FORSCHUNG AUSTRIA
Zukunft verbindet

Bundesministerium
Verkehr, Innovation
und Technologie

AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

Alpbach 2018 Workshop BMVIT – Forschung Austria

ÖSTERREICH ALS DIENSTLEISTUNGSEXPORTWELTMEISTER

ERFOLGREICHE SICHERHEITSFORSCHUNG AM BEISPIEL AIT

Helmut LEOPOLD
Head of Center for Digital Safety & Security
AIT Austrian Institute of Technology

Alpbach, 22. August 2018
(v1.0_short2pub)

Sicherheitsforschung – Besondere Aspekte des Marktes

Spezifische Markttreiber

- Starke internationale Forschungsförderung (EU)
- Öffentliche Hand als Endkunde mit spezifischen Beschaffungsprozessen
- Economy of Scale für ein Produkt ist durch den internationalen Markt bestimmt
- Neue Technologien generieren **immer** einen Veränderungsdruck in einer Organisation → Änderung von Geschäftsprozessen
- Im Digitalbereich ist immer eine beträchtliche Auswirkung auf vorhandenen IT-Systeme zu beachten

Rahmenbedingungen in Österreich

- Gute nationale Forschungsförderung (KIRAS)
- Viele leistungsfähige Akteure in der Forschungscommunity (RTOs, UNIs, FHs) auch zu ganz neuen Technologien wie AI, Blockchain, 5G, Cyber Security, IoT, electronic based systems (EBS), etc.
- Internationale Hersteller und Betreiber betreiben in Österreich keine Forschung!
- Produkt- und Serviceanbieter Eco-System KMU geprägt
- Öffentliche Hand als Benutzer neuer Technologien …

Sicherheitsforschung – Ziele

R&D Ziele

- Neue Technologien
  - Sensoren, Endgeräte, Algorythmen, Service-Plattformen
- Requirementsengineering als Grundlage für
  - den Design eines neuen Produktes
  - Anpassungen des IT-Eco-Systems für den praktischen Einsatz
- Proof of Concept neuer Technologien
- Prozessvalidierung für den Einsatz neuer Technologien
- Validierung von Einsatzszenarien von neuen Technologien
- Skill-Entwicklung für die Implementierung, Betrieb und Nutzung neuer Technologien

Standortvorteile

- Innovationsstandort Österreich:
  - früher Einsatz von neuen Technologien
  - Managebarkeit von neuen Technologien
- Wirtschaftliche Implementierung neuer Technologien
- Effektive Nutzung neuer Technologien
- Neue, international führende Technologien „made in Austria“

F&E ⟷ *Innovationsmanagement* ⟷ *Betrieb*

Sicherheitsforschung – effektive R&D Methodology

R&D Methodology

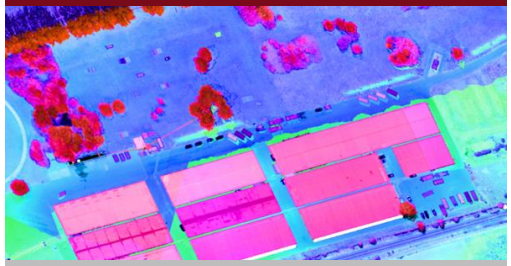
- Aufbau von spez. Kernkompetenzen — AIT
- Etablierung von Partnerschaften für den Aufbau von Domänenkompetenz — Technologiepartner, Service Betreiber, Benutzer
- Schaffung von kritischer Masse
  - Technologien, Lösungen, Services (am Standort Österreich)
  - Schaffung eines Eco-Systems an Kompetenzen am Standort Österreich
  - Aufbau von Partnerschaften für Business Development

Co-Finanzierung aus dem EU Innovationssystem

Grundlage für den frühen Einsatz von neuen Technologien

BEISPIELE FÜR HIGH-TECH “MADE IN AUSTRIA”

