



Steinbeis

# Risk – we care<sup>®</sup>!

**Steinbeis Advanced Risk  
Technologies GmbH**

Activities 2001-2011

**European Virtual Institute for  
Integrated Risk Management  
(EU-VRI)**

Activities 2006-2011

## Editorial

### Risk – we care™

An anniversary is usually a good thing to have. A double anniversary even better. The year 2011 is such an occasion: 10 years ago, in June 2001, within the network Steinbeis GmbH & Co. für Technologietransfer a transfer center dedicated to "Advanced Risk Technologies" (Steinbeis R-Tech) was founded. This was an easy endeavor compared to the next step, which followed 5 years later: in November 2006 the 5 founding members of EU-VRi (BZF, Hungary, INERIS, France, Steinbeis, Germany University of Stuttgart, Germany and Technologica Group, Belgium) finalized their "long journey" through the maze of rules and regulations of Stuttgart's "Amtsgericht" and established a European Economic Interest Group (EEIG) dedicated to the promotion of European collaboration and joint activities in the area of integrated risks management. The new initiative was named EU-VRi (European Virtual Institute for Integrated Risk Management).

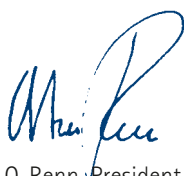
Having these anniversaries in mind, this document provides an overview of the events and developments following those two initiatives which are based on "one shared idea. The idea that "risk is something we should (all) care about". Meanwhile, the host "Steinbeis Advanced Risk Technologies" developed further: in addition to the two risk initiatives, Steinbeis founded the initial transfer center, a homonymous (what is this?) Institute within Steinbeis University Berlin and a subsidiary of Steinbeis Holding (Steinbeis Advanced Risk Technologies GmbH). EU-VRi became an "operating agent" of the ETPIS European Technology Platform Industrial Safety and established cooperation and service agreements with organizations such as OECD, DIN, CEN, SRA Europe, JRC of the European Commission. Its membership exceeded 50 members and the volume of projects managed by EU-VRi and R-Tech grew to over 50

million €. But the devotion to the lead idea of better risk management remained unchanged.

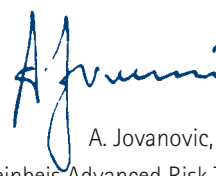
This idea has been passionately pursued in practically all activities and projects. The "enablers of the enterprise" (knowing that we do injustice to many, let's just mention the names of Mr Bareiß, Mr Bogaerts, Ms Buhlmann, Mr Haug, Mr Labroye, Mr Laflèche, Ms Lenkey, Mr Löhn, Mr Ressel, Mr Salvi...) have remained involved ever since. The idea is kept alive and implemented through the "5 Ps" of EU-VRi/R-Tech: Projects (over 100), People (over 1,000 involved), Partnerships (industry, research, academia...), Products ("Risk as the main product" – specialized for "integrated risk management" and "emerging risks", including the production of software, books and reports, and the organization of events, numerous symposia and new collaboration models...) and Portfolio of above items, oriented toward technical, scientific and commercial success.

The concept of the two initiatives proved successful in meeting market and environmental challenges. Over time the main topics such as integrated risk management, risk-risk tradeoffs, multiple and interconnected emerging risks of New Technologies and early warning systems became increasingly important in a complex, interconnected and fast-moving environment. The response the associated industrial partners confirms this commitment. Insurance companies like SwissRe, AXA and Allianz are for example aligning their internal areas activities in the risk area with the work of EU-VRi/R-Tech). Recent events, such as Fukushima, Gulf of Mexico or volcanic ashes disasters provided ample opportunities for EU-VRi to successfully check the validity of concepts, solutions and products offered.

We hope you will enjoy to enjoy this document and do not hesitate to contact EU-VRi/R-Tech if you interested in "caring about risks".



O. Renn, President EU-VRi

A. Jovanovic, CEO EU-VRi,  
CEO Steinbeis Advanced Risk Technologies



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2006-2011

## 5 Years European Virtual Institute for Integrated Risk Management

5 main fields of activities in the area of sustainability, emerging risk and integrated risk management: Project & services, Products & tools, Coordination & networking, Support to EU harmonization & standardization, R&D.



### Application Areas:

- petro chemical and process plants
- power plants
- material technologies, especially advanced/new material technologies
- new emerging technologies (e.g. CO<sub>2</sub>, H<sub>2</sub>, nanotechnologies...)

### Types of Risks:

- risks in/of innovation (e.g. risks of unexpected side-effects)
- risk of non-performance or performance below expectations (e.g. risks of system or component failures)
- risk of adverse/unexpected effects and impacts (e.g. on public health and/or environment)
- risks over the life-cycle of products and technologies (e.g. unexpected problems in decommissioning or recycling phase)
- project risks, especially in R&D and new technologies related/ oriented projects

### Projects:

- industrial, national, EU and international
- integrated management of risk related to new technologies (FP7 project iNTeg-Risk)
- risks of impacts and/or non-performance of nanotechnologies, new bio-fuels in aerospace industry, slurry coating technologies, etc. (FP7 projects MUST, Particoat, MATRANS, M-RECT, Alfa-Bird, Fire-Resist...)
- governance and regulatory aspects of risks in industrial plants (e.g. plants falling under the EU Seveso directive)



### 5 Founding members:

- Bay Zoltán Foundation ([www.bzaka.hu](http://www.bzaka.hu))
- Institut National de l'Environnement Industriel et des Risques ([www.ineris.fr](http://www.ineris.fr))
- Steinbeis GmbH & Co. KG für Technologietransfer (StC – "Steinbeis Limited Liability Company and Commercial Partnership for Technology Transfer" – [www.stw.de](http://www.stw.de))
- Technologica Group c.v. ([www.technologica.org](http://www.technologica.org))
- ZIRN - Interdisciplinary Research Unit for Risk, Governance and Sustainable Technology, University of Stuttgart ([www.zirn-info.de](http://www.zirn-info.de))

### 5 Honorary members:

- CEN - European committee for standardization
- CIOP - Central Institute for Labour Protection
- DIN - Deutsches Institut fuer Normung e.v.
- JRC/EC - Commission of the European Communities, Joint Research Center
- OECD - Organisation for Economic Co-operation and Development



**A dynamic group of partners offering integrated, flexible and efficient solutions, products and services**

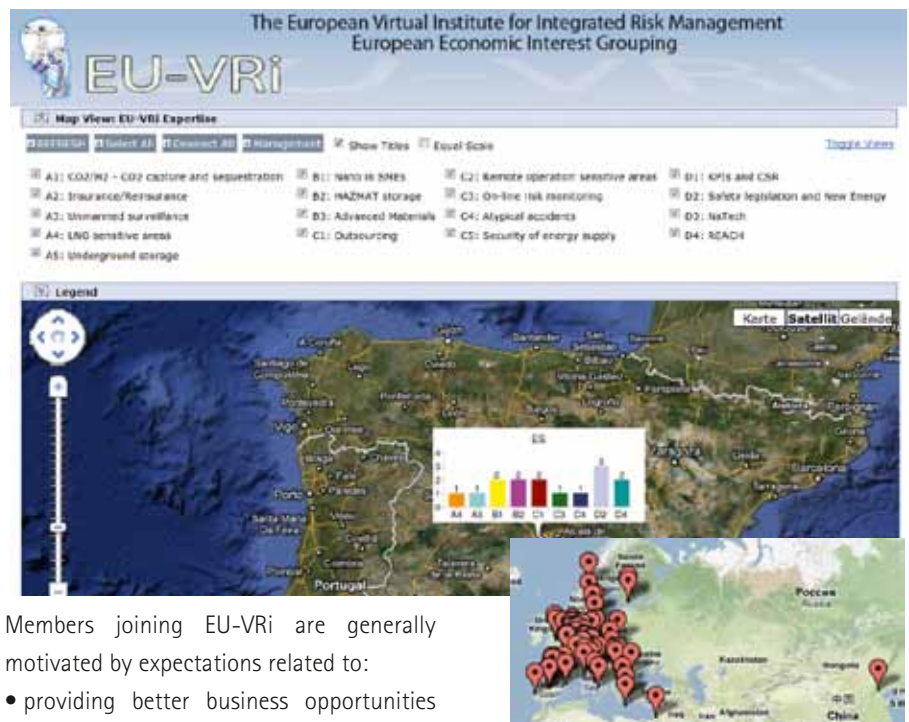
## European Virtual Institute for Integrated Risk Management (EU-VRi) EWIV

**EU-VRi aims to facilitate or develop the economic activities of its members by pooling of resources, activities and skills, thus yielding new opportunities, not or hardly achievable for members when acting alone.**

EU-VRi has been legally established in Nov. 2006 by 5 Founding Members (BZF, INERIS, Steinbeis, Technologica and University of Stuttgart). EU-VRi is organized as a European Economic Interest Grouping (EEIG) and its purpose is to facilitate or develop the economic activities of its members by a pooling of resources, activities or skills, thus yielding new opportunities, not or hardly achievable for members when acting alone. The activities of the EEIG are related to the economic activities of its members and the main goal of the EEIG is to add value to the businesses of the members.

It means that EU-VRi creates new opportunities by:

- providing services to industry, research community and/or public authorities, including stakeholders like EU, OECD, EP-STOA, OSHA, CEN... 1
- connecting industrial companies or networks of companies to the most appropriate research facility – acting as a research broker
- establishing and documenting the state-of-the-art especially in the fields of integrated management of risks related to new technologies
- identifying research and development needs and gaps in the fields of the EUVRi expertise and activities
- acting as dissemination centre for research results and developments
- facilitating and supporting the mobility of staff (researchers, consultants...)
- supporting creation of consortia to address the R&D and/or industry needs



Members joining EU-VRi are generally motivated by expectations related to:

- providing better business opportunities through pooling the available human and other resources concerning integrated risk management at the European level
- providing better opportunities for the members to interact with the EU policy
- contributing to the European research studies and having access to a structured group of partners with a large spectrum of skills in the field of risk management, and who are ready to work together
- improving and making easier management of large EU and industrial projects taken over by EU-VRi as an established and well geared consortium.

In its 5 years of its existence, EU-VRi has become a recognized provider of innovative solutions and risk-related products and services both EU- and worldwide.

Current priorities and plans for EU-VRi include the following main points:

- preparation for Framework Programme 8 of the EU
- increased emphasis on products (both in terms of material ones and, e.g. services) resulting, e.g. out of the activities in iNTeg-Risk "1StopShop"
- further setting-up industrial projects (e.g. refineries, power plants and other industrial plants, involving more members of EU-VRi as one team) and PPP (public-private-partnership) projects
- future increase of international collaboration and presence: USA, Japan, China, India... - including the activities in SRA and ETPIS as their respective Operating Agent (SRA Europe)

## EU-VRi Founding Members

Any founding member and any associate member of the EU-VRi accompanied by a founding member of the EU-VRi may offer and provide services/products on behalf of the EU-VRi, according to the statutes of EU-VRi.



