



<b>Name</b>	Alexander Totsky
<b>Position, Department/Faculty</b>	Professor of Dept of Information-Communication Technologies
<b>Academic Degree, Academic Title</b>	Doctor of Technical Sciences, Professor
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<b>Scopus Author ID:</b>	<a href="https://www.scopus.com/results/authorNamesList.uri?sort=count-f&amp;src=al&amp;affilName=National+Aerospace+University&amp;sid=94ab5ea6939ce949e0303147a647d692&amp;sot=al&amp;sdt=al&amp;sl=89&amp;s=AUTHLASTNAME%28EQUALS%28Totsky%29%29+AND+AUTHFIRST%28A.V.%29+AND+AFFIL%28National+Aerospace+University%29&amp;st1=Totsky&amp;st2=A.V.&amp;orcidId=&amp;selectionPageSearch=anl&amp;reselectAuthor=false&amp;activeFlag=true&amp;showDocument=false&amp;resultsPerPage=20&amp;offset=1&amp;jtp=false&amp;currentPage=1&amp;previousSelectionCount=0&amp;tooManySelections=false&amp;previousResultCount=0&amp;authSubject=LFSC&amp;authSubject=HLSC&amp;authSubject=PHSC&amp;authSubject=SOSC&amp;exactAuthorSearch=true&amp;showFullList=false&amp;authorPreferredName=&amp;origin=searchauthorfreelookup&amp;affiliationId=&amp;txGid=0fbc624093d0c815ad61034f8c3ccf47">https://www.scopus.com/results/authorNamesList.uri?sort=count-f&amp;src=al&amp;affilName=National+Aerospace+University&amp;sid=94ab5ea6939ce949e0303147a647d692&amp;sot=al&amp;sdt=al&amp;sl=89&amp;s=AUTHLASTNAME%28EQUALS%28Totsky%29%29+AND+AUTHFIRST%28A.V.%29+AND+AFFIL%28National+Aerospace+University%29&amp;st1=Totsky&amp;st2=A.V.&amp;orcidId=&amp;selectionPageSearch=anl&amp;reselectAuthor=false&amp;activeFlag=true&amp;showDocument=false&amp;resultsPerPage=20&amp;offset=1&amp;jtp=false&amp;currentPage=1&amp;previousSelectionCount=0&amp;tooManySelections=false&amp;previousResultCount=0&amp;authSubject=LFSC&amp;authSubject=HLSC&amp;authSubject=PHSC&amp;authSubject=SOSC&amp;exactAuthorSearch=true&amp;showFullList=false&amp;authorPreferredName=&amp;origin=searchauthorfreelookup&amp;affiliationId=&amp;txGid=0fbc624093d0c815ad61034f8c3ccf47</a>
<b>Web of Science ResearcherID:</b>	[ID]
<b>ORCID ID:</b>	0000-0003-3966-0746
<b>Google Scholar:</b>	<a href="https://scholar.google.com.ua/citations?user=MEBF4fIAAAAJ&amp;hl=ru">https://scholar.google.com.ua/citations?user=MEBF4fIAAAAJ&amp;hl=ru</a>
<b>ResearchGate:</b>	<a href="https://www.researchgate.net/profile/Alexander-Totsky#:~:text=Fetal%20hypoxia%20or%20distress%20is,present%2C%20the%20basic...">https://www.researchgate.net/profile/Alexander-Totsky#:~:text=Fetal%20hypoxia%20or%20distress%20is,present%2C%20the%20basic...</a>

## EDUCATION:

### Basic education (university, major, year of graduation):

Kharkov State University, Kharkov, Ukraine, 1974,  
Radio Physics Engineer

### Postgraduate/Doctoral studies:

1977-1980, PhD courses, Kharkov Aviation Institute, Diploma of Candidate of Technical Sciences (PhD) in Radio Engineering, 1981  
Doctor of Technical Science (DrSc), Kharkov Aviation Institute, Diploma of Doctor of Technical

Sciences in Radio Engineering, 2010

## **WORK EXPERIENCE:**

### **Professional Career (Workplace, Years, Position):**

Professor – since 2010 till now

Docent – since 1987 till 2010

Teacher – since 1981 till 1987

PhD student – since 1977 till 1980

Engineer – since 1974 till 1977

### **Teaching Experience:**

Full-time Professor – since 2010 till now

Docent – since 1987 till 2010

Teacher – since 1981 till 1987

### **Experience in International or National Projects:**

Participated in numerous National Projects. For instance, as follows:

- Development of a screening system for early diagnosis of cardiovascular diseases based on high-precision assessment of endothelial function
- A new medical diagnostic complex for non-invasive assessment of endothelial function and the creation of the first domestic system of non-ultrasound monitoring of the condition of the fetus and mother
- Methodological and implementation fundamentals of analysis, adaptive processing and noise-immune coding of multichannel multimedia and telemedicine data

