Advanced systems for prevention & early detection of forest fires (ASPires)

KICK OFF MEETING

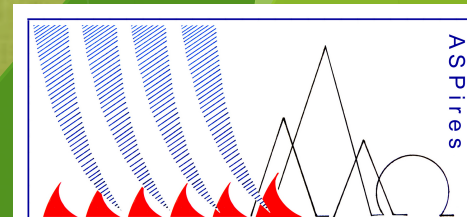**Call for proposals for prevention and preparedness project 2016**
Brussels, 18 January 2017

ECHO/SUB/2016/742906/PREV03

Coordinator: Prof. Dr. Rumen Stainov, Fulda University of Applied Sciences (DE)

20.1.17   1

ASPires

Advanced systems for prevention
and early detection of forest fires

Partners

Fulda University of Applied Sciences (DE)
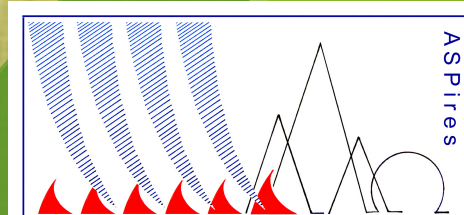
Military Academy Skopje (MK)

Comicon Ltd (BG)

InterConsult Bulgaria Ltd (BG)

Cluster NCITES (BG)

End Users

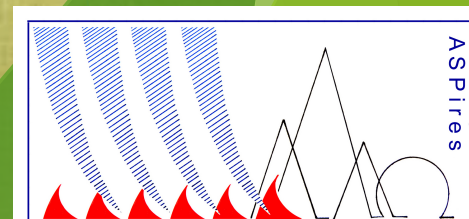## FYR of Macedonia:

- Ministry of Environment and Physical planning.
- Ministry of Agriculture, Forestry and Water.
- Crisis Management Center.
- National Park Mavrovo and National Park Pelister.

Bulgaria:

- Fire Safety and Civil Protection Directorate, Ministry of Interior.

Germany: Bundesministerium des Innern.

ICB SOFTWARE INNOVATION

Comicon®

ASPires

Advanced systems for prevention and early detection of forest fires

Costs

Total eligible cost € 829.523,00

EC co-financing € 622.142,00
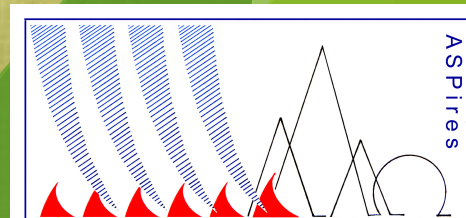
Duration: two years

WEB Page: www.ASPires.eu
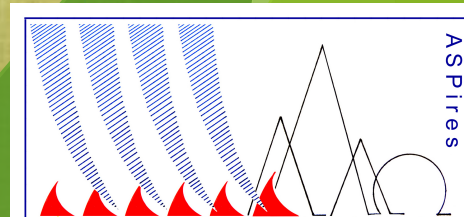
Area of activity

Early detection of Forest fires

Priority

Our system will help all Crisis Management Information Systems in Europe to develop and to implement different methodologies for initial stage warning, localization and organization of the firefighting teams and tactics to suppress the disaster.

ASPires

Advanced systems for prevention and early detection of forest fires

Summary

- Early detection systems of forest fires that integrates sensor networks and mobile (drone) technologies for data collection and acquisition of those data at existing Crisis Management Information Systems (CMIS).

- The mobile (drone) technologies will allow covering much larger areas in order to raise the percentage of forest fires detections in area of particular importance, to monitor area with high fire weather index, and to monitor areas already affected by forest fires.

- Although initially implemented in our test bed in fYR of Macedonia and in our end-users, e.g. Bulgarian Ministry of Interior, our system will be open to all European countries.
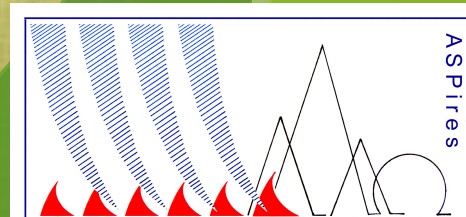
Actions and deadlines

- **A. MANAGEMENT AND REPORTING TO THE COMMISSION, M1 - M24**
  - A.1. Management and Coordination. (HFD et al.)
  - A.2. Financial Management. (HFD et al.)
  - A.3. Evaluation and feedbacks. (HFD et al.)

- **B. PUBLICITY, M1 - M24**
  - B.1. Preparation of publicity material, establishing a web-site.(NCITES et al.)
  - B.2. Dissemination events and workshops. (HFD et al.)
  - B.3. Advocating and Networking - at both bilateral and regional levels. (HFD et al.)

