



INDIGO

Crisis Management Solutions

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<i>Abstract</i>	
<p>This report concludes the INDIGO project which has been carried out between May 2010 and May 2013.</p>	

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	Name	Company	Date	Signature
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1 Executive summary

Although, in many ways, modern European society has never been safer, a number of natural and man-made disasters still strike. These include storms, fires, flooding, industrial accidents and terrorist attacks.

Urban and industrial areas are most vulnerable when disaster strikes owing to a combination of dense populations, main infrastructures and complex built-up environments. This makes designing effective emergency plans, training security organisations and managing crises particularly challenging.

Building on the success of an earlier EU-funded research project, 'Innovative training and decision support for emergency operations' (INDIGO) sought to revolutionise the way in which cross-border crises and threats are handled.

INDIGO's solution enables multiple operational from different organisations, crisis managers as well as first responders to exercise simultaneously in the real site, share information, tactical intelligence and mine horizontal and vertical relations, between different command centres and field units.

The solution includes a tool for training personnel, planning operations and facilitating joint crisis management across organisations and nations. Based upon the analysis of various stakeholders' detailed needs, the project researched, developed, tested and validated a prototype version of the system.

INDIGO enhances the capacity of crisis responders to understand real or simulated incidents they are facing and respond, thanks to improved communication channels and anticipated scenarios based on early-warning signals. The system has proven so effective that the consortium is already in talks to commercialise it. INDIGO can also be adapted and added to by third parties.

The INDIGO project aims to research, develop and validate an innovative system integrating the latest advances in Virtual Reality and Simulation in order to homogenize and enhance both the operational preparedness and the management of an actual complex crisis. The INDIGO system enables:

- the 3D interactive and realistic visualization of the complete crisis environment, including data coming from the field, simulation results, and building interiors;
- the creation and simulation of different evolving scenarios for planning, training, and anticipating future states and impending developments during operations, and the analysis of events after the crisis;
- the simultaneous training of decision makers, crisis managers as well as first responders that will be influenced by the simulated scenario and that will reciprocally influence its evolution;
- the involvement of multiple participants, thanks to its distributed architecture, while offering a unique pictorial way of sharing and communicating complex knowledge across organizational boundaries.

In addition, INDIGO proposes a European emergency symbology reference for 2D/3D maps. This will fill an important gap by offering a common visual reference that can be used across Europe to facilitate the immediate understanding of the situation, thus improving decision making across organizational boundaries. The definition of the functional specifications of the system has been driven by the analysis of the needs of real end-users participating in the project as partners or involved in the User Group. These organizations have tested and validated the outcomes of the project with two real-world practical scenarios. More information at <http://indigo.diginext.fr>

2 Summary Description

Modern societies have experienced a spate of catastrophic events in recent years. Terrorist attacks (London, Madrid, Mumbai), factory explosions (Enschede, Toulouse), floods and storms (Louisiana) – these are but a few examples of crises and disasters that threaten the security, prosperity and well being of citizens. Urbanised areas are especially vulnerable to the onset of crises and disasters. The combination of dense population concentrations (35M in Tokyo, 10M in Paris) and complex architectural environments makes it very hard to anticipate, prepare for and manage the impact of natural, industrial or man-made incidents. The recent crises have demonstrated the inherent difficulties that urban safety and crisis managers face when a large-scale disaster threatens an urban environment. **In this ever-changing environment, it is hard to design proper emergency plans, to train security organisations and effectively handle crisis management procedures.**

Therefore, it is essential for public authorities to better plan and train organisations and crisis managers and to provide relevant systems for complex crisis management across organisational and geographic boundaries. This is no easy task, as research has shown. New approaches and technologies should therefore be researched and developed to serve these critical needs.

Based on both the experience and results of the CRIMSON (Crisis Management Simulation) project, funded by the European Commission in the frame of the Preparatory Action for Security Research, and drawing on the consortium's extensive expertise in crisis management, the INDIGO consortium has identified a strong need for an innovative and unified approach extending and broadening the advances of CRIMSON to the entire security field in order to enhance planning, training and crisis management operations. Indeed, CRIMSON produced a critical breakthrough by enabling the simulation of urban crises for the purpose of enhancing operational preparedness. However, this system is limited to the training of crisis managers, in outdoor environments, without connection to physical simulation or the possibility to involve field staff forces.

INDIGO aims to provide a revolutionary solution that will enable inter-organisational preparation and response to transboundary crises and disasters, in any environment. INDIGO will allow for inter-organisational exercising, information sharing and analysis – mining both horizontal and vertical relations. With regard to the latter, the relation between central command centres and field units is traditionally underdeveloped, both before and during crises. First responders are insufficiently involved in large-scale strategic exercises because these are very complex and expensive to organise and manage.

The proposed system proves an **essential and integrated tool for training personnel, planning operations, and facilitating crisis management and co-operation across organisations and nations**. It enables users to:

- display and manipulate an operational representation of the situation that is as complete and as easy to understand as possible, for indoor and outdoor situations;
- simulate different evolving scenarios for planning, training, and anticipating future states and impending developments during operations, and analyse events after the crisis;
- involve first responders and emergency field units in simulated exercises;
- enhance the work across organisational boundaries and decision levels.

Since the project began, the consortium has met with users (both within and outside of the user group) to determine the requirements of the system. Based on those requirements and the vision of the partners, specifications were designed and development on the system has begun. Moreover, three major project milestones have proven the efficiency and usefulness of the INDIGO system, respectively the Beta validation, the Final validation and the Final Dissemination event. End users within and outside the user group benefited from these training sessions based on tailored scenarios. Thanks to the fruitful experiences which showed the work and integration achieved, commercial discussions are already in progress.

