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CONCEPT PAPER
HANDBOOK
The "risk assessment map" software: the experience in the big city of Milan

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This paper focalizes the attention on the implementation of a software aimed at operationalizing the risk assessment model and the related theoretical framework.

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INTRODUCTION

The theoretical framework of a geo-referential risk map (see Concept Paper 1), based on a wide approach in light of the main sociological and criminological theories[1], is at the base of the development of a "risk assessment model"[2] (see Concept Papers 5, 6 and 7)[3], characterized for the data gathering from the

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[11] The theoretical framework is characterized for the analysis of the most diffused theories, according to the international literature: i.e. Environmental Criminology, Situational Crime Prevention, Radicalization and Lone Wolf theories.

[2] The "risk assessment model" is characterized for the implementation of a system based on the s.c. "Evil Done" model by R. V. Clarke, aimed at *a priori* identifying and then analyzing potential ("hard and soft") targets of terrorism, in respect to the classification of certain features that the international experience considers facilitators factors for terrorist attacks. Therefore, the doctrine considers this model as a form of analysis of the safety and security level of

stakeholders involved at different level in the Big City safety and security, considering the special issues of Critical Infrastructures and Big Events.
The joint action between the theoretical framework aspect and the implementation of the "risk assessment model" produced, as output, a software, which can be considered the operational aspect of the two previous components.
In fact, the final purpose is exactly the implementation of a software, able to analyze a given urban context from a broad perspective (i.e. from social uneasiness factors, to the terrorism threat: namely, both safety and security aspects). The reality is represented through a set of indicators (i.e. social and urban/environmental vulnerabilities: empirical events) and indexes (i.e. standardized indicators), which are not intended to be exhaustive, as they are an "open list", which can be modified through the time, in conformity to the changes of the urban context of reference. Besides, the added value of the abovementioned information is due to the geo-localization of the uploaded data.
Furthermore, this model is not to be intended as a "predictive" one, as the new frontier of terrorism (i.e. "lone wolf", "home grown terrorism", "solo actors", etc.), experienced in the international scenarios, has demonstrated to be highly unpredictable, thereof it has determined the overcome of the "predictive model" approach. In light of this consideration the software is completed with the interpretation of the outcomes (i.e. data feedback analysis) by an Expert Committee, which periodically, will provide the map operators with expertise, on the risk level and the related potential (socio-criminological) threats, intended to be an added value to the pure software elaboration of the uploaded information/data.

In detail, this paper aims at analyzing the operationalization process and the passage from theory to practice: namely, from a socio-criminological model ("risk assessment model") to a tangible software ("risk assessment map"), applicable in any urban context and involving different stakeholders that, at different level, can implement the data gathering, as well as the related geo-location of those data.

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each potential terrorism target. In fact, a risk assessment analysis, before a terrorist or criminal event occurs, aims in implementing effective prevention/repression policies within a certain urban context of reference.

[3] Concept Paper 5: "*Analysis of EU and global system and methodologies for risk assessment*"; Concept Paper 6: "*The city governante and the 'Evil Done' model for the risk assessment of the terrorism potential targets. First part: the 'soft targets', i.e. symbolic/iconic sites*"; Concept Paper 7: "*The city governante and the 'Evil Done' model for the risk assessment of the terrorism potential targets. Second part: the 'hard targets', i.e. Critical Infrastructures*"

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THE "RISK ASSESSMENT MAP" SOFTWARE

1§ Technological component

The elaboration of a software to operationalize the model from a theoretical perspective, required the development of several technological components. In fact, the result is a sophisticated software able to gather and analyze the data stored in the system (i.e. database).
A detailed explanation of this process, requires an evaluation of the technological components, which characterize the software, intended to be the output of the theoretical aspect.

In particular, the tool for the research and analysis is Web GIS[4], characterized by a database, composed of data *a priori* defined in the theoretical model, i.e. indicators and indexes (see **Appendix I**). Therefore, the software is able to perform temporal and statistical analysis in "real-time", since the database is constantly updated, through a geo-referential system of data collection and representation.