ASPires

Advanced systems for prevention and early detection of forest fires
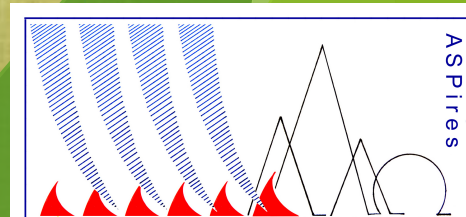
Actions and deadlines

- **C. SYSTEM DEFINITION, M1 - M20**
  - C.1. Conduct comparative analysis with other models of information systems for detection and monitoring forest fires (MA et al.).
  - C.2. Conduct comparative analyzes of occurred forest fires in fYR of Macedonia in period of 2006-2015 (MA et al).
  - C.3. System design of advanced systems for prevention and early detection of forest fires. (MA et al.)
  - C.4. Research of existing interfaces for forest fires (prediction and behaviour). (MA et al.)
  - C.5. MOCK-UP development for existing MKFFIS. (MA et al.)
  - C.6. Creating data-bases, needed to support the upgraded and extended CMIS. (ICB et al.)
  - C.7. Specification and experimental prototype development of the gateway. using standard interfaces. (Comicon, MA, HFD)
  - C.8. Networks and data model simulation.(Comicon, MA, HFD)

Advanced systems for prevention and early detection of forest fires
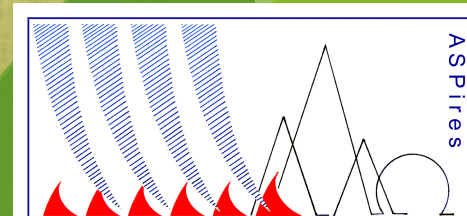
Actions and deadlines

- D. **COMMUNICATION PROTOCOLS AND INTERFACES BETWEEN DIFFERENT ACTORS OF THE CRISIS MANAGEMENT SYSTEM**, M6 – M18
  - D.1. Analysis and description of proper standards for communication with the goal of overcoming the challenges of dependence of the information systems on known and already used technology and creating and partially implementing an information system. (ICB, Comicon, MA)
  - D.2. Creating communication protocols between the users that form the Crisis Management System. (HFD, MA)
  - D.3. Definition of standard interfaces and protocols at sensor network and cloud level. (ICB et al.)

- E. **SYSTEM IMPLEMENTATION AND INTEGRATION**, **M9 – M21**
  - E.1. Algorithms development and connecting market available sensors for detecting forest fires. (ICB..)
  - E.2 Model selection for transferring data to a central database. (MA, ICB)
  - E.3 Data-bases experimentally development for supporting the upgraded and extended CMIS. (MA et al.)
  - E.4. Installing set of cameras detectors and mobile device (like drone) available on the market with a large optical range of monitoring forest fires in areas of particular importance and transfer data to a central database of existing MKFFS. (MA et al.)
  - E.5 Conceptual implementation and partial proof of man-machine platform integration (connecting API and machine learning algorithms). (MA et al.)

20.1.17

Actions and deadlines

- **F. SYSTEM TESTING, VERFICATION AND VALIDATION, M10-M23**

  - F.1. Testing, of the system through simulation. (Comicon, ICB, MA)

  - F.2. Verification and validation of the system through simulation. (Comicon, ICB, MA)

  - F.3. Perform research and measurements to see the degree of efficiency, effectiveness of cameras detectors and mobile device (like drone) in detecting and monitoring of forest fires in areas of particular importance and transfer data to a central database of existing MKFFS. (MA et al.)

- **G. OPERATIVE USE OF UPGRADED AND EXTENDED CMIS, M15-M24**

  - G.1. Connecting the system with the existing systems used in the Crisis Management System and the EU CIWIN (Critical Infrastructure Warning Information Network). (MA et al.)

  - G.2. Familiarization of end users with system. (MA et al.)

  - G.3. Trial Period (Putting part of the system in operative use). (MA et al.)

Advanced systems for prevention and early detection of forest fires
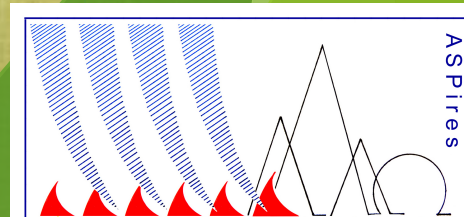
Tentative dates

Start Date 1 May 2017
End Date 30 April 2019
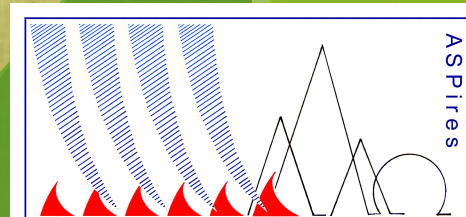
Kick off meeting Sofia March 2017

Virtual steering committee May 2017, September 2017, January 2018, March 2018, June 2018, November 2018

Reporting Periods Months 1- 8, Months 9 – 16

Final Peport for Months 1-24

Workshop with final beneficiaries and partners Skopje, September 2018

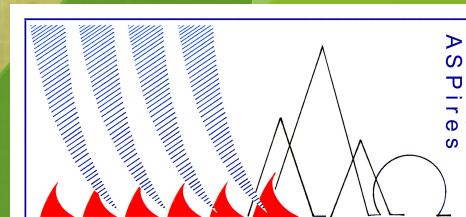**Final conference Brussels,** April 2019

