



The Third IEEE Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications

Final Program



IDAACS'2005

*The crossing point of Intelligent Data Acquisition & Advanced
Computing Systems and East & West Scientists*

SOFIA, BULGARIA
September 5-7, 2005

ORGANISED BY:
INSTITUTE OF COMPUTER INFORMATION TECHNOLOGIES,
TERNOPIL ACADEMY OF NATIONAL ECONOMY, Ukraine

IN COOPERATION WITH:
FACULTY OF COMPUTER SYSTEMS AND CONTROL,
TECHNICAL UNIVERSITY OF SOFIA, Bulgaria

SPONSORED BY:
Ternopil Academy of National Economy
Technical University of Sofia
IEEE Instrumentation & Measurement Society
Science & Technology Center in Ukraine
IEEE Bulgaria Section
IEEE Computer Chapter of Bulgaria Section

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Workshop Co-Chairmen



Anatoly Sachenko,
The Institute of Computer
Information Technologies,
Ternopil Academy of National
Economy,
Ternopil, Ukraine



Plamenka Borovska,
Faculty of Computer Systems
and Control,
Technical University of Sofia,
Sofia, Bulgaria

International Program Committee Co-Chairmen



Domenico Grimaldi,
University of Calabria,
Rende, Italy



Peter J. A. Reusch,
University of Applied Sciences /
Fachhochschule Dortmund
Dortmund, Germany

IDAACS'2005 Workshop Committee

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Oleksandr Palahin, Ukraine	Vassil Sgurev, Bulgaria
Yaroslav Yatskiv, Ukraine	Kamen Veleev, Bulgaria
Serhiy Yuriy, Ukraine	Kamen Veselinov, Bulgaria

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Theodore Laopoulos, Greece - Chairman	
Lucio Grandinetti, Italy	Fernando Lopes Pena, Spain
Robert Hiromoto, USA	Allen Tucker, USA

Workshop Co-Chairmen:

Anatoly Sachenko, Ukraine	Plamenka Borovska, Bulgaria
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International Program Committee Co-Chairmen:

Domenico Grimaldi, Italy	Peter Reusch, Germany
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International Program Committee:

Nikos Chrisochoides, USA	Natalia Kussul, Ukraine
Dominique Dallet, France	John Lygouras, Greece
Pasquale Daponte, Italy	Kurosh Madani, France
Jose Dias Pereira, Portugal	George Markowsky, USA
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Richard Duro, Spain	Vladimir Oleshchuk, Norway
Mykola Dyvak, Ukraine	John Pollard, UK
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Pierre Fiorini, USA	Elena Shoikova, Bulgaria
Vladimir Golovko, Belarus	Valeriy Shyrochyn, Ukraine
Vladimir Haasz, Czech Republic	Miki Sirola, Finland
Akira Imada, Belarus	Alexander Sovlukov, Russia
Orest Ivakhiv, Ukraine	Demosthenes Stamatis, Greece
Masami Iwase, Japan	George Tombras, Greece
Vladimir Jotsov, Bulgaria	Wolfgang Tysiak, Germany
Ivan Kalchev, Bulgaria	Ioannis Vlahavas, Greece
Zdravko Karakehayov, Bulgaria	Igor Voytovych, Ukraine
Jordan Kolev, Bulgaria	Wieslaw Winiecki, Poland
Nikolay Kolev, Bulgaria	Alain Vande Wouwer, Belgium
Yuriy Kolokolov, Russia	Hideki Yamamoto, Japan
Valeriy Koval, Ukraine	Dali Zhang, China

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Pavlo Bykovyy, Ukraine	Cyril Mechkov, Bulgaria
Viktor Demchuk, Ukraine	Valentin Mollov, Bulgaria
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Volodymyr Hrusha, Ukraine	Roman Pasichnyk, Ukraine
Borys Kharchuk, Ukraine	Taras Puhol, Ukraine
Ljuben Klochkov, Bulgaria	Plamen Tzvetkov, Bulgaria
Roman Kochan, Ukraine	Nataliya Yatskiv, Ukraine
Nikolay Kolev, Bulgaria	Lyudmyla Zahorodnya, Ukraine

Message from Chairmen

It's our pleasure to invite all of you to participate in the Third IEEE Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS), <http://umcs.maine.edu/~idaacs/> which will be held in Sofia.

The IDAACS Workshop is organized by the Institute of Computer Information Technologies of the Ternopil Academy of National Economy in cooperation with the Faculty of Computer Systems and Control, Technical University of Sofia. It is supported financially by the Ternopil Academy of National Economy, the Technical University of Sofia, IEEE Instrumentation and Measurement Society (IMS), the Science and Technology Center in Ukraine, IEEE Bulgaria Section, IEEE Computer Chapter of Bulgaria Section. Technical cooperation and support is also provided by IEEE Region 8, the IEEE/IMS/Technical Committee on Education for Instrumentation and Measurement, State International Committee of Science and Culture at the National Academy of Sciences of Ukraine, Ministry of Education and Science of Ukraine, IEEE Ukraine Section, IEEE Instrumentation & Measurement/Computation Intelligence Joint Societies Chapter of Ukraine Section, IEEE Student Branch at Ternopil Academy of National Economy, the Aristotle University of Thessaloniki, Greece, the University of Maine, U.S.

The one of the IDAACS Workshop's strategies is the promotion of the collaboration between the East & West Scientists, and the phrase – IDAACS is the crossing point of Intelligent Data Acquisition & Advanced Computing Systems and East & West Scientists – became therefore the motto of the IDAACS Workshop. The First IDAACS Workshop was held in Foros, Crimea, Ukraine, July 1-4, 2001, and there were totally the 70 participants from 18 countries, the proceedings of IDAACS'2001 consisted of 280 pages. The IEEE Second IDAACS'2003 was held in Lviv, Ukraine, September 8-10, 2003, there were the 85 participants from 21 countries, the proceedings of IDAACS'2003 consisted of 529 pages.

The Program Committee of IDAACS'2005 has accepted 147 papers by authors coming from different countries of Europe, America and Asia. We would like to thank very much all the reviewers of the submitted papers – their names are listed in the proceedings, their contribution to the quality and success of this Workshop is

hereby grateful acknowledged. As a result of the selection process 96 papers have been chosen and scheduled for oral presentations and 51 papers - for poster presentations, they are organized in 16 oral and 8 poster sessions. A selection of these papers will be proposed for publication in a Special Issue of the International Journal of Computer Standards & Interfaces, and the IEEE Transactions on Instrumentation & Measurement, and the International Journal of Computing, and the International Journal Sensors and Systems (Datchiki i Sistemy in Russian), and other.

