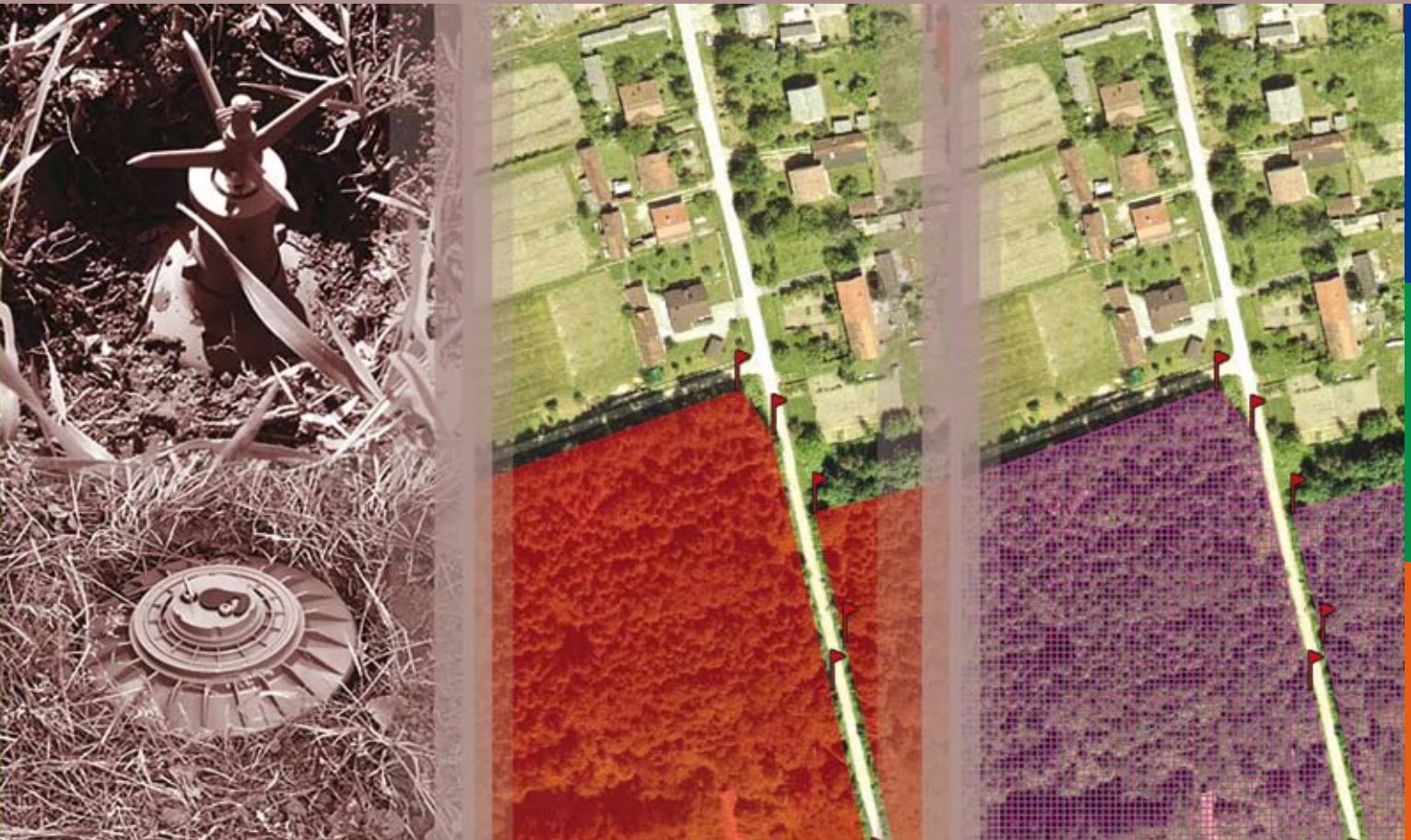




HRVATSKI CENTAR ZA RAZMINIRANJE
CROATIAN MINE ACTION CENTRE



Croatian Mine Action System

For Croatia **without mines**
and **mine-free** world

Introduction



The Republic of Croatia, as any other country in the world that has been confronted with the plague of war, is burdened with one of its most difficult consequences – contamination with mines.

