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Blackout 2014 Exercise - Prague, the Capital of the Czech Republic

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ABSTRACT:

Our world appears to be more and more complex in a time. We are getting to use more and trickier tools to feed and enjoy ourselves. Our society is getting more and more complicated, which is nice on one side, but might be dangerous on the other side. Our dependence on the electric power is almost absolute and the long-term break – Blackout can be fatal to the region or country being hit by it. It has been a rule of life, which the intensive preparation to some crisis begins not sooner than after it strikes and causes a big damage. Prague city management did not want to wait and decided to organize an exercise to understand what such a situation might look like and how well prepared is the capital of the Czech Republic to manage it. The exercise was designed, run and documented by up-to-date information technology, which enabled further study and analyses of the results to improve the city resilience and to prepare adequate means for potential damage mitigation.

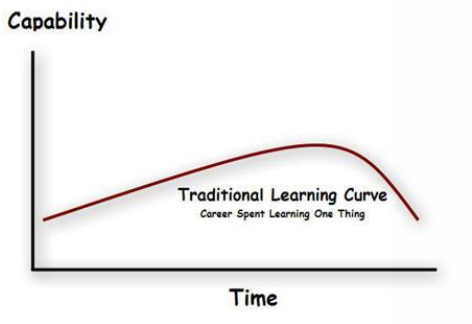
KEYWORDS:

Critical infrastructure, Energy Security, Exercising, Scenario

1. INTRODUCTION

There is a similarity between a city, region or other organization and a living organism. Living creatures are very flexible in their behavior and they have an ability to learn from the past situations and optimize their activities to survive and keep their lives cozy. Having some knowledge and skills inherited from their predecessors, there is all the time a need and chance to learn new things. Learning, this is sometimes a painful process of absorbing new information and training new skills, results in better reaction to known situations and better adaptation to the environment. The experience is passed from generation to generation and enriched by new findings and inventions. In order to keep muscles and senses in shape, there is necessary to exercise. Not educated and not exercised organism deteriorates to the weak condition, getting ready for predators to enjoy.

In most cases the learning and exercising is not enough to undertake just once. The process of acquiring knowledge and skills is very complex; various factors are influencing other ones and the “preparedness” as we may call the required metrics changes in time.



The traditional learning curve[1] shows that the capability of the subject varies in time, depending on the effort spent and its timing.

This is valid for a person and also for the organization, which may be a company, city, region or country. In case of the organization the situation is more complex and difficult to manage: there are people changing, as well as external conditions and technologies. To assure the preparedness to the potential crisis situation is a hard management task, which does contain also strong economic and political influences.

Figure 1 Traditional learning curve

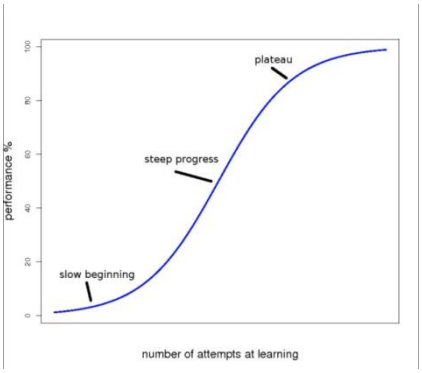


Figure 2 Cumulated learning curve [2]

Rather than a one-time-shot learned capabilities we would like to see the permanent and systematic rise of preparedness of the organization up to let's say „optimal" level and keep it there. Tis request can be accomplish only by periodical learning increments.

Another question is – what is the best method to build the capabilities and thus assure the preparedness of the organization?

Traditional way is to perform the complete risk management process as defined in many standards:

1. Risk communication
2. Establishing the Context
3. Risk Identification
4. Risk Analysis
5. Risk Evaluation
6. Risk Treatment
7. Risk Acceptation
8. Risk Utilization
9. Monitoring Risks

Such a nicely structured approach fails many times not for its poor implementation, but for the fact, that it is being initiated and fulfilled in most cases just once, leaving lot of paperwork done as a crisis plans etc. – which is exactly the first step as shown at Fig. 1. For the increments there is obviously not enough motivation – except the cases when

[1] **Hannah Wells, Paul Sturch, Gordon Muir** - *Urology Department, King's College Hospital, London, UK*

[2] http://www.flashcardlearner.com/articles/the-learning-curve/

some real crisis strikes. After that experience, obviously the respective part of crisis plans and other risk management documents is redesigned. The new experience serves as a real-time training for the whole management.