Fulda University of Applied Sciences Germany

- First application-oriented university in the EUA

- Independent right to confer the doctorate within strong research areas

- Right to confer the doctorate in cooperation with a research-university within other research areas

- 87 PhD-students (March 2015)

ICB SOFTWARE INNOVATION

ASPires

Advanced systems for prevention and early detection of forest fires
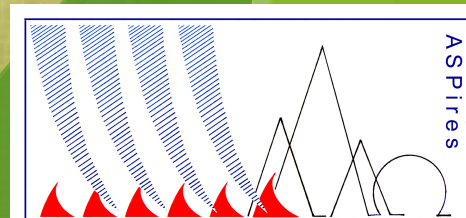
Fulda University of Applied Sciences Germany

Three research focuses :

- Health, Nutrition, Food

- Intercultural Aspects and Social Sustainability

- Computer Science and System Technology

ASPires

Advanced systems for prevention and early detection of forest fires

Fulda University of Applied Sciences Germany

Students   8,062   Professors   170
International Students   1,060 (13 %)   Staff   375
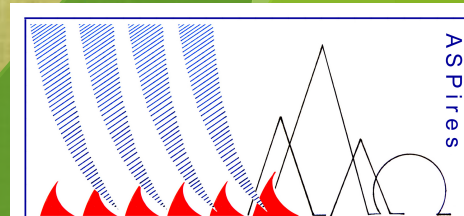
Departments   8

   undergraduate study programmes   34

   Postgraduate study programmes   19

   long distance learning programmes   3

   programmes offered in co-ooporation with
   partner universities (Kassel, Marburg)   4

University Budget in 2014   39,3 mill. €

Advanced systems for prevention
and early detection of forest fires

ASPires

Fulda University of Applied Sciences Germany

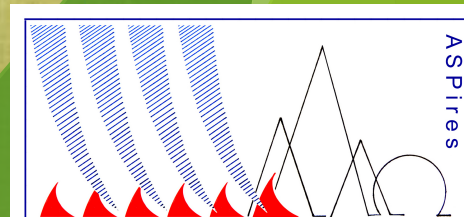Business Administration   1.509 Students*

Social Work   1.367 Students

Nursing and Health Care   1.250 Students

Applied Computer Science   1.182 Students

Social and Cultural Sciences   947 Students

Electrical Engineering and
Information Technology 835 Students

Nutritional, Food and Consumer Sciences 822 Students

Food Technology 583 Students

* figures as of 10/11/16

20.1.17   15

European projects of the University

- Fulda University has coordinated the OPEN-EYE network (COSME, Erasmus for young entrepreneurs) since 2009 and signed a Framework Partnership Agreement until 2021 in 2016 as one of 10 consortia in Europe

- Fulda University has coordinated Erasmus/Leonardo Traineeship mobility consortia since 2001, coordinating 9 regional universities

- Fulda University has coordinated European projects of the Life-Long Learning Programme such as UNI-Key (Erasmus) and Chance (Grundtvig)

- Fulda University participates in numerous EU projects of the H2020, Erasmus+, Interreg, CIP and other programmes; the Dept. of Applied Computer Science participated in the FP7 project I-SEARCH
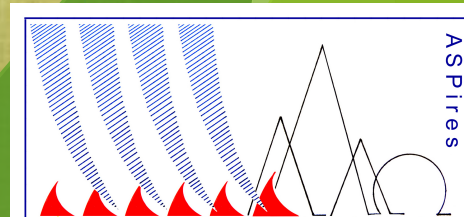
ASPires

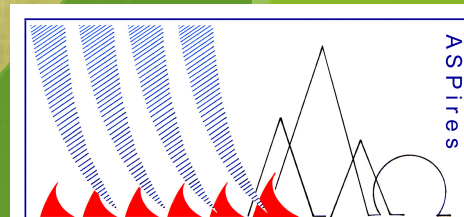Advanced systems for prevention and early detection of forest fires

Military Academy Skopje (MK)

▶ Status Military Academy, Skopje, fYR Macedonia (MA)

- Military academy (MA) is founded by the Law for Military Academy and functions in accordance to the Law for High education and the Law for scientific-research activities in the Republic of Macedonia.

- MA is accredited by the Ministry of education and science according to the European Credit Transfer System.

- MA offers university studies in three cycles (bachelor degree, master studies and specializations, and the third cycle (PhD).

