M – ELROB 2010

Military European Land-Robot Trial
17.05. – 20.05.2010
Infanterieschule Hammelburg
REAL MILITARY TASKS, IN A REAL WORLD SCENARIO

Military transport tasks can be roughly divided into two broad areas, those for dismounted soldiers and those for vehicles, e.g. trucks as a part of convoys.

Movements of personnel, material, humanitarian aid etc. are routine tasks on missions. In hostile environment these movements are dangerous, because convoys always attract attacks like roadside IEDs etc.

Dismounted troops have to carry ever more and heavy kit when on a mission. This tends to distract them from their actual tasks and tires soldiers out. MULE is a particularly apt description for such carrying tasks.

Due to this the ELROB 2010 transport trial is subdivided into independent tasks/trials.

To give more participants the chance to take part in ELROB 2010 you can choose to take part in either one or both parts of the trial.
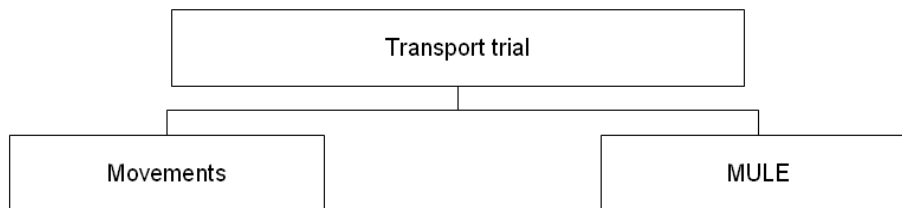
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Transport trial

Environment:

Non-urban wooded, hilly terrain with roads and paths (e.g.: asphalt, loose chippings, concrete, dirt road).

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Transport-Movements

Situation:

There is a delivery for a camp within approx. 7-14 km.

A group of at least two vehicles has to be moved to this camp.

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 transport route can be expected.

Therefore the transport should be executed without risking own personnel.

Objective:

Move at least two vehicles of at min. 50 kg each to the target location as fast as possible and with highest autonomy possible.

Execution/Implementation:

Only one vehicle can be manned!

Acquire own position (not known).

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

Approach should be done with maximum autonomy.

Acquire position of vehicle using UTM coordinates.

Plot route in digital map.

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

There will be three (3) levels of difficulty. The first two (2) routes are standard and shall be driven by all scenario participants. You can drive level two only if you have successfully mastered level one. The third level is optional and can be inspected before hand.

Timing:

Max: Duration approx. 60 min.

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Constraints:

There will be NO inspection of the operational area permitted 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 vehicles.

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

There is only one control station allowed, either vehicle mounted or stationary outside the vehicle.

Exception: If there is a safety assistant absolutely necessary (meaning that there is definitely NO other technical solution, e.g. radio emergency stop like on DARPA Grand Challenge and also requested by our rules) the safety assistant can sit in the unmanned vehicle. His position in the vehicle is exclusively limited on the front passenger's seat or on the back seat!

There will be no support at starting location (table, chair, electricity etc.).

The setup time already counts as part of the trial time!

The troop will receive a section of a digital map with UTM grid and UTM co-ordinates that have to be traversed in the given order.

See Example.

Medium: USB flash drive.

The operator can control the vehicle by teleoperation, semi-autonomous (waypoint, electronic drawbar) 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 location or time limit, what ever occurs first.

Any data handling is part of the trial time.

An intervention of 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.

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Example

UTM (GRS80)

