Description of DAC [Dynamic-AI-Creator] by Silola

The main elements of DAC are:

-Dynamic creation of units

-Dynamic creation of waypoints

-Dynamic behaviour of units

These three elements are optimal balanced on each other and causing an extremly dynamic destrict where the mapper wants to.

A further more element of DAC is that it is quite simple to place into missions,although DAC is very complex. DAC gives a lot of flexibility to the mapper.DAC can also be placed into already existing missions.

The **[Dynamic-AI-Creator]** is for Sp and MP as well.

The zones

The mapper creates so called AI-Zones by setting a trigger on the map (pic 1 / **Abb.1**).The size and position is free chooseable. The trigger must be a rectangle and may not been spinning.

In these zones random waypoints will be created and saved by the DAC (pic 2 / **Abb.2**).
The number of that waypoints is free chooseable.

In the next step a certain number of waypoints will be choosen of that waypoint pool (pic 3 / **Abb.3**) to create a group of units.

So created groups will be randomly positioned to their waypoints
and follow randomly their waypoints (pic 4 / **Abb.4)**.

Imagine, a few groups are created in one zone, getting their waypoints of one pool
(the exp. down just reflects one group), so the possibility is given that more than one group is using the same waypoints. But that is intended.

In each zone a high dynamic is created by this system, which regenerates new by every restart of the mission. As big a zone is choosen,as bigger the dynamic will be.

Abb. 1

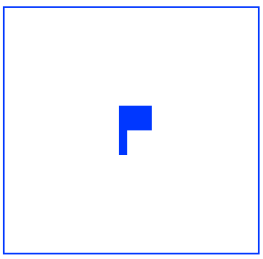


Abb.2

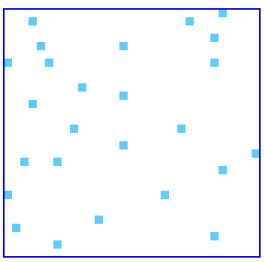


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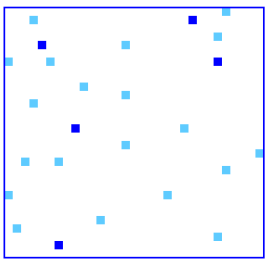
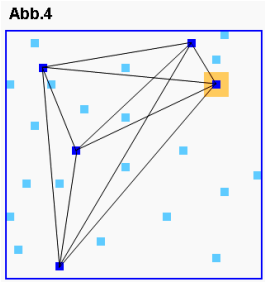


Abb.4



To combine zones

This however not enough. The dynamic can be substantially increased by combining zones.
As the following examples will show.

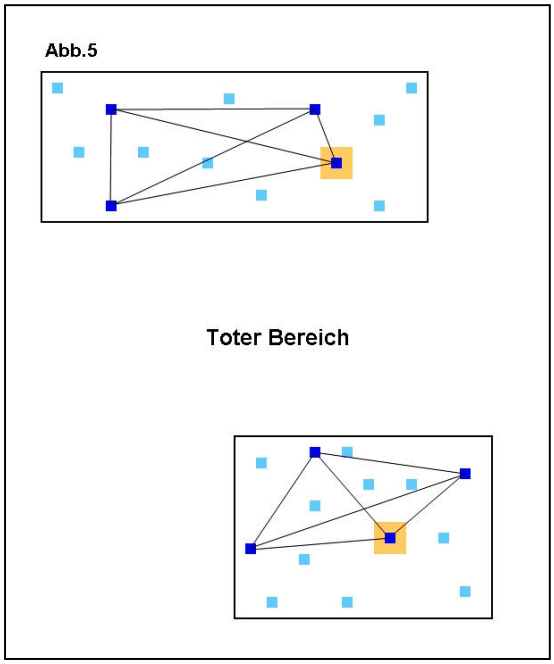
(following examples are simplyfied for better understanding)

As mentioned, you can create more than one zone,
by copy and paste and changing names and perhaps
if needfull changing size.