Prague as a historical and developed city suffered a lot of various disasters, the most damaging were floods. There were times in history, when almost no floods came for dozens of years – and the vigilance and preparedness dropped. It was the situation in the last century, which ended in 2002, when so called "1000 year water" appeared, causing a big disaster. [3] After this big "exercise" lot of improvements were done the next floods[4] were treated much better. The city was prepared.

There has been was no blackout in Prague or in the Czech Republic so far … So even that risk analysis for the power failure has been done and crisis plans created for the city, there was no real situation of that kind, that would motivate for deeper investigation, planning and maybe for some measures taken to mitigate the risk or minimize the potential damage.

The blackout situation has been known from some parts of the world, including the big cities, which showed a potentially very different behavior in comparison to other kind of threats. There are coming some new threats, derived from the complexity of critical infrastructure.

In such a situation – no pure analytical study is enough to describe the whole matter, the optimal way is to organize an exercise, to discover, how the whole system consisting of organizations, people, resources and technologies would and should behave.

2. SUPERSYSTEMS

We are more and more dependent on the infrastructure. We are in a role of a juggler, who keeps various things rotating in the air. It creates a nice show – everythint moves, flies, rotates, shines …

BUT … what if the juggler looses the light? What if he loses the temper to keep-up? What if somebody hits him? … The things fall to the ground and the show is over.

We have a similar situation – 24x7 services at mobile networks, energy supply, banking and credit-cards systems, health-care systems etc. We are juggling as well.

What about the situation the light goes off? What about a black-out? What about the hostile acts? (cyber-attacks …).

Our critical infrastructure is so complex, that we can hardly determine or analyze what is interconnected with what, what is dependent on what and by what rules, … So we might be surprised by a **SUPERSYSTEM**, which nobody designed, nobody created, but it is here!

We may treat such a supersystem as strengths. It brings us a possibility to interlink our activities and optimize our effort.

But in the same time we should treat a supersystem as a threat, as it could bring us an unforeseen situations and disaster scenarios. The more the automation is incorporated to such a scenarios, it requires a proper and qualified response in the whole organization.

3. BLACKOUT

The blackout situation is sort of special – sudden fail of all electric power supply influences everything and might cause the domino effect with damaging consequences (long term insufficiency to fulfil basic human needs may lead to the social disorder and economic collapse).

Unlike floods, blackout can come without any warning, without any chance to prepare. Most of the things we take in our daily lives as automatically granted just disappear. This situation is far different comparing to the "classic" disasters, which give some time for decisions, preparation etc.

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[3] http://en.wikipedia.org/wiki/2002_European_floods

[4] http://en.wikipedia.org/wiki/2013_European_floods

4. EXERCISE BLACKOUT PRAGUE 2014 - PLANNING

Prague City decided to organize the exercise as a tool to assess the preparedness of Prague to the possible blackout situation and to identify areas for improvement.

The exercise was prepared and carried out at the management level; there were no actual power fails planned.

The preparation took 4 months, with weekly meetings with all important subjects of critical infrastructure and representatives of the city and state administration, especially the national Integrated Rescue System (comprising Firemen, Police and Ambulance).

Other participants were organizations covering areas:

- Power distribution
- Gas distribution
- Communication (Telco operators)
- Hospitals and social services, hygiene
- Water management
- Food supply
- Heat management
- Municipal police
- Traffic control
- City services
- City transport
- Military support
- State material reserves
- Funeral service

The **scenario** was designed to start at 23:00 by night and to last for 3 days until the recovery. The exercise run was set for one day.

The scenario was described in the system PRACTIS[5] to cover all the steps, their relations, to organizations and persons, timing and linked documents.