Physical protection



Sensor Fusion for remote / autonomous UAVs

Situational Awareness

Digital Identity Border Management

Smart Devices for Digital Identity

Border Management Systems

CDM Crises & Disaster Management

Sensor Systems / Social Media

Interoperability civil – military

Safety & Security Model Driven Engineering

Autonomous Systems

3D Vision Sensing

Cyber Security

Post Quantum + Smart (Cloud) Encryption

Cyber Range

Digital Forensic Virtual Currencies

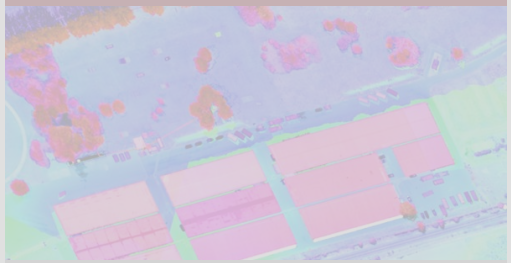
Blockchain/Dark Net

Law Enforcement Tools Capacity Building

SUCCESSFUL APPLIED R&D

AUSTRIAN INSTITUTE OF TECHNOLOGY

Physical protection



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BORDER CONTROL AND BIOMETRICS
AIT AS EUROPEAN COMPETENCE CENTER

Austrian Security Research Programm - KIRAS

KIRAS ASaP

KIRAS FBC

KIRAS Modentity

European Security Research Programm – FP7/H2020

FP7 FastPass

FP7 MobilePass

H2020 BODEGA

H2020 Foldout

30 M€
UNDER AUSTRIAN MANAGEMENT

Industry Contracts

...

...

...

2014 2015 2016 2017 2018 2019 2020 2021

Timeline

EU-wide standards, assessments, evaluations and pilot projects for border control. Technological injection for EU-industry for new products for biometrics. Prototypes, Proof of Concept, etc.

AIT BORDER TECHNOLOGY ROADMAP – ACHIEVEMENT: INT. LEADING POSITION

First automated border control (ABC) pilot in Austria

Novel Video surveillance support for ABC

1st Security Assessment for ABC handed over to Frontex

Influence in standardization committees

Standardisation Award

Mobile & contactless biometric verification device prototype

Fingerprint Capturing on Smartphone Prototype

Dedicated Fingerprint Sensor On-the-Fly

Threat Frontex

CEN/ ISO

Timeline

2014 2015 2016 2017 2018 2019 2020 2021

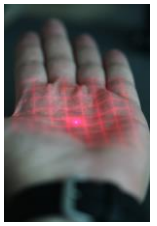
Piloted reference system for all types of borders (air, land, sea)

Evaluation of different systems (1 –step vs 2 step) at one spot for ABC

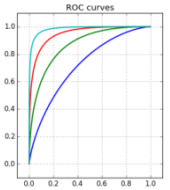
Contactless Fingerprint Capturing Technology