Pic 5 **(Abb.5)** shows two zones which are working so
called "local". Each units moving just in their zones,
following their given waypoints.The dynamic is just in one zone.

Between the zones the player is moving in "dead zones",
where the player is safe, because no enemy unit is moving in it.

(Toter Bereich = dead zones)



But you can also link two zone with each other.

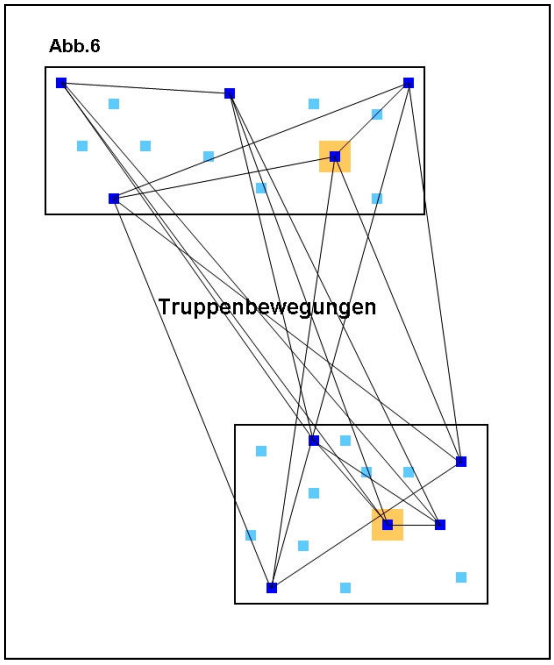
Requirements is, that the same unit type is created
and so the same waypoint type belongs to the units,
to link the zones with each other.

Basicly that means, all waypoints of a linked zone belongs
to one pool, so that all groups of all linked zones can get
the pools´ waypoints.

Result is a unit movement between the zones **(Abb.6)**

(Truppenbewegung = unit movement)

The zone will be linked with each other by their zone-ID-number.
Zones with the same ID will automatically be linked.



At this point i want to clarify that no script needs to be modified. Everything works in the editor ☺

Pure waypoint zones

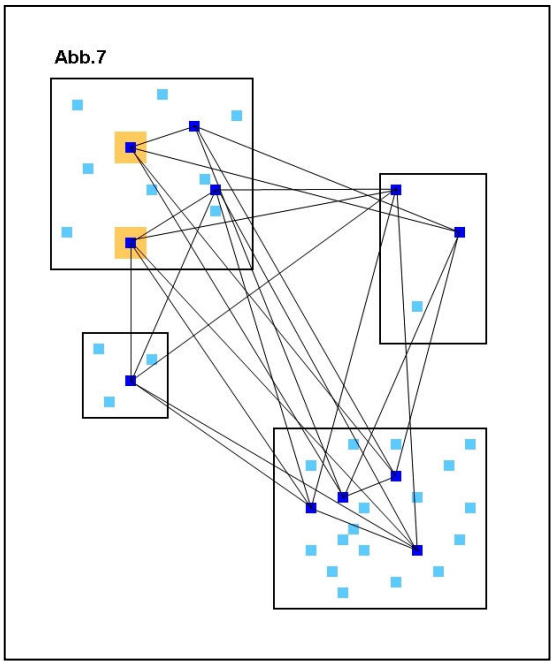
We just talked about unit-zones unitl now.
Zones in wich waypoints and units are created.
It is also possible creating pure waypoint zones.

These waypoint zones give other unit-zones
more waypoints to use (pic 7 / **Abb.7**)

Another advantage by using waypoint zones
is that no units are created in it but in on going
mission time units from the main zone will appear.

As much waypoints are created in one zone
as higher the chance of appearing units.