ASPires

Advanced systems for prevention and early detection of forest fires

Military Academy Skopje (MK)

► MISSION

   Military Academy, as the only military high educational and research Institution in the Republic of Macedonia, has a basic role to conduct research work and to educate, train and qualify personnel for the needs of:
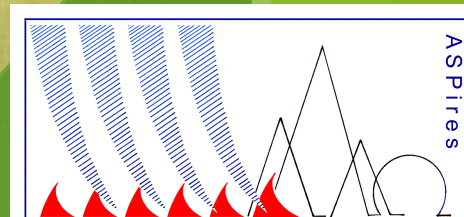
 Ministry of Defence

     Army of Republic of Macedonia

     System of Crisis Management

     System of Protection and Rescue

20.1.17   18

A S P i r e s

Advanced systems for prevention
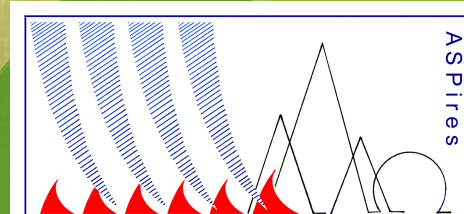and early detection of forest fires

Military Academy Skopje (MK)

INTERNATIONAL PROJECTS
- 2015-2018 Military Academy is a partner in the project "SIARS" Smart I(Eye) Advisory Rescue funded by the NATO program "Science for Peace and Security"
- - 2013-Academy was co-organizer of Advance school for cyber security with over 60 participants from the region
- -2014- Military Academy was co-organizer of Advance school "Terrorist Use of Cyberspace" with over 40 participants from the region and 15 lecturers
- -2015- Military Academy organized a workshop for cyber resistant building society

ASPires

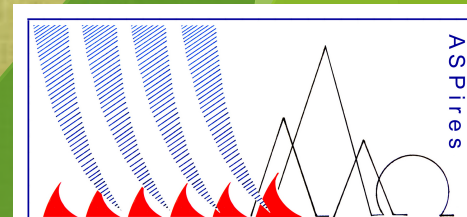Advanced systems for prevention and early detection of forest fires

Military Academy Skopje (MK)

MILITARY ACADEMY DIRECTLY IS RESPONSIBLE FOR IMPLEMENTING OF FOLLOWING ACTIONS:

Action C.1 Conduct comparative analysis with other models of information systems for detection and monitoring forest fires;

Action C.2 Conduct comparative analyzes of occurred forest fires in fYR of Macedonia in period of 2006-2016;

Action C.3 System design in different concepts for advanced prevention and early detection of forest fires;

Action C.4 Research of existing interfaces for forest fires detection and prevention systems (prediction and behavior);

Action C.5 MOCK-UP development for existing CMIS;

20.1.17 20

ASPires

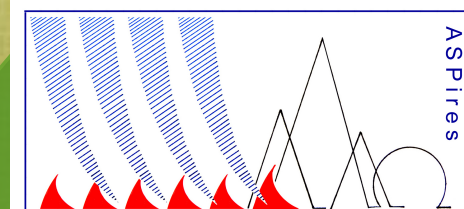Advanced systems for prevention and early detection of forest fires

Military Academy Skopje (MK)

▶ **Action E.3** Data-bases experimentally development for supporting the upgraded and extended CMIS;

▶ **Action E.4** Installing set of cameras and mobile device available on the market in areas of particular importance and transfer data to a central database of existing MKFFS

▶ **Action E.5** Conceptual implementation and partial proof of man-machine platform integration;

ASPires

Advanced systems for prevention and early detection of forest fires

ICB SOFTWARE INNOVATION

Comicon ®

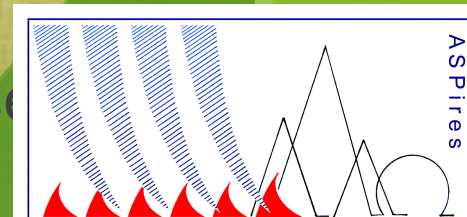# Military Academy Skopje (MK)

▶ **MILITARY ACADEMY DIRECTLY IS RESPONSIBLE FOR IMPLEMENTING OF FOLLOWING ACTIONS:**

▶ **Action F.3** Perform research and measurements to see the degree of efficiency, effectiveness of cameras and mobile device (like drone) in detecting and monitoring of forest fires and transfer data to a central database of existing MKFFS;

▶ **Action G.1** Connecting the system with the existing systems used in the Crisis Management System and the EU CIWIN (Critical Infrastructure Warning Information Network)

▶ **Action G.2** Familiarization of end-users with system;

▶ **Action G.3** Trial Period (Putting part of the system in operative use

Advanced systems for prevention and early detection of forest fires

Military Academy Skopje (MK)
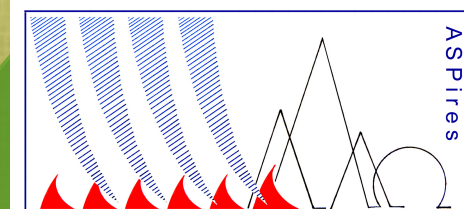
▶ **Duration of the activities in the project 24 mounts**

1. Total costs of the actions in   € 218,855

2. Beneficiary's own contribution in   € 54714

3. Amount of EC contribution requested in   € 164,141

ASPires

Advanced systems for prevention
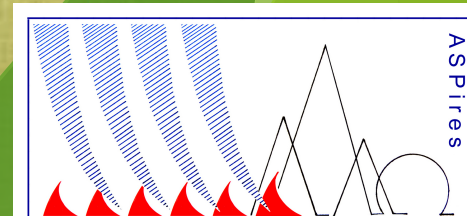and early detection of forest fires

Comicon Ltd (BG)

▶ *AREA OF ACTIVITY*: Comicon is a small-sized R&D and engineering company located in Sofia, Bulgaria. Provides products and services in the field of industrial automation.

