

OKAN TOPÇU

PERSONAL INFORMATION

Email: okantopcu@gmail.com

Website: <https://sites.google.com/view/okantopcu/home>

ORCID ID: 0000-0003-3900-0078

WoS ResearcherID: AAQ-9459-2021, A-4137-2016

ScholarID: Vo2KAdEAAAAJ

ScopusID: 36955853700

Yoksis Researcher ID: 217315

SHORT BIO

Okan Topçu obtained his bachelor's degree in Electrical/Electronics (Computer) Engineering from the Naval Academy in 1993. In 1999, he earned his master's degree from the Middle East Technical University (METU) Department of Computer Engineering, and in 2007, he completed his doctoral studies in the same department. During the course of his doctoral studies, he conducted research at the Defense Research and Development Atlantic (DRDC Atlantic) Research Center in Canada from 2002 to 2003. In 2010, he pursued research in the field of C4I at the Naval Postgraduate School (NPS) in the United States, and between 2012 and 2013, he carried out postdoctoral research at Auburn University's Department of Computer Science and Software Engineering in the United States.

Prof. Okan Topçu has held various academic positions, including serving as the Coordinator of the Computer Engineering Program at the Middle East Technical University Northern Cyprus Campus (METU NCC) from 2020 to 2021. Between 2021 - 2024, he took on the role of Academic Council President of the Faculty of Engineering and Natural Sciences (equivalent to the position of dean) and he also served as an advisor to the Rector. Since 2016, he has been conducting his research within the Computer Engineering Program at METU NCC.

Prof. Okan Topçu is currently affiliated with Türkiye-Azerbaycan University, where he serves as the coordinator of the Computer Engineering Program offered by METU.

Prof. Okan Topçu is the author of two books on Distributed Simulation and his research interests encompass various areas, including Modeling and Simulation, Distributed Simulation, Intelligent Agents, Autonomous Systems, Software Engineering, Model-Based Engineering, and Cybersecurity.

RESEARCH INTERESTS

Distributed Simulation, Virtual Environments, Goal Deliberation, Decision Making, Autonomous Systems, Intelligent Agents, Creative Evolutionary Systems, Agent-based Simulation, Software Engineering, Model Driven Engineering, Software and Simulation Architectures, Software Verification and Validation, C4I Systems, Domain Specific Modeling, Cyberspace Defense, Cybersecurity.

EDUCATION

Academic Degree	Institution
Ph.D. (09/2000 – 12/2007)	Middle East Technical University Department of Computer Engineering, Ankara, Turkey
MS (09/1997 – 12/1999)	Middle East Technical University, Department of Computer Engineering, Ankara, Turkey
BS (08/1989 – 08/1993)	Naval Academy, Department of Electrical and Electronic (E&E) Engineering (Computer), Istanbul, Turkey

PUBLICATIONS

Books

- 2 **Topçu, Okan**, and Halit Oğuztüzün. “[Guide to Distributed Simulation with HLA](#)”, Springer Series in Simulation Foundations, Methods, and Applications Series, **Springer International Publishing**, eBook ISBN: 978-3-319-61267-6, Hardcover ISBN: 978-3-319-61266-9, DOI: [10.1007/978-3-319-61267-6](#), 327 pages, Cham, Zug, Switzerland, August 23, 2017.
- 1 **Topçu, Okan**, Umut Durak, Halit Oğuztüzün, and Levent Yılmaz. “[Distributed Simulation: A Model Driven Engineering Approach](#)”, Springer Series in Simulation Foundations, Methods, and Applications Series, **Springer International Publishing**, eBook ISBN: 978-3-319-03050-0, Hardcover ISBN: 978-3-319-03049-4, DOI: [10.1007/978-3-319-03050-0](#), 276 pages, Cham, Zug, Switzerland, January 28, 2016.