12 waypoints

35W 427433.55 7216222.93

35W 427241.47 7216235.05

35W 427117.71 7216185.88

35W 427088.03 7216191.55

35W 427108.11 7216218.62

35W 427520.44 7216880.68

35W 427503.51 7216931.69

35W 427481.76 7216963.17

35W 427476.80 7217015.29

35W 427502.91 7217047.02

35W 427503.51 7216931.69

35W 427565.50 7216725.99

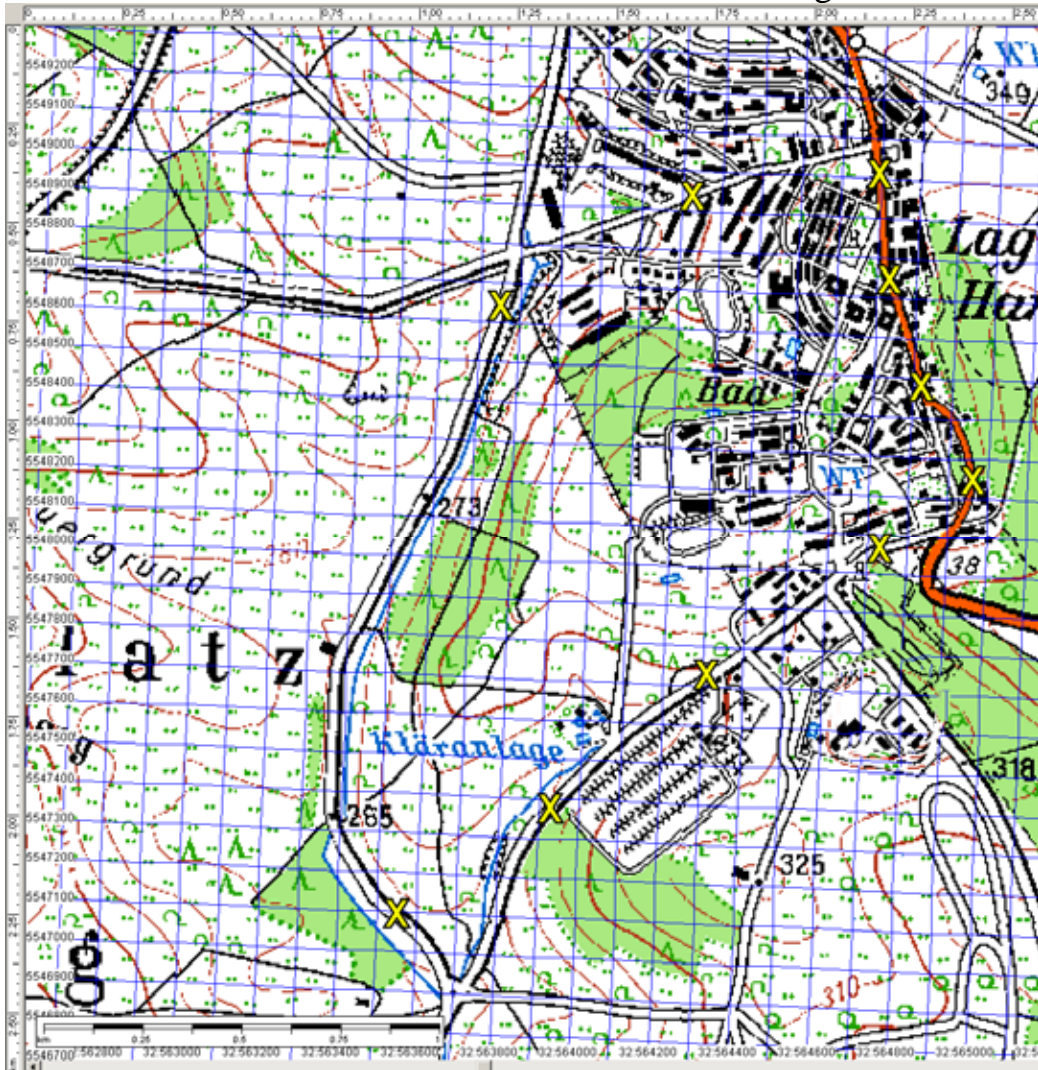**!!! The document is subject to change and refinement!!!**

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Example

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Transport-Mule

Situation:

There are two camps with a distance of approx. 2 km in between.

A vehicle should serve as a "mule" between the two camps carrying as much payload as possible .

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 transport route can be expected.

Therefore, the transport should be executed unmanned to avoid risking any personnel.

Objective:

Shuttle with the highest achievable autonomy as often as possible between two points P1 and P2 carrying as much payload as possible.

Execution/Implementation:

The MULE (Multiple Utility for Logistic Equipment) system is delivered to a starting point.

From there it has to reach a given loading point (P1) with highest autonomy possible.

From this loading point a person will then lead the MULE vehicle from P1 to a turning point (P2).

From there the vehicle has to shuttle with highest autonomy possible between both points (P1, P2) carrying equipment.

If your vehicle can not reach a point given by coordinates:

The vehicle will be allowed to start at loading point (P1).

If you can't follow a person for teach-in:

The turning point (P2) will be given by coordinates directly.

Setup a troop of two people.

Only one vehicle can be used.

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Acquire own position (not known).

Approach loading point by using given UTM coordinates.

Approach should be done with maximum autonomy.

Follow a person with maximum autonomy from loading to turning point.

The turning point is decided by the person walking in front (teach-in) or alternatively given before the trial (no teach-in possible).

Acquire position of vehicle using UTM coordinates.

Plot route in digital map.

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

Timing:

Max: Duration aprrox. 60 min.

Constraints:

There will be NO inspection of the operational area permitted 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.

There will be no support at starting location (table, chair, electricity etc.).