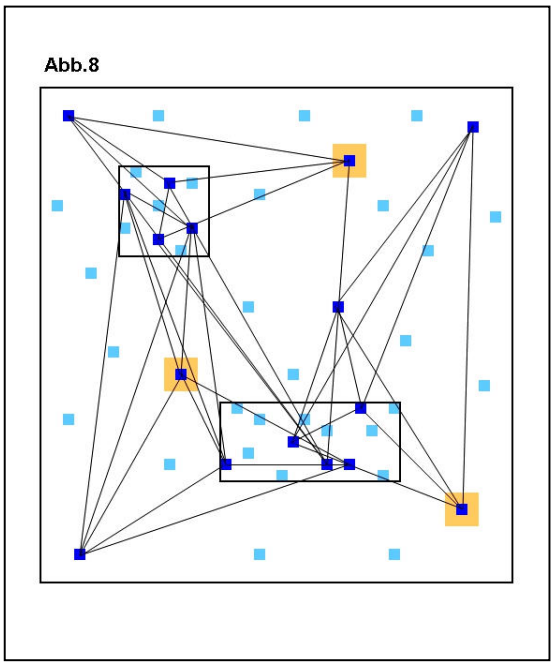
At pic 7 (**Abb.7**) you see that the most southern zone is
doubled sized to the opposite northern main zone.
So the chance of taking waypoints from the
southern zone pool is comparely bigger.



You can also link a few small zones in a big one (pic 8 / **Abb.8**).

So you are able creating a higher volume of waypoints
per square which set up the chance of appearing units as well.

You can also create a big zone about a complete island.
Made in a few seconds.



Btw. it is also possible taking apart another unit-Addon
in each zone.That requires that you own that addon
and the units are mentioned in the unit-config-script.

In that config script you can save as many individual
unit-cofigurations as you want,that will be mensioned
by their ID in each zone.

So you are able setting BAS-Units to a zone,
RHS-Units to another zone or setting other units
to those zones.

As well each side is free chooseable, so RHS units are able to be created as west units ...no fronts
are given. Each zone is individually configurable.

Activating zones

Another usefull element of DAC is to create the AI in the zone at a certain time during the mission

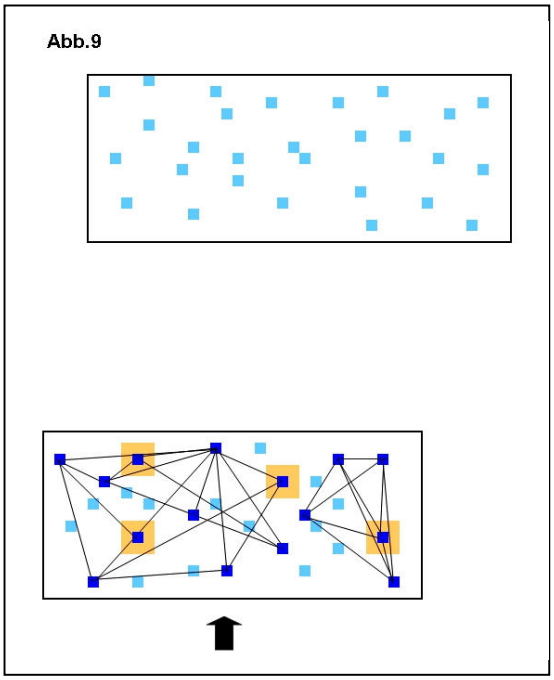
Simply example at pic 9 (**Abb.9**)

In this example the player begins anywhere in the south, where supposely "object status one" of your mission is. This zone will be generated directly after starting the mission.

The next zone is in the north, where "object status two" is.

That northern zone can be on "standby".This means that everything is prepared in the zone but no unit will be created before activating.So resources will defintely be safed.

Abb.9



Deactivating zones

Staying to our example:The player passed first mission objective and is moving north.