▶ *COMICON IS RESPONSIBLE FOR THE FULFILMENT OF THE FOLLOWING PROJECT ACTIONS:*

▶ Comicon Ltd., Bulgaria will specify, simulate and partially perform experimental testing on one or two of the concepts for CMIS systems using its expertise in wireless sensor network, fixed and mobile industrial applications, gateway and controller specification, simulations through OMNET++. The aim of the simulation is to prove the vitality of the solution during disasters.

ICB SOFTWARE INNOVATION

ASPires

Advanced systems for prevention and early detection of forest fires

Comicon Ltd (BG)

▶ *TOTAL ELIGIBLE COST: EUR 143,648*
  ▶ *EC COFINANCING: EUR 107,736*

▶ *DELIVERABLES AND DEADLINES:*

▶ D.C.7. Sensor fixed and mobile network solutions specification. Possible concepts for sensor network applicable for forest fire monitoring and prevention – month 6.

▶ D.C8. Gateway using standard interfaces is specified and experimentally developed - month 14.

▶ D.C.9. Simulation of networks and data model- month 18.

ASPires
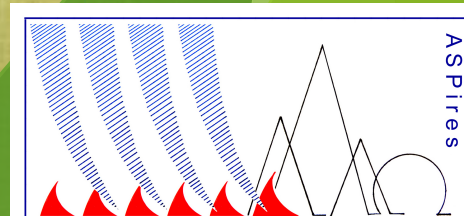
Advanced systems for prevention
and early detection of forest fires

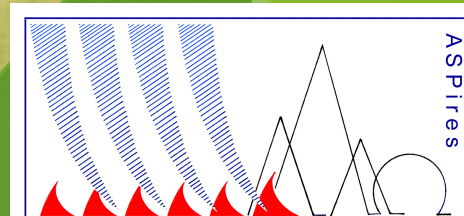# Comicon Ltd (BG)

▶D.D.1.   Proper standards communication protocol between end-users are experimentally developed and implemented - month 14.

▶D.D.3.   Standard interfaces and protocols at sensor network and cloud level are defined - month 16.

▶D.F.1.   System is tested through simulation – month 14.

▶D.F.2.   System is verified and validated through simulations - month 22.

ASPires

Advanced systems for prevention and early detection of forest fires

Comicon Ltd (BG)

▶ Area of activity: Comicon is a small-sized R&D and engineering company established in 1991 and located in Sofia, Bulgaria. The company provides products and services in the field of industrial automation. Its customers are from the oil & gas sector, electric & power utilities, water, construction, telecommunication, mining, food and textile industries, etc. Comicon is ISO 9001 certified.

▶ As R&D company Comicon provides:

© R&D of hardware and software for industrial networks, wireless communication, controllers, interfaces, converters

© R&D of prototypes – hardware and firmware

© Integration of systems of different producers.

ASPires

Advanced systems for prevention and early detection of forest fires

ICB SOFTWARE INNOVATION
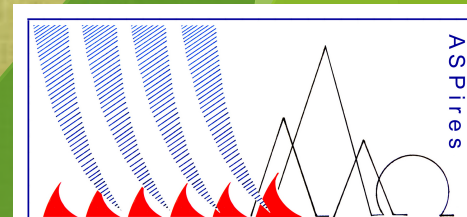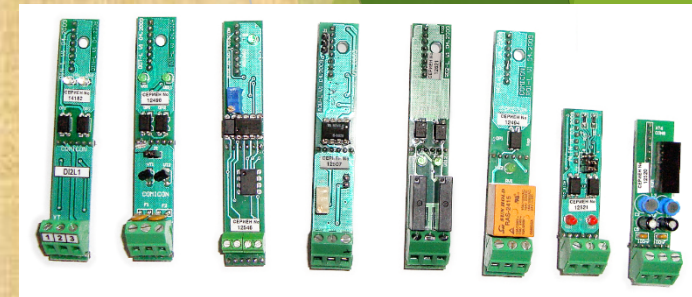
Comicon Ltd (BG)

▶ <u>The expertise of the company is in the following areas</u>:

◎ Zigbee, Zigbee Pro and Zigbee Green Power technologies
◎ Enocean technology
◎ Small and middle sized programmable logic controllers
◎ Wireless and wire industrial networks, communication equipment
◎ SCADA systems, Energy management and monitoring systems
◎ Telemetric systems for control and monitoring of remote installations.

