



# M – ELROB 2010

Military European Land-Robot Trial

17.05. – 20.05.2010

Infanterieschule Hammelburg

REAL MILITARY TASKS, IN A REAL WORLD SCENARIO

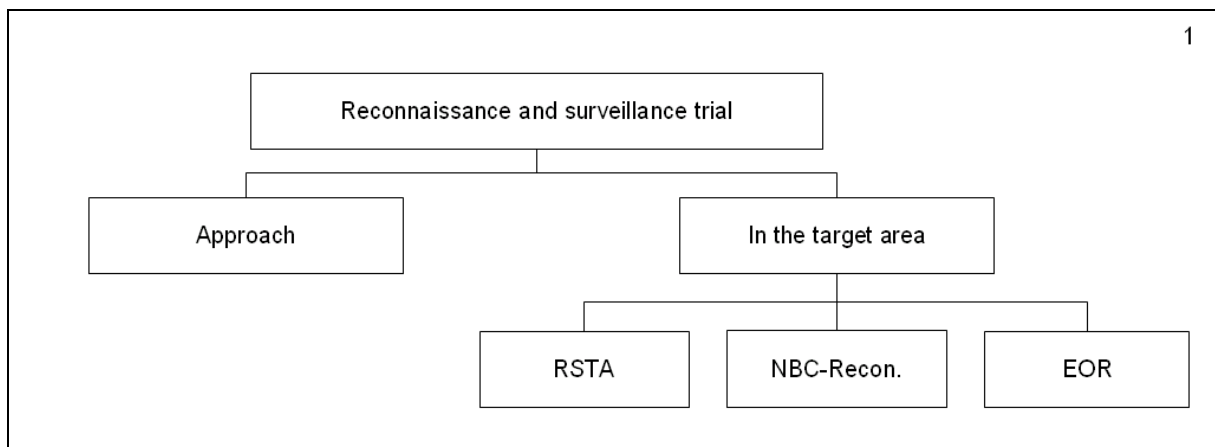
## Reconnaissance and surveillance

Reconnaissance and surveillance is a key military task. It can be divided into two phases. First phase is the undiscovered approach of the target area and second phase is the actual reconnaissance of the target area.

The way to reconnoitre the target area is done differently throughout the military branches. This can be general “reconnaissance, surveillance and target acquisition” (RSTA), “NBC-reconnaissance” or e.g. “explosive ordnance reconnaissance (EOR)”.

Due to this, the ELROB 2010 reconnaissance and surveillance trial is subdivided into independent tasks/trials which are done both by day and night.

To give more participants the chance to take part in ELROB 2010, you can choose in which parts of the reconnaissance and surveillance trial you want to participate.



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**Reconnaissance and surveillance - Approach**

To start in the night trial you have to successfully take part in the day trial.

## Environment:

Non-urban area, vegetation, grass, sand, water, stones, bushes, roads and paths.

## Situation:

A target point is located in up to 3000m (meters) distance and has to be approached.

There will be dynamic objects and static obstacles on the route.

Dead ends, sharp turns, virtual mine fields and narrow passages can occur.

Enemy presence at the route can be expected.

## Objective:

Approach target location with highest autonomy possible. Take a picture of the village that can be seen from the given target coordinate.

## Execution/Implementation:

Setup troop of max two people.

Acquire own position (not known/given).

Approach target location by using given UTM coordinate.

Traverse given waypoints (UTM coordinates) on the way to destination.

This should be done with maximum autonomy available.

Plot route on a digital map.

Take a picture of the village that can be seen from the given target coordinate.

If possible, transmit live position and imagery to the control station.

## Timing:

Max: Duration approx. 50 min.

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## Constraints:

There will be NO inspection of the operational area allowed or possible.

Each team has to name a “set-up assistant” and an operator.

These two people are the troop.

Only the operator is allowed to control the vehicle.

The troop (and material) will be moved to within vicinity of 50 meters to the location where the control station has to be placed.

The material required has to be moved by the troop from the unload location to the starting point.

The “set-up assistant” will leave the starting area (including control station) as soon as the vehicles have been started.

There will be no support at this location (Table, chair, electricity etc.).

The setup time counts as trial time!

The troop will receive a section of a digital map with UTM grid and measures and a target location in UTM co-ordinates.

See example.

Medium: USB flash drive.

The operator can control the vehicle by teleoperation, semi-autonomous (waypoint) or autonomous or in any combination of these methods.

The route will include mobile obstacles and on-the-fly modifications. For example, a dead-end can appear where the previous participant had a free road!