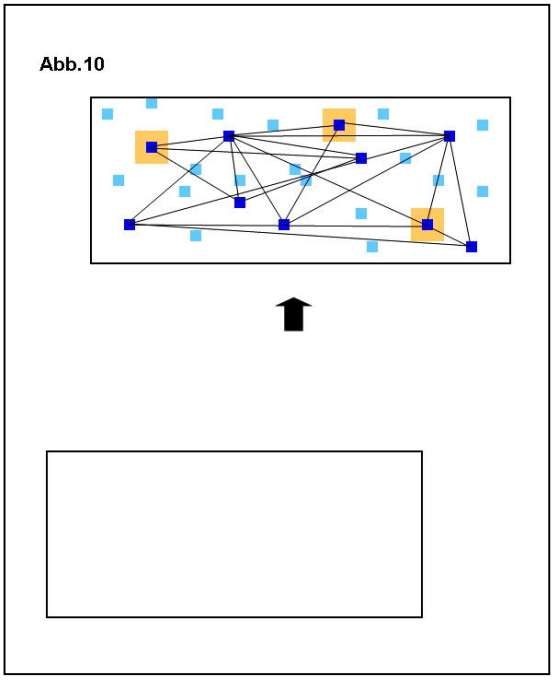
At anytime the northern zone will be activated or the units will be created.

It would be pregnant deactivating the southern zone and deleting the implemented units.

Even this is possible in DAC.To a certain condition the zone will be deactivated.

By (de-)activating of zones and a certain mission plan you can safe a lot of performance.

Abb.10



Finding waypoints

The generation of waypoint is the heart of the DAC. Without this functionality this project could not have been realized.

A further small innovation is that you do not have to hand any positions to any scripts, if you shift zones or its size because the DAC automatically picks out the zones and takes its info to appropriate scripts hands.

The units are always generated exactly where you place the triggers.
This mechanism makes DAC also so easy and also particulary simple in handling.

Ok ... back to the main theme:

We just talked about generating waypoints but not about how it works.Creating random position in a certain area is not that hard.The DAC needs diferenced orders about a random creating position.

Before setting a waypoint the position needs to be proved of valuation.
There we got three elements the script needs to look for:

Element1 = **waypoints may not be onto water (** pic 5 / **Abb.5)**

Element2 = **waypoints for vehicles may not be into the woods (** pic 6 / **Abb.6)**

Element3 = **waypoints may not be in houses (** pic 7 / **Abb.7)**

Abb.5

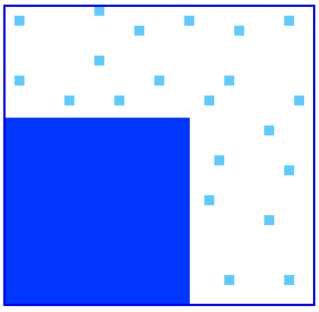


Abb.6

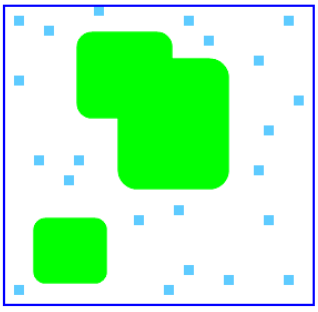
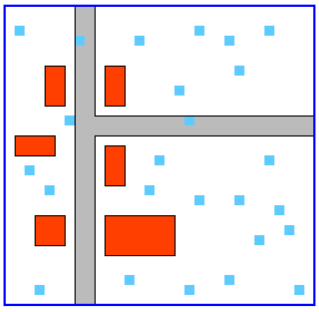


Abb.7



You need one more element if generating helicopters and choppers.Air vehicles need no generated waypoints (in airspace of ofp are no static objects), that so saved time will be used for looking for load and getin places on the map.

The needed element needs to be called:

find a position in the zone,in which radius are no or just small objects.The area needs to be quite flat.

This element is just value for airvehicles.