### **Bay Zoltán Foundation ([www.bzaka.hu](http://www.bzaka.hu))**

Bay Zoltán Institute for Logistics and Production Systems was founded by Bay Zoltán Foundation for Applied Research in 1993. The Institute is located in Miskolc, Hungary. The Institute is a member of the chain of new institutes in the Bay Zoltán Foundation for Applied Research. Contact Person: Dr. Gyöngyvér Lenkey (Mrs.), [lenkey@bzlogi.hu](mailto:lenkey@bzlogi.hu)



### **Institut National de l'Environnement Industriel et des Risques ([www.ineris.fr](http://www.ineris.fr))**

Founded in 1990, INERIS is a public research body of an industrial and commercial character, under the supervision of the French Ministry of the Environment and Sustainable Development. Located at Verneuil-en-Halatte (Oise), in the Picardy Region (at about 60 km from Paris), INERIS is equipped with physicochemical analysis laboratories and testing and computing facilities that rank among the best in France. INERIS mission is to assess and prevent accidental and chronic risks to people and the environment originating from industrial activities, chemical substances and underground works. Contact Person: Mr. Vincent Laflèche, [vincent.lafleche@ineris.fr](mailto:vincent.lafleche@ineris.fr)



### **Steinbeis**

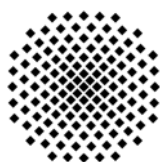
### **Steinbeis GmbH & Co. KG für Technologietransfer (StC – “Steinbeis Limited Liability Company and Commercial Partnership for Technology Transfer” – [www.stw.de](http://www.stw.de))**

StC is a part of Steinbeis-Stiftung für Wirtschaftsförderung (StW – “Steinbeis Foundation for Economic Development”), an umbrella organization for the entire Steinbeis network. Therein, StC is responsible for commercial activities related to knowledge and technology transfer performed by StC business units. In EU-VRi StC stands for and acts on behalf of Steinbeis Advanced Risk Technologies group, composed out of three business units: one transfer center, one spin-off company (Steinbeis Advanced Risk Technologies Transfer Center GmbH) and one Transfer Institute, part of the Steinbeis University Berlin, offering training and degree programs. Contact Person: Mr. Uwe Haug, [uwe.haug@stw.de](mailto:uwe.haug@stw.de)



### **Technologica Group c.v. ([www.technologica.org](http://www.technologica.org))**

TECHNOLOGICA Group is a joint venture set up by a number of high-tech corporate partners and individual, internationally renowned, scientists and engineers, both from academia and industry. Amongst its main goals is the improved exploitation of results and know-how from previous R&D projects sponsored by the European Commission or by various UN agencies or USA-based organizations. Contact Person: Prof. Dr. ir. Walter Bogaerts, [mail@technologica.org](mailto:mail@technologica.org)



### **ZIRN - Interdisciplinary Research Unit for Risk, Governance and Sustainable Technology, University of Stuttgart ([www.zirn-info.de](http://www.zirn-info.de))**

ZIRN, the "Interdisciplinary Research Unit on Risk Governance and Sustainable Technology Development" is part of IZKT, the "International Center for Cultural and Technological Studies" of Stuttgart University. ZIRN aims to systematically research into the conditions and consequences of sustainable development of technologies, including its risks, and the interaction of politics, economy and civil society (governance). Contact Person: Prof. Dr. Ortwin Renn, [ortwin.renn@sowi.uni-stuttgart.de](mailto:ortwin.renn@sowi.uni-stuttgart.de)

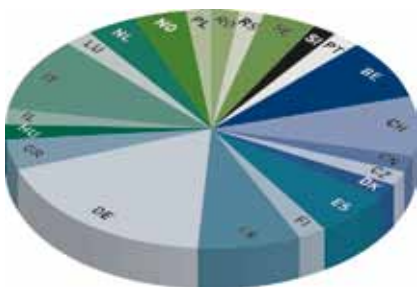
## European Virtual Institute for Integrated Risk Management

# The "50 Members" of EU-VRi in 2011

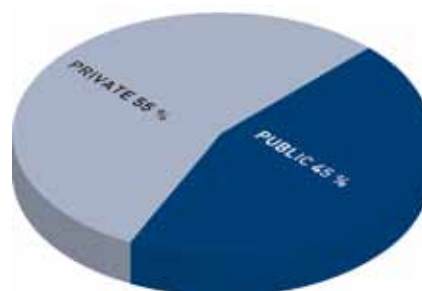
**Main Activities: business-oriented services for industry and other clients, technology transfer, research and development projects, professional education and specialization including the post-graduate academic studies (Master of Risk Engineering & Management).**

### The "50 Members" of EU-VRi in 2011

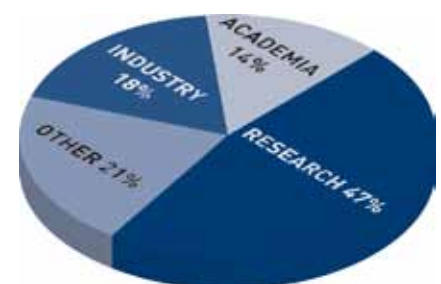
- **ARC** – Allianz Risk Consulting GmbH
- **AXA** – Group AXA, France
- **2B** – Consulenza Ambientale, Italy
- **BAM** – Bundesanstalt für Materialforschung und -prüfung, Germany
- **Blue Ocean** – Semantic Web Solutions GmbH, Switzerland
- **BMILP** – Beijing Municipal Institute of Labor Protection, China
- **BZF** – Bay Zoltán Foundation, Hungary
- **CEA** – Commissariat à l'Energie Atomique, France
- **CEN** – European Committee for Standardization, Belgium
- **CIOP-PIB** – Central Institute for Labour Protection, Poland
- **CNR-IRC** – Istituto di Ricerche sulla Combustione, Italy
- **CONPRICI** – Consorzio Interuniversitario per la Prevenzione e la Protezione dai Rischi Chimico-Industriali, Italy
- **CrisisTox Consult**, The Netherlands
- **D'Appolonia S.p.A.**, Italy
- **Demokritos** – National Center for Scientific Research, Greece
- **DIN** – Deutsches Institut fuer Normung e.v., Germany
- **DNV** – Det Norske Veritas AS, Norway
- **DTU** – Danish Technical University (Risoe National Laboratory), Denmark
- **EDF** – Electricité de France, France
- **EKON** Modeling Software Systems Ltd. Israel
- **ELITE** Foundation, Germany
- **Erasmus** University Rotterdam, Netherlands
- **Expert System** SpA, Italy
- **IOSB** – Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung, Germany
- **INCDPM** – National Research and Development Institute on Occupational Safety, Romania
- **INERIS** – Institut National de l'Environnement Industriel et des Risques, France
- **IRGC** – International Risk Governance Council, Switzerland
- **ISQ** – Instituto de Soldadura e Qualidade, Portugal
- **IVF** – Swerea IVF AB, Sweden
- **JRC/EC** – Commission of the European Communities, Joint Research Center, Belgium
- **JSI** – Jozef Stefan Institute, Slovenia
- **KMM-VIN** – European Virtual Institute on Knowledge-based Multifunctional Materials, Belgium
- **MIT** – Management Intelligenter Technologien GmbH, Germany
- **NIS** – Petroleum Industry of Serbia, Serbia
- **OECD** – Organisation for Economic Co-operation and Development, France
- **OttoUNI** – Otto-von-Guericke-Universität Magdeburg, Germany
- **PROMIS@Service** Sarl, Luxembourg
- **SINTEF** – Stiftelsen SINTEF, Norway
- **SP** – Technical Research Institute of Sweden, Sweden
- **STW** – Steinbeis GmbH & Co. KG für Technologietransfer, Germany
- **Swiss Re** – Swiss Reinsurance Company, Switzerland
- **SWISSI** – Sicherheitsinstitut, Switzerland
- **SWISSI España** – Instituto Suizo para la Promoción de la Seguridad, Spain
- **TECNALIA** – Fundacion Tecnalia Research & Innovation, Spain
- **Technologica** – Technologica Group c.v., Belgium
- **TÜV SÜD** Industrie Service GmbH, Germany
- **URL** – Universidad Ramon Llull Fundación Privada, Spain
- **VŠB** – Technical University of Ostrava, Czech Republic
- **VTT** – Technical Research Centre of Finland, Finland
- **ZIRN** – Interdisciplinary Research Unit for Risk, Governance and Sustainable Technology, University of Stuttgart, Germany



EU-VRi Members Countries represented (as per number of companies)



EU-VRi Members Type of organization



EU-VRi Members Type of activities

2001-2011

# 10 Years Steinbeis Advanced Risk Technologies

**Main Activities: business-oriented services for industry and other clients, technology transfer, research and development projects, professional education and specialization including the post-graduate academic studies (Master of Risk Engineering & Management).**



Steinbeis Advanced Risk Technologies Group (R-Tech) is the cluster of units belonging to and/or linked to Steinbeis ([www.stw.de](http://www.stw.de)). Over 700 Steinbeis units present in 50+ countries worldwide act today as a global player in the area of innovation management and technology transfer. The group of Steinbeis units working in the area of "Advanced Risk Technologies" deals with multiple aspects of risks, risk engineering and risk management appearing, for instance, in:

- petro-chemical and process plants
- power plants and energy supply
- material technologies, especially advanced material technologies
- new & alternative technologies (CO<sub>2</sub>, H<sub>2</sub>, nano, ...).

## Main aspects of risks dealt with are:

- risks in/of innovation (e.g. risks of unexpected side-effects)
- risk of non-performance or performance below expectations (e.g. risks of system or component failures)
- risk of adverse/unexpected effects and impacts (e.g. on public health and/or environment)
- risks over the life-cycle of products and technologies (e.g. unexpected problems in decommissioning or recycling phase)
- project risks, especially in innovation, R&D and new technologies oriented projects.

Organizing European and national stakeholders, promoting and supporting technology transfer, introducing new approaches to the risks and their management, developing specific methods and tools are examples of these activities.

R-Tech is also one of the five founding members of European Virtual Institute for Integrated Risk Management EU-VRi. The insti-

tute ([www.eu-vri.eu](http://www.eu-vri.eu)) is an EEIG (European Economic Interest Grouping). The group is capable to cover the above topics either on its own or in close co-operation with Steinbeis network, European Virtual Institute for Integrated Risk Management (EU-VRi), Virtual Institute of Knowledge-based Multifunctional Materials (KMM-VIN), European Technology Platform Industrial Safety (ETPIS) and other networks (all involving over 2,000 persons and over 500 companies).

The activities of the R-Tech group involve projects and activities on industrial, national, EU, and international level, tackling, e.g.:

- integrated management of risk related to new technologies (FP7 project iNTeg-Risk)
- risks of impacts and/or non-performance of nanocontainer technologies, new bio-fuels in aerospace industry (Alfa-Bird), slurry coating technologies (FP7 projects MUST and Particoat), etc.
- governance and regulatory aspects of risks in industrial plants falling under the EU Seveso directive (EU project F-Seveso).

## Steinbeis Advanced Risk Technologies (group) [www.risk-technologies.com](http://www.risk-technologies.com), [www.risk-technologies.eu](http://www.risk-technologies.eu)

### Education

 Steinbeis Transfer Institute  
Advanced Risk Technologies (R-Tech)

**part of:**  
Steinbeis University Berlin  
HRB 69231



[www.steinbeis-hochschule.de](http://www.steinbeis-hochschule.de)

### Technology Transfer

 Steinbeis Transfer Center  
Advanced Risk Technologies

**part of:**  
Steinbeis GmbH & Co. KG  
für Technologietransfer  
HRA 12480



[www.stw.de](http://www.stw.de)

 Steinbeis Advanced Risk  
Technologies GmbH

HRB 725454

[www.risk-technologies.com](http://www.risk-technologies.com)

### R&D and Services



A European Economic Interest  
Grouping - EEIG

HRA 720579

— BZF  
— INERIS  
— Steinbeis  
— Technologica  
— University of Stuttgart

[www.eu-vri.eu](http://www.eu-vri.eu)

## Risiken neuer Technologien – ein sicheres Geschäft

# Risk Technologies @ Steinbeis

Seit einigen Jahren gewinnen die technologiebezogenen Aktivitäten bei Steinbeis in vielen industriellen und öffentlichen Projekten im Bereich der Industriellen Sicherheit immer mehr an Bedeutung. Auf diesem Gebiet hat das Steinbeis-Transferzentrum Advanced Risk Technologies eine leitende Rolle übernommen: beispielsweise bei der Koordination von europäischen und nationalen Stakeholders, der Förderung des Technologietransfers, der Einführung neuer Ansätze im Risikomanagement und der Leitung großer europäischer, nationaler und Industrieprojekte.



Laut europäischen Statistiken gab es 2001 in den EU-Staaten 7,6 Millionen Arbeitsunfälle. 4,9 Millionen dieser Unfälle führten zu einer Arbeitsunfähigkeit von mehr als drei Tagen und zu 4.900 Todesfällen. Das bedeutet, dass alle fünf Sekunden ein Arbeiter Opfer eines Arbeitsunfalls wird und alle zwei Stunden ein Arbeiter stirbt. Industriesektoren wie Prozessindustrie, Energie, Transport oder Bauwesen sind davon am meisten betroffen.

