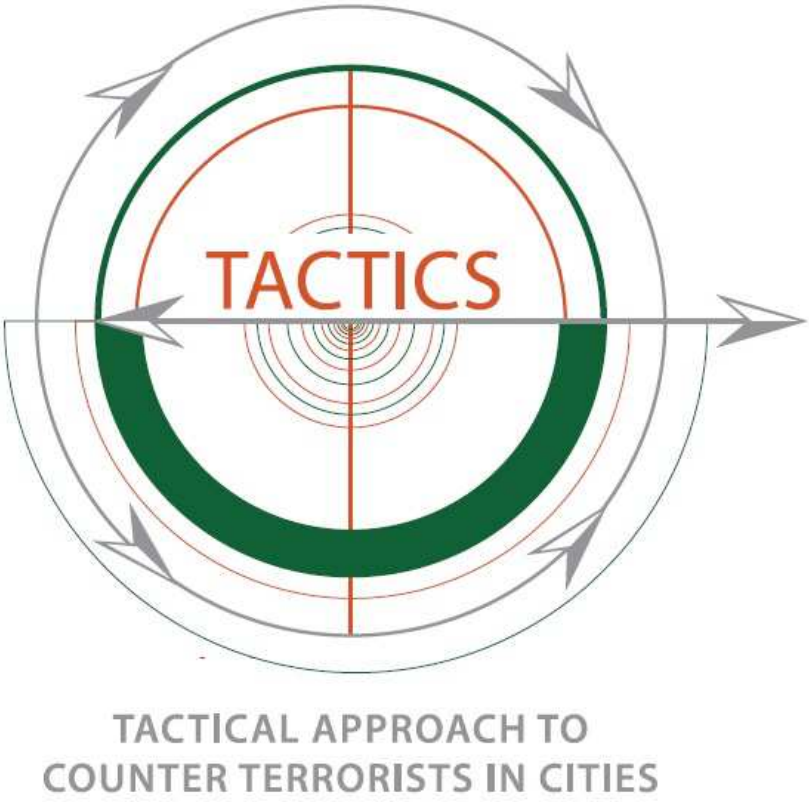
SEVENTH FRAMEWORK PROGRAMME

Collaborative project
Small or medium-scale focused research project
FP7-SEC-2011-1
Grant Agreement no. 285533



TACTICS

Tactical Approach to Counter Terrorists in Cities

Deliverable details	
Deliverable number	D6.4
Title	Information Management tool functional requirements.
Author(s)	UPV
Due date	31.10.2013
Delivered date	30.10.2013 (updated version 11-12-2013)
Dissemination level	PP
Contactperson EC	PO

Cooperative Partners	
1.	UPV
2.	ITTI
3.	FHG
4.	TNO

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Executive Summary

This document collects the Threat Management Tool (TMT) functional requirements, which is the next step for the TMT design and development phase.

The functional requirements stated in this deliverable are based on the general and TMT specific requirements gathered during WP2. Taking this set of requirements as the main input, in D6.4 other technical requirements have been added in order to cover all TMT functionalities stated by the end users and reflected in D3.2 (System architecture).

This set of TMT functional requirements will put the basis for the correct TMT design and development and cover all the TMT functional areas.

The TMT functional requirements are divided into twelve main sections, which encompass all TMT main technical functionalities. These twelve sections are as follows:

1. TMT scalability requirements
2. Threat management and analysis requirements
3. TMT Localization and Identification Requirements
4. TMT Communications/Interoperability Requirements
5. TMT Human Machine Interface Requirements
6. TMT Fusion Unit Requirements
7. TMT Application Requirements
8. TMT Data Logging Requirements
9. TMT GIS Requirements
10. TMT Configuration and Management Requirements
11. TMT Security Requirements
12. Ethical Requirements

These twelve sections cover the main TMT technical functionalities and the accomplishment of these functional requirements will ensure the successful development of TMT during WP6.

1 Introduction

The main TMT functionalities stated during WP2 and WP3 are covered by the functional requirements described in the following sections. These requirements are divided into different sections depending on the part of the TMT they affect.

The main TMT functionalities including the requirements which cover them will be described through several use cases diagrams at the beginning of each section. These use cases diagrams will be part of the design process of the TMT during WP6.

In order to ensure that all these requirements will be implemented during the development phase some traceability matrix will be produced at the end of this phase for showing the accomplishment status of all functional requirements.

The requirements importance and priority has been given following the MoSCoW methodology. **M**o**SC**o**W** stands for: **M**ust (this requirements will be implemented for sure, since it has the higher priority), **S**hould (this requirement should be implemented during the project development phase, since it has the second degree of priority), **C**ould (this requirement could be implemented or not depending on the development performance) and finally **W**ould (this requirement would be implemented if the rest of the requirements with higher priority have been already implemented).

2 TMT Overview

TMT stands for the Threat Management Tool – a part of the TACTICS system. TMT is the application to be used in a LEA control room during counterterrorism operation. Its goal is to support the Threat Manager in his/her duties, namely:

- preventing the attack,
- managing threat
    - finding out what the threat nature is (with help from Threat Decomposition Tool (TDT))
    - finding out the attack target (with help from TDT)
    - using all needed and necessary capabilities (with help from Capability Management Tool)
    - managing capabilities and resources
- gathering and using incoming information from
    - analysts
    - sensors
    - fusion units
    - officers on the street
- managing communication with friendly forces and sensors/resources

3 TMT Limitations and Assumptions

- TMT will be switched on only after attack indication (e.g. from intelligence)
- TMT is not 24/7 system
- TMT will be switched off after the threat is over
- TMT is dedicated for LEA operating in urban environment
- TMT is operated by Threat Manager
    - High-rank officer
    - Has the necessary skills, clearances, training etc.

  - Commands Counter Terrorism operation
- TMT is to be used in command and control (C2) room/space
- TMT should support (not replace) other systems used by LEA to counter terrorist threat in the city
- TMT can be used also by more personnel (than TM) if needed and allowed:
  - Analysts
  - Officers (e.g. to watch/observe specific screens)
- TMT is information management system - its role is to help to better use and understanding the information (about threats, about capabilities, about context, etc.)
- TMT cooperates with CMT and TDT in
  - Automated fashion and/or
  - Non-automated fashion (e.g. TM can talk to capability manager on the phone/face to face)
- TMT is independent on the communication systems used by LEA at given time (TMT is not a communication system – it can work with any system currently used by LEA)
- TMT uses capabilities/resources
  - Operated/used by LEA
  - Within legal regulations in given country
- TMT can use the fusion unit – a fusion engine to fuse information from various sources/capabilities – it is an independent module on the TMT
- TMT can use information from other relevant databases used by LEA (e.g. situational database containing information about events in the city) – such database is independent on the TMT
- TMT does not need a direct link to capability/resource – it needs relevant information (e.g. stream is not needed from the camera – in many cases the textual information from someone operating the camera will be enough)

4 TMT high-level architecture

TMT is a software system to enhance the situational awareness (SA) of commanders in charge of facing a terrorist threat operation. It is a distributed command and control system with specific focus on the threat analysis and its understanding. It can be composed of several nodes that replicate information and knowledge to have a shared situational awareness and a Common Operational Picture (COP). There can be two kinds of nodes: TMT node and on filed units reduced version of the system. Basically composed of a central node, the TMT node, and nodes that run a limited/mobile version of the system, normally will be on field but share a particularized to their needs vision of the COP.

The TMT central node is where the TMT full capabilities are executed: command and control, threat analysis and management and communication with TDT and CMT. It is composed of a three-layered architecture with a high level HMI layer, a core functionalities layer and low level communications layer.

HMI layer is where the HMI and presentation capabilities reside. It is composed of TDT and CMT HMI interfaces as well as a GIS subsystem on top of a GIS abstraction layer (GAL) that encapsulates interfaces for several GIS engines such as Google earth, Google maps, Mapserver, etc.

The TMT core layer is where the main functionalities of the system are managed. It has modules for security and Access control management, database management, high level (ISO/OSI) communication protocols management, video capabilities management, threat analysis and management as well as a mash up module to gather open Access internet data and integrate it in order to enhance TMT users COP.

Low level communications layer abstracts the system communications means and technologies having modules for typical emergency management communications technologies such as: TETRA, TETRAPOL, 802.11, WiMAX, satellite communications, etc.

TMT mobile nodes run a reduced version of TMT system where they have a vision of what is going on at the hot spot, can see sensor data, send and receive messages, etc. This mobile version cannot have access to threat management and analysis capabilities, as well as TDT and CMT communication. The whole TMT architecture can be seen in figure 1