Capturing Technology on Smartphone

Human factors analysis for border control

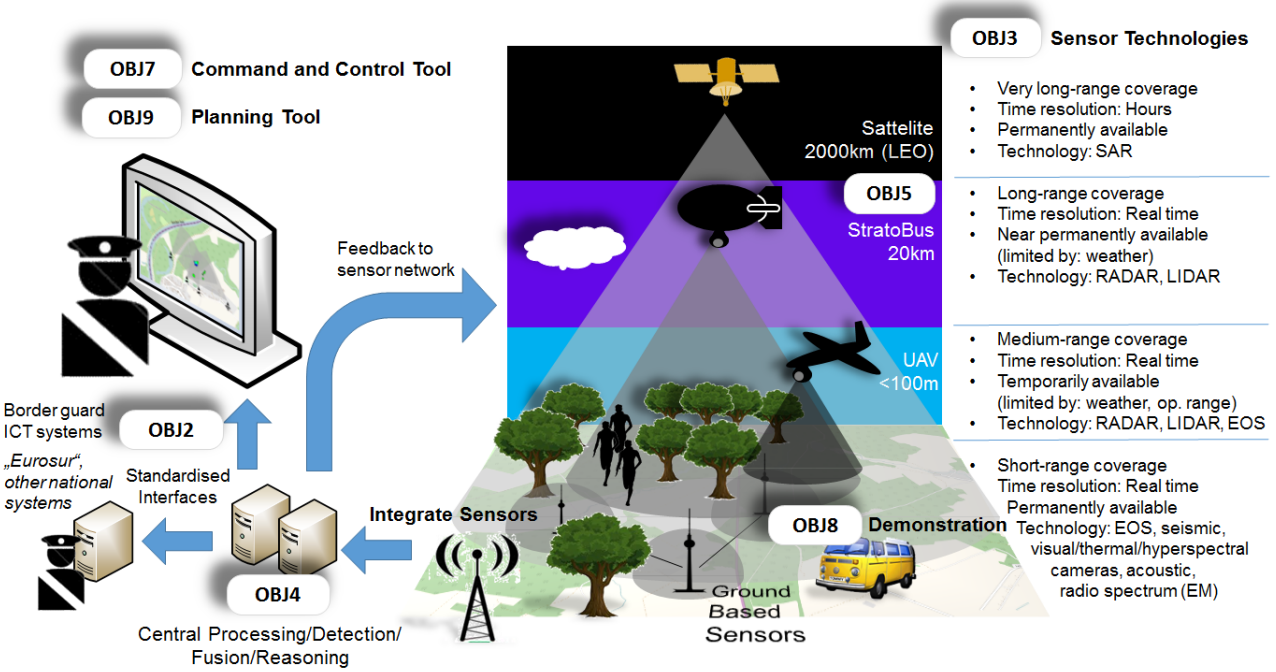


Biometrics detection On-the-Fly



AIT HAS REACHED AN EU COMPETENCE CENTER STATUS

AIT is leading the EU H2020 Project on Green Border Protection FOLDOUT



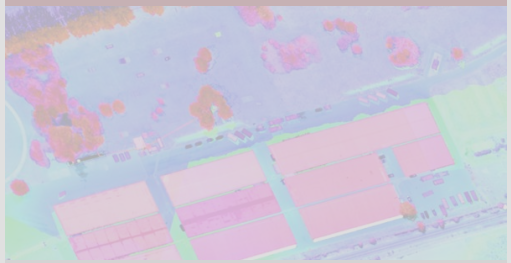
AIT is accepted EU Expert and Technology supplier

FRONTEX
EUROPEAN BORDER AND COAST GUARD AGENCY

SUCCESSFUL APPLIED R&D

AUSTRIAN INSTITUTE OF TECHNOLOGY

Physical protection



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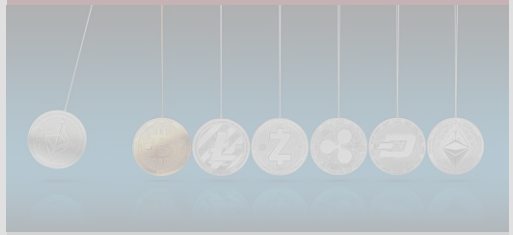
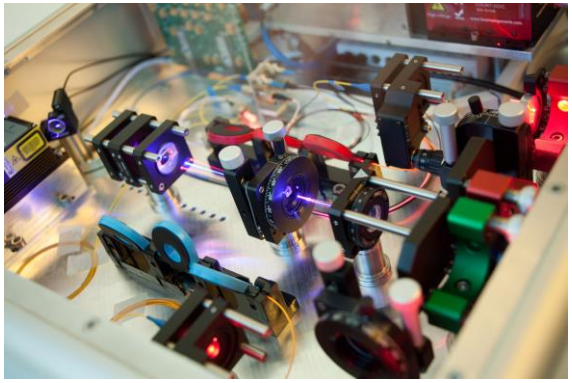


Blockchain/Dark Net

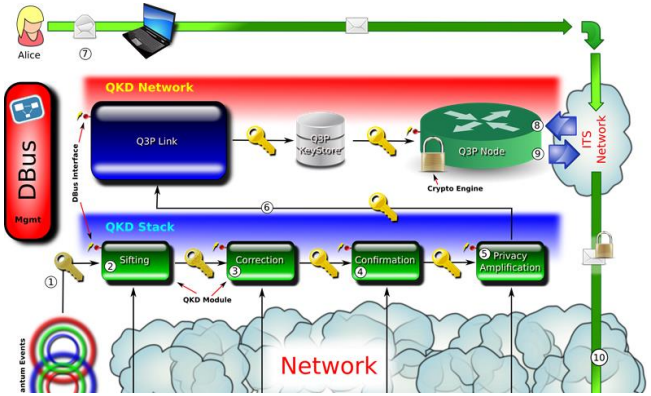
Law Enforcement Tools Capacity Building

OPTICAL QUANTUM TECHNOLOGIES @ AIT

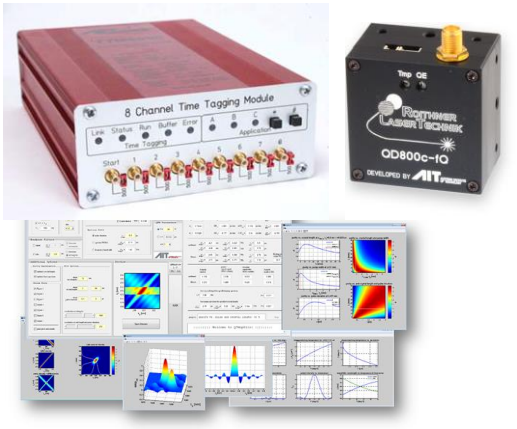
Quantum Key Distribution Systems



QKD Post-Processing & Key Management Software



Enabling Quantum Technologies



Technologies:
- **Entangled Photon sources**
- **FPGA based signal processing**
- **RF opto-electronics**
- **QKD software**
- **Continuous Variable QKD**
- **Quantum Photonic Integration**