Um diesem Problem entgegen zu treten, hat die Europäische Union eine Reihe von Zielen für zukünftige Forschungs- und Entwicklungsaktivitäten definiert, die ein gemeinsames Vorgehen erfordern. Beim Lissabon-Gipfel im Jahr 2000 hat die EU für sich das Ziel festgelegt, bis 2010 die dynamischste und wettbewerbsstärkste wissensbasierte Wirtschaft zu werden. Der Göteborg-Gipfel (2001) legte den Schwerpunkt auf nachhaltige Entwicklung und daraus resultierende Aspekte für Umwelt, Gesundheit und Wirtschaft. Daraus ergibt sich, dass die Industrielle Sicherheit eine Voraussetzung für verbesserte Produktivität und Wettbewerbsfähigkeit der EU-Industrie ist. Jeder Bruch in der Produktions- oder Transport-

kette wirkt sich negativ auf das EU-Wirtschaftssystem aus, da nationale Wirtschaftssysteme immer stärker miteinander vernetzt sind. Deswegen ist ein einheitlicher Sicherheitsansatz in allen europäischen Ländern gefordert, der konsequent in den verschiedenen Industriezweigen eingehalten wird.

Momentan ist dieser Zustand noch eine Vision. Ein erster Schritt auf dem Weg zur Realisierung dieser Vision war die Gründung der „Europäischen Technologieplattform Industrielle Sicherheit“ („European Technology Platform Industrial Safety ETPIS“ [www.industrialsafety-tp.org](http://www.industrialsafety-tp.org)), die bisher über 350 Mitglieder aus allen relevanten Gruppen der Stakeholders zählt. Das Steinbeis-Transferzentrum Advanced Risk Technologies unterstützt aktiv die ETPIS-Aktivitäten und leitet einige von ihnen, beispielsweise den Bereich „Emerging Risks“. Eins der Ergebnisse dieser Tätigkeiten war auch die Mitwirkung zur Gestaltung der entsprechenden FP7-Ausschreibung (Thematic Priority NMP).

Darüber hinaus hat das Steinbeis-Transferzentrum Advanced Risk Technologies mit Partnern aus Deutschland (Universität Stuttgart), Frankreich (INERIS), Ungarn (BZF) und Belgien (Technologica), die Europäische Wirtschafts-Interessenvereinigung EU-VRI (European Virtual Institute of Integrated Risk Management, [www.eu-vri.eu](http://www.eu-vri.eu)) gegründet.

Priorität und Ziel von EU-VRI ist sicherzustellen, dass das Management von möglichen Technologierisiken auf sichere, verantwortungsvolle und transparente Weise

gestaltet wird. In diesem Sinne führt das Steinbeis-Transferzentrum Advanced Risk Technologies im Rahmen von EU-Vri eine Initiative innerhalb des 7. Europäischen Rahmenprogramms (FP7) durch, die unter dem Namen „iNTeg-Risk – Early Recognition, Monitoring and Integrated Management of Emerging, New Technology Related Risks“ Forschungs- und Entwicklungsprojekte mit einem Wert von über 25 Millionen Euro gestalten soll. Diese Initiative soll ermöglichen, dass Sicherheit, Umweltfreundlichkeit und gesellschaftliche Verantwortung das Warenzeichen von „Technology made in the €“ bleiben.

Auch auf dem Gebiet der auf Risikomanagement bezogenen Dienstleistungen für die Industrie verfolgt Steinbeis die Strategie, Innovation in nachhaltiger Weise in die Industrie einzuführen. Dies war der Hauptgrund für die Erdöl-, Energie- und andere Industrie in mehreren Ländern, wie Ungarn, Slowakei, Serbien, Rumänien, Malaysia und Indien, sich auf die Lösungen von Steinbeis im Bereich der Risk-based Inspection (RBI), Reliability-Centered Maintenance (RBM) und Health-Safety-Environment (HSE) Management zu stützen und diese erfolgreich anzuwenden.

## Managing risks related to new technologies – a sustainable business opportunity

### Risk technologies @ Steinbeis

**Steinbeis involvement in activities related to and relevant for industrial safety has been increasing steadily in the last years both for industry and public sector. The Steinbeis Advanced Risk Technologies stands in the centre of this development and brings together the European and national stakeholders, promotes technology transfer, introduces new approaches to risk management, and manages and coordinates major European and industrial projects.**



According to European statistics, there were 7.6 million industrial accidents in the EU states in 2001. Out of these, 4.9 million accidents resulted in absence from work for more than 3 days and 4,900 of them had a fatal outcome. In other words every five seconds a European worker is victim of an accident at work and every two hours a fatality at work occurs. The industrial sectors mostly affected by these problems are the process industry, energy, transport and construction.

In order to deal with the problem, the European Union has laid down a series of goals for future research and development activities based on the collaboration and cooperation. At the Lisbon summit in 2000, the EU set the goal of becoming the most dynamic and competitive knowledge based economy by 2010. The Gothenburg 2001 summit laid an emphasis on long-term development and resulting issues affecting the environment, health and the economy. The two goals directly entail that industrial safety is a prerequisite for improved productivity and competitiveness. Every interruption in the production or transport chain has negative

implications for the EU economic system and the national economies which are getting increasingly interlinked. Therefore, a uniform approach to safety across all European countries is needed and it has to be widely accepted in and coherently applied across all sectors of industry.

This is still the vision yet to be realized, but the first steps on the way of its realization are already made. One of the most important among them is the creation of the European Technology Platform Industrial Safety (ETPIS: [www.industrialsafety-tp.org](http://www.industrialsafety-tp.org)) which nowadays coordinates the interests and activities of its more than 350 members from all key stakeholder groups. Steinbeis Advanced Risk Technologies actively supports and leads some of the ETPIS projects, in particular in the area of emerging risks. An outcome of these activities has resulted in the involvement of ETPIS in the drafting of the FP7 calls for the Thematic Priority NMP.

Furthermore, in cooperation with partners from Germany (University of Stuttgart), France (INERIS), Hungary (BZF) and Belgium (Technologica), the Steinbeis Transfer Center for Advanced Risk Technologies has founded the European Economic Interest Grouping EU-VRi (European Virtual Institute of Integrated Risk Management, [www.eu-vri.eu](http://www.eu-vri.eu)). The main priority and goal of EU-VRi is to ensure that potential technology risks are managed safely, responsibly and transparently. In pursuit of this goal, Steinbeis Advanced Risk Technologies, as a part of EUVRi, is leading an important initiative within the European "Seventh Framework Programme" (FP7). The initiative named

iNTeg- Risk – "Early Recognition, Monitoring and Integrated Management of Emerging, New Technology Related Risks" aims to coordinate research and development activities worth more than 25 million Euros and ensure that safety, environmental friendliness and social responsibility remain the trademark of the "technology made in the €.

Steinbeis is following the same strategy in the field of risk management-related services for industry introducing the state-of-the-art innovation and technology in industry. For the oil, energy and other industries in countries like Hungary, the Czech Republic, Slovakia, Serbia, Romania, Malaysia and India, this was the main motivation to invite and use the services of Steinbeis Advanced Risk Technologies in the field of risk-based inspection (RBI), reliability-centered maintenance (RBM) and health-safety-environment (HSE) management, and implement these technologies successfully.

## **2007**

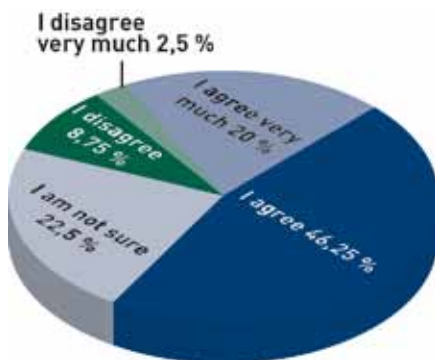
**A year full of events and actions**

**p. 12**

## Initiatives in 2007

# A year full of events and actions

In 2007 EU-VRI has organized a large number of events: brokerage events, project meetings, etc., provided support to the European Technology Platform on Industrial Safety (ETPIS) and set-up several project and initiative web sites, and explored needs of the stakeholders in several areas.



### Examples of such activities are:

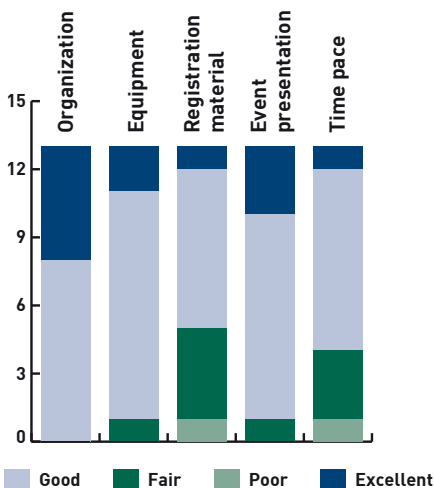
- **Brokerage event FP7-NMP-Nano, Nano-safety HUB Meeting, March 2007** – Brussels No. of participants: 45
- **Brokerage Event FP7-NMP-Risk, Nov. 2006** – Paris No. of participants: 95
- **ETPIS Technology Platform support:** 2nd General Assembly ETPIS (February 13, 2007) No of participants: 93
- **Project meetings and support:** involving over 500 persons in 2007

project design, management and control. The web-tools set-up for the projects are currently used for on-line management of:

- Almost 200 registered companies
- About 1500 registered users, and
- Additional 8000+ addresses of potential customers, partners and/or contacts provided by Steinbeis and other members.

Collaboration, primarily through ETPIS, with other **European Technology Platforms** has been established, in particular: Advanced Materials (EuMaT), Manufacturing (Manu-future), Construction (ECTP), Chemistry (SusChem)... A number of **web surveys** have been conducted, in order to analyze perception of different issues, such as:

- Harmonization/standardization (iNTeg-Risk)
- New technologies – emerging risks
- ETPIS: members' satisfaction
- F-Seveso survey on effectiveness of Seveso II directive implementation



EU-VRI has provided management and organization support (also by means of the dedicated web portals) to a number of proposals, projects and technology platforms, such as:

- iNTeg-Risk – <http://integrisk.eu-vri.eu>
- Alfa-Bird – <http://alfa-bird.eu-vri.eu>
- F-Seveso – <http://f-seveso.eu-vri.eu>
- ETPIS – <http://industrialsafety-tp.org>
- DE-TPIS (German national platform) – <http://industrialsafety-tp.org/de>

Each portal provides a full set of tools for interactive, web-based communication, information dissemination, proposal and

Common EU approach to the issue of emerging risks will shorten the time to market and increase competitiveness of the EU economy

## 2008

EU and industry projects	p. 14
EU-Project: iNTeg-Risk (FP7)	p. 15
Industry Project: RiskNIS	p. 16

## Activities in 2008

# EU and industry projects

In 2008 EU-VRi has started and/or continued work on a number of large important projects, involving majority of the EU-VRi members.

