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RASOR-DWP12.10-20151118-2-CIMA- 2ndRevisionRDTK – Second revision of the RASOR Dissemination Toolkit



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Purpose of the Document

The purpose of the document is to synthetically report on the RASOR Dissemination Toolkit 2nd revision.

Executive Summary

The present document refers to the 2nd revision of the RASOR Dissemination Toolkit, a set of electronic material that can be used by the RASOR partners for dissemination purposes.

Abbreviations

Abbreviation	Meaning
RDTK	RASOR Dissemination Toolkit
RASOR	Rapid Analysis and Spatialisation of Risk
SC	Steering Committee
AB	Advisory Board

The RASOR Dissemination Toolkit

The 3rd release of the RDTK is composed by the revision of following material:

- RASOR Articles
- RASOR Infographics
- RASOR Services Information Sheets
- RASOR Newsletters
- RASOR Posters
- RASOR Presentations

with the addition of the RASOR USB Pen that is loaded with the above mentioned Material.

The material can be found in the RASOR WEB site in the section "Dissemination Materials" (www.rasor-project.eu), the RASOR Services Information Sheets are instead accessible on the website in the section "Services".

The RDTK includes also a RASOR Event's kit. RASOR event's kit is composed by a folder containing informative material on the project (printed newsletter and infographics), paper notes, a RASOR pencil, a USB PEN and a RASOR STICKER.



RAPID ANALYSIS AND SPATIALISATION OF RISK



Figure 1 RASOR Event's Kit revised



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RAPID ANALYSIS AND SPATIALISATION OF RISK

AN UNIQUE AND GLOBAL PLATFORM TO PERFORM MULTI-
HAZARD RISK ANALYSIS

EARTHQUAKES

FLOOD

VOLCANOES

OTHER GEOHAZARDS

Figure 2 "Services" section in the RASOR Website

Main improvement of the RTDK

The main improvements of the RTDK regard on one side the addition of informative material that regards the services provided through the RASOR platform and synthetically described in hazard specific informative sheets regarding:

- Earthquakes
- Flood
- Volcanoes
- Other Geohazards

and all information material that relate to the beta version of the RASOR Platform:

- The RASOR Platform Infographic
- The RASOR Platform Overview presentation
- The Article on Science & Technology dedicated to the platform Launch:

Rudari Roberto (2015): "[RASOR First Release: The Cima foundation's Roberto Rudari discusses the objectives of the Rasor Project, a platfor to perform multi-hazard risk analysis](#)", Pan European Networks: Science & Technology, issue 16; www.paneuropeannetworks.eu



RASOR
RAPID ANALYSIS AND SPATIALISATION OF RISK

EARTHQUAKES

THE SOURCE OF AN EARTHQUAKE IS A FAULT RUPTURE OCCURRING IN THE EARTH'S CRUST. USING RADAR AND OPTICAL SATELLITE DATA WE MEASURE THE PERMANENT GROUND SURFACE MOVEMENTS CAUSED BY THE FAULT DISPLACEMENTS AT DEPTH.

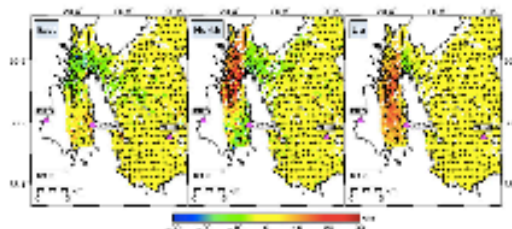
LARGE EARTHQUAKES CAN GENERATE FAULT SCARPS, TOPOGRAPHIC STEPS UP TO TENS OF METERS HIGH AND HUNDREDS OF KILOMETERS LONG, ABLE TO DESTROY OR DAMAGE ALL THE STRUCTURES THEY CROSS. EVEN MODERATE EARTHQUAKES GENERATE DIFFUSE, PERMANENT SURFACE DEFORMATION, WHICH MAY BE INVISIBLE TO THE EYE BUT CAN STRONGLY AFFECT THE HYDROLOGICAL REGIME, AND CAUSE FOR INSTANCE INUNDATION OF SUNKEN AREAS, OR INCREASED EROSION AND LAND SLIDING OF UPLIFTED ONES.

THE RASOR CONSORTIUM PROVIDES TAILORED SERVICES AND INFORMATION PRODUCTS FOR THE MONITORING OF EARTHQUAKE HAZARDS, AND FOR THE GENERATION OF MODELS AND SCENARIOS, WHICH CAN BE ANALYSED WITHIN THE RASOR PLATFORM TO PREDICT THE SPATIAL OCCURRENCE OF AN ADVERSE EFFECT.