3 Main S&T results

The INDIGO project's main objective is to develop a novel system to improve crisis management and crisis training. This objective has been reached and the system has proven its efficiency through three major validation milestones, where in average 20 consortium external end users have effectively achieved operational training with mainly the INDIGO system. Much effort has been put on the integration of all the scientific and technological results into a single system. This has been particularly appreciated by end users as there is a unique and coherent interaction with the system.

Nevertheless, the system can be subdivided into 10 technological elements, namely:

1. The INDIGO Framework;
2. The INDIGO Network;
3. The INDIGO Desktop Tool;
4. The INDIGO Field Mobile;
5. The INDIGO Advanced Scenario Creation Tool;
6. The INDIGO Map Table;
7. The INDIGO Whiteboard;
8. The INDIGO TransporTable;
9. The INDIGO 3DNSite Generator and Viewer;
10. The INDIGO European Emergency Symbol Set.

Each of these technological elements are described in the subsections below.

3.1 The INDIGO Framework

The INDIGO SDK is a C++ SDK which enables developers to customize the INDIGO crisis management and training application. This framework includes:

- the visualization and interactive edition of a synchronized Common Operational Picture made of a 2D/3D maps and a dashboard, with information notification and filtering capabilities, which allow crisis managers to exchange main crisis information in a centralized system with a clear view of the current situation in a world scale 3D environment;
- an integrated audio and video conferencing system which enables an easy communication with distant sites;
- a walky-talky communication mechanism with multiple communication channels, which replicates the usual mean of audio communication in crisis management, with log features;
- an integrated messages system which enables one to exchange textual information without opening external messaging applications;
- a media news component, which enables trainers to make use of journalism solicitation to crisis responders, as they have to frequently conduct press conferences;
- a 3DNSite controller mechanism, which allows users to operate the 3DNSite application directly within the INDIGO 2D Maps component, thus centralizing all the visualization control in the same window;

- a Live Virtual Constructive client component which enables trainees to receive situational awareness information;
- scenario and exercise creation means, which enables trainers to create the necessary scenario elements to conduct an exercise and the situation;
- the INDIGO European Emergency Symbology, which enables EU crisis managers to communicate Maps information in a common language.

Through a simple and clear API, all of these components can be controlled and customized. This framework is an excellent basis for the creation of tailored crisis management applications. As an example, the INDIGO Desktop Tool, Map Table, Whiteboard, Field Mobile and Advanced Scenario Creation Tool are build upon this framework, as shown in Figure 1.



Figure 1. The INDIGO components and main user interface of the Framework.

3.2 The INDIGO Network

The INDIGO Network enables multiple trainees and trainers to simply share information and communicate via an audio and video conferencing system. This is made available through reliable web services and all Common Operational Picture information are stored in a cloud database. This system has been made flexible enough to deploy either in a local area network or in world area network. Moreover, to enable communication in a crisis situation when almost no network is available, many optimizations have been applied which allow users to exchange information in network critical situations. The INDIGO Network architecture is shown in Figure 2.

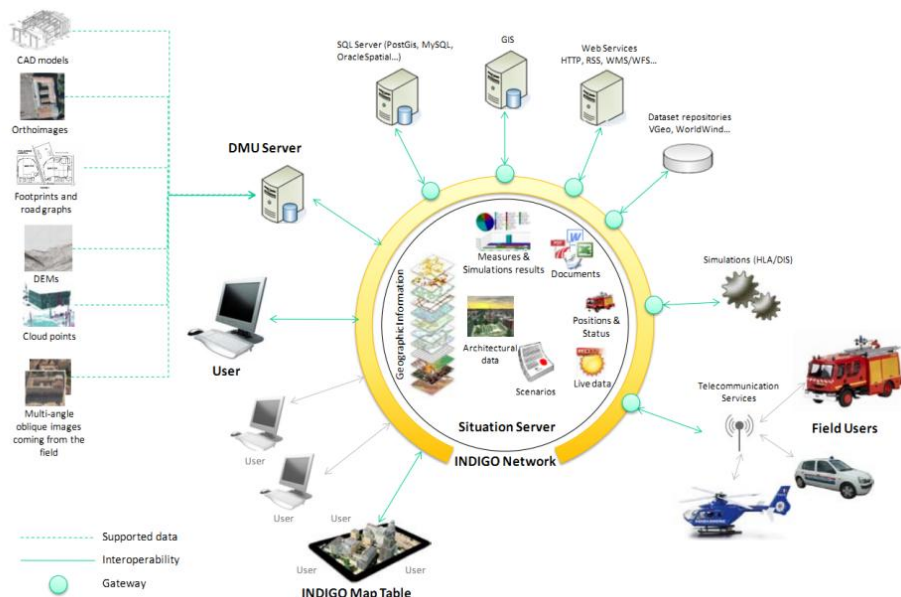


Figure 2. The INDIGO Network architecture.

3.3 The INDIGO Desktop Tool

The INDIGO Desktop tool is a customized version of the INDIGO Framework tailored for computer and laptop needs. Focus has been made on mouse and keyboard interactions where dedicated user interfaces allow an intuitive manipulation of the entire application. This tool is a perfect solution for trainers to create the necessary scenario elements and to observe the trainees performance. This tool is shown in Figure 3.



Figure 3. The INDIGO Desktop Tool.

3.4 The INDIGO Field Mobile

The INDIGO Field Mobile is a lightweight immersive device which enables operational in a crisis response situation to share with and receive information from other crisis responders. Moreover, in a training environment, this device creates a distant connection between the trainers and the trainees, for example to communicate the current state of the exercise. This enables trainers to stay at a fixed position while being able to monitor and control more trainees. In addition, this Field Mobile coupled with the Advanced Scenario Creation Tool enables trainees to receive contextual information with respect of their current state (e.g. location) predefined by the trainer in a Live Virtual Constructive approach. For example, trainees will be able to see the incident they are supposed to face, or acknowledge their current life status being affected by a nearby catastrophe. This tool is meant for first responders who could benefit from the smaller form factor and the longer battery life provided by a handheld device, as shown in Figure 4.