The user interface is web-based and intuitive, characterized for adopting Client Side RIA[5], providing a fast Client, a reduced Network traffic and a *minimum* load on the Server. This system is developed through ArcGIS API for JavaScript, aimed to represent mapping data and geo-processing services referred to certain criminal phenomena.
In concrete, the data analysis is based on SGS[6], able to calculate the density of a certain indicator (i.e. event), from a chronological perspective interlinked with the spatial representation (i.e. geo-localization of data). The results implement the Global Criticality Index, which highlights the Alerts referred to potential targets, identified on the frequency of certain critical phenomena, localized in specific areas of the urban context.
The geo-localized data are content in the Database Server, i.e. Oracle DB, where the data are managed and uploaded through the ArcGIS for Desktop Standard 10.1 Client system.
The added-value of the software is the possibility in sharing information among the several stakeholders involved in the management of the risk assessment map: i.e. Municipality of Milan, Local Police (PL), Critical

[4] GIS: Geographic Information System
[5] RIA: Rich Internet Application
[6] SGS: Scheduled Geoprocessing System

Infrastructures (CI)[7], exploiting the Esri's ArcGIS Online Cloud services, which provides this function through its web platform, guaranteeing at the same time a highly secured environment.

The basic features which characterize the Web GIS Application can be described as follow:

a) **Representation of the indicators event: Flags or Clusters**
There is a possible alternative in representing the indicators, the system allows also to choose whether to display all types or filter for a single type of indicator.
Flag: i.e. static representation on which each indicator appears on the map where it has been detected (e.g. one or more abandoned car/s is/are logistically located on the map with a symbol)
Cluster: i.e. representation that draws a large symbol to represent clusters of points
In both cases (i.e. Flag or Cluster), all the indicators representations are filtered on a time basis, including the last rolling 12 months collected in the database. Through a time-slider tool the user can dynamically change the time filter (up to a maximum of one year).

b) **Dynamic representation of the indexes by type of event**
This dynamic representation is based on predetermined classes and it is referred to the three subdivision areas: i.e. Decentralization Zones[8], NIL – Neighborhoods[9], Census Areas[10]. To perform such a representation, there is the s.c. SGS (i.e. Scheduled Geoprocessing Service) that, on a periodic basis (i.e. every 24 hours, according to the expectations) updates the indexes on the map (i.e. Geodatabase), using the "indicator events" recorded in a specific period of time (e.g. 1 year).
The user can choose from a window form the index to represent, interlinked with one of the three subdivisions.

c) **Global Criticality Index Representation**
It is the result of the indexes normalization, using the appropriate algorithm provided by the Municipality of Milan, available for the three predefined homogeneous areas (Decentralization Zones, NIL –

[7] Critical Infrastructures: A2A (electrical and gas service), AMSC (dump sites and environmental issues), ATM (public transportation system), FerrovieNord (local railway company), RFI (national railway company), SEA (airport of Linate and Malpensa), MM (water system)
[8] i.e. *Zone di Decentramento*
[9] NIL: i.e. *Nuclei d'Identità Locale*
[10] i.e. *Zone di Censimento*

Neighborhoods, Census Areas). This index is calculated through the SGS system, and graphically represented in the same way of the three subdivision areas.

d) **Representation of a criticality alert for a target**
Each category of static/dynamic target is defined and interlinked through an Alert system based on the count of the indicators of a particular type, falling into a buffer area, given a predefined period of time. This calculation is also made by the Scheduled Geoprocessing Service.

e) **Temporal Comparison Report**
This is a short report that shows in a graphic way the indicator's trend over time for a selected area. It is possible to download it in CVS format (numerical data) and printable (from Web browser).

f) **Index Report**
It is a short report containing the principal indexes related to a single homogeneous area (i.e. Decartelization Zones, NIL – Neighborhoods, Census Areas) and also the Global Criticality Index. It is possible to download it in CVS format (numerical data) and printable (from Web browser).

g) **GIS functionalities**
- Map navigation (i.e. Zoom In, Zoom Out, Panning)
- Identifying features on a map to see their attributes
- Table of Contents which lists all layers and shows the symbol assigned
- Loading external map services from ArcGIS Online or from the Web
- Search Addresses (i.e. Geosearch)
- Map printing

2§ Structure of the system
The structure of the whole system (i.e. software) is characterized for three main components:
a. **Map Interface**
b. **Data analysis system**
c. **System of events (i.e. indicators) gathering**

Therefore, it is important to define these three aspects, as they represent the structure on the base of which the software has been implemented.

a. **Map Interface**: the interface is the component that allows the static and geographic representation of data, able to analyze them and highlight the critical aspects and vulnerabilities of the urban context
b. **Data analysis system**: this system aims at analyzing the data, to elaborate the interactions among the several gathered events (i.e. geographical and statistical data), highlighting, at the same time, the outputs on the user interface (i.e. visual and graphic representation of data analysis)
c. **System of events (i.e. indicators) gathering**: this system allows to upload and manage the information (i.e. data)

The intersection of the abovementioned three components determines *a priori* the structure and then the functionality of the "risk assessment map" software.