CO-SEISMIC GROUND DEFORMATION MAP

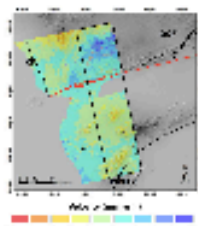
During an emergency, the co-seismic ground deformation map and its derived products are an important product for disaster managers, used for the environmental damage assessment and the situational awareness. RASOR provides this information in near real time (once images are available) using data from a variety of SAR or optical satellites and different analysis methods (range and azimuth interferometry, offset tracking).

The figure shows the intensity of the three cartesian components of the ground displacement caused by the February 3, 2014 Cephalonia earthquake, Greece (Merryman et al., 2015)



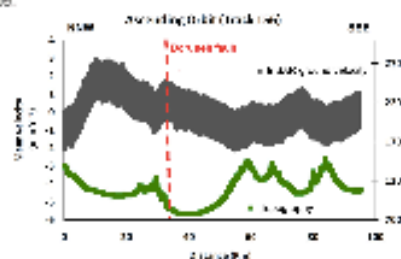
INTER-SEISMIC GROUND DEFORMATION MAP

During the inter-seismic period the faults accumulate tectonic stress which is suddenly released by seismic ruptures. The slow building of crustal deformation can be measured at the surface and used to predict the long-term rate of fault slip through modeling. Risk managers then use slip rates to constrain probabilistic seismic hazard assessment.



RASOR provides inter-seismic ground deformation measurements, as displacement time series and mean velocities, using data from a variety of SAR satellites processed by multitemporal InSAR analysis methods (SBAS, PS-InSAR, mixed methods). Given the rather steady rates of crustal deformation velocities, these measurements are normally updated yearly.

The figure on the left shows the inter-seismic ground velocity map across the Western Dordnech Fault in Central Iran (Pezzo et al., 2012). The red line in the middle is the Dordnech Fault system. The ground North of the fault moves West with respect to the ground on the South side. The black box marks the buffered velocity profile shown below. These data were modeled to provide important information for seismic hazard assessment, as fault kinematics and slip rate.



SEISMIC SOURCE MODELS

The characterisation of the seismic source is rapidly needed for the situational awareness following an earthquake, to address the possibility of further adverse effects, as large shocks caused by slippage of locked fault patches, post-seismic increase of surface deformation along damaging fault scarps, or simply to update the hazard modes for the region.

The RASOR consortium can provide accurate seismic source models based on the geophysical inversion of the co-seismic deformation field obtained from InSAR and GPS data. We use state of the art modeling procedures to characterise the source location, geometry, extension and fault slip vector. We can also use any additionally available information to validate the model.

The figure shows the modeled sources of the main earthquakes of the 2012 Emilia, Northern Italy, seismic sequence. Purple dots represent the seismicity. (Pezzo et al., 2013)

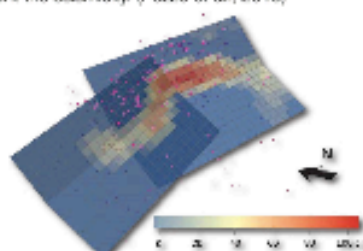


Figure 3 AN example of the Services Sheet:: EARTHQUAKE

AN UNIQUE AND GLOBAL PLATFORM TO PERFORM MULTI-HAZARD RISK ANALYSIS

The Rapid Analysis and Spatialisation Of Risk (RASOR) project has developed a platform to perform multi-hazard risk analysis to support the full cycle of disaster management, including targeted support to critical infrastructure monitoring and climate change impact assessment. RASOR uses the 12m resolution TanDEM-X Digital Elevation Model (DEM) for risk management applications. The DEM serves as a base layer, and is combined with other exposure, hazard and vulnerability data sets to develop specific disaster scenarios. RASOR overlays archived and near-real time very-high resolution optical and radar satellite data, combined with in-situ data for both global and local applications. Initially, RASOR is available with full functionality over five case study areas. The global tool will be available in 2016 for upload of user data sets and user risk assessment activities. Ultimately, the RASOR Consortium will offer global services to support in-depth risk assessment and full-cycle risk management.



RISK ASSESSMENT MAPPING : FIVE MAIN AREAS OF IMPACT



RASOR uses a scenario-driven query system to allow users to simulate future scenarios based on existing and assumed conditions, to compare with historical scenarios, and to model multi-hazard risk both before and during an event. Managers can, for example, determine the extent of flooding in a given area and assess risk to Critical Infrastructure Systems in terms of the residual functionality of a given system

(e.g. energy, transport, health). Public authorities can determine the potential impact of sea surge scenarios based on actual, accurate subsidence and its effect on flood defence infrastructure. RASOR allows managers to use real scenarios when determining new mitigation or prevention measures, and integrate new, real-time data into their operational systems during response activities.