Goals

- Everlasting secure communication
- Integration of QKD in commercial optical networks
- Products for Enabling Technologies

Research focus

- Photonic integration of QKD components
- Low-cost QKD
- Quantum Random Number generator
- Software Defined Quantum networks

Next Generation Smart Encryption for IoT & Cloud
AIT as European Competence Center (30M€)


Security


Privacy

Compliance


Transparency

seccrit
SEcure Cloud computing for CRitical infrastructure IT

http://www.seccrit.eu

https://prismacoud.eu

CREDENTIAL

https://credential.eu

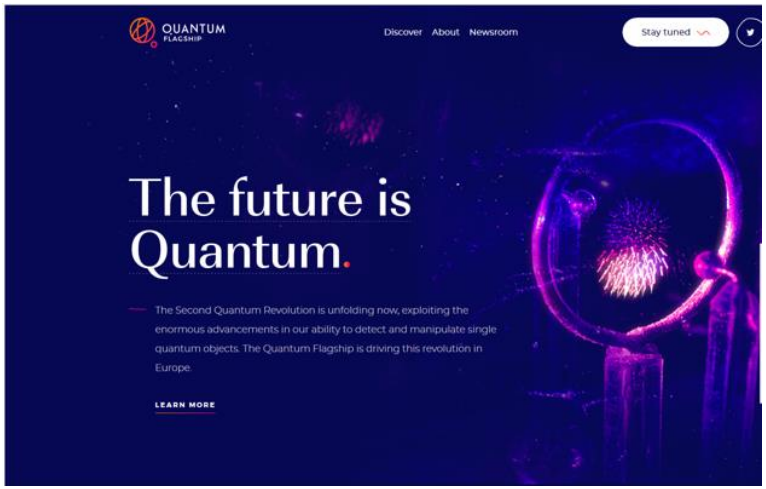
SEVENTH FRAMEWORK PROGRAMME

HORIZON 2020

30 M€

UNDER AUSTRIAN MANAGEMENT

OPTICAL QUANTUM TECHNOLOGY
AIT AS EUROPEAN COMPETENCE CENTER



EU Flagship initiative
2018 - 2022

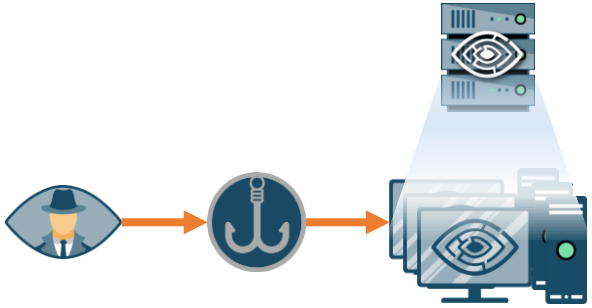
HORIZON 2020

AIT manages 2 out of 3 EU Quantum Flagship projects 2018 - 2022

Cyber Security Technology für next gen digitale Produkte
„AIT Technology inside“

fragmentiX™
QUANTUM SAFE STORAGE SOLUTIONS

Milipol 2015



CYBERTRAP

*Cyber**Trap** is the European Leader in Deception Technology*

HUAWEI

Huawei QKD Programme

esa

ESA initiative QKD Encryption on the satellite

Austria as international Competence center for Cyber Security Training

Support the safe and secure design and operation of industrial control systems (ICS) for nuclear facilities

Critical Infrastructures
National resilience against cyber attacks

Critical infrastructures
IT Operations

IAEA

KURATORIUM SICHERES ÖSTERREICH

BUNDESKANZLERAMT ÖSTERREICH

BM.I REPUBLIK ÖSTERREICH BUNDESMINISTERIUM FÜR INNERES

bundesheer

EUROPA INTEGRATION ÄUSSERES BUNDESMINISTERIUM REPUBLIK ÖSTERREICH

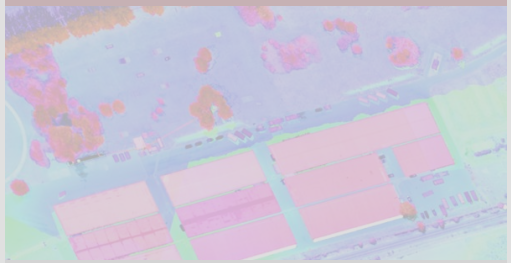
EVN

Training Programme in Vienna for Europe, Asia, ROW

SUCCESSFUL APPLIED R&D

AUSTRIAN INSTITUTE OF TECHNOLOGY

Physical protection



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BACKGROUND - CRYPTOCURRENCY RESEARCH @ AIT