Almost ten years after the establishment by the Government of the Republic of Croatia, CROMAC, as roof mine action organization, has turned into an organizational leader in the region in the sphere of mine action. Continuous organizational development and incessant investing and use of most sophisticated techniques and technologies resulted in successful creation of our own models for all phases of complex demining process. These models have now been used almost routinely in the processes of quality assurance and quality control over demining operations, project documentation development, defining and marking of mine suspected area as well as development and maintenance of the most modern database. Introduction of market model and public tender procedure into mine action system but also linking the development projects with demining projects enabled fast development of capacities and

obtaining fully transparent method of forming the prices that increased a great deal the economical quality of management on the one hand and through performance results, the efficacy and quality of operations on the other hand. In this way, there is a permanent basis for the continuation of successful development of all parts of mine action system created what represents one of primary CROMAC goals in the future period. Such model is applicable and adaptable to all countries facing the mine problem.

It is important to mention that the mine suspected area in the Republic of Croatia currently extends to ca. 997 km² what we still consider to be a very large area but we would also like to stress the fact that, thanks to the organized work methods and clear priority setting, Croatia has achieved security of the road network, tourist destinations, community and public facilities as well as house yards as part of the reconstruction process and generally in most parts of the area used in everyday living.

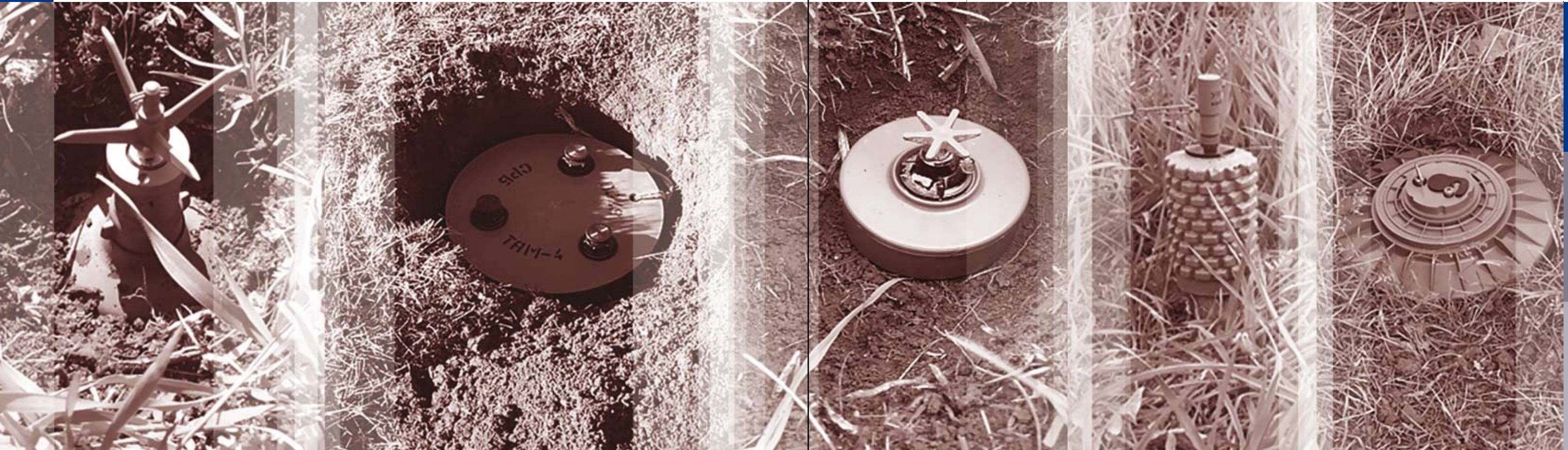
This is also supported by considerable decrease of a number of mine victims and mine incidents

in the period from 1998 until today when mine incidents happen extremely rarely and sporadically mostly due to lack of attention or human mistakes and not due to lack of information or marking of the area etc. what CROMAC believes to be a great success.

With its priceless experience, knowledge and sophisticated technology at disposal, CROMAC is now open to all forms of co-operation and providing assistance to all countries that can not face the mine problem on their own or do not have proper knowledge or capacities to do themselves. It is our aim to make our know-how, methods, techniques and technologies available to all and, in that way, involve ourselves in solving the overall mine problem in the world i.e. be a stabile and efficient partner in the global mine action community.