20.1.17

28

ASPires

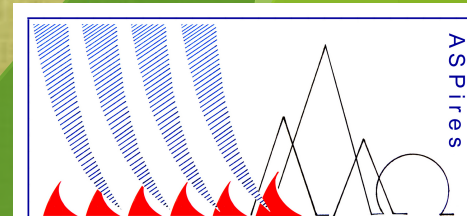Advanced systems for prevention and early detection of forest fires
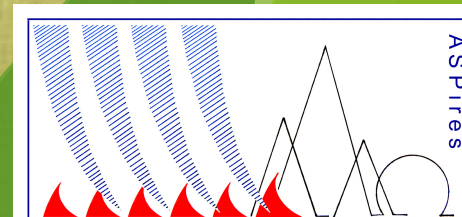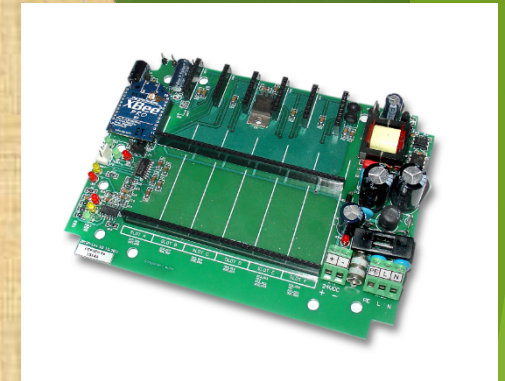
Comicon Ltd (BG)

▶ Comicon Ltd., Bulgaria will specify, simulate and partially perform experimental testing on one or two of the concepts for CMIS systems using its expertise in wireless sensor network, fixed and mobile industrial applications, gateway and controller specification, simulations through OMNET++. The aim of the simulation is to prove the vitality of the solution during disasters.

▶ **TASK C: SYSTEM DEFINITION**

▶ **Action: C.7** Specification and experimental prototype development of the gateway using standard interfaces.

▶ **Action: C.8** Networks and data model simulations.

20.1.17   29

ASPires

Advanced systems for prevention and early detection of forest fires

- **TASK D: COMMUNICATION PROTOCOLS AND INTERFACES BETWEEN DIFFERENT ACTORS OF THE CRISIS MANAGEMENT SYSTEM**

- **Action: D.1** Analysis and description of proper standards for communication with the goal of overcoming the challenges of dependence of the information systems on known and already used technology and creating and partially implementing an information system, based on Structure-oriented Architecture. **Action: D.3** Definition of standard interfaces and protocols at sensor network and at cloud level.
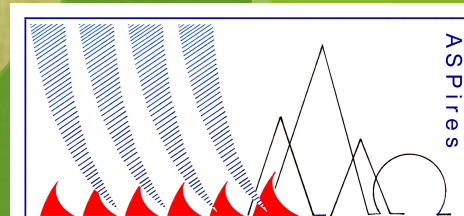
Advanced systems for prevention and early detection of forest fires

ASPires
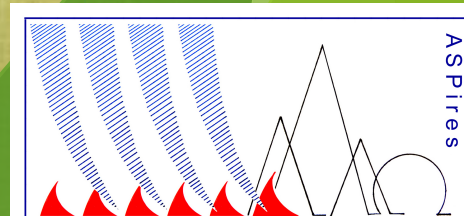
Comicon Ltd (BG)

- **TASK F: SYSTEM TESTING, VERIFICATION AND VALIDATION**
- **Action: F.1** Testing, of the system through simulation.
- **Action: F.2** Verification and validation of the system through simulation.
- *DELIVERABLES AND DEADLINES:*
- **TASK: SYSTEM DEFINITION**
- D.C.7. Sensor fixed and mobile network solutions specification. Possible concepts for sensor network applicable for forest fire monitoring and prevention – month 6.
- D.C8. Gateway using standard interfaces is specified and experimentally developed - month 14.
- D.C.9. Simulation of networks and data model- month 18.

Advanced systems for prevention
and early detection of forest fires

Comicon Ltd (BG)

- **TASK: COMMUNICATION PROTOCOLS and interfaces BETWEEN DIFFERENT ACTORS OF THE CRISIS MANAGEMENT SYSTEM**
- D.D.1.   Proper standards communication protocol between end-users are experimentally developed and implemented - month 14.
- D.D.3.   Standard interfaces and protocols at sensor network and cloud level are defined - month 16.

- **TASK: TESTING THE SYSTEM**
- D.F.1.   System is tested through simulation - month 14.
- D.F.2.   System is verified and validated through simulations - month 22.