Sofia, Bulgaria's capital and largest city with a population of more than 1.2 million people, is world wide known as a historical and cultural center, and it dominates Bulgaria's economic, social and political scenes. Modern Sofia is a Tourist's Mecca, filled with a wide assortment of shops, galleries and cafés, scenic tree-lined boulevards, parks and gardens and a large number of recommendable hotels, Vitosha Mountain (peak Cherni Vrah – 2 291 m) is situated on the south part of the town. The National Palace of Culture (known to the locals as "NDK"), in the center of Sofia is the biggest multifunctional complex in the southern part of Eastern Europe.

Mentioning Bulgaria, the first thing that many tourists think probably is the Black Sea with its endless sunny beaches, emerald waters and modern resorts as Albena, Golden Sands, Sunny Day, Riviera, Kamchia, Sunny Beach, Nessebar, Pomorie, Kraimorie, Sozopol, Tsarevo, Ahtopol, Sinemorets and others. The best-known mountain ranges are Rila (highest peak Mussala 2,925 m.), Pirin (Vihren 2,914 m.), and Stara Planina or the Balkan range (Botev Peak 2,376 m.). Bulgaria has the three National Parks: Pirin, Rila, Central Balkan, and Central Balkan is one of the biggest European protected territories, four of its reserves are included into UNESCO world system "Man and Biosphere". More than 120 monasteries in Bulgaria still fascinate the visitors with the magnificent architecture, rich history and beautiful nature surrounding, including Rozhen Monastery, Ruen Monastery, Svishtov Monastery, Transfiguration Monastery, Troyan Monastery.

Welcome to IDAACS'2005 Conference, enjoy the wonderful Sofia city and the nice country Bulgaria!

Workshop Timetable

SUNDAY, SEPTEMBER 4th, 2005			
05:00 PM	Registration		
07:00 PM	Welcoming Reception		
MONDAY, SEPTEMBER 5th, 2005			
08:00 AM – 09:00 AM	Registration		
09:00 AM – 10:00 AM	Opening		
10:00 AM – 10:30 AM	Coffee Break		
10:30 AM – 12:00 PM	Room: Oral 1 Session M11: Instrumentation and Data Acquisition Systems	Room: Oral 2 Session M21: Artificial Intelligence and Neural Networks	Room: Oral 3 Session M31: High Performance Computing Technologies
01:00 PM – 02:00 PM	Lunch		
02:00 PM – 03:45 PM	Room: Oral 1 Session M41: Distributed Systems and Virtual Instrumentations	Room: Oral 2 Session M22: Artificial Intelligence and Neural Networks	Room: Oral 3 Session M32: High Performance Computing Technologies
12:00 PM – 01:00 PM	Hall: Poster 1 Session MP1: Instrumentation and Data Acquisition Systems	Hall: Poster 2 Session MP2: Artificial Intelligence and Neural Networks	Hall: Poster 3 Session MP3: High Performance Computing Technologies
05:00 PM – 07:00 PM	Sophia City Tour		
TUESDAY, SEPTEMBER 6th, 2005			
08:00 AM – 08:30 AM	Registration		
08:30 AM – 10:00 AM	Room: Oral 1 Session T61: Cyber and Homeland Security	Room: Oral 2 Session T51: Advanced Mathematical Methods for Computer Based Systems	
10:00 AM – 10:30 AM	Coffee Break		
10:30 AM – 12:00 PM	Room: Oral 1 Session T62: Cyber and Homeland Security	Room: Oral 2 Session T52: Advanced Mathematical Methods for Computer Based Systems	
01:00 PM – 02:00 PM	Lunch		

02:00 PM – 03:45 PM	Room: Oral 1 Session T42: Distributed Systems and Virtual Instrumentations	Room: Oral 2 Session T71: Data Processing and Analysis	
12:00 PM – 01:00 PM	Hall: Poster 1 Session TP1: Distributed Systems and Virtual Instrumentations	Hall: Poster 2 Session TP2: Advanced Mathematical Methods for Computer Based Systems	Hall: Poster 3 Session TP3: Cyber and Homeland Security
05:30 PM – 11:30 PM	Workshop Dinner		
WEDNESDAY, SEPTEMBER 7th, 2005			
08:00 AM – 09:00 AM	Registration		
09:00 AM – 10:30 AM	Room: Oral 1 Session W81: Applications of Information Computing Systems	Room: Oral 2 Session W72: Data Processing and Analysis	
10:30 AM – 11:00 AM	Coffee Break		
11:00 AM – 12:30 PM	Room: Oral 1 Session W82: Applications of Information Computing Systems	Room: Oral 2 Session W73: Data Processing and Analysis	
01:00 PM – 02:00 PM	Lunch		
12:30 PM – 01:00 PM	Hall: Poster 1 Session WP1: Applications of Information Computing Systems	Hall: Poster 2 Session WP2: Data Processing and Analysis	
02:00 PM – 04:50 PM	Round Table + Closing		

Workshop Technical Program

SUNDAY, SEPTEMBER 4th, 2005

- 05:00 PM **Registration**
- 07:00 PM **Welcoming Reception**

MONDAY, SEPTEMBER 5th, 2005

- 08:00 AM – 09:00 AM **Registration**
- 09:00 AM – 10:00 AM **Opening**
- 10:00 AM – 10:30 AM **Coffee Break**
- 10:30 AM – 12:00 PM

Session M11: Instrumentation and Data Acquisition Systems

Chairs: **Vladimír Haasz, Czech Technical University, Czech Republic,**
G. Theodoridis, Aristotle University of Thessaloniki, Greece

Room: **Oral 1**

1. Remote Sensor Calibration Through MADAMS Services. F. Cicirelli, A. Furfaro, D. Grimaldi, L. Nigro. Italy.
2. Analysis of Hot-Wire Anemometer Turbulent Signals by Means of Delay Based Networks. F. Bellas, F. López Peña, R. J. Duro, M. Sanchez Simon. Spain.
3. A/D Converters Testing Based on Beat Frequency Method. Daniel Belega, Dominique Dallet. Romania and France.
4. Information System for Analysis of Random Processes in Nonstationary Objects. A.M. Prokhorenkov, N.M. Kachala, I.V. Saburov, A.S. Sovlukov. Russia.
5. Experimental Activities on TTCAN Protocol. Manuele Bertoluzzo. Italy.
6. Processing in Time Domain of 3-D Measured Data. Ivan Kalchev, Bogdana Petrova, and Uliana Paskaleva. Bulgaria.