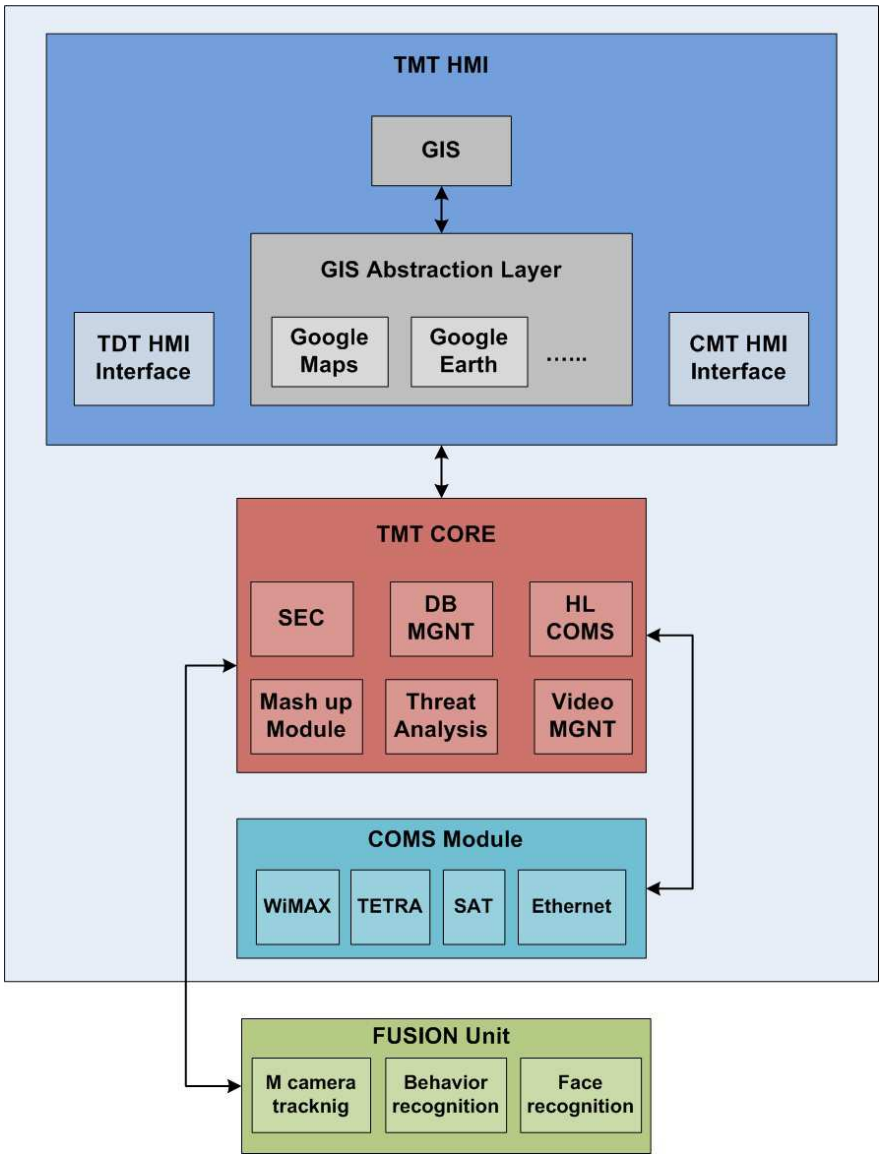

Figure 1 TMT high level architecture

Technical description of components:

- OS supported:
  - Microsoft Windows XP, Windows 7 for main TMT module
  - Windows Mobile/Phone for PDA/Smartphone reduced version
- Programming languages:
  - C++
  - C#
  - Programming environments: .NET 4.0 or higher
- Database engine:
  - MySQL
- FFMPEG video decoders
- Google Earth and google maps APIS
- Mapserver GIS engine
- Google data collection APIs (google places, etc.)

5 TMT general requirements

ID	GEN_REQ#001	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable TM to ask for potential targets or modus operandi. Such questions will be sent to TDT.		
Comment			

ID	GEN_REQ#002	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable TM to ask for capabilities/resources. Such questions will be sent to CMT.		
Comment			

ID	GEN_REQ#003	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable to receive process and display information from TDT.		
Comment			

ID	GEN_REQ#004	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable TM to ask for potential targets or modus operandi. Such questions will be sent to TDT.		
Comment			

ID	GEN_REQ#005	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable to receive, process and display information from CMT		
Comment			

ID	GEN_REQ#006	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable to filter information from TDT (based on TM queries/filters).		
Comment			

ID	GEN_REQ#007	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will enable to filter information from CMT (based on TM queries/filters).		
Comment			

ID	GEN_REQ#008	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will have a portable version for being run by PDAs and smart phones of the units deployed on the field.		
Comment			

ID	GEN_REQ#009	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will have pre-formatted forms to ask for capabilities to the CMT		
Comment			

ID	GEN_REQ#010	Priority (MoSCoW)	M
Source		Version	v4
Description	TMT will use standards for video decoding, GIS, real time scheduling policies and communications protocols		
Comment			

6 TMT scalability requirements

ID	SCAL_REQ#001	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT should be able to track, process and visualize GPS from 500 units in real-time		
Comment			

ID	SCAL_REQ#002	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT should be able to receive and process 500 text messages, streams, other in real-time		
Comment			

ID	SCAL_REQ#003	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT should be able to receive and process information from 100 nodes simultaneously in real-time		
Comment			

ID	SCAL_REQ#004	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT should be able to prepare and send text messages, commands, other in real-time to 500 nodes simultaneously.		
Comment			

ID	SCAL_REQ#005	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT, in a 100 Mbps high bandwidth environment should be able to receive and process 250 real time video flows.		
Comment			

ID	SCAL_REQ#006	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT, in a 1 Mbps or smaller low bandwidth environment should be able to receive and process 10 real time video flows.		
Comment			

For achieving the expected scalability requirements stated above, the minimum hardware characteristics of the TMT server according to some initial tests performed would be as follows:

Mainboard type: D 3009

Chipset: Intel® C202

Processor quantity and type

1 x Intel® Celeron® processor / Intel® Pentium® processor / Intel® Core™ i3 processor / Intel® Xeon® processor E3-1200v2 product family

Processor: Intel® Xeon® processor E3-1240v2 (4C/8T, 3.40 GHz, TLC: 8 MB, Turbo: Yes, 1600 MHz, 69 W)

Memory slots: 4

Memory slot type: DIMM (DDR3)

Memory capacity (min. - max.): 4 GB - 32 GB

Memory protection: ECC

Memory options: 4 GB (1 module(s) 4 GB) DDR3, unbuffered, ECC, 1600 MHz, PC3-12800, DIMM

Interfaces USB 2.0 ports: 9 (2x front, 6x rear, 1x internal for backup device)

Graphics (15-pin): 1 x VGA (ATI ES1000 (64MB) on board)

Serial 1 (9-pin): 1 x RS232

LAN / Ethernet (RJ-45): 2 x Gbit/s Ethernet

Operating ambient temperature: 10 - 35 °C

Operating temperature note: ETSI 300 019-2-3 Class 3.

7 Threat management and analysis requirements

ID	THR_MGMT_REQ#001	Priority (MoSCoW)	S
Source		Version	v1
Description	TMT should enable the possibility to enhance the situation understanding about a threat by providing knowledge generated from heterogeneous internet sources		
Comment			

ID	THR_MGMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v1
Description	Knowledge generation from internet heterogeneous sources will come from sources such as: open Access video flows.		
Comment			

ID	THR_MGMT_REQ#003	Priority (MoSCoW)	S
Source		Version	v1
Description	Knowledge generation from internet heterogeneous sources will come from sources such as: open Access financial transactions such as the ones provided by real state web portals APIS		
Comment			

ID	THR_MGMT_REQ#004	Priority (MoSCoW)	S
Source		Version	v1
Description	Knowledge generation from internet heterogeneous sources will come from sources such as: open Access real time traffic status.		
Comment			

ID	THR_MGMT_REQ#005	Priority (MoSCoW)	S
Source		Version	v1
Description	Knowledge generation from internet heterogeneous sources will come from sources such as: open Access weather forecasts.		
Comment			

ID	THR_MGMT_REQ#006	Priority (MoSCoW)	S
Source		Version	v1
Description	Knowledge generation from internet heterogeneous sources will come from sources such as: open Access commercial and financial facilities location.		
Comment			

8 TMT Localization and Identification Requirements

These requirements cover all location functionalities of the TMT needed for improving the Threat Manager situation awareness. With the accomplishment of these requirements the units, capabilities and potential threats location on the field features will be performed.

The use case diagram representing the actors involved and the TMT location functionalities is shown in the following figure.

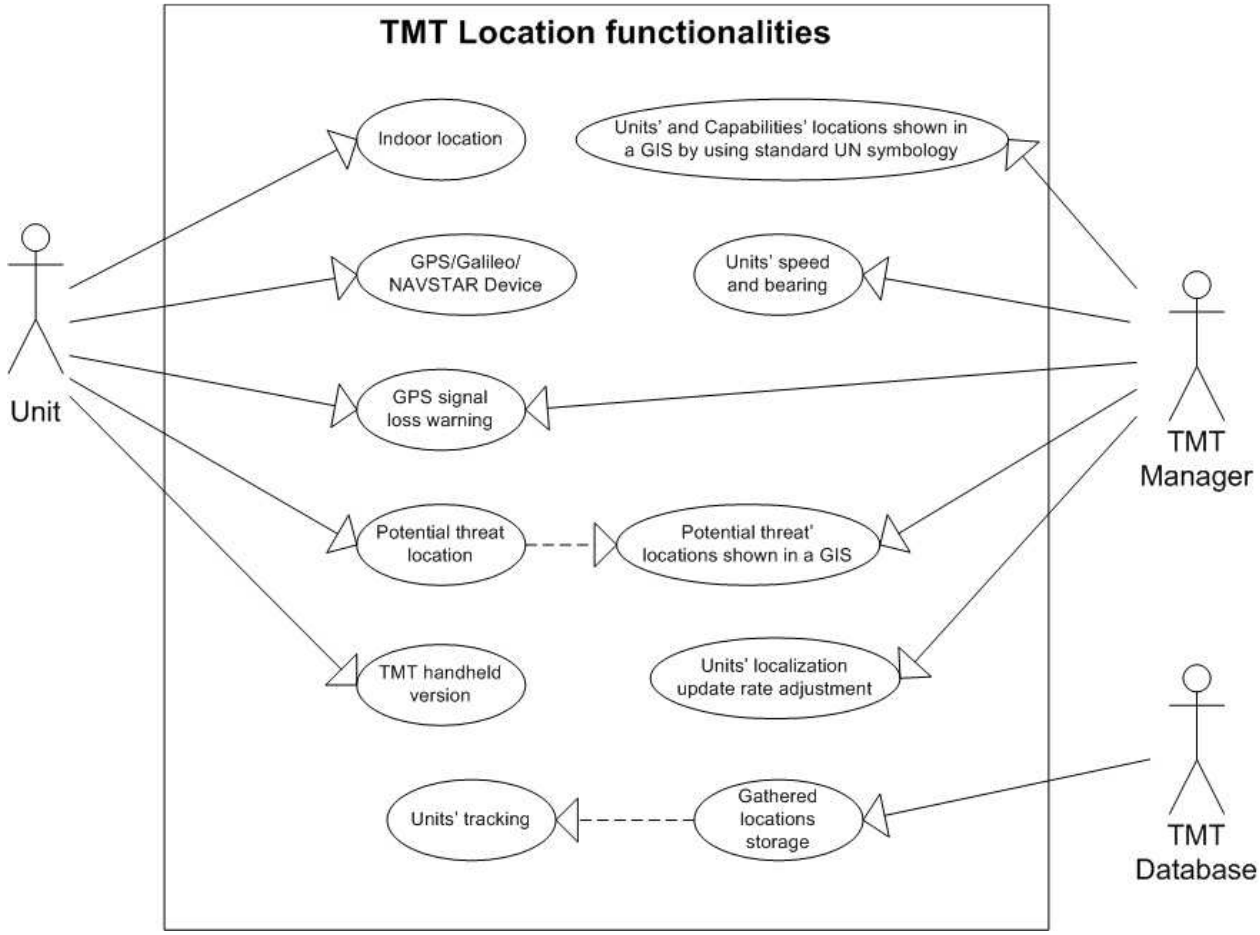

Figure 2 TMT location functionalities use cases diagram

ID	LOC_TMT_REQ#001	Priority (MoSCoW)	M
Source		Version	v3
Description	System will use standard GPS devices.		
Comment			

