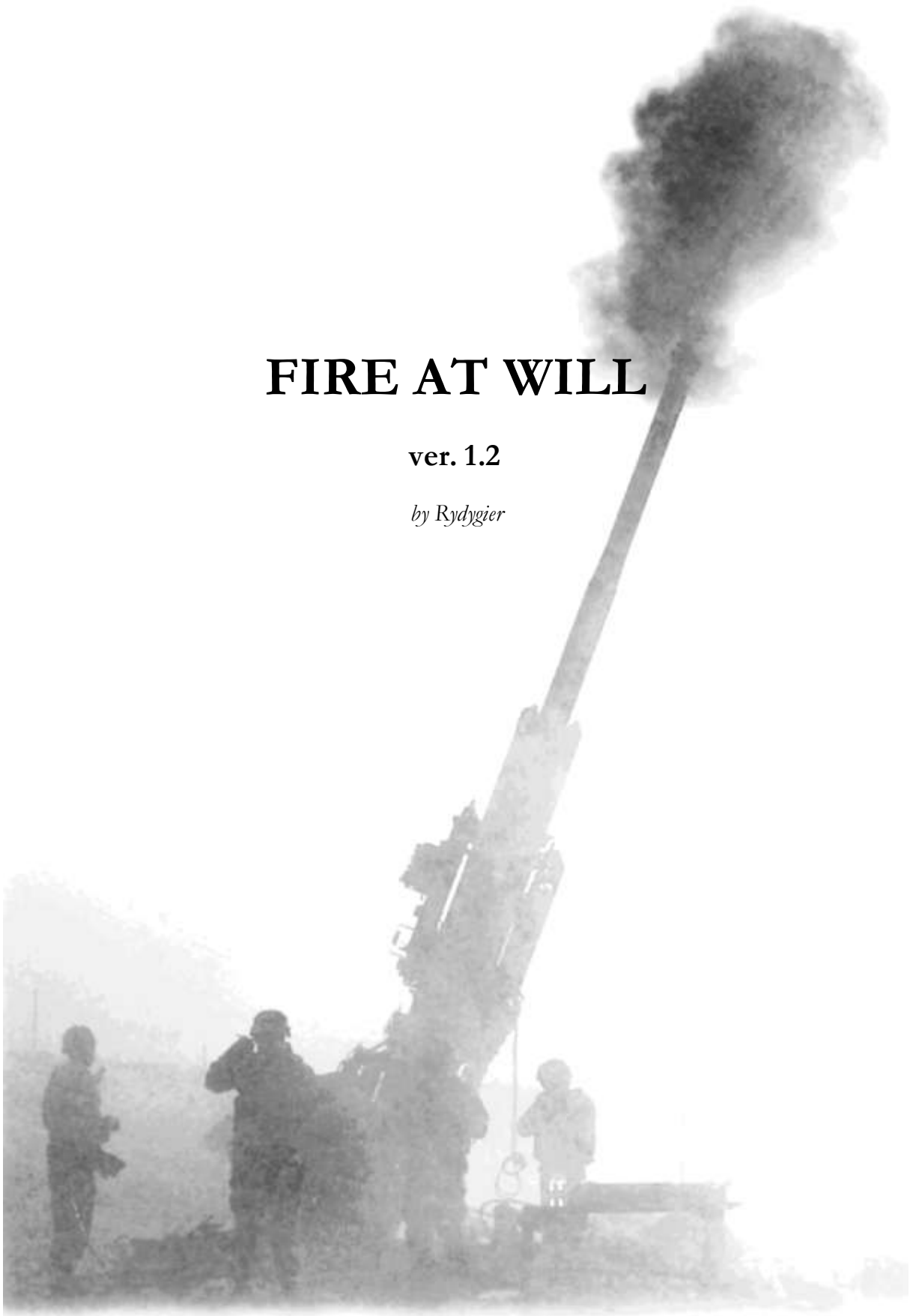# FIRE AT WILL

ver. 1.2

by Rydygier

INTRODUCTION

Purpose of „Fire At Will" addon is to give in simplest way possible fully functional AI artillery to battlefield for those, who can't or simply refuse to learn script language but still want functional AI artillery in his Arma 2 missions. It was created because in my opinion it is illogical to force a player to learn sript language and to study BIS_ARTY Module commands and variables even if he wants just to set up some AI artillery in his missions, while such knowledge is not required for any other types of AI combat units, which are fully functional without any scripting.

Addon supports all generic Arma 2 artillery units (howitzers: M119, D30; mortars: M252, 2B14; rocket systems: GRAD and MRLS). Tested on singleplayer missions for Arma 2 1.10.