The scenario ends with reaching the target point and delivering the picture of the village or reaching time limit; what ever occurs first.

**Any data handling is part of the trial time.**

Any intervention by the team during the scenario is not permitted.

If for any reason the team fails they can use the next available (unallocated) start slot for a retry.

Every participant can retry as often as there are empty start slots available.

The daylight scenario serves as the qualification for the identical night scenario.

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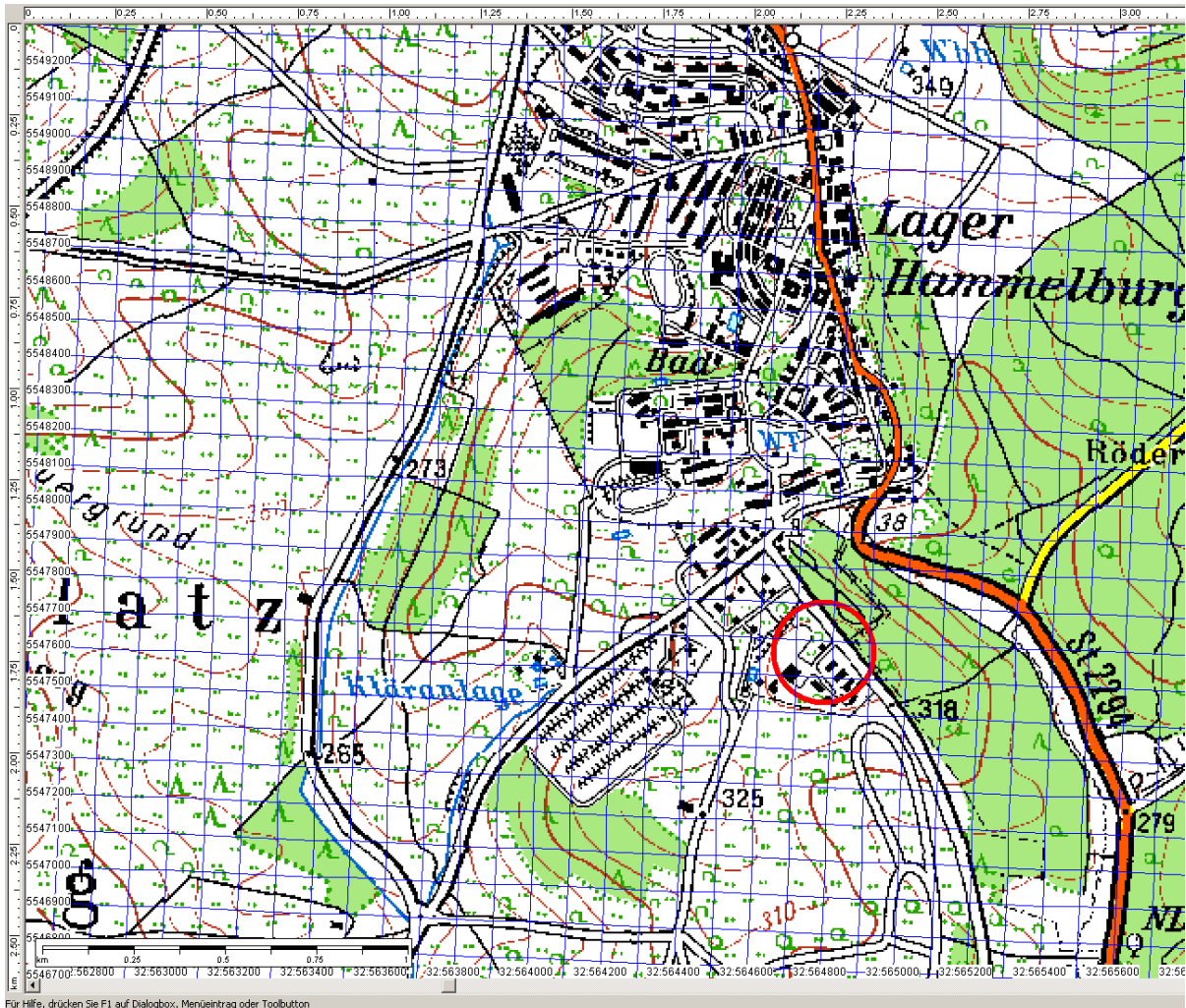
## Example

# UTM (GRS80)

2 waypoints

32U 564376.77 5547294.88

32U 564418.15 5547357.05



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**Reconnaissance and surveillance – The target area**

To start in the night trial you have to successfully take part in the day trial.

## Environment:

Urban area within a valley. The urban area consists of small buildings and homesteads which are spread with different distances between each other. Roads, footpaths, grassland complete this area. Barricades, barriers or any kind of blockades can occur.



