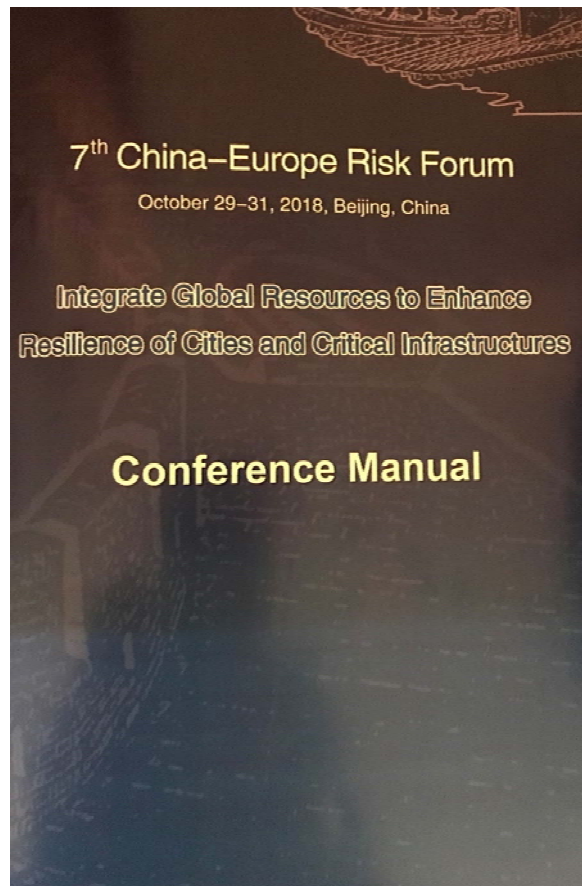
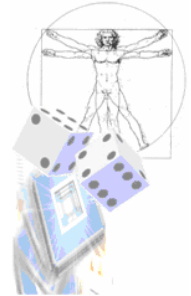




*Smart Resilience Indicators for Smart
Critical Infrastructures*



ISO 31050: Guidance for managing emerging risks to enhance resilience – Thriving in a world of uncertainty

(ISO 31050, European Resilience and Risk Assessment and Rating and SmartResilience project approach, methodology, tools and results)

Beijing, October 30, 2018

A. Jovanovic



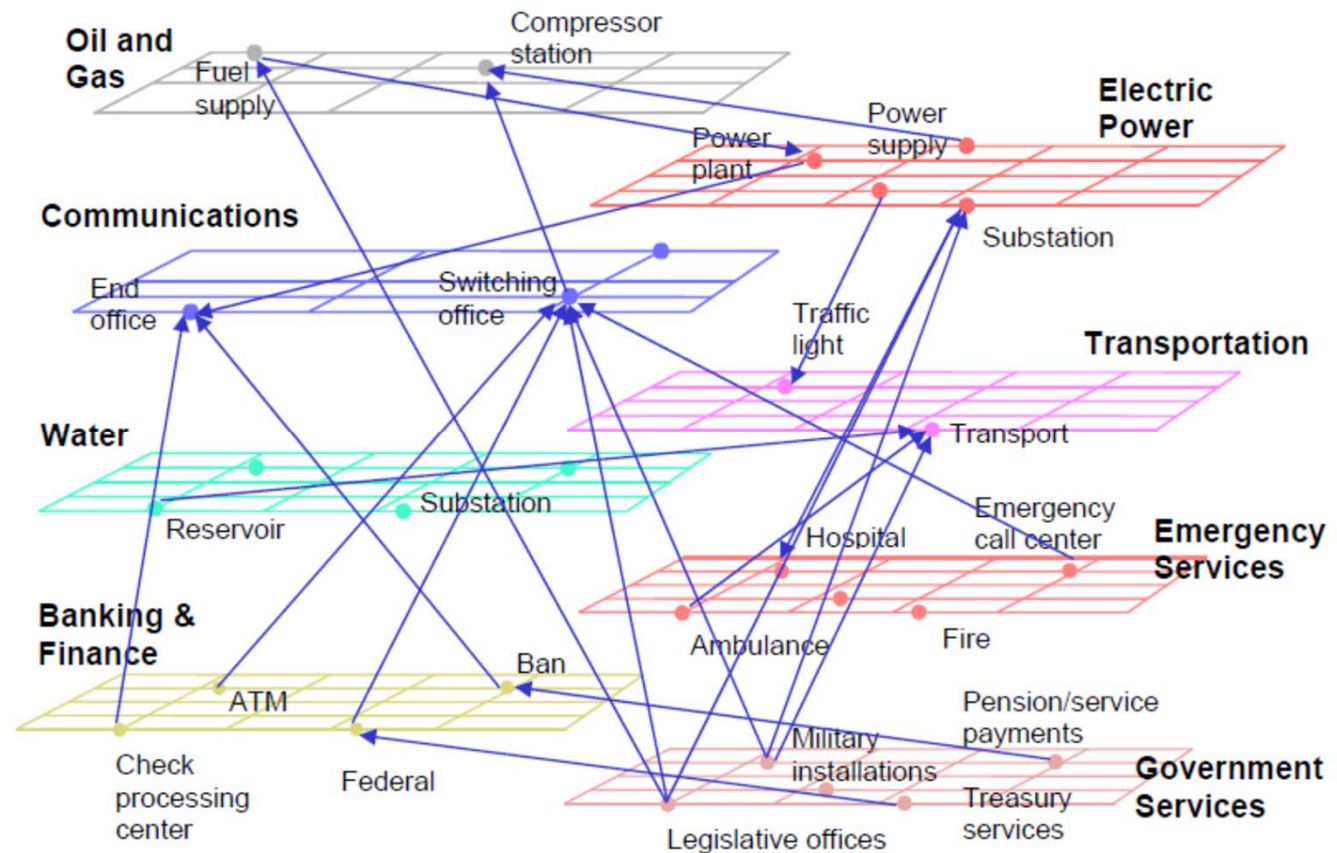
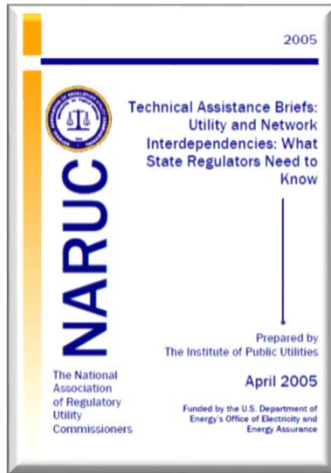
Steinbeis Advanced Risk Technologies, Stuttgart, Germany
University of Stuttgart – ZIRIUS, Stuttgart, Germany



**EU-VRI – European Virtual Institute for Integrated Risk
Management, Stuttgart, Germany**

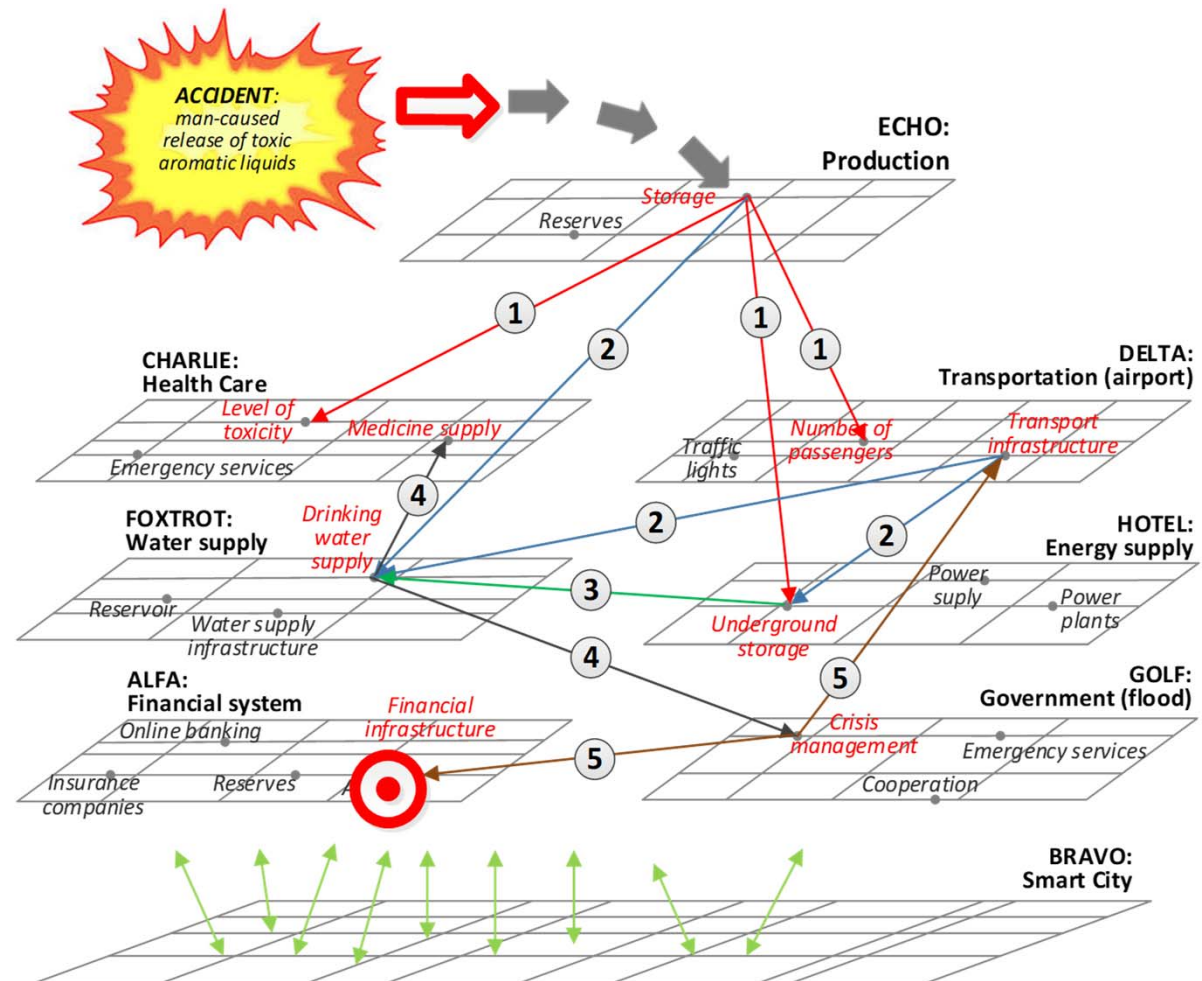


NARUC 2005 – How much have we progressed?



Many single answers, cases, studies, tools...

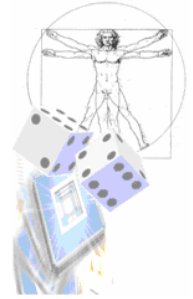
- ... but NO agreed methodology... not even on one country level, let alone something globally agreed
- EU: 600+ projects, many talking about cascading, ripple, inter-this-inter-that...
- Here: Examples from SmartResilience project



Multiple threats...

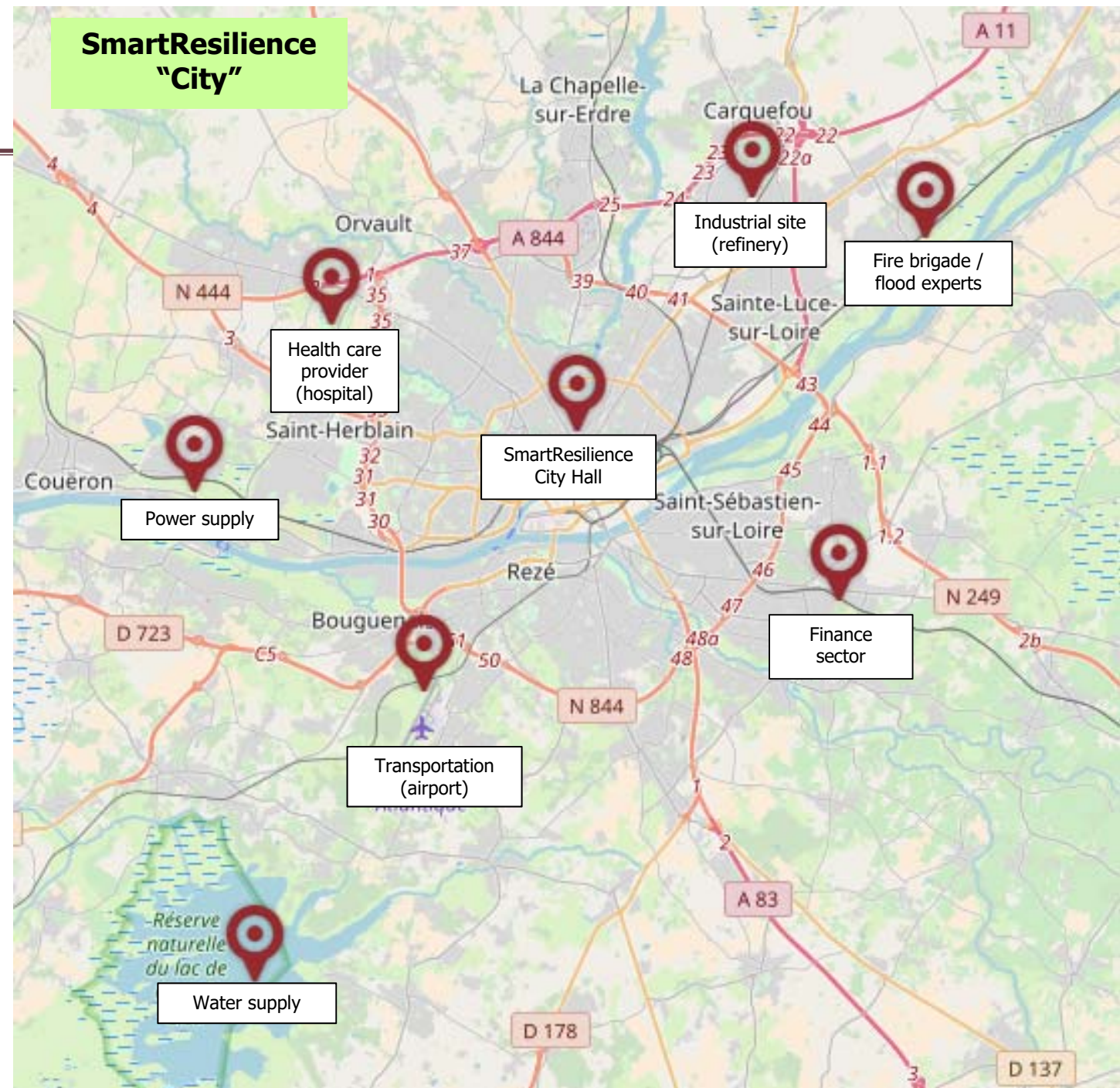
terror, cyber, weather, health, ...