The main projects are:

### iNTeg-Risk- Early Recognition, Monitoring and Integrated Management of Emerging, New Technology Related Risks

Duration/Partners: 54 Months / 63

Large collaborative project FP7

Budget/EC Grant : approx. 19.5/13.6 M€

Status end 2008: running, EU-VRi coordinator

[www.integrisk.eu-vri.eu](http://www.integrisk.eu-vri.eu)

### ALFA-BIRD - Alternative Fuels and Bio-fuels for Aircraft Development

Duration/Partners: 48 Months / 23

Large collaborative project FP7

Budget/EC Grant : approx. 10.5/6.8 M€

Status end 2008: running, EU-VRi coordinator

[www.alfa-bird.eu-vri.eu](http://www.alfa-bird.eu-vri.eu)

### NANODEVICE - Novel Concepts, Methods, and Technologies for the Production of Portable, Easy-to-Use Devices for the Measurement and Analysis of Airborne Engineered Nanoparticles in Workplace Air

Duration/Partners: 48 Months / 26

Large collaborative project FP7

Budget/EC Grant: approx. 12.8/9.5 M€

Status end 2008: contracted, EU-VRi partner

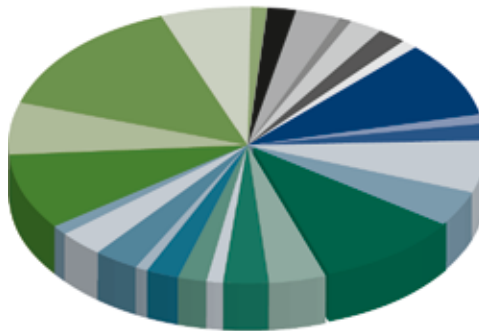
### F-Seveso - Study of the effectiveness of the Seveso II Directive (96/82/EC)

Duration/Partners: 9 Months / 5

Service Contract/Consultancy for DG ENV

Status end 2008: finished, EU-VRi coordinator

[www.f-seveso.eu-vri.eu](http://www.f-seveso.eu-vri.eu)



### RiskNIS - Industry project introducing a integrated risk management system for oil industry of Serbia

Duration/Partners: 42 Months / 5

Budget: 2.3 M€

Status end 2008: Package A finished, Package B running, Package C planned

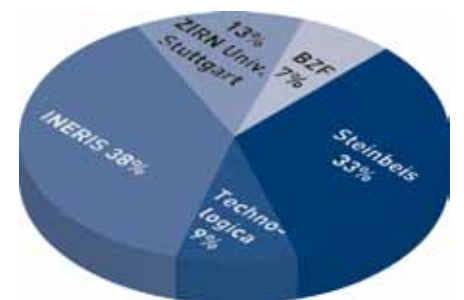
[www.risknis.risk-technologies.com](http://www.risknis.risk-technologies.com)

The activities in 2008 have confirmed that the basic ideas of EU-VRi, to act as a one-stop-shop and to provide a "pre-established" international multidisciplinary consortium framework, have been broadly accepted and have lead to a successful market debut.

More details about

- EU and
- Industry

projects are provided further on.



Over 30 million € of running projects – the "return of investment" for the EU-VRi members

## Manage risks of the “New Technologies”...

# EU-Project: iNTeg-Risk (FP7)

**iNTeg-Risk is a large-scale integrating collaborative project aimed at improving the management of emerging risks related to “new technologies” in European industry. This will be achieved by building a new management paradigm for emerging risks as a set of principles supported by a common language, agreed tools & methods, and Key Performance Indicators, all integrated into a single framework.**

The “EU response” proposed by the project will be based on 17 individual applications of new technologies like nanotechnology applications in SMEs, H2 technologies, underground storage of CO2, new materials (ERRAs – Emerging Risk Representative Applications in EU Industry). The solutions will be generalized and then used for the framework, which will be validated in a second application cycle.

The overall solution will be made available to the users in the form of the iNTeg-Risk “one-stop shop” for EU solutions addressing emerging risks. The solution will include issues of early recognition and monitoring of emerging risks, communication, governance, prestandardization, education & training, dissemination, as well as new tools such as Safetypedia, Atlas of Emerging Risks, Reference Library, etc. The project involves leading EU industries and renowned R&D institutions and it is coordinated by the European Virtual Institute for Integrated Risk Management, the dedicated EEIG guaranteeing the sustainability of the results after the project.

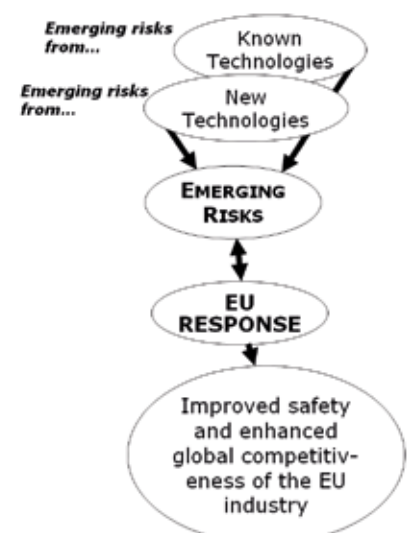
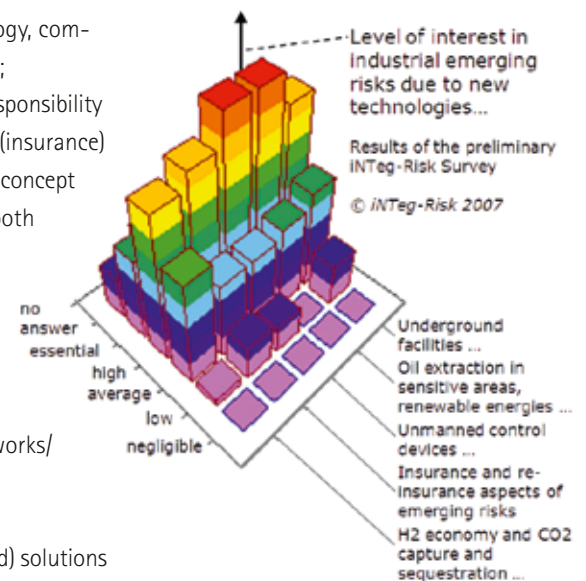
The iNTeg-Risk RTD strategy relies upon the breakthrough innovation and it will be embedded into the very core of the project so-

lutions and deliverables. The main innovation points of iNTeg-Risk are:

- An agreed mind set (framework) of dealing with emerging risks;
- New dynamic metrics of risk, in particular the Key Performance Indicators for Emerging Risks, including the societal, cultural and governance aspects; all defined within the iNTeg-Risk Framework technology, communication, human, regulation;
- Introduction of the life-cycle responsibility of the owner of emerging risks (insurance) and extending the conventional concept of CSR – feed-back related to both environment, society and economy;
- iNTeg-Risk will rely on use of new methods and new technologies for dealing with risks in complex industrial networks/ systems.

A number of novel (first of the kind) solutions will be provided in iNTeg-Risk Safetypedia, iNTeg-Risk EU Atlas of Emerging Risk, iNTeg-Risk European Network of Industrial Systems and Facilities for exploration of Emerging Risks, iNTeg-Risk Network for monitoring of the emerging risks and iNTeg-Risk “One-stop-shop”.

With the help of the European (CEN) and national organizations (DIN) iNTeg-Risk will use prestandardized innovation, in particular the one related to general iNTeg risk procedures, new technologies, new materials, new production and production networks, new policies (governance).



### iNTeg-Risk Early Recognition, Monitoring and Integrated Management of Emerging, New Technology Related Risks

Grant no. CP-IP 213345-2 A large collaborative FP7 project in the area of NMP – Nanosciences, Nanotechnologies, Materials and new Production Technologies

### Emerging risks in industry and society:

The insurances count today with approx. 20 most important emerging risks in different branches of industry and society: about a half of them will be looked at in iNTeg-Risk through its 17 ERRAs, ERMF tools and data/info sources in the iNTeg-Risk “onestop-shop”.

## Critical review of assets in a large petrochemical company

# Industry Project: RiskNIS

Risk management and use of risk-based approaches in inspection, maintenance and HSE analyses of NIS a.d. plants (Serbia) is performed as a project under the leadership of Steinbeis Advanced Risk Technologies under the contract between the Petroleum Industry of Serbia (NIS a.d.).

In the first package of the project (Project "A") the comprehensive critical review of the assessment of NIS assets (Basic Resource Document) has been made and the integrated webbased system for

- Risk-based inspection (RBI),
  - Reliability Centered Maintenance (RCM),
  - Root Cause Failure Analysis (RCFA) and
  - Health, Safety and Environment analysis
- installed and applied on over 2,000 items (units, systems, pieces of equipment). Approx. 300 participants of the corresponding training, education and certification measures have obtained the professional skills needed to apply the methods and use the system.

The work done in the area of RBM (Risk Based Management), RBI, RCM, RCFA, HSE and HSSE systems, which has allowed to include safety, environmental, business and reliability considerations into the decision making process and, thus, provide better targeting of resources and improving the results of the run-replace-repair decisions, as well as in the overall operation, safety, inspection and maintenance. This is accomplished by considering the risks of possible undesirable events, the risk itself being expressed as the likelihood of the event (in a given scenario) multiplied by its probable consequences. The implemented and used

RBI, RCM, RCFA and HSE/HSSE systems have helped to significantly optimize plant key performance indicators (KPIs) and assure safe, economical and, hence, competitive operation.

RiskNIS project has provided an integrated RBI, RCM, RCFA and HSE/HSSE solution which is transparent and affordable. This solution is based on innovative, but recognized methodologies (USA, EU), used nowadays by the leading industrial companies, and the state-of-the-art software tools. The solution has provided support for successful application of RBI, RCM, RCFA and HSE in shortest possible time and, in most of the cases without having to change/replace the existing system(s).



### Oil industry of Serbia

Petroleum Industry of Serbia ("Naftna industrija Srbije" a.d. Novi Sad (NIS a.d.) is one of the biggest vertically integrated companies for oil and gas production in Southeast Europe, dealing with exploration, production and refining of crude oil and natural gas, as well as with the sales of a broad range of petroleum products.

### Participating EU-VRi Partners:

- Steinbeis Advanced Risk Technologies
- BZF
- D'Appolonia
- vfdb
- TÜV

## 2009

<b>Industry projects: Technical, HSE, environmental, legal and project risk</b>	<b>p. 18</b>
<b>1st iNTeg-Risk Conference 2009</b>	<b>p. 19</b>
<b>Exploring prospects of further expansion</b>	<b>p. 20</b>
<b>Quality and project management</b>	<b>p. 21</b>
<b>Knowledge enhancement – Our priority for the future</b>	<b>p. 22</b>

Solving real-life industrial problems

# Industry projects: Technical, HSE, environmental, legal and project risks

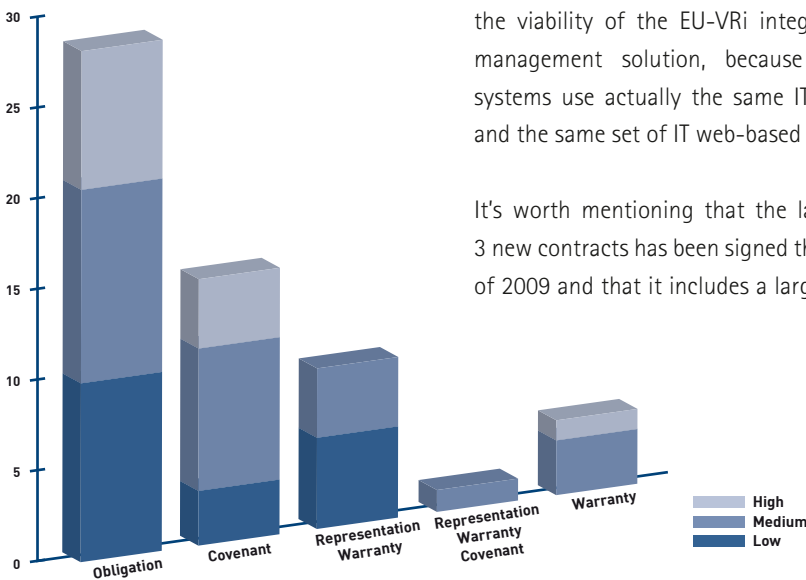
The project "Risk-Nis – Risk management and use of risk-based approaches in inspection, maintenance and HSE analyses of NIS a.d. plants (Serbia)" has been extended in 2009 by 3 further projects dealing with Environmental Risks, Legal Risks and Project Risks.



All the projects are performed under the leadership of Steinbeis Advanced Risk Technologies under the contract between the Petroleum Industry of Serbia (NIS a.d.) and Gazprom. In the first of the projects the comprehensive critical review of the assessment of NIS assets has been made and the integrated web-based system for

- Risk-based inspection (RBI),
- Reliability Centered Maintenance (RCM),
- Root Cause Failure Analysis (RCFA) and
- Health, Safety and Environment analysis

The system as it now stands is installed and applied on over 8,000 items (units, systems,



Risk by Obligation Type

pieces of equipment). Approx. 500 participants of the corresponding training, education and certification measures have obtained the professional skills needed to apply the methods and use the system.