INSTALLATION

Addon version is installed by placing folder "@Ryd_FAW" in the same place, where are situated other addon folders. Script version is installed by placing contents of folder "Source" in a mission folder in which shall be used. Addon version requires CBA.

USAGE

To use the FAW primary, addon version in yours missions just set up some artillery batteries in editor and play with addon.

Technically you also probably can play this way any other mission, but it's not recommended due to unpredictable changes on the battlefield, that are likely to ruin mission designers concept.

To init FAW script version (in folder „source") place following eg in init field of any unit or activation field of trigger or in init.sqf etc.: **nul = [ ] execVM „PrepArt.sqf";**

Important notes:

1. group of artillery must consist of the same kind of artillery units.

2. bombardment trajectory is calculated from position of leader such artillery group, so do not place leader far from rest of group.

To set addon to run at certain point of the mission:

1. define a **RydART_Manual** variable at the beginning of the mission (for example in the init of any unit);

2. at a certain point of the mission define with any value (via another script, a trigger, waypoint etc.) variable **RydART_Start**.

To turn addon off at certain point of the mission:

1. define variables **RydART_Manual** and **RydART_Start** at the beginning of the mission (for example in the init of any unit);

2. at certain point of the mission define with any value (via a script, a trigger or whatever else) variable **RydART_Start** as „nil" (***RydART_Start = nil***). Addon scripts will turn off at the end of their ongoing cycle.

To remove given artillery piece from addon control:

Give it one of the following names (in field „name" of unit's window in editor or via command *setVehicleVarName*): **NoFAWa**, **NoFAWb**, **NoFAWc**, and so on till **NoFAWl** (available 12 names).

FO mode:

There is a possibility of replacing default system in which anyone can provide to allied batteries information about potential targets with "FO mode". If **RydART_FO** variable is not „nil" (has defined value) then only certain units will be „questioned" whether they see potential targets. FO this type must meet following conditions:

- can't be assigned to any groups (the only member of their group);

- must belong to one of the following types units: U.S. spotter (***USMC_SoldierS_Spotter***), RU spotter (***RU_Soldier_Spotter***), CDF spotter (***CDF_Soldier_Spotter***), INS officer (***Ins_Soldier_CO***), GUER scout (***GUE_Soldier_Scout***) OR must to have one of the following names: **FOa**, **FOb**, **FOc**, **FOd**, **FOe**, **FOf** (name is defined in „name" field of unit's window in the editor or via script command *setVehicleVarName*).

Thus, on the battlefield, in this FO mode, in addition to units enumerated classes, with spotting targets will be able to deal up to six units of any kind and any non-civilian („civ" and „civ_RU" excluded) faction. Additionally, with launch of a **RydART_FO** variable is changing method of bombardment. Salvos will be now divided into a test shot or shots (1 / 6 of salvo, rounded up) and main salvo, much more accurate thanks to the amendments after test shots. There is also possibility to set two-phased method of bombardment in normal mode, with no special FO units. To achieve this you should launch (define) variable **RydART_2PhWithoutFO**. By default multiplier of salvo drift in second phase of artillery fire of this kind is equal 0.2 + (random 0.2), but its non-random part can be changed by giving desired numerical value to the variable **RydART_FOAccGain** (eg ***RydART_FOAccGain = 0.4*** will set gain to value 0.4 + (random 0.2). Larger multiplier means a possibility of larger main salvo drift and thus a smaller accuracy gain from spotter's info). **RydART_OnePhase** sets one-phased bombardment in FO mode when is not „nil".

HOW IT WORKS

Artillery of given side will shoot at enemy group (chosen with some kind of „temptation" system - targets become primarily probably more valuable enemy groups) with an amendment for its leader motion vector if:

- it is in range;

- it is spotted by any soldier of same or allied faction (except for Arma 2 civilians („CIV" and „CIV_RU" factions) still spotters and other units with binoculars or sniper rifles are valuable FOs because they see and identify the enemy as potential target at a much greater distance);

- it is not captive or defenseless (leader has no weapon, to not firing at harmless civilians even when they are hostile);

- it moves with speed lesser than 30 km/h because of keeping chance for hit on reasonable level;

- it is not more than 20 meters above ground (air units may become targets if are landed, or hover very low);

- there is not friendly units in „danger zone" radius (default is 200 * WNDF meters from calculated impact position); weapon nominal dispersion factor (WNDF) = 1 for mortars, 2 for howitzers, 3 for MRLS and 4 for GRAD.