10:30 AM – 12:00 PM

Session M21: Artificial Intelligence and Neural Networks

Chairs: **Vladimir Golovko, Brest State Technical University, Belarus,**
Arūnas Lipnickas, Kaunas Technical University, Lithuania

Room: **Oral 2**

1. Tree-Like Multiple Neural Network Models Generator with a Complexity Estimation Based Decomposer. Kurosh Madani, Abdennasser Chebira, Mariusz Rybniak, El-Khier Bouyoucef. France.
2. Parallel Algorithm of Enhanced Historical Data Integration Using Neural Networks. Volodymyr Turchenko, Chefi Triki, Lucio Grandinetti and Anatoly Sachenko. Italy and Ukraine.

3. Can an Immuno-fuzzy Approach Detect Only a Few Non-self Cells Existed in an Enormous Amount of Self Cells? Akira Imada, Belarus.
4. Fuzzy Hybridization of “Artificial Neural Networks” (ANN) Based Signal and Image Processing Techniques: Application to Intelligent “Computer Aided Medical Diagnosis” (CAMD). Amine Chohra, Nadia Kanaoui, Véronique Amarger, Kurosh Madani. France.
5. Neuro-Fuzzy Modelling on Experimental Data in the Anaerobic Digestion of Organic Waste in Waters. Snejana Yordanova, Nelly Noikova, Rusanka Petrova, Plamen Tzvetkov. Bulgaria and Finland.
6. Intellectual Search Systems Based on the Model of Natural Language Understanding. Anatoliy Kargin, Anton Paramonov. Ukraine.

10:30 AM – 12:00 PM

Session M31: High Performance Computing Technologies

Chairs: **Pierre Fiorini, University of Southern Maine, USA,**

Wolfgang Tysiak, University of Applied Sciences, Dortmund, Germany

Room: **Oral 3**

1. In-Chip Configuration for Monitoring Power Consumption in Micro-processing Systems. V. Konstantakos, K. Kosmatopoulos, S. Nikolaidis, and Th. Laopoulos. Greece.
2. Multiplicative Devices’ SH-Models. Mykola Cherkaskyy, Mourad Houssein Khalil. Ukraine and Lebanon.
3. I/O-Aware List Scheduling for Distributed Embedded Systems. Zdravko Karakehayov. Denmark.
4. A Door Lintel Locator Sensor for Mobile Robot Topological Navigation. V. Egido, M.J.L. Boada, R. Barber and M.A. Salichs. Spain.
5. The Effect of Data-Reuse Transformations on Multimedia Applications for Application Specific Processors. N. Vassiliadis, A. Chormoviti, N. Kavvadias, S. Nikolaidis. Greece.
6. Parallel Out-of-Core Constrained Delaunay Mesh Generation. Andriy Kot, Andrey Chernikov, Nikos Chrisochoides. USA.

01:00 PM – 02:00 PM

Lunch

02:00 PM – 03:45 PM

Session M41: Distributed Systems and Virtual Instrumentations

Chairs: **Theodore Laopoulos, Aristotle University of Thessaloniki, Greece,**

Wieslaw Winiecki, Warsaw University of Technology, Poland

Room: **Oral 1**

1. Virtual Instrument – no Virtual Reality but Real PC Based Measuring System. Vladimír Haasz, Antonín Platil. Czech Republic.
2. Data Stream Synchronization of Distributed Measurements Systems using GPS Technology. Detlef Helling, Marc Hense, Herman van der Auweraer, Jan Leuridan. Germany and Belgium.
3. Constraint-based Localization of Nodes in Wireless Networks. Dániel Darabos, Tódor Balázs. Hungary.

4. Functional Generator and Data Acquisition System Controlled by Internet. Rumen Iv. Arnaudov, Ivo N. Dochev. Bulgaria.
5. Precision Data Acquisition (DAQ) Module with Remote Reprogramming. Roman Kochan, Orest Kochan. Ukraine.
6. A Virtual Instrument for Non-invasive Intracranial Pressure Detection. Qin Shuren, Ji Zhong. China.
7. Portable Chronofluorometer for Express-Diagnostics of Photosynthesis. V. Fedack, O. Kytaev, P. Klochan, V. Romanov, I. Voytovych. Ukraine.

02:00 PM – 03:45 PM

Session M22: Artificial Intelligence and Neural Networks

Chairs: **Kurosh Madani, University PARIS XII, France,**
Volodymyr Turchenko, Ternopil State Economic University, Ukraine

Room: **Oral 2**

1. Multi-agent Systems in a One-man Operation Measurement Setup. Antonio Vecchio, Alexander Hüntemann, Herman Van der Auweraer, Jan Leuridan. Belgium.
2. Evolutionary Learning in Identification of Fuzzy Model of Air Flow Supply System. Arūnas Lipnickas, Vidmantas Mačerauskas, Vaclovas Kubilius. Lithuania.
3. Intrusion Recognition Using Neural Networks. Vladimir Golovko, Pavel Kochurko. Belarus.
4. Approach to Face Recognition Using Neural Networks. Ihor Paliy, Anatoly Sachenko, Vasyl Koval, Yuriy Kurylyak. Ukraine.
5. Distributed Neural Network Used in Control of Brake Torque Distribution. Iwona Adamiec-Wójcik, Krystian Obrocki, Kornel Warwas. Poland.
6. The Software Structure Development for Mobile Robot Control. Vasyl Koval, Oleh Adamiv. Ukraine.

02:00 PM – 03:45 PM

Session M32: High Performance Computing Technologies

Chairs: **Richard Duro, University of La Coruna, Spain,**
Bob Hiromoto, University of Idaho, USA

Room: **Oral 3**

1. Analytically Modeling Unreliable Parallel Processing Systems with General Task Time Distributions. Pierre M. Fiorini. USA.
2. Enhancing Embedded Processors with Specific Instruction Set Extensions for Network Applications. A. Chormoviti, N. Vassiliadis, G. Theodoridis, and S. Nikolaidis. Greece.
3. Cloud Mask Extracting from Meteosat Data with Use of Parallel Markovian Segmentation Algorithm. Natalia Kussul, Michael Korbakov, Alexiy Kravchenko, Andriy Shelestov. Ukraine.
4. Associative Matrix Complexity Levels. Mykola Cherkaskyy, Said Sadek Abdallah. Ukraine and Lebanon.
5. A High-Speed FPGA Implementation of the SHA-1 Hash Function. A.P. Kakarountas, G. Theodoridis, T. Laopoulos, and C.E. Goutis. Greece.