Optional you got two more elemts to look at by generating waypoints:

Optional element1 = **certain distance to each waypoint in one zone**
Optional element2 = **maximal height,which is not able to get over**

You see the script is doing lots of useful stuff ;-)
Your work is to place one or more zones on the map and to configurate them. DAC is making the rest:-)

Configuration of the zones

The zones will be configurated by a scriptcall by "activation". Following parameters are in use:

1.Array = Zonemode

IndexNr. : to link zone with each other
ActivateNr : the creation of units can be linked to a condition
Deactivate Nr : the erasure of units can be linked to a condition

2. to 5. Array = UnitClass

In each zone up to 4 units.categories can be created.

The 4 categories are: **infantry**, **unarmed vehicle**, **armed vehicles**, **choppers/helicopters**

For each category an own waypoint pool is created,to which the group belongs.
The parameter for each category looks as follows:

GroupCount : Number of groups ,created in one zone
UnitCount : The side to which the units belong to
ZoneWPCount : The number of waypoints, which are generated in the zone
GroupWPCount : The Number of waypoints that belong to each group
GroupArray : This parameter is optional. All groups of this categorie of this zone are saved to a global array, to respond later.

6.Array = ZoneBase

UnitConfigNr : Nr. of unit configuration (as much as you want can be created)
ZoneSideNr : The side to which the units of the zone belong to
ZoneSkillNr : Units skill that belong to the zone (random or 3 randomsteps)

Dynamic behaviour of units

All generated units are equipped with a AI-Addon that possesses the following characteristics:

detect, follow, attack, seek, order reinforcements

The units of unarmed vehicles take a kind of walk at their waypoints to recon the area.The generated helicopters (with cargo) get an infantry group,that will save the landing zone or
will take a helping function to other units near them.Each and every group/unit move back to their waypoint after finishing their mission to follow the waypoint again.

I cancelled to take care for enemys behaviour on corpses and finished cigarettes etc ;-) ,so that i just keep care of the important behaviours. Not at last to safe resources.

There is still another further substantial point ,that represents to a certain extend characteristic:

The main elements,**so detect, follow, attack, seek, order reinforcements**,are added to the players´ group and all enemy units.These let certain situations become quite more dynamic, because you don´t get the feeling that enemy units just take a look at the players´back.Enough units,that cross the AI´s way required.

To be done

There are still a lot of possibilties to change and to add to the system or to integrate into the system.
All possibilities that are given by those zones ,in which areas however,are not completly grounded.

I am planning to do as follows:

Bases will randomly be created in the zones (more possibilities of configuration as well),which play their role in respawning.So there will be support and the possibility to refuel or to reammo.

At first i there will be simple bases for respawn....to be continued in this direction.

As well:

- static units ,exp. watchtowers, mg positions etc.
- static objects, exp. trees, gras, rocks, buildings etc.

Summary of the most important features of DAC

dynamic generating of units and waypoints in certain zones

extreme high dynamic, that will be generated new by each mission loading

chooseable size and number of zones (set in the editor)

each zone is configurable individually (set in the editor)

up to 4 different unit-categories are generateable each zone
(infantry, unarmed vehicles, armed vehicles, helicopters)

2 kinds of zones : unit-zones + waypoint zones

chooseable number of linkable unit-zones

chooseable number of linkable waypoint-zones

chooseable number of unit configuration can be created, that are mensioned by a zone

zone can be on "standby" to create units where and when you want

units of one zone can be erased

as well a erasing function

dynamic AI-Addon added (can be deactivate)

MP able

added dynamic weather script
(MP able; the only script running on all clients, remaining scripts runnig on the server)

waypoints are generateable and so balanceable

dynamic AI-respawn in dynamic generated bases (upcoming in an upgrade)

Ending words

The DAC takes a few second at the beginning of the mission for initialisation.
During this time **size of the zones are calculated**, **the waypoints are generated** and the **units are created**.
After this process the AI scripts are started and the dynamic takes its run.

I hope i was able getting your intrests with this description.

Finally a few words by a betatester

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changing the mission in adding the DAC is very simple and quick.