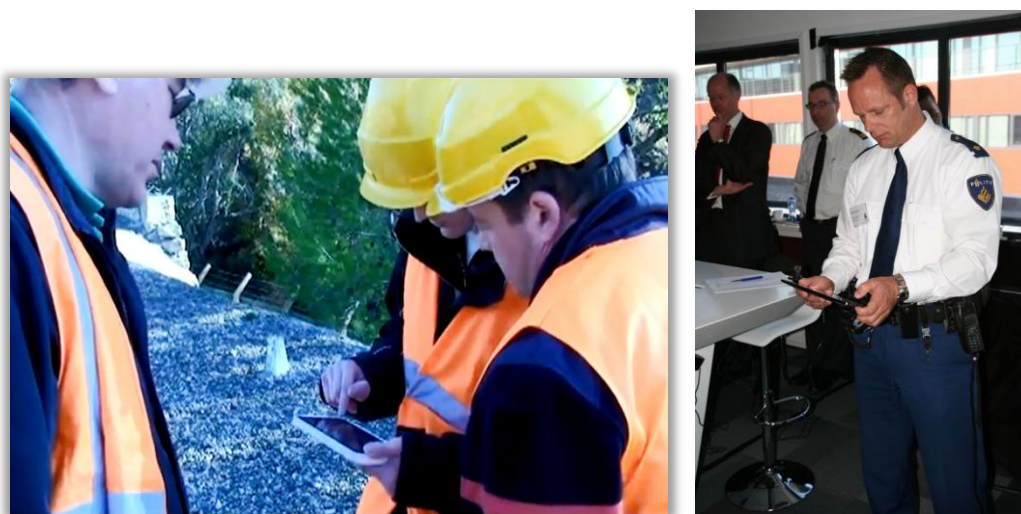


Figure 4. The INDIGO Field Mobile in action.

3.5 The INDIGO Advanced Scenario Creation Tool

The INDIGO Advanced Scenario Creation Tool enables trainers to create a simulated scenario environment which evolve through time with respect of the trainees actions. The simulation automatically sends information to the trainees in a Live-Virtual Constructing manner, relieving the trainer from tedious tasks and letting him focus on the trainees' performance. Trainees in the field receive situational context information prepared by the trainer that is generated with respect of their current situation. Examples are situational context videos and virtual sensors. Disasters implying crisis management or training on the field often cover large geographical areas. However, simulated 3D environments are often restricted to relatively small and closed areas because of technical difficulties. A technological breakthrough has been made by bringing a small scale scenario editor to a world scale Live-Virtual-Constructive scenario approach, enabling world-wide scaled scenario with contextual information sent to crisis trainees on the field thanks to their connection to the INDIGO network with the INDIGO Field Mobile device. Visual immersive information is generated with respect to the current crisis status and is sent to trainees. Moreover, a virtual sensor measure system enables trainers to create virtual dangerous zones evolving over time. Trainees are then able to make use of a virtual sensor. Depending on their location, which can be real or teleported, the sensor will measure and display different values. A screenshot of the definition of an major explosion in a building in the Advanced Scenario Creation Tool is shown in Figure 5.

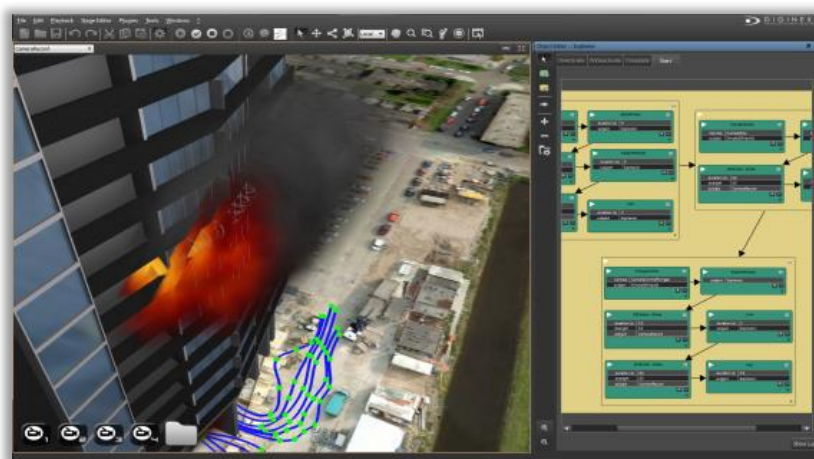


Figure 5. The INDIGO Advanced Scenario Creation Tool.

3.6 The INDIGO Map Table

The INDIGO Map Table device is an innovative interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner. During specific validation tests, this map device has been evaluated by experts in the field. Regarding the collaborative visualisation and interaction, end-users are really satisfied with the table. Indeed the Table has been designed to ensure a comfortable use adapted to a meeting and to address easily several user profiles. Ergonomic studies have initially taken a large part of the design of this solution. A direct interaction channel allows users to interact intuitively with 2D and 3D contents and tangible interaction channels allow users to interact thanks to traditional tools. This Map Table is shown in Figure 6.



Figure 6. The INDIGO Map Table.

3.7 The INDIGO Whiteboard

Like the INDIGO Map Table, the INDIGO Whiteboard device is an innovative interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner. This device aims strategic and tactical levels of crisis management where actors of different professional backgrounds needs to collaborate around a Common Operational Picture. Because no assumptions about the user's computer skills can be made, having an intuitive device that doesn't replace their work habits but take advantage of them is essential. To do so, the standard blackboards interactions have been duplicated, such as the vertical standing and the writing with a pen, namely its digital version, a stylus, as shown in Figure 7.