ID	LOC_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	System will be compliant with NAVSTAR.		
Comment			

ID	LOC_TMT_REQ#003	Priority (MoSCoW)	M
Source		Version	v3
Description	System will be compliant with GALILEO.		
Comment			

ID	LOC_TMT_REQ#004	Priority (MoSCoW)	C
Source		Version	v3
Description	Units speed can be computed from gathered positions.		
Comment			

ID	LOC_TMT_REQ#005	Priority (MoSCoW)	C
Source		Version	v3
Description	Units bearing can be computed from gathered positions.		
Comment			

ID	LOC_TMT_REQ#006	Priority (MoSCoW)	M
Source		Version	v3
Description	Units' localization update rate will be adjusted to get an accurate real-time estimation of the position.		
Comment			

ID	LOC_TMT_REQ#007	Priority (MoSCoW)	M
Source		Version	v3
Description	TM will be able to configure Units' localization update rate.		
Comment			

ID	LOC_TMT_REQ#008	Priority (MoSCoW)	M
Source		Version	v3
Description	In case of a unit GPS signal loss, the operator will be warned with a red circle around the unit icon		
Comment			

ID	LOC_TMT_REQ#009	Priority (MoSCoW)	M
Source		Version	v3
Description	In case of a unit GPS signal recovery, the red circle around the unit icon will disappear.		
Comment			

ID	LOC_TMT_REQ#010	Priority (MoSCoW)	M
Source		Version	v3
Description	Unit GPS signal loss parameter will be configurable by the operator		
Comment			

ID	LOC_TMT_REQ#011	Priority (MoSCoW)	M
Source		Version	v3
Description	Units' gathered positions will be stored in a database.		
Comment	Each unit location gathered will be stored in order to have a log on the unit locations.		

ID	LOC_TMT_REQ#012	Priority (MoSCoW)	M
Source		Version	v3
Description	Units will be represented on GIS using standard United Nations (UN) emergency relief symbology.		
Comment			

ID	LOC_TMT_LOC_REQ#013	Priority (MoSCoW)	S
Source		Version	v3
Description	Geo-located resources and capabilities will be represented on GIS using standard United Nations (UN) emergency relief symbology.		
Comment			

ID	LOC_TMT_REQ#014	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT will allow units to localise visually-contacted potential threats by means of the usage of laser telemeters.		
Comment	This requirement is about potential threats detected by the units on the field. E.g. an abandon backpack. Then the officer locates it remotely through the laser range and this location is marked as a potential threat for the officer.		

9 TMT Communications/Interoperability Requirements

With this set of requirements the main technical functionalities regarding communications and tools interoperability will be covered.

The use case diagram representing the tools (actors) involved and the TMT main communication functionalities is shown in the following figure.

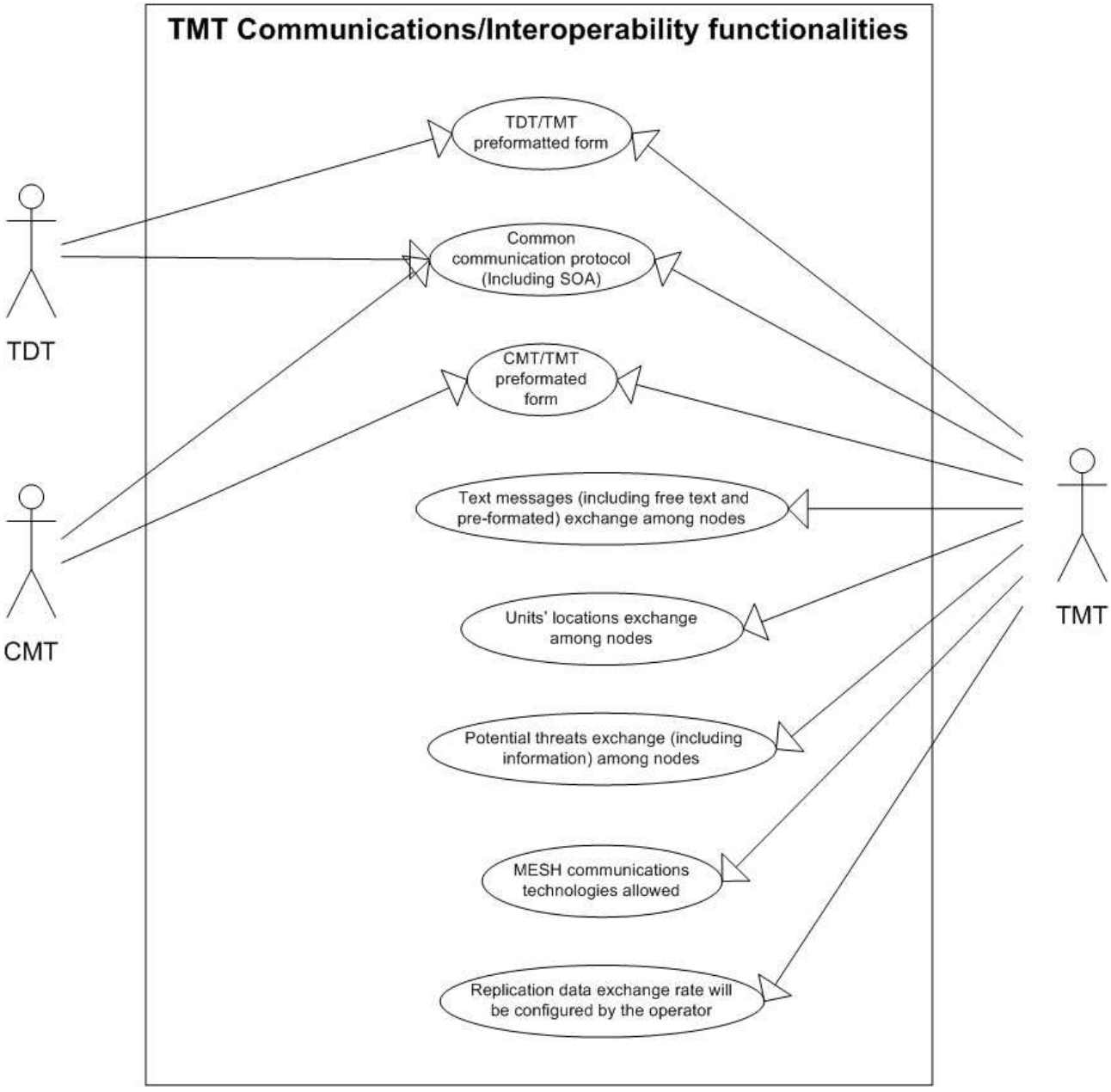

Figure 3 TMT Communication functionalities use cases diagram

ID	COM_TMT_REQ#001	Priority (MoSCoW)	S
Source		Version	v3
Description	Communications protocols used between TMT-CMT and TMT-TDT should be the same in order to simplify system design, management and maintenance of TACTICS system		
Comment			

ID	COM_TMT_REQ#002	Priority (MoSCoW)	S
Source		Version	v3
Description	Communications protocols with TDT will use SOA architectures capabilities.		
Comment			

ID	COM_TMT_REQ#003	Priority (MoSCoW)	S
Source		Version	v3
Description	Communications protocols with CMT will use SOA architectures capabilities.		
Comment			

ID	COM_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	v3
Description	Communications with TDT manager will be performed through a preformatted form which includes a free text field for further refinements.		
Comment			

ID	COM_TMT_REQ#005	Priority (MoSCoW)	M
Source		Version	v3
Description	Communications with CMT manager will be performed through a preformatted form which includes a free text field for further refinements.		
Comment			

ID	COM_TMT_REQ#006	Priority (MoSCoW)	S
Source		Version	v3
Description	TMT communication protocols should allow the exchange of information about the potential threats among TMT central node and on-field officers mobile system version (Mobile reduced capabilities TMT version)		
Comment	(mobile command posts, both rear and vehicle, as well as PDA or smartphones for operatives on field)		

ID	COM_TMT_REQ#007	Priority (MoSCoW)	S
Source		Version	v3
Description	TMT communications protocols should allow the exchange of preformatted text messages among TMT central node and on-field officers mobile system version (Mobile reduced capabilities TMT version)		
Comment	(mobile command posts, both rear and vehicle, as well as PDA or smartphones for operatives on field)		

ID	COM_TMT_REQ#008	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT communications protocols should allow the exchange of free text messages among nodes		
Comment	(mobile command posts, both rear and vehicle, as well as PDA or smartphones for operatives on field)		

ID	COM_TMT_REQ#009	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT communications protocols should allow the exchange of units location among nodes		
Comment	(mobile command posts, both rear and vehicle, as well as PDA or smartphones for operatives on field)		

ID	COM_TMT_REQ#010	Priority (MoSCoW)	M
Source		Version	v3
Description	System will allow the use of mesh networking (basically for on-field units)		
Comment			

ID	COM_TMT_REQ#011	Priority (MoSCoW)	M
Source		Version	v3
Description	Replication data protocols will take into account the underlying network capabilities.		
Comment	For instance, in on-field communications, in order to avoid data loss, aspects as packet loss effects reduction should be considered.		