Book Chapters

- 1 Ota, Daniel, and **Okan Topçu**. “[Distributed Ledger-Based Trustful Information Exchange on the Tactical Level](#)”, revised version of DIGILIENCE 2020 conference paper in Springer Digital Transformation, Cyber Security and Resilience book, Communications in Computer and Information Science Series, edition number 1, pp. 12-22, Springer. DOI: [10.1007/978-3-031-44440-1](#). eBook ISBN: 978-3-031-44440-1, softcover ISBN: 978-3-031-44439-5, 258 pages, Springer Cham, October/November 2023.

International Journals (SCI and SCI-Expanded)

- 7 Dalkıran, Emre, Tolga Önel, **Okan Topçu**, and Kadir Alpaslan Demir. “Automated Integration of Real-Time and Non-Real Time Defense Systems”, Defence Technology Journal, vol.17, issue 2, pp. 657-670, DOI: [10.1016/j.dt.2020.01.005](#), ISSN: 2214-9147, Elsevier, Jan 2020 (online), April 2021 (press).
- 6 **Topçu, Okan**. “Adaptive Decision-Making in Agent-based Simulation”, Journal of Simulation: Transactions of the Society for Modeling and Simulation International, vol.90, issue 7, pp. 815-832, DOI: [10.1177/0037549714536930](#), ISSN: 0037-5497, SAGE, July 2014.
- 5 **Topçu, Okan**, and Halit Oğuztüzün. “Layered Simulation Architecture: A Practical Approach”, Simulation Modelling Practice and Theory (SIMPAT) Journal, vol. 32, pp. 1-14, DOI: [10.1016/j.simpat.2012.11.001](#), ISSN: 1569-190X, Elsevier, March, 2013.

- 4 Adak, Mehmet, **Okan Topçu**, and Halit Oğuztüzün. "Model-based Code Generation for HLA Federates", *Software: Practice and Experience (SPE) Journal*, vol. 40, no.2, pp. 149-175, [DOI: 10.1002/spe.949](https://doi.org/10.1002/spe.949), ISSN: 0038-0644, Wiley Interscience, February 2010.
- 3 **Topçu, Okan**, Mehmet Adak, and Halit Oğuztüzün. "Metamodeling Live Sequence Charts for Code Generation", *Software and Systems Modeling (SoSym) Journal*, vol. 8, no.4, pp. 567-583, [DOI: 10.1007/s10270-009-0113-8](https://doi.org/10.1007/s10270-009-0113-8), ISSN: 1619-1366 (print version), Springer, Feb 2009 (online), September 2009.
- 2 **Topçu, Okan**, Mehmet Adak, and Halit Oğuztüzün. "A Metamodel for Federation Architectures", *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, vol.18, issue 3, article no. 10, pp.10:1-10:29, [DOI:10.1145/1371574.1371576](https://doi.org/10.1145/1371574.1371576), ISSN: 1049-3301, ACM, July 2008.
- 1 **Topçu, Okan** and Halit Oğuztüzün. "Developing an HLA Based Naval Maneuvering Simulation", *Naval Engineers Journal (NEJ)* by American Society of Naval Engineers (ASNE), vol.117, no.1, pp. 23-40, [DOI: 10.1111/j.1559-3584.2005.tb00319.x](https://doi.org/10.1111/j.1559-3584.2005.tb00319.x), ISSN: 0028-1425, Wiley Interscience, January 2005.

Topçu, Okan and Levent Yılmaz. "Workflow Discovery and Evaluation System", manuscript, 2016.