6. Simultaneous Localization and Mapping with Particle Swarm Localization. Tódor Balázs, Dániel Darabos. Hungary.
7. Performance-Driven Floorplanning Technique based on Collaboration of Software and Hardware. Masaya Yoshikawa, Masahiro Fukui, Hidekazu Terai. Japan.

12:00 PM – 01:00 PM

Session MP1: Instrumentation and Data Acquisition Systems

Chair: **Plamen Tzvetkov, Technical University of Sofia, Bulgaria**

Hall: **Poster 1**

1. Reliability Indicators for Redundant Systems used on Ships. Cornel Panait, George Caruntu, Marieta Dragomirescu, Ovidiu Dragomirescu. Romania.
2. Data Acquisition System and Reference Model Used for the Investigation and Verification of the Resistance Tomography System. Mykhaylo M. Dorozhovets, Pawel Potyranski. Ukraine and Poland.
3. The Measurement of the Torque at the Naval Engine Shaft. George Caruntu, Cornel Panait. Romania.
4. Accurate Measurement of Delay-Time for Ultrasonic Signals Monitoring Applications. N. Tsagourias, I. Pafilis, C. Kosmatopoulos, Th. Laopoulos. Greece.
5. Intelligent Data Acquisition System Error Correction in Working External Conditions. Petro Stoliarchuk, Vasyl Yatsuk, Maryna Mikhailieva, Grygoriy Barylo. Ukraine.
6. Vertical Hall Effect Devices in the Basis of Smart Silicon Sensors. Chavdar Roumenin, Konstantin Dimitrov and Plamen Tzvetkov. Bulgaria.

12:00 PM – 01:00 PM

Session MP2: Artificial Intelligence and Neural Networks

Chair: **Anatoliy Kargin, Donetsk National University, Ukraine**

Hall: **Poster 2**

1. Object Oriented Neural Network in .NET Framework. Pawel Falat. Poland.
2. Application of Neural Network to Control the Load Motion of an Offshore Crane. Pawel Falat, Lucyna Brzozowska, Krzysztof Brzozowski. Poland.
3. Combining Clonal Selection Algorithm and Gene Expression Programming for Time Series Prediction. V.I. Litvinenko, P.I. Bidyuk, J.N. Bardachov, V.G. Sherstjuk, A.A. Fefelov. Ukraine.
4. Intellectual Microprocessor Systems in Electroenergetics. Andriy Segin, Igor Sabadash. Ukraine.
5. An Application of Artificial Neural Network to Diesel Engine Modelling. Lucyna Brzozowska, Krzysztof Brzozowski, Jacek Nowakowski. Poland.
6. Neural Network's Classification of Terrestrial Surface by Spectral Measuring. Alla Lavrenuk, Lilia Gnibeda, Katherine Yarova. Ukraine.
7. Recognition of MPS Output Signal Described by Different Mathematical Models. Iryna Turchenko, Volodymyr Kochan, Anatoly Sachenko. Ukraine.

12:00 PM – 01: 00 PM

Session MP3: High Performance Computing Technologies

Chair: **Mykola Cherkaskyy, National University “Lviv Polytechnic”, Ukraine**

Hall: **Poster 3**

1. Precision Single-line Dimension Measurement Using CMOS Image Sensor and Photometric Interpolation. Jan Šedivý, Jan Fischer. Czech Republic.
2. Analysis of Human Operation Utilizing Closed-loop Identification Method. Shoshiro Hatakeyama, Masami Iwase, Satoru Yamaura. Japan.
3. SCIT – First Supercomputer Cluster in Ukraine, Hardware Architecture and Software. Valeriy Koval, Volodymyr Savyak, Ivan Serhienko. Ukraine.
4. Category Model of Process of Repeated Software Testing. Viktor Lokazyuk, Tetyana Govoruschenko. Ukraine.
5. A Comparison of Aggregation/Broadcast Methods and Multicomputer Architectures, and an Examination of the Communication Overhead on the IBM pSeries 655. Linda Markowsky. USA.
6. Information Technologies of Models Formalization and Designing for Data Movement in Computer Networks of Automatic Control System. Yaroslav Nykolaychuk, Igor Pitukh, Natalia Vozna, Lyubov Nykolaychuk. Ukraine.

05:00 PM – 07:00 PM

Sophia City Tour

TUESDAY, SEPTEMBER 6th, 2005

08:00 AM – 08:30 AM

Registration

08:30 AM – 10:00 AM

Session T61: Cyber and Homeland Security

Chairs: **Dimitrios Serpanos, University of Patras, Greece,**

Assen Krumov, Higher School of Transport, Bulgaria

Room: **Oral 1**

1. A Dynamic Authentication Mechanism for Real-Time Network Security. Craig Bossie, Pierre M. Fiorini. USA.
2. Detection of Unauthorized Intrusion into Cargo Containers that are Under Custom Seals. Vitaliy Firsov, George Markowsky, Sergey Kutovoy, Dmitriy Pozdnyakov, Olga Litvinova, Nataliya Lyzikova. Ukraine and USA.
3. Evaluation System of Suitable Computer Input Device for Patients. Yoshio Tanimoto, Kuniharu Nanba, Yasuhiko Rokumyo, Kazunari Furusawa, Akihiro Tokuhiko, Hiroyuki Ukida, and Hideki Yamamoto, Japan.
4. Modularity, Self-Organization and Complexity Estimation: Three Foremost Supplies toward Intelligent Information Processing. Kurosh Madani. France.
5. A Digital Control Circuit for a Biomedical Microrobot. R.Casanova, A.Dieguez, J.Lacort, A.Arbat and J.Samitier, M.Nierlich, O.Steinmetz. Spain and Germany.
6. A Low-Cost Network Controller for Security Systems. Pavlo Bykovyy, Ihor Maykiv, Iryna Turchenko, Orest Kochan, Vasyl Yatskiv, George Markowsky, Ukraine and USA.

08:30 AM – 10:00 AM

Session T51: Advanced Mathematical Methods for Computer Based Systems

Chairs: **Miki Sirola, Helsinki University of Technology, Finland,**
Mykola Dyvak, Ternopil State Economic University, Ukraine

Room: **Oral 2**

1. Privacy Preserving Detection of Patterns in Event Sequences. Vladimir Oleshchuk. Norway.
2. Automatic Aerodynamic Design of a Wind Turbine through Evolutionary Techniques. V. Díaz Casás, F. Lopez Peña, R. J. Duro, A. Lamas. Spain.
3. Structure and Organization of Typical Virtual Laboratory for Computer-Aided Design. O.V.Palagin, I.B.Galelyuka, V.O.Romanov. Ukraine.
4. Fully Compensated Method for Earth Rotation Measurement with Micromechanical Yaw-Rate Gyro. Nikolay Kolev, Rumen Arnaudov, Yassen Angelov. Bulgaria.
5. Non Coherent Spectral Analysis of ADC using FFT Windows: an alternative approach. Stéphane Razé, Dominique Dallet, Philippe Marchegay. France.
6. Computation of Information Content of Data Analyzing their Symmetry. Alexandr Makarenko, Liudmyla Sagaidak. Ukraine.