ID	COM_TMT_REQ#012	Priority (MoSCoW)	M
Source		Version	v3
Description	Replication data exchange rate will be configured by the operator (advanced user profile).		
Comment			

10 TMT Human Machine Interface Requirements

This set of requirements covers all TMT Human Machine Interface (HMI) functionalities stated by the end users during WP2.

The use case diagram representing the actors involved and the TMT main HMI functionalities is shown in the following figure.

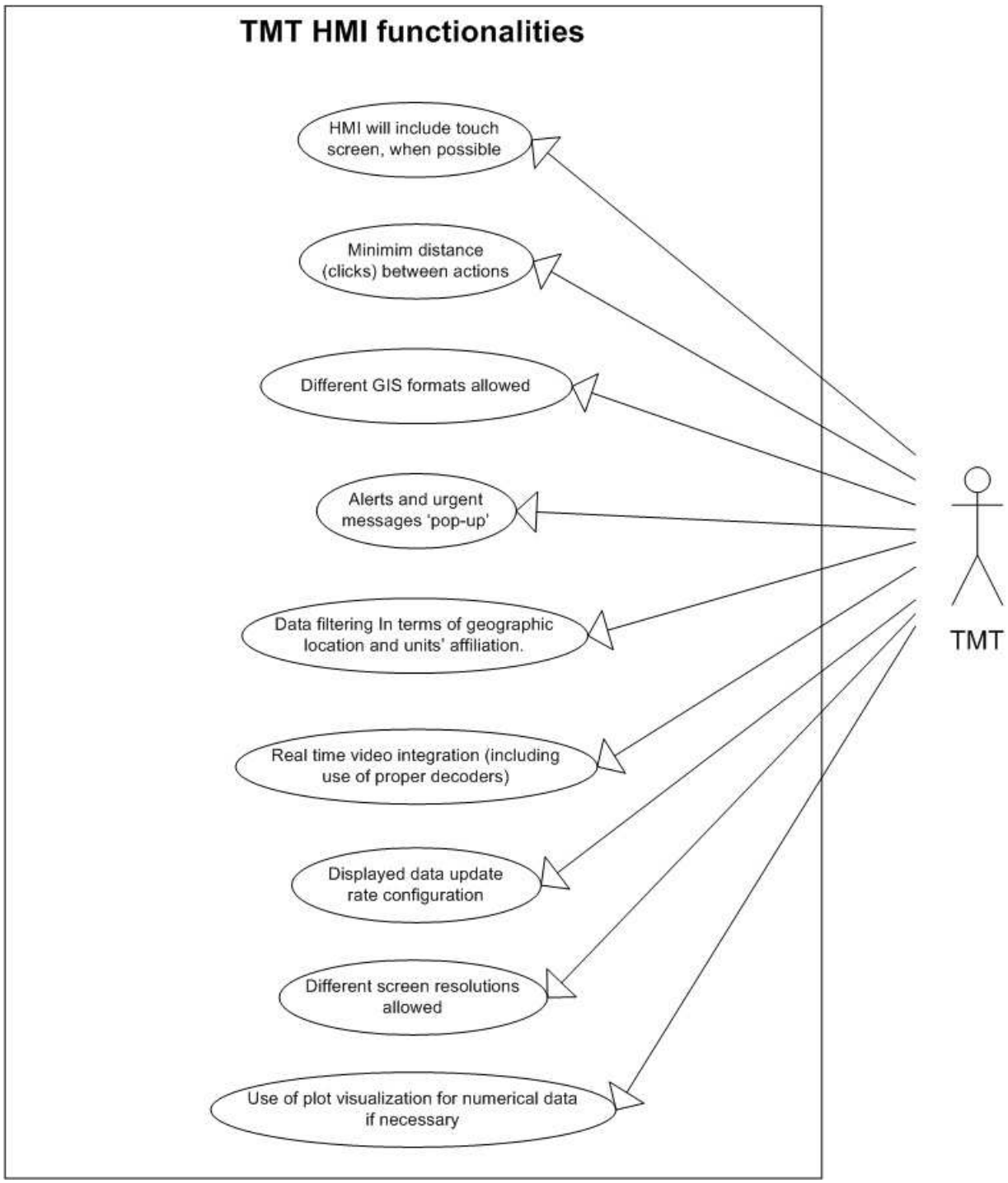

Figure 4 TMT HMI functionalities use cases diagram

ID	HMI_TMT_REQ#001	Priority (MoSCoW)	C
Source		Version	v3
Description	HMI will work on touch screen if needed		
Comment			

ID	HMI_TMT_REQ#002	Priority (MoSCoW)	S
Source		Version	v3
Description	Any action will be done in no more than 4 steps (Clicks)		
Comment			

ID	COM_TMT_REQ#003	Priority (MoSCoW)	C
Source		Version	v3
Description	Any action will be done in 3 steps (Clicks) in average		
Comment			

ID	HMI_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	v3
Description	HMI language will be English.		
Comment			

ID	HMI_TMT_REQ#005	Priority (MoSCoW)	S
Source		Version	v3
Description	HMI design should be able to use ESRI GIS		
Comment			

ID	HMI_TMT_REQ#006	Priority (MoSCoW)	S
Source		Version	v3
Description	HMI design should be able to use Google earth GIS		
Comment			

ID	HMI_TMT_REQ#007	Priority (MoSCoW)	S
Source		Version	v3
Description	HMI design should be able to use MAPSERVER GIS		
Comment			

ID	HMI_TMT_REQ#008	Priority (MoSCoW)	S
Source		Version	v3
Description	There should be an option to maximize the GIS display by hiding buttons, screens and menus so that hot-spot map occupies the overall screen.		
Comment			

ID	HMI_TMT_REQ#009	Priority (MoSCoW)	C
Source		Version	v3
Description	Alerts should ‘pop-up’ on the operators’ attention at any moment.		
Comment	E.g. Potential terrorist detected in the attached location		

ID	HMI_TMT_REQ#010	Priority (MoSCoW)	C
Source		Version	v3
Description	Urgent messages should ‘pop-up’ on the operators’ attention at any moment.		
Comment	E.g. Send more units to the following location.		

ID	HMI_TMT_REQ#011	Priority (MoSCoW)	C
Source		Version	v3
Description	TMT operators could have the option to filter data to be shown on screen by geographic location.		
Comment			

ID	HMI_TMT_REQ#012	Priority (MoSCoW)	C
Source		Version	v3
Description	TMT operators could have the option to filter data to be shown on screen by units' affiliation.		
Comment			

ID	HMI_TMT_REQ#013	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow real time video integration from fixed cameras		
Comment			

ID	HMI_TMT_REQ#014	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow real time video integration from operatives attached cameras.		
Comment	(e.g. to the helmets of the deployed units).		

ID	HMI_TMT_REQ#015	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow real time video integration from operatives vehicle attached cameras.		
Comment			

ID	HMI_TMT_REQ#016	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow the integration of MPEG-4 Part2 decoder.		
Comment			

ID	HMI_TMT_REQ#017	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow the integration of H.264 decoder.		
Comment			

ID	HMI_TMT_REQ#018	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow the integration of windows Media Video decoder.		
Comment			

ID	HMI_TMT_REQ#019	Priority (MoSCoW)	M
Source		Version	v3
Description	Displayed data update rate will be configurable by an advanced operator profile on a special screen in the configuration interface of the HMI..		
Comment			

ID	HMI_TMT_REQ#020	Priority (MoSCoW)	S
Source		Version	v3
Description	System should work properly in different screen resolutions like 800x600.		
Comment			

ID	HMI_TMT_REQ#021	Priority (MoSCoW)	S
Source		Version	v3
Description	System should work properly in different screen resolutions like 1024x768.		
Comment			

ID	HMI_TMT_REQ#022	Priority (MoSCoW)	S
Source		Version	v3
Description	System should work properly in different screen resolutions like 1920x1080.		
Comment			

ID	HMI_TMT_REQ#023	Priority (MoSCoW)	W
Source		Version	v3
Description	System will show cursor coordinates at any time.		
Comment			

ID	HMI_TMT_REQ#024	Priority (MoSCoW)	S
Source		Version	v3
Description	System should allow the plot visualization of numerical data.		
Comment	If, for instance, sensor measurements are given in such a format and this approach enhances information and situation understanding.		

11 TMT Fusion Unit Requirements

This set of requirements covers all TMT Fusion unit functionalities stated by the end users during WP2.

The use case diagram representing the actors involved and the TMT main Fusion unit functionalities is shown in the following figure.

