evaluation of subflow capable SCTP. *[Elsevier] Comput. Commun.* **29**(12), pp. 2413–2432, 2006.

[5] ———. Throughput models for SCTP with parallel subflows. *[Elsevier] Comput. Netw.* **50**(13), pp. 2160–2182, 2006.

[6] M.A. Fecko and C.M. Lott. XML-based requirements engineering for an electronic clearinghouse. *[Elsevier] Inform. Softw. Technol.* **47**(13), pp. 841–858, 2005.

[7] M.U. Uyar, J. Zheng, M.A. Fecko, S. Samtani, and P.T. Conrad. Evaluation of architectures for reliable server pooling in wired and wireless environments. In Li et al., eds, *Recent Advances in Service Overlay Networks (S.I.)*, *IEEE J. Select. Areas Commun.* **22**(1), pp. 164–175. 2004.

[8] M.A. Fecko, M.U. Uyar, A.Y. Duale, and P.D. Amer. A technique to generate feasible tests for communications systems with multiple timers. *IEEE/ACM Trans. Netw.* **11**(5), pp. 796–809, 2003.

[9] M.U. Uyar, M.A. Fecko, A.Y. Duale, P.D. Amer, and A.S. Sethi. Experience in developing and testing network protocol software using FDTs. In Dssouli and Khendek, eds, *Testing and Validation of Communication Software (S.I.)*, *[Elsevier] Inform. Softw. Technol.* **45**(12), pp. 815–835. 2003.

[10] M.A. Fecko and C.M. Lott. Lessons learned from automating tests for an operations support system. *[Wiley] Softw. Pract. Exper.* **32**(15), pp. 1485–1506, 2002.

[11] P.D. Amer, M.A. Fecko, A.S. Sethi, M.U. Uyar, and A.Y. Duale. Formal specification and conformance testing of Army communications protocols. In Tardif and Gowens, eds, *ARL Advanced Telecommun./Inform. Distribution Research Program (ATIRP)*, pp. 3.1–3.28. UMD Printing, 2001. **(invited paper)**.

[12] M.A. Fecko, M.U. Uyar, P.D. Amer, A.S. Sethi, T.J. Dzik, R. Menell, and M. McMahon. A success story of formal description techniques: Estelle specification and test generation for MIL-STD 188-220. In Lai, ed, *FDTs in Practice (S.I.)*, *[Elsevier] Comput. Commun.* **23**(12), pp. 1196–1213. 2000.

[13] M.A. Fecko, M.U. Uyar, A.S. Sethi, and P.D. Amer. Conformance testing in systems with semicontrollable interfaces. In Budkowski and Najm, eds, *Protocol Engineering: Part 2 (S.I.)*, *[Hermes] Annals Telecommun.* **55**(1-2), pp. 70–83. 2000.

[14] M.U. Uyar, M.A. Fecko, A.S. Sethi, and P.D. Amer. Testing protocols modeled as FSMs with timing parameters. *[Elsevier] Comput. Netw.* **31**(18), pp. 1967–1988, 1999.

Books and Theses

[1] M.U. Uyar, A.Y. Duale, and M.A. Fecko, eds. *Proc. IFIP Int'l Conf. Test. Communicat. Syst. (TestCom)*, *[Springer] LNCS* **3964**, New York, NY, 2006.

[2] M.A. Fecko. *Timing and Controllability Issues in Conformance Testing of Communications Protocols.* PhD thesis, Univ. Delaware, Newark, DE, 1999. (advised by Dr. U. Uyar and Dr. P. Amer).

[3] ———. *Cooperation and Conflict in Autonomous Agents' Environment.* MSc thesis, AGH Univ. Science & Technology, Krakow, Poland, 1994. (advised by Prof. Dr. J. Nawarecki).

[4] M.A. Fecko and D. Kudzia. *VME-based Laboratory System with ADSP-2100 Digital Signal Processor.* MSc thesis, AGH Univ. Science & Technology, Krakow, Poland, 1993. (advised by Dr. B. Wiśniewski).