The solution applied in the project has provided an integrated RBI, RCM, RCFA and HSE/HSSE solution which is transparent and affordable. This solution is based on innovative, but recognized methodologies (USA, EU), used nowadays by the leading industrial companies, and the state-of-the-art software tools. The solution has provided support for successful application of RBI, RCM, RCFA and HSE in shortest possible time and, in most of the cases without having to change/replace the existing system(s).

Through the extension of the above system towards legal, project management and special environmental-specific has proven the viability of the EU-VRi integrated risk management solution, because all four systems use actually the same IT platform and the same set of IT web-based tools

It's worth mentioning that the last of the 3 new contracts has been signed the last day of 2009 and that it includes a large number

of local companies and workforce, many of them certified exactly through the continuous education scheme introduced by Steinbeis for risk engineers.

Participating EU-VRi Partners:

- Steinbeis Advanced Risk Technologies
- BZF
- D'Appolonia
- vfdb
- TÜV

Example of legal/project risks managed in/by the integrated system delivered in the project:

```

Information Database:
Objects
• Site/Location: 3
• Unit: 65
• Static Equipment - Vessels: 617
• Rotating Equipment: 1122
• Electrical Equipment: 7
• Electrical Equipment/P&ID: 4
• Misc. Equipment: 67
• Static Equipment - Heat exchangers, boilers and furnaces: 831
• Static Equipment - Piping: 211
• Company: 1

Analyses
• HAZOP Analysis: 5
• Management Systems Evaluation Questionnaire: 7
• RBI Qualitative Component Based (Level I): 641
• RBI Qualitative Unit Based: 61
• RBI Quantitative (Level III): 63
• RBI Semi-quantitative (level II): 95
• RCM/RCFA Analysis: 244

RNP
• Energana
• HPV
• Manipulacija
• S-0100
• S-0200
• S-0250
• S-0290
• S-0300
    
```

## Conferences, meetings, workshops: Promoting the idea of integration in the area of risk management

### 1st iNTeg-Risk Conference 2009

In a number of events organized and co-organized in 2009 EU-VRI has organized and co-organized over 500 (five hundred!) meetings, virtually all EU or international, most of them as project meetings devoted for technical tasks but quite a number of them (5-10%) also devoted to the dissemination of project results and spreading and promoting the basic message of "integration" in the area of risk management.



About 250 participants were attending the iNTeg-Risk 2009 conference

The 1st iNTeg-Risk Conference organized in June 2009 in Stuttgart, the city for being the cradle of path breaking technologies – thanks to its numerous inventors and universities, big businesses or multinational companies. The State of Baden-Württemberg still belongs to the regions with the highest patent applications in Europe. This first conference dealing with the integrated risks of new technologies was a success.

Altogether about 250 participants from 28 countries around the world listened to 57 state-of-the-art presentations in the conference and the post-conference workshop.

According to the concluding survey project partners and external participants equally appreciated the conference as well as its accompanying events highly. Over 90% of them rated the organization of the iNTeg-Risk support team as a great success. Especially the conference book and the updated list of attendees were praised. Some participants

suggested that there should be more time for questions at the second day or parallel sessions. Nevertheless, all participants agreed on the good quality of the iNTeg-Risk Conference as it was the first of its kind ever.

The conference tackled a broad range of technologies: from healthy workplaces and tools in nanotechnology applications, over broader approaches such as corporate responsibilities and public perception on technology, up to a global perspective like the OECD's efforts to harmonize safety and risk indicators or the governments' expectations in R&D projects.

The subject of finding „Key Performance Indicators" (KPIs), which shall set European standards for how to detect and go on about emerging risks, was addressed and especially

in the post-conference workshop discussed. Or, as Søren Bøwadt, from the European Commission Research Directorate for Industrial technology in DG research, put it: „This Conference is about the team spirit! The 20 Million Euro project line is there to set the scene for the iNTeg-Risk project in order to find guidelines. It is a lifetime chance to make a difference to create a safer world!"

Other events involving bilateral (e.g. France) and international cooperation complemented the above activities.



Project Officers for iNTeg-Risk Søren Bøwadt and Antonio Cipollaro listening to the presentations



Ch. Dumon, B. de Montferrand (ambassador), J. Löhn, A. Jovanovic, O. Salvi, U. Haug (from left) discussing the possibilities of France-German cooperation

## Partnership with China on integrated risk management

# Exploring prospects of further expansion

**In a global economy, the challenges faced by the human in the different part of the world are similar or interconnected. This is also true for the risk issues which most of the time require global solutions. EU-VRi management has, therefore, initiated and supported a close partnership with China on risk analysis and risk management, in particular for the risks related to sustainable production, clean transport, impact of climate change, impact of the world demography, sustainable energy use, safety and security of critical infrastructures.**

Partnership and cooperation is seen as a two ways process. China quick development demands for effective solutions for risk management, which should benefit from the European experience.

The leaders in China know what the best practices are and how to implement them, but they might profit from external support from European resources in order to enhance the successful technology transfer and adapt new solutions to the local market and the local culture. Europe, obviously, is aware of the opportunities in China, e.g. when sharing investment in research, development and innovation for more effective risk management solutions.

Therefore, within the collaboration initiated with China in 2009, research programs are planned to be elaborated and common projects will be setup to look for synergies and mutual benefit. They will address both methodological and technological aspects, and the collaboration in building tools with global range and of global character.

In particular, the partnership is intended to cover the following three aspects:

- Projects, funded by the European Commission, international organizations, or by

national countries (China and states which have an interest in such a cooperation)

- Education (academic and professional education)
- Dissemination and implementation of best practices, including consulting activities

With the objective to develop a strong partnership with Chinese risk analysis experts, EU-VRi managers decided to play an active role in the two important events that took place in China in 2009:

- The 2nd International Conference on Risk Analysis and Crisis Response (RACR-2009)
- The 1st China-Europe Risk Forum

The European Programme Committee of the Risk Forum was composed by:

- B. Affeltranger, INERIS, France
- L. Bodsberg, SINTEF, Norway
- R. Bubbico, University of Rome ("La Sapienza"), Italy
- A. Jovanovic, EU-VRi/Univ. Stuttgart, Germany
- O. Salvi, EU-VRi/INERIS

A major outcome of the visit in Beijing in October 2009 was the interest from BMILP to become an associated member of EU-VRi. Prof. Bin Zhang, Director of BMILP, deputized Prof. Wang Tong, the Vice-Director of BMILP,

to become the representative of BMILP in EU-VRi.

With this membership, EU-VRi expects generating new initiatives between BMILP and other EU-VRi members.

In addition, in order to develop the dialog between Chinese and European experts in risk analysis, EU-VRi has organized a workshop in the framework of the 2nd iNTeg-Risk conference.

The objective of the workshop is to develop cooperation between Europe and China on emerging risks, as a follow up of the 1st China-Europe Risk Forum that took place in October 2009 in Beijing, hosted by BMILP and sponsored by SRA-Europe and EU-VRi.

EU-VRi was a sponsor and co-organizer of the 1st China-Europe Risk Forum that took place just after the RACR conference, on 22-23 October 2009. The Forum was hosted by the Beijing Municipal Institute of Labor Protection, represented by Prof. Bin Zhang, Director of BMILP. SRA Europe was also a sponsor of this event.



Second International Conference on Risk Analysis and Crisis Response Organized with the support of BMILP ("Beijing Municipal Institute of Labor Protection")

System audited and certified in 2009

## Quality and project management

EU-VRI has developed and applies a modern project and quality management system needed for the complex project and "distributed" way of working.



### Main related activities in the area in 2009:

- Finalization of the web-based Quality Management and Project Management tool for the large scale projects iNTEg-Risk, Alfa-Bird and other projects
- Certification of the system according to ISO 9001:2006 by ZDH ZERT (Nov, 2009)
- Approval of the System by the European Commission (May 2009)
- Development and introduction of web-based tool for financial and technical reporting in EU-projects
- Establishment of a web-based Quality

Management System (QMS), which provides the users of the web-based project management system with the general description of project-specific terms and definitions; overview of the contractual agreements of the project; EU-determined, iNTEg-Risk web-tool- and project-specific procedures; as well as templates for the common documents and actions. The development of the system has been the critical step for managing projects like iNTEg-Risk with more than 400 people actively participating in the project:

- Due diligence like audit in Sept.- Nov. 2009 (by Deloitte, contracted by INERIS)

The above systems for management, follow-up and budgeting of the projects allowed to meet the very strict requirement of EU projects (e.g. for the costs and time-sheets monitoring on the per-person and per-task level).

Both the QMS and the financial system have been explicitly praised in the reports prepared by the auditors.

Education, training, certification

# Knowledge enhancement – Our priority for the future

In its report for 2008, EU-VRI has set the continuous collaboration with universities has been set as one of the strategic goals of EU-VRI for 2009. Indeed the goal has been pursued and the main results described below achieved. The activities were focused onto the two main universities within the EU-VRI founding membership – University of Stuttgart and Steinbeis University (extension of these activities to other members of EU-VRI is set as a priority for 2010!).

The curriculum includes currently the following main areas:

- I. Introduction, basics – risks in industry (e.g. general introduction, specific introduction/basics for single industry branches)
- II. Asset/plant oriented risks management (e.g. RBI, RCM, RCFA, ...)
- III. Hazard (consequence) oriented risks management (e.g. HSE, HSSE, HAZOP, consequence modeling, dangerous chemicals, fire, explosion, ...)
- IV. Business/governance oriented risk management (e.g. business continuity risks, insurance issues, governance frameworks, e.g. the IRGC one, ...)

The basic, core modules/courses cover primarily cover the introductory and basic

theoretical concepts in the area of risk identification, assessment and management.

The second term courses (elective courses, in general) can be pursued at any of the partner institutions, as well as, if organized by them on other venues, provided that the standards set by the Steinbeis University Berlin are met. Elective Courses include topics industrially or academically oriented, as well as practical modules on modern methods, software and techniques.

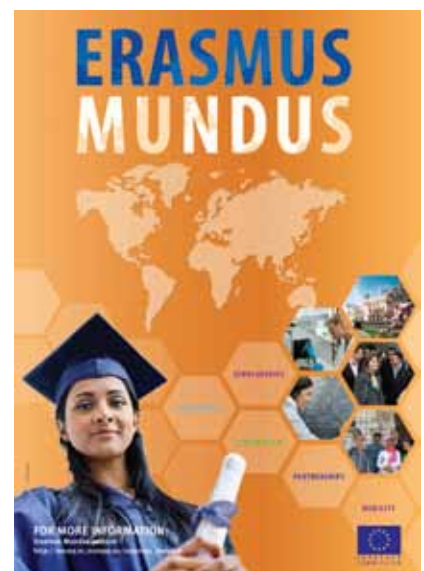
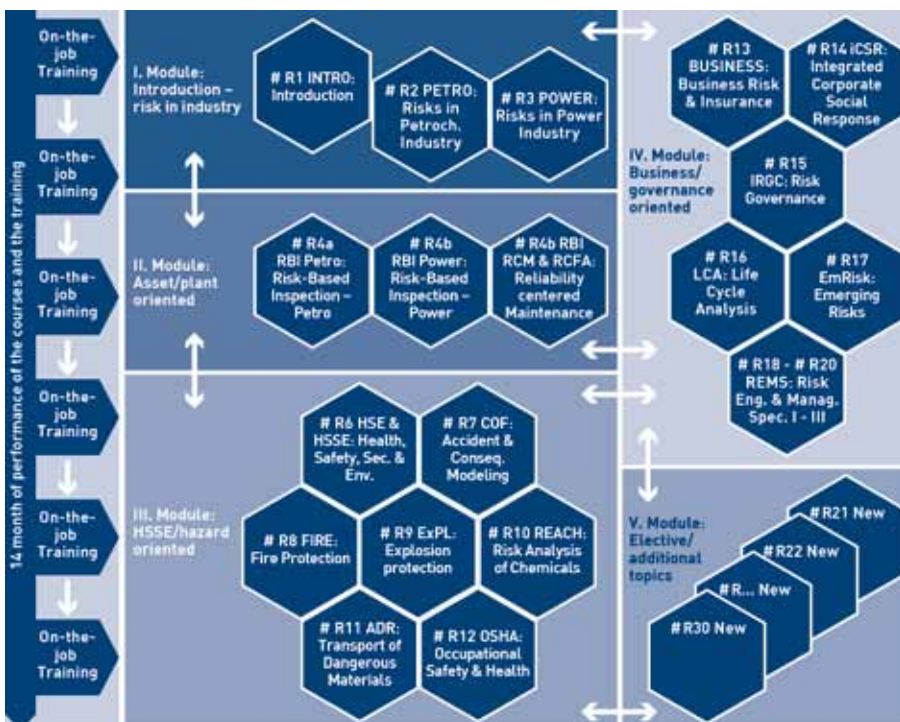
For the Master Thesis and practical (on-the-job, project-related) training the students can choose a topic related to one of their areas of specialization. The content of the Thesis can be oriented toward a research interest or should be application oriented.