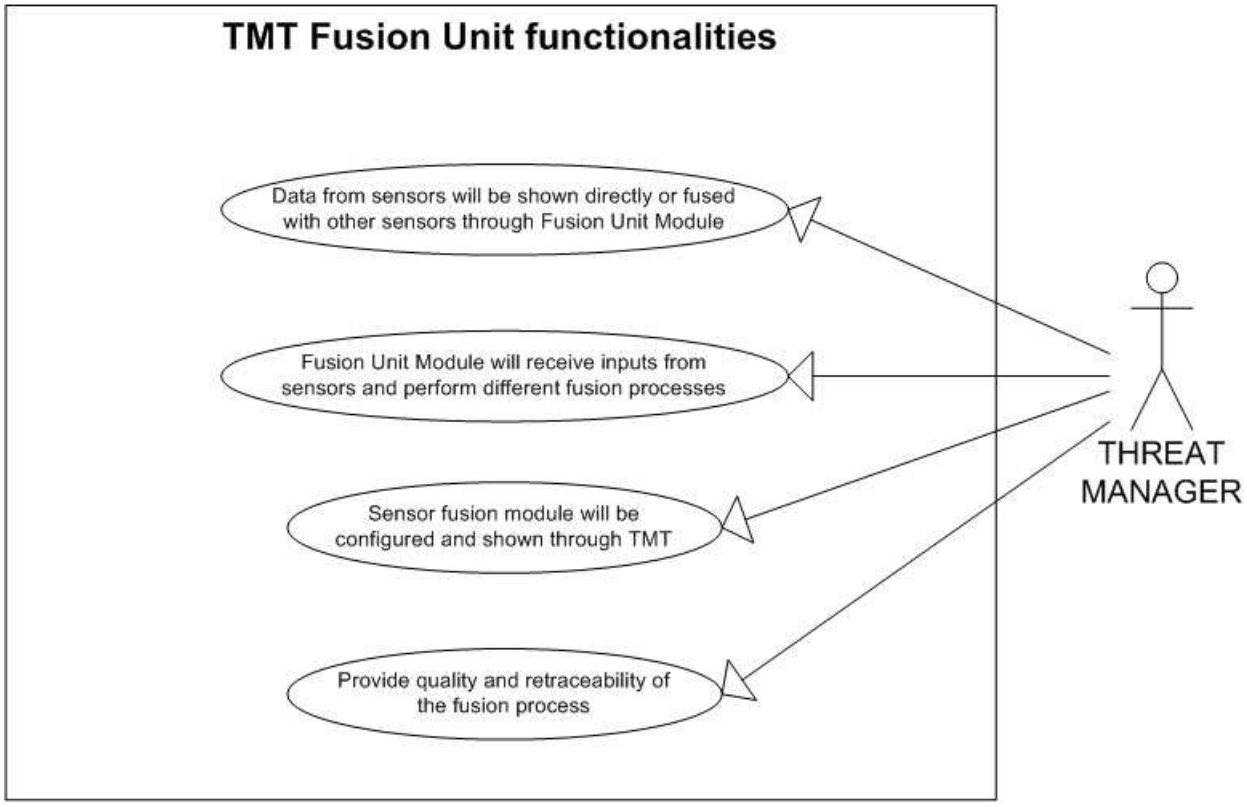

Figure 5 TMT Fusion unit functionalities use cases diagram

ID	FU_TMT_REQ#001	Priority (MoSCoW)	S
Source		Version	v3
Description	Data from sensors will be able to be shown directly at the TMT in a specific screen.		
Comment			

ID	FU_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	Fusion Unit Module will receive inputs directly from sensors and perform different fusion processes offering the results of these processes to the TMT as enhanced information.		
Comment			

ID	FU_TMT_REQ#003	Priority (MoSCoW)	S
Source		Version	v3
Description	Sensor fusion module will be configured through TMT.		
Comment			

ID	FU_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	V1
Description	Sensor Fusion approach must be re-traceable		
Comment	This means that on request the user gets all information required to assess whether the fusion makes sense.		

ID	FU_TMT_REQ#005	Priority (MoSCoW)	S
Source		Version	V1
Description	Information on the fusion quality should be provided		
Comment	e.g., reliability of fused data should be provided		

ID	FU_TMT_REQ#006	Priority (MoSCoW)	M
Source		Version	V1
Description	Ethical and juridical restrictions must be shown to the end user.		
Comment			

ID	FU_TMT_REQ#007	Priority (MoSCoW)	W
Source		Version	V1
Description	A two key policy would be used for ethical related actions		
Comment	if a specific action must made BUT there's a further clearance order (send UAVs, do something very invasive) the clearance is given by others through code.		

12 TMT Application Requirements

This set of requirements covers all functionalities of the application layer of the TMT. The main TMT application functionalities and communications methods among the different managers of TACTICS system are stated in this section.

The use case diagram representing the actors involved and the TMT main application functionalities is shown in the following figure.

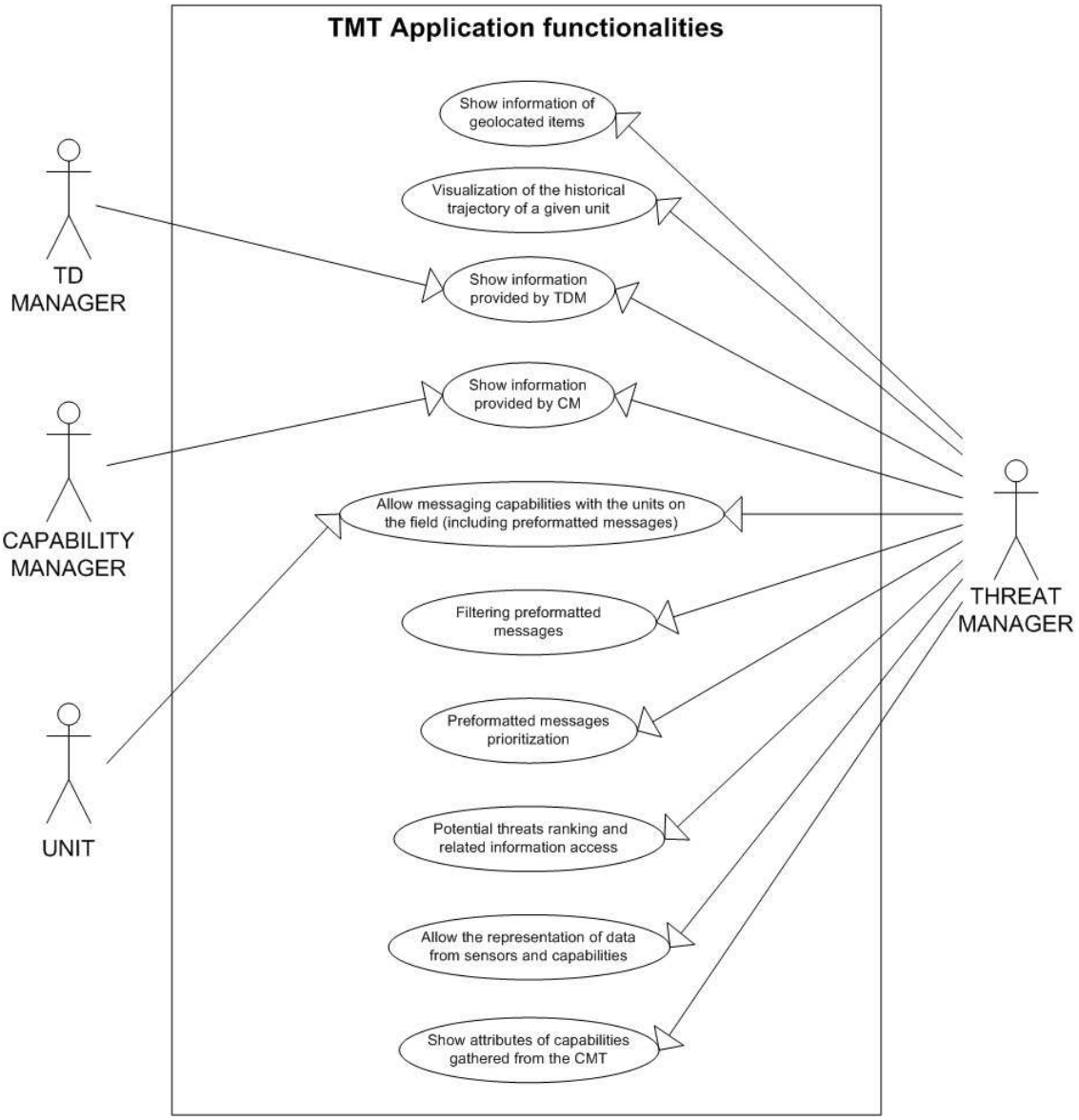

Figure 6 TMT Application functionalities use cases diagram

ID	APP_TMT_REQ#001	Priority (MoSCoW)	S
Source		Version	v3
Description	System should provide associated information of geo located elements involved in an operation.		
Comment	For instance when click on the icon of a unit appears the number of the unit, his rank and his phone number for contacting him if necessary.		

ID	APP_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	TM will ask to the TDT different modus operandi expected in relationship with the threat information received by means of preformatted form.		
Comment			

ID	APP_TMT_REQ#003	Priority (MoSCoW)	M
Source		Version	v3
Description	TM will ask for different capabilities the CMT in relationship with the threat information received by means of preformatted form.		
Comment	These capabilities could be number of agents in the surroundings of each target (including location information if available), location of the available cameras in each area (including access to the video flow if available), possibility of using aerial means (helicopter, UAV, etc.) and so on. Communication should be by means of preformatted forms.		

ID	APP_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	v3
Description	System will allow messaging capabilities from/to nodes in the hot-spot.		
Comment			

ID	APP_TMT_REQ#005	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT will allow the filtering of messages.		
Comment			

ID	APP_TMT_REQ#006	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT will allow operators to define sets of users to whom send what.		
Comment			

ID	APP_TMT_REQ#007	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages should be orders from the commanders to the operatives.		
Comment			

ID	APP_TMT_REQ#008	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages should be reports from the operatives to the commanders.		
Comment			

ID	APP_TMT_REQ#009	Priority (MoSCoW)	M
Source		Version	v3
Description	TMT System will allow access to information from TDT regarding threats.		
Comment			

ID	APP_TMT_REQ#010	Priority (MoSCoW)	M
Source		Version	v3
Description	System will allow potential threats ranking.		
Comment			

ID	APP_TMT_REQ#011	Priority (MoSCoW)	S
Source		Version	v3
Description	TMT should prioritize messages delivered to operators.		
Comment	The factor to look for in prioritization should be key indicators and their weights. (E.g. if a preformatted message with 3 options marked has more priority that one with only one option marked)		

ID	APP_TMT_REQ#012	Priority (MoSCoW)	M
Source		Version	v3
Description	System must allow the location and representation of potential threats (on the GIS) as well as associated information. By clicking on potential threat symbol, the system will lead the user to an extra information screen.		
Comment	The main threat would be the information provided by intelligence (e.g attack with bomb to a church). On the other hand, potential threats associated to this main threat could be a van parked in the entrance of the church, a backpack abandoned in the back door of the church, and so on ...		

ID	APP_TMT_REQ#013	Priority (MoSCoW)	M
Source		Version	v3
Description	System must allow the representation of sensor data (geo-located) as well as associated information.		
Comment	By clicking on sensor symbol, the system will lead the user to an extra information screen.		

ID	APP_TMT_REQ#014	Priority (MoSCoW)	M
Source		Version	v3
Description	System will allow the representation of data from capabilities, such as video flows or availability of actuating resources.		
Comment	CMT should provide the link to those resources.		