10:00 AM – 10:30 AM **Coffee Break**

10:30 AM – 12:00 PM

Session T62: Cyber and Homeland Security

Chairs: **Zdravko Karakehayov, University of Southern Denmark, Denmark,**
Natalia Kussul, Space Research Institute, Ukraine

Room: **Oral 1**

1. A Progress Review of Intelligent CCTV Surveillance Systems. Anthony C. Davies, Sergio A. Velastin. United Kingdom.
2. Fast Detection of Mammographic Masses with Difficult Case Exclusion. Gábor Takács, Béla Pataki. Hungary.
3. Software Reliability, Safety and Security. Assen V. Krumov. Bulgaria.
4. Using Set Theoretic Estimation to Implement Shannon Secrecy Theory. Albert H. Carlson, Richard B. Wells, and Robert E. Hiromoto. USA.
5. Countermeasures Against Distributed Denial of Service Attacks. K. Stefanidis and D. N. Serpanos. Greece.
6. P-adic Shrinking-Multiplexing Generator. Zhaneta Tasheva, Borislav Bedzhev, Borislav Stoyanov. Bulgaria.

10:30 AM – 12:00 PM

Session T52: Advanced Mathematical Methods for Computer Based Systems

Chairs: **George Markowsky, University of Maine, USA,**
Domenico Grimaldi, University of Calabria, Italy

Room: **Oral 2**

1. SOM Based Decision Support in Failure Management. Miki Sirola, Golan Lampi, Jukka Parviainen. Finland.

2. A Method for Synthesis of Perfect Two Dimensional Arrays. Zhaneta Tasheva, Borislav Bedzhev, Borislav Stoyanov. Bulgaria.
3. Algorithm of Tolerance Identification of “Input-Output” Interval Dynamic Model. Mykola Dyvak, Petro Stakhiv, Iryna Kalishchuk. Ukraine.
4. Intelligent Data Acquisition and Processing Using Wavelet Neural-Networks. Andrea Kulakov, Danco Davcev. Macedonia.
5. Criterion of Design of Experiments for Tasks of Decision Support Interval Model Creation. Mykola Dyvak, Andriy Pukas. Ukraine.
6. An Algorithm for Lossless Signal Processing. Borislav Bedzhev, Zhaneta Tasheva, Borislav Stoyanov, Rosen Bogdanov, Bulgaria.

01:00 PM – 02:00 PM **Lunch**

02:00 PM – 03:45 PM

Session T42: Distributed Systems and Virtual Instrumentations

Chairs: **Fernando Lopez Peña, University of Corunna, Spain,**
Orest Ivakhiv, National University “Lviv Polytechnic”, Ukraine

Room: **Oral 1**

1. State of Art of the Distributed Measurement Systems for Industrial and Educational Purposes. D. Grimaldi, S. Rapuano, Th. Laopoulos. Italy and Greece.
2. A Self-Adaptable Method To Optimize The Performance Of Frequency-To-Code Conversion Based Measurement Systems. J.M. Dias Pereira, O. Postolache, P. Silva Girão. Portugal.
3. New Type of Position Encoder With Possibility of Direct Zero Position Adjustment. Dragan Denić, Ivana Randelović. Serbia and Montenegro.
4. Intelligent System for Users’ Activity Monitoring in Computer Networks. Natalia Kussul, Serhiy Skakun. Ukraine.
5. The Parametric Method for Functional Testing of Virtual Instruments. Marek Florczyk, Wiesław Winiecki. Poland.
6. Wireless Distributed Measurement System by Using Mobile Devices. A. Aiello, D.L. Carnì, D. Grimaldi, G. Guglielmelli. Italy.

02:00 PM – 03:45 PM

Session T71: Data Processing and Analysis

Chairs: **Rauf Sadykhov, Belarusian State University of Informatics and Radioelectronics, Belarus,**
Richard Gatward, Coventry University, UK

Room: **Oral 2**

1. Automatic 3D Morphological Design through Evolution. A. Lamas and R.J. Duro. Spain.
2. Image Pre-Processing for Micro Nucleuses Detection in Lymphocyte. Domenico Luca Carnì, Domenico Grimaldi, Francesco Lamonaca. Italy.
3. The Landscape Object Three-dimensional Image Creation. O.Ivakhiv, D.Kravchenko, D.Puyda, V.Puyda. Ukraine.
4. Intelligent Data Analysis in Environmental Sampling. Monica Filice, Pierantonio De Luca, Alfonso Nastro. Italy.

5. Wavelets Transforms Applied to Termite Detection. J.J.G. De la Rosa, I. Lloret, C.G. Puntonet and J.M. Górriz. Spain.
6. Visualization of Stability of Dynamical Systems by 3D Graphics Supported by Cluster Computing. Takashi Funasaka, Masami Iwase, Katsuki Fujisawa, and Shoshiro Hatakeyama. Japan.

12:00 PM – 01:00 PM

Session TP1: Distributed Systems and Virtual Instrumentations

Chair: **Roman Kochan, Ternopil State Economic University, Ukraine**

Hall: **Poster 1**

1. The Use of Web-services for Development of Distributed Measurement Systems. Tomasz Mielcarz, Wieslaw Winiecki. Poland.
2. Tool for Simulation of Control Systems. Stanislovas Bartkevicius, Vidmantas Macerauskas, Kastytis Sarkauskas. Lithuania.
3. Distributed System for Collection and Management of the Information Using Wireless Technology. Simeon Angelov, Veselin Georchev, Angel Angelov, Dichko Batchvarov, Ani Boneva, Rумыana Krasteва, Elmira Bachvarova, Kiril Belov. Bulgaria.
4. Study on the Networked Virtual Instrument and It's Application. Qin Shuren, Liu Xiaofeng, Bo Lin. China.
5. Neurocontroller to Tracking Antenna Control of Information Reception from Earth Remote Sensing Satellites. M. Palamar. Ukraine.
6. Implementing IP over Short Range Wireless Networks. Axel Sikora. Germany.
7. Using Formal Methods to Design Measuring Systems. Robert Łukaszewski, Wiesław Winiecki. Poland.
8. Distributed Web-based Measurement System. Volodymyr Hrusha, Olexandr Osolinskiy, Pasquale Daponte, Domenico Grimaldi, Roman Kochan, Anatoly Sachenko, Iryna Turchenko. Ukraine and Italy.
9. Fuzzy-system of automatic control of power of transmitter in radio communication channel. V.I. Gostev, N.I. Kunakh. Ukraine.