## **RESEARCH ACTIVITIES:**

### **Main Research Areas:**

Digital signal processing techniques including spectral analysis, higher-order spectral analysis, bispectrum-based encoding technique in digital communications, and radar object detection, recognition and classification. Over the last time, estimation of the common power spectral density is found to be very useful in a various number of digital signal processing applications including radar, telecommunications and pattern recognition. Higher-order spectrum that is the Fourier transform of higher-order moment function or cumulant contains unique information not represented in the power spectrum density. Recently, higher-order spectra have been shown to be available for solving various signal processing problems in radar, telecommunications and pattern recognition applications. In particular, bispectrum estimation technique has been found available in detecting non-Gaussian signals in Gaussian noise environment, detecting phase-coupled harmonics in additive Gaussian noise environment, extracting phase-frequency dependences in processed data, as well as extracting novel bispectrum-based classification features for solving radar object recognition and classification problems. The most important reason for exploiting bispectrum estimation in signal processing is in possibility to extract such relationships between spectral components contained in processed data that other technique just disables to extract. Moreover, the bispectrum tends to zero for a stationary zero-mean additive white Gaussian noise (AWGN). Therefore, bispectrum-based signal processing provides suppression of AWGN contribution of unknown variance contained in observed time-series.

### **Number of Publications (Scopus, WoS, others):**

In aggregate, more than 200 publications, 81 publications in Scopus

### **Monographs, Textbooks:**

In aggregate 4 monographs, 6 Chapters in Monographs, 8 textbooks selected

## Participation in Scientific Conferences:

26 International Conference papers

## TEACHING ACTIVITIES:

### Courses Taught:

- Microwave Devices and Engineering (84-85, 85-86, 86-87, 87-88 years).
- Microwave Devices and Shielding Engineering (88-89, 89-90, 90-91, 91-92, 92-93, 93-94, 95-96, 96-97 years).
- Electronic and Quantum Microwave Devices (96-97, 97-98, 99-00, 00-01 years).
- Information Displaying Devices (99-00, 00-01, 01-02, 02-03, 03-04 years).
- Technical Electrodynamics (99-00, 00-01, 01-02 years).
- Fundamental Tomography (97-98, 98-99 years).
- Communication Antenna Devices (08-09, 09-10, 10-11, 11-12 years).
- Antennas and Microwave Devices (07-08, 08-09, 09-10, 10-11, 11-12 years).
- Antenna devices and complexes (13-14....22-25 years)
- Information Theory and Coding (18-19...22-25 years)
- Satellite Communication Systems (04-05, 05-06, 06-07, 07-08, 08-09, 09-10, 10-11, 11-12 years)

### Methodological Materials, Textbooks:

8 selected textbooks

## INTERNATIONAL ACTIVITIES:

### Cooperation with Foreign Universities:

Tampere University of Technology (Finland) – short-time visits (2002 – till now);

University Alcala de Henares (Spain) - short-time visits (2007 – till now)

## SELECTED PUBLICATIONS:

### Key Articles (Scopus, WoS, others):

P.A. Molchanov, J.T. Astola, K.O. Egiazarian, S.P. Leshchenko, M. P. Jarabo-Amores, **A.V. Totsky**

Title: Classification of aerial targets by using bicoherence-based features

Ref. journal: IEEE Transactions on Aerospace and Electronic systems

Vol. 50, No 2, Pages 13, inicial: 1455 – final: 1467, Date: 2014

Place of publication: USA

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Pavlo O. Molchanov, Jaakko T. Astola, Karen O. Egiazarian, **Alexander V. Totsky**

Title: Classification of ground moving targets using bispectrum-based features extracted from micro-Doppler radar signatures

Clave. journal: EURASIP Journal on Advances in Signal Processing 2013, Springer Open, 27 March, 2013.

Key: A , doi: 10.1186/1687-6180-2013-61, Date: 2013

Place of publication: USA

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Authors: J.T. Astola, K.O. Egiazarian, G.I. Khlopov, S.I. Khomenko, I.V. Kurbatov, V.Ye. Morozov, **A.V. Totsky**

Title: Application of bispectrum estimation for time-frequency analysis of ground surveillance Doppler radar echo signals

Ref. journal: IEEE Transactions on Instrumentation and Measurement

Clave: A Vol. 57 , No. 9 , Pages 9, inicial: 1949 final: 1957, Date: Sept. 2008

Place of publication: USA



**Totsky A.V.**, Egiazarian K.O., Fevralev D.V., Katkovnik V.Ya., Lukin V.V., Paliy D.V., Pogrebnyak O.B., Astola J.T.

Title: Performance study of adaptive filtering in bispectrum signal reconstruction

Ref. journal: Circuits Systems and Signal Processing

Key: A Vol. 25, No. 3, Pages 29, inicial: 314 final: 342, Date: 2006

Place of publication: Canada

**Books, Chapters in Collective Monographs:  
Chapters in Books**

6

Authors: **Totsky O.V.**, Viunytskyi O.G.