ID	APP_TMT_REQ#015	Priority (MoSCoW)	M
Source		Version	v3
Description	Include attributes of capabilities gathered from the CMT		
Comment	(E.g. time to arrival or reliability). Use these attributes to let TMT manager understands situation at a glance.		

ID	APP_TMT_REQ#016	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages will have information regarding time of generation.		
Comment			

ID	APP_TMT_REQ#017	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages will have information regarding sender.		
Comment			

ID	APP_TMT_REQ#018	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages will have information regarding destination.		
Comment			

ID	APP_TMT_REQ#019	Priority (MoSCoW)	S
Source		Version	v3
Description	Messages will have information regarding the location of the sender when sent.		
Comment			

ID	APP_TMT_REQ#020	Priority (MoSCoW)	C
Source		Version	v3
Description	Potential threats will have information regarding time of generation.		
Comment			

ID	APP_TMT_REQ#021	Priority (MoSCoW)	C
Source		Version	v3
Description	Potential threats will have information regarding sender.		
Comment			

ID	APP_TMT_REQ#022	Priority (MoSCoW)	S
Source		Version	v3
Description	Potential threats will have information regarding the potential threat kind.		
Comment			

ID	APP_TMT_REQ#023	Priority (MoSCoW)	S
Source		Version	v3
Description	Potential threats will have information regarding the location of the sender when sent.		
Comment			

ID	APP_TMT_REQ#024	Priority (MoSCoW)	S
Source		Version	v3
Description	Potential categories of threat will be configured by an administrator profile user.		
Comment			

ID	APP_TMT_REQ#025	Priority (MoSCoW)	S
Source		Version	v3
Description	Potential categories of the threat will be disseminated off-line by means of their embedding in the Mission file (see requirement CFG_TMT_REQ#002).		
Comment			

ID	APP_TMT_REQ#026	Priority (MoSCoW)	C
Source		Version	v3
Description	Potential threat can be free text data inserted by operatives with attached multimedia material, mainly, photos and videos		
Comment			

ID	APP_TMT_REQ#027	Priority (MoSCoW)	C
Source		Version	v3
Description	Video sources, as well as other sensors, will be managed by TMT and CMT		
Comment	CMT will provide the capabilities (video sources, sensors and so on) location and how to access them and the TMT will use and display the video flows and gather the data.		

ID	APP_TMT_REQ#028	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the visualization of the historical trajectory of a given unit from data recorded at the database.		
Comment			

13 TMT Data Logging Requirements

This set of requirements will cover all TMT logging functionalities for having a detailed report of all actions taken during the operations. These functionalities were highly valuated by the end users during WP2.

The use case diagram representing the actor involved and the TMT main logging functionalities is shown in the following figure.

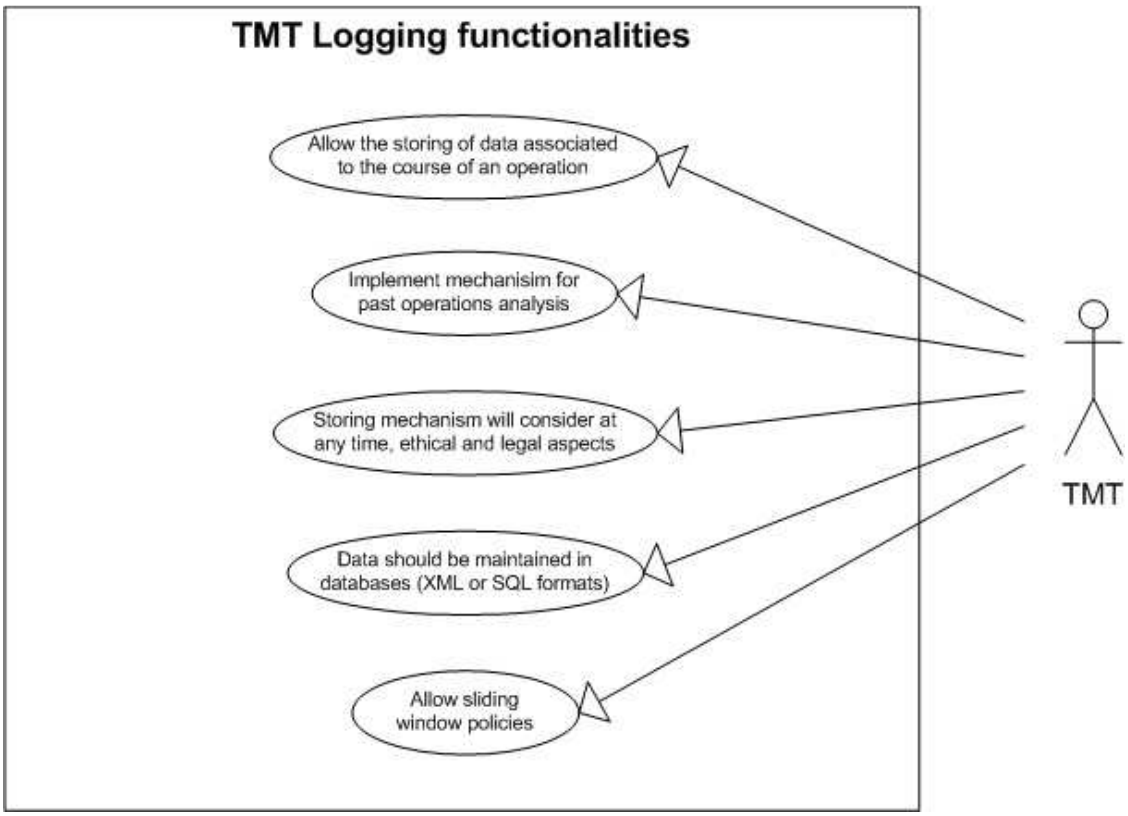

Figure 7 TMT Logging functionalities use cases diagram

ID	LOG_TMT_REQ#001	Priority (MoSCoW)	M
Source		Version	v3
Description	System will allow the storing of data associated to the course of an operation in corresponding databases		
Comment			

ID	LOG_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	System will implement a mechanism for tracking and afterwards reproducing units past movements for forensic and ‘post-mortem’ operation analysis.		
Comment			

ID	LOG_TMT_REQ#003	Priority (MoSCoW)	M
Source		Version	v3
Description	Database storing mechanism will consider at any time, ethical and legal aspects to protect citizen's privacy.		
Comment			

ID	LOG_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	v3
Description	When exporting data from databases to files, recommended formats must be XML.		
Comment			

ID	LOG_TMT_REQ#005	Priority (MoSCoW)	M
Source		Version	v3
Description	When exporting data from databases to files, recommended formats must be SQL		
Comment			

ID	LOG_TMT_REQ#006	Priority (MoSCoW)	M
Source		Version	v3
Description	When exporting data from databases to files, recommended formats must be JSON		
Comment			

ID	LOG_TMT_REQ#007	Priority (MoSCoW)	M
Source		Version	v3
Description	System can log everything on sliding window policies which can be implemented for efficiency and storage consumption reduction.		
Comment	For instance only log last 30 minutes.		

14 TMT GIS Requirements

This set of requirements groups the main requirement regarding the kind of GIS necessary for covering all user requirements related with the units' location and maps layering.

The use case diagram representing the actor involved and the TMT main GIS functionalities is shown in the following figure.