International Journals (Others)

- 3 **Topçu, Okan** and Levent Yılmaz. "Rapid Prototyping of Cognitive Agent Simulations Using C-BML Transformations", *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology (JDMS)*, vol.17, issue 2, pp. 155-173, [DOI: 10.1177/1548512919860222](https://doi.org/10.1177/1548512919860222), ISSN: 1548-5129, SAGE, first published online July 4, 2019, issue published April, 2020, indexed by ESCI.
- 2 Ünal, Ömer, and **Okan Topçu**. "Modeling Unmanned Surface Vehicle Patrol Mission with Coalition Battle Management Language (C-BML)", *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology (JDMS)*, Special Issue: Novel Approaches to Defense and Military Modeling and Simulation, [DOI: 10.1177/1548512912475107](https://doi.org/10.1177/1548512912475107), vol.11, issue 3, pp.277-308, ISSN: 1548-5129, SAGE, originally published online March 08, 2013, June 2014, indexed by ESCI.
- 1 **Topçu, Okan**, and Halit Oğuztüzün. "Scenario Management Practices in HLA-Based Distribution Simulation", *Journal of Naval Science and Engineering (JNSE)*, ISSN: 1304-2025, vol.6, issue 2, pp.1-33, April 2010.

Magazine Articles

- 2 Akarı, Selçuk, **Okan Topçu**, Yekta Kılıç, Emre Dalkıran. "Decision Making in Command and Control (Komuta Kontrolde Karar Verme)", *Turkish Navy Magazine (Deniz Kuvvetleri Dergisi)*, vol.623, pp. 67-78, [ISSN: 1300-2015](https://doi.org/10.1300-2015), in Turkish, September, 2015.
- 1 **Topçu, Okan**. "Intelligent Autonomous Systems (Akıllı Otonom Sistemler)", *Turkish Navy Magazine (Deniz Kuvvetleri Dergisi)*, issue 622, pp 18-25, [ISSN: 1300-2015](https://doi.org/10.1300-2015), in Turkish, May, 2015.

International Conferences

- 12 Ota, Daniel, and **Okan Topçu**. "[Distributed Ledger-Based Trustful Information Exchange on the Tactical Level](#)", 2nd International Scientific Conference "Digital Transformation, Cyber Security and Resilience" (DIGILIENCE 2020). Varna, Bulgaria, Sep 30 – Oct 02, 2020.

- 11 Altunay, Damla Gül, Naciye Karademir, Cem Direkoğlu, and **Okan Topçu**. “Intelligent Surveillance System for Abandoned Luggage”, 26th IEEE Signal Processing and Communications Applications Conference (SIU 2018), [DOI: 10.1109/SIU.2018.8404327](https://doi.org/10.1109/SIU.2018.8404327), ISBN: 978-1-5386-1501-0, İzmir, Turkey, May 02-05, 2018.
- 10 **Topçu, Okan**. “Using Situational Awareness for Adaptive Decision Making in Agent-Based Simulation”, Winter Simulation Conference (WSC 2017), [DOI: 10.1109/WSC.2017.8247873](https://doi.org/10.1109/WSC.2017.8247873), ISBN: 978-1-5386-3428-8, pp. 1276-1287. IEEE Press, Las Vegas, NV, December 03-06, 2017.
- 9 **Topçu, Okan**, and Levent Yılmaz. “Agent-Supported Simulation for Coherence-Driven Workflow Discovery and Evaluation”, Winter Simulation Conference (WSC 2014), pp. 419–428. IEEE Press. Savannah, GA, December 07-10, 2014.
- 8 Durak, Umut, **Okan Topçu**, Robert Siegfried, and Halit Oğuztüzün, “Scenario Development: A Model Driven Engineering Perspective”, 4th International Conference on Simulation and Modeling Methodologies, Technologies and Applications (SIMULTECH 2014), [DOI: 10.5220/0005009501170124](https://doi.org/10.5220/0005009501170124), pp. 117 – 124, Vienna, Austria, August 28 – 30, 2014.
- 7 İşçi, Serkan, **Okan Topçu**, and Levent Yılmaz, “Extending the Jadex Framework with Coherence-Driven Adaptive Agent Decision-Making Model”, IEEE/WIC/ACM Conference on Intelligent Agent Technology (IAT 2014), [DOI: 10.1109/WI-IAT.2014.149](https://doi.org/10.1109/WI-IAT.2014.149), pp. 48-55, Warsaw, Poland, Aug 11 – 14, 2014.
- 6 **Topçu, Okan**, and Halit Oğuztüzün, “Multi-layered Simulation Architecture: A Practical Approach”, in the Proceedings of 26th International Symposium on Computer and Information Sciences (ISCIS), ISBN 978-1-4471-2155-8, Springer, pp 439-443, short paper, London, UK, September 26 - 28, 2011.
- 5 Kızılay, Vijdan, **Okan Topçu**, Halit Oğuztüzün, and Feza Buzluca, “Verifying the Interface Compliance of Federates Using Pre- and Postconditions of RTI Services”, 09F-SIW-079, in the Proceedings of 2009 Fall Simulation Interoperability Workshop (SIW), Orlando, Florida, USA, September 20 - 25, 2009.
- 4 Molla, Ayhan, Kaan Sarioğlu, **Okan Topçu**, Mehmet Adak, and Halit Oğuztüzün, “Federation Architecture Modeling: A Case Study with NSTMSS”, 07F-SIW-052, in the Proceedings of 2007 Fall Simulation Interoperability Workshop (SIW), Orlando, Florida, USA, September 16 - 21, 2007.
- 3 **Topçu, Okan**, Halit Oğuztüzün, and M. G. Hazen, “Towards a UML Profile for HLA Federation Design, Part II”, in the Proceedings of Summer Computer Simulation Conference (SCSC-2003), pp. 874-879, Montreal, Canada, July 19 - 24, 2003.
- 2 **Topçu, Okan** and Halit Oğuztüzün, “Towards a UML Extension for HLA Federation Design”, in the Proceedings of 2nd Conference on Simulation Methods and Applications (CSMA-2000), pp 204-213, Orlando, FL, USA, Oct. 29 - 31, 2000.
- 1 **Topçu, Okan** and Halit Oğuztüzün. “Design of a Naval Surface Tactical Maneuvering Simulation System (NSTMSS)”, in the Proceedings of 31st Summer Computer and Simulation Conference (SCSC-1999), pp 319-324, Chicago, Illinois, USA, July 11 - 15, 1999.