Title: ECG-data filtering by using cross-bispectrum

Ref. journal Book: Intellectual and Technological Potential of the XXI Century. Monographic series «European Science»

Publishing: Book 33. Part 1. 2024, pp. 179-193

Place of publication: Germany

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5

Authors: **Alexander Totsky**, Karen Egiazarian

Title: Bispectrum- and Bicoherence-Based Discriminative Features Used for Classification of Radar Targets and Atmospheric Formations,

Ref. journal  Book: Topics in Radar Signal Processing, ISBN 978-1-78923-121-2, pp. 243-269, Date: 2018.

Publishing: IntechOpen

Place of publication: United Kingdom

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4

Authors: P.A. Molchanov, A.A. Zelensky, **A.V. Totsky**, J. T. Astola, K.O. Egiazarian

Title: Classification of moving terrestrial radar targets by using time-frequency distributions of the non-stationary backscattering signals

Ref. journal Book: Practical aspects of signal processing in telecommunication systems (cooperative monography) (in Russian)

Pages 20, inicial: 33 final: 52 Date: 2013

Publishing: YURGUES Edition

Place of publication: Rostov-na-Donu (Russian Federation).

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3

Authors: J.T. Astola, K.O. Egiazarian, V.V. Lukin, **Totsky A.V.**, A.A. Zelensky

Title: Bispectrum-based techniques and algorithms for signal processing in noise environment

Ref. journal Book: Digital Signal Processing in Telecommunications.

Clave: CL Pages 58, inicial: 152 final: 209 Date: 2010

Publishing: YRGUES.

Place of publication: Rostov (Russian Federation)

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2

Authors: **A.V. Totsky**, K.O. Egiazarian, V.V. Lukin, P.A. Molchanov, A.A. Roenko, A.A. Zelensky

Title: Signal detection in additive Gaussian noise, Doppler frequency shift and propagation fading fluctuations environment by using third-order test statistics



Ref. journal                      Book: Festschrift in Honor of Jaakko Astola on the Occasion of his 60<sup>th</sup> Birthday  
Clave: CL                              Pages 24, initial: 320                      final: 343                      Date: 2009  
Publishing (si Book): Tampere University of Technology, Finland  
Place of publication: Tampere (Finland).

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1

Authors: **A.V. Totsky**, V.V. Lukin, A.A. Zelensky  
Title: Bispectrum Analysis in Application for Digital Signal Processing  
Ref. journal                      Book: Digital Signal and Image Processing in Radio Physical Applications (in Russian)  
Clave: CL                      Vol.:                      Pages 82, initial: 92 final: 173                      Date: 2007  
Publishing: FIZMATHLIT  
Place of publication: Moscow (Russian Federation).

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### Books

4

Authors: A.A. Zelensky, V.V. Naumenko, **A.V. Totsky**  
Title: Methods for parametric and non-parametric processing of non-stationary signals using the properties of third-order cumulant functions and bispectrum (in Russian)  
Pages: 340 p.  
Date: 2016  
Publishing: National Aerospace University  
Place of publication: Kharkov, Ukraine

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3

Authors: **A.V. Totsky**, A.A. Zelensky, V.F. Kravchenko  
Title: Bispectral methods of signal processing: applications in radar, telecommunications and digital image restoration  
Pages: 208 p.  
Date: 2014  
ISBN: 978-3-11-036888  
Publishing: DE GRUYTER Publisher, Berlin, Germany

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2

Authors:                      Zaikin I.P., Zelensky A.A., **Totsky A.V.**, Abramov S.K  
Title:                      Antenna Devices in Telecommunications Systems, (in Ukrainian)  
Clave:                      L  
Pages:                      initial: 001    final: 523  
Date:                      2009  
ISBN:                      978-966- 662-197-2  
Publishing:                      Kharkov, KHAI  
Place of publication:                      Kharkov, Ukraine

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1

Authors: **A.V. Totsky**, V.V. Lukin, A.A. Zelensky, J.T. Astola, K.O. Egiazarian, G.I. Khlopov, V.Ye. Morozov, I.V. Kurbatov, P.A. Molchanov, A.A. Roenko, D.V. Fevralev  
Title: Bispectrum-based methods and algorithms for radar, telecommunication signal processing and digital image reconstruction



Ref. journal            Book: Preprint  
Clave: L                Vol.:                Pages, initial: 001    final: 204                Date: 2008  
Publishing: Tampere International Center for Signal Processing, Tampere University of Technology.  
ISBN: 978-952-15-2031-0  
Place of publication: Tampere, Finland

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## **ADDITIONAL INFORMATION:**

### **Language Proficiency:**

Ukrainian, English, French, Czech, Russian