In detail, the system of events (i.e. indicators) gathering is based on "*Ambrogio*" map, namely the already existent system implemented by the Local Police (i.e. PL) of Milan. In fact the indicators are collected through the CRM of "*Ambrogio*" platform by DCSI (i.e. Central Direction of Information Systems and DPA)[11], aimed to adapt the existent system to the peculiarities and exigencies of the "risk assessment map" software.
This platform allows to gather geo-referential data directly from the territory (i.e. urban context), through the use of PDA, shortly intended to be substituted with SmartPhone devices, by the several operators (i.e. Local Police agents), in charge to monitor the different urban areas of Milan.
The collected events can be uploaded on the risk map where the "server" is physically located (i.e. office) *via* Web.
Besides, the "*Ambrogio*" platform manages the uploaded stream of data on the base of a chronological criterion (i.e. historical *excursus* of events/indicators). As the database is characterized for sensitive data collection, the system offers the possibility to develop "dedicated areas" of the program, where only certain subjects can access this part of the system. In few words, there is the possibility of managing "profiled data", database analysis of the collected data and statistical reports accessible only through "passwords" to specific authorized subjects.
Finally, "*Ambrogio*" supplies the output, necessary for the further elaboration of the map database.

From a visual perspective, "*Ambrogio*" interface is characterized by a two-levels representation: at first instance, it is possible to visualize a list of events collected from the territory, through the s.c. "Control

[11] DCSI: i.e. *Direzione Centrale Sistemi Informativi e Agenda Digitale*

Panel"[12]; but the software gives the possibility to access details of each event, through the s.c. "Detailed Event File"[13], namely a visual file with the description of the event: i.e. when it happened, who discovered the event, where it happened, how it was managed, how/when it has been solved and *a priori* whether it has already been solved.

In detail, the system of information elaboration is developed through the interaction of three components, aimed to develop a process of data analysis:

User Interface
↓
Algorithm
↓
Business Intelligence (BI) system (i.e. data analysis)

Considering that the "*User Interface*" is able to represent all the geographical and statistical data, plus the inputs (i.e. Indicators and Indexes), as well as the outputs (i.e. Alerts); while the "*Algorithm*" can be defined as the "brain" of the data elaborations that, whether properly calibrated, can reveal the critical issues (i.e. Alert) on the map. Furthermore, the data analysis is achieved through the BI (i.e. "*Business Intelligence*") "motor", able to elaborate even the geographical aspect of the data gathering (i.e. "*Location Intelligence*"). In fact, the ESRI user interface contains a geographical modulus of BI, a basic version of this program, which can be implemented, increasing the number and typology of provided services by the software (for instance, it would be possible to add further databases, managed by other entities – e.g. Critical Infrastructures -, able to implement from both a qualitative and quantitative perspective, the existent "risk map" database).

The previous version of "*Ambrogio*" map was characterized for a GIS system, able to represent in a dynamic form the data on the Milan city map, visible through the LAN network only, with an ESRI user interface. Originally, this map was defined as a "critical issues map", while the implementation of this system has been leading to develop a "map of uneasiness". In fact, the risk map improved in the course of the present

[12] i.e. *Pannello di Controllo*
[13] i.e. *Dettaglio Scheda Evento*

study, is characterized for a WebGIS system, able to visualize geographical and statistical data, as well as the "proximity data" analysis and the graphic representation of the s.c. Alert. Therefore, the evolution of the original map aims at developing the potentialities of the risk map approach, for the implantation of effective prevention/repression measures referred to the safety and security issues within an urban context.
Thereof, the risk map exploits an existent operative platform, located at SIT in the Municipality of Milan, namely ArcGIS Server 10.1, adopting an user interface technology for JavaScript.

