



"COMMAND d"

Commanding and Operations Mechanism for Multisector Analysis of Nexus Disaster Data

EU Civil Protection Mechanism

Capacity building materials on the use of IT platform with inclusive training on real-time data integration in North Macedonia





1. INTRODUCTION

The main goal of the COMMAND d project is to develop a system to support an efficient protection and rescue system at the local level, that is, an IT platform, which will have the ability to collect and analyze the exchange of all data needed for successful preparedness for disasters and emergency situations at local level, making quality decisions about the procedure and operational action of the operational forces of the civil protection system, which include the competent headquarters of the civil protection and other operational forces such as, for example firefighters, local authorities, private companies, public enterprises and NGO's.

The special value of this project is that it focuses on the local level of the civil protection system and will result in the exchange of best practices between a member state of the European Union (Republic of Croatia), through Zagreb County, and other countries that are members of the European Union Mechanism for Civil Protection (Montenegro and North Macedonia) or want to become its members (Albania and Bosnia and Herzegovina).

This document describes features of the system that will serve as educational material on the use of the IT platform for the area of the City of Skopje.



Image1. COMMAND D system for the City of Skopje





2. BASIC FEATURES OF THE IT PLATFORM

In the process of designing and developing the COMMAND d platform, one of the primary objectives was to make the system user-friendly so as to enable the user to independently explore and use the basic functions of the system.

The IT platform will serve to integrate the existing hydro meteorological, seismological, cadastral, medical, firefighting, erosion, landslides and other data in Skopje.

The results of the project will facilitate and speed up the reception of data, GIS analysis/simulation of the development of events and data transmission in emergency cases. The project has established standard operating procedures in crisis, which will increase preparedness and connect all participants in the project through a common IT platform. The technical assessment of the capacity and needs of the civil protection system, management and rescue operations provide the basis for the analysis of the civil protection system and makes proposals for further development of the protection and rescue system in all phases of disaster management (planning, prevention, preparedness, response and recovery). In the IT platform, the data will be provided in the coming period by operation center 112, regional crisis management center 195, administration for hydro meteorological affairs, Automotive Union of Macedonia, EVN (data on interruption of electricity power) and PE "Water supply and sewerage" - (data on interruption and field work for water supply) in accordance with the positive legal norms of the Republic of North Macedonia.

This document contains basic instructions and guidelines on using the platform for all local users in the system. Each of the partners' data will be protected, that is, partners will have limited access to respective partners' data. At the request of each partner, the system can be adapted to local needs (names of layers with data, map key, set of attributes/data on individual facilities on the map, etc.) in a way that suits the partner.

2.1. System entry and system administration

The platform is designed as a web application for a number of reasons. Some of the reasons for choosing a web platform over desktop application include the following:

- Ease of access; to access the system, only an Internet connection is required, and the system can be entered through any device (mobile device, tablet, PC, laptop, etc.) The user is not limited to a single computer, as is the case with desktop systems.
- No (local) upgrades for users to be concerned with,
- Storage space (disk space),
- Easy integration with other systems,
- Access from different locations (office, field, etc.),
- Data security,
- Possibility of creating an unlimited number of system users,
- No added costs when adding new users,
- An unlimited number of system users can simultaneously work in the system,
- Simple adjustment of users' rights (to view data and edit data),
- Speed of data entry, data update and data exchange; every change to the data is automatically visible to all other system users (changes in real time).





The platform can be accessed through any web browser (Firefox, Google Chrome, etc.), via address: <u>https://commandd.pipgis.eu/</u>. On home page, user registers using a username and password. The super (master) administrator creates the system administrators for each project partner. The City of Skopje, as other project partners, appoints its system administrator.

The administrator of the City of Skopje is responsible for the security and reliability of the database and has the authority to review and change all data for the purpose of correcting errors. Also, the administrator can create system users, edit administrator rights, grant users the permission to change and view certain data, etc. In addition, local administrators (Partners' administrators responsible for user management) have the same competences. *Annex 1* of this document contains a Manual that is important only to users/partners who will have administrative approval to edit and/or update certain types of data.

The operational units of the City of Skopje and other relevant protection and rescue services which will find the use of this system of great importance will appoint authorized representatives (external users) to maintain and update the database or with an agreement the City of Skopje will implement this part with filling the platform with the given data.

Due to the sensitivity of certain data and its protection, the platform was created in such a way that the City of Skopje, like every project partner, has a "separate" system that administrators and authorized persons can access. Each of the partners reviews and edits its own database. Other partners will have insight into the data that will be submitted by each partner via a form (notification of major accidents/disasters).