Infrastructure (CI) / Scenarios	Terrorist attack	Cyber attack	Extreme weather incl. NaTech events	IC-specific events	Cross- cutting issues
• Smart cities (Germany, UK, Ireland)	✓	✓	(✓)	Social unrest, urban floods	Insurance, law enforcements, legislation, ...
• Smart health care (hospitals, Austria)	(✓)	✓	(✓)	Massive breach of privacy	
• Smart energy supply systems (Finland)	✓	(✓)	(✓)	Solar storms (space weather)	
• Smart industrial/production plants (new and refurbished plants, Industry 4.0 plants)	✓	✓	✓	Interruptions in the critical supply chains	
• Smart transportation (airports; Hungary)	✓	✓	✓	Border control	



**Imagine an accident/event... in an
infrastructure-of-infrastructures
(the “INDIA” case in SmartResilience project)**

infrastructure-of- infrastructures



SmartResilience “code names”

ALPHA:

Finance sector

BRAVO:

Smart city hall
(headquarters HQ)

CHARLIE:

Health care provider
(hospital)

DELTA:

Transportation (airport)

ECHO:

Industrial site (refinery)

FOXTROT:

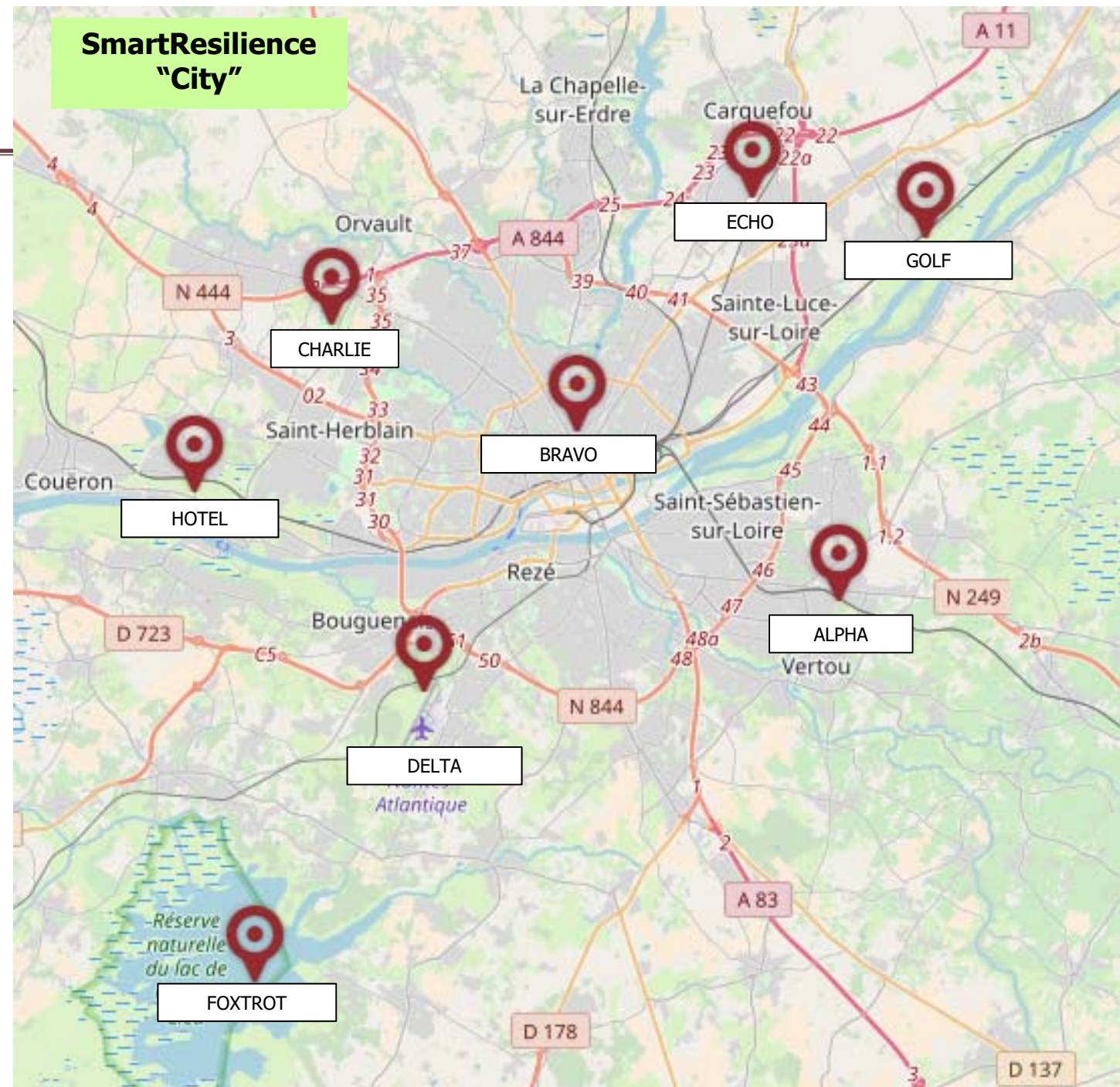
Water supply

GOLF:

Fire brigade / flood
experts

HOTEL:

Power supply

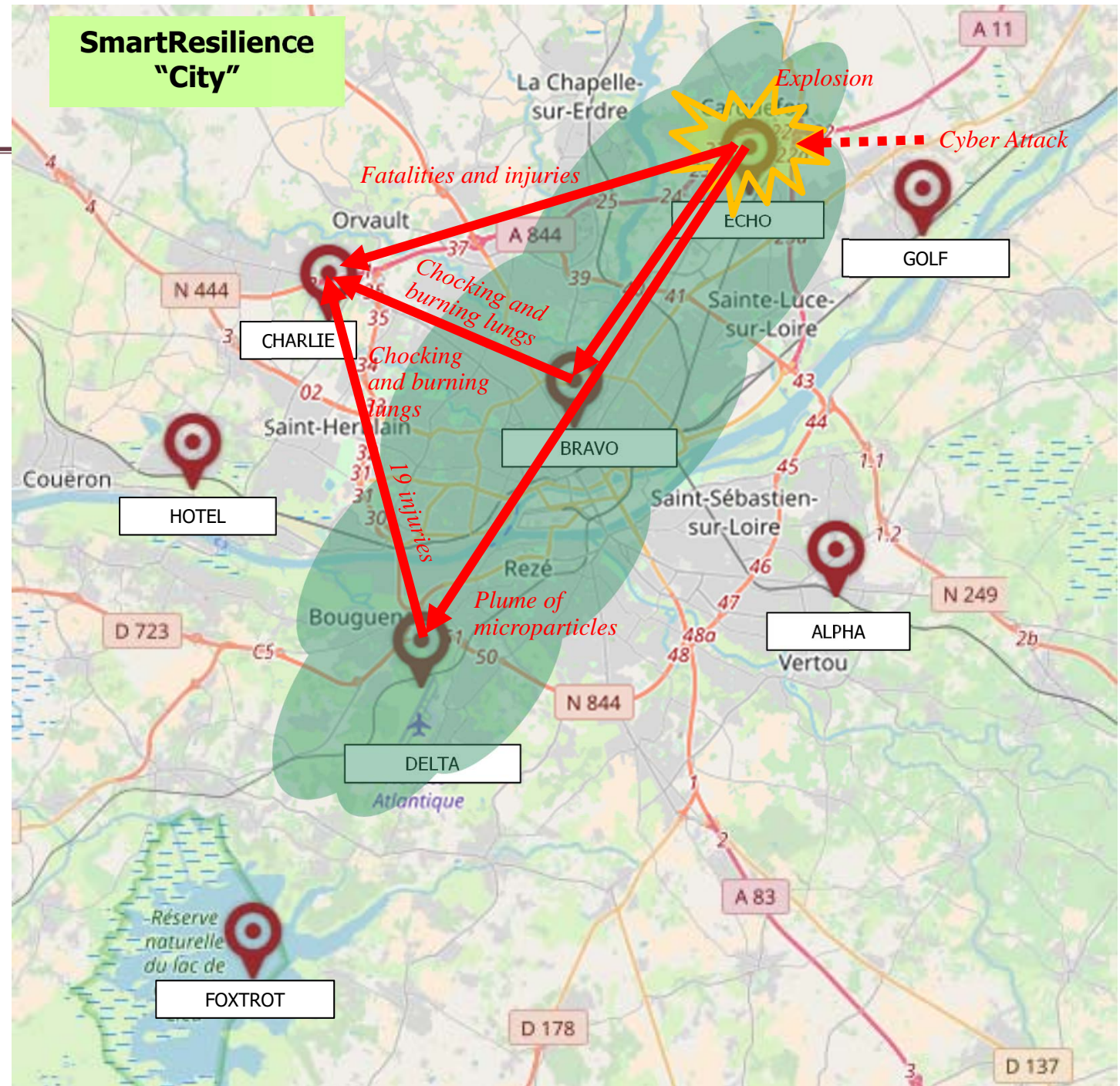


Imagine an event (the “INDIA” event in SmartResilience project)

<i>Time</i>	<i>Event description (announcement)</i>
Day 1 05:00	<i>explosion in the ECHO industrial production complex within BRAVO city.</i>
Day 1 05:24	<i>DELTA Air Traffic Control issues NOTAM due to lack of visibility and the aggressive chemical nature of the fog arising from explosion</i>
Day 1 05:30	<i>Certain districts of BRAVO city must be evacuated</i>
Day 3 16:00	<i>CHARLIE health service providers report that they have no more capacity at local service providers.</i>
Day 5	<i>Heavy rainfall hits BRAVO city (more than 100 mm in one day with a very intensive period), causing pluvial flood, immediately followed by a tidal flood.</i>
Day 12	<i>Financial systems report extended spear-phishing attempts on customers of banking and insurance services.</i>
Day 8	<i>FOXTROT waterworks report that the flood had contaminated the FOXTROT drinking water reservoir</i>
Day 10	<i>HOTEL underground storage plant reports that it has been successfully sealed off and prevented flooding of coal reserves,</i>
Day 12	<i>CHARLIE: bacteria in the drinking water system is resistant to carbapenems and the last line antibiotic colistin as well. Through the damage of an antibiotic storage caused by the recent incidents, both antibiotics are release into the water, killing non-resistant bacteria and facilitating overspread of resistant strands.</i>

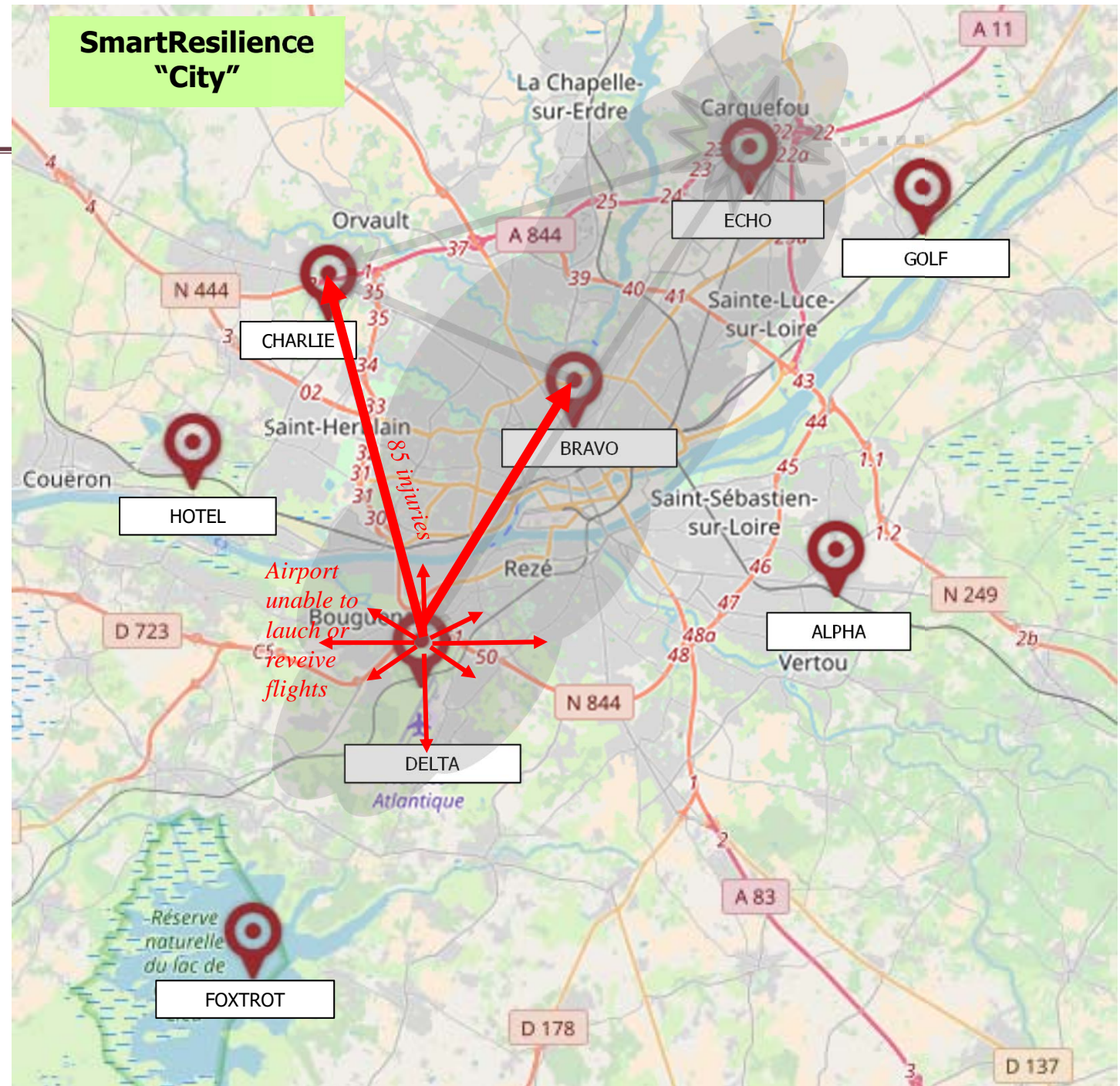
Day 1 5:00 AM

A cyberattack causes **explosion in the ECHO industrial production complex within BRAVO city**. The attack releases a large fog of microparticles. Lots of casualties, the fog is choking and burning lungs of people inhaling it. The wind blows the plume across the river towards densely inhabited area of BRAVO city and towards the airport DELTA. 19 fatalities and 19 injured (38 casualties).



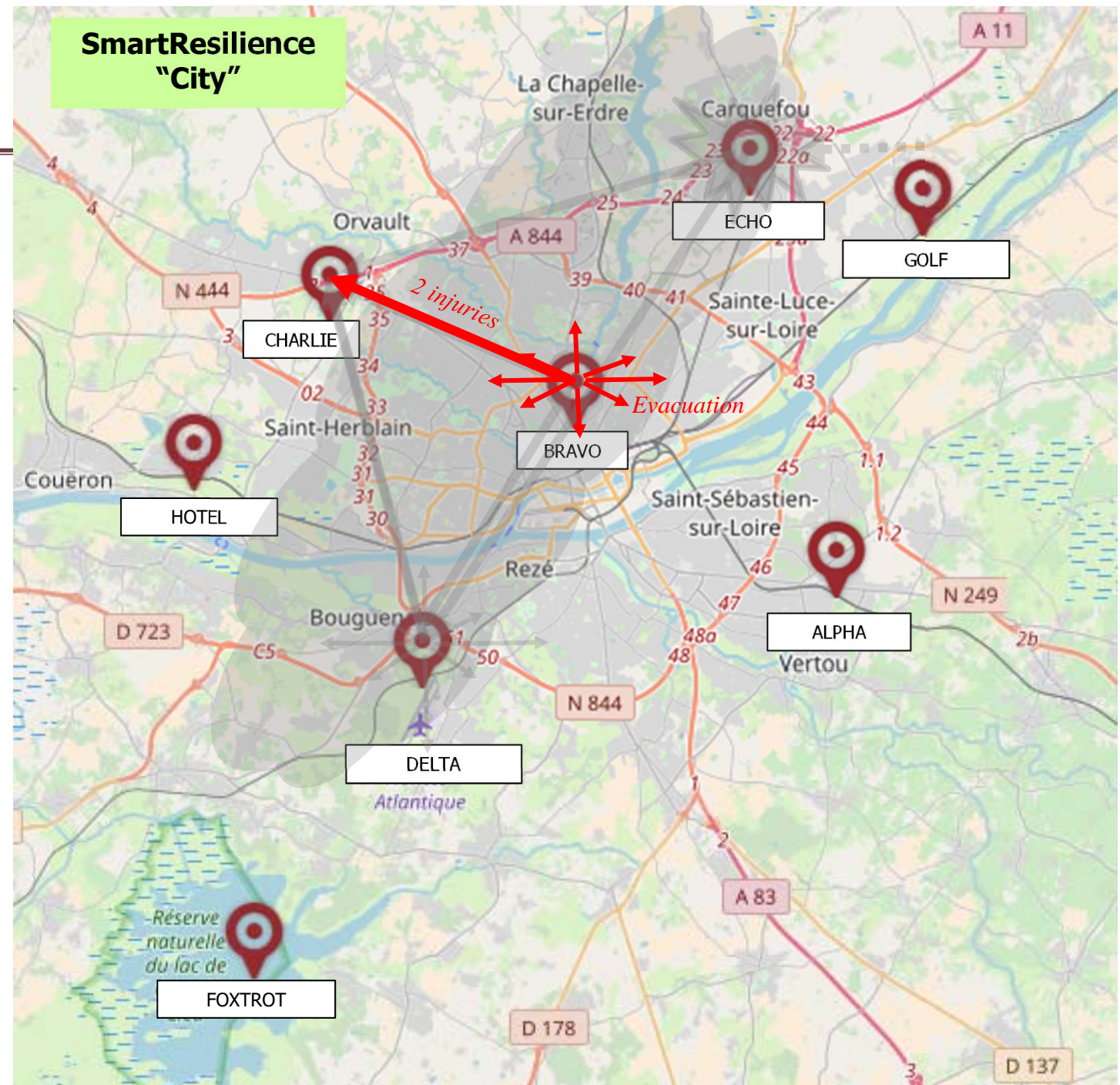
Day 1
5:24 AM

DELTA Air Traffic Control issues NOTAM due to lack of visibility and the aggressive chemical nature of the fog arising from explosion and declares DELTA airport unable to launch or receive flights. All airplanes are grounded. Passengers were sheltered inside the terminal as the fog covers the passenger terminal as well. Another 34 fatalities and 85 injured (157 casualties).



