Austrian Showcase Science & Technology
Aerospace & Security USA

Smart Security and Aerospace Technologies from AIT

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Washington, D.C.,
March 16-19, 2015
(v0.15)
Federal Ministry for Transport, Innovation and Technology
50.46%

Federation of Austrian Industries
49.54%

Austrian Institute of Technology (AIT)

- 1300+ employees
- Budget: 120 Mio €
- Business Model: 40:30:30

Strategic Cooperation

Funding Sources
Safety & Security Technologies from AIT

- **Cyber Security**
  - CAIS Cyber Attack Information System by anomaly detection and CIIS Cyber Incident Information sharing
  - Cloud Security 2.0 through distributed secret sharing
  - Unbreakable Quantum based encryption

- **Intelligent Vision Systems (IVS)**
  - Industry 4.0 quality management
  - public transport systems (e.g. intelligent tramways)

- **Airborne Systems**
  - IVS sense & avoid and positioning for autonomous systems
  - Verification and Validation for highest system reliability (safety)
  - Weather radar analyses (2D & 3D)

- **Next Generation Smart Border Technologies**

- **Crisis and Disaster Management (CDM)**
  - Next generation decision support for environmental management
  - Big Data Management for CDM decision management system
Cybersecurity – CAIS Cyber Attack Information System

Critical Infrastructure

- CAIS Cyber Attack Information System
- CIIS Cyber Incident Information Sharing
- Security by Design
- Risk Management – Service Assurance

Secure Cloud 2.0

- Security and Privacy by Secret Sharing (Federated Cloud)

Unbreakable Encryption

- Optical Quantum based eEncryption

Cyber Defense and Situational Awareness

- Preventive Protection Mechanisms and Resilience Architectures
- Detection of Advanced Persistent Threats for Critical Infrastructure Protection
- Incident Information Sharing in a Trusted Environment
- Mitigation of Attack Impact through Mutual Aid
- Establishing Situational Awareness
- Advanced Persistent Threat (APT)

Use Case: Private Safe

- Get latest x-ray image from physician
- Share photos with family
- Main User
AIT Quantum technology for identification of un-authorised satellites

Big Data analyses for sender localisation

All hardware and software names used are brand names and/or trademarks of their respective holders.
AIT’s next generation Intelligent Vision Systems (IVS)

Industry 4.0
Autonomous driving
Smart public transport
Sense & avoid

Take off

Next generation Verification & Validation (safety)

- high-speed inspection with up to 300 km/h
- 200,000 images per second
- finest resolution of 0.002 mm
- 360° panoramic view
- 3D point cloud
Intelligent Vision Systems for Industry 4.0

Inspection & Control

- Worldwide fastest vision sensor technology
- Online inspection during production with up to 250,000 products per hour
- Compact single box solution with display
- Quality check less than 10 ms

Banknote inspection
- In real-time (60 km/h)
- 11 m/s inspection speed
- 44 banknotes/s
- 100 μm resolution

μm defect detection
- 500m² polished metal
- Detects μm-defects

3D real-time object measurement
- Scalable measuring system from mm to m size
- Accuracy in μm
- Real-time measurement

Worldwide fastest object detection
- Online inspection during production with up to 250,000 products per hour
- Compact single box solution with display
- Quality check less than 10 ms

Worldwide smallest stereo camera for mobile applications
- Real-time creation of a 3D model (20 μm)
- No maintenance or calibration required

3D real-time object measurement
- Scalable measuring system from mm to m size
- Accuracy in μm
- Real-time measurement

360° panoramic view

High-Speed Inspection with up to 300 km/h
200,000 images per second finest resolution of 0.002 mm

3D point cloud

High-Speed Inspection with up to 300 km/h
200,000 images per second finest resolution of 0.002 mm
Next Generation Smart Border Technologies

- Safe, efficient and user-friendly automated border control system for border entry procedures - *air, sea, land*

- AIT system competence through extensive POC projects
  - 28 Mio Euro project budget
  - strong links to European Stakeholder

- Next generation technologies:
  - 3D stereo vision for enhanced person / object detection
  - Passport and biometrics verification
  - Passport quality control
  - Multi-camera surveillance and novel video archive search
AIT Intelligent Vision Systems for autonomous airborne systems

- IVS based sense & avoid
- Land slide detection
- IVS based positioning & navigation
- Small object detection
Improved short-term Weather Forecast by Intelligent Vision Systems for Air Traffic Management

- Weather Radar
  - Recognizing and removing artifacts
  - Filling gaps using 2D and 3D computer vision methods and meteosat data
- Blending of image structures with numerical weather prediction models to
  - improve forecasts (up to 6h) for available airspace (in particular development of thunderstorms)
  - Increase safety in air traffic, reduce alternates
- Automated creation of MET-reports
Crisis & Disaster Management - Decision Support for Environmental Management

Supports execution and adherence of environmental laws (ozone, pollution, CO2, etc.)

Big Data Management for CDM decision management (e.g. Crowd Tasking)

Treatment of drinking water and waste water

Removing contaminants in soil and groundwater

plant improvement, plantmicrobiome, plant genetics, application know-how

Austria, Switzerland, Bulgaria, Indonesia

Emikat.at

uwedat

Monitoring & decision support network

Emission and energy cadaster

Environmental sensor network

air and water pollutants, radiation, meteorology and electromagnetic fields (NO, NO2, NOx, CO, CO2, O3, black carbon, Noise, PM10, PM2.5, radioactivity, EM, Traffic…)

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Thank you for listening!

An idea is not a single thing.

The trick to having good ideas is not to sit around in glorious isolation and try to think big thoughts. The trick is to get more parts on the table, which enable us to combine and bring different parts together.

A good idea is a network - it is all about bringing people and ideas together ..... 

Steve Johnson, „Where do innovation or good ideas come from?”, 2010

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