Each "separate" system is adapted to the local language of the partner. The first reason why each system is adapted to the local language is that not all users understand the English language. The second reason is the faster and easier use of terms, because in major accidents and disasters, it is necessary to quickly analyze the data and make a decision.

The English language will be used for communication among all project partners. That is, English will be used for data exchange via form on major accidents and disasters.

2.2. Interface

After entering the system, a set of tools is displayed. The 80% of the tools are maps, and the rest are menus for managing the display of data in the system. The initial display can be adapted to the user's requirements or needs.

The basic interface consists of:

- o main menu
- o submenu
- o user menu
- \circ map view
- positioning menu





The system is fast. The user uses the mouse to zoom in and out on the map with the mouse, and the right-click allows the user to move left and right on the map.

2.2.1. Main menu and submenu

The main menu contains basic options for viewing, searching, activating and editing all layers in the system. The options on the main menu bar include:

- ➤ layers
- ➤ search
- ≻ data
- ➤ print
- \succ tools
- ➤ other

The submenu provides a detailed overview and selection of layers, base maps and tools under the activated option of the main menu.

2.2.1.1. Main menu option – layers

By enabling the option "layers "in the main menu, the following options can be managed in the submenu:

- a) Base maps
- b) Layers
- c) Active
- d) Map key

a) Base maps

This option enables the user to change the base maps. Public base maps are already default base maps (eg. OSM, Google Maps, Google Terrain and Google Satellite).

Layers are divided into groups and subgroups depending on the need. They contain all data in the base. By selecting a specific layer on the map, the objects of the selected layer will appear. Selecting an object on the map will open an attribute table on the right side with a database relating to the selected object.

Some examples of the database (layers) containing the following information's:

- \checkmark Address model
- \checkmark Street names
- ✓ Street segments
- \checkmark House numbers





- \checkmark Intersection nodes
- ✓ Borders
- ✓ Scope GUP 2012-2022
- ✓ Municipalities
- ✓ Settlements
- ✓ Fourth
- \checkmark Education facilities
- \checkmark Transportation
- \checkmark International transport stations
- ✓ Bus facilities
- ✓ Parking lots
- ✓ Wells
- ✓ Erosions
- \checkmark Category of erosions
- \checkmark Areas threatened by erosion
- \checkmark Erosive areas
- ✓ Flashpoints in torrential watercourses
- \checkmark Lands slides

All the above mentioned data, as well as the data that will be collected, will be continuously maintained and updated.

By combining layers, a number of various layers are displayed as desired - parallel use of several program modules.

b) Active

Active layers enable viewing the list of all active data layers (data display on the map).

Types of layers: linear (e.g. roads and streets) and polygonal (e.g. settlements that make up a certain area)

All active layers can be removed at once or individually as needed.

Layer visibility option allows one or more layers to be hidden and displayed again as needed.

All active layers can be stored and reused as needed.

c) Map key





Map key is important in navigating the map. The map key displays the meaning of symbols and colors of the currently selected layers.

2.2.1.1. Main menu option - Search

The search option is used to search the data available in the system database. Selecting the search option in the submenu displays a list of all searchable data in the system. After selecting any of the search options within the map, a table opens. The table is interactive, which means that when selecting a particular data from the table, the data automatically displays on the map base, and the attribute table related to that object displays on the right.

Selecting the magnifying glass icon enables data filtering. All data resulting from a search or filtered data can be exported in different formats (eg. CSV, GEOJSON, SHP, DXF, etc.), saved or shared with other users.

2.2.1.2. Main menu option – Data

The option contains modules tailored to the user's needs. It enables fast search and browsing. The Data icon currently consists of the options: *Locate data* and *Other options* (eg. Comments and Address Register).

The Address Register contains Street Register, which enables the transition between the administrative interface and GIS.

Option Comments enables recording events in space as points, lines and polygons, facilitates communication and data exchange among system users and attaching documents in any digital format.

Comments can be made anywhere on the map with no limitation in terms of number.

Comments are visible in the attribute table. They are changeable (comments can be changed and edited later). Each comment can be archived or permanently deleted.

2.2.1.3. Main menu option - Print

This option allows the user to arbitrary create and generate documents.

2.2.1.4. Main menu option - Tools

Measuring tools can be used for various analyses, assumptions and the like. Measuring tools can:

- measure distance from one point to another
- measure the surface of the existing polygon
- draw a radius and coordinates of an area.