In Refereed Conferences

[1] Y. Abdelmalek, T. Saadawi, A. Abdelal, M. Lee, J. Sucec, and M. Fecko. The join/leave policy for video multicast group members. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, Orlando, FL, 2007.

[2] I. Hökelek, M.A. Fecko, P. Gurung, S. Samtani, J. Sucec, A. Staikos, J. Bowcock, and Z. Zhang. Seamless soft handoff in wireless battlefield networks using local and remote LFAPs. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, Orlando, FL, 2007.

[3] J. Sucec, M.A. Fecko, J. Unger, S. Samtani, and A. Staikos. Planning robust OSPF domains for future battlefield networks. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, Orlando, FL, 2007.

[4] X. Ma, S. Cevher, M.U. Uyar, M.A. Fecko, J.M. Sucec, and S. Samtani. Network planning for multicast using partitioned virtual user domains. In *Proc. IFIP/IEEE Int'l Conf. Manage. Multimedia Netw. Serv. (MMNS)*, *[Springer] LNCS* **4787**, pp. 113–124, San Jose, CA, 2007.

[5] I. Hökelek, J. Zou, U. Uyar, A. Abdelal, J. Xiao, N. Chakravarthy, M. Fecko, and S. Samtani. Testbed experiments of dynamic survivable resource pooling using FPGA-based robots. In *Proc. IEEE Int'l Conf. Wirel. Mob. Comput. Network. Commun. (WiMob)*, White Plains, NY, 2007.

[6] M.A. Fecko, I. Hökelek, S. Samtani, and A. Staikos. Controlled dissemination filter (CDF) for integrated link selection agents. In *Proc. IEEE/Create-Net/ICST Int'l Conf. Commun. Syst. Softw. Middlew. (COMSWARE)*, Bangalore, India, 2007.

[7] M.A. Fecko, J. Sucec, S. Samtani, and A. Staikos. Deployment mode functionalities of dynamic domain optimization agent (DDOA) for OSPF area design. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 1–7, Washington, DC, 2006.

[8] G. Di Crescenzo, R. Ge, M.A. Fecko, and G.R. Arce. Securing virtual backbone creation in mobile ad hoc networks. In *Proc. IEEE Int'l Wksp Mob. Distrib. Comput. (MDC)*, pp. 26–29, Niagara-Falls/Buffalo, NY, 2006.

[9] M.U. Uyar, S.S. Batth, Y. Wang, and M.A. Fecko. Multiple fault models for timed FSMs. In *Proc. IEEE Instrum. Measure. Technol. Conf. (IMTC)*, pp. 936–941, Sorento, Italy, 2006.

[10] J. Zou, M.U. Uyar, M.A. Fecko, and S. Samtani. SF-SCTP: A new transport protocol to support QoS for FCS applications. In *Sensors and C3I Technologies for Homeland Security and Homeland Defense V*, *Proc. SPIE* **6201**, pp. 6201–6209. (SPIE, Bellingham, WA), 2006.

[11] _____. Integrating fractional congestion control into SF-SCTP design. In *Proc. IEEE Sarnoff Symp. Adv. Wired Wirel. Netw.*, Princeton, NJ, 2006.

[12] _____. SF-SCTP: An extension of Stream Control Transmission Protocol to support QoS. In *Proc. IEEE Int'l Conf. Netw. Sens. Control (ICNSC)*, pp. 780–785, Ft. Lauderdale, FL, 2006.

[13] I. Hökelek, M.U. Uyar, and M.A. Fecko. Node link stability in wireless mobile networks. In *Defense Transformation and Network-Centric Systems*, *Proc. SPIE* **6249**, pp. 6249–6233. (SPIE, Bellingham, WA), 2006.

[14] _____. Degree and link failure frequency analysis for MANETs with different node densities. In *Proc. IEEE Sarnoff Symp. Adv. Wired Wirel. Netw.*, Princeton, NJ, 2006.