Each student will present at the beginning of the second academic year a research project plan and the students are allowed and encouraged to complete their thesis at their earliest convenience, but must submit this work before June of the second year.

Practical training is an essential element in the curriculum of the students and will be developed during the second academic year. This training should preferably be closely related to the master thesis and provide application knowledge and skills needed in Risk Engineering/Management projects.

### Contents of the curriculum „Master of Risk Engineering“

Educational concept proposed for Masters of Risk Engineering by EU-VRI members ZIRN University of Stuttgart and Steinbeis (started in 2009 at Steinbeis University Berlin in Cooperation with ZIRN)



## 2010

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<b>EU-Project: Alfa-Bird – Eco-fuel to make aircrafts fly green</b>	<b>p. 25</b>
<b>EU-Project: NanoDevice</b>	<b>p.26</b>
<b>EU-Working Group: Biogas Safety and Regulation</b>	<b>p. 27</b>
<b>Industry projects: Assessment of technical, HSE, environmental, legal and project risks</b>	<b>p. 28</b>
<b>2nd iNTeg-Risk Conference 2010</b>	<b>p. 29</b>
<b>SafeChina</b>	<b>p. 30</b>

Risk Management of “New Technologies”...

# EU-Project: iNTeg-Risk (FP7) – first results

iNTeg-Risk is a large-scale integrating collaborative project aimed at improving the management of emerging risks related to “new technologies” in European industry. This is being achieved by building a new management paradigm for emerging risks as a set of principles supported by a common language, agreed tools & methods, and Key Performance Indicators, all integrated into a single framework.

In November 2010 iNTeg-Risk project accomplished the 2nd year by finishing the work on 17 ERRAs and entering the phase of their comparison and search for common features. The validation process has also started by the end of 2010.

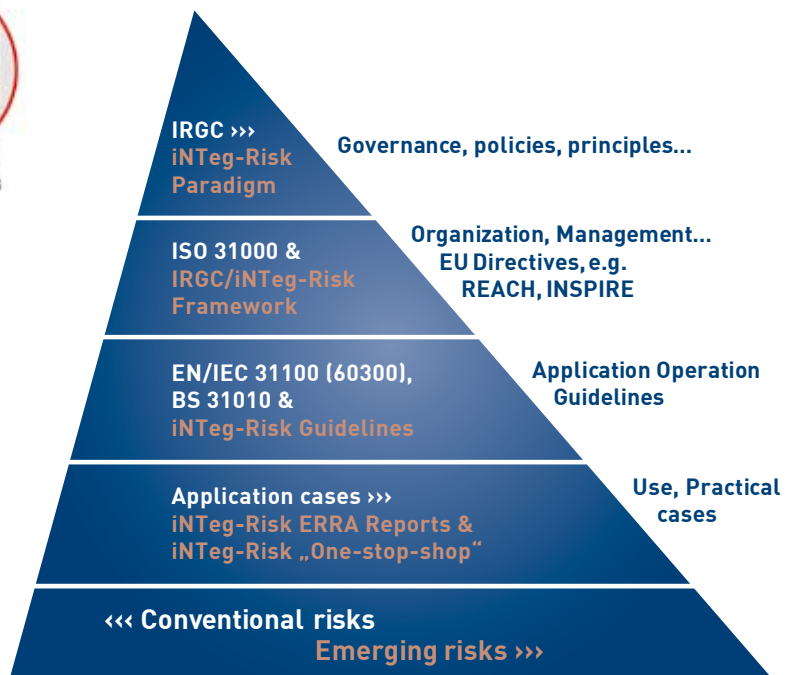
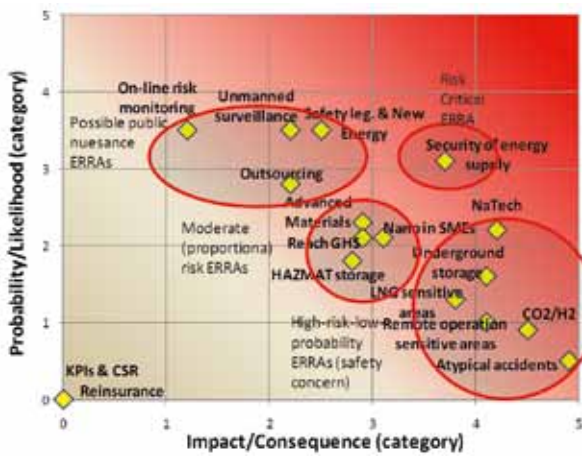
IRGC Risk Governance Framework, the risk management systems such as Basel II and Solvency II, the work done in/for World Economic Forum, the EU directive INSPIRE and the EU projects in the area of LCA (Life Cycle Assessment).

The cases like volcanic ashes crisis were dealt with primarily within the RiskEars module of 1-Stop-Shop (the Emerging Risk Early Warning & Monitoring System). The system allows to collect notions of emerging risks (currently over 900) coming from different sources, usually persons and/or organizations “of confidence”, registered as sources of notions about emerging risks, but also the less conventional sources like Web and/or Tweeter. The Gulf of Mexico case was treated be one of the ERRAs and the KPI-Library Module. The cases like Fukushima disaster are dealt primarily by Risk Atlas (containing currently over 200 layers of GIS data about hazards, threats and vulnerabilities). Last but not least, the project has started work on 6 CEN Workshop Agreement documents related to emerging risks of new technologies.

In the sub-project dealing with the new risk management framework, iNTeg-Risk work has fully integrated the results of some recent and/or still running activities and projects such as standardization work ISO related to integrated risk management (ISO 31000), the

Regarding the development of the tools, the project has shown that it can handle important issues of 2010/2011:

- the volcanic ashes
- Gulf of Mexico spill and
- Fukushima disaster (2011)



The Emerging Risk Management Framework (ERMF) developed in iNTeg-Risk project



## Sustainability as main challenge for aviation

# EU-Project: Alfa-Bird – Eco-fuel to make aircrafts fly green

The search to identify and develop environmentally friendly fuels is meeting with success as new options are being tested for aircrafts.

As the price of fuel oil continues to fluctuate and climate change becomes a pressing challenge, there is a growing need to develop more eco-friendly ways for aircrafts to fly. The Alfa-Bird project is working on developing alternative fuels for planes, taking civil aviation towards more sustainable growth.

Coming up with sustainable alternative fuels in aeronautics is a great challenge since the operational constraints – e.g. flying in very cold conditions – are very strict. The long lifetime of current civil aircraft – almost 50 years – also challenges the use of newer, greener fuels. To address this, Alfa-Bird is gathering industrial partners from the aviation and fuel industries, along with experts in aeronautics, biochemistry, combustion and industrial safety. This approach involves the study of alternative fuels, chemical analyses, new injection and combustion systems, compatibility with aircraft systems and the actual production of new fuels.

### Careful selection of the fuels for the future

Based on a first selection of the most relevant alternative fuels, a detailed analysis of four new fuels has been performed with tests under

real conditions in 2010 and 2011. The first fuel selection matrix has been designed around three main axes, covering a wide range of possible alternative fuels. The short- and middle-term options include paraffinic fuels based on hydro-treated vegetable oils and synthetic fuels. Another middle-term possibility is based on naphthenic fuels, representing new production processes such as coal or biomass liquefaction. Oxygenated fuels, such as higher alcohols or furanic compounds, fall into the long-term category.

More tests will be undertaken on fuel blends and the engines in 2011 and 2012. Data collected during these tests will be used to prepare the environmental and economical impact assessment which will help develop the future strategy for alternative fuels in aircraft.

Ultimately, the impact of such a project will be of prime importance for the evolution of aviation over the next five decades. Our skies may well become cleaner, as Europe helps set the standard for better and greener aircraft fuel.



Source: Airbus

### Main achievements and products

The main achievements and products from Alfa-Bird consist in:

- The selection of sustainable alternative fuels for aircraft to replace petroleum kerosene
- The basis for safety requirements to optimize the supply chain (including production), the use and the operability of alternative fuels
- New methodologies and corresponding tools for eco-efficiency assessment taking into account the whole life-cycle analysis
- A long term strategy and implementation plan for the use of alternative fuels for aircraft

### Alfa-Bird Alternative Fuels and Biofuels for Aircraft Development

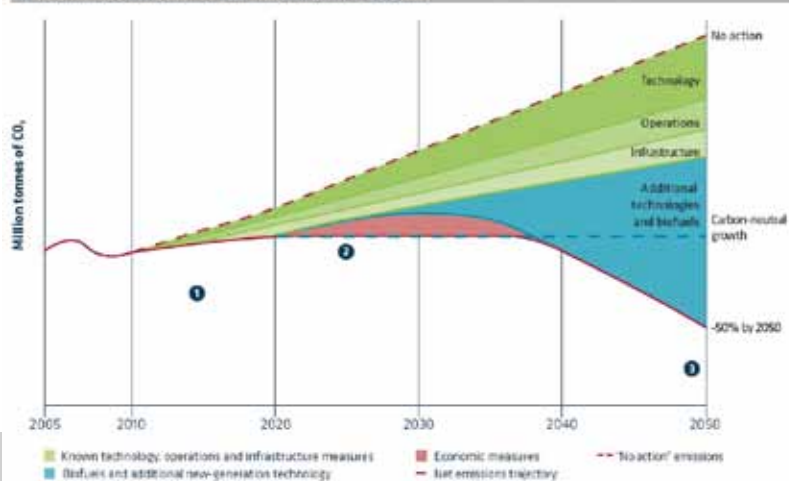
Gant no. ACP7-GA-2008-213266

FP7- AAT- 2007- RTD- 1: 7 Transport (including aeronautics)



Source: ATAG 2010, document available at [www.enviro.aero/aviationefficiency](http://www.enviro.aero/aviationefficiency)

Emissions reduction roadmap (schematic, indicative diagram)



## Devices for nanoparticles

# EU-Project: NanoDevice

One of important challenges for assuring a safe production of engineered nanomaterials (ENM) and the promotion of the use of nanotechnologies is reliable assessment of exposure of workers to these materials in the occupational setting, i.e. during the production, storage, handling and preparation of nanotechnology-based products. This information supports the assessment of potential hazards and risks of ENM, and subsequent management of possible risks associate with ENM.