2.2.1.5. Main menu option - Other

This option contains other tools and external services that provide the user with the information about data from the database or enable the user to share information with other users.

Other tools contain option that allows the user to download the map and view change history.

2.2.2. User menu

In the upper right corner of the interface there is a user menu which consists of: Admin panel and User data.

2.2.2.1. Admin panel

The Admin panel allows the user to switch between the Geoinformation System (map view with all relevant features) and the Administrator menu.

2.2.2.2. User data

The user data contains options My Profile and Logout. By selecting the option My Profile, basic information about the user is displayed, while the Logout option is used to log out of the system.

2.2.3. Map view

Map view makes up the largest part of the interface (80%) and shows the existing map bases and all data contained in the active layers. The map view has interactive features, which means that selecting any object of the active layer of the system automatically displays the attributes (information) of the selected object.

2.2.4. Positioning menu

It is located in the lower right part of the interface and includes the following options:

- zoom +/- (zoom-in or zoom-out option)
- disable zoom (zoom-in or zoom-out options are disabled)
- free scale
- tracking user's location (positioning the registered user on the map)
- full screen display (the program will be displayed across the full screen of the computer).





2.3. Basic part of the system in the section for the City of Skopje

Basic part of the system contains following information:

- Layer Hazardous Substances will contain the locations of all legal entities that dispose of hazardous materials in their warehouses
- Layer Legal Entities will provides an overview of all legal entities of interest for the protection and rescue system
- Layer Seismological active areas will provides information of the location of the earthquake
- Layer Simulation of industrial accidents
- > Layer *Zone for floods* will provide information regarding the floods
- Layer Protection and Rescue Service lists all the services that are currently in the system.

All the data mentioned above will be regularly updated and their real-time integration with the central Command d system as well as with other services in the protection and rescue system.





3. REAL TIME INTEGRETAION OF DATA

It is planned to deliver information in real time for the COOMMAND d data system from the following institutions:

- Operation center 112
- Regional crisis management center 195
- Administration for hydro meteorological affairs
- Automotive Union of Macedonia
- EVN (data on interruption of electricity power)
- PE "Water supply and sewerage" (data on interruption and field work for water supply).

The connection is expected to be carried out in the coming period in accordance with the positive legal norms of the Republic of North Macedonia.





4. CONCLUSION

The system provides the following:

- Simple and quick view of data
- Simple definition of rights (granting permission) to users and system and data administrators
- Data search on the map or in the table
- Data entry for internal users
- Possibility to grant permission for data entry to external users
- Data filtering and export
- Integration with other systems in the area of the City of Skopje
- Real-time integration with other data
- Real-time data integration in accordance with legal and technical possibilities.





Annex 1

Manual for editing or adding object geometry





1. Data editing





Image1. Zoom for vector view

There are several conditions that need to be met before editing. First, a layer must **be editable** (some layers are for orientation purposes only or cannot be arbitrarily edited, such as cadastre). Second, the user must have **permission to edit the layer** (granted by the user administrator in Admin panel). Furthermore, the user must be **zoomed in large enough** for the editing functions to become **active**. Automatic zooming to the minimum required scale is achieved by clicking the Zoom button to display the vector. Unlike the browsing mode where the map scrolling is done with a left click, in the editing mode the scrolling is done with the middle mouse button.



Image2. Editing geometry of the object





1.1. Data editing (point, line and polygon objects)

Before editing, the layer to be edited must be **displayed and activated**.

There are two ways to activate layers. One is to chose a layer to be edited from the folder Layers in the main menu. Activation is done by clicking the selected layer.



Image 3. Activating the layer through Main menu

Another way to activate a layer is to press the **CRTL** + **SPACE** keys which will open a menu on the map base with all layers/bases/tools displayed and typing in the search engine and clicking on the selected layer/base/tool activates that layer/base/tool. In the example below, clicking on a layer activates that layer. By activating the layer, it is possible to display objects on a map base.







Image 4. Activating the layers for display on map base using the CRTL+SPACE shortcut

Layer editing is done by clicking on the icon of the selected layer in the Main menu where the user selects the Edit geometry option to change the geometry in the system.



≲ 8 Q e -. + Add new technological accident Holders of dangerous substanc : III Attribute table Simulations of industrial accide 🖋 Edit geometry Search by ID T Filter 20 Zoom to layer extent ≓ Add to side by side vi -0 × Transparency

Image5. Activating layer editing options





1.2. Toolbar with options to edit or add object geometry

Clicking Edit Geometry option activates the geometry editing mode and **a toolbar with options for editing or adding object geometry** appears above the map view. The instructions on the use of each of the individual tools for editing or adding object geometry, as well as for editing and adding options for point, line and polygon objects respectively, are provided in the text below.