As far as the sources of collected data is concerned, it is possible to identify two information channels of different nature:
-**Municipality of Milan**
-**Critical Infrastructures** (CIs)

The abovementioned entities gather both static/structural and dynamic data. In particular, the implemented software is able to record and elaborate a maximum of 55.000 data in real-time, as the final aim is to develop a map characterized for a high speed of data elaboration system and at the same time a data gathering system, which is as much complete as possible.

In detail, the data collected by the **Municipality of Milan** can be classified as "***structural data***", i.e. the basic demographical information (population) about the city gathered from the statistical department; the "***static targets***", i.e. the potential "soft" targets (see Concept Paper 6), which characterize an urban context (e.g. central station, Duomo, Palazzo Marino, etc.); the "***dynamic targets***", i.e. sensitive points that, given a certain time-line, are the result of the elaboration of the "***dynamic data***", i.e. indicators (events classified as vulnerabilities of the city: e.g. unauthorized camps, vandalism, etc.) (see **Appendix I**).
The "dynamic data" can vary through the time, according to the modification of the urban features, therefore there is a complementary modification of the "dynamic targets", as direct consequence, on the base of a data elaboration from a time-line perspective (i.e. day, week, month, year).
The software takes into consideration not only the event, represented on the map at the level of civic number, but events of the surrounding area, as the risk assessment process can be conducted also in light of the several vulnerabilities, sharing the same surrounding area: in this case the software will reveal an increasing risk level, in terms of safety and/or security according to the nature of the vulnerabilities.
In other words, it is not the user/operator that predetermines the areas where there is a higher possible risk-level, on the contrary the risk-level is determined and represented on the map, as the outcome of the

indicators/indexes elaboration by the software. From this perspective, the map keeps changing and "adapting" itself to the "real" situation of the city, on the base of the collected data. Thereof, it is able to define the "surrounding" situation of a certain event (i.e. indicator), revealing the "density" of a certain phenomenon (i.e. topic indicator) or certain phenomena from an holistic perspective (i.e. interaction among indicators).
The system in fact, allows to match several indexes at time (2 up to 5) and elaborate complex analysis of the interlinked events content in each index[14].

The graphic representation is characterized for a numerical division of the data, grouped within 4 classes, on the base of the three-levels subdivision areas (i.e. Decentralization Zones, NIL – Neighborhoods, Census Areas), visualized through a *spectrum* of colors that facilitates the identification of the "dimension" of certain aspects represented on the map.
The technical profile of the graphic representation is defined through a basic Cartography -DBT 2012-, Ortophoto 2012, Raster 2012, Pictometry 2012.

The second source of data gathering is the **Critical Infrastructures** (CIs), as it is possible to classify "***static targets***", the s.c. "hard" targets, which characterize the specificity of each infrastructure (e.g. gas pipelines, electrical cabinets for A2A –gas an electrical company-) and "***dynamic data***", i.e. a set of indicators that defines certain events experienced by each infrastructure and to be intended as phenomena that increase the risk-level (i.e. stealing of specific material –e.g. iron, copper-, abandoned vehicles/cars, etc.) (see **Appendix I**). These data are completed with a "pop-up" system, linked to each CI represented on the map, containing the "profile" of the infrastructure on the base of the "Evil Done" model approach to assess potential targets of terrorism (see Concept Paper 7).
As far as the CIs is concerned, the Lombardy Region has developed operative round-table meetings with the CIs (i.e. PReSic), aimed to understand the critical areas of the several infrastructures, in light of the key-points intersection, where there is an overlap of different CIs sites, sharing the same location (e.g. the presence of an electric cabinet closed to a bus stop or a train railway portion, etc.). Therefore, the Municipality of Milan aims at attending these meetings, sharing the information gathered and elaborated by the risk map software, involving both the public institutions (i.e. Region, Local Police, Municipality, etc.) and the CIs.

[14] The "index" is the standardization of several homogeneous "indicators" (i.e. events)

3§ Functionality of the system

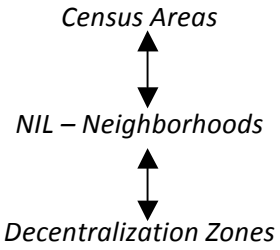
The "risk assessment map" software can provide with different kind of data analysis, through a multi-dimensional approach, which characterizes a complex form of information elaboration.