12:00 PM – 01:00 PM

Session TP2: Advanced Mathematical Methods for Computer Based Systems

Chair: **Roman Pasichnyk, Ternopil State Economic University, Ukraine**

Hall: **Poster 2**

1. Investigation and Simulation Social and Ecological Factors Influence on the Social-Ecological Damage. Lyudmila Bartkova, Mykola Dyvak, Yuriy Pigovsky, Frederick Satkowiak. Ukraine and USA.
2. A New Advanced Hybrid Analysis Method in Power Systems Disturbances. Dolores Borrás, Juan Carlos Bravo, Juan Carlos Montaña, Manuel Castilla, Antonio López and Jaime Gutiérrez. Spain.
3. Geometric Methods of Assigning Tolerances. Galina Shilo. Ukraine.
4. Wavelet Analysis of Ultrasonic Guided Waves in Pipeline Inspection. Igor Lyutak. Ukraine.
5. Genetic Algorithm of Structural Identification of Interval Models of Static Systems. Volodymyr Manzhula. Ukraine.

6. Multiple Access on the Basis of Residue Number System Transformation. Vasyl Yatskiv, Nataliya Yatskiv. Ukraine.
7. Optimization Approaches of Multizone Furnace Loading Process Control. Roman Pasichnyk, Alain Vande Wouwer, Yuriy Pigovsky. Ukraine and Belgium.
8. Construction of Optimal Uniform Polar Switched Quantizer in Wide Volume Range. Dragan Antić, Zoran H. Perić, Marko T. Milojković. Serbia and Montenegro.
9. Optimal Piecewise Uniform Vector Quantization of the Memoryless Two Dimensional Laplacian Source. Zoran H. Perić, Aleksandra Ž. Jovanović, Srdjan M. Bogosavljević. Serbia and Montenegro.
10. Burst Recognition Algorithm Based on Symmetry Properties. Anatolii I. Poliarush, I. V. Tetko, Alexander S. Makarenko. Ukraine and Germany.
11. Suboptimal Filter for an Estimate of the State of a Dynamical System. Galina Panayotova, Todor Ivanov, Bulgaria.
12. Fractal Approach to the Analysis and Synthesis of Tumular Cells Images. Oleh Berezsky. Ukraine.

12:00 AM – 01:00 PM

Session TP3: Cyber and Homeland Security

Chair: **Vasyl Koval, Ternopil State Economic University, Ukraine**

Hall: **Poster 3**

1. Data Mining Approaches for Signatures Search in Network Intrusion Detection. Hu Zheng Bing, Valeriy P. Shirochin. China and Ukraine.
2. Formalization Assessment Criterion Attacks on Cryptosystems Using Elliptic Curves. M. P. Karpinsky, I. Z. Yakymenko, J.M. Chaikivska. Ukraine.
3. Modern Algorithms and Methods of the Person Biometric Identification. V.A. Andrijchuk, I.P. Kuritnyk, M.P. Karpinsky, M.M. Kasyanchuk. Ukraine and Poland.
4. The Technology of Identification and Authentication of Financial Transactions. From Smart Cards to NFC-Terminals. Sergiy Golovashych. Ukraine.
5. Automated Optoelectronic Sensors for Medicine and Biology. Volodymyr Korsunsky, Volodymyr Romanov, Mykola Starodub, Igor Voytovych. Ukraine.

05:30 PM – 11:30 PM **Workshop Dinner**

WEDNESDAY, SEPTEMBER 7th, 2005

08:00 AM – 09:00 AM **Registration**

09:00 AM – 10:30 AM

Session W81: Applications of Information Computing Systems

Chairs: **Peter Reusch, University of Applied Sciences Dortmund, Germany,**
Plamenka Borovska, Technical University Sofia, Bulgaria

Room: **Oral 1**

1. cc-IFF: A Cascading Citations Impact Factor Framework for the Automatic Ranking of Research Publications. Dimitris A. Dervos, Thomas Kalkanis. Greece.
2. Hybrid Decision Support Based on Knowledge Discovery and AI Techniques for the Management of Maintenance Services in the Public Transport Sector. Ken Adamson, Piers Campbell, Alessandra Orsoni. United Kingdom.
3. Mining for Contiguous Frequent Itemsets in Transaction Databases. Christos Berberidis, George Tzanis and Ioannis Vlahavas. Greece.
4. Mechanisms for Coordination of Master Planning and Lot Sizing within a Hierarchical Production Planning Model. Rainer Leisten, Pascal Reusch. Germany.
5. Extraction of the Convective Day Category Index using Data Mining Techniques. Evangelos G. Tsagalidis, Leonidas Karamitopoulos, Georgios Evangelidis, Dimitris A. Dervos. Greece.

09:00 AM – 10:30 AM

Session W72: Data Processing and Analysis

Chairs: **Vladimir Oleshchuk, Agder University College, Norway,**
Akira Imada, Brest State Technical University, Belarus

Room: **Oral 2**

1. Face Identification Algorithm Based on Synthetic Linear Descriptors. R. Kh. Sadykhov, V.A. Samokhval. Belarus.
2. Motion Detection Using 3D Image Histograms Sequences Analysis. Panayot Iliev, Plamen Tzvetkov, George Petrov. Bulgaria.
3. Raster Transformation and Resampling Technique for Geodetic Applications. Rauf Kh. Sadykhov, Leonid P. Podenok. Belarus.
4. Real-time Voice over IP over Bluetooth. R. Ali, J.K. Pollard. United Kingdom.
5. Objects Identification on the Color Layout Images of the Integrated Circuit Layers. Alexander Doudkin, Alexander Inyutin, Maksim Vatkin. Belarus.
6. Methods for Specular Color Component Accelerate Calculation. Olexandr Romanuyk, Anatolij Chernij. Ukraine.

10:30 AM – 11:00 AM **Coffee Break**

11:00 AM – 12:30 PM

Session W82: Applications of Information Computing Systems

Chairs: **Elena Shoikova, Technical University of Sofia, Bulgaria,**
Masami Iwase, Tokyo Denki University, Japan

Room: **Oral 1**

1. New Communication Concepts Based upon Advanced RSS Feeds. Peter J. A. Reusch, Bastian Stoll, Torsten Schulwandt, Pawel Serwatowski. Germany.
2. Modeling a Profit-Driven Fishery. Linda Markowsky. USA.
3. VoiceXML-Applications for E-Commerce and E-Learning. Peter J. A. Reusch, Bastian Stoll, Daniel Studnik. Germany.