The RASOR Consortium is an open partnership of concerned organizations, working together to improve risk management through an open source, freely available tool. The Consortium is inviting other interested organizations to partner as RASOR Associates and increase the availability of data and tools to manage risk.

For more information about RASOR,
contact roberto.nudari@cimafoundation.org
or attend the RASOR SME Workshop
at IGARSS on 30 July, 2015
(9:00 am in room 4+5)

Figure 4 Informative sheet on the RASOR Platform

THE CIMA FOUNDATION'S ROBERTO RUDARI DISCUSSES THE OBJECTIVES OF THE RASOR PROJECT, A PLATFORM TO PERFORM MULTI-HAZARD RISK ANALYSIS

RASOR first release

RASOR offers a single work environment that generates new risk information across hazards, across data types (satellite Earth observation, *in situ*), across user communities (global, local, climate, civil protection and insurance etc.) and across the world. RASOR is developing a platform to perform multi-hazard risk analysis for the full cycle of disaster management, including targeted support to critical infrastructure monitoring. A scenario-driven query system simulates future scenarios based on existing or assumed conditions and compares them with historical scenarios. Initially available over five case study areas, RASOR will ultimately offer global services to support in-depth risk assessment and full-cycle risk management.

RASOR uses the 12m Tandem-X Digital Elevation Model as a base layer, and then adds archived and near real-time very high resolution optical and radar satellite data, combined with *in situ* data. The RASOR tool allows users to model multi-hazard risk both before and during an event. Managers can use actual scenarios when determining new mitigation or prevention measures, and integrate new real-time data into their operational system during disaster response.

Beginning in 2016, RASOR will offer commercial services to tailor the tool to a specific geographic area; once RASOR has been customised for use in a given country or area, its use is free of charge for most users.

First internal release

Unlike many disaster support tools, RASOR was developed using a multi-hazard approach. This is critical because the same risk managers often consider floods and fires, landslides and earthquakes over a given geographic area. The availability of a single tool that can serve as a platform to address multiple hazards is a significant advantage. It is also important that the tool is standardised to consider different areas without

the need for heavy tailoring. This allows international organisations such as the World Bank, the UN or the European Commission to provide support to countries unable to address risk due to capacity or development challenges.

A single tool with standard input data that easily adapts on a global basis and interoperates with existing systems would provide the international disaster management community with currently unavailable insight into risk exposure in developing nations where populations are most vulnerable, and could be used to support development decisions for project funding, optimise emergency response and help reduce the damage from disasters.

Support

RASOR will enhance understanding of risk, as evidenced by the support the concept has found in the prospective user community. The RASOR Consortium will also offer commercial services that will generate benefits for European industry and NGOs at both SME and larger levels. For the global insurance and re-insurance community, a single platform that integrates available data from a wide array of sources offers strong advantages for rapid risk assessment in remote areas. However, perhaps the most interesting element for the global re-insurance industry is the availability of tailored information layers addressing hazards, exposure and vulnerabilities that can be imported into their own proprietary models for internal analysis.

Some of the most important achievements that the platform offers include:

- Rapid spatialisation of assets and critical infrastructure with or without pre-existing or proprietary local data sets;
- Analysis of hazard exposure and extent;
- Support to the analysis of risk elements for a broad range of hazards including flooding, storm surge, earthquakes, ground subsidence, landslides, tsunamis and volcanic eruptions, and the ability to rapidly

The RASOR platform

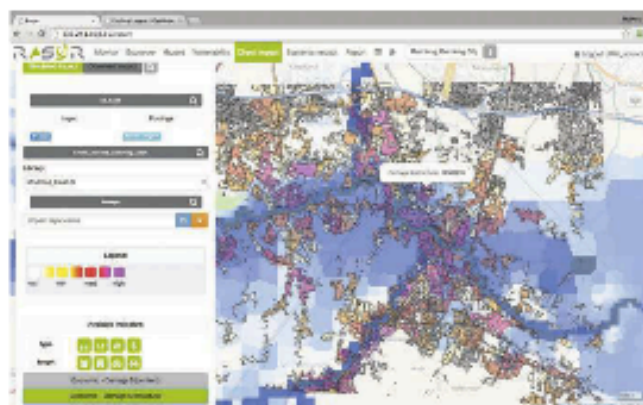


Figure 5 S&T Article on the First Platform Release

Conclusions/Implications for RASOR

The Dissemination Material is a core part of the RASOR dissemination strategy and the material will be maintained and revised during the full cycle of the project.

[HTTP://WWW.GASOR-PROJECT.EU](http://www.gasor-project.eu)