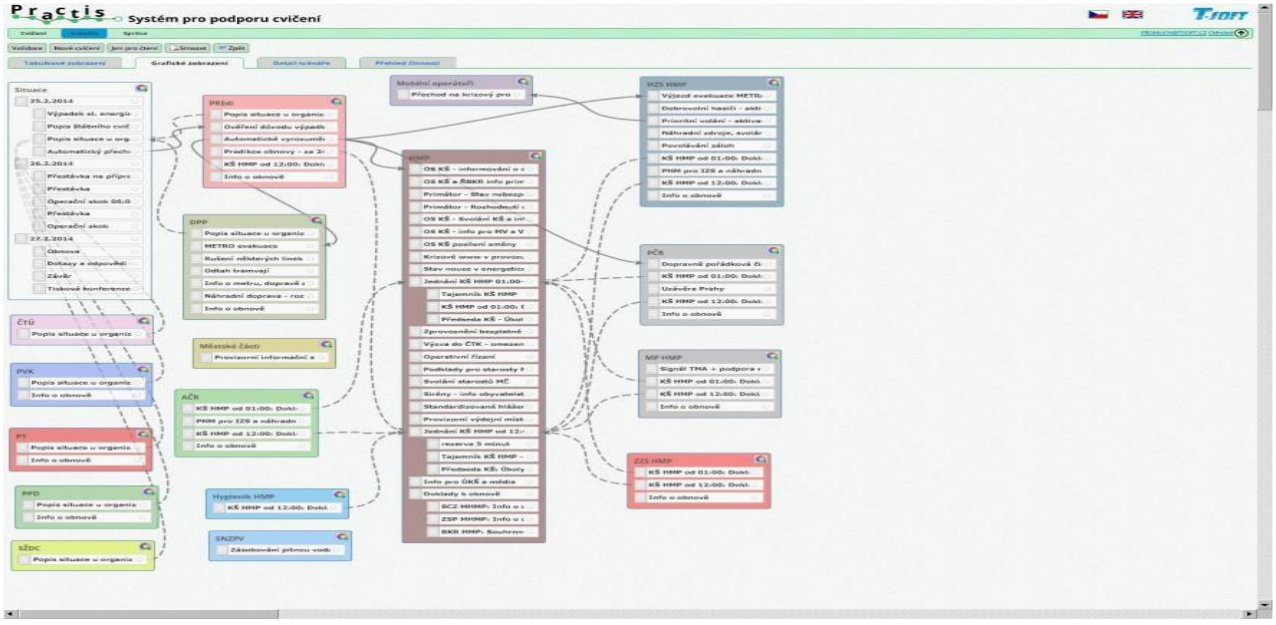


Figure 3 Scenario in Practis

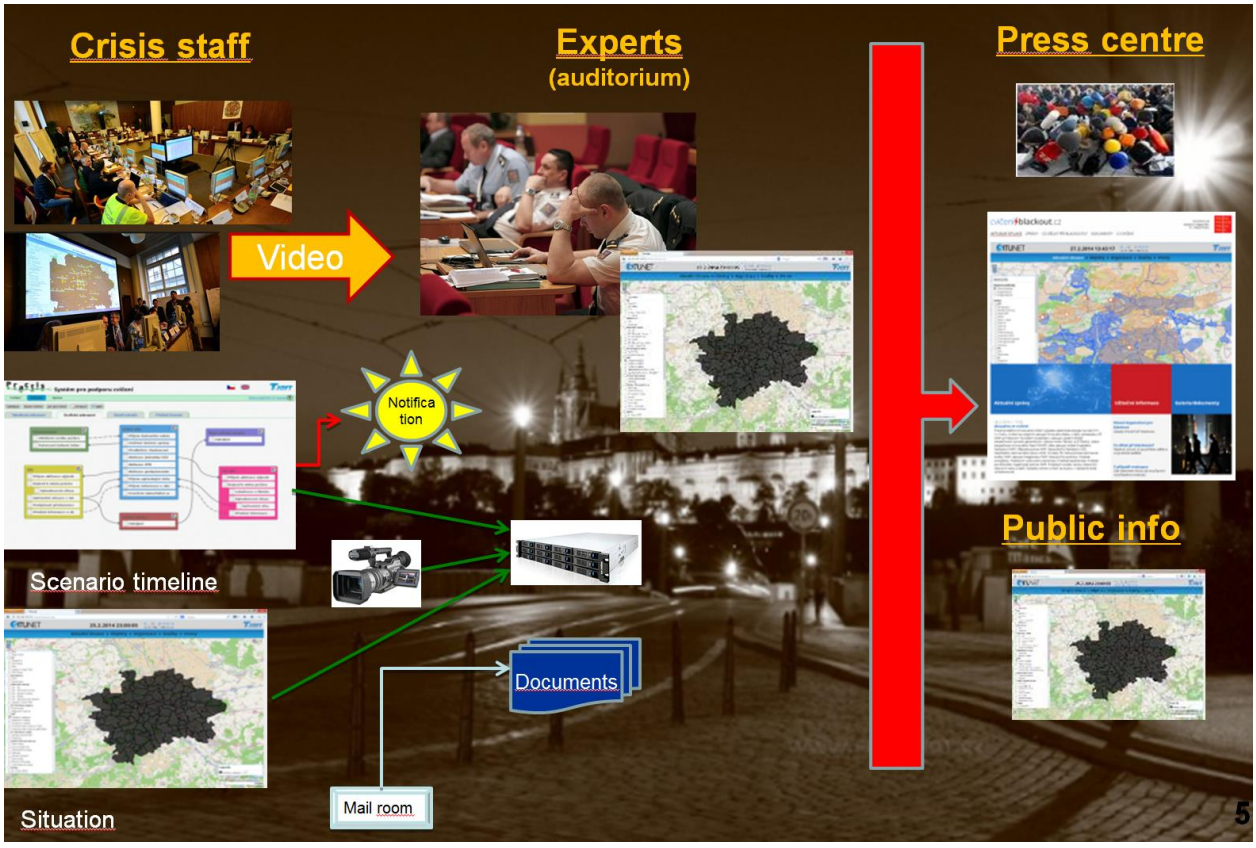
[5] PRACTIS: Information system for exercising http://www.tsoft.cz/en/practis