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2 missoin which had been added with DAC were a bit performance critic on pcs´with 1,7GHZ.
At one i changed 2 patrols (1inf;1tank) with one zone with 2 inf.-patrols and one zone
with one group of armed vehicles (-> more units than before) and i didn´t mention any performance lags.

At all my 3 missions i had no delay time at the start up.

It is a really big tool but with which mission are changable in a minimum of time.

To test DAC was no work,it was fun

I added during 10 min a complete island (malden) with enemy units,to fight with aircrafts against.
It is unbelievable how fast to deal with the DAC and create missons.
You never know where the enemy unit will appear,eveb as missionmaker oneself.

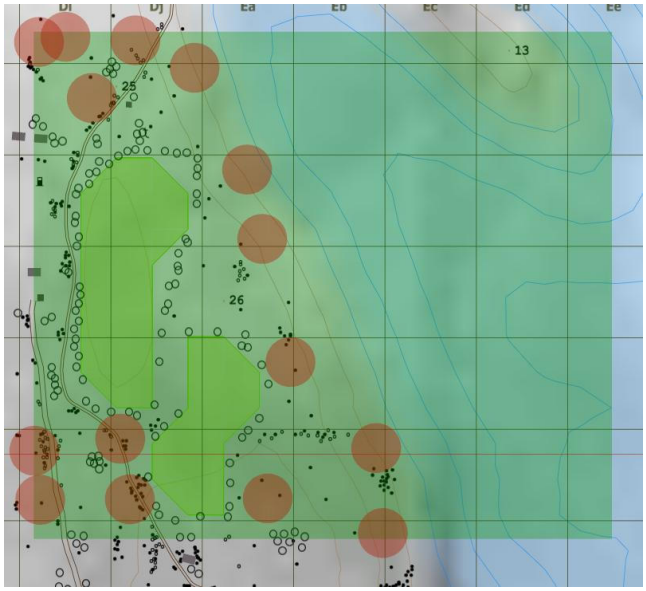
All in all an excellent work,in my eyes genial.

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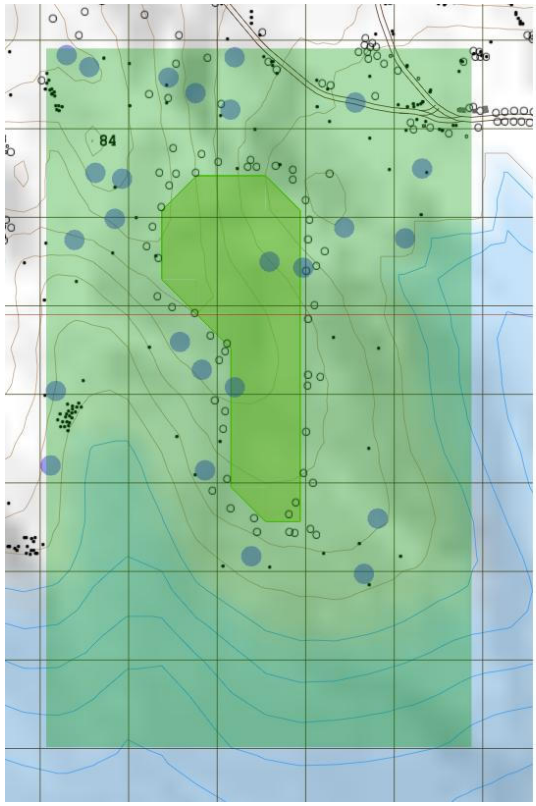
thanx for your attention

greetz **Silola** [Mapfact Member]