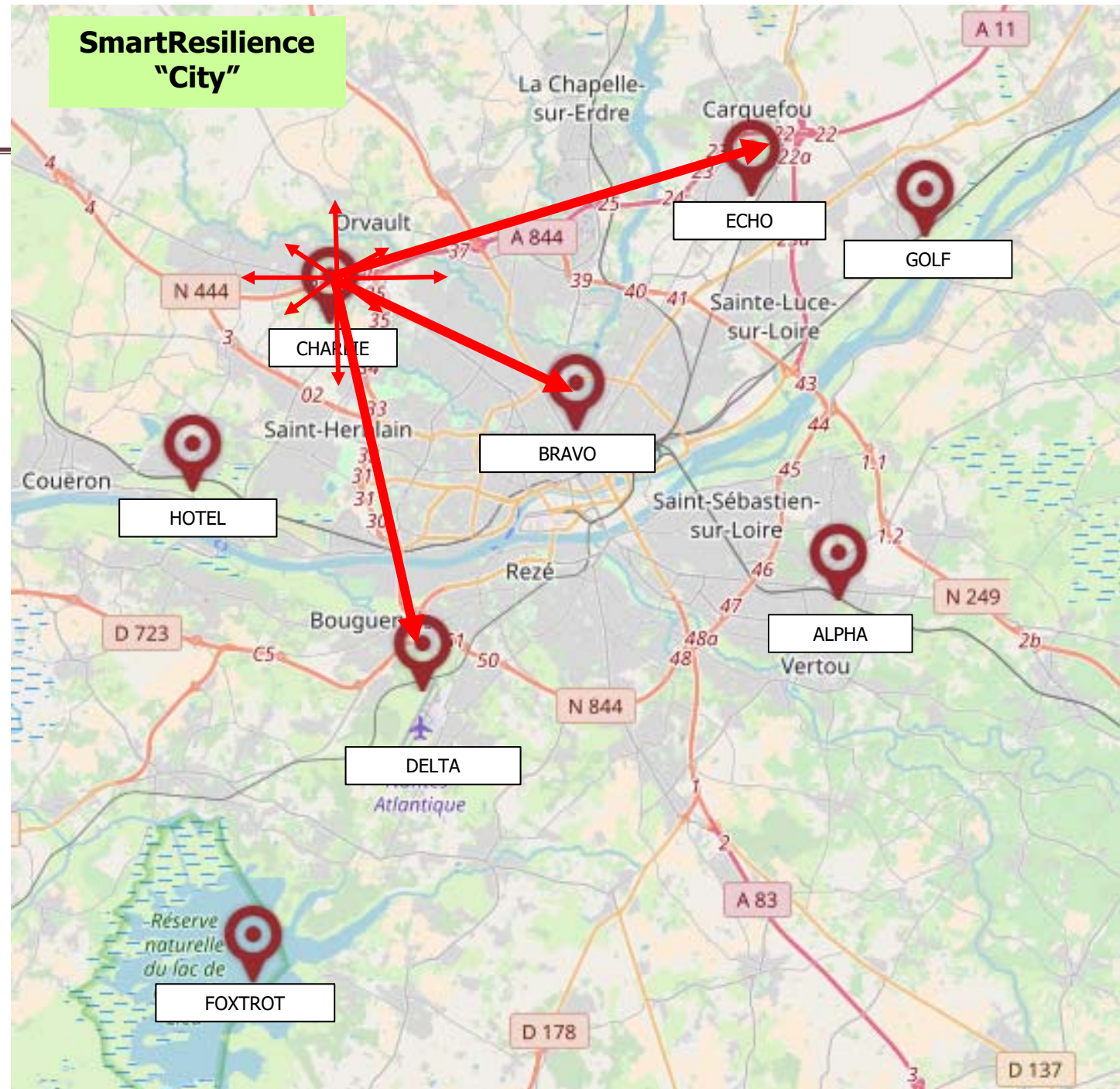
Day 1 5:30 AM

Certain districts of BRAVO city must be evacuated, in the other parts residents are advised to keep shut all doors and windows. Some citizens decide to self-evacuate. Roads get overcrowded. Another 83 fatalities and 2 injured (242 casualties).



Day 3 16:00 PM

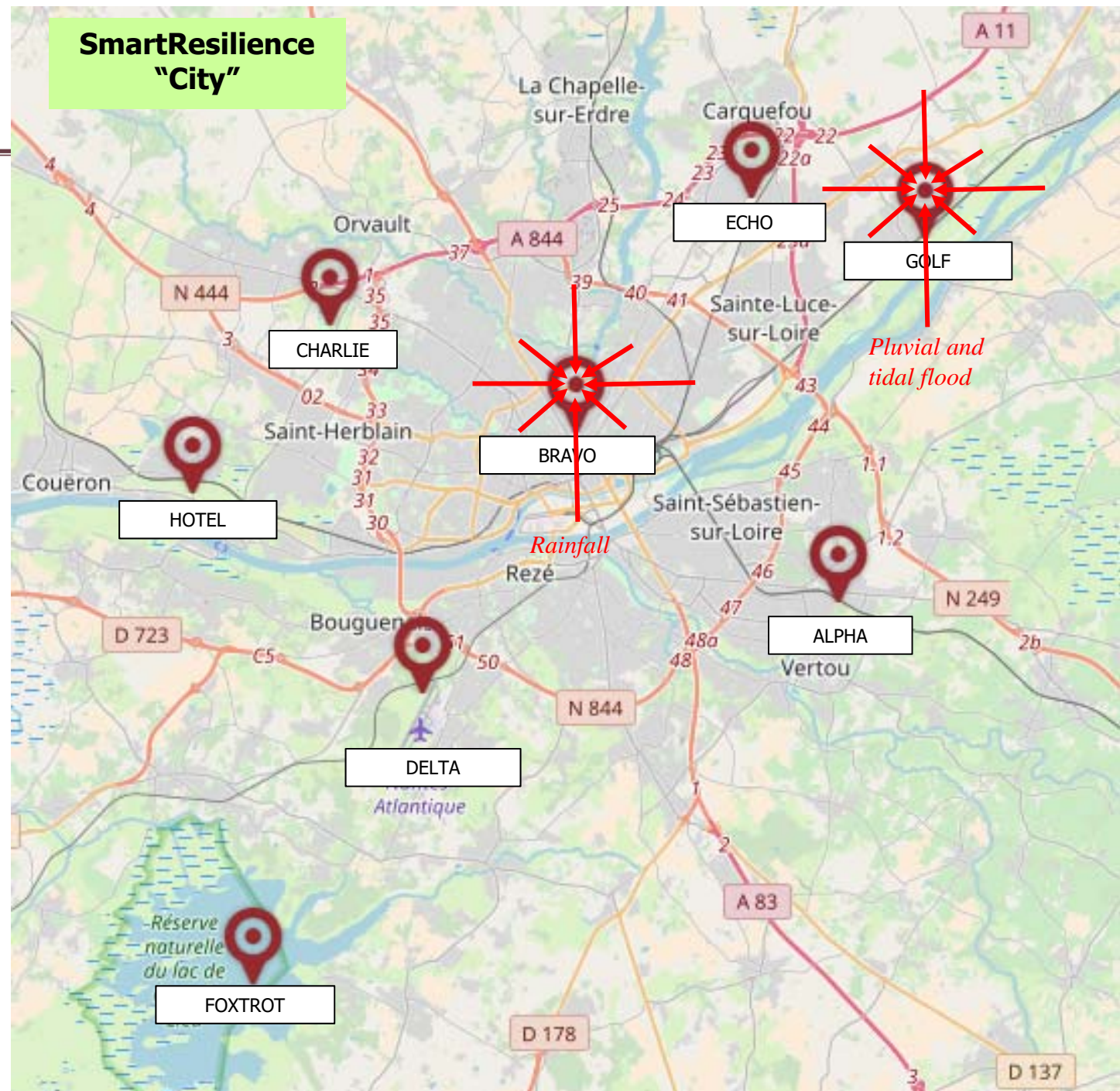
CHARLIE health service providers report that they have no more capacity at local service providers. During first medical response, 21 employees get injured and can not continue their work, in spite of efforts of health service staff, 51 more fatalities and 64 more injuries occur during decontamination efforts and aftermath. (378 casualties).



SmartResilience "City"

Day 5

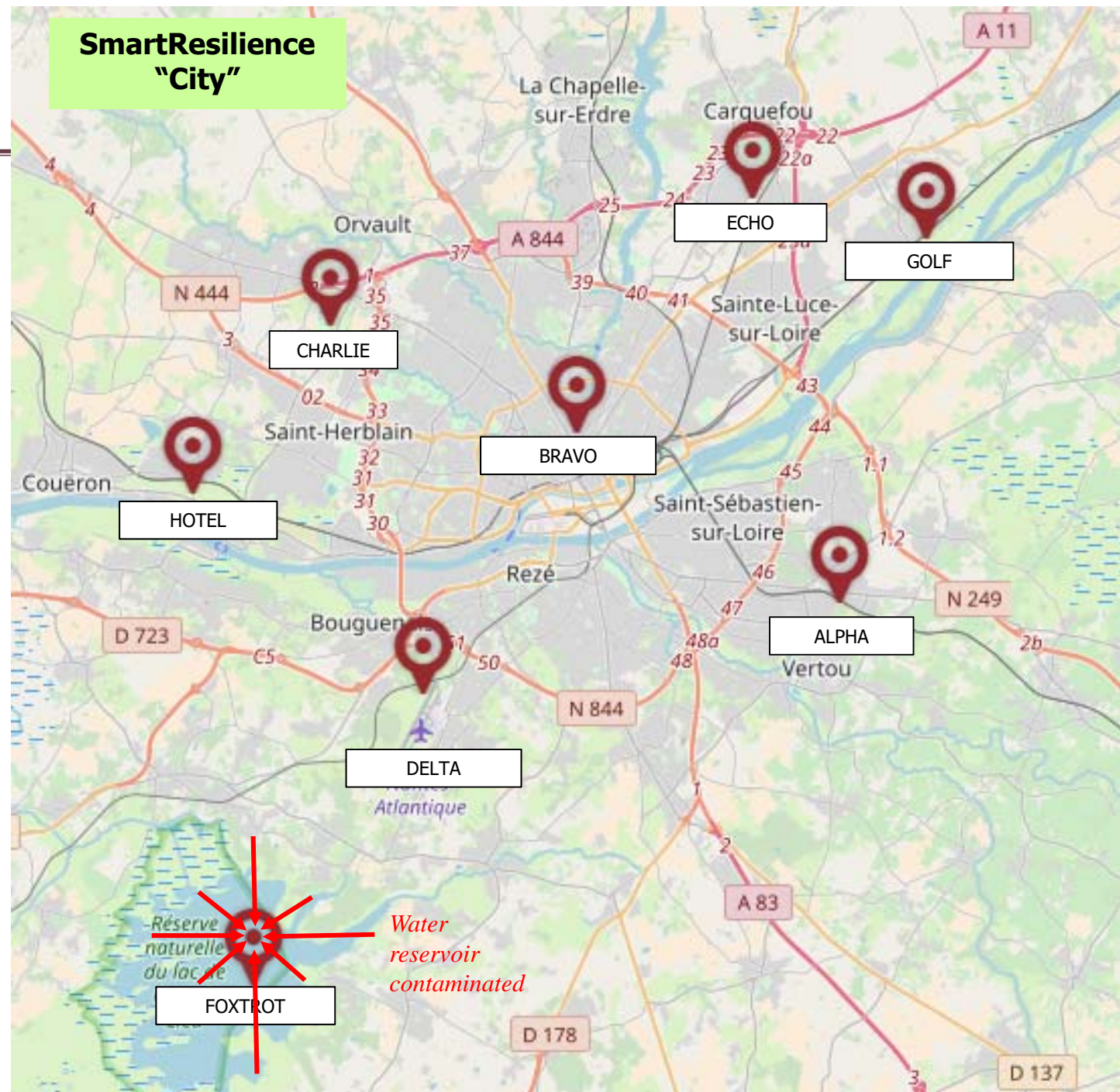
Heavy rainfall hits BRAVO city (more than 100 mm in one day with a very intensive period), causing pluvial flood, immediately followed by a tidal flood. GOLF flood protection facilities are not able to prevent water rising on the streets. 59 dead, 2 injured (439 casualties).



SmartResilience "City"

Day 8

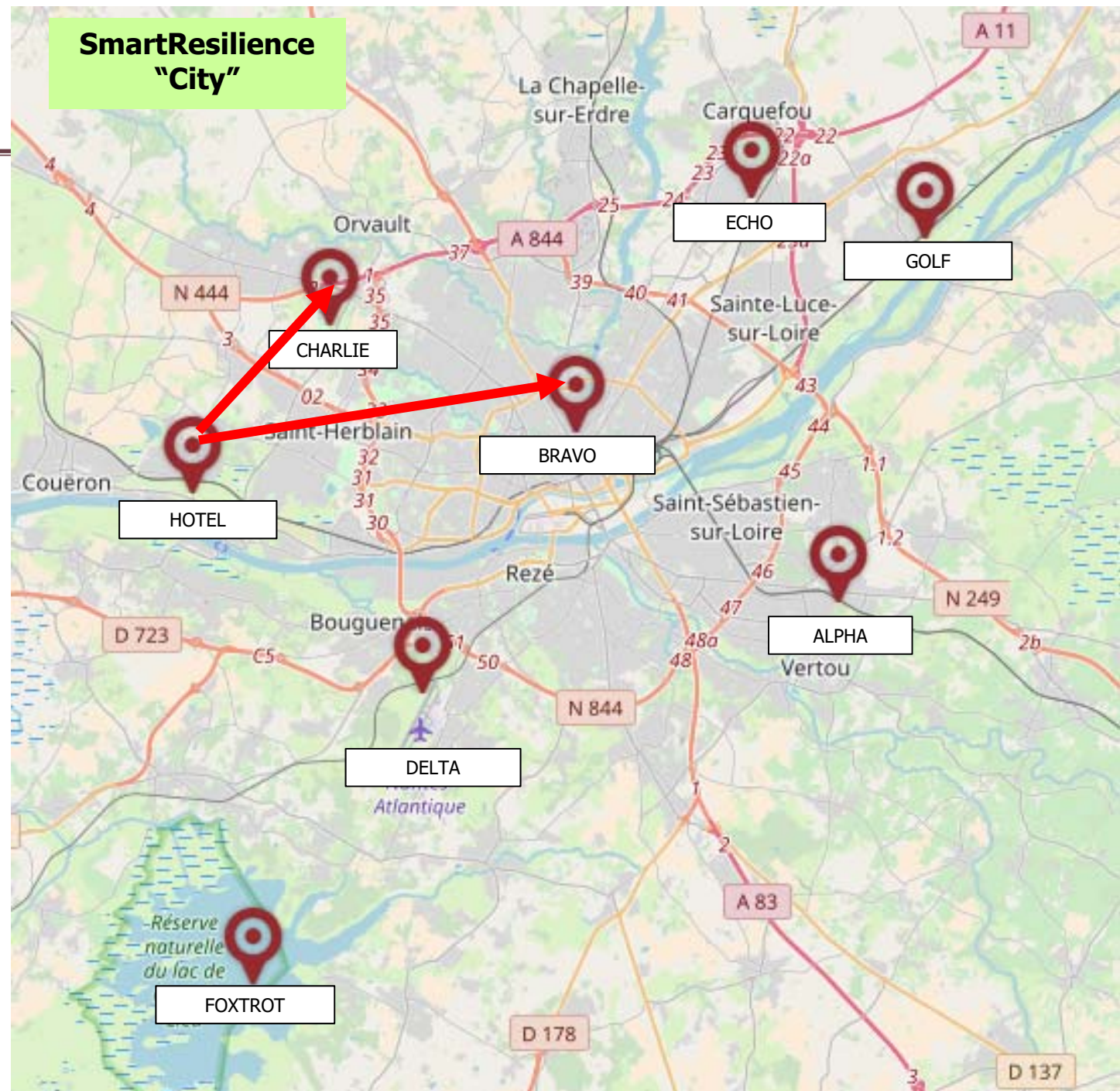
FOXTROT waterworks report that the flood had contaminated the FOXTROT drinking water reservoir by washing water from the on-site wastewater treatment plant of ECHO production site into the river and from the river to the lake. They detected large amount of antibiotics-resistant bacteria multiplying rapidly in the drinking water. The bacteria are resistant to carbapenems and the last line antibiotic colistin as well, both antibiotics are also present in the contaminated water.