If there is allied leader in „danger zone" battery try to correct impact coordinates in attempt to avoid friendly fire by moving impact point in direction of actual target position at the cost of the amendment to the motion vector, if still there is FF-danger, battery try to fire actual target position. If still there is FF-danger, battery will call off fire mission an wait for next chance. However „friendly fire" is still possible due to salvo drift (targeting error) and single rounds impact dispersion or units movement);

Drift calculation is based on factors: distance from the target point, health status of battery leader, weather (worse weather means less predictable atmospheric conditions) and battery leader's aiming skill; Maximal drift is halfed when battery shoots to the same target as before;

Dispersion calculation is based on factors: distance from the target point, damage status of battery leader's vehicle (his artillery piece) or health status of battery leader if not mounted in any gun, weather and battery leader's overall skill (matters ordinates practice in proper setting and use of gun), kind of artillery;

Script needs some time to gather all necessary data from battlefield. Usually passes at least about a minute before they are fired first salvos on condition that enemy was spotted of course. I recommend optional debug markers mode for adjusting and testing purposes.
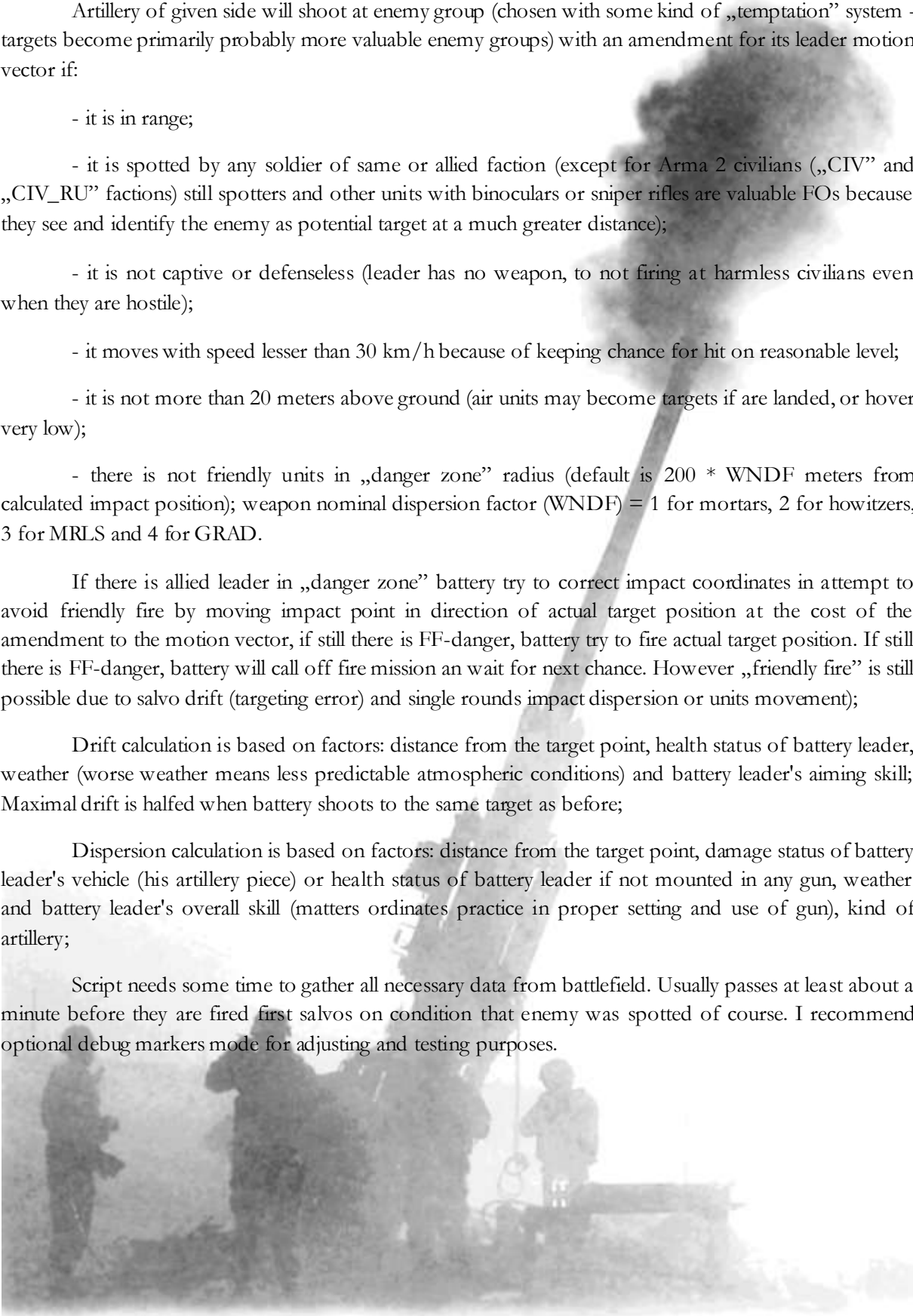
OPTIONAL

There are also global variables allowing, within certain limits, to adjust functioning of artillery as needed by defining them in any units init field, triggers or waypoints activation field or in script. All the following affects every AI battery on battlefield, regardless of its kind or side (means every AI controlled artillery unit; however if unit is set „playable" you can to „incarnate" his crew later, when script done with setting up batteries control (10-20 seconds from start) and it will stay under script control, but it's not recommended too). Not possible in simply way to adjust batteries separately.