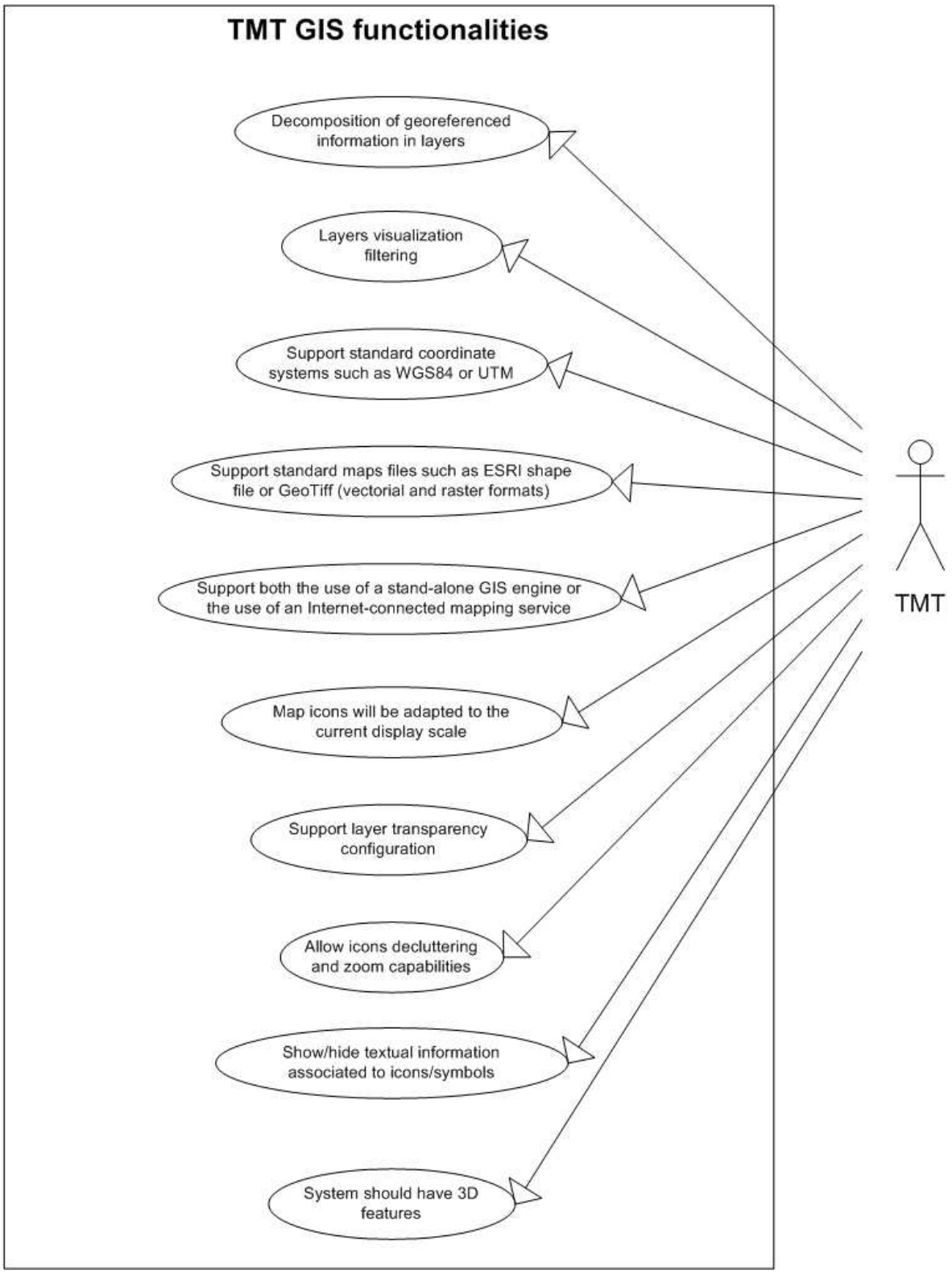

Figure 8 TMT GIS functionalities use cases diagram

ID	GIS_TMT_REQ#001	Priority (MoSCoW)	S
Source		Version	v3

Description	Enable decomposition of geo-referenced information into subsets following a layered approach to show information and the resources they have available.
Comment	For instance, all the cameras in an area as a layer, another layer with all the public (open, no permission needed) cameras, etc. Then, if needed, TMT requests the proprietary (for instance a private bank who owns several security cameras) to let him see those that were not available.

ID	GIS_TMT_REQ#002	**Priority (MoSCoW)**	M
Source		**Version**	v3
Description	System will allow simple configuration of map layers		
Comment			

ID	GIS_TMT_REQ#003	**Priority (MoSCoW)**	M
Source		**Version**	v3
Description	System will be compliant with Open Geospatial Consortium (OGC) standards WMS, WFS and WCS GIS standard.		
Comment			

ID	GIS_TMT_REQ#004	**Priority (MoSCoW)**	M
Source		**Version**	v3
Description	System will be compliant with ESRI (*Enviromental Systems Research Institute*) shapeFile GIS standard.		
Comment			

ID	GIS_TMT_REQ#005	**Priority (MoSCoW)**	M
Source		**Version**	v3
Description	System will be compliant with GeoTiff GIS standard.		

Comment	

ID	GIS_TMT_REQ#006	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System should support WGS84 latitude/longitude coordinate system (the one that commercial GPS use)		
Comment			

ID	GIS_TMT_REQ#007	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System should support Universal Transversal Mercator (UTM) coordinate system		
Comment			

ID	GIS_TMT_REQ#008	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System will be able to use a stand-alone GIS engine with no Internet connection such as ESRI or Mapserver		
Comment			

ID	GIS_TMT_REQ#009	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System will be able to use an Internet-connected mapping service such as Google Earth/Maps API, OpenstreetMap, etc.		
Comment			

ID	GIS_TMT_REQ#010	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	Mapping file formats should be, at least, vectorial and raster.		

Comment	

ID	GIS_TMT_REQ#011	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	On the GIS representation there should be a scale to show current map dimensions and zoom level.		
Comment			

ID	GIS_TMT_REQ#012	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	Map icons and symbols should be enlarged or reduced to fit current display scale.		
Comment			

ID	GIS_TMT_REQ#013	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	Depending on the operative mode, user can center the map on a particular units or geo-located item (such as a sensor or a camera).		
Comment			

ID	GIS_TMT_REQ#014	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	Layers transparency should be adjusted by the operator.		
Comment			

ID	GIS_TMT_REQ#015	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	A decluttering mechanism will be implemented.		

Comment	

ID	GIS_TMT_REQ#016	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	User can permanently center the map on a particular unit or moving feature so that the map moves instead of the unit.		
Comment			

ID	GIS_TMT_REQ#017	**Priority (MoSCoW)**	C
Source		**Version**	v3
Description	System could show textual information associated to icons/symbols, mainly unit/element names.		
Comment			

ID	GIS_TMT_REQ#018	**Priority (MoSCoW)**	C
Source		**Version**	v3
Description	Textual information associated to icons/symbols should not disrupt proper visualization of data on the GIS. If required by user, textual data can be removed from the GIS by clicking on a button.		
Comment			

ID	GIS_TMT_REQ#019	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System will have typical GIS capabilities such as zoom in, zoom out, etc. Always depending on what the underlying GIS engine provides.		
Comment			

ID	GIS_TMT_REQ#020	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System will have typical GIS measuring capabilities such as linear distance		

	measurement, area measurement, etc
Comment	

ID	GIS_TMT_REQ#021	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System should have a 3D view of the area.		
Comment			

ID	GIS_TMT_REQ#022	**Priority (MoSCoW)**	S
Source		**Version**	v3
Description	System should have 3D models of the buildings and features of the area.		
Comment			

15 TMT Configuration and Management Requirements

This set of requirements pay attention to the TMT configuration functionalities. This way the configuration functionalities will accomplish the user needs on this matter.

The use case diagram representing the actor involved and the TMT configuration functionalities is shown in the following figure.

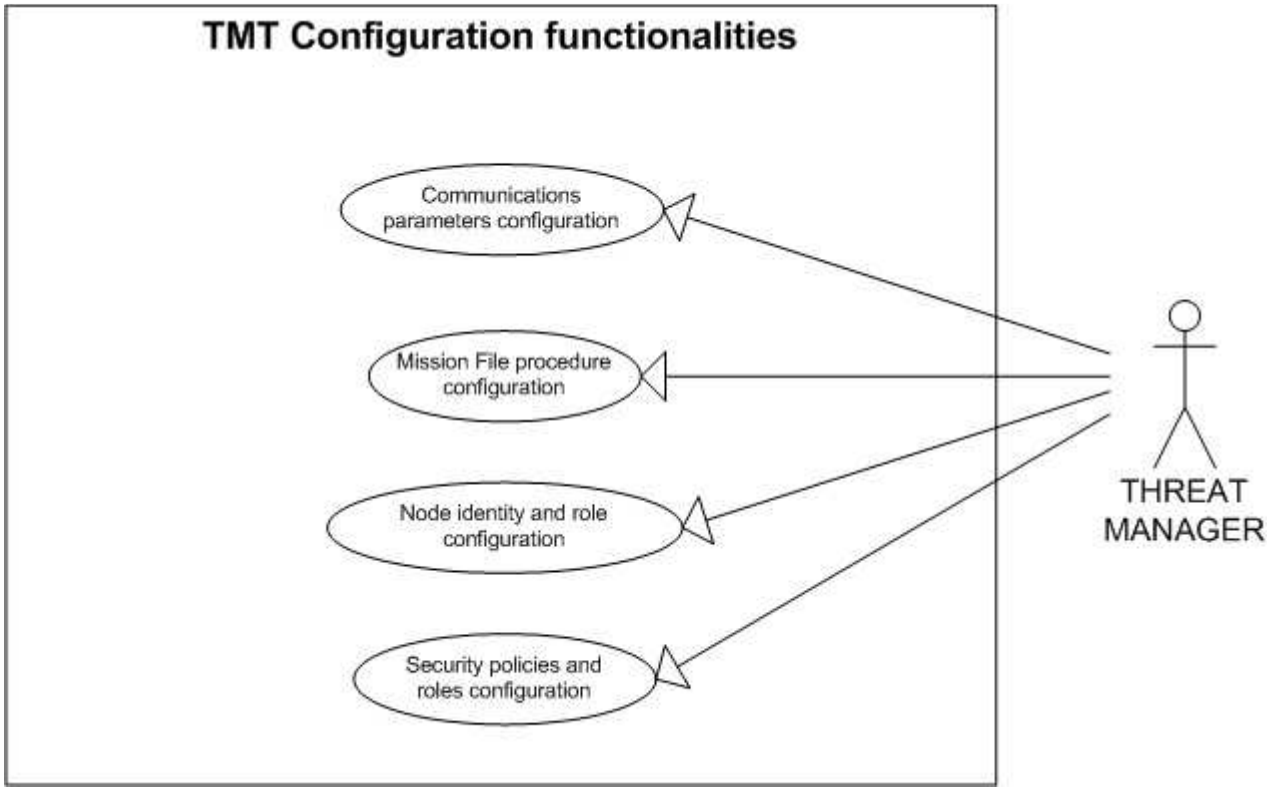

Figure 9 TMT Configuration functionalities use cases diagram

ID	CFG_TMT_REQ#001	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the configuration of communications parameters such as IP address, ports, etc.		
Comment			

ID	CFG_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the configuration of a Mission File procedure.		
Comment	That ‘Mission File’ (hereinafter MF) should contain relevant information for the current operation as well as the identification of the current node, relevant communications parameters, etc.		

ID	CFG_TMT_REQ#003	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the configuration of node identity and role.		
Comment			

ID	CFG_TMT_REQ#004	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the configuration of security policies and roles.		
Comment			

16 TMT Security Requirements

This last set of functional requirements will cover all TMT security related issues for protecting and secure the system.

The use case diagram representing the actor involved and the TMT security functionalities is shown in the following figure.