SmartResilience "City"

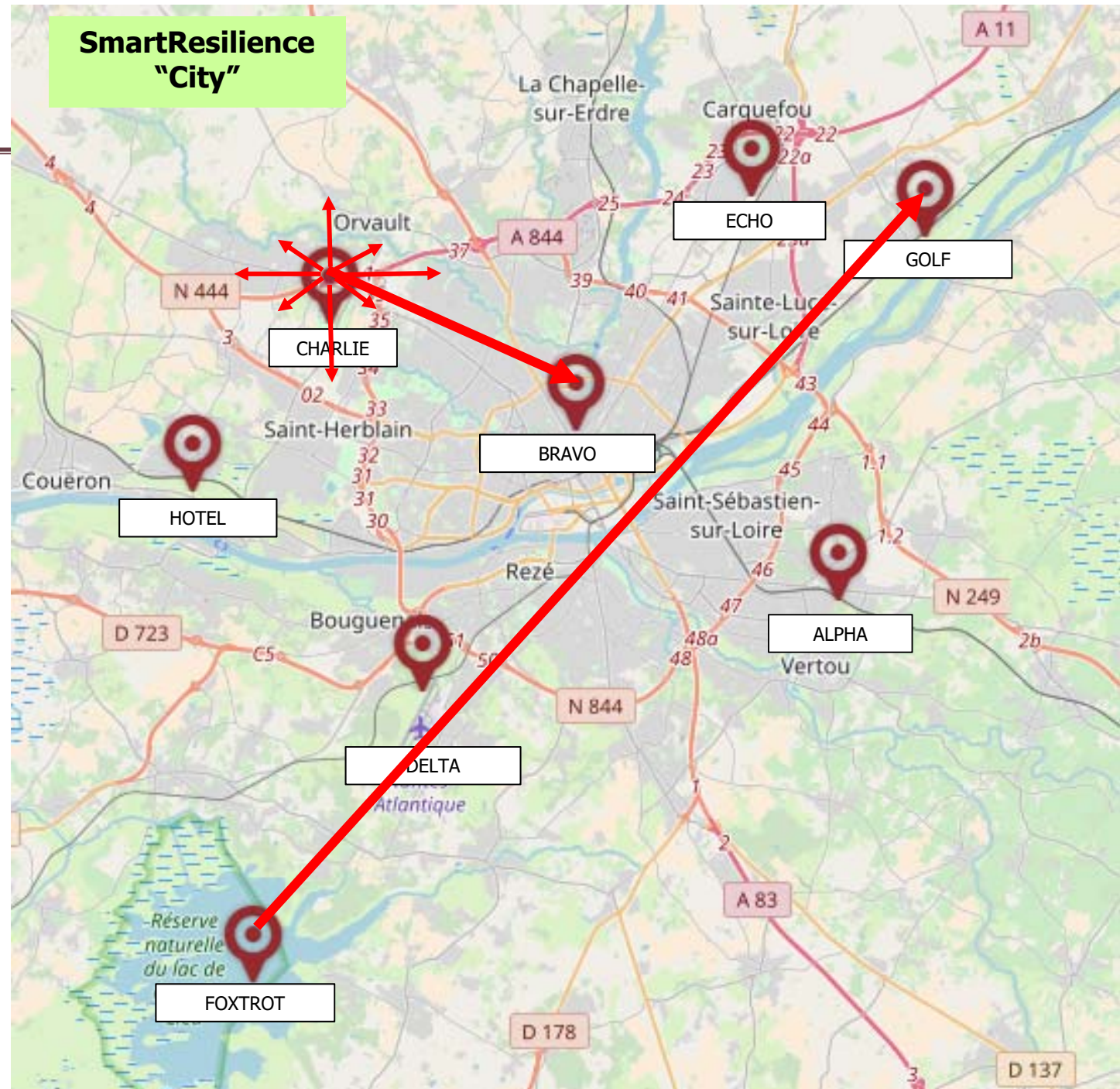
Day 10

HOTEL underground storage plant reports that it has been successfully sealed off and prevented flooding of coal reserves, but one out of the four storages is suffering a self-ignition. 2 fatalities and 2 injured (441 casualties)



Day 12

A given percent of the bacteria in the drinking water system is resistant to carbapenems and the last line antibiotic colistin as well. Through the damage of an antibiotic storage caused by the recent incidents, both antibiotics are released into the water, killing non-resistant bacteria and facilitating overspread of resistant strands. CHARLIE health system is not able to cure infected patients. 810 people got infected and there is no available remedy for them (1251 casualties).

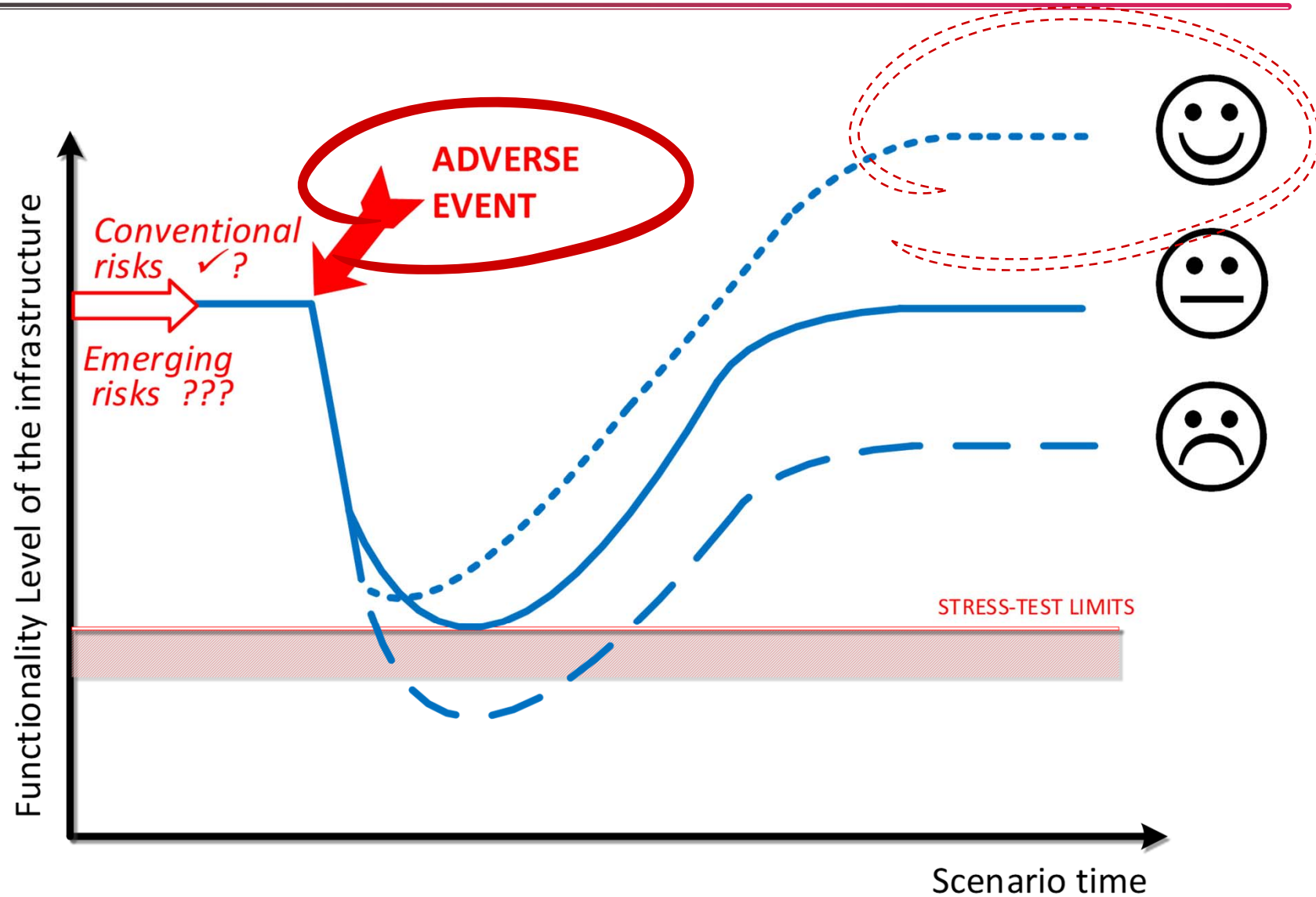




Key questions

1. Do we need indicators? Do we need indicator-based resilience assessment?
2. If yes, how to do it? How to MEASURE resilience of critical infrastructures and systems... in the age of information overload?
3. How to deal with unknown or poorly known threats?
4. If we do it, how to do it in a globally agreed way?
5. Who's concern is the “resilience of the world”?

... manage risks to enhance resilience:

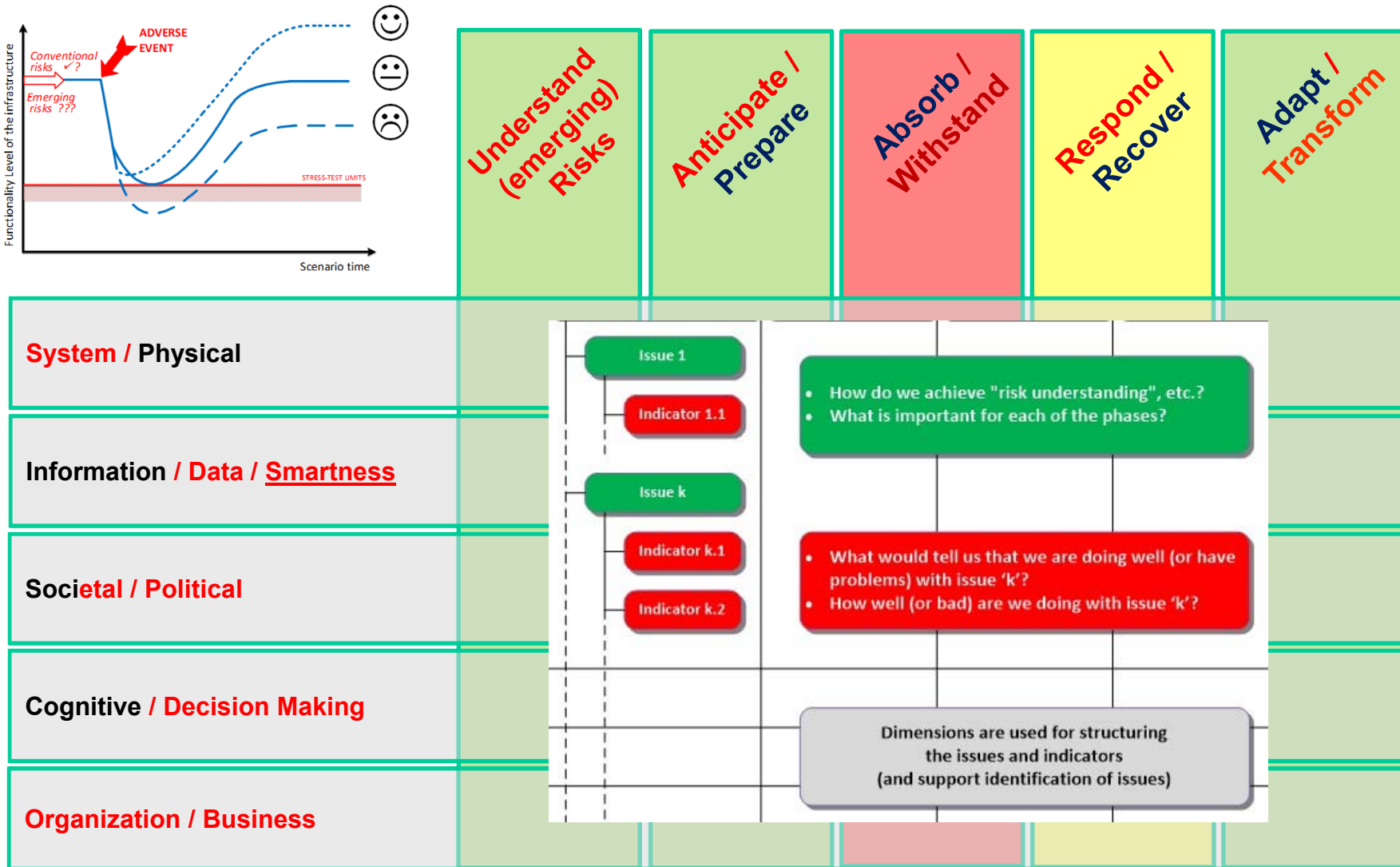
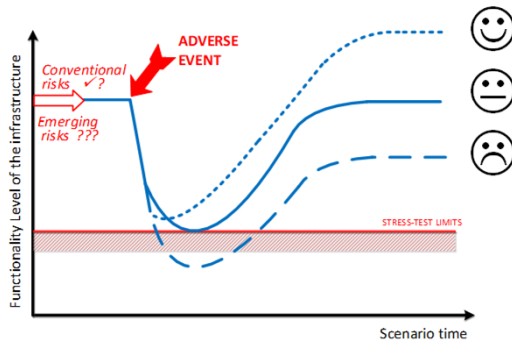




Indicators-based resilience
assessment?