Oto JUNGWIRTH, CROMAC director

CROMAC activities



Main activities are:

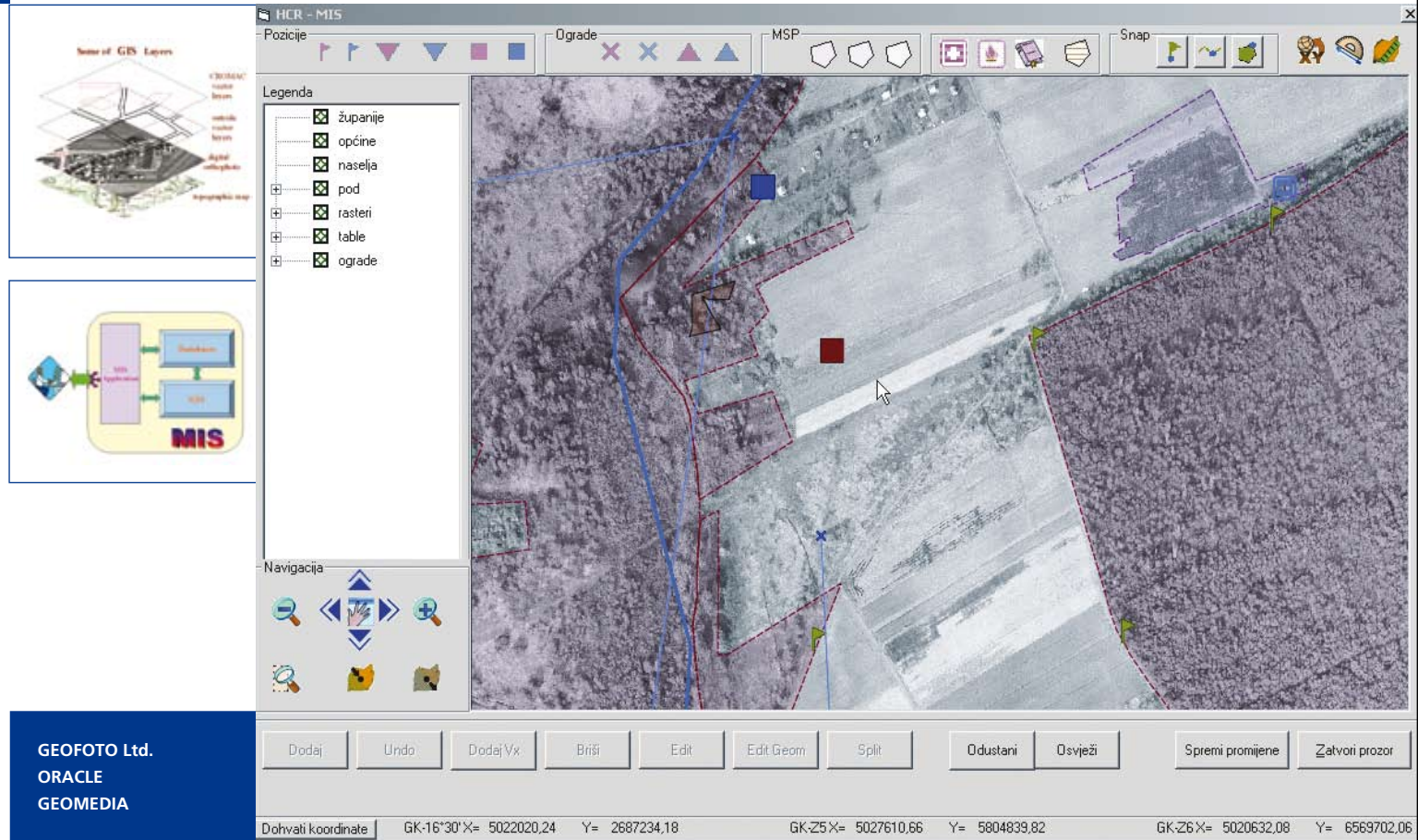
- General and technical survey
- MSA marking and fencing
- Planning and development of mine search and demining project proposals
- Public tenders and awarding the works
- Quality control - quality assurance over mine search and demining operations and handover of searched and/or demined area
- Issuance of demining certificates guaranteeing that the area is no longer mine contaminated
- Accreditation of certified legal entities or tradesmen for conducting humanitarian demining operations
- Research and development of demining technologies
- Testing of machines, devices and equipment used in humanitarian demining operations
- Providing expert assistance and information on mine danger and status of mine suspected area to the authorized bodies
- Cooperation with international mine action subjects