ASPires
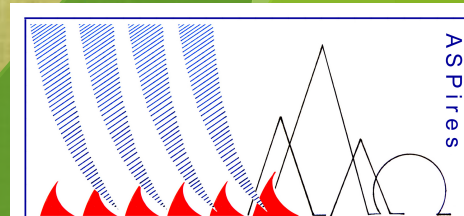
Advanced systems for prevention and early detection of forest fires

ICB | SOFTWARE & CONSULTING

Introduction to ICB

Bridge your domain knowledge with our **development experience**

Partnerships:

Microsoft Partner
Gold Application Development

software AG

OSIsoft partner

LEADING EDGE PARTNERS

Created in 1996 as a Bulgarian-Norwegian entity.
Today, more than **90% of ICB business takes place in the Nordic countries, Western Europe and North America.**

Delivered **350+ projects** for **50+ customers** in 10+ countries.

More than **130 specialists** in business process analysis, enterprise architecture, and agile software development.

BULGARIAN ASSOCIATION
OUTSOURCING
OUTSOURCING EXCELLENCE AWARD
2016

IT EUROPA
European IT Excellence Awards

Deloitte.
Technology Fast 50

ИНОВАЦИОНЕН СЕК...
INNOVATION HUB 2013 AWARD

IT EUROPA
EUROPEAN IT & SOFTWARE
EXCELLENCE AWARDS
2016 WINNER

MICROSOFT PARTNER
Award 2013

20.1.17   33

Comjcon ®

ICB SOFTWARE INNOVATION

ASPires

Advanced systems for prevention
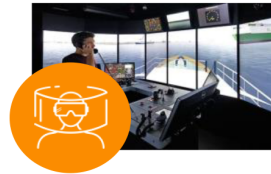and early detection of forest fires

1995
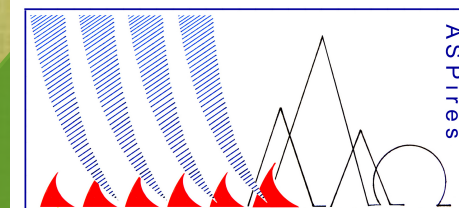
Competencies:

Software development
With Microsoft's technology stack

Industrial Internet of Things
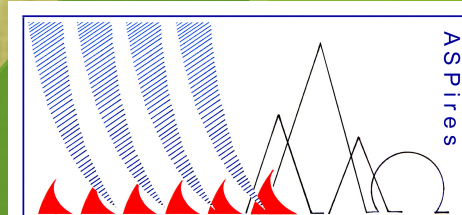More than 130 man-years of experience

Simulation and Virtual Reality
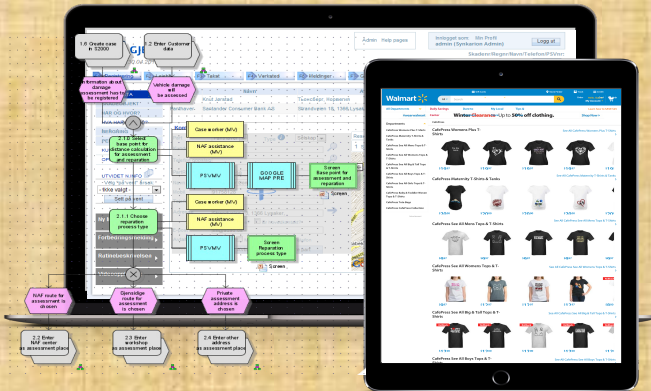From headset apps to hydraulic simulators

Awards:

Technology partners:

Microsoft Partner
Gold Application Development
Silver Application Development
Silver Data Analytics
Silver Datacenter

software AG

OSIsoft. partner

20.1.17   34

ASPires

Advanced systems for prevention
and early detection of forest fires

InterConsult Bulgaria Ltd (BG)

ICB | SOFTWARE & CONSULTING

BUSINESS LINES

Business Process Automation

- Cloud computing;
- Mobile applications;
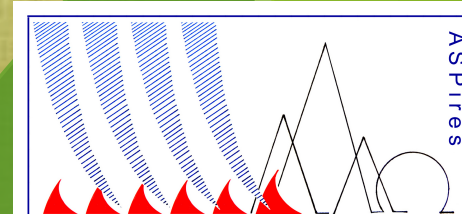- Workflow-driven software;
- Cash processing for banks.
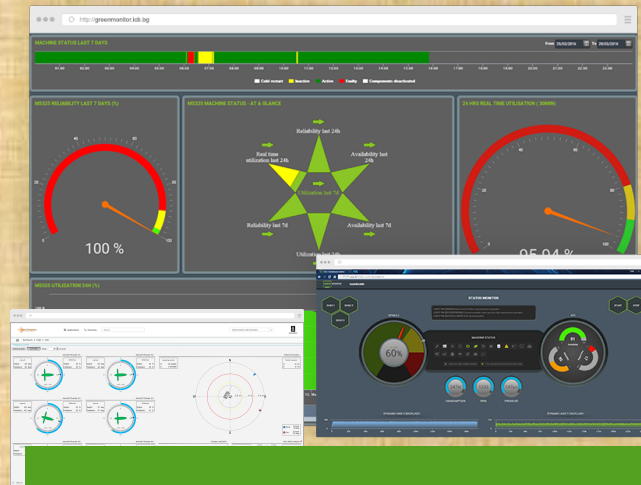
Internet of Things

- Real-time monitoring;
- Big data analysis;
- Operational intelligence;
- Executing workflows from alarms/events.