RydART_Manual - when defined with whatever value (means: if this variable is not „nil") automatic mode is off (script will not start automatically with mission). Automatic mode is on by default;

RydART_Start - when defined and when manual mode is on it will start script;

RydART_AddAmmo - number of magazines for all artillery units, will replace original ammunition. When „nil", number is 9;

RydART_Ammo - kind of ammo for all batteries when **RydART_AddAmmo** is used (possibly values are „HE", „WP", „SMOKE", „ILLUM","SADARM" or „LASER" (with quotes)) when „nil" kind of ammo become „HE". Do not choose kind, which is not supported by artillery piece (eg. „WP" when deployed MRLS, see below specifications);

RydART_Interval - Pause in seconds between salvos (how often script checks if battery is ready for new fire mission - battlefield bombardment density). If „nil", pause is, by default, 120 seconds;

RydART_SpawnM - if „nil" artillery is firing in non-spawn mode (projectiles physically fly all its trajectory), if not „nil" spawn mode is activated (shells are spawned near impact point);

RydART_FMType - type of fire missions. „IMMEDIATE" (default, when is „nil") or „TIMED";

RydART_Amount - (intensity of fire) if type is „IMMEDIATE" this defining number of rounds fired per fire mission for each battery, if type is „TIMED" it defining duration of salvos in seconds. If „nil" - become 6;

RydART_Rate - defining a time gap between shots in salvo, default is 0 (batteries will fire their salvo as fast as they are able to);

RydART_Disp - multiplier of probable (not exact) maximal impact dispersion radius between single shots in salvo. Default is 0.4 (possible from 0 to inf.; lesser values = lesser dispersion);

RydART_Acc - multiplier of maximal salvo drift radius (aiming error factor for whole salvo). Default is 2 (possible from 0 to inf.; lesser values = lesser drift);

RydART_Safe - Minimal allowable distance (in meters) between position of any commander of allied groups and planned impact point. Default 200. NOTE: this value is always multiplied by WNDF (see above) so for example for GRAD default final value will be equal 800 meters;

RydART_Mark - if not „nil" debug map markers and „shells tracking tool" (ready after some (about 20) sec. from start; in non-spawn mode tool shows rounds on fly in 1500 meters radius from point clicked on map, in spawn mode shows projectiles only when they are about to splash. To off: left mouse button single click + „Alt" on map) are activated. Is „nil" by default;

RydART_Monogamy - if not „nil" „one target - one battery" mode is active;

RydART_FO - if not „nil" FO mode is active;

RydART_2PhWithoutFO - if defined with whatever value (not „nil") Two-phased (test phase/main phase)) salvos are active without FO mode;

RydART_OnePhase - if not „nil" sets simply, one-phased salvos in FO mode;

RydART_FOAccGain - sets non-random part of multiplier of main salvo drift (in phase two of salvo in two-step bombardment mode). Less value means more accurate impact. Default: 0.2 + (random 2).

DEBUG MARKERS

In debug mode on map will appear and disappear some markers:

- **Black square** icon on every battery actual position with its name, like *RYD_BIS_ARTY_Logic_0 - „m252"*;

- **black dot** on planned impact position for every battery on firing mission;

- **blue circle** around planned impact position that indicates drift radius;

- **red dot** on a blue circle that indicates central point of salvo impact with text specifying: drift radius in meters, dispersion radius in meters and type of artillery unit; for example: „70m/20m - „M119",,;

- **red, half-transparent circle** around red dot that indicates probable (approximate) radius of the dispersion salvo projectiles;

- there are also some **auxiliary lines** between dots.

Available is also „tracking tool" that allow to see rounds on fly in 1500 meters radius (see note for **RydART_Mark** variable). Projectiles are marked by **orange dots**, and radius of tracking by **„khaki" circle**. This tool not always works properly (because of some refreshing issues), so should be considered as experimental.

SPECIFICATIONS

Some info such as minimal and maximal firing range and supported kinds of rounds for artillery:

Howitzers   : Range: 2375m - 5800m ; Ammo: HE, WP, ILLUM, SADARM, LASER, SMOKE

Mortars   : Range: 100m - 3700m; Ammo: HE, WP, ILLUM

Rocket artillery :

  MRLS : Range: 4900m - 15550m; Ammo: HE

  GRAD : Range: 3300m - 10100m; Ammo: HE