National Journals

- 1 Ünal,Ömer and **Okan Topçu**. “Modeling Unmanned Surface Vehicle Patrol Task with NATO Data Model (JC3IEDM) (İnsansız Suüstü Aracı Karakol Görevinin NATO Veri Modeli (JC3IEDM) ile Modellenmesi)”, [the Journal of Defense Sciences \(JDS\) \(Milli Savunma Üniversitesi KHO Savunma Bilimleri Dergisi\)](https://doi.org/10.1501/JDS_0000000810), National Defense University Defense Sciences, ISSN: 1303-6831, vol.11, issue 1, pp. 67-80, reprint from USMOS11 conference, in Turkish, May 2012.

National Conferences

- 3 Ünal, Ömer, and **Okan Topçu**, "Modeling a Patrol Mission of an Unmanned Surface Vehicle Using Nato Data Model (JC3IEDM) (İnsansız Suüstü Aracı Karakol Görevinin Nato Veri Modeli ile Modellenmesi)", 4th National Defence Applications, Modeling and Simulation Conference (4. Ulusal Savunma Uygulamaları Modellleme ve Simulasyon Konferansı - USMOS11), pp. 14-25, ISBN: 978-605-88041-0-4, Ankara, Turkey, in Turkish, June 14-15, 2011.
- 2 Kızılay, Vijdan, **Okan Topçu**, and Halit Oğuztüzün, "Introducing Preconditions and Postconditions of HLA Federate Interface Services to the Federation Architecture Metamodel (HLA Federe Arayüz Servislerinin Ön ve Son Koşullarının Federasyon Mimari Metamodeline Eklenmesi)", 3rd National Defence Applications, Modeling and Simulation Conference (3. Ulusal Savunma Uygulamaları Modellleme ve Simulasyon Konferansı - USMOS09), Ankara, Turkey, in Turkish, June 17-18, 2009.
- 1 Dökeroğlu, Tansel, **Okan Topçu**, and Halit Oğuztüzün, "Federate Interface Specification Library for HLA Federation Architectures (HLA Federasyon Mimarileri için Federe Arayüz Spesifikasyon Kütüphanesi)", 2nd National Software Architecture Conference (2. Ulusal Yazılım Mimarisi Konferansı - UYMK08), pp. 89-98, ISBN: 978-975-483-783-4, İzmir, Türkiye, in Turkish, September 11-12, 2008.