[15] _____. Random-walk based analysis of virtual backbone in MANETs. In *Proc. IASTED Int'l Conf. Commun. Netw. (CCN)*, pp. 132–137, Marina del Rey, CA, 2005.

[16] I. Hökelek, M.A. Fecko, and M.U. Uyar. Analytical model of a virtual backbone stability in mobile environment. In *Proc. IEEE Sarnoff Symp. Adv. Wired Wirel. Netw.*, pp. 41–44, Princeton, NJ, 2005.

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[20] _____. Single fault models for timed FSMs. In *Proc. IEEE Instrum. Measure. Technol. Conf. (IMTC)*, pp. 2349–2354, Ottawa, Canada, 2005.

[21] K.C. Young, S. Samtani, S. Khurana, P. Gurung, L. Wong, J. Lee, J. Chiang, J. Unger, M. Fecko, W. Stephens, C. Graff, L. Muzzelo, and M. Bereschinsky. MOSAIC ad hoc mobility protocol suite (AMPS) enhancements. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 1503–1508, Monterey, CA, 2004.

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[25] J. Zou, M.U. Uyar, M.A. Fecko, and S. Samtani. Preferential treatment of SCTP subflows: Analysis and simulation. In *Proc. IEEE Int'l Symp. Comput. Commun. (ISCC)*, pp. 810–815, Alexandria, Egypt, 2004.

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[27] M.A. Fecko, M.U. Uyar, and A. Y. Duale. Towards testing SDL specifications: Models and fault coverage for concurrent timers. In *Proc. IFIP Int'l Conf. Formal Tech. Netw. Distrib. Syst. (FORTE)*, *[Springer] LNCS* **2767**, pp. 273–288, Berlin, Germany, 2003.

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[29] _____. Performance study of reliable server pooling. In *Proc. IEEE Int'l Symp. Netw. Comput. Appl. (NCA)*, pp. 205–212, Cambridge, MA, 2003.

[30] M.U. Uyar, J. Zheng, M.A. Fecko, S. Samtani, and P.T. Conrad. Reliable server pooling for future combat systems. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 927–932, Boston, MA, 2003.

[31] S. Samtani, J.R. Iyengar, and M.A. Fecko. SCTP multistreaming: Preferential treatment among streams. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 966–970, Boston, MA, 2003.

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[40] P.D. Amer, M.A. Fecko, A.S. Sethi, M.U. Uyar, T.J. Dzik, R. Menell, and M. McMahon. Using Estelle to evolve MIL-STD 188-220. In *Proc. Int'l Wksp FDT Estelle*, pp. 157–161, Evry, France, 1998.
[41] M.U. Uyar, M.A. Fecko, A.S. Sethi, and P.D. Amer. Generation of realizable conformance tests under timing constraints. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 966–971, Bedford, MA, 1998.
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[43] M.A. Fecko, P.D. Amer, A.S. Sethi, M.U. Uyar, T. Dzik, R. Menell, and M. McMahon. Formal design and testing of MIL-STD 188-220A based on Estelle. In *Proc. IEEE Mil. Commun. Conf. (MILCOM)*, pp. 716–722, Monterey, CA, 1997.

Unrefereed or in Review

[1] I. Hokelek, M. Fecko, P. Gurung, and S. Samtani. Loop-free IP fast reroute using local and remote LFAPs. Internet draft, IETF, 2007. [draft-hokelek-rlfap-00.txt, work in progress].
[2] I. Hökelek, J. Zou, M.U. Uyar, A. Abdelal, J. Xiao, N. Chakravarthy, K. Henry, M.A. Fecko, and S. Samtani. Dynamic survivable resource pooling in FPGA-based distributed robotics system. *IEEE Trans. Robotics* , 2006. (submitted for **journal** publication).
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[4] S.S. Batth, M.U. Uyar, Y. Wang, and M.A. Fecko. Fault masking by multiple timing faults in timed EFSM models. *IEEE/ACM Trans. Netw.* , 2006. (submitted for **journal** publication).