Figure 7. The INDIGO Whiteboard.

3.8 The INDIGO TransporTable

To enable easy transport of a multi-touch hardware, a mobile multi-touch system has been produced as a solution for short training session or short commercial presentation, as shown in Figure 8. Based on the INDIGO Framework, this device is an interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner. This device respects mobile constraints. It weighs less than 20 kg, is package in a rugged case is deployable for an operational situation in a few minutes.



Figure 8. The INDIGO TransporTable.

3.9 The 3DNSite Generator and Viewer

The 3DNSITE system is a novel framework which enables the visualization of photos from the field aligned on a 3D environment. This is achieved thanks to Innovative algorithms which enables the 3DNSite generator to align the collection of sparse photos with a 3D acquisition of the site. This aligned collection is then visualized thanks to the novel 3DNSite Viewer which offers a intuitive and multitouch navigation within this sparse database, as shown in . This research has been published in international conferences and workshops and is available as an open source platform (<http://vcg.isti.cnr.it/indigo/>).



Figure 9. The 3DNSite Viewer.

3.10 The INDIGO European Emergency Symbol Set

The INDIGO European Emergency Symbol Set enables EU crisis managers to communicate Maps information in a common EU language. Given the fact that most civil security services and industrials use specific symbols, this is often a cross-organisation barrier when collaboration is required. A world wide state of the art on symbols and systems has lead to the development of this European Emergency Symbol Set which is made freely available on the INDIGO website, as well as the design sources, in the downloads/symbology menu.



Figure 10. A screenshot of a few of the European Emergency Symbol Set.

4 Potential Impact

The INDIGO project results are a clear answer to the needs identified through previous projects such as CRIMSON for example, but also through the INDIGO end user requirements and through the three full scale exercises carried out within the project agenda.

The developed system targets two main markets shares, namely crisis training and crisis management. DIGINEXT, in collaboration with CRISISPLAN and ISA, are finalizing discussions of a crisis management and training solution and services build on top of INDIGO. They plan to exploit the INDIGO framework in a similar fashion than the previous CRIMSON project, whose technology was acquired by ESA, DGA, IRSN, and EADS. Already, two real world use cases occurred during the last months of the project demonstrate the potential impact of the project results, as described in the following subsections.

4.1 Operational - La Haye

Following the successful Final Dissemination Event, the police of the Netherlands decided to evaluate the INDIGO "Operational" system through a pilot operational event, namely the Veteran's day, in the end of June 2013. During this national memorial, the police will make use of the INDIGO system to monitor and report information between the mobile and the stationary control centre, in parallel of their actual monitor system. Stakes are quite high with reliable marketing outcome. The police will make use of the TransporTable, the Whiteboard, the Field Mobile and the European Emergency Symbol Set during this event.

4.2 Training - French Firefighters

On-going discussions with French Fighters are leading to two uses of the system, one operational, as for the police of La Haye, but also for training purposes within their organisation and international cross-organisation training and methodology exchanging. This international training cooperation will probably happen take place in the summer 2013.

5 Contact details



INDIGO Office

Simulation & Virtual Reality Division

DIGINEXT

5 Rue Brindejont des Moulinais

BP 15872

31506 Toulouse Cedex 5

France

Tel.: +33 56117 6642

Fax: +33 56117 6578

EEmail: indigo@diginext.fr

6 Use and dissemination of foreground

6.1 dissemination measures

A lot of effort has been put for the dissemination of the results of the projects. Almost one dissemination activity has been achieved per month of the project. The following tables summarise the final results.

LIST OF SCIENTIFIC PUBLICATIONS								
No.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place	Year	Open access ¹
1	A Streaming Framework for Seamless Detailed Photo Blending on Massive Point Clouds	Ruggero Pintus.	Proceedings of Eurographics Area Papers	Annually	Eurographics	-	2011	Yes
2	Fast Low-Memory Seamless Photo Blending on Massive Point Clouds using a Streaming Framework	Ruggero Pintus	ACM Journal on Computing and Cultural Heritage	Volume 4 Issue 2	ACM New York	-	2011	Yes
3	Fast and Robust Semi-Automatic Registration of Photographs to 3D Geometry.	Ruggero Pintus	Proceedings of VAST 2011, the 12th International Symposium on Virtual Reality, Archaeology and Cultural Heritage	Annually	Eurographics Association	Prato, Italy	2011	No

¹ Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

LIST OF SCIENTIFIC PUBLICATIONS

No.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place	Year	Open access ¹
4	Real-time Rendering of Massive Unstructured Raw Point Clouds using Screen-space Operators	Ruggero Pintus	Proceedings of VAST 2011, the 12th International Symposium on Virtual Reality, Archaeology and Cultural Heritage	Annually	Eurographics Association	Prato, Italy	2011	Yes
5	INDIGO-system för krishantering och gemensam lägesbild: möjligheter och utmaningar	Helena Hermansson	GIT 2011	Annually	Kartografiska sällskapet, Sveriges Kart- och Mättekniska Förening och Utvecklingsrådet för landskapsinformation	Jönköping, Sweden	2011	Yes
6	Perspectives and propositions for the use and ordering of map Symbols in systems for improving situational awareness in crisis	Lindy Newlove-Eriksson	International Conference on Information Systems for Crisis Response and Management	Annually	IAS of ISCRAM	Lisbon, Portugal	2011	Yes
7	Interactive Simulation Technology for Crisis Management and Training: The INDIGO Project	Alexandre Ahmad	International Conference on Information Systems for Crisis Response and Management	Annually	IAS of ISCRAM	Vancouver, Canada	2012	Yes
8	3DNSITE: A networked interactive 3D visualization system to simplify location recognition in crisis management	Giovanni Pintore	ACM International Web3D Conference	Annually	ACM New York	Los Angeles, USA	2012	Yes
9	Interactive exploration of gigantic point clouds on mobile devices	Marcos Balsa Rodriguez	Proceedings of VAST 2012, the 13th International Symposium on Virtual Reality,	Annually	Eurographics Association	Brighton, UK	2012	Yes