It is possible to classify the several forms of analysis as follow:
-**Analysis of Indexes**
-**Analysis of Indicators**
-**Dimensional analysis** (SGS: Scheduled Geoprocessing Service)
-**Geographical analysis**

In detail, the **analysis of indexes** is based on a dimensional valuation referred to the statistical variables. Therefore, the interface of the map can be considered a "repository" of the statistical data, which can be object of specific data elaborations and evaluations. For instance, given a certain area (i.e. portion of urban context) of particular interest, it is possible to observe the residential population from different perspectives and on the base of different criteria: e.g. age, ethnic origin, immigration rate, etc.
From a quantitative perspective the population analysis is characterized for the division of the whole data set within 4 categories, to which a specific color has been attributed, to facilitate the visual identification of the several classes. Each category represents a numerical portion of the whole population.

The **analysis of indicators** can be represented in two different ways: i.e. flags or clusters.
Therefore, all the gathered indicators (i.e. events) can be visualized on the software interface, through a geo-localization of the collected data: i.e. it is possible to identify the events at the level of civic number (i.e. flag) or it is possible to have aggregated data, from a general perspective (i.e. cluster), visualizing the "density" of a certain event.
Both the indicators representations, i.e. flag or cluster, are printable or downloadable and there is a selection of file format: i.e. Pdf, CVS, etc.

The **dimensional analysis** is based on the s.c. Scheduled Geoprocessing Service (ie. SGS), which allows an elaboration of the indicators from a dimensional perspective of certain phenomena or events. In fact, every 24 hours the system graphically updates the percentage representation of the risk level referred to each territorial "dimension": through a bottom-up/top-down process, namely from the smaller dimension to the bigger one and *vice versa*. In concrete, on a three dimension scale, according to the Milan urban context:



The software provides for each dimension with the sum of the gathered events (i.e. indicators).
The result is the development of a "Global Index of Critical Events", defined as the synthesis of the indicators dimensional analysis. It is calculated through *ad hoc* algorithms, as it is the result of the normalization of the indexes, calibrated on the predefined homogeneous areas (i.e. Census Areas, NIL - Neighborhoods and Decentralization Zones).

Finally, the **geographical analysis** is the urban assessment from a spatial perspective, based on the interaction between the "static targets" (i.e. "soft and hard" targets) and the "dynamic data" (i.e. indicators). In concrete, considering a static target (e.g. Duomo, Palazzo Marino, bus stop, electrical cabinet, etc.), the software analyses the proximity, in terms of events/indicators gathered in that specific portion of space. In case certain predefined (quantitative and qualitative) limits are overcome, the system shows an Alert on the map interface.
The same spatial approach is applicable in the analysis exclusively referred to the "dynamic data", namely the interaction among indicators (without considering the "static targets"). Thereof, the algorithms of the map elaborate the percentage repetition of a specific indicator on the territory, as well as the interaction from a geographical proximity perspective of different typologies of indicators. Also in this case, when certain predefined (quantitative and qualitative) limits are overcome, the system shows an Alert on the map interface.
In consideration to the importance of the final visual effect of the "risk assessment map", it is relevant to highlight that on the market there is a wide typology of map interfaces, applicable to several technological devices and providing with different kind of algorithms and graphic outputs. Therefore, the ITC experts carefully studied several solutions and already existent map experiences to select the best choice, in light of the final purpose of the present research: i.e. a "risk assessment map" of an urban context.

FURTHER POSSIBLE DEVELOPMENTS OF THE SOFTWARE

The structure and the functions of the software described in the previous paragraphs, can exceedingly be implemented through the development of further system evolutions.
Therefore, it is possible to describe the potentialities of the software, obtainable in light to the modular architecture of the information system, as follow:

- **Integration and analysis of real-time events**: due to its modular design, the system can easily evolve by integrating the reports of events in real time, providing information to analyze (even on a territorial basis) and unleashing a series of actions both in a client interface and also (and above all) to the channels as disparate (e-mail, Tweeter, What's app, etc.).
  This possibility is offered by the new GeoEvent Server extension that allows the user to manage and analyze the geo-localized data stream coming from the various channels (still or moving), integrating real-time analysis functions based on the content and the geo-location, and redirecting information both on GIS analysis and on other channels. In addition to being available many adapters for all standard communication channels, are easily configurable additional adapters for proprietary channels.
- **Analysis based on the definition of "service area"**: for example, the incidence of certain indicators in an area covered within 10 minutes from a location of emergency or from a selected point on the map.
- **Access from Tablet, SmartPhone and PDA**: the data gathering through the use of PDA is the system already tested by the "*Ambrogio*" map in its original version.
- **3D service**: 3D features can be explanted from the analysis of visibility, for example to get the coverage areas of video surveillance cameras: knowing any uncovered areas may suggest a repositioning of the same or the need for new cameras.
- **Creation of video**: ability to export as an AVI video the temporal representation of the indicators through timeline
- **Density analysis**: realization of a continuous surface which shows the concentration of the phenomena (i.e. indicators) in the territory (i.e. point density)
- **Integration with CRM and external data warehouse**: through the adoption of standard architectural technologies, the integration of ArcGIS with Business Intelligence technologies, both in desktop and server environment, is made possible
- **Dedicated areas of the map**: for example the Critical Infrastructures can access with a password to specific part of the map, as they gather sensitive data and the map can offer them the possibility to

manage in a secure "environment" their data, at the same time accessing to a global urban analysis of the data gathered from the several sources involved in the data collection

- **Chronological and time analysis**: it would be possible to implement a system able to develop an historical *excursus* analysis of the events, given a certain period of time *a priori* selected by the user. Furthermore, it would be possible to create a complementary data analysis to the abovementioned approach, in terms of "time range", namely to implement a system able to analyze how a certain phenomenon varies according to the hour/time through the day (e.g. quiet areas during the daytime, may become dangerous/vulnerable areas during the nighttime)
- **Geo-referential calendar of the city events**: the system can be implemented providing with the possibility in sharing information from a logistic perspective of the events that are scheduled in the city (e.g. fairs, cultural or sportive events, art exhibitions, etc.). given a certain event in a certain time/space, the map should allow to analysis the historical set of indicators happened in that location, projecting also statistical data referred to the vulnerabilities that have a higher probability to influence the dynamics of the scheduled big event.
  Similarly, the Calendar would help to improve the operational capability of the involved Municipality and Critical Infrastructures stakeholders, aimed to organize in a more effective way an event (e.g. implementation in terms of number of public transportation vehicles, implementation in terms of human resources of the employees/operators in charge for guaranteeing the security of the venue, etc.)

In conclusion, it is important to underline the final purpose of the software: it is necessary to maximize the integration of the several sources in charge for the data gathering (Local Police, Municipality of Milan, Critical Infrastructures, etc.), to maximize the flexibility of the technological tool, for an effective elaboration of the gathered data.

A complete overall description of the "risk assessment map" software requires to integrate the explanation of the technological component with the "human factor". In fact, the elaboration of data by the software are intended to be completed with a periodical analysis by an Expert Committee, able to provide with expertise the feedback of the data gathered on the map, through a "Think Terrorist" approach, aimed to detect the radicalization processes which can characterize certain urban areas. In few words, the Expert Committee will evaluate "where" there could be a social substrate that can facilitate the development of radicalization phenomena and the "context" in which certain vulnerabilities can easily take root.

Therefore, the Expert Committee aims at overcoming the limited public security forces involvement in the vulnerable phenomena gathering (i.e Local Police), excluding the data collected by Nation Police (i.e. *Polizia di Stato* –PS-), *Carabinieri* (CC) and Fiscal Police (i.e. *Guardia di Finanza* –GdF-). In fact, this Committee is intended to be composed of academic experts, as well as security managers of the Critical Infrastructures, providing with both a theoretical and operational background.