We need a **METHOD**

ISO 31050 – new way, the 5x5 matrix: ... manage emerging risks to enhance resilience

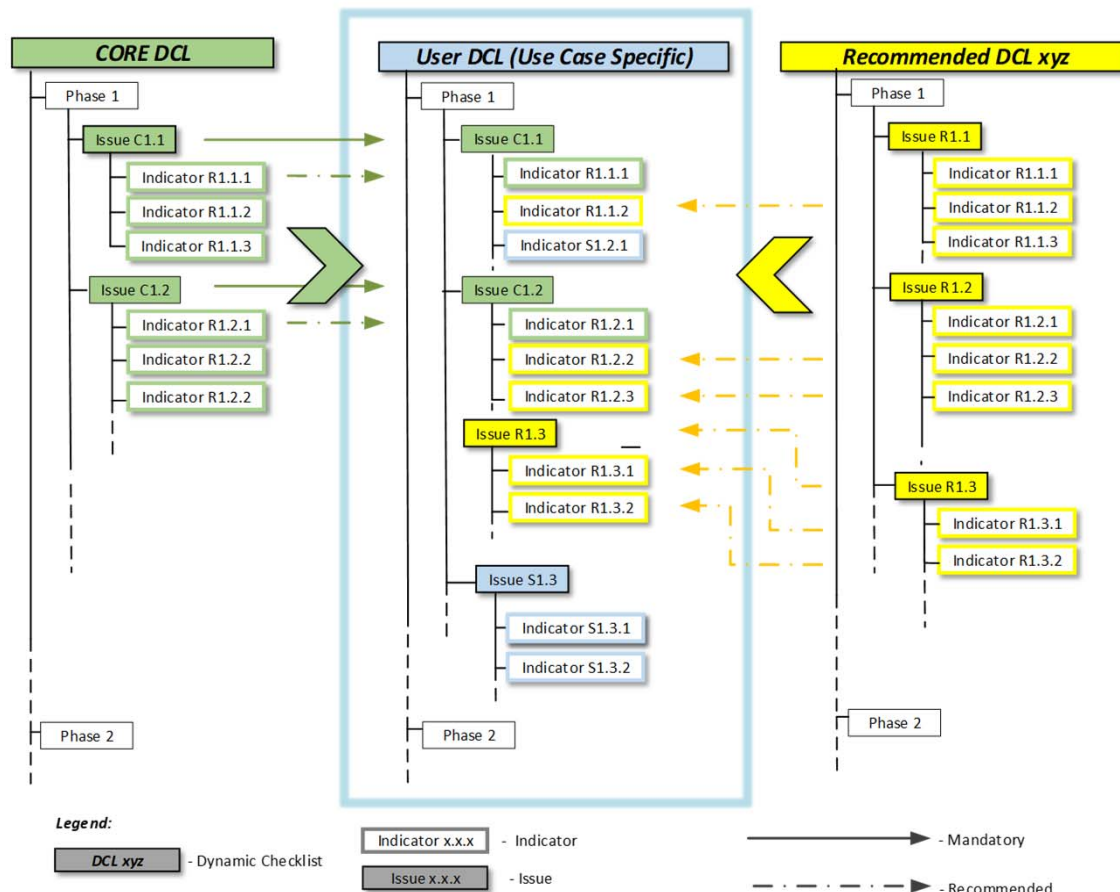


Create (customized, but still comparable) checklists of indicators

Same for all
("CORE")...

User's
customized
list...

Recommended
for a sector...



I. UNDERSTAND RISKS

- Risk assessment [ISO 22301]; ID-759
- Data Analysis; ID-3822
- Possibilities of unauthorized access ; ID-3828
- Threat to Physical Protection; ID-3829
- Emerging risks analysis and management; ID-3847
- New types of ICT attack to smart Infrastructure; ID-3863

II. ANTICIPATE/PREPARE

- Training ; ID-988
- Business continuity plan [ISO 22301]; ID-1031
- Use of smart technologies and devices for safety and security; ID-3517
- 51C Emergency management/planning; ID-2258
- Management of information and knowledge relevant for resilience; ID-3823
- Physical Protection; ID-3812
- Cyber operation continuity plan; ID-3833
- ICT Attacks monitoring; ID-3865

III. ABSORB/WITHSTAND

- Business continuity plan [ISO 22301]; ID-1031
- Physical Protection; ID-3824
- Cyber operation continuity plan; ID-3833
- 51C Emergency management/planning; ID-2258
- Offsite/external capabilities and resources available; ID-3834
- Command/Coordination structures availability and effectiveness; ID-3837
- First Preventer/Responder available and effective; ID-3836
- Proper use of smart CI related procedures and protocols ; ID-3866

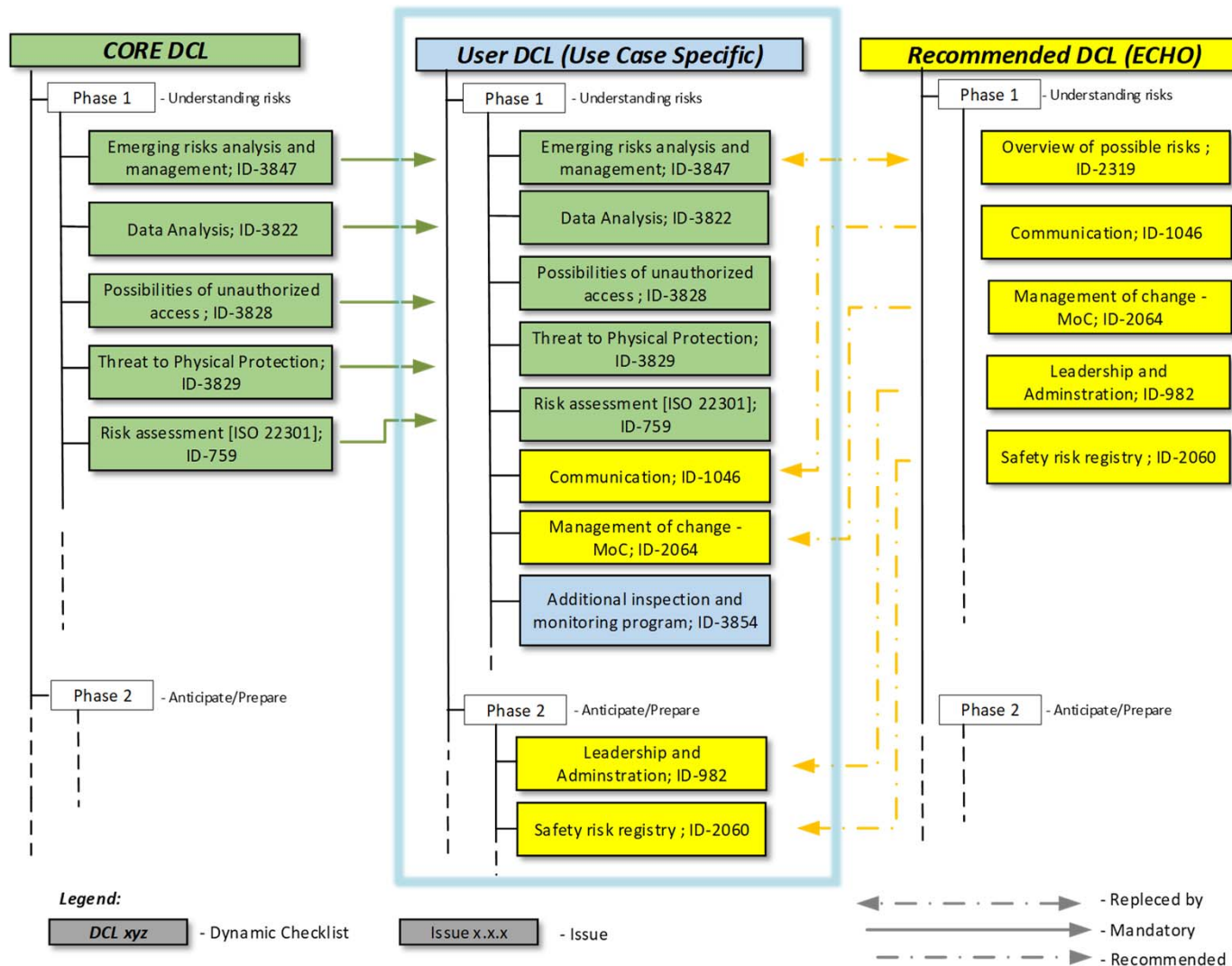
IV. RESPOND/RECOVER

- Emergency response; ID-996
- Incident management plans and procedures effectiveness; ID-3825
- Management of information and knowledge relevant for resilience; ID-3823
- Impact of dependencies on resilience; ID-3835
- Proper use of smart CI related software; ID-3867

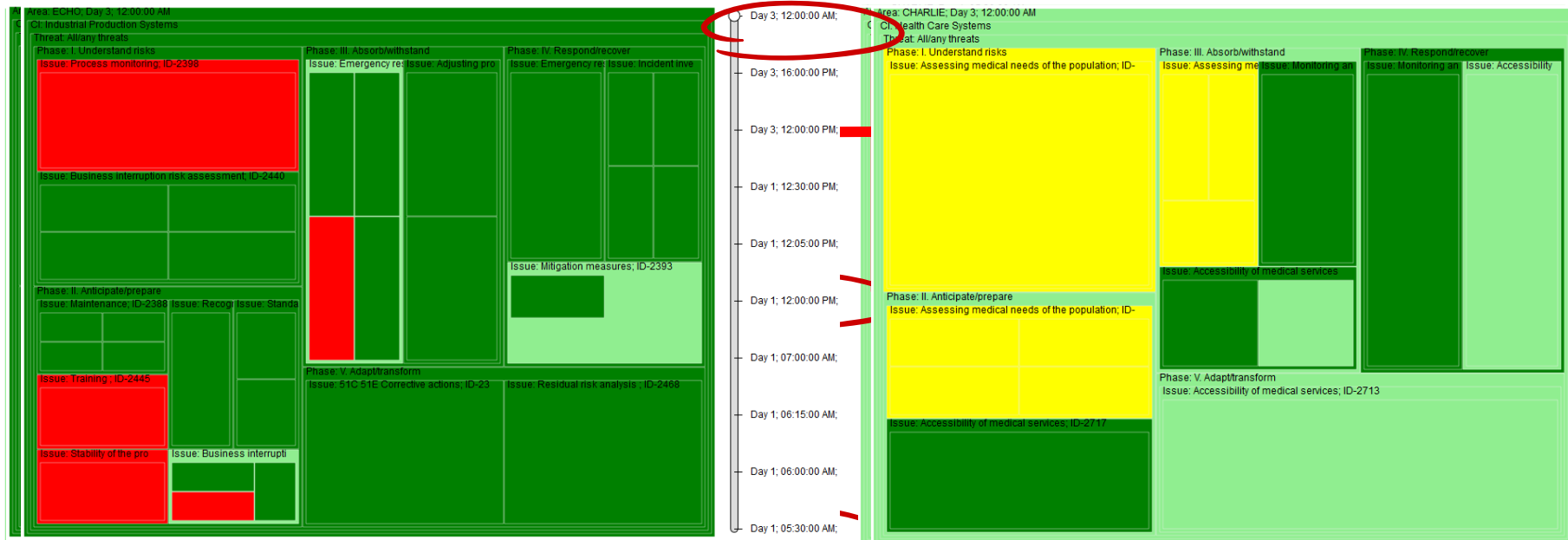
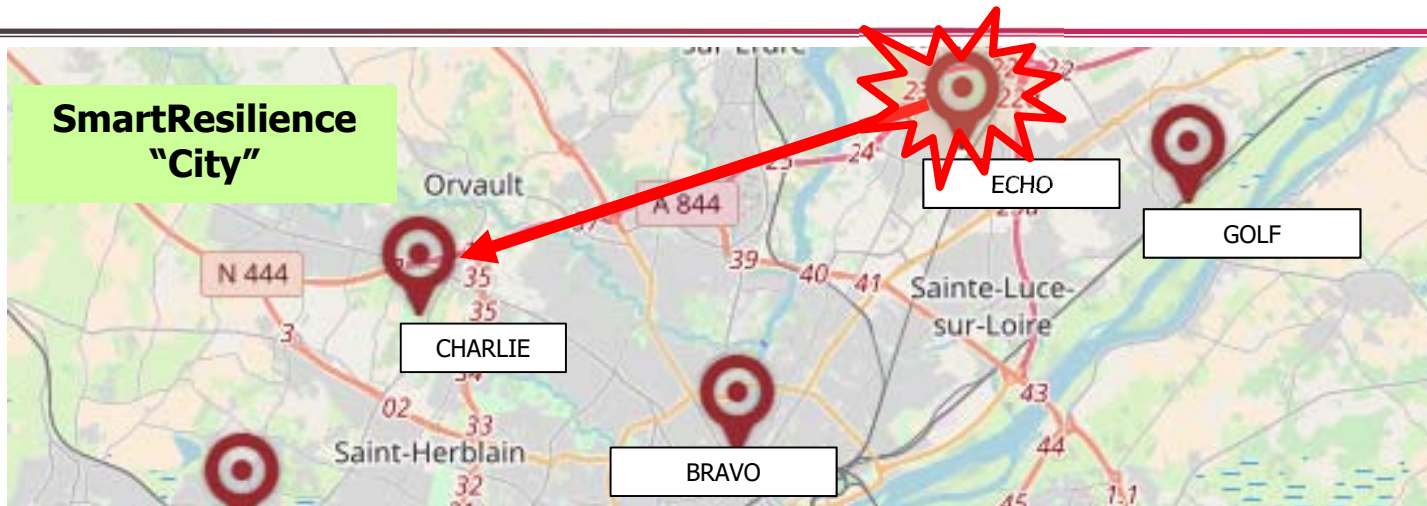
V. ADAPT/TRANSFORM

- Business continuity plan [ISO 22301]; ID-1031
- Incident investigation; ID-1004
- Emergency response reporting including lessons learned ; ID-3826
- Availability of adequate human resources; ID-3827
- Management of information and knowledge relevant for resilience; ID-3823
- Organizational learning and continual improvement; ID-3848
- Measuring adaptation/transformation; ID-3860
- Improving smart IC related protection capacity; ID-3869

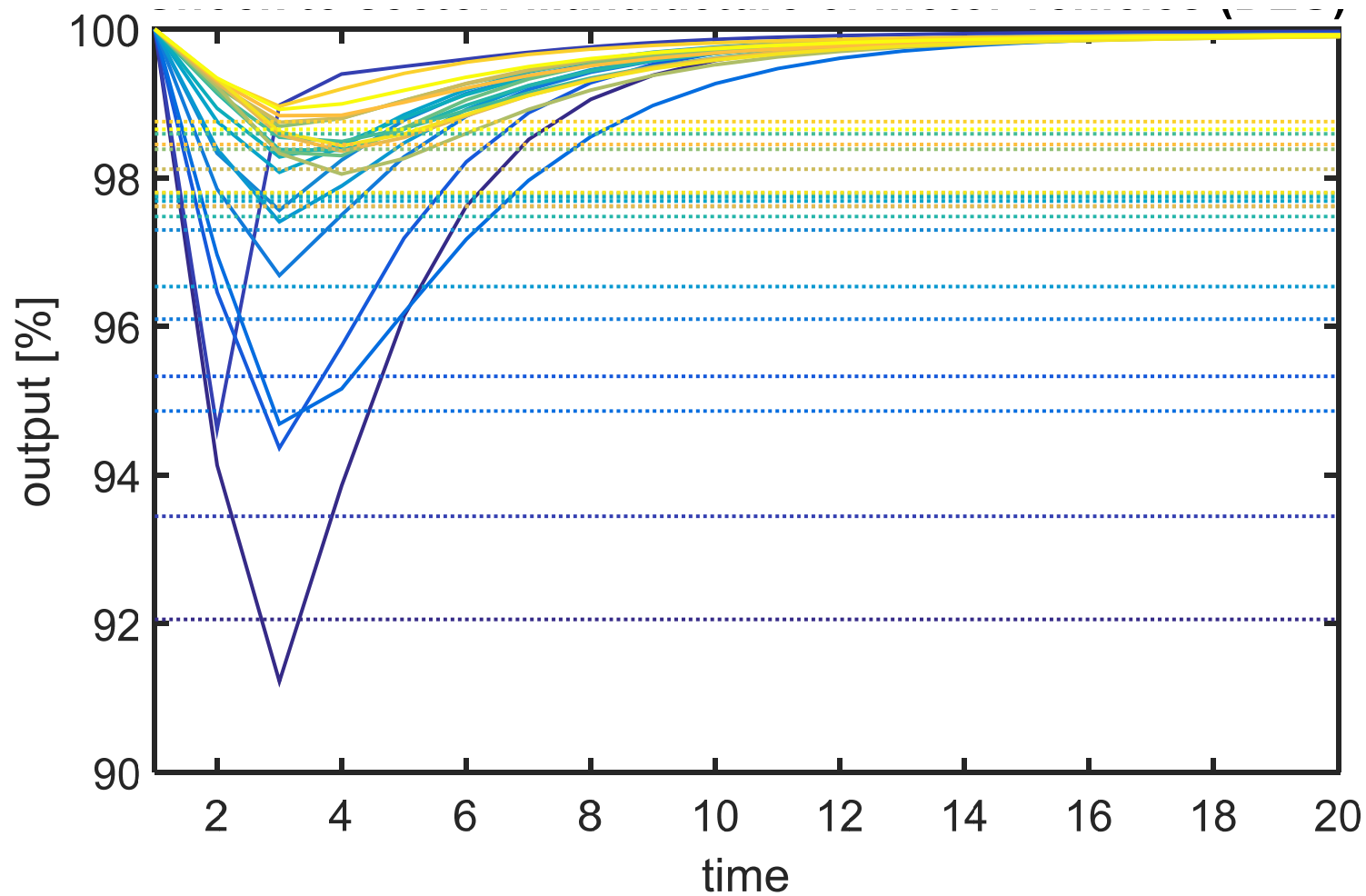
How to create a DCL needed for a particular case?