LIST OF SCIENTIFIC PUBLICATIONS

No.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place	Year	Open access ¹
			Archaeology and Cultural Heritage					
10	GAIL: Geometry-aware Automatic Image Localization	Luca Benedetti	VISAPP 2013 - International Conference on Computer Vision Theory and Applications,	Annually	SCITEPRESS Digital Library	Barcelona, Spain	2013	Yes

LIST OF DISSEMINATION ACTIVITIES

No.	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
1	Web	DIGINEXT	Opening of the project website	01/07/2010	-	-	1000+	World
2	Workshop	CRISISPLAN	End User Workshop #1	03/11/2010	The Hague, Netherlands	Fire brigades, Police Units, Crisis Managers	16	Sweden, Netherlands, France
3	Presentation	CRISISPLAN	EU Funding of Research Projects	19-20/11/2010	Brussels, Belgium	Academics	50	Europe
4	Exhibition	DIGINEXT	IMAGINA 2011, The European 3D Simulation and visualization event	01/02/2011	Monaco	Simulation and visualisation users	1700+	Europe
5	Workshop	CEREN	End User Workshop	08/03/2011	Aix en provence, France	Fire brigades, Police Units, Crisis Manager, industrials	20	France, Sweden, Netherlands
6	Presentation	CRS4 CNR	Eurographics 2011 area papers	11-15/04/2011	Landudno,UK	Scientific community	400+	Europe
7	Presentation	CRISMART	ISCRAM 2011	8-11/05/2011	Lisbon, Portugal	Academics, reseachers, practitioners,	30+	World

LIST OF DISSEMINATION ACTIVITIES

No.	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
						policy makers		
8	Presentation	CRS4 CNR	VAST 2011	18-21/10/2011	Prato, Italy	Scientific community	100+	World
9	Workshop	CEREN	End User Workshop #2	22/11/2011	Manosque, France	Fire brigades, Police Units, Crisis Managers, industrials	200+	France, Sweden, Netherlands
10	Workshop	DIGINEXT	FP7 Security Research Workshop Towards a Demonstration Programme on Crisis and Disaster Management	25/01/2012	Brussels, Belgium	Crisis managers, crisis responders	120	Europe
11	Exhibition	DIGINEXT	Imagina 2012	07/02/2012	Monaco	Industry, Civil Society, Media	1500+	Europe
12	Presentation	CRS4	LowCost3D 2012	8/03/2012	Trento, Italy	Scientific community	80+	World
13	Presentation	DIGINEXT	ISCRAM2012	22-25/03/2012	Vancouver, Canada	Academics, reseachers, practitioners, policy makers	30+	World
14	Presentation	DIGINEXT	International Symposium on Crisis Management	29/03/2012	London, England	Crisis managers, crisis responders	50	Europe
15	Exhibition	IMMERSSION	LAVAL VIRTUAL 2012	31/03/2012	Laval, France	Virtual reality audience	2000+	France
16	Presentation	CRS4	ACM SIGGRAPH WEB3D 2012	04-05/08/2012	Los Angeles, USA	Scientific community and industry	25000+	World
17	Workshop	CRISMART	End User Worshop#3	4-5/10/2012	Stockholm, Sweden	Fire brigades, Police Units, Crisis Managers, Marine brigades	40	Sweden, Netherlands, France

LIST OF DISSEMINATION ACTIVITIES								
No.	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
18	Presentation	CRS4 CNR	VAST 2012	19-21/11/2012	Brighton, UK	Scientific community	100+	World
19	Presentation	CNR	International Conference on Computer Vision Theory and Applications	21-24/02/2013	Barcelona, Spain	Scientific community	100+	World
20	Flyer	DIGINEXT	Final Dissemination Flyer	01/03/2013	-	-	50	-
21	Exhibition	CRISISPLAN	Final Dissemination Event	25-27/03/2013	Leiden, Netherlands	Fire brigades, security managers, police, medics, Transport services	35	Netherlands

Please note that the project produced several dissemination materials such as videos that are not listed in the previous table because they relate previously listed INDIGO key events. They are available on the project website: <http://indigo.diginext.fr>. Moreover, a few photos of the events are visible in Figure 11 and Figure 12.



Figure 11. The second end user workshop.



Figure 12. The final dissemination event.

6.2 INDIGO Videos

6.2.1 The Geomethane exercise video

The first successful full-scale INDIGO exercise has been video captured for dissemination purposes. A video edit has been developed to overview the content of Geomethane event. This video gives an insight of the INDIGO functionalities for training and operational use. A preview of this video is shown in Figure 13, video which is available on the project website.



Figure 13. Preview of the Geomethane video report.

6.2.2 The Stockholm exercise video

The successful second full-scale INDIGO exercise has been filmed. This video gives an overview of the INDIGO system functionalities for the three crisis training and management phases, i.e. crisis training preparedness, operational use case and debriefing. Moreover, this video recalls the Stockholm experience. A preview of this video can be seen in Figure 14. The full video is freely available on the project website.



Figure 14. Preview of the Stockholm video report.

6.2.3 The Leiden exercise video

After the successful second full-scale INDIGO exercise, the consortium has organized a last event of dissemination dedicated to users from the Netherlands. This event has been filmed and will be made freely available soon on the project website.



Figure 15. Preview of the Leiden exercise video.