References:

- Definition and marking of mine suspected area of the Republic of Croatia, SOP 01.01, 2003/2005
- Revision of the entire mine suspected area of the Republic of Croatia, SOP 01.01, 2005/2007
- General survey and development of demining project proposals relating to demining of state border between the Republic of Montenegro and Republic of Albania
- Development and establishment of the database, Mine Information System, 2003-2007

- CROMAC-GEOFOTO project CROMAC GIP, Design of the unique topographic database as the basis for monitoring and development of all demining activities in the framework of MIS, 2005/2006
- Croatian-Norwegian geoinformation project CROMAC SCAN Centre, 2004/2007
- Establishment of quality control system of humanitarian demining operations 2003/2004, SOP 04.01, 2007
- SAMPLING-Sampling and inspection of soil treatment depth during demining machine usage, SOP 04.02, 2007
- Sampling-Sampling for inspection and control of the area searched and demined by metal detector and MDDs, SOP 04.03, 2007
- Rules and regulations on technical requirements and establishment of compatibility assessment of machines, devices and equipment used in humanitarian demining operations, 2007
- Rules and regulations on technical requirements and eligibility testing procedure of mine detection dogs and handlers in humanitarian demining operations, 2007
- CROMAC joined ITEP as Co-operating Partner, 2007
- Organization of International Symposium "Humanitarian Demining", Šibenik, 2004, 2005, 2006 and 2007

Mine Information System - MIS



GEOFOTO Ltd.
ORACLE
GEOMEDIA

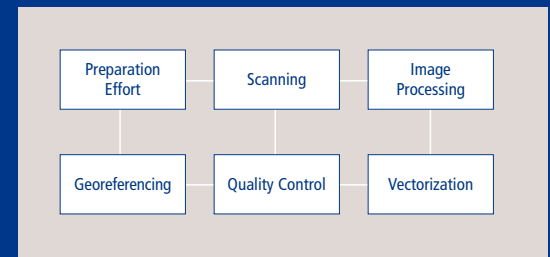
Mine Information System - MIS

- Database
- Geographic Information System
- Scanning
- DOF 2

Database and GIS are in function of planning humanitarian demining, efficient and rational conducting of general and technical surveys, inclusion and cancellation of MSA, development of project documentation, quality assurance, quality control, issuance of demining certificate and availability of information over the Internet.

Mine information system is an integral dynamic user system of digital mine situation data collected and it consists of:

- database
- geographical information system (GIS)



Maps produced with most modern technologies of digital colour ortophoto (DOF 2, product of GEOFOTO Ltd.) S 1: 2 000) are inserted into the database. Thanks to the donation of the Kingdom of Norway to IT Department – Scan Section, in March 2007, there was a highly sophisticated scanner installed and CROMAC SCAN CENTRE established. The scanner was manufactured and installed by the company ProCaptura from Norway.

Scan Centre enables scanning of large format maps and other graphical information and their geocoding into the official co-ordinate system, vectorization of data from the maps and their distribution.

Mine suspected area (MSA)

General survey

- Analytic preparation
- Field data collection and verification
- Marking of mine suspected area
- Final analysis and making general survey reports