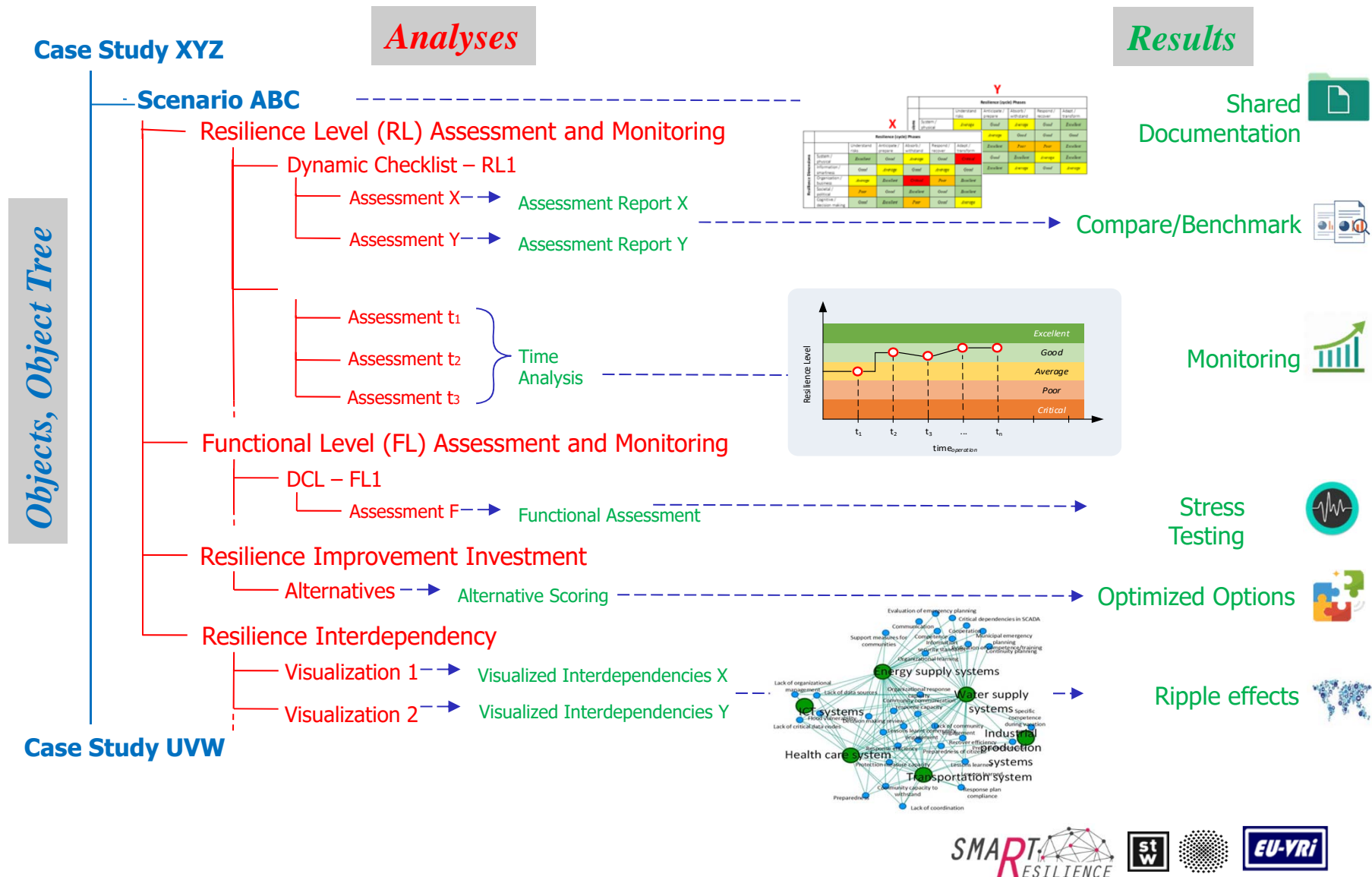
Indicators telling what happens in an “infrastructure-of-critical-infrastructures”:



... manage risks to enhance resilience: also in infrastructure-of-infrastructures



Integrated, indicator-based, resilience analysis: resilience level, functionality loss, interdependency...





Indicators-based resilience
assessment?

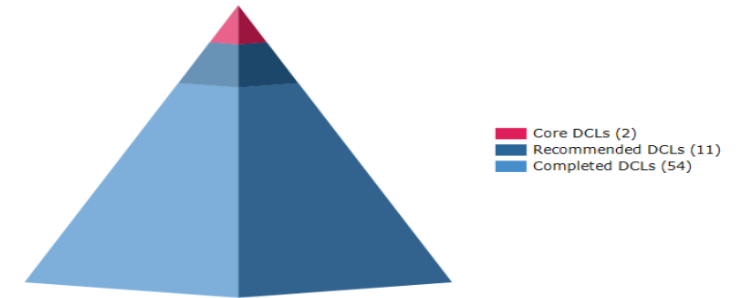
We need **INDICATORS**

Implementation

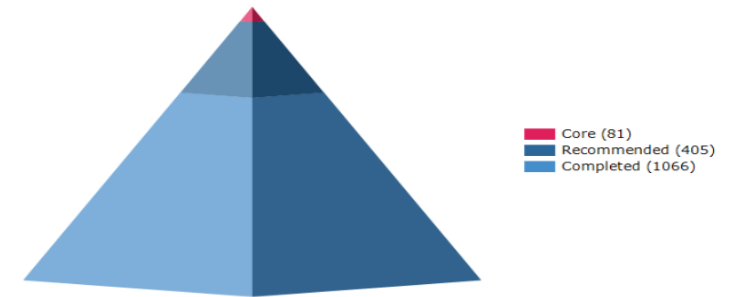
User dashboard



Number of Dynamic Checklists per Class



Number of Indicators per Class



Total Case Studies			12					
Total Scenarios	30		Total RLs	59		Total FLs	32	
Total Indicators	2,070		Total Issues	606		Total Elements	56	
Total MCDMs	4		Total Assessed RLs	206		Total Assessed FLs	36	



Indicators-based resilience
assessment?

We need a **SYSTEM**



Smart Resilience Indicators for Smart
Critical Infrastructures



TRANSLATE

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Overview

Overview

- SCI Dashboard
- Overview
- Manage & Setup
- Assessment and monitoring
- Resilience optimization
- Benchmark / Monitoring
- Report
- Education
- Knowledge Base
- Help

Expand All

☒ Show all data [

- General
- SmartResilience Project: ALPHA: Financial System
- SmartResilience Project: BRAVO: Smart city
- SmartResilience Project: CHARLIE: Healthcare system
- SmartResilience Project: DELTA: Transportation system
 - Smart Airport, Hungary
 - 51D Budapest airport affected by blocked traffic
 - D52 DELTA Test Scenario 1
 - D52 DELTA Test Scenario 2
- SmartResilience Project: ECHO: Large industrial zones
- SmartResilience Project: FOXTROT: Drinking water supply system
- SmartResilience Project: GOLF: Cork city
- SmartResilience Project: HOTEL: Energy supply system
- SmartResilience Project: INDIA: Integrated smart critical infrastructures
- SMR Project: Smart City Maturity Model
- Resolute Project: Water Bomb Florence
- Scout Project: Radar Infrastructure
- CIA factbook (OECD-like): World
- CIA factbook (OECD-like): Austria
- CIA factbook (OECD-like): Canada
- CIA factbook (OECD-like): Finland
- SmartResilience Project: ICT (ED)

SmartResilience:
System

"Infrastructure of Critical Infrastructures" (e.g. a Smart City)



Scenario

Infrastructure(s)

Threat(s)

Phases

Issues

Indicators

Analysis

OUTCOME OF A DISRUPTIVE EVENT?
Functionality level

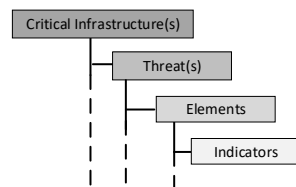
RESILIENCE OF AN INFRASTRUCTURE?
Resilience level

INFLUENCE OF INTERCONNECTEDNES?
Analysis of interdependencies

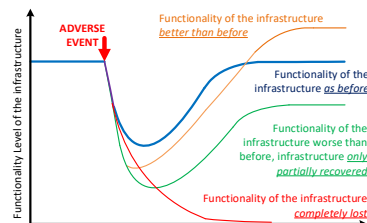
INVESTMENT IN RESILIENCE OPTIMIZATION?
Decision optimization

TANGIBLE RESULTS / OUTPUTS

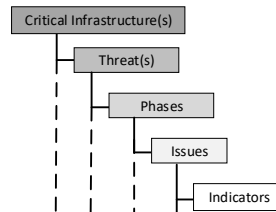
time *scenario*



Functionality	
1. Production performance; ID-1234	
1.1. G4-4: Domestic gas production (million m3/day); ID-1236	
1.2. G4-4: Domestic oil production (thousand tons/day); ID-2302	
1.3. Overall Equipment Effectiveness (OEE); ID-2308	
2. HSE-Health, Safety and Environment performance; ID-1247	
2.1. G4 EN3: Energy consumption within the organization (GJ/day); ID-1249	
2.2. G4 EN21: Amount of air pollutant i.e. SO2 emitted (tons/day); ID-1255	
2.3. G4 L66: Number of lost days/year; ID-1263	
2.4. Number of HSE training/year; ID-2305	
3. Global/ international/ interconnectedness; ID-1271	
3.1. Economic interoperability between the NIS Serbia and Angola (K/day); ID-1272	
3.2. Exports (thousand tons/day); ID-2306	
4. SOCIAL/SOCIETAL performance; ID-1281	
4.1. Percentage of employees present per shift; ID-2309	



time *operation*

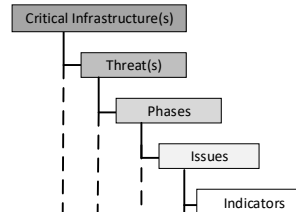


I. Understand risks	
I.1. Register of accidents/incidents; ID-2071	
I.1.1. The existence of a register of accidents/incidents; ID-2072	
I.1.2. Frequency of communication with units about an occurred incidents;	
I.2. Safety risk registry; ID-2060	
I.2.1. Does the Safety Risk registry exist?; ID-2061	
I.2.2. Using of Safety Risk registry in decision making; ID-2062	
I.2.3. Frequency of revision of Safety Risk registry defined?; ID-2063	
I.3. Management of change - MoC; ID-2064	
I.3.1. Is procedure for Management of change established?; ID-2065	
II. Anticipate/prepare	
II.1. Measures ordered through inspection visits; ID-2093	
II.1.1. Are inspection visits measures documented?; ID-2094	
II.1.2. Are inspection visits measures realized?; ID-2095	



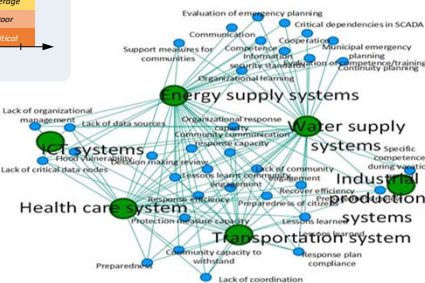
RESILIENCE LEVEL OK?

time *operation OR scenario*

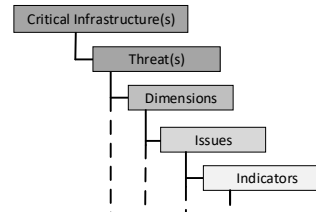


Dynamic Checklist - Resilience Level	
III. Absorb/withstand	
III.22. External alert/ communication; ID-3016	
III.22.1. What is the scope of external alert/communication in case of a disturbance?; ID-3069	
Dynamic Checklist - Resilience Level	
II. Anticipate/prepare	
II.7. Communication; ID-1046	
II.7.1. Are there sufficient guideline for internal and external communication?; ID-2366	
II.7.2. Review of communication policy conducted?; ID-919	

UNEXPECTED CASCADING EFFECTS?



time *operation OR implementation*



b. Information/ data & smartness	
II.5. Data Analysis; ID-408	
II.1.1. How frequent is the Big Data analyst available?; ID-3169	
II.1.2. Big Data analysed?; ID-3171	
c. Societal/ political	
III.1. Operating procedures; ID-2121	
III.1.1. Frequency of review of resilience ID-325	
d. Societal/ political	
IV.1. Training; ID-988	
IV.1.1. What is the frequency of simulator training for operating personnel?; ID-3175	

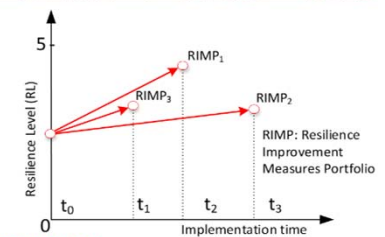
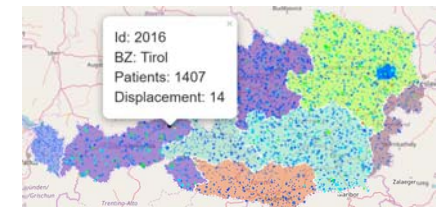
RIMP 1	
Indicator	Value
III.22. External alert/ communication; ID-3016	0.58
III.22.1. What is the scope of external alert/communication in case of a disturbance?; ID-3069	0.58
RIMP 2	
Indicator	Value
III.22. External alert/ communication; ID-3016	0.31
III.22.1. What is the scope of external alert/communication in case of a disturbance?; ID-3069	0.31
RIMP 3	
Indicator	Value
III.22. External alert/ communication; ID-3016	0.41
III.22.1. What is the scope of external alert/communication in case of a disturbance?; ID-3069	0.41

INVESTMENT IN RESILIENCE IMPROVEMENT OPTIMAL?