EU H2020 TITANIUM
Tools for the Investigation of Transactions in Underground Markets

EU H2020 DANTE
Detecting and analysing terrorist-related online contents and financing activities

VIRTCRIME
tracing criminal transactions in post-Bitcoin

INTERPOL

EU LEAs

UNODC

friendly customer

Training for LEAs

Post-Bitcoin Cryptocurrencies

Darknet Marketplaces

Cross-ledger Analytics

Mixing-Service Detection

Information Sharing

Tool and Service Ecosystem

Court-proofed reports

Legal, Societal, Ethical Aspects

Blockchain-based Electronic Markets

Supply chain quality

ICT of the Future

BITCRIME

GRAPHSENSE

Organised crime in virtual currencies

HANDELS VERBAND

Use of blockchain for supply chains

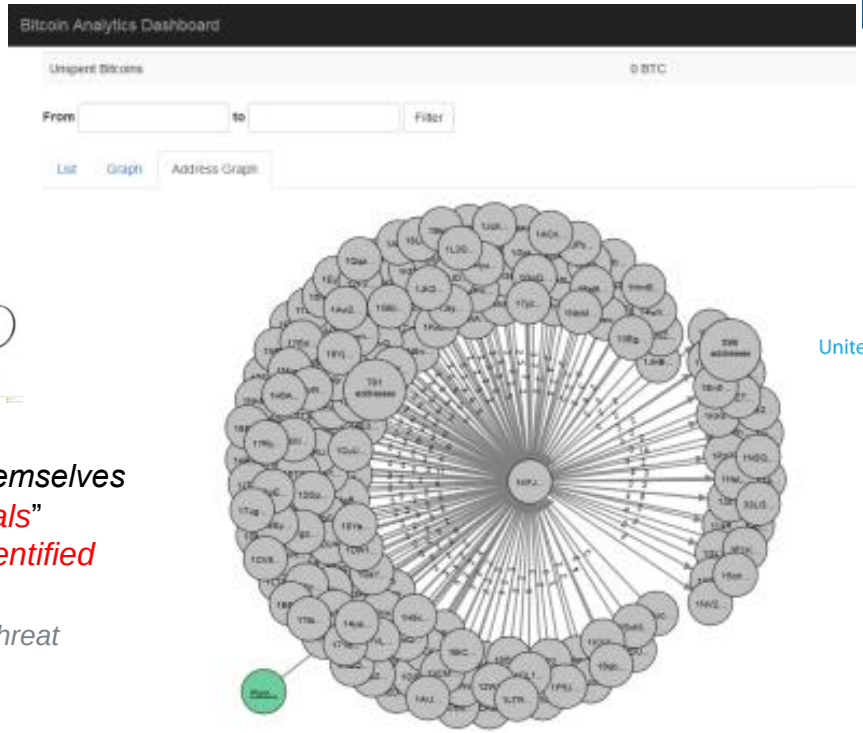
DATA MARKET AUSTRIA

Smart contracts for data sharing

2014 ----- 2017 2018 2019 2020

BLOCKCHAIN FORENSIC – INT. LEADING SCIENTIFIC & TECH COMPETENCE IN AUSTRIA @ AIT

Blockchain Digital Insight platform @ AIT



OSCE
Organization for Security and Co-operation in Europe

UNODC
United Nations Office on Drugs and Crime

INTERPOL

"*…virtual currencies such as Bitcoin establish themselves as single common currency for cybercriminals*"
"*Bitcoin is […] accounting for over 40% of all identified criminal-to-criminal payments.*"

*(Source: Europol 2015 Internet Organized Crime Threat Assessment Report
)*

BitCrime

BM.I

KIRAS Sicherheitsforschung

GraphSense

VIRTCRIME

DANTE

Ti H2020

HORIZON 2020

EU LEAs

VIELEN DANK

“Innovation is always a conversation”

DI Helmut Leopold, PhD
Head of Center for Digital Safety & Security

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