DOF 2

SOP 01.01
SOP 01.02
SOP 01.03



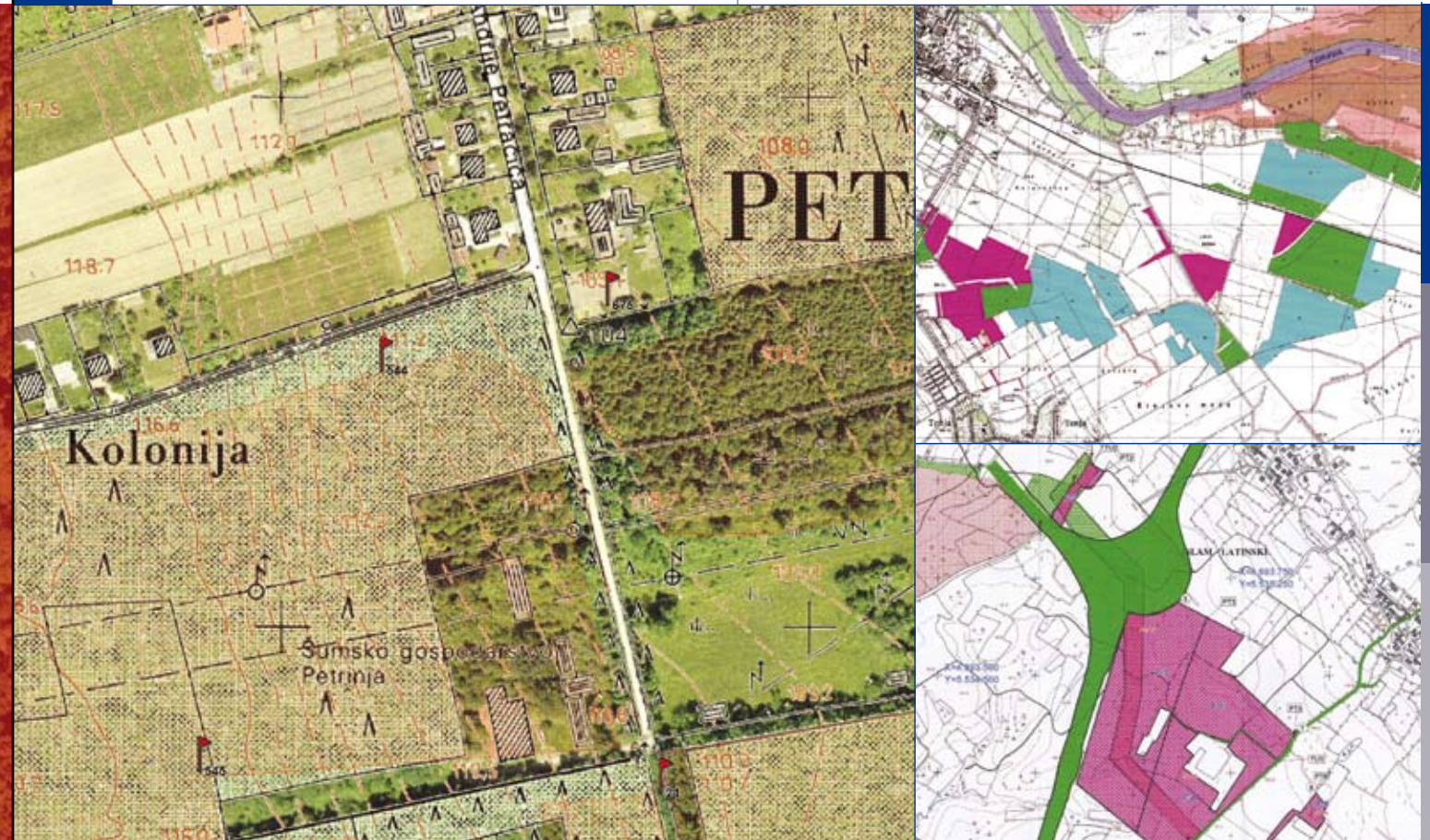
- Defines the boundaries of mine suspected area (MSA)
- Defines the categories of areas inside MSA
- Estimates the MSA structure according to the area type and intended use
- Performs the reconstruction of minefields inside the MSA and estimates the number and type of mines
- Performs the MSA marking with mine warning signs
- Continuous reconstruction of the entire MSA

- Areas inside MSA are defined as per method of demining on the basis of criteria for the establishment of area status by general survey:
 - **area to be demined**
 - **area to be searched**
 - **areas used at one's own risk**
- All registered general survey data is inserted into CROMAC MIS and available in a form that suits the practical use for mine search and/or demining project development and informing the citizens.