RESILIENCE ASSESSMENT OF A SINGLE INFRASTRUCTURE OR A CITY

		Resilience (cycle) Phases				
		Understand risks	Anticipate / prepare	Absorb / withstand	Respond / recover	Adapt / transform
Resilience Dimensions	System / physical	Average	Good	Average	Good	Excellent
	Information / smartness	Good	Average	Good	Good	Good
	Organization / business	Excellent	Excellent	Poor	Poor	Excellent
	Societal / political	Poor	Good	Excellent	Average	Excellent
	Cognitive / decision making	Critical	Excellent	Average	Good	Average

RESILIENCE ASSESSMENT OF A COUNTRY OR REGION



TOOL:



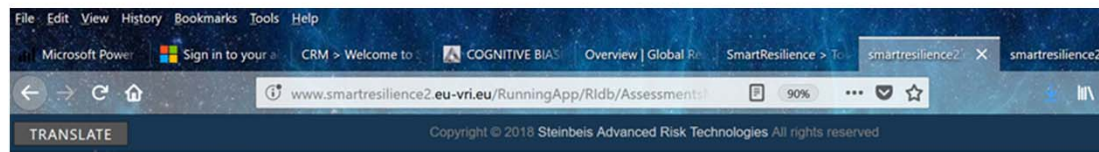
Case Studies

Scenarios

Dynamic Checklists (DCLs)

Assessments

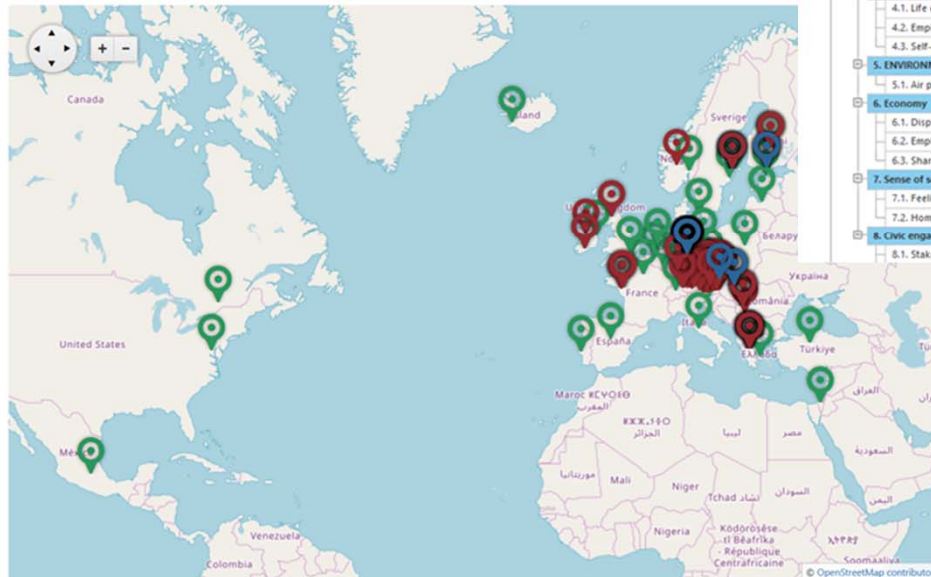
Country resilience



Interactive map of assessments

SCI Dashboard > Visualisation > Interactive map of assessments

Show assessments: ☒ Resilience level ☒ Functionality level ☒ Multilevel DCL



Multilevel Dynamic Checklist Assessment Results

Assessment Basic Information

Name:	Turkey
On:	20.07.2018
By:	Tetiak Katarzyna (R-Tech)
Scenario:	Typical CIA factbook scenario: World
DCL:	Resilience CIA Factbook Profiles



[Open all](#) | [Close all](#)

Introduction :: Turkey
Geography :: Turkey
People and Society :: Turkey
Government :: Turkey
Economy :: Turkey

$R_t = 3.03$
Good



Name	Level	ID	Type	Score	Resilience Level
Turkey	0	1	Root	3.03	Good
1. Disaster impact	1	3752	Issue	4.06	Excellent
1.1. Average number of disasters per year (1980-2016)	2	3751	Indicator	3.78	Good
1.2. Average damages due to disasters (1980-2016)	2	3755	Indicator	4.63	Excellent
1.3. Average damages due to disasters as a percentage of GDP (1995-2015)	2	3756	Indicator	3.76	Good
2. Health Care	1	3757	Issue	1.02	Poor
2.1. Total hospital beds per 1000 population	2	3758	Indicator	1.02	Poor
3. ICT Technology	1	3779	Issue	2.97	Average
3.1. ICT Access and Usage by Households and Individuals	2	3783	Indicator	2.97	Average
4. Well-being	1	3781	Issue	2.74	Average
4.1. Life expectancy at birth	2	3801	Indicator	4.77	Excellent
4.2. Employees working very long hours	2	3802	Indicator	0	Critical
4.3. Self-evaluation of life satisfaction	2	3803	Indicator	3.45	Good
5. ENVIRONMENT	1	3782	Issue	3.06	Good
5.1. Air pollution, level of PM2.5	2	3804	Indicator	3.06	Good
6. Economy	1	3780	Issue	3.52	Good
6.1. Disposable household income per capita	2	3798	Indicator	2.51	Average
6.2. Employment rate	2	3799	Indicator	3.65	Good
6.3. Share of labour force with at least secondary education	2	3800	Indicator	4.09	Excellent
7. Sense of security	1	3810	Issue	3.88	Good
7.1. Feeling safe walking alone at night	2	3805	Indicator	3.02	Good
7.2. Homicide rate	2	3806	Indicator	4.74	Excellent
8. Civic engagement	1	3809	Issue	2.96	Average
8.1. Stakeholder engagement for developing regulations	2	3807	Indicator	2.62	Average



Critical infrastructure resilience

- SCI Dashboard
- Overview
- Manage & Setup
- Assessment and monitoring
- Resilience optimization
- Benchmark / Monitoring
- Report
 - Resilience / Functionality level
 - Multilevel DCL
- Education
- Knowledge Base
- Help

Report - Resilience / Functionality level

Report > Resilience / Functionality level

- (8) Case Study - General
 - (2) Case Study - Resolute Project: Water Bomb Florence
 - (3) Case Study - Scout Project: Radar Infrastructure
 - (5) Case Study - SmartResilience Project: ALPHA: Financial System
 - (18) Case Study - SmartResilience Project: BRAVO: Smart city
 - (124) Case Study - SmartResilience Project: CHARLIE: Healthcare system
 - (9) Case Study - SmartResilience Project: DELTA: Transportation system
 - (25) Case Study - SmartResilience Project: ECHO: Large industrial zones
 - (16) Scenario - Quality deterioration of product in Refinery; ID-16
 - (9) Scenario - Smart Industrial zone in the City of Pančevo affected by a hypothetical BLEVE
 - (1) DCL - NIS Oil Refinery resilience assessment by D.Bezrukov; ID-21
 - (1) DCL - NIS Oil Refinery resilience assessment; ID-13
 - (1) DCL - NIS refinery functionality assessment - newly proposed; ID-16
 - (1) DCL - Контролна листа: Процена ризика себес оператора; ID-70
 - (2) DCL - NIS refinery functionality assessment; ID-1
 - (3) DCL - Chemical industry ECHO; ID-12
 - Assessment - After BLEVE event; ID-263
 - Assessment - During BLEVE event; ID-264
 - Assessment - Normal operating condition; ID-12
- (19) Case Study - SmartResilience Project: FOXTROT: Drinking water supply system
- (8) Case Study - SmartResilience Project: GOLF: Cork city
- (14) Case Study - SmartResilience Project: HOTEL: Energy supply system
- (13) Case Study - SmartResilience Project: ICT (ED)
- (7) Case Study - SmartResilience Project: INDIA: Integrated smart critical infrastructures
- (1) Case Study - SMR Project: Smart City Maturity Model

Assessment Report

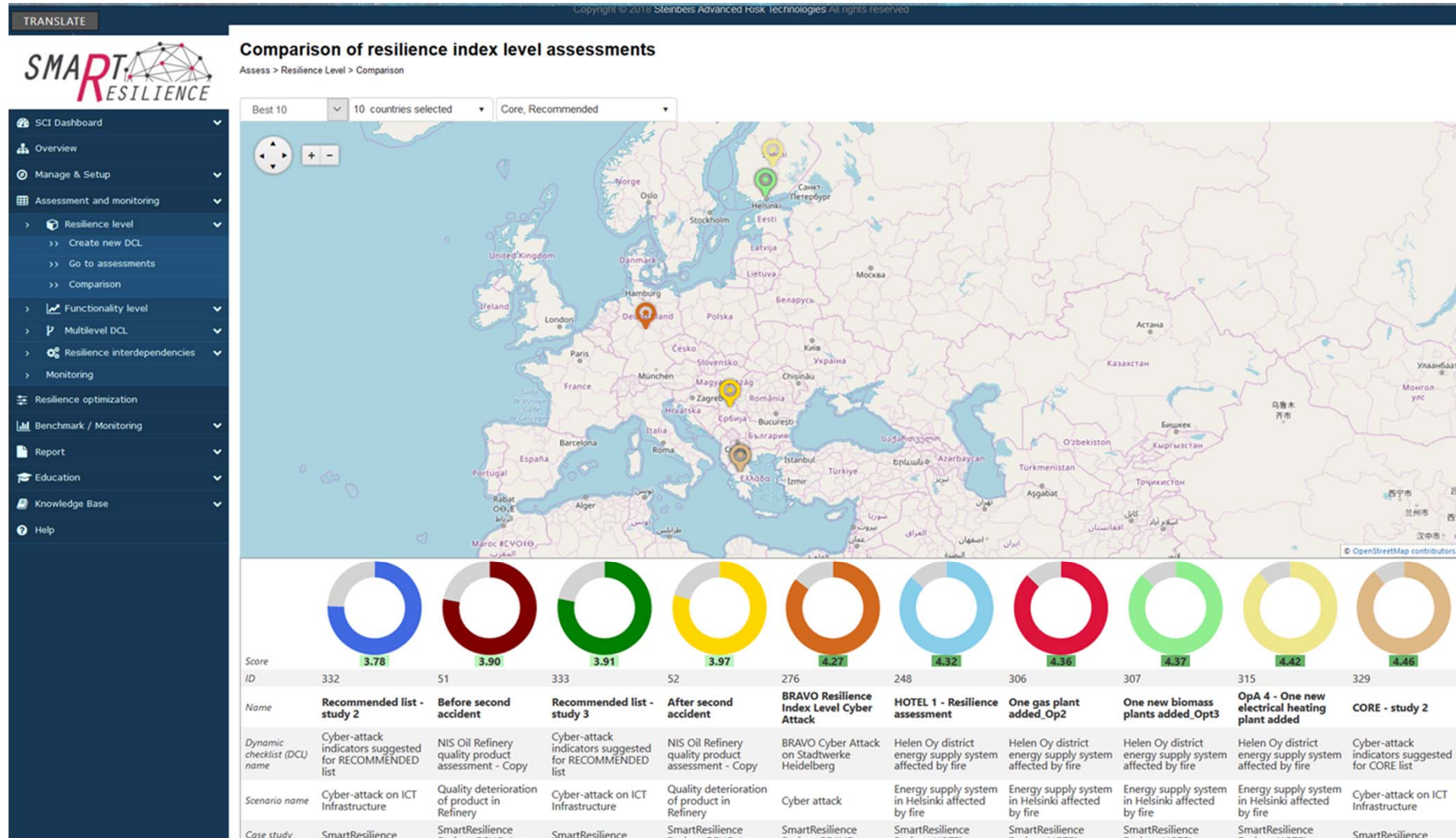
Save Report

Print Report

Before printing please save the report

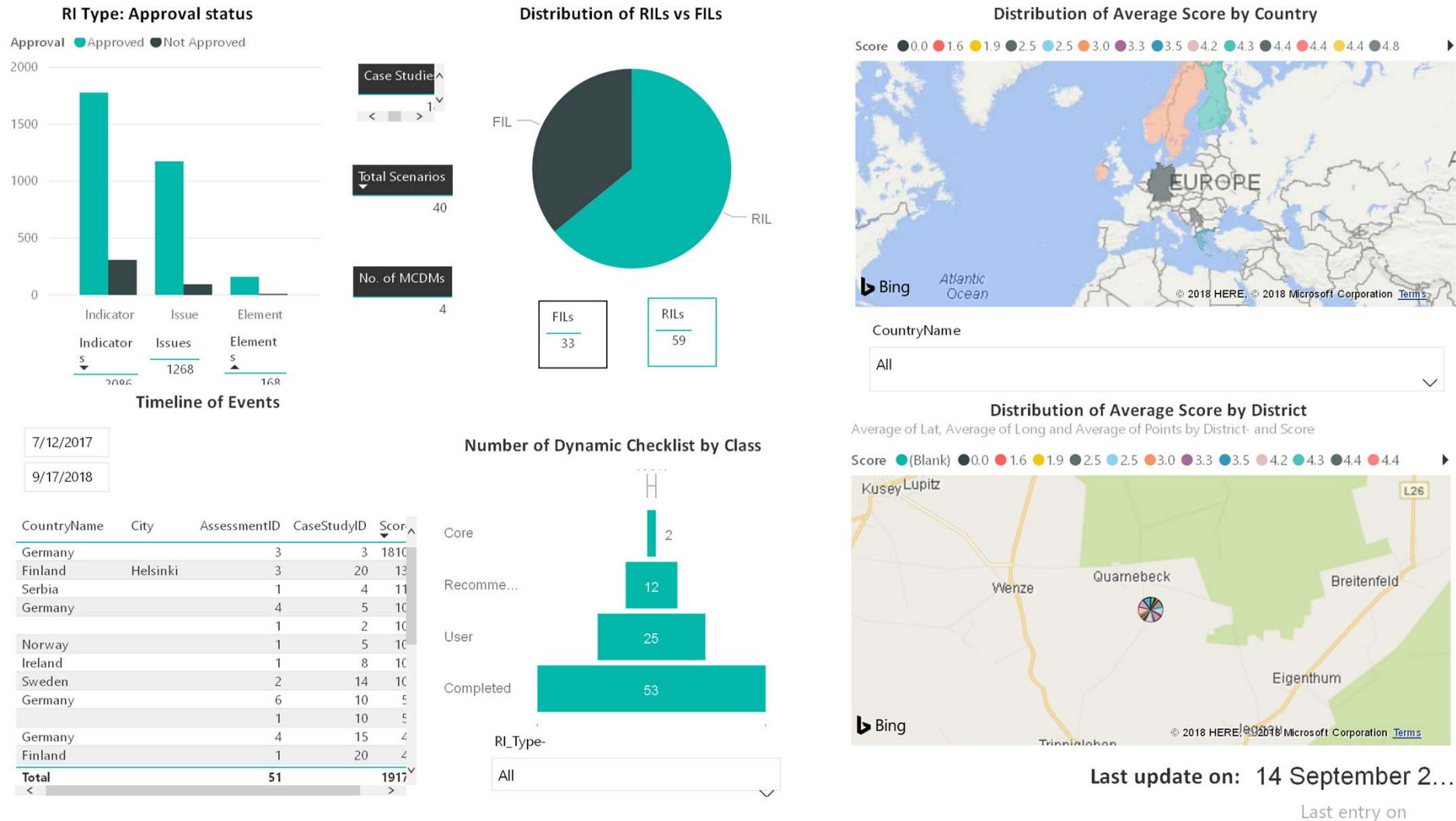
Indicator	Score	Resilience Level
Phase: 1. Understand risks		
Safety risk registry		
Does the Safety Risk registry exist?	4	Good
Using of Safety Risk registry in decision making	1	Critical
Frequency of revision of Safety Risk registry defined ?	1	Critical
Issue score: 2		Poor
Management of change - MoC		
Is Procedure for Management of change established ?	2	Poor
Issue score: 2		Poor
Register of accidents/incidents		
The existence of a register of accidents/incidents	5	Excellent
Frequency of communication with units about an occurred incidents	5	Excellent
Issue score: 5		Excellent
Phase score: 3		Average
Phase: 2. Anticipate/prepare		
Emergency exercises		
Existence Emergency exercise Plan	1	Critical
% Emergency exercises completed according to the schedule	2	Poor
% for a new employees and emergency response training provided	2	Poor
Issue score: 1.67		Poor
Maintenance plan		
Maintenance plan developed for each production unit?	1	Critical
Is maintenance plan executed ?	2	Poor
Is maintenance plan based on recorded events?	2	Poor
Issue score: 1.67		Poor
Measures ordere through Inspection visits		
Are inspection visits measures documented?	2	Poor
Are inspection visits measures realized?	3	Average
Are inspection visits measures classified?	5	Excellent
Ratio between preventive and corrective measures from inspection visits	1	Critical
Issue score: 2.75		Average



Critical infrastructure resilience



How to manage 2,000 indicators?