CAD and Simulation

- Training simulators for maritime purposes;
- 3D modeling;
- Architecture solutions.

ASPires

Advanced systems for prevention and early detection of forest fires

InterConsult Bulgaria Ltd (BG)

ICB'S STRENGTHS

Business Processes

Create IT solutions driven by business processes, and not the other way round. Transition them to one web-based software layer.

- Improved maintainability;
- Flexible to changes in process.

Internet of Things (IoT)

Generate real, actionable insights from systems and sensor data:

- Scalable and reliable infrastructure;
- Real-time monitoring, operational, and event data relevant to users.
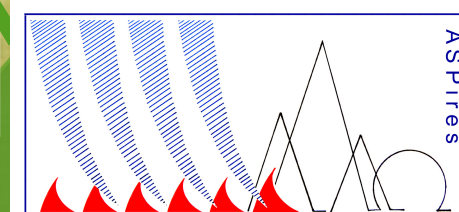
Technology Synergy

ICB Innovation Lab

- Founding partner of Bulgaria's Microsoft Innovation Center;
- Augmented Reality (AR);
- Microsoft Kinect;
- In-house navigation with beacons;
- Implementing print optimization;
- Video streaming technology.

Cloud Computing

Develop new, **migrate** existing, and **integrate** legacy IT systems in the cloud:

- Fast time to market;
- Lower operating cost &TCO;
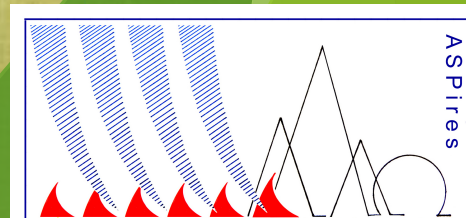- Consistent, cross-platform user experience.

20.1.17

36

Advanced systems for prevention and early detection of forest fires

Cluster NCITES (BG)

- The National Cluster for Intelligent Transport and Energy Systems (NCITES)
http://www.cluster-ites.org/

- The NCITES is founded in year 2014 in Sofia, Bulgaria as a voluntary association of 20 companies from industrial and inter-industry sectors of production for Danube region and Black Sea Basin.

ICB
SOFTWARE
INNOVATION

Comicon ®

ASPires

Advanced systems for prevention
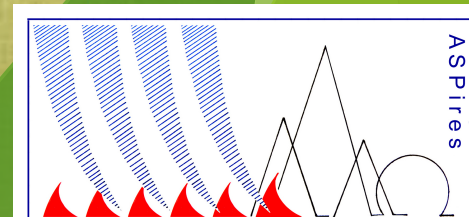and early detection of forest fires

Cluster NCITES (BG)

- The Cluster is aimed in development of scientific and practical projects in the field of Intelligent Management and Control Systems in the field of telecommunication, energy, environment and economy.

- NCITES covers companies in the field of telecommunications, information technology, transport and energy technical infrastructure, etc.

- We work for develops and implement innovative solutions that domineer in European infrastructure.

20.1.17   38

Advanced systems for prevention and early detection of forest fires

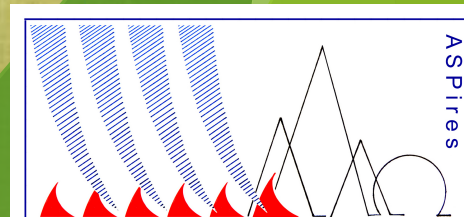ASPires

Cluster NCITES (BG)

As a part of ASPires team (www.aspires.eu) about CMIS for MKFFIS in FYR of Macedonia, the Cluster will participate in:

- ✓ Developing and testing of a multi sensor module consisting: thermo graphic camera, HD CCD/CMOS camera, Pan/Tilt device, laser pointer, meteorology station and intelligent software for fire detection. The solution can be extended with drones.

ICB
SOFTWARE
INNOVATION

Comicon ®

ASPires

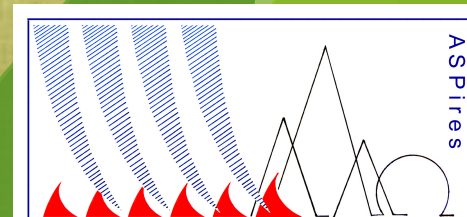Advanced systems for prevention
and early detection of forest fires

Cluster NCITES (BG)

▶ The Cluster also will be responsible for the dissemination of the entire project solution like: building of a web site (a multi language web portal for inter-operate of the material, reports, methodologies, announcement, events of the participants), preparation of publicity materials (designing of flyer&poster, newsletter, journal articles, policy papers and press releases) and workshops.

Advanced systems for prevention and early detection of forest fires