Planning and project documentation development

Planning and project documentation development

- Planning
- Technical survey execution projects
- Mine search and demining execution projects



- For the purpose of precise priority setting, standardized criteria and rational usage of limited funds for areas important from safety, socio-economic and ecological aspect, Croatian Mine Action Centre has developed criteria for setting humanitarian demining priorities that are the basis for the development of Three-Year Humanitarian Demining Plan as well as Annual Humanitarian Demining Plans and clear definition of mine impact on the development of the Republic of Croatia.
- Based on Annual Humanitarian Demining Plan, Croatian Mine Action Centre makes Operative Plans of Activities defining project documentation development (mine search and demining project proposals, technical survey execution projects), general and technical survey, marking and supervision over demining operations.

- Project documentation is made in accordance with valid regulations and rules of profession. It comprises all information that enable the following:
 - **making a decision on implementation of public tender procedure i.e. awarding mine search and/or mine clearance operations to accredited legal entities or tradesmen as per law on public procurement on the basis of mine search and/or demining project proposal,**
 - **conducting demining, mine search or technical survey based on demining, mine search or technical survey project proposals.**

Mine suspected area

Quality assurance and control

- Accreditation of humanitarian demining companies
- Quality Assurance
- Supervision
- Quality Control



- Quality Assurance (QA) and Quality Control (QC) over mine search/ demining operations is the responsibility of a Quality Assurance and Quality Control Department. Quality Assurance during the execution of mine search/demining operations is conducted by Quality Assurance Officers and Monitors. Quality Assurance during the execution of operations includes:
 - supervision over the operations in progress,
 - control inspection, sampling of the area searched and demined,
 - record keeping.
- During the QA procedure, QA Officer identifies the situation at the worksite in relation to the execution project and performs sampling of searched and demined areas.
- Quality Control over executed mine search and/or demining operations is planned and conducted by QA Officer on the control samples of the demined i.e. searched worksite.

- QA Officer determines the control samples manual mine detection is to be applied.
- Sampling methods and procedures have been elaborated by applying sampling plans indexed as per acceptable quality level-AQL (ISO 2859-1).
- Control samples include all project entireties (minimum 1% of the total area searched and/or demined).
- Maximum size of separate control sample is determined depending on the intended use of the land area.
- Based on the Report on Handover of the demined or searched area, CROMAC issues a certificate guaranteeing that the area is no longer contaminated i.e. that it has been cleared.
- Analysis of completed demining projects

Capacities

Capacities

- 28 certified demining companies
- 576 deminers
- 46 various demining machines
- 746 metal detectors
- 74 tested mine detection dogs

CROMAC-CTDT Ltd.



CROMAC-CTDT Ltd. conducts the following activities:

- testing and certification of demining machines, metal detectors and mine detection dogs
- testing of demining equipment, methodologies and technologies

Testing facilities:

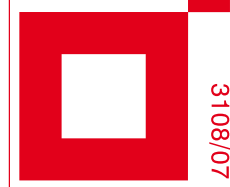
- CEROVAC test site:
 - performance and survivability testing of demining machines (three test lanes with different soil types in accordance with CWA 15044)



Croatian Mine Action System



45011-HAA



3108/07

Accreditation Certificate

According to HRN EN 45011:1998 for conducting certification of demining machines, metal detectors and mine detection dogs used in humanitarian demining activities

- testing and certification of mine detection dogs and handlers
 - conformity verification of metal detectors
 - training of deminers on the use of metal detectors
- BENKOVAC test site:**
- testing of hand-held mine detection systems and vehicle-mounted systems (MD, GPR, dual sensors)
 - training of deminers on the use of metal detectors
- ŠKABRNJA test site:**
- testing of biosensors and vapor sensors
 - testing and certification of demining machines and MDDs during winter

- training on the use of metal detectors
- organizing workshops, conferences and seminars on the subject of mine action
- implementation of research and development projects in the field of mine action
- field testing and evaluation of technologies used for mine contaminated area detection and mine suspected area reduction
- scientific and professional cooperation with national and international institutions

Manufacture of machines, devices and equipment

Dok-ing Ltd.

Žitnjak bb
 HR-10000 Zagreb, Croatia
 tel: +385 (0)1 2481 300, fax: +385 (0)1 2481 303
 e-mail: dok-ing@dok-ing.hr, http://www.dok-ing.hr

- small dimensions
- excellent maneuverability
- high engine power
- low track-ground pressure
- easy maintenance
- low operating costs
- simple to operate
- inpex 2004 awarded demining machine and mini-dozer



DOK-ING d.o.o.
 TRAINING AND MANUFACTURING OF SPECIAL EQUIPMENT

Croatian Mine Action System



ĐURO ĐAKOVIĆ
 SPECIJALNA VOZILA d.d.
 SLAVONSKI BROD, HRVATSKA

"Đuro Đaković" Special vehicles Inc.