The setup time counts as trial time!

The "set-up assistant" will leave the starting area (including control station) as soon as the vehicle has been started.

There is only one control station allowed, either stationary or carried by operator (for teach-in).

The troop will receive a section of a digital map with UTM grid and measures.

See Example.

Medium: USB flash drive.

The operator can control the vehicle by teleoperation, semi-autonomous (waypoint, teach-in) 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!

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The scenario ends with reaching time limit.

Any data handling is part of the trial time.

An intervention of the troop during the scenario is not permitted.

If for any reason the troop 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.

Example

UTM (GRS80)

1 waypoints

35W 427433.55 7216222.93

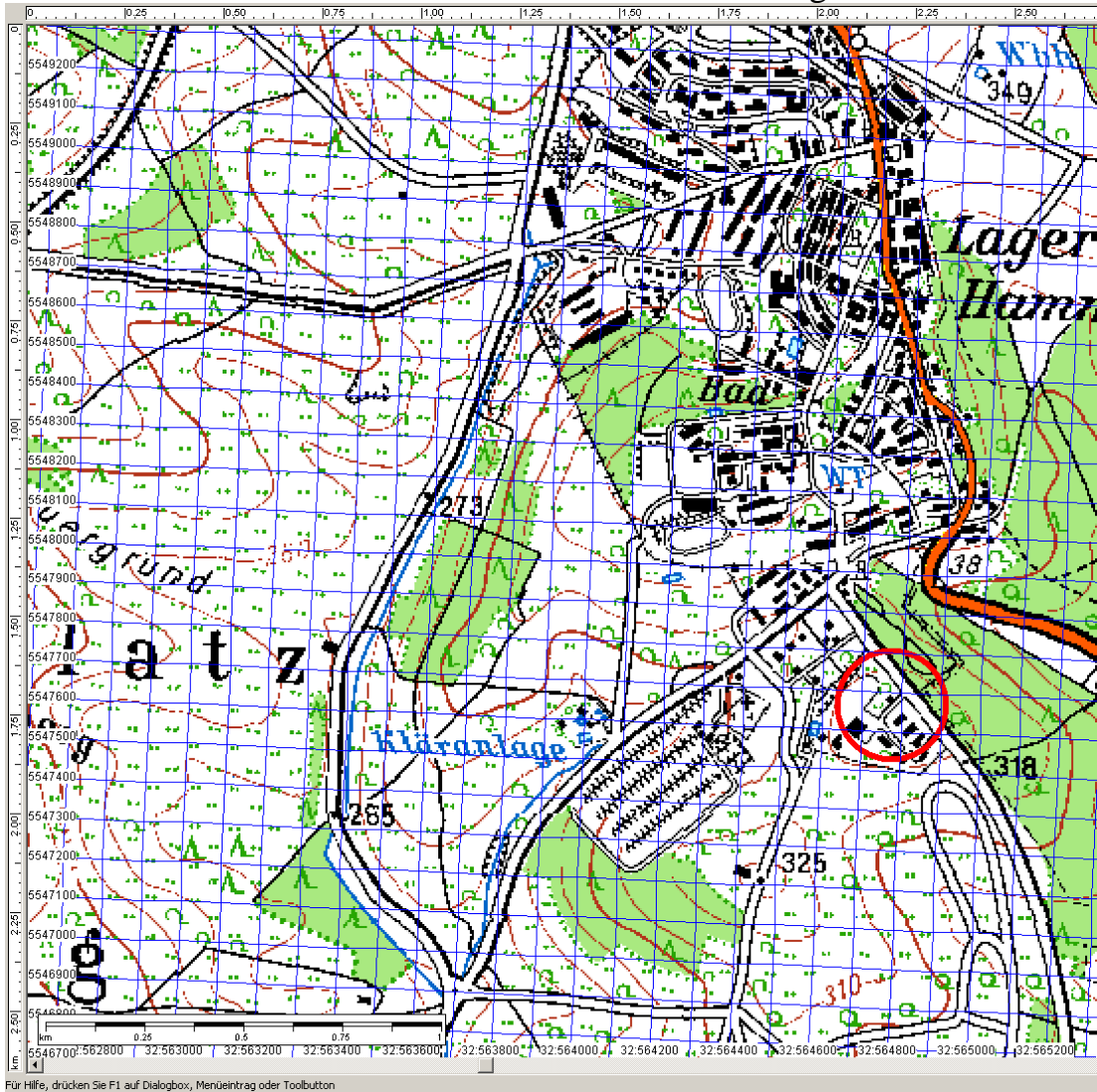**!!! The document is subject to change and refinement!!!**

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