4. Guidelines for Satellite Tracking (Navstar Software). Dušan Vučković, Petar Rajković, Dragan Janković. Serbia and Montenegro.
5. Models of Project Resources Using. Taras Lendyuk, Roman Pasichnyk, Sergey Rippa, Serhiy Voznyak. Ukraine.

11:00 AM – 12:30 PM

Session W73: Data Processing and Analysis

Chairs: **John Pollard, University College London, UK,**
Nikolay Kolev, Technical University of Sofia, Bulgaria

Room: **Oral 2**

1. Regression Analysis of Intrinsic Linear Models with Automated Transformations of Monotone Predictors. Wolfgang Tysiak. Germany.
2. Experimental Research of the Pulse System Stability and Robustness. Yu.V. Kolokolov, S.L. Koschinsky, A.V. Romanov. Russia.
3. An Automated Acquisition Setup for the Analysis of Chaotic Systems. S.G. Stavrinides, Th. Laopoulos, A.N. Anagnostopoulos. Greece.
4. EthnoModel: An Approach for Developing and Evaluating CSCW Systems. Rahat Iqbal, Richard Gatward, Anne James. The Netherlands and United Kingdom.
5. Interface and Reprogramming Controller for Dynamically Reprogrammable Network Capable Application Processor (NCAP). Roman Kochan, Volodymyr Kochan, Anatoly Sachenko, Ihor Maykiv, Andriy Stepanenko. Ukraine.
6. Real-time Pulse System Emergency Forecasting Through Time-Series Intelligent Processing. Yu.V. Kolokolov, A.V. Monovskaya, A.P. Sholonik. Russia.

01:00 PM – 02:00 PM **Lunch**

12:30 PM – 01:00 PM

Session WP1: Applications of Information Computing Systems

Chair: **Vladimir Romanov, Glushkov Institute of Cybernetics, National Academy of Science, Ukraine**

Hall: **Poster 1**

1. Short-Term Forecasting Model for Commodity and Financial Flows in Electrical Energetics of Ukraine. S.Ye. Saukh, E.P. Semagina. Ukraine.
2. Material Flow Analysis and Plant Lay-Out Optimization of a Manufacturing System. Francesco Longo, Giovanni Mirabelli, Enrico Papoff. Italy.

12:30 PM – 01:00 PM

Session WP2: Data Processing and Analysis

Chair: **Yury Kolokolov, Orel State Technical University, Russia**

Hall: **Poster 2**

1. Research on Virtual Instrument for Wavelet Transform. Baoping Tang, Fabian Cheng, Aijun Yin. China.

2. Method of Multistage Mixing Speech Signals for the Real-Time Multimedia Systems. Anatoly Melnyk, Tymoor Korkishko, Ruslan Shevchuk. Ukraine and Korea.
3. Application of Marching Cubes Algorithm in X-Knife Radiation Treatment Plan System Based on Image Segmentation and Distance Fields. Jinqi Zhang, Dali Zhang. China.
4. Mathematical Model of Electroretinogram in the Form of Linear Stochastic Process. A.V. Matsyuk, M.V. Pryimak. Ukraine.

02:00 PM – 04:50 PM

Round Table + Closing

How to get to Sofia

- **By air**

Sofia is the country's main international airport operating all year round. Varna and Bourgas are used for domestic flights and only during the summer months handle international charter flights. Plovdiv is predominantly a military airport and only operates international charter flights during the winter season.

Sofia Airport – tel.: /+359 2/ 720 672

Plovdiv Airport – tel.: /+359 32/ 551 963

Varna Airport – tel.: /+359 52/ 50 08 34, 50 08 40

Bourgas Airport – tel.: /+359 56/ 340 62

- **By train**

Central Railway Station (Tsentralna Gara) Information - 931-1111 Buy tickets at the Rila Ticket centre (info 987 07 77), near the Central Post office in Sofia. There is also a travel centre under NDK (info 65 84 02). Students with proper ID should be able to get a discount of 40 per cent on tickets.

- **By bus**

Most privately-run domestic and international buses depart from two large staging areas near the central train station in Sofia or from the central bus stations in major Bulgarian cities. Mitsubishi and Mercedes luxurious coaches featuring air-conditioning and video are some of the vehicles used.

State Bus Stations - for national destinations

In Sofia:

North Tel. # 38 31 91

South Tel. # 72 00 63

East Tel. # 955 5362

To Bansko - 3 hours - 7 leva single trip

To Blagoevgrad - under 2 hours - 5 leva

To Sandanski - 3 hours - 6 leva

- **Rent a car**

Big towns, resorts and airports have subsidiaries of the big international rent-a-car companies. You can get the respective information at the hotels or from the tourist agencies. There are petrol stations with all types of fuels in all towns and along the motorways.

Small fees are paid on the border checkpoints for the use of roads. Custom duty is owed for sailing the Danube and crossing the bridges. You can have the updated rates from the Bulgarian tourist offices.

AVIS - 8 Kaloyan St., tel.: +359 2 873412

EURODOLLAR - 25 Vitosha Blvd., tel.: +359 2 875779,

Airport Office, tel.: +359 2 657102, 79323389

EUROPCAR - Head Office: 8 Positano St., tel.: +359 2 835049

Airport Office, tel.: +359 2 720157

HERTZ - 10 Gurko St., tel.: +359 2 817722, 808494

INTERCAR (Including chauffeur drive services) - Airport Office, tel.: +359 2 791477

Registration

The Registration Desk is open on

- Sunday, September 4th, from 5:00 PM to 7:00 PM
- Monday, September 5th, from 8:00 AM to 9:00 AM
- Tuesday, September 6th, from 8:00 AM to 8:30 AM
- Wednesday, September 7th, from 8:00 AM to 9:00 AM

Internet Access

Each participant of the IDAACS'2005 Workshop will have free Internet access capability. The computers will have all necessary Internet-software for connecting to your home servers and remotely read your messages as well as send the new ones.