This four year project aims at developing several portable easy-to-use devices for the monitoring of the levels of ENM workplace aerosols with an emphasis on online monitoring of the exposure, and to effectively reach all the project goals through efficient management and coordination of the project activities. The key goals of the project include 1) characterization of chosen ENM such as carbon nanotubes (CNT) and metal oxides; 2) understanding of the association of ENM characteristics and their potential toxicity; 3) generation of realistic exposure scenarios for workplace exposure to ENM; 4) development of monitoring devices and measurement principles to capture the features and concentrations of ENM in aerosols in workplaces; 5) to develop testing and calibration processes to optimize the functioning of the devices in the measurement of exposure; and 6) to assure a major impact of the project and its results on the safe handling of ENM and the safety of nanotechnologies. The impact in the promoting

of safe use of ENM and safe nanotechnologies takes place through training and dissemination information on the benefits of safe use of ENM handling and production by providing education and training, promoting international standardization of processes related to ENM, publishing a nanosafety handbook, organizing an international congress and other international events, and promoting international networking in the field of safe nanotechnologies. The impact is focused on different user groups of ENM including the industry, social partners, workplaces, regulators, the scientific community, and the public at large. These groups are reached via a stakeholder group that consists of the representatives of these groups.

### Main products developed by EU-VRi in NANODEVICE

The main achievements and products consist in:

- Elaboration of a data-base and knowledge base related to measurement devices pre-

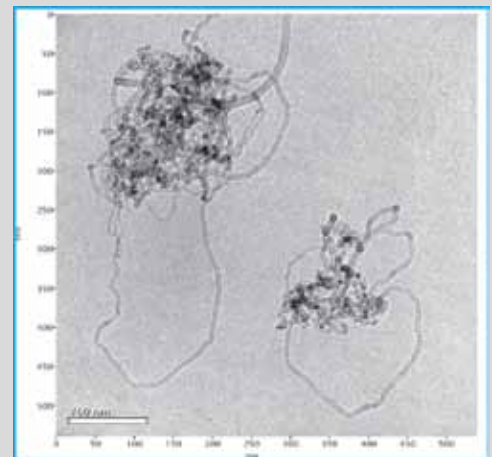
senting the results of NanoDevice and links to other databases,

- Preparation of brochures to support the elaboration of new regulations using the results of NanoDevice related to risk management of ENM,
- Pre-normative activities related to risk assessment and exposure assessment including calibration and test protocols and the applicability of ISO/IEC Guide 98:2009 (Uncertainty of measurement), all in line with the objectives of CEN TC 352 (Nanotechnologies).

**NANODEVICE – Novel Concepts, Methods, and Technologies for the Production of Portable, Easy-to-Use Devices for the Measurement and Analysis of Airborne Engineered Nanoparticles in Workplace Air**  
Grant no. ACP7-GA-2008-211454-2  
FP7- NMP



Purpose-designed particle impactor, Source: Fraunhofer IPA



TEM-image of CNTs from a CNT-generator developed by Karlsruhe Institute of Technology (KIT), Source: KIT

## Search for alternative sustainable energies

# EU-Working Group: Biogas Safety and Regulation

The development of new energies is experiencing a great development in the world and particularly in Europe. As a result, solar panels, wind turbines and other ecological technologies are more and more installed in many European countries and are constantly evolving. The main purpose of this development is to find an alternative energy replacing the fossil energy dependence which is more sustainable and reducing CO<sub>2</sub> emissions. Thus, the impact on the environment is reduced and energy consumption is sustainable.

Biogas has a special major advantage in addition to other renewable bio-energies. Indeed, it reuses waste as raw materials. The production of biogas is positioned as energy which can not only generate a source of energy known as "green" but also which can recycle waste.

In a context of sustainable development, the place of the biogas is therefore essential. However, the processes of anaerobic digestion are continually improving and new ideas for the uses of this gas continue to emerge.

However, the risks corresponding to processes of biogas production from biomass or waste are still too little known.

Several issues have appeared and need to be solved: the optimization of the production, the safety of the processes, the harmonization of the regulations and the need to develop standards (at European or International Level).

To address these issues and find answers to these questions, INERIS and EU-VRI took the initiative to organize a workshop on 24th November 2010 in Paris to share knowledge,

to structure questions, and to propose answers and further actions aiming at improving safety of biogas production and supporting the quick and sustainable deployment of this energy.

**As an outcome, a EU Working Group has been established. The main achievements consist in:**

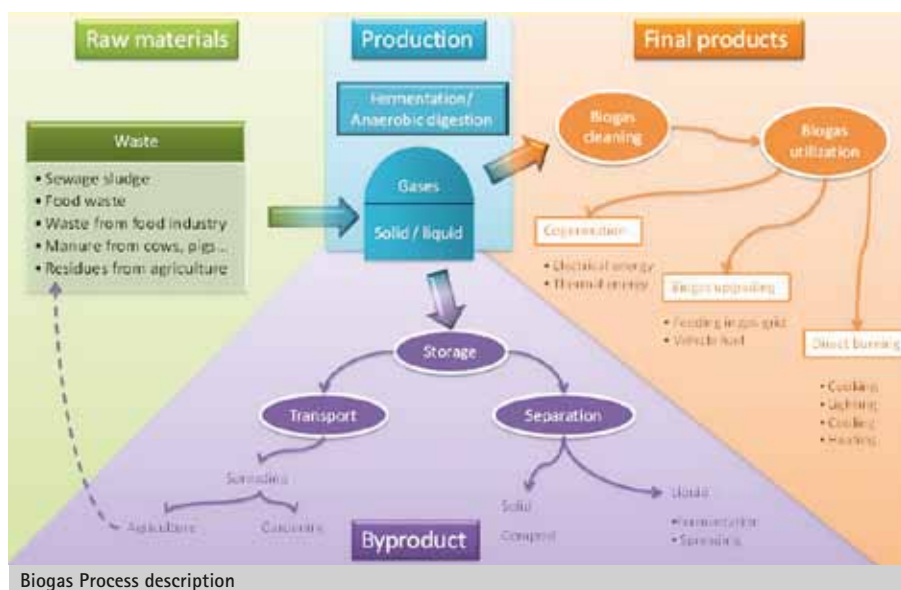
- Creation of an international committee with 15 experts in biogas safety acting as Programme Committee for the international workshop,
- Preparation of a reference document presenting the state-of-the-art in terms of safety and regulations related to biogas production and uses,
- Establishment of a permanent Working Group to further exchanges on best practices and prepare reference documents at European Level.



Biogas plant (courtesy Sébastien Evanno, INERIS)



Public transport using biogas



### Biogas Safety and Regulation

Contract for INERIS (Founding Member)

#### Sponsors:

- European Technology Platform on Industrial Safety
- European Biogas Association
- ATEE Club Biogaz

Examples of projects with NIS-Gazprom Solving real-life industrial problems

# Industry projects: Assessment of technical, HSE, environmental, legal and project risks

The project "Risk-Nis – Risk management and use of risk-based approaches in inspection, maintenance and HSE analyses of NIS a.d. plants (Serbia)" has been finished in its Part B in 2010 by completing analysis for FCC plant of 3 refineries.

The comprehensive assessment of NIS assets has been made and the integrated web-based system for

- Risk-based inspection (RBI),
  - Reliability Centered Maintenance (RCM),
  - Root Cause Failure Analysis (RCFA) and
  - Health, Safety and Environment analysis
- introduced. The system as it now stands is installed and applied on over 10,000 items (units, systems, pieces of equipment). Approx. 500 participants of the corresponding training, education and certification measures have

obtained the professional skills needed to apply the methods and use the system. Through the extension of the above system towards legal, project management and special environmental-specific has proven the viability of the EU-VRI integrated risk management solution, because all four systems use actually the same IT platform and the same set of IT web-based tools.

### EnvironNIS project: "Complex ecological examination of NIS production facilities"

Objectives of the project

- assessment of environmental status, risks and management system
- and development of corrective actions for the improvement of the environmental status and the reduction of the ongoing environmental risks and liabilities

Assessment included twelve facilities of Petroleum Industry of Serbia and their potential effects on the environment

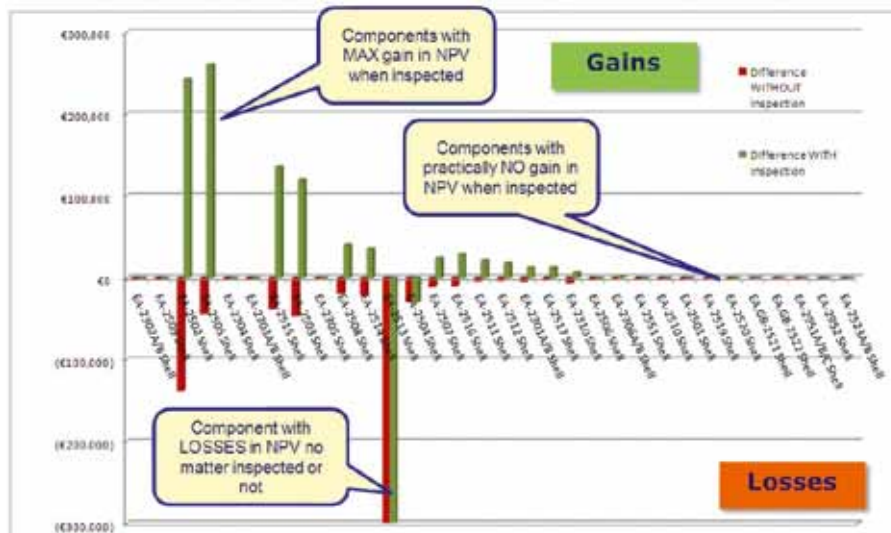
- two oil and one refineries
- two petrol stations
- two tank farms
- two service units
- two dispatch and collection stations for gas and oil
- one storage station for LPG.

The results of the project were qualified by the client and by the authorities as "one of the best and the most comprehensive studies ever performed in Serbia" and they will lead to a further investment of approx. 200 million € in environmental protection and safety improvement projects. The results of the project provided the detailed blueprint for the imminent investment of approx. 9.6 million € will be additionally invested.



12 NIS-Gazprom facilities assessed in EnvironNIS project in Serbia

### Optimizing gains in asset management of NIS-Gazprom facilities:



Persons and competences have been pooled from the following EU-VRI participating/involved partners:

- Steinbeis Advanced Risk Technologies
- D'Appolonia
- JSI

## Organization of Conferences, meetings and workshops

# 2<sup>nd</sup> iNTeg-Risk Conference 2010

As an example on behalf of various events and training activities organized and/or carried out by EU-VRi in the year 2010, the successful 2<sup>nd</sup> iNTeg-Risk Conference in June 2010 in Stuttgart, Germany is mentioned here.

The 2<sup>nd</sup> iNTeg-Risk Conference with the title "New Technologies & Emerging Risks. Dealing with multiple and interconnected emerging risks" was accompanied by 8 courses and workshops organized in cooperation with e.g. Ernst & Young, EU-OSHA, IRGC, Swiss Re, BASF, EDF, BMILP and others.

**I.1 Course:** Principles of IRGC Framework

**I.2 Course:** Life Cycle Assessment

**I.3 Course:** Life management, maintenance and aging (OSHA)

**I.4 Course:** Use of semantic technology (web text-mining) to generate early warning information for risk management

**III.2 Course:** Nanosmile – Communicating risks related to nanotechnologies

**III.1 Workshop:** Concepts and Applications

of Key Performance Indicators for New Technologies

**III.3 Workshop:** New Technologies and CSR (Corporate Social Responsibility)

**III.4 Workshop:** China-Europe partnership in the area of emerging risks Proceedings for workshops & courses

The main conference with 250 participants as well as the courses and workshops were considered as successful, which was underlined by evaluation survey carried out among the participants coming from various fields of expertise.

In addition to the Conference the International Advisory Board for iNTeg-Risk project held its 2<sup>nd</sup> meeting on June 15, 2010.