Resilience intelligence (based on BI)



	<h2 style="text-align: center;">RESILIENCE ASSESSMENT EXERCISE REPORT</h2> <p style="text-align: center;">The template is proposed in the EU funded project: SmartResilience (the Grant Agreement No. 700621) http://smartresilience.eu-vri.eu/</p>	
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Infrastructure assessed:
Scenario name & ID:
DCL name & ID:
Assessment name & ID:
Date:

Executive summary of the exercise:

<p><i>Historical data/ situational reporting of the similar events (real or simulated):</i></p>
<p><i>Main objectives and challenges of the exercise:</i></p>
<p><i>Description of the conducted exercise:</i></p> <p> Expected length of this section is the following: ½ page in case of discussion-based exercises (seminar, workshop, table-top or game) 1 page in case of operation-based exercises (drill, functional exercise or full-scale exercise)</p>
<p><i>Measurements:</i></p>
<p><i>Main findings after the exercise:</i></p> <p> Can be copied from section: 1.5 Results</p>

Part A: Basic info

I. Resilience assessment/stress-test team¹ member's information: Requestor		
I.1 Requestor's initials & last name ² :	I.2 Requestor's organization:	I.3 Requestor's position:
I.4 Requestor's phone number:	I.5 Requestor's email address:	

¹ The Resilience Assessment Exercise structure is shown on the Figure 2 (see: below).

² The requestor can be EC/local authorities/company authorities/individual person.

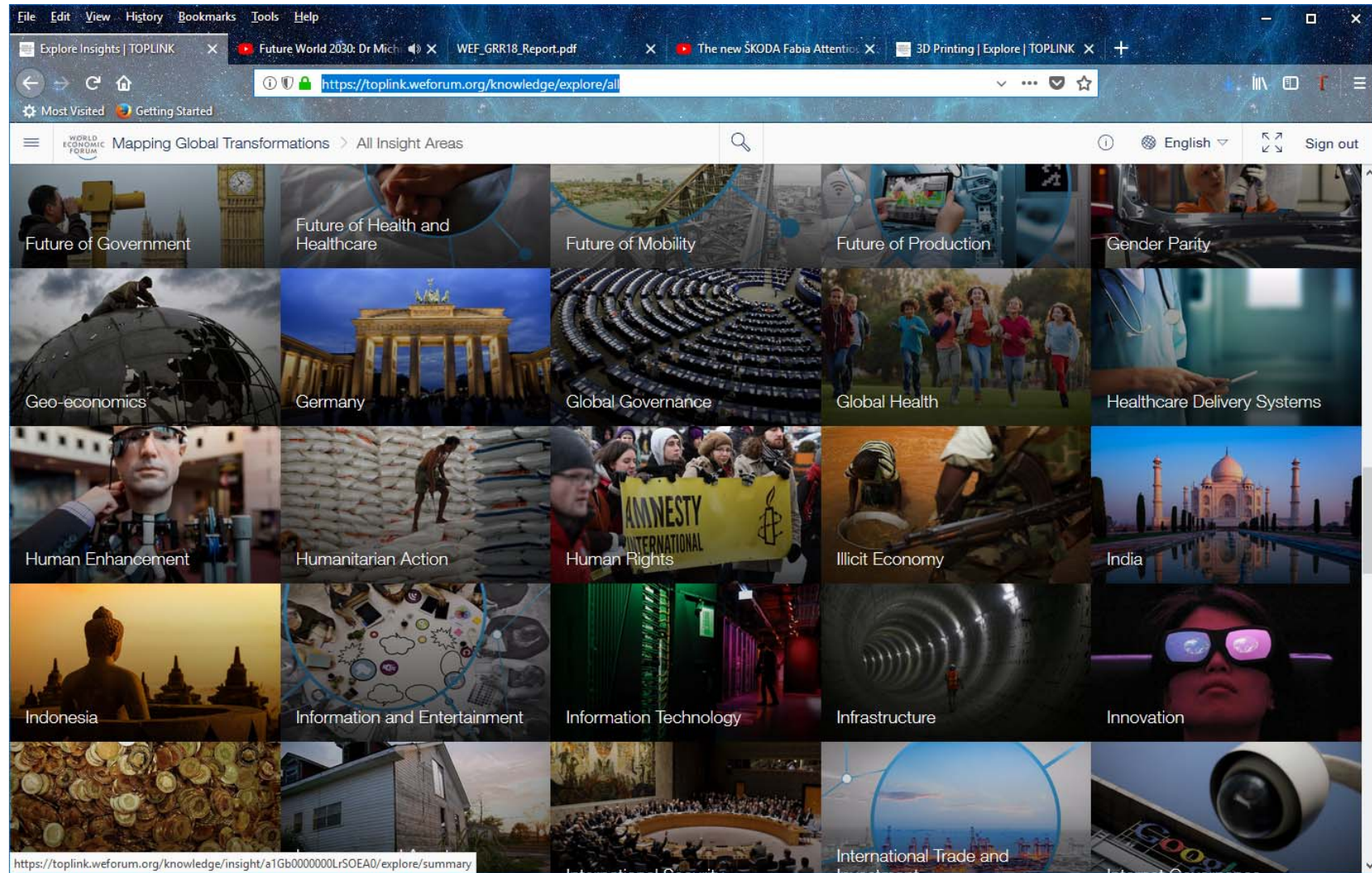
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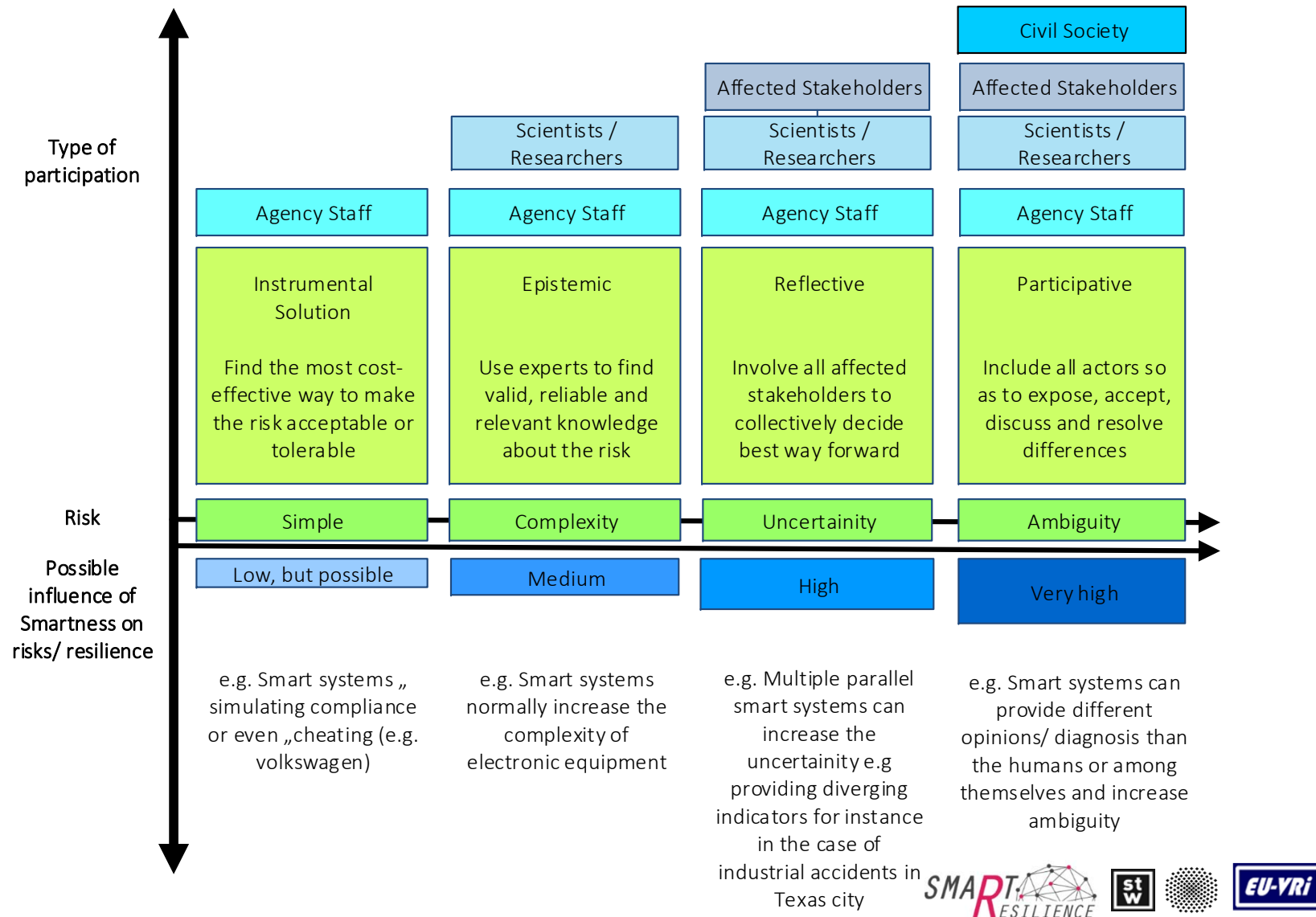
Conclusions

Problem #1:

The world is (very) complex ☹️...



Problem #2: Our institutions!



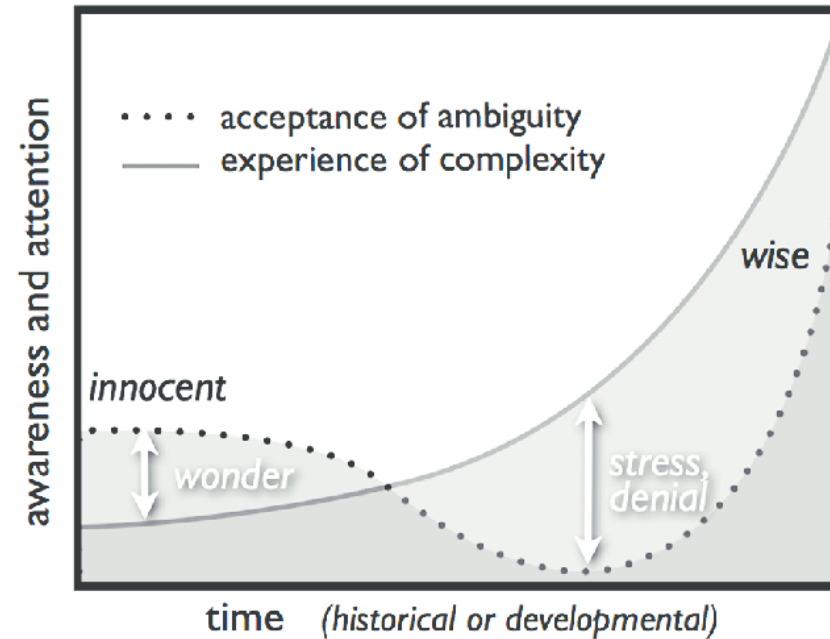
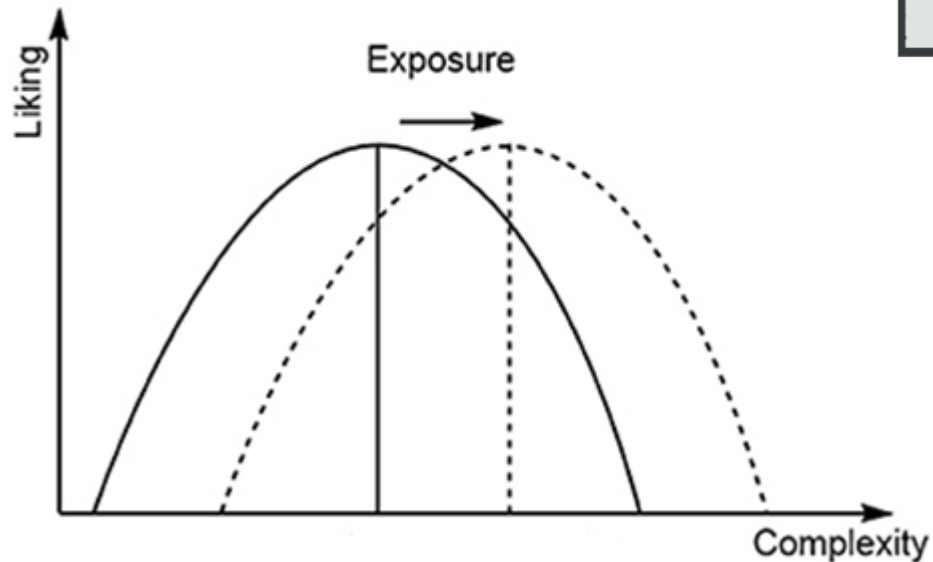
Problem #3: We think and act in silos!

- Interdependent infrastructures!
... often analyzed independently!!!



Problem #4:

The world is (very) complex ☹... and we do not like it!



Problem #5: We are bad at seeing unexpected things!



- Open intelligent systems of nth generation
- Smart/interactive/intuitive/3D/serious-gaming-based education
- Full-scale exploitation of big/open data (self-feeding systems!)

ch:



o!)

- Resilience mapping
- GRI-like resilience (voluntary)
bottom-up reporting
(**European Risk and Resilience
Assessment & Rating Agency ?**)
- Global alignment/agreement (**ISO 31050!**)

Challenge(s)? Emerging risks!



ISO 31000 <https://www.iso.org/iso-31000-risk-management.html>

TC262 Risk Management – WG8 <https://www.iso.org/committee/629121.html>

ISO 31050

Guidance for Managing Emerging Risks to Enhance Resilience: Thriving in a World Growing in Uncertainty

Why ISO 31050?

At the current pace of change, the world in the 21st century will experience 20,000 years of advancements, in just one 100 years (WEF, 2016). This is changing the risk landscape and bringing in an avalanche of new uncertainties and new emerging risks the management of which is essential for the society.

The new ISO 31050 standard will provide the much needed foresight and insight to deal with these risks. It will also provide new ways for enhancement of organizational resilience and new capabilities to deal with new challenges, helping, at the same time, to increase the level of trust in management of risk.

ISO 31000:2018 as a "generic standard"

The newly revised and published International Standard on Risk Management [ISO 31000:2018](#) is created, monitored and supplemented (with supporting documents) by [ISO Technical Committee TC262](#). ISO 31000 standard is one of the few ISO Standards (of the several thousand promulgated by top experts in their fields) that is qualified as a "generic ISO standard" – this means that all other standards must accommodate and align to its provisions.

Therefore, it is mission critical for every entity utilizing ISO Standards, to address and strategically approach risk management and, when doing so, to follow ISO 31000.

New ("emerging") risks

"Emerging" risks are emerging daily...
Example:
Foreign Affairs
June 2018

(on June 12, 2018, ISO voted for 31050!)



Today we face risks that didn't exist 20 years ago. Some of them didn't exist a week ago.

ISO 31050:

A new member of ISO 31000 family

Starting from the ISO 31000 definition of risk ("effect of uncertainty on objectives") and understanding risk management as significant contributor to value creation and preservation, the new

"ISO 31050 Guidance for Managing Emerging Risks to Enhance Resilience"

will contribute to the further development of integrated management processes that provide insight into how risk may affect the achievement of organization objectives. The development of the standard is assigned to the Work Group 8 (WG8) of the Technical Committee TC262. The work started in June 2018, taking [DIN SPEC 91299 \(CWA 1664\)](#), the work of the ISO TC292 ([ISO 223xx standards](#)) and the works of organizations such as [OECD](#), [SRA](#), [WEF](#) and EU (projects [INTEG-Risk](#) and [SmartResilience project](#), [ResiStand](#)) as its main reference.

The main calling is to provide universal, yet meaningful guidance on developing new competencies and business models to create relevant and realistic recommendations in an ever-changing uncertain world, to facilitate best practices, enhance resilience, promote agility, assist transformation, deliver insight, insure foresight, establish value and integrate resources.

With ISO 31050, the decision makers in organizations will be better equipped to manage both known (ISO 31000) and emerging risks (ISO 31050) with confidence. To this aim, ISO 31050 will, deliver:

Final conclusion: INTEGRATE & ALIGN resources GLOBALLY!