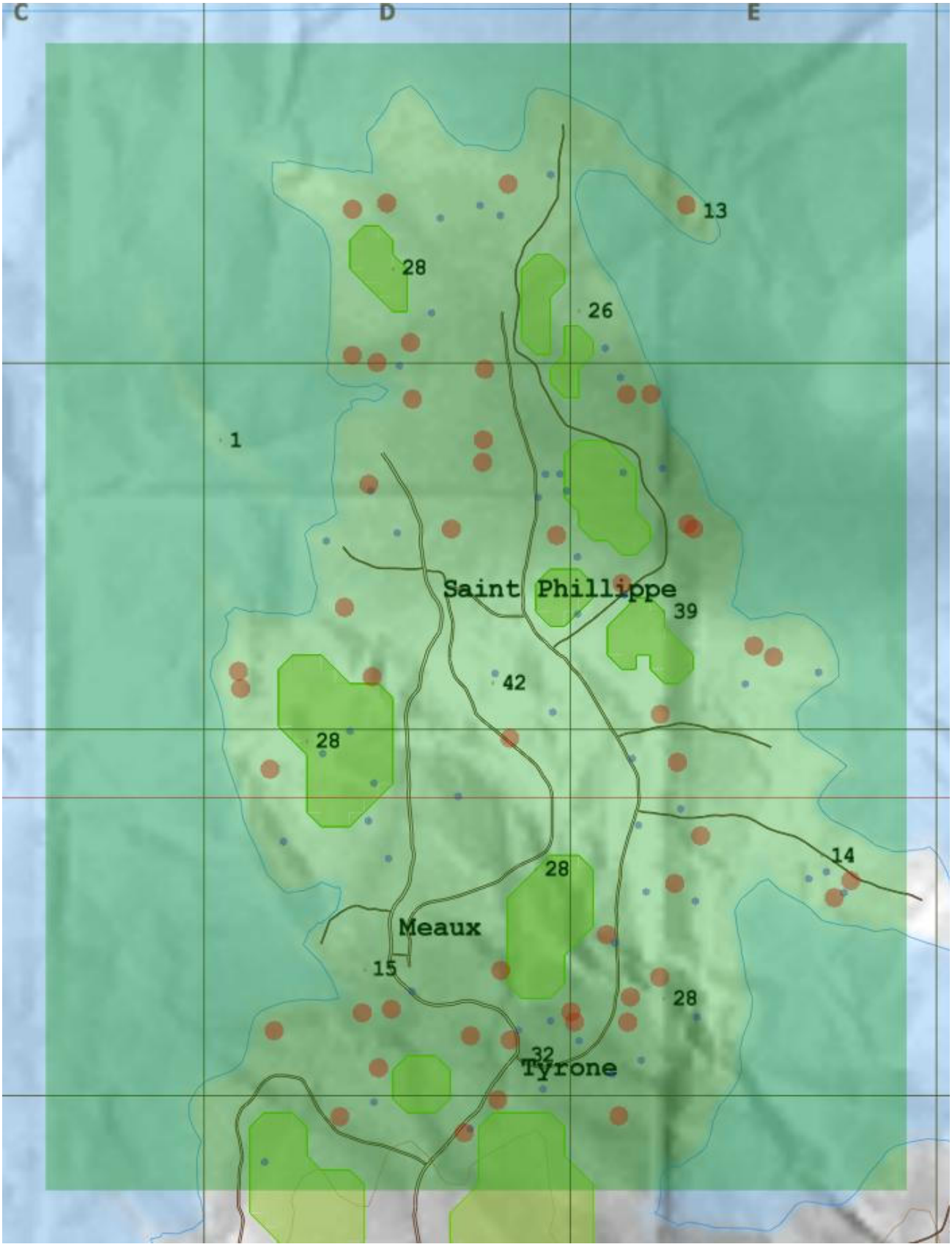
[a small zone with waypoints for vehicle units]
[none waypoints on water and in the forest]