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GLOSSARY

BIG CITY: it refers to a metropolis or a complex urban setting, characterized for a big flow of people living and/or working within a specific urban context.
BIG EVENT: Big Events of mega-events are "large-scale cultural (including commercial and sporting) events which have a dramatic character, mass popular appeal and international significance".
CRITICAL INFRASTRUCTURES: the EU Communication COM(2004) 702 defines Critical Infrastructures as "Those physical and information technology facilities, networks, services and assets which, if disrupted or destroyed, would have a serious impact on the health, safety, security or economic well-being of citizens or the effective functioning of the government Member States".
"EVID DONE" MODEL: it is a risk assessment model based on the "Situational Criminology" by Clarke, characterized for the development of certain features that, the experience and the most diffused literature, recognize as the most determinant aspects that make a certain site/place a potential/privileged target for terrorism.
"Evil Done" is the acronym of a set of features that characterize the potential targets to analyze:
E-exposed; V-vital; I-iconic; L-legitimate; D-destructible; O-occupied; N-near; E-easy
HARD TARGETS: the predominant literature in the terrorism context defines the "hard targets" as those that have a more probability in being object of terrorism attacks, because of the intrinsic nature and function that these kind of targets have within a social context. Usually the hard targets are identified with the Critical Infrastructures. Examples of "hard targets" could be the following: electrical and gas company, public transportation company, water system, train and railway company, etc. (see also "Critical Infrastructure" definition).
INDEX: a theoretical category that serves to guide the observation ("the focus of the observation").
INDICATOR: empirical facts and/or data that serve to measure the extent of a phenomenon ("what we collect").
RISK: the doctrine has not created a unique definition of "risk", since this phenomenon can occur in different contexts and it can be expressed from a wide *spectrum* of phenomena of different nature.
This research defines "risk" as is "the evidence of a (potential or real) threat of damage, injury, liability, loss or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through pre-emptive measures, such as surveillance practices".
RISK ASSESSMENT MODEL: a "model" is a schematic and simplified description of a phenomenon, system or process that accounts for its known or inferred proprieties and may be used for further study of its characteristics (i.e. predictions). Thereof, a "risk assessment model" is a scheme through which it is possible

to analyse a set of phenomena that the experience indentifies as (quantitative and qualitative) highly probable to generate "risk" within a certain context.

RISK MAP: the "risk map" is a cartographic representation of the several vulnerabilities gathered from a certain urban setting. The added value is the fact that the several signals of social uneasiness and criminal phenomena are visually represented on the city map, so that it is possible to have a clear picture of the logistical location of the vulnerabilities. Besides, a cartographic system can facilitate the public institutions in implementing prevention/repression strategies against the most diffused criminal phenomena, as well as to reduce/control the vulnerabilities present in certain areas represented on the map system.

SAFETY AND SECURITY POLICY: the distinction between the two terms "safety" and "security" is always ambiguous, since in many languages there is not a concrete distinction between the two words, as there is only one word to express the both concepts (e.g. German '*Sicherheit*', French '*sécurité*', Italian '*sicurezza*', Spanish '*seguridad*', etc.). In reality the doctrine defines "safety" as 'the condition of being free form harm or risk', which is basically identical to the "security" definition, i.e. 'the quality or state of being free from danger'. But in the case of "security", a further meaning has been developing, more specifically in connection with criminological aspects, i.e. 'the measures taken to guard against espionage or sabotage, crime, attack or escape'.

In light of the pervious premise, the "security and safety policy" is the set of rules and strategies to prevent/repress any form of danger, harm or risk , whatever is the nature of these phenomena.

SOCIAL UNEASINESS: see "vulnerability".

SOFT TARGETS: the predominant literature in the terrorism context defines the "soft targets" as those that have a possibility on the base of the most recent events in being object of terrorism attacks. These targets are defined as "soft" in light of their intrinsic nature and function, since they are not essential for the functioning of a certain urban context and society at large (as it is the case, for instance, of the Critical Infrastructures). Examples of "soft targets" in both public and private sectors, could be the following: hotels, museums, sport stadium, churches and religious sites, art monuments, etc.

TERRORISM: the doctrine has not given an exhaustive and clear definition of "terrorism". In fact, both the U.S.A. and the EU created their own "terrorism" definitions, although the result is for both definitions, a list of behaviours that the experience referrers to terrorism phenomenon.

The main difficulty in defining this complex criminal activity is due to its "dynamic and flexible" capability in adequate its violent strategy to the social, political, religious, historical context of reference. Thereof, the doctrine distinguishes different forms of "terrorism": i.e. religious terrorism, political terrorism, narco-terrorism, environmental terrorism, etc.; furthermore the logistic violent operative capability influences the "terrorism" definition: i.e. national terrorism and international terrorism.

VULNERABILITY: it is a certain phenomena that has negative consequences (social uneasiness) within a certain space (urban setting) from different viewpoints: i.e. social, political, institutional, economical, cultural, religious, etc.

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Appendix I

List of static (i.e. structural) and dynamic data utilized for the 1° test of the software in Milan city.