EU-VRi President Ortwin Renn and EU-VRi CEO Aleksandar Jovanovic are welcoming the participants



250 participants were attending the 2<sup>nd</sup> iNTeg-Risk conference 2010



2<sup>nd</sup> meeting of the International Advisory Board for iNTeg-Risk project



Haus der Wirtschaft served as a wonderful location also for 2010 conference

## Project started

# SafeChina

**SafeChina PPP Project is the third DEG (Deutsche Investitions- und Entwicklungsgesellschaft mbH) PPP project with companies from the Steinbeis Group. From August 2003 until July 2006, the Steinbeis GmbH & Co. KG from Stuttgart was DEG-PPP Partner in a project for qualification and certification of IT specialists in Serbia and Montenegro. Since June 2008 to May 2010 the same Steinbeis Company was DEG-PPP-Partner in a project to qualify experts in the field of industrial safety and environmental protection in Serbia.**



The contract for SafeChina project Promoting the EU and German standards and practices of Environmental Protection and Industrial Safety in China, has been signed in September 2010 between DEG and Steinbeis-Hochschule-Berlin GmbH ([www.safechina.risk-technologies.com](http://www.safechina.risk-technologies.com)). The project aims to build a sustainable education service in China offering to engineers and relevant professions to learn about the EU HSE practices and regulation and qualify as Environmental- and Safety engineers according to EU criteria, guidelines and practice.

The project will last 24 months, starting from September 2010. Kick-off meetings took place in Stuttgart (October 26, 2010) hosted by Steinbeis University Berlin and in Beijing (November 16, 2010) hosted by Beijing Municipal Institute of Labor Protection (BMILP). The local media gave full attention to this event in Beijing.

The core of the project SafeChina are:

- a) Set of courses in the area of industrial safety
- b) HSE certifications scheme according to the EU requirements, and
- c) on-the-job training in EU/Germany.

This educational concept combines theoretical education with on-the-job training, giving to the trainees opportunity to meet in practice implementation of some successful sets of measures for industrial risk management, i.e. to apply the competences obtained during the courses in the practical work in participating German/EU companies.

Appropriate educational structures will be built in Germany and China to support the core project activities. The educational structure in China will be organized by Beijing Municipal Institute of Labor Protection (<http://www.bmilp.com/en/>) and Beijing Normal University (<http://www.bnu.edu.cn/>), as the main Steinbeis strategic partners in China. Both Steinbeis and BMILP are members of the EU-VRI, which ensures good collaboration framework.

Initial set of training courses includes 10 different 5-day courses. SafeChina survey of needs was launched in the beginning of March 2011 aiming to determine areas where the lack of knowledge and of trainers exists.

SafeChina courses are divided in four modules: I Introduction – risk in industry with 3 general courses, II Asset/plant management also with 3 courses, III HSE/Hazard oriented with 7 courses and IV Business/governance oriented with one course. This modular system allows to a wide range of participants to

shape their training according to their own professional needs or wishes.

Certification scheme for HSE professionals, senior risk assessors and risk examiners, also in compliance with the modules, was already developed in ESPRIT project and will be applied in SafeChina project as well.

The target numbers in the whole project are:

- 200 students participated SafeChina training courses
- 100 students received Steinbeis HSE certificates after passing successfully the final exams
- 20 students participated one-week on-the-job training in German companies while 5 students participated 4-week on-the-job training in German companies
- 10 students trained for SafeChina trainers
- 20 students received certificates as HSE professionals after fulfilling the requirements of certification schemes.

The quoted numbers present also contractual indicators which will guide the development of the project activities and be used in the end of the project to evaluate its overall success.

It is expected that the project will bring advantages to all participants starting, directly to the training participants and indirectly to Chinese industry and governmental institutions. Steinbeis University Berlin expects to gain access to a significant pool of HSE experts with which further projects towards technology- and know-how-transfer in the areas of environmental and risk management could be acquired and executed also in neighboring Asian countries.

## Future Plans

**Safety as a trade-mark of technology  
„made in EU”**

**p. 32**

**Safe innovation for a competitive  
and sustainable future**

**p. 33**

**Global Collaboration for Safer Future**

**p. 34**

## SafeFuture: Forward Looking

# Safety as a trade-mark of technology „made in EU”

An initiative of the ETPIS High-Level Group (ETPIS, the European Technology Platform Industrial Safety, led by EU-VRi as Operating Agent).



### ETPIS Vision:

Industrial safety performance progressively and measurably improved in terms of reduction of reportable accidents at work, occupational diseases, environmental incidents and accident-related production losses. „Incident elimination” and „learning from failures” cultures embedded in design, maintenance, operation at all levels in enterprises. Structured self-regulated safety programs in all major industry sectors in all European countries. Measurable performance targets for accident elimination and accident free mind set workplaces as the norm in Europe.

The initiative „**SafeFuture – Safe innovation for a competitive and sustainable future**” is organized around 4 pillars that will bring innovative and sustainable solutions to the European Grand Challenges:

- **Safe Infrastructure**, to address e.g.: life extension of process plants, transport infrastructures, power plants, off-shore platforms...; intensification of Natural catastrophes due to climate change; design and monitoring for long term operation for Carbon Capture and Storage; protection and security of critical infrastructures...
- **Safe Energy**, to address e.g.: safety of the use of new energy carriers for vehicles (FEV, fuel cells, CNG, biofuels...); safety for the green energy technologies (wind mills, photovoltaic panels, concentrating solar power (CSP)...); making the underground transport infrastructure compatible with the new energy carriers; combining pan European transport infrastructures and smart high power electricity grids...
- **Safe Products and Production**, to address e.g.: development of the European Factory of the Future, by managing emerging risks through new integrated solutions (safety systems, advanced personal protective equipments, new organizational models, ergonomics, etc.); enabling higher productivity under better workplaces; safety for the green jobs; safe production and use of nanomaterials...
- **Transversal issues**, to solve existing challenges for sustainable integration, interaction and risk governance such as: difficulties in putting together different risk mitigation policies and ensuring their compatibility (Risk-Risk trade-offs), Multi-risk and interdependencies of risks in a global competitive market...

Each of the 4 pillars will be addressed with the following aspects:

- Grand Challenges (Current situation and future needs)
- On-going projects and needs (research and implementation)
- Standardization activities and needs
- Actions to involve SMEs or to disseminate knowledge to them
- Education and training
- International cooperation
- Links with other ETPs, Associations or Federations, and with possible Innovation Partnerships and other structuring initiatives.

## SafeFuture: Implementation

# Safe innovation for a competitive and sustainable future

ETPIS with the support of EU-VRI has initiated the implementation of the SafeFuture strategy by joining the efforts with other European Technology Platforms and initiatives, and by providing new "green and safe" solutions/technologies needed for sustainable integration, interaction and risk governance.

Three main lines of implementation are proposed, namely:

- **Regular European Commission calls:** Embedding of ETPIS topics in FP7/FP8 projects dealing with "Safe new materials & technologies" and "Safe production networks and processes" mainly in the NMP programme, but also in other parts of the EC workprogramme and directly with some executive DGs such as Enterprise, Environment, Energy, Move, Info, Sanco...
- **PPP-Financing** for single projects of "SafeFuture" initiative (approx. volume of 200 mil. € envisaged – min. 50% industry) at European and national level (in line with the European Innovation Partnership principles)
- **Direct industrial financing**, e.g. through multi-client industrial projects with EU-supported coordination

Other challenging aspects need to be further considered during the implementation:

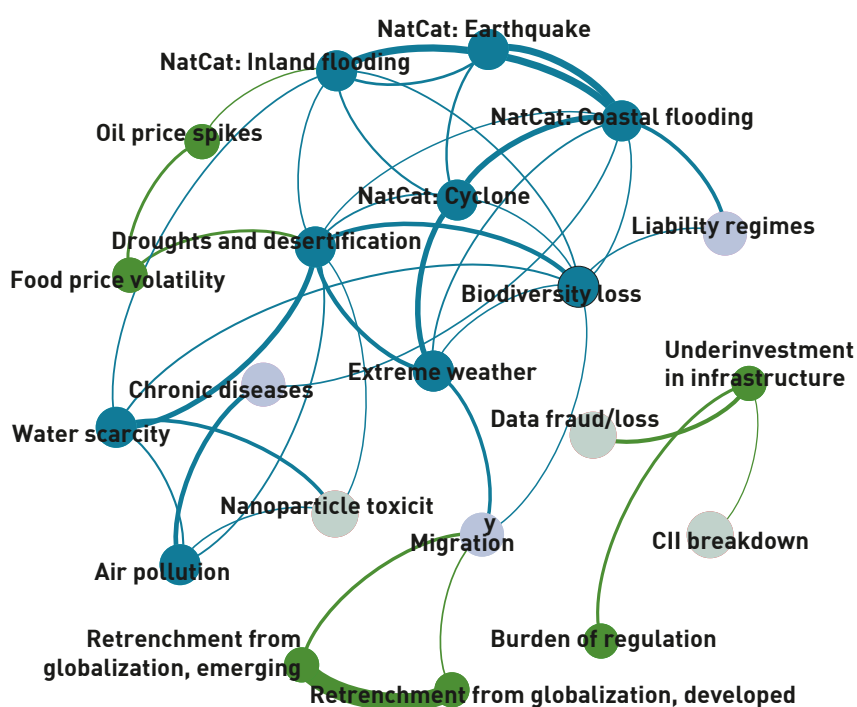
- Global early warning systems in Networked Systems
- Global life cycle assessment and management
- Global safety/risk governance
- Locally available state-of-the-art European safety technology (IES)
- European normalization and standardization as competitiveness factor

For the implementation, collaboration has started with:

- Executive DGs from the European Commission: Industry and Enterprise, Energy, Environment, Health, Information Society and Media, Employment...
- European Agencies such as EU-OSHA, ECHA, JRC...
- International organizations: OECD – Future Global Shocks project, International Risk

Governance Council (IRGC), World Economic Forum – Global risks reports...

- Standardization bodies: ISO, CEN-CENEL-EC, DIN, AFNOR, AENOR...
- Industry: chemical, oil & gas, energy, transport, insurance, safety equipment manufacturers, inspection and control companies... and 300+ member companies of ETPIS



Selected WEF (World Economic Forum) Global Risks mapping in (and for the needs of) iNTeg-Risk project

# Global Collaboration for Safer Future

In 2010 EU-VRi has joined the large international OECD project on "Future Global Shocks": As an international organization, EU-VRi has participated in the project at the same level with the government representatives of Canada, Finland, France, Korea, The Netherlands, Singapore, UK and the USA . In June 2011 the project has delivered its main report, with 5 further supplemental reports (case studies) to follow.

Under the leadership of OECD (Organization for Economic Cooperation and Development) the International Futures Programme's project on "Future Global Shocks" originated in 2009 with a series of consultations among partners focusing on follow-up work to the decade-long research into risk management, leading to the new concept of "global shocks" which takes into account a different pattern of risk: cascading risks that become active threats as they spread across global systems, whether these arise in health, climate, social or financial systems. EU-VRi was invited to join the project in 2010 and decided to actively participate in it, primarily engaging its

two founding members (University of Stuttgart, ZIRN, and Steinbeis Advanced Risk Technologies) as well as the partners from the iNTeg-Risk project.

The main report draws its conclusions primarily from analysis contained in five case studies on different types of events that could lead to global shocks, and a background paper that provides an overview of concepts, ideas, and examples of extreme events. All six background papers are available separately on the OECD website: [www.oecd.org/futures](http://www.oecd.org/futures). The report's contents are also based on input derived from consul-

tations with the project's Steering Group (EU-VRi was part of it) and the results of independent research conducted by the OECD Secretariat. The Steering Group selected the case studies' topics on financial crises, pandemics and cyber risks for their potential to impact global systems and relevance in connection with recent events. The case studies on social unrest and geomagnetic storms were also commissioned to ensure that the report's conclusions were applicable to a broader range of events that might produce global shocks.

EU-VRi has decided to contribute to the sustainable and seminal character of the OECD work (including also the reports "Emerging Risks in the 21st century: An Agenda for Action", and "Large-scale Disasters: Lessons Learned" underlying economic, technological, environmental and social trends driving the emergence of global

risks. The analysis and main conclusions from these publications hold true today, which underlines the need for policy makers to pay added attention to risks that are ever more present and ominous. A particular contribution of EU-VRi is the practical implementation of the concept of the "Tools to prepare for future global shocks": the iNTeg-Risk tools like RiskAtlas, RiskEars, Risk-Clock and others, incorporate the ideas of mapping and modeling of complex global systems, and strategic approaches promoted in the OECD work.





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