Target area



Typical building in the target area

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## Situation:

A defined urban area has to be explored and monitored for threats (static and dynamic).

Situation at this location is unclear.

There will be dynamic objects and static obstacles present.

Enemy presence in the area can be expected.

Reconnaissance without risking own personnel is required.

Your system is already at the in the target area!

Target area is the same for RSTA, CRNE-Recon and EOR.

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**Reconnaissance and surveillance - RSTA**

## Objective:

Perform reconnaissance at target location with highest autonomy possible.

Gain situational awareness of the environment by

- reconnoitring inside and outside buildings and the environment in distances from 50m up to 1000m,
- detection and identification of possible threats, like:
  - suspicious persons and vehicles,
  - weapons and ammunition,
  - barricades, barriers, blockades,
  - acoustic signals (weapon fire, discussions etc.) ,
  - heat sources from vehicles, fires or persons

If anything suspicious is found acquire imagery and position and report to control station.

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**Reconnaissance and surveillance – CRNE -Recon**

## Objective:

Perform CRNE reconnaissance (and if possible CRNE sampling) at target location with highest autonomy possible.

Gain situational awareness in the environment by

- reconnoitring inside and outside buildings and the environment in distances from 50m up to 700m,
- detection and provisional identification of possible CRNE threats, like:
  - Chemical Agents, Toxic Industrial Chemicals
  - radiation (low level radiation and/or operationally significant level of radiation) and/or
  - explosives

If found anything suspicious, acquire imagery, CRNE measurements and if possible samples, threat position and report data to control station.

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**Reconnaissance and surveillance – explosive ordnance reconnaissance (EOR)**

## Objective- Day:

Perform reconnaissance along-side a route in the target area with highest autonomy possible.

Detect and take pictures of suspicious objects (possible IEDs, ammunition, explosives, wires etc.) under, beside or on the road without touching them.

If anything suspicious is found, acquire imagery and position and report data to control station.

## Objective- Night:

Approach a given point (location of explosive ordnance that has been found) on a road while detecting and circumnavigating possible obstacles or wires with highest autonomy possible.

Reconnoitre the environment of the location, approximately 900sqm, and detect any explosive ordnance without touching any part of it/them.

If anything suspicious is found acquire imagery and position and report to control station.

Return to starting point.

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## Timing (RSTA, CRNE and EOR):

Max: Duration approx. 60 min.

## Execution/Implementation (RSTA, CRNE and EOR):

Setup troop of max two people.

Acquire own position (not known/given).

Explore and monitor target area without line-of-sight to your system. (your system will already start in the named area of interest).

This should be done with maximum autonomy available.

Plot route in digital map, if possible attribute available map with new sensor information.

Mark threats and environment changes in the map separately & distinguishably, acquire imagery with position (UTM coordinates) and report data to control station.

If possible, transmit live position and imagery to the control station.

## Constraints (RSTA, CRNE and EOR):

There will be NO inspection of the operational area allowed or possible.

Each team has to name a “set-up assistant” and an operator.

The two people are the troop.

Only the operator is allowed to control the vehicles.

The “set-up assistant” will leave the starting area (including control station) as soon as the vehicles have been started.

There will be no support at this location (Table, chair, electricity etc.).

The setup time counts as trial time!

The troop will receive a section of a digital map of the area and the virtual perimeter of the area (boundaries of the area to inspect) or the target point; both in UTM coordinates.

See example.

Medium: USB flash drive.

The operator can control the vehicle by teleoperation, semi-autonomous (waypoint) or autonomous or in any combination of these methods.

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The route will include mobile obstacles and on-the-fly modifications. For example, a dead-end can appear where the previous participant had a free road!

The scenario ends with reaching time limit.

**Any data handling is part of the trial time.**

Any intervention by the team of the troop during the scenario is not permitted.

If for any reason the team fails they can use the next available (unallocated) start slot for a retry

Every participant can retry as often as there are empty start slots available.

The constraints are identical for the night scenario.

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Examples for possible threats:



Threat: person with weapon



Threat: wired object

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Threat: person with weapon



Threat ?: loitering with intention?

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Threat: person with weapon



Threat: person with weapon

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Threat: person wearing parts (!) of a uniform



Threat: wired object

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Threat: suspicious installation



Threat: barricades, barriers, blockades

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Threat: suspicious wreck



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Threat: suspicious vehicles



Threat: potential radioactive source

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Threat: potential Toxic Industrial Chemicals



Threat: potential laboratory to produce chemical agents

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