1.2.1. History

Undoing the latest changes is done by pressing the **CTRL+Z** keys, and repeating the changes is done by pressing the **CTRL+SHIFT+Z** keys. These functions are available by clicking



1.2.2. Adding new objects

Depending on the type of data in a layer (points, lines, or polygons), the system offers the option to add a point, line, or polygon object.

Geometry editing activation is the same for point, line or polygon objects. In case of **point objects** (children's playground equipment, baskets, vertical traffic signals, lighting posts, address register, etc.) when adding an object the toolbar will show the option of adding a point, or line in case of activation of **line objects** (links, pipelines, pedestrian and bicycle paths, etc.) or a polygon in case of activation of **polygon objects** (children's playgrounds, lawns, terraces, parking lots, road facilities, etc.).

Adding **point objects** can be done by clicking the icon *Add point [draw-Point]* which activates the tool to add new point objects. The text below specifies how to add new point objects.







ADDING NEW POINT OBJECT

After the user chooses the location for the new point object, the desired location is marked with a left click. The point of the newly created object will be displayed on the selected location on the map.

Changes then have to be saved.





ADDING ATTRIBUTES TO AN OBJECT

A new point object has been added. Left-clicking on the object opens the point object menu, where the user either enters data or selects the options from the drop-down menus in order to assign attributes to the selected point object. Changes have to be saved.

Image7. Adding a point object

Adding **line objects** is done by clicking on the icon *Add line [draw-LineString]* which activates the tool for adding new line objects. The line is drawn by left-clicking to add breakpoints. Double-clicking (the left mouse button is pressed twice in quick succession) completes the line drawing.







POSITIONING THE MOUSE POINTER

Position the mouse pointer at the initial location where the desired line object is to be drawn.

ADDING NEW LINE OBJECT Once the user specifies the starting location for the line, the line is drawn by left-clicking the mouse to add breakpoints. The line of the newly created object will be displayed on the map base. Doubleclicking (the left mouse button is



Image 8. Adding line object

Adding **polygon object** is done by clicking the icon activates the tool for adding new polygon objects.

pressed twice in quick succession) completes the line drawing.

Adding polygon [draw-Polygon] which

Position the mouse pointer at the initial location where the line object is to be drawn.



POSITIONING THE MOUSE POINTER

Position the mouse pointer at the initial location where the desired polygon object is to be drawn.





ADDING NEW POLYGON OBJECT

Once the user specifies the starting location for the polygon, the polygon is drawn by left-clicking the mouse to add breakpoints. Double-clicking (the left mouse button is pressed twice in quick succession) completes the drawing. The polygon of the newly created object will be displayed on the map base. Changes have to be saved.



Image9. Adding polygon object





1.2.3. Drawing a circle

There are two ways to draw a circle: by defining center and radius *Circle, center and radius [circle-center]* or by using three points *Circle, 3 points [circle-3points]*.



Circle. center and radius [circlecenter]

The user positions the mouse pointer in the middle of the circle and draws the border of the circle by moving the mouse. Double-clicking (the left mouse button is pressed twice in quick succession) completes the circle drawing. Lines and polygons are drawn in the same way.

Image10. Drawing circle (polygon) using the tool Circle, center and radius







Image11. Drawing the circle (line) using the tool Circle, center and radius

Circle, 3 points [circle-3points]

The user draws a circle by marking the border of the circle with three dots. Double-clicking (the left mouse button is pressed twice in quick succession) completes the polygon drawing. Lines and polygons are drawn in the same way.



Image12. Drawing circle (polygon) using the tool Circle, 3 points





1.2.4. Editing objects

Before editing the geometry, the user **marks** the object to be edited. The user must be **zoomed in large enough scale** to activate the editing options. There are three ways to mark an object by left-clicking the mouse button. The first is to click on the object. The other two ways to mark the object is by left-¬clicking on the map and dragging the cursor while holding the button.



Image13. Marking the object ,, to the left "that intersects with the area of choice



Image 14. Marking the object ,, to the right "that are within the area of choice





The breakpoints of the selected object can be edited using the tool *[modify]*.





MARKING THE OBJECT

Mark the object to be edited. The object can be marked by left-clicking the object..