About Bulgaria

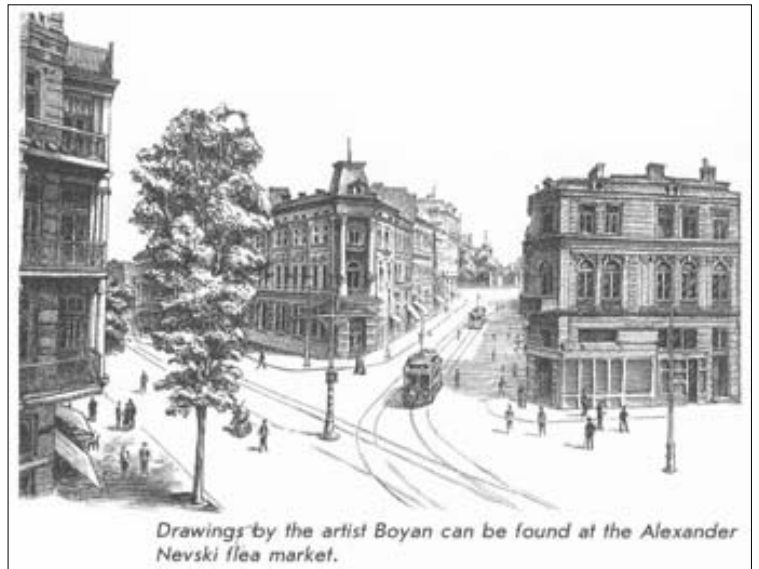
Location and Territory. Bulgaria is located in South-Eastern Europe and occupies the North-Eastern part of the Balkan Peninsula. To the North, the country borders on Romania via the Danube River, to the East it touches the Black Sea, its southern neighbors are Turkey and Greece, and to the West it borders on the Former Yugoslav Republic of Macedonia and Serbia. The total territory of the country is 110,993 sq km and Bulgaria ranks 15th in size among the other European countries.

History. The Bulgarian state was founded in 681 AD as an union of Slavs, Thracians and Proto-Bulgarians. Tsar Boris I converted the state to Orthodox Christianity in 865. This First Bulgarian State, which stretched from the Carpathians in the north to the Balkan range in the south, fell to the Byzantines in 1018. The Second Bulgarian State, established in 1185 at Veliko Turnovo, reinstated the borders and a 'Golden Age' began in which Bulgaria bordered on three seas the Black, the Adriatic and the Aegean Seas. From 1389 to 1878 the country was under the rule ('yoke' as the Bulgarians call it) of the Ottoman Turks. Sofia became the capital of Bulgaria after the Veliko Turnovo Constitution was accepted in 1879. From 1878 (liberation from the Turks) to 1945, Bulgaria enjoyed a brief but unstable period of freedom. In 1945 the Communist Party, led by Georgi Dimitrov, took power and proclaimed Bulgaria a 'People's Republic'. The oppressive Communist rule lasted till November 1989 when, following the lead of the other East European states, Bulgaria peacefully ousted the Party leader Todor Zhivkov and declared itself as a democratic republic.

About Sofia



Sofia has a beautiful city centre whose many late 19th and early 20th century buildings have recently been restored with the help of the UNDP and EU's 'Beautiful Bulgaria' project. In some areas this neo-Classical and Secession architecture sits side by side with the monolithic constructions of the communist period. There are also many glossy new buildings, particularly office centres, and some have made a real effort to integrate their modern glass and metal components with the original facades of the buildings. The municipality has been busy over the past few years and has upgraded the old roads and revived some of the parks and gardens. Although locals complain fiercely about the amount of traffic and air pollution, Sofia is actually quite a tranquil capital city. Car owners still form a relatively small portion of the population and the city is virtually empty on weekends. Outside of the centre most of the city's 1.1 million inhabitants live in the monstrous socialist housing complexes, but beyond these, the city is surrounded on all sides by wonderful mountain ranges. Over the last ten years the suburbs around Sofia, in particular those on Vitosha Mountain, have been overwhelmed with a non-stop building boom as the 'nouveau riche' battle to outdo each other with bigger and grander villas, many in total disregard of their beautiful setting and without the relevant planning permission. Anyone driving around these areas may be forgiven for thinking there is no economic hardship in Bulgaria. Sofia became the capital of Bulgaria as recently as 1879, usurping the position from Veliko Turnovo after six hundred years. Sofia was felt to possess a strategic location and the change of capital marked the end of Bulgaria's dark ages under Ottoman rule. When it became capital, Sofia was a muddy, underdeveloped town of just 12,000 inhabitants, something akin to a large, open-air market. Historians talk of how the city's inhabitants attended the first royal ball dressed in woollen socks and baggy Turkish pants. The city's historic buildings date from the turn of the century up until the 1930s, when there was a rush to bring the city up to date and turn it into a modern European capital. Evidence has been found that Sofia was inhabited as early as 7000 years ago. Thracian and Roman remains can still be seen dotted around the city: in the underpass in front of the presidency, behind the Military Club, and behind the Sheraton hotel. Sofia's thermal springs meant that it was always an attractive place for settlement. There are springs in the city centre, Gorna Banya, Bankya, Knyazhevo and Ovcha Kupel. Under Thracian, and later Roman, rule Sofia was known as Serdika; from the middle of the 6th century the Byzantines renamed it Triaditsa and from the 9th century



onwards during the First Bulgarian Kingdom it took on the Slavonic name of Sredets. The city finally became known as Sofia from the beginning of the 15th century taking on the name Sofia (Wisdom), from St. Sofia church. Sofia's coat of arms was designed in 1900. The city's motto "Raste no ne stare' (grows but does not age) was added a year later. During World War II, Sofia was badly bombed by allied air



raids in the early months of 1944. Over 3000 buildings were totally destroyed and another 9000 damaged. Municipal elections in October last year saw the incumbent mayor, Stefan Sofiyanski, elected for a third term with a narrow lead ahead of the Bulgarian Socialist Party candidate. The successes of his previous mandates include creating several wide new boulevards taking traffic away from the city centre, completing two stages of the city's underground and giving an altogether cleaner and more modern look to the city. On the downside he has failed miserably to tackle the stray dogs issue, the abominable parking situation and to exercise any control over building regulations. Soon after his re-election the tabloid press blew the cover on shocking deals with municipal property over the past 6 years and in particular the amount of land that had been sold off for less than the market price to shady groups implicated in organised crime. A smiling Sofiyanski pointed the finger at the



previous municipal councils. Even so, he has kept an uncharacteristically low profile since the scandal broke. Sofia's main hotels are centrally located and many of the main sights are within easy walking distance. We have put together some walking tour suggestions to take in a variety of Sofia's main sights and you can spend anything from a couple of hours to a whole day along the route depending on whether you choose to visit the museums, galleries and shops en route. Unfortunately still far too many sights lack adequate information in any foreign language, so you may wish to enlist the services of a local guide or purchase a more detailed guide book.