5. THE EXERCISE EXECUTION

February 25th 2014 at 9:00 started the execution of the scenario (with the "game time" of 23:00).

There were principally three groups of attendees:

1. **Crisis staff**, led by the Prague Mayor, located in the meeting room, with permanent presence of about 30 people (key organizations managers, crisis management staff, advisors and international guests).
2. **Expert forum** located in the large auditorium, where analysts and other experts were preparing the decisions for their managers.
3. **Media and general public** – open area and internet site.



There was a permanent video transmission from the crisis staff to the expert's auditorium and also the shared common situation picture was available on large screens and user terminals.

The scenario was executed step by step and responsible persons presented the situation and reaction of their organizations to the crisis staff. There were some fixed steps in the scenario, known to all the participants in advance, but there were also some "surprises", revealed just in time thru the SMS-based notification to test the ability to react to ad-hoc situations.

A comprehensive set of documents and models was prepared during the preparation and integrated to the scenario. The system allowed at any time to display any document or status using multilayered zoomable city map. The exercise progress was visualized on two large screens – both the scenario and the common situation picture. It allowed understanding the situation to take a qualified decision.

The whole exercise was recorded not only as a video, but also as a set of all screens appearing during the scenario execution. It enabled to create the unique integrated multimedia document with time synchronization, which allows the detailed analysis of any second of the exercise and to synchronously recall everything which was shown at any of the screens.

A special website for media and public was in operation, where the selected situation pictures were published in time

with the automated notification of the media. This enabled an instant penetration of the information to the public.

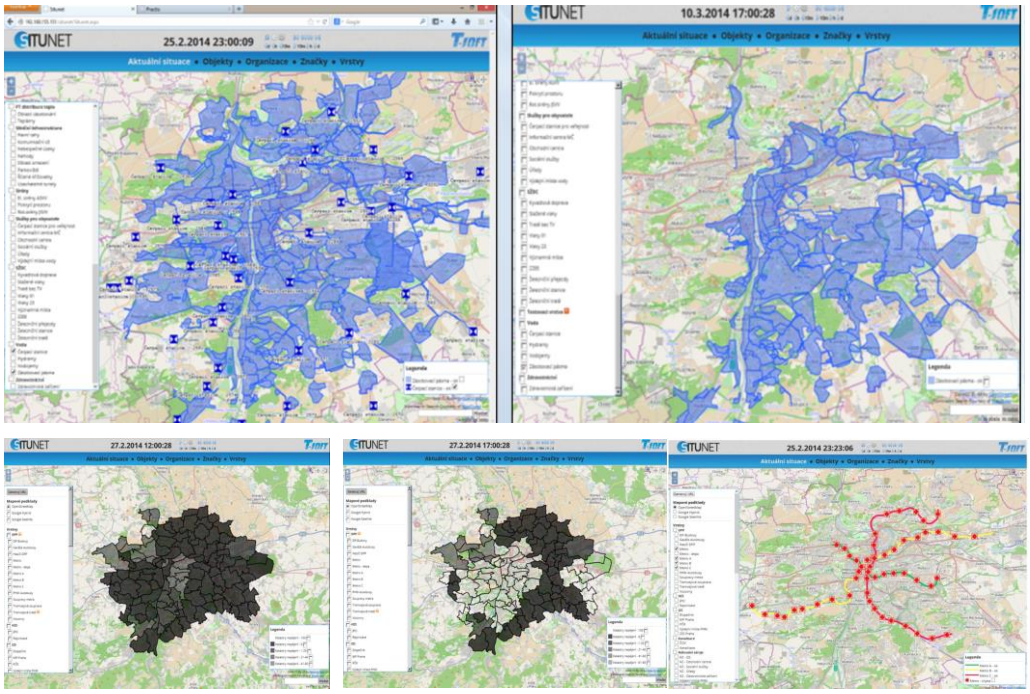


Figure 4 – results of the models and status information as shown at common situation picture