MODIFYING THE OBJECT GEOMETRY

In order to move an existing breakpoint, place the pointer on the blue circle that marks the breakpoint, click the left mouse button and keep it pressed to move it to a new location.



Image15. Modifying object geometry

Objects are moved by clicking the icon *Move [move]*. Once the object is selected, hold the left button and move it to a new location. The initial location will have a dashed border.





Image16. Moving the object







Objects are rotated by clicking the icon *Rotate [rotate]*. Select the object you want to rotate by clicking on the object. On the map view in the Rotation angle menu enter the desired angle change and save the rotation change by clicking on the "check mark".



Image17. Object rotation

In order to widen or narrow down the polygon, or to move the line parallel for a defined distance, used the

tool **Offset** [offset]. On the example of a polygon, the user marks the polygon to be expanded/narrowed down, which is indicated by the blue line. At the same time, a line appears that connects the polygon and defines the distance by which the polygon will expand/narrow down. When the cursor moves to a new distance from the polygon, left-click and the polygon will change shape.









Splitting objects is done with *Split tool [split]*.



SPLITTING OBJECTS

Once the object is mark, left-click the point near the location where you want to split the object and draw a line that will split the object. The command ends with a double click.

Image19. Splitting the object

To reverse the direction of the line use the tool *Reverse line [reverse-line]*.



REVERSING THE DIRECTION OF THE OBJECT LINE

The direction of a line is marked by arrows. To reverse direction click on the tool when the object is selected.



Image20. Reversing the object line direction

Object mirroring features are available by clicking the icon *Horizontal mirroring [flip-h]* or

Vertical mirroring [flip-v].

1.2.5. Polygons

To make a hole in the polygon, you mark the polygon and click the icon Add hole in polygon [add-hole].



ADDING A HOLE IN POLYGON

After marking a polygon, draw a new polygon inside the existing one (the procedure is the same as when assigning a new polygon).







Conversely, if you want to delete a hole in a polygon, mark the polygon with a hole and activate the function

Remove hole in polygon [remove-hole]. Click on the outer border of the hole (it turns to lighter shades of blue) which will eventually disappear and leave the polygon without the hole.

To draw a polygon with right angles use the tool *Rectify angles [rectify]*. Once the polygon is marked, it left-click on the icon and the polygon angles will rectify.



RECTIFYING POLYGON ANGLES

Once the polygon is marked, leftclick on the tool to rectify the angles of the polygon. The polygon will have right angles.

Image22. Rectifying polygon angles

If an object can be both linear and polygonal, such as county projects, the functionality of creating an object

from line to polygon is available by clicking on the tool *Create polygon from line [line-to-poly]*.



Image23. Creating polygon from line





Conversely, to create an object from a polygon to a line, select the polygon and activate the function *Create line from polygon [poly-to-line]*.

1.2.6. Operations

To merge two polygons use the tools



MERGING POLYGONS

Union [union].



Mark the two polygons you want to merge and click on the tool icon. The result is a new polygon.



Image24. Merging polygons

To get a polygon that represents the difference between two polygons (everything that belongs to the first polygon, but does not belong to the second polygon) use the tool **Difference [difference]**. Select the polygons and click on the tool icon.



Image25. Difference between the two polygons





To make an intersection between two polygons use the tool **Intersection [intersection]**. Mark the polygons and click on the tool icon. The object that was marked first will be modified (the shape of the polygon will change), and the result is two polygons - one input polygon and one that represents the overlap.



Image26. Polygon intersection

1.2.7. Multigeometry

For multigeometry, mark the objects and activate the function *Create multigeometry [multi-join]*.

Conversely, to break the multigeometry of objects, select the objects and activate the Multi-break function



Break multigeometry [multi-break].





1.2.8. Other

To enable the drawing of an object whose breakpoints overlap with the points of the neighboring object use the tool *Enable snapping [wrap-snap]*.



Image27. Snapping

To delete objects, select the objects and press button

Remove selected objects [delete].

To copy objects, mark the objects and click on the icon *Copy objects [copy]*. The outline of the new object will be displayed. Move the cursor to a new location and click on the location where you want to copy the object.

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to display the dimensions of the object while drawing, click on the option **Display measures while** drawing [measure].



Image28. Displaying measures when drawing an object





If you want to draw an object with right angles or in line with a rectangular coordinate grid use the tool

Enable orthographic drawing [snap-ortho].



ORTHOGRAPHIC DRAWING OF AN OBJECT

When using the tool for orthographic drawing, yellow auxiliary lines appear to facilitate the drawing of objects.



Image29. Orthographic drawing of an object