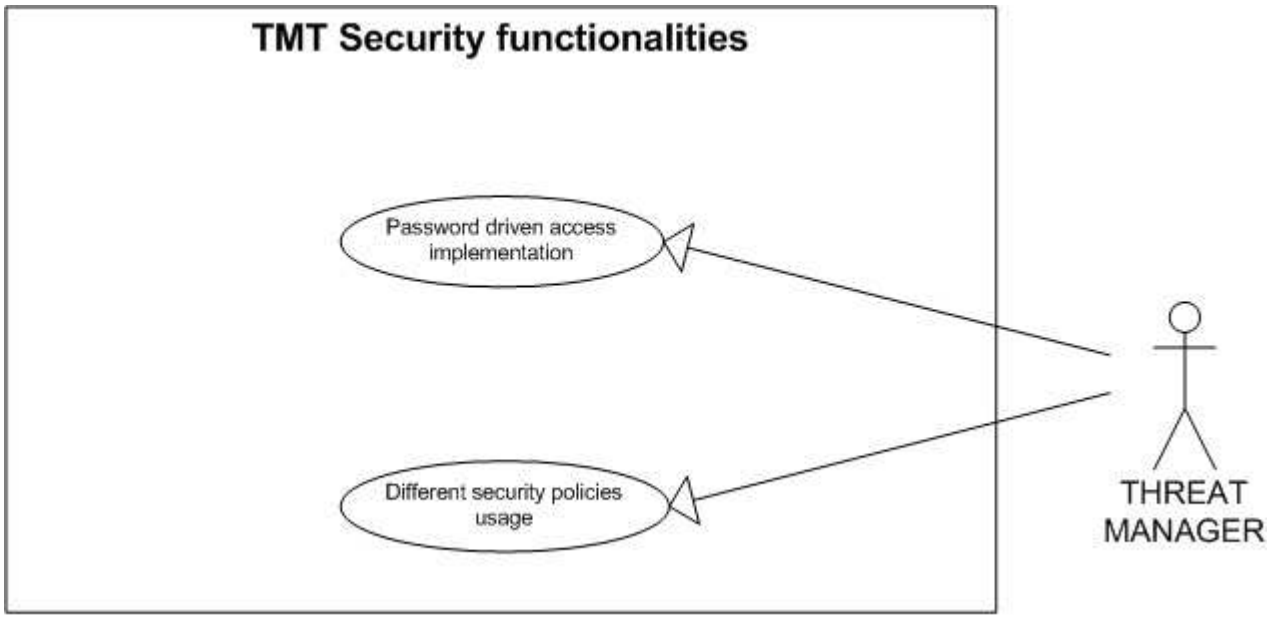

Figure 10 TMT Security functionalities use cases diagram

ID	SEC_TMT_REQ#001	Priority (MoSCoW)	M
Source		Version	v3
Description	System should allow the usage of security policies.		
Comment			

ID	SEC_TMT_REQ#002	Priority (MoSCoW)	M
Source		Version	v3
Description	Password driven access should be implemented if required.		
Comment			

17 Ethical Requirements

In this section are referenced all ethical related requirements stated in different sections of this document.

FU_TMT_REQ#014
LOG_TMT_REQ#003

18 Requirements traceability matrices

Traceability matrices are typically used (also in R&D projects) in order to track specified user requirements during the development process (through all involved WPs) and to ensure the completeness of solutions and products in relation to defined scope of work.

The final result will be a set of traceability matrices which will track and assess the status of the user requirements.

The methodology for performing the different traceability matrices will be the following:

- Mapping the more prioritize functional requirements (priority= Must and Should) on TMT (to be done in D6.4)
- Description of the different test cases (Functional TMT uses cases) which involve the developments performed on TMT (to be done in D6.4).
- Once each test case had been described, the functional use cases will be introduced in the traceability matrix in order to match up which TMT functional requirements have been accomplished by each functional use cases (to be done in D6.4 and D6.5).
- Finally, at the end of the matrix will be stated the status of the requirement development, since this procedure will be performed at month 14 of the project (D6.4) and at the end of the project (D6.5). In the midterm revision some of the functional requirements will not be completely developed and therefore its status will be pending (D6.4 and D6.5).

18.1 TMT functional requirements tracking

The mapping of TMT functional requirements against the main TMT functionalities is presented inTable 1.

Table 1: TMT functional requirements Mid Term Traceability matrix

Req ID	Priority	Location Funct.	Communication Funct.	HMI Funct.	Fusion U. Funct.	Application Funct.	Logging Funct.	GIS Funct.	Configuration Funct.	Security Funct.	Status
LOC_TMT_REQ#001	M	√									Done
LOC_TMT_REQ#004	M	√									Pending
LOC_TMT_REQ#007	M	√									Done
LOC_TMT_REQ#008	M	√									Done
LOC_TMT_REQ#009	M	√									Done
LOC_TMT_REQ#010	M	√									Done
LOC_TMT_REQ#011	M	√									Done
LOC_TMT_REQ#012	M	√									Done
LOC_TMT_REQ#013	S	√									Done
LOC_TMT_REQ#014	M	√									Done
COM_TMT_REQ#001	S		√								Pending
COM_TMT_REQ#002	S		√								Pending
COM_TMT_REQ#003	S		√								Pending
COM_TMT_REQ#004	M		√								Pending
COM_TMT_REQ#005	M		√								Pending
COM_TMT_REQ#006	S		√								Pending
COM_TMT_REQ#007	S		√								Done
COM_TMT_REQ#008	M		√								Done
COM_TMT_REQ#009	M		√								Pending
COM_TMT_REQ#010	M		√								Done
COM_TMT_REQ#011	M		√								Pending
COM_TMT_REQ#012	M		√								Pending
HMI_TMT_REQ#002	S			√							Pending

HMI_TMT_REQ#004	**M**			√							Pending
HMI_TMT_REQ#005	**S**			√							Pending
HMI_TMT_REQ#006	**S**			√							Done
HMI_TMT_REQ#007	**S**			√							Done
HMI_TMT_REQ#008	**S**			√							Done
HMI_TMT_REQ#013	**S**			√							Pending
HMI_TMT_REQ#014	**S**			√							Done
HMI_TMT_REQ#015	**S**			√							Done
HMI_TMT_REQ#016	**S**			√							Done
HMI_TMT_REQ#017	**S**			√							Pending
HMI_TMT_REQ#018	**S**			√							Pending
HMI_TMT_REQ#019	**M**			√							Done
HMI_TMT_REQ#020	**S**			√							Done
HMI_TMT_REQ#021	**S**			√							Done
HMI_TMT_REQ#022	**S**			√							Done
HMI_TMT_REQ#024	**S**			√							Pending
FU_TMT_REQ#001	**S**				√						Pending
FU_TMT_REQ#002	**M**				√						Pending
FU_TMT_REQ#003	**S**				√						Pending
FU_TMT_REQ#004	**M**				√						Pending
FU_TMT_REQ#006	**S**				√						Pending
FU_TMT_REQ#005	**M**				√						Pending
APP_TMT_REQ#001	**M**					√					Pending
APP_TMT_REQ#002	**S**					√					Pending
APP_TMT_REQ#003	**S**					√					Pending
APP_TMT_REQ#004	**S**					√					Pending
APP_TMT_REQ#005	**S**					√					Pending
APP_TMT_REQ#006	**S**					√					Done
APP_TMT_REQ#007	**S**					√					Pending
APP_TMT_REQ#008	**S**					√					Done

APP_TMT_REQ#009	**S**					√					Done
APP_TMT_REQ#010	**M**					√					Pending
APP_TMT_REQ#011	**M**					√					Pending
APP_TMT_REQ#012	**M**					√					Pending
APP_TMT_REQ#013	**M**					√					Pending
APP_TMT_REQ#014	**S**					√					Pending
APP_TMT_REQ#015	**M**					√					Pending
APP_TMT_REQ#016	**M**					√					Pending
APP_TMT_REQ#017	**S**					√					Done
APP_TMT_REQ#018	**S**					√					Done
APP_TMT_REQ#019	**M**					√					Pending
APP_TMT_REQ#022	**M**					√					Pending
APP_TMT_REQ#023	**M**					√					Pending
APP_TMT_REQ#024	**M**					√					Pending
APP_TMT_REQ#025	**M**					√					Pending
APP_TMT_REQ#028	**S**					√					Done
LOG_TMT_REQ#001	**M**						√				Pending
LOG_TMT_REQ#002	**M**						√				Pending
LOG_TMT_REQ#003	**M**						√				Pending
LOG_TMT_REQ#004	**M**						√				Done
LOG_TMT_REQ#005	**M**						√				Done
LOG_TMT_REQ#006	**M**						√				Done
LOG_TMT_REQ#007	**M**						√				Pending
GIS_TMT_REQ#001	**S**							√			Pending
GIS_TMT_REQ#002	**M**							√			Pending
GIS_TMT_REQ#003	**M**							√			Pending
GIS_TMT_REQ#005	**M**							√			Done
GIS_TMT_REQ#006	**M**							√			Done
GIS_TMT_REQ#007	**S**							√			Done
GIS_TMT_REQ#008	**S**							√			Done

GIS_TMT_REQ#009	**S**							√			Pending
GIS_TMT_REQ#010	**S**							√			Pending
GIS_TMT_REQ#011	**S**							√			Done
GIS_TMT_REQ#012	**S**							√			Pending
GIS_TMT_REQ#013	**S**							√			Done
GIS_TMT_REQ#014	**S**							√			Pending
GIS_TMT_REQ#015	**S**							√			Done
GIS_TMT_REQ#016	**S**							√			Pending
GIS_TMT_REQ#019	**S**							√			Done
GIS_TMT_REQ#020	**S**							√			Pending
GIS_TMT_REQ#021	**S**							√			Done
GIS_TMT_REQ#022	**S**							√			Pending
CFG_TMT_REQ#001	**M**								√		Done
CFG_TMT_REQ#002	**M**								√		Pending
CFG_TMT_REQ#003	**M**								√		Pending
CFG_TMT_REQ#004	**M**								√		Pending
SEC_TMT_REQ#001	**M**									√	Pending
SEC_TMT_REQ#002	**M**									√	Pending

19 Conclusions

In this document the main functional requirements of the TACTICS Threat Management Tool (TMT) are stated based on the deliverable 2.2, and the technical functionalities stated by the end users during WP2.

To ensure the traceability of the requirements throughout the project an approach and respective a tool, i.e, traceability matrix has been used.

The mid-term traceability matrix is included in this report (Section 2.1). In this mid-term matrix the current status of the more important requirements (those under “Must” and “Should” priority) is shown along with the functionality that each requirement affects.

The final traceability matrix stating the final status of these requirements will be included in D6.5 at the end of WP6.

The whole set of functionalities of TMT has been grouped into eleven main functional areas which covers all technical necessities for facing a terrorist threat by the security forces such as in the control room as on the field.

20 References

[1] http://www.volere.co.uk/index.htm,last visited 29.01.2013

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