The list of static/structural demographical data and dynamic indicators/indexes, with respect to the data owners (i.e. public/private entities), that manage the several sets of data:

BASE MAP	DATA OWNERS
DBT 2012	Municipality of Milan (SIT)
Raster 2012	Municipality of Milan (SIT)
Ortophoto 2012	Municipality of Milan (SIT) – license to be bought
Pictometry 2012 (perspective photos)	Municipality of Milan (SIT) – license to be bought
DYNAMIC LAYERS	DATA OWNERS
Census Areas	Municipality of Milan (statistics dept.), ISTAT
NIL – Neighbourhoods	Municipality of Milan (SIT, urbanization dept..)
Decentralization Zones	Municipality of Milan (SIT, decentralization areas)
Sensitive areas (churches, schools, mosques, etc.)	Municipality of Milan (SIT, tourism dept.)
Sensitive areas (gas pipelines, electric cabinets, etc.)	AMSC, FerrovieNord, RFI, A2A, ATM, MM
Services Plan	Municipality of Milan (SIT)
Commercial Activities	Municipality of Milan (SIT, commerce dept.)
CCTV systems and alarms (Municipality ownership)	Local Police (security dept.)
Security CCTV	Local Police, Critical Infrastructures

INDICATORS	DATA OWNERS
CLUSTER 0	
Demographic data	Municipality of Milan (register of birth, marriages and deaths – statistics dept.)
Unemployment rate	Municipality of Milan (statistics dept.), ISTAT
School dropout rate	Municipality of Milan (register of birth, marriages and deaths - statistics dept.), ISTAT, local education office
Immigration rate	Municipality of Milan (register of birth, marriages and deaths – statistics dept.)
Residence and citizenship request	Municipality of Milan, NAGA
NGOs	Municipality of Milan, S.O.C.I. office
Social housing	Aler, Erp, real estate managements association

Social workers	Social workers, Municipality of Milan (welfare dept.), S.E.A.D.
Social workers for minors	Social workers, Municipality of Milan (welfare dept.), S.E.A.D.
Radical meeting points	Internet, associations
Association centres for youths (CAG and CAM)	Municipality of Milan (SIT, statistics dept.)
Reports by the citizens to the local police call-centers	Local police (PL)
Fines made by the local police	Local police (PL)

CLUSTER 0.1	DATA OWNERS
Unauthorized settlements (e.g. Roma camps)	PL, AMSC, FerrovieNord, RFI
Unauthorized houses occupancies	PL, AMSC, council sub-commission for unauthorized occupancies
Unauthorized dump sites	PL, AMSC
Damages of different nature (e.g. vandalism, graffiti)	PL, AMSC, FerrovieNord, RFI, A2A, ATM, MM, SEA
Begging	PL, ATM
Homeless	PL, AMSC, ATM

CLUSTER 1	DATA OWNERS
Proximity with unauthorized camps	PL, AMSC, FerrovieNord, RFI
Stealing of copper, iron, etc.	PL, AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Arson	PL, AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Graffiti	PL, AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Breaking and damages of perimeter walls, gates and enclosures	AMSC, FerrovieNord, RFI, SEA, ATM, MM
Breaking and damages of technological devices	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Stealing of ID badge and documents	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Employees assaults	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Peri-operational surveillance	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Unauthorized parking of vehicles in reserved areas	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Abandoned cars/vehicles	PL, AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Unidentified objects	PL, AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Sabotage against technical devices	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Damages (e.g. electrical cabinets, gas pipelines, manhole cover)	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Suspicious behaviours	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Persons parking, standing or loitering in the same area in a multiple-day period	AMSC, FerrovieNord, RFI, A2A, SEA, ATM, MM
Organized crime	Eurispes

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CLUSTER 2	DATA OWNERS
Unauthorized settlements and occupations	PL
Unauthorized dump	PL
Damages or removed directions signs and/or traffic lights	PL
Threats to public officials	PL
Robberies	PL
Damages against goods and/or properties	PL
Breaking and damages of public security devices (e.g. CCTV)	PL
Insufficient/lack of lighting	PL
Unauthorized vendors	PL
Abandoned cars in specific locations	PL
Vandalism	PL
Food adulteration	PL
Narcotics/drug dealing	PL
Street prostitution	PL
Assaults to public officers	PL
Brawls	PL
Forgery of brands, documents or cars	PL
Pollution and environmental crimes	PL
Gangs	PL
Other necessities of Critical Infrastructures	CIs