6.2.4 The Mobile Multitouch System video

A Mobile Multitouch System has been produced at the request of end-users to enable an easy transportation of a Mobile Command Centre. Within a few minutes, the transportable rugged box is transformed into can Mobile Command Centre. This video shows the steps to achieve such a quick installation.



Figure 16. Preview of the Mobile Multitouch System video.

6.3 The INDIGO Flyer

A dissemination flyer has been produced for the final dissemination event which was held in Leiden. Focus has been made on marketing features to enable an easy and attractive understanding of the system. Photos taken from previous INDIGO exercise illustrates this flyer. The 3-fold flyer is shown in Figure 17. This flyer has been printed in more than 50 copies and has been completely distributed during the final dissemination event.

"INDIGO enables different actors to be at different geographical locations but still on the same page. This system creates a virtual room for information sharing that is much better than the open telephone lines that are common today.

In the future, a virtual room for coordinating activities will probably be indispensable."

Rescue Services Chief

CONSORTIUM

DIGINEXT
Advanced Computing Systems

CRS
Crisis Response System

cen
Crisis Emergency Network

CRISMART
Crisis Management Research and Training

CRISTOPHER
Crisis Response Information System

CONTACTS

indigo@diginext.fr
<http://indigo.diginext.fr>

INDIGO
Crisis Management Solution

<http://indigo.diginext.fr>

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n°242341

WHAT IS INDIGO ?

- An innovative **crisis management training system** designed by and for crisis management experts to go beyond table-top exercises
- A system enabling the display and manipulation of a complete and clear **Common Operational Picture** for indoor and outdoor situations

TRAINER
Prepare, conduct and debrief training and exercises

MONITOR
Observe and contribute to the debriefing

OPERATIONAL RESPONDER
Identifies key issues and decide strategies to resolve the crisis

TACTICAL MANAGER
Translates high-level strategic decisions into actions and related resources allocations

FIRST RESPONDER
Participate in the field at the operational level

KEY FEATURES

CREATE THE UNEXPECTED

- Intuitively create, unfold and animate crisis scenarios
- Prepare First Responders actions and dialogs
- Plan incidents and events
- Prepare **media releases**
- Unfold **interactive** scenarios
- Adjust the scenario to the **performance** of participants during the exercise

SHARE THE COMMON OPERATIONAL PICTURE

- Visualize a **shared representation** of the tactical situation
- **Annotate** directly on maps and dashboard
- **Track** positions of First Responders in the field
- **Monitor** teammates status and the environment
- **Simulate** incidents like fire, smoke, flooding
- Import your 2D/3D **cartographical** data

IMMERSE INTO THE FIELD

- Report the situation
- Visualize what you are **supposed to face**

GATHER YOUR REMOTE TEAMS

- Connect distant responders and managers
- Cooperate with remote sites

IMPROVE YOUR TRAINING

- Store, evaluate and replay training sessions

Figure 17. The INDIGO 3-fold Final Dissemination Event Flyer.

6.4 The INDIGO USB Keys

USB keys are a great and common mean to exchange information. For dissemination purposes, 50 USB keys have been offered to end-users containing INDIGO information such as the videos of the INDIGO Geomethane and Stockholm exercises, but also the INDIGO dissemination flyer. The keys have been customized with the logo of the project. A photo of the key model is shown in Figure 18.



Figure 18: The INDIGO USB Key.

6.5 The INDIGO User Manual

During the Leiden Final Dissemination event, a customized version of the D8.2.0 Final Release User Manual has been printed and made available to end-users manipulating the system. In addition to this manual, the INDIGO team assisted end-users. A preview of the User Manual is shown in Figure 19.

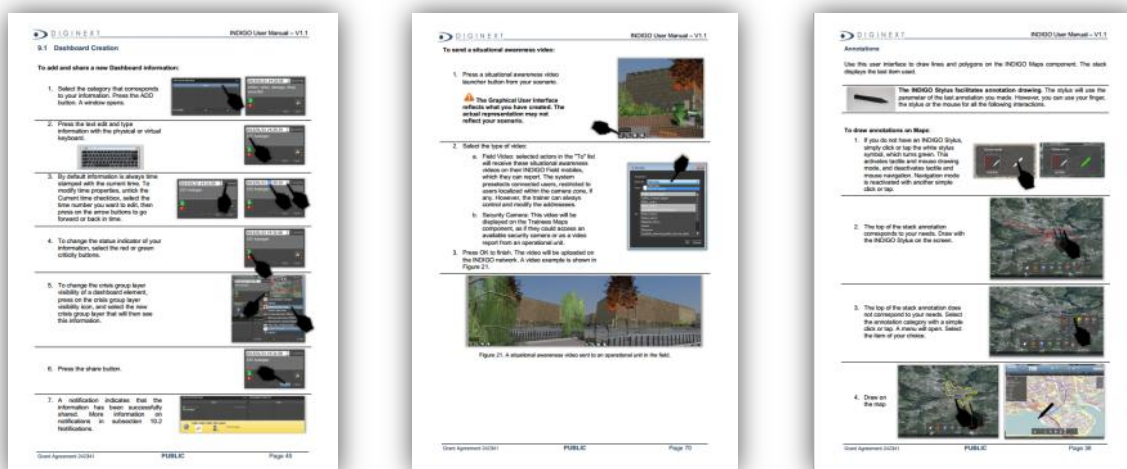


Figure 19: A preview of the customized INDIGO User Manual.

6.6 The INDIGO bags

In order to give easily all information about INDIGO (Manual, key, Flyer and partner details), 50 bags has been produced and given during the last dissemination event. A photo of this bag is shown in Figure 20.