Dr. Mile Budaka
 35000 Slavonski Brod, Croatia
 tel.: +385 35 218 822
 fax: +385 35 218 833
 e-mail marketing@dds.hr
 http://www.dds.hr

- Machine for humanitarian demining
- using tiller or hammers with chains
- capable of cleaning depth over 300mm
- Average surface cleaning: 2000 sqm/h

Croatian Mine Action System

Manufacture of machines, devices and equipment

"BOROVO" GUMITRADE Ltd.

Dr. Ante Starčevića bb
32010 Vukovar, Croatia
tel.: +385 32 422 613
fax: +385 32 421 731, e-mail borovova@inet.hr

- protective boots
- protective vest against fragments B1
- protective covers for military footwear NZ M-2

Manufacture of machines, devices and equipment

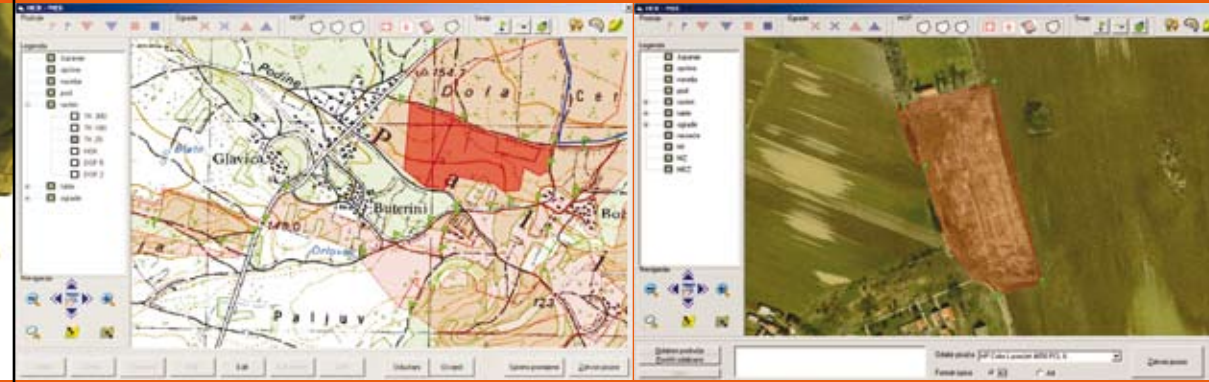
GEOFOTO Ltd.

Buzinski prilaz 28
10010 Zagreb, Croatia
tel: +385 1 6680 103, fax: +385 1 6680 112
e-mail: monika.vlasic@geofoto.hr, <http://www.geofoto.hr>

- Geo Information:
- Mine Information System
- CROTIS GML
- Military geoinformation

- Production and integration of geodata:
- Digital orthophoto of high resolution (10,20,50 cm)
- Topographic data
- Cartographic backgrounds
- Cadastral data

Borovo
GUMITRADE d.o.o.



Croatian Mine Action System

SB
SESTAN-BUSCH



SUIS
NOVI

SESTAN -BUSCH Ltd.

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tel: +385 40 646 330 , fax: +385 40 646 300
e-mail: sestan.buch@ck.htnet.hr, <http://www.sestan-busch.hr>

- Produce and exports protection and security equipment for army, police, security, sports institutions and individuals
- Helmets
- Bullet-proof vests and clothes
- Personal decontamination kits
- Multi purpose plastic products

New Special Devices and Systems Ltd.

Potok 41
10090 Zagreb, Croatia
tel: + 385 (0) 1 3484 565, fax: + 385 (0) 1 3484 565
gsm: + 385 98 934 8733, e-mail: novi.suis@gmail.com

- Production, repairs and turnover of arms and military equipment (production of NME) and other products of special purpose
- Purchasing and selling goods
- Commercial intercession on domestic and foreign markets
- Representation of foreign companies

Contact

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For Croatia without mines and mine-free world