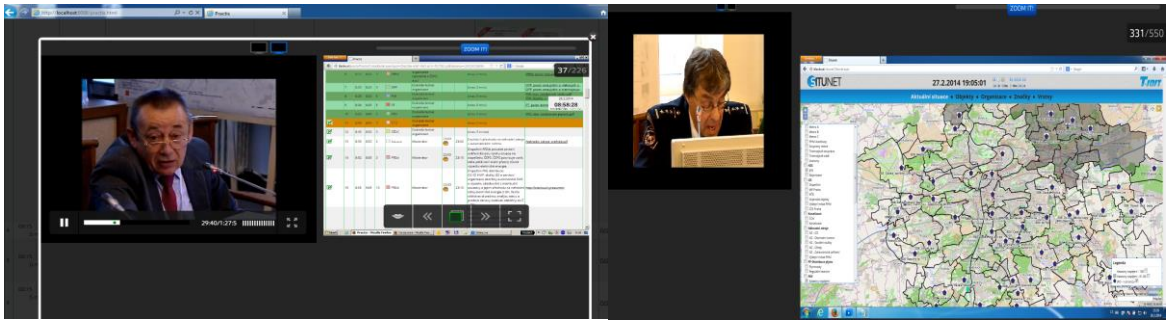


Figure 5 – Integrated multimedia document

The exercise was finished at the end of the day, after fulfilling all the scenario steps, covering 3 days from the power fail to the full power restoration.

6. CONCLUSIONS AND LESSONS LEARNED

The exercise Blackout Prague 2014 proved that despite of the fact that no blackout had happened yet at this territory, it was very useful to organize an attempt to try what might really happen during such a situation.

Most important observations and results arose not from the actual exercise execution, but from many detailed meetings during preparation. The discussions revealed some vulnerability due to which the city would have severe problems to react to a sudden total power fail. Most of the standard procedures were tuned up for the flood or similar situations, but in case of blackout their usability or efficiency would be in doubts.

There were broken some assumptions from other cities which already suffered a blackout. For example the municipal metro system would not be of primary concern – the system in Prague was designed and built for overcoming such situations and during the preparation it showed the ability to work properly as one of a few systems in the city and help to solve the situation.

The key risks were discovered in following areas:

- Healthcare and social care
- Water and heat management
- Energy supply and distribution

Special has to be done to the communication system represented by operators.

The city management and rescue forces have the private radio network, which is capable to work even in the power outage. But there is a need to keep the critical infrastructure subjects interconnected. The exercise revealed a key importance of (especially mobile) communication systems in the power outage. It may seem as a paradox, but the GSM network is one of the least vulnerable systems in case of blackout. Due to the nature of the system (distributed, able to be powered by generators and at the user-end there is the ability to recharge mobile phones in cars) it becomes the most important infrastructure for the territory survival. In the blackout situation the mobile network (including data access) together with the radio broadcast system may be the only communication infrastructure for public and business available.

The Prague exercise showed that the exercising is very effective way to prepare for crisis situations, even for those which have not happened yet. The exercising brings a new dimension to the crisis planning. It involves and engages people, stimulates their interpersonal communication and relations and builds an experience which might be used later in real crisis.

To keep the learning curve optimal and stable, independently of people fluctuation and external conditions changes, the repeating exercise is the right way to assure the goal. Having in mind that there are information technologies capable to support design, execution and documentation of the exercises, we may postulate the repetitive exercising as a basic method for building and maintaining the organization preparedness for risks.

Having passed the exercise we may say Prague is way better prepared for the blackout than before. The next exercise is planned to cover more challenging situation when blackout strikes during the winter day, when many people are in metro, lifts, shops, offices, schools and other places.

The periodical exercising is an optimal tool to build preparedness to the potential crises of any kind.