Figure 20: INDIGO bags

6.7 Exploitation Plan

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
Commercial exploitation of R&D results	The map Table device is an innovative interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner.	YES	Map table	C26, N80	2013		IMMERSION (owner) + DIGINEXT (owner of the Common Operational Picture Software version for the table)
Commercial exploitation of R&D results	The Whiteboard device is an innovative interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner.	YES	Whiteboard	C26, N80	2013		IMMERSION (owner) + DIGINEXT (owner of the Common Operational Picture Software version for the table)
Commercial exploitation of R&D results	The TransporTable is an innovative interactive display meant to visualise and interact with the INDIGO Common Operational Picture in a natural, simple and efficient manner.	YES	TransporTable	C26, N80	2013		IMMERSION (owner) + DIGINEXT (owner of the Common Operational Picture Software version for the table)
Commercial exploitation of R&D results	The INDIGO Frameworks enables developers to customize the crisis management and training application.	YES	INDIGO Framework	N80, J58.2	2013		DIGINEXT (owner)
Commercial exploitation of R&D results	3DNsite Generator and Viewer enables to visualize collections of sparse photos on a real 3D acquisition.	YES	3DNSite	J58.2	2014		CNR, CRS4 (owner)

More information about the exploitable foreground is available in the D3.1.2-Final Dissemination And Use Plan. Feel free to contact the INDIGO team at indigo@diginext.fr to get additional details.

7 Report on societal implications

Replies to the following questions will assist the Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

A General Information *(completed automatically when Grant Agreement number is entered.*

Grant Agreement Number:	242341
Title of Project:	INDIGO: Innovative Training and Decision Support for Emergency Operations
Name and Title of Coordinator:	Ms. Martine JULIEN, DIGINEXT

B Ethics	
1. Did your project undergo an Ethics Review (and/or Screening)? <ul style="list-style-type: none"> If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? <p>Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 'Work Progress and Achievements'</p>	<i>No</i>
2. Please indicate whether your project involved any of the following issues (tick box) :	YES
RESEARCH ON HUMANS	
• Did the project involve children?	
• Did the project involve patients?	
• Did the project involve persons not able to give consent?	
• Did the project involve adult healthy volunteers?	
• Did the project involve Human genetic material?	
• Did the project involve Human biological samples?	
• Did the project involve Human data collection?	
RESEARCH ON HUMAN EMBRYO/FOETUS	
• Did the project involve Human Embryos?	
• Did the project involve Human Foetal Tissue / Cells?	
• Did the project involve Human Embryonic Stem Cells (hESCs)?	
• Did the project on human Embryonic Stem Cells involve cells in culture?	
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	
PRIVACY	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	
• Did the project involve tracking the location or observation of people?	X
RESEARCH ON ANIMALS	

• Did the project involve research on animals?	
• Were those animals transgenic small laboratory animals?	
• Were those animals transgenic farm animals?	
• Were those animals cloned farm animals?	
• Were those animals non-human primates?	
RESEARCH INVOLVING DEVELOPING COUNTRIES	
• Did the project involve the use of local resources (genetic, animal, plant etc)?	
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	
DUAL USE	
• Research having direct military use	No
• Research having the potential for terrorist abuse	Yes

C Workforce Statistics

3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women	Number of Men
Scientific Coordinator	0	1
Work package leaders	2	7
Experienced researchers (i.e. PhD holders)	4	6
PhD Students	2	2
Other	8	14

4. How many additional researchers (in companies and universities) were recruited specifically for this project?	0
Of which, indicate the number of men:	

D Gender Aspects		
5. Did you carry out specific Gender Equality Actions under the project?	<input type="radio"/> X	Yes No
6. Which of the following actions did you carry out and how effective were they?		
<input type="checkbox"/> Design and implement an equal opportunity policy	Not at all effective	Very effective
<input type="checkbox"/> Set targets to achieve a gender balance in the workforce	○ ○ ○ ○ ○	○ ○ ○ ○ ○
<input type="checkbox"/> Organise conferences and workshops on gender	○ ○ ○ ○ ○	○ ○ ○ ○ ○
<input type="checkbox"/> Actions to improve work-life balance	○ ○ ○ ○ ○	○ ○ ○ ○ ○
○ Other: <input style="width: 150px;" type="text"/>		
7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?		
○ Yes- please specify <input style="width: 150px;" type="text"/>		
X No		
E Synergies with Science Education		
8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?		
○ Yes- please specify <input style="width: 150px;" type="text"/>		
X No		
9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?		
○ Yes- please specify <input style="width: 150px;" type="text"/>		
X No		
F Interdisciplinarity		
10. Which disciplines (see list below) are involved in your project?		
X Main discipline ² : 5.4		
X Associated discipline ² : 1.1	○	Associated discipline ² :
G Engaging with Civil society and policy makers		
11a Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)	X ○	Yes No
11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?		
○ No		
X Yes- in determining what research should be performed		
X Yes - in implementing the research		
X Yes, in communicating /disseminating / using the results of the project		

² Insert number from list below (Frascati Manual).

11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	<input type="radio"/> <input checked="" type="radio"/>	Yes No
12. Did you engage with government / public bodies or policy makers (including international organisations)		
<input type="radio"/> No <input checked="" type="radio"/> Yes- in framing the research agenda <input checked="" type="radio"/> Yes - in implementing the research agenda <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project		
13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers? <input type="radio"/> Yes – as a primary objective (please indicate areas below- multiple answers possible) <input checked="" type="radio"/> Yes – as a secondary objective (please indicate areas below - multiple answer possible) <input type="radio"/> No		
13b If Yes, in which fields? Education, Training, Youth, Foreign and Security Policy , Humanitarian aid		
Agriculture Audiovisual and Media Budget Competition Consumers Culture Customs Development Economic and Monetary Affairs Education, Training, Youth Employment and Social Affairs	Energy Enlargement Enterprise Environment External Relations External Trade Fisheries and Maritime Affairs Food Safety Foreign and Security Policy Fraud Humanitarian aid	Human rights Information Society Institutional affairs Internal Market Justice, freedom and security Public Health Regional Policy Research and Innovation Space Taxation Transport