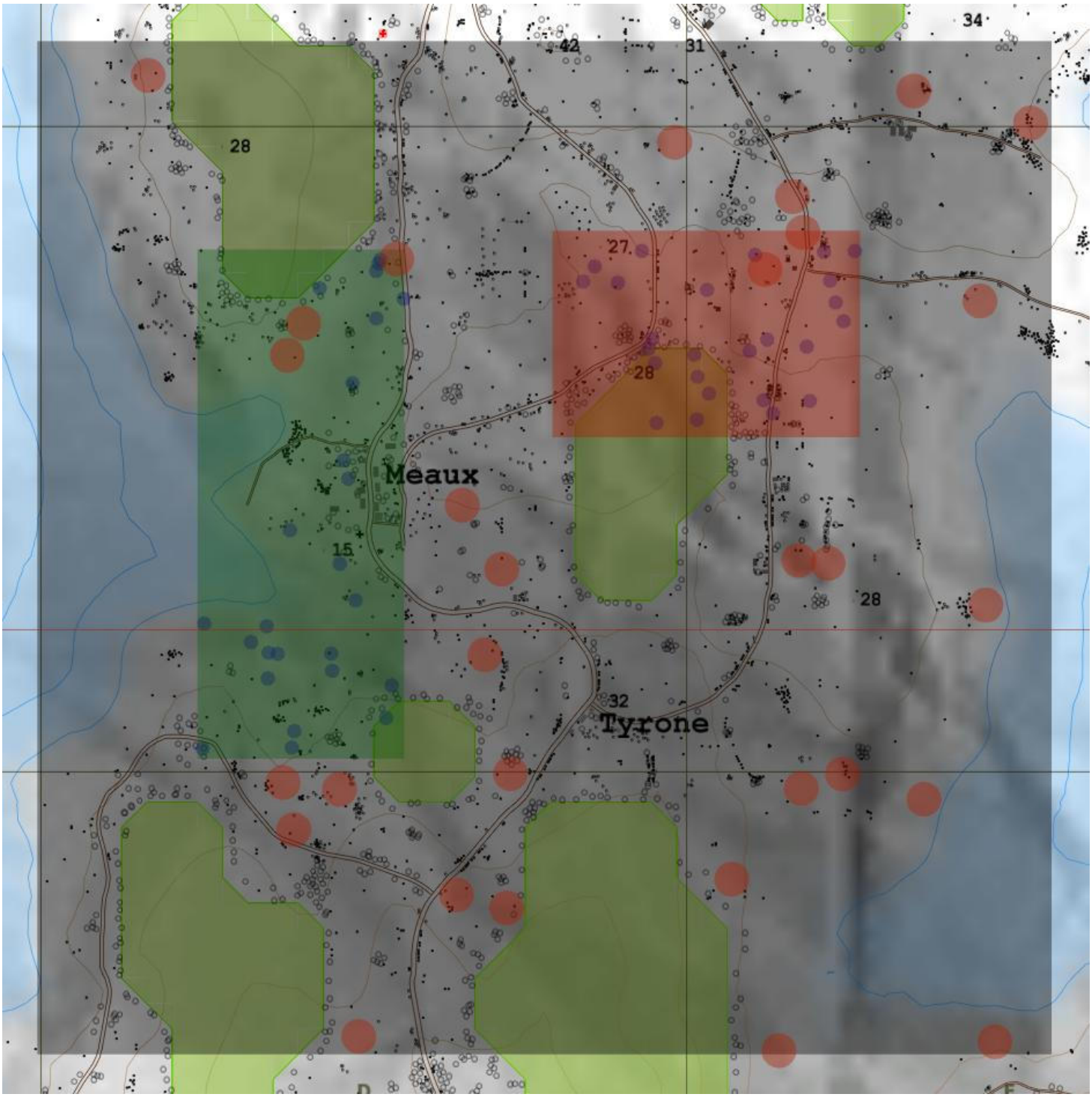
[a small zone with waypoints for infantry units]
[none waypoints on water however in the forest]



[a big zone over north everon with infantry-waypoints (blue) and vehicle-waypoints (red)]



[a big zone with vehicle-waypoits and two small zones with infantry-waypoints]



That’s all ☺