Technical Reports / Memoranda

- 3 **Topçu, Okan**, and Halit Oğuztüzün. "A Metamodel for Live Sequence Charts and Message Sequence Charts". Technical Report (METU-CENG-TR-2007-3), Middle East Technical University, May 2007.
- 2 **Topçu, Okan**. "Development, Representation, and Validation of Conceptual Models in Distributed Simulation", Defence R&D Canada – Atlantic (DRDC Atlantic) Technical Memorandum (TM 2003-142), Halifax, NS, Canada, February 2004.
- 1 **Topçu, Okan**. "Review of Verification and Validation Methods in Simulation: Literature Survey, Concepts, and Definitions", Defence R&D Canada – Atlantic (DRDC Atlantic) Technical Memorandum (TM 2003-055), Halifax, NS, Canada, April 2003.

Thesis

- 2 **Topçu, Okan**. "Metamodeling for the HLA Federation Architectures", PhD Thesis, The Computer Engineering Department, The Graduate School of Natural and Applied Sciences, Middle East Technical University (METU), Ankara, Turkey, December 25, 2007.
- 1 **Topçu, Okan**. "Naval Surface Tactical Maneuvering Simulation System", MSc Thesis, The Computer Engineering Department, The Graduate School of Natural and Applied Sciences, Middle East Technical University (METU), Ankara, Turkey, December 29, 1999.

PROJECTS

Funded Projects

- PI: Okan Topçu Adaptive Decision Making in Autonomous Systems, funded by The Scientific and Technological Research Council of Turkey (TÜBİTAK), 3001 Project, Grant Number 114E008, 31K. Completed 2015.

International Projects

Participant	Cybersecurity: "Blockchain Technology for Coalition Operations". Member of NATO IST-ET-110 Working group, 2019-2020.
Participant	NATO research fellow and verification and validation (V&V) member, Virtual Battle Experiments (VBEs) – 1, Virtual Combat Systems Group, Canada Defence Research and Development Canada – Atlantic Research Center (DRDC Atlantic), Halifax, Canada, 2002.

Unfunded Projects

RACoN	RACoN is an open-source library , which is fundamentally a .NET wrapper for High Level Architecture runtime infrastructure (RTI) application programmer's interface (API). This library is used by simulation researchers, students, and engineers.
SimGe	SimGe is a fully-dressed High Level Architecture (HLA) object model editor, simulation design and development environment, and a code generator that is intended to generate code automatically for HLA based distributed simulations. It is a freeware that is intended for simulation researchers and students.
DeCoAgent	DeCoAgent is an extension to Jadex Framework and aims to develop an autonomous agent, which is using adaptive decision making architecture based on Thagard's deliberative coherence.
FAMM	FAMM is a metamodel for describing the architecture of a High Level Architecture (HLA) compliant federation. A salient feature of the Federation Architecture Metamodel (FAMM) is the behavioral description of federates based on live sequence charts (LSCs). FAMM formalizes the standard HLA Object Model and Federate Interface Specification.
NSTMSS	Conceptually, Naval Surface Tactical Maneuvering Simulation System (NSTMSS) is a distributed virtual environment, where a group of players controls the virtual frigates in real time and some players behave as tactical players that command the groups of the frigates. All shares a common virtual environment, which its environment characteristics (e.g., time of day) and parameters (e.g., the wind direction) are forced by an environment application, obeying a common scenario that is distributed (e.g., role casting), controlled (e.g., injection messages), and monitored by an exercise planner.