13c If Yes, at which level?		
<input checked="" type="checkbox"/>	Local / regional levels	
<input checked="" type="checkbox"/>	National level	
<input checked="" type="checkbox"/>	European level	
<input type="checkbox"/>	International level	
H Use and dissemination		
14. How many Articles were published/accepted for publication in peer-reviewed journals?		10
To how many of these is open access³ provided?		9
How many of these are published in open access journals?		
How many of these are published in open repositories?		
To how many of these is open access not provided?		1
Please check all applicable reasons for not providing open access:		
<input type="checkbox"/> publisher's licensing agreement would not permit publishing in a repository <input type="checkbox"/> no suitable repository available <input type="checkbox"/> no suitable open access journal available <input type="checkbox"/> no funds available to publish in an open access journal <input type="checkbox"/> lack of time and resources <input checked="" type="checkbox"/> lack of information on open access <input type="checkbox"/> other ⁴ :		
15. How many new patent applications ('priority filings') have been made? <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i>		0
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	0
	Registered design	0
	Other	0
17. How many spin-off companies were created / are planned as a direct result of the project?		0
<i>Indicate the approximate number of additional jobs in these companies:</i>		
18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:		
<input checked="" type="checkbox"/> Increase in employment, or	<input checked="" type="checkbox"/> In small & medium-sized enterprises	
<input checked="" type="checkbox"/> Safeguard employment, or	<input checked="" type="checkbox"/> In large companies	
<input type="checkbox"/> Decrease in employment,	<input type="checkbox"/> None of the above / not relevant to the project	
<input type="checkbox"/> Difficult to estimate / not possible to quantify		

³ Open Access is defined as free of charge access for anyone via Internet.

⁴ For instance: classification for security project.

<p>19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:</p>	<p><i>Indicate figure:</i></p> <p>5 to 10</p> <p><input type="checkbox"/></p>		
<p>Difficult to estimate / not possible to quantify</p>			
<p>I Media and Communication to the general public</p>			
<p>20. As part of the project, were any of the beneficiaries professionals in communication or media relations?</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>			
<p>21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?</p> <p style="text-align: center;"><input type="radio"/> Yes <input checked="" type="radio"/> No</p>			
<p>22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid black; padding: 5px;"> <input checked="" type="checkbox"/> Press Release <input checked="" type="checkbox"/> Media briefing <input type="checkbox"/> TV coverage / report <input type="checkbox"/> Radio coverage / report <input checked="" type="checkbox"/> Brochures /posters / flyers <input checked="" type="checkbox"/> DVD /Film /Multimedia </td> <td style="width: 50%; padding: 5px;"> <input checked="" type="checkbox"/> Coverage in specialist press <input type="checkbox"/> Coverage in general (non-specialist) press <input type="checkbox"/> Coverage in national press <input type="checkbox"/> Coverage in international press <input checked="" type="checkbox"/> Website for the general public / internet <input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café) </td> </tr> </table>		<input checked="" type="checkbox"/> Press Release <input checked="" type="checkbox"/> Media briefing <input type="checkbox"/> TV coverage / report <input type="checkbox"/> Radio coverage / report <input checked="" type="checkbox"/> Brochures /posters / flyers <input checked="" type="checkbox"/> DVD /Film /Multimedia	<input checked="" type="checkbox"/> Coverage in specialist press <input type="checkbox"/> Coverage in general (non-specialist) press <input type="checkbox"/> Coverage in national press <input type="checkbox"/> Coverage in international press <input checked="" type="checkbox"/> Website for the general public / internet <input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)
<input checked="" type="checkbox"/> Press Release <input checked="" type="checkbox"/> Media briefing <input type="checkbox"/> TV coverage / report <input type="checkbox"/> Radio coverage / report <input checked="" type="checkbox"/> Brochures /posters / flyers <input checked="" type="checkbox"/> DVD /Film /Multimedia	<input checked="" type="checkbox"/> Coverage in specialist press <input type="checkbox"/> Coverage in general (non-specialist) press <input type="checkbox"/> Coverage in national press <input type="checkbox"/> Coverage in international press <input checked="" type="checkbox"/> Website for the general public / internet <input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)		
<p>23 In which languages are the information products for the general public produced?</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid black; padding: 5px;"> <input checked="" type="checkbox"/> Language of the coordinator <input checked="" type="checkbox"/> Other language(s) </td> <td style="width: 50%; padding: 5px;"> <input checked="" type="checkbox"/> English </td> </tr> </table>		<input checked="" type="checkbox"/> Language of the coordinator <input checked="" type="checkbox"/> Other language(s)	<input checked="" type="checkbox"/> English
<input checked="" type="checkbox"/> Language of the coordinator <input checked="" type="checkbox"/> Other language(s)	<input checked="" type="checkbox"/> English		

Question F-10: Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):

FIELDS OF SCIENCE AND TECHNOLOGY

1. NATURAL SCIENCES

- 1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]
- 1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)
- 1.3 Chemical sciences (chemistry, other allied subjects)
- 1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)
- 1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

2. ENGINEERING AND TECHNOLOGY

- 2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)

- 2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]
 - 2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)
3. MEDICAL SCIENCES
- 3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)
 - 3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
 - 3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)
4. AGRICULTURAL SCIENCES
- 4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
 - 4.2 Veterinary medicine
5. SOCIAL SCIENCES
- 5.1 Psychology
 - 5.2 Economics
 - 5.3 Educational sciences (education and training and other allied subjects)
 - 5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary , methodological and historical S1T activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].
6. HUMANITIES
- 6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)
 - 6.2 Languages and literature (ancient and modern)
 - 6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and other S